# AVIDYNE®

## IFD440 FMS/GPS/NAV/COM
## IFD410 FMS/GPS
# Pilot's Guide

Revision History

| Revision | Date of Release | Reason for Release |
|---|---|---|
| 00 | April 2015 | Initial Release of document that coincided with Software Release 10.1.0.0 |
| 01 | July 2015 | Optimizations for black and white printing |
| 02 | November 2015 | Corrected several errors and added some additional descriptions |
| 03 | December 2016 | Update to accompany Software Release 10.2.0.0 |
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| 06 | March 2018 | Added network connection description 10.2.1.0 |
| 07 | April 2019 | Update to accompany Software Release 10.2.3.1.  Combined all IFD400 series products into one document |
| 08 | September 2021 | Update to accompany Software Release 10.3.0.2 |

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# 1 System Overview

All images contained in this manual are for reference use only, and are subject to change.

Avidyne strongly recommends that pilots use the IFD system only under VFR conditions until completely familiar with its operation and use.

Boxed areas marked as NOTE within this manual identify certain situations or areas of operation having heightened safety implications.  While it is important for the operator to be familiar with all of the information in the manual, it is essential to the safe use of the IFD that pilots give careful attention to the material contained within these NOTEs.

In order to avoid a diversion of attention from the task of safely taxiing, pilots should avoid performing the described cockpit tasks while the aircraft is in motion on the ground. It remains the pilot's duty to monitor the IFD for proper function upon activation and during use.

Internal data logs and the storage devices that record and store data are property of Avidyne.

## INTENDED FUNCTION

This manual describes the operation of the Avidyne IFD4xx series of equipment. Not all capabilities described herein are applicable to every model in the series. The IFD440 is the basis for capabilities described in the manual. Differences from the IFD440 are specifically identified throughout the manual.

IFD440

The Avidyne IFD440 is a GPS, VHF Communication, and VHF Navigation transceiver whose primary function is to conduct VHF communication and navigation, and serve as the primary navigation system for all VFR and IFR VHF and GPS navigation and instrument flying, provided it is connected to an external navigation source selection annunciator and a CDI/HSI indicator that is installed in the required field of view.

*IFD440 Integrated Flight Display*



Supplemental IFD functions include a moving-map, flight management system (FMS), checklists, and a number of timer and calculator types of utilities. Optional IFD functions include control and display of remote transponders. The system includes terrain alerting as well as an option for HTAWS.

## IFD410

The Avidyne IFD410 differs from the IFD440 in that there is no internal VHF communication and navigation transceiver.  Its primary function is to conduct GPS navigation, provided it is connected to an external navigation source selection annunciator and CDI/HSI indicator that are installed in the required field of view.  The IFD410 cannot be used to execute terminal area procedures that rely on VHF navigation. The IFD410 bezel differs physically from the IFD440 in that the radio controls along the left side of the bezel are absent, the navigation source selection knob is replaced by an OBS button, and the volume knob is replaced by a single-function power on/off button.

*IFD410 Integrated Flight Display*



> **DOCUMENTATION CONVENTION**
>
> **Throughout this document, capabilities that are not applicable to the IFD410 are identified using a † symbol.**

## FUNCTIONAL OVERVIEW

The Avidyne Integrated Flight Display (IFD) system supports the following functions:

- Flight Management System (FMS)
- SBAS and non-SBAS GPS Navigation
- VHF Communication and Navigation (16W and 10W variants) **†**
- Moving map, including synthetic vision view
- Terrain Awareness
- Forward Looking Terrain Alerting (FLTA)
- Display of datalink weather
- ADS-B position and display
- Lightning sensor display
- Traffic display
- Electronic checklists
- Data logging
- Crew Alerting System (CAS)
- Utilities (e.g. Schedulers, Timers, Calculators)
- Multi-touch touch screen control
- Multiple IFD operations
- Remote transponder control and display
- WiFi and Bluetooth® communication

The system has been designed for single-pilot IFR operation and features a Page and Tab user interface.

Most functions revolve around the page keys that appear across the bottom edge of the bezel. Each of the three functional pages has associated tabs, which contain related data, often in different views. These functions and tabs are covered in detail throughout this reference manual.

> **NOTE**
>
> **Global SBAS Support**
> Wide area/regional satellite based augmentation system (SBAS) support provided by the IFD include WAAS (Continental US, Alaska, Canada and most of Central America), EGNOS (most of Europe and North Africa), MSAS (Japan) and GAGNAN (India). These are regional augmentations of the GPS satellite constellation and should not be interpreted as meaning the IFD is compatible with other GNSS constellation systems such as Galileo (Europe), GLONASS (Russia), or Compass (China).

> **NOTE**
>
> The HTAWS functions provided by the IFD are compliant with TSO-C194.

## BASIC CONCEPTS

PAGE KEYS

The buttons along the bottom of the IFD bezel are called "page keys". Each key is labeled by function:

- FMS (Flight Management System)
- MAP (Moving Map)
- AUX (System Pages)

Each page has a number of associated tabs. Each page key has a left and right rocker nature to it. Select the page of interest by pressing either side of the page key and navigate through the available tabs by pressing the left or right side, in the direction of the desired tab.

***Page keys***



LINE SELECT KEYS

Line Select Keys (LSK), are the buttons found along the left vertical side of the bezel. These are different from page keys in that they are labeled on the screen, just inside the bezel adjacent to the physical button, indicating the function of the LSK.  An LSK can either represent an action or a state.

A **State LSK** is identified by a title on the first row, shown in blue-green, and the current state on the second row shown in white. The title reflects the system function or setting to be affected, and the state shows the current state of that setting.  Pressing the LSK or touching the label will change to the next state.

An **Action LSK** is identified by a phrase shown in blue-green. The phrase is usually in verb-subject form, but there are exceptions when the verb is omitted (e.g. "Timers").  Pressing the LSK or touching the label will cause the system to perform the specified action.

*LSK Types*
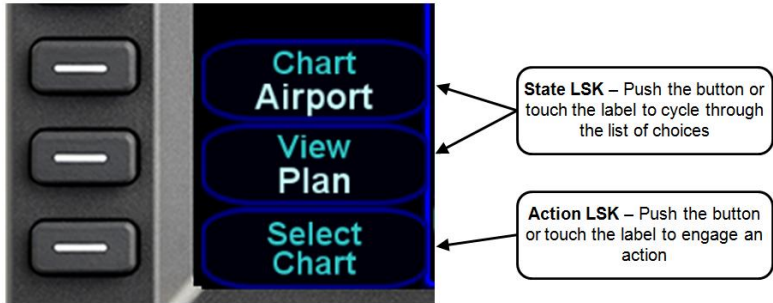


## RIGHT KNOB LABELING

The bottom right dual-concentric knob on the IFD is context-sensitive.  Displayed in the lower right corner of the display, the knob label indicates the function of the knobs and the knob button on the left and right side, respectively.  The symbol used to represent the knob button is a ring with a center dot.

*Right Knob Label Scheme*



In the example above, the outer knob scrolls through a list in a coarse manner and the inner knob scrolls through the same list stopping at each minor field along the way.  Pushing the knob generates a drop-down menu.

## COLOR PHILOSOPHY

There are a few generalities with the use of color that are consistent across the IFD as described in the table below:

| IFD Feature/Function | Color |
|---|---|
| Page keys | Green - Active<br><br>White - Available but not currently active<br><br>Note: AUX can also be Red, Yellow, or Cyan if there is an active alert as described later in this manual |
| FMS "Fly To" Data  (e.g. active leg of flight plan, To Waypoint datablock) | Magenta |
| Active Navigation Data (e.g. Active Com frequency, Active Navigation frequency, Active Navigation Source mode) | Green |
| Line Select Key Labels | Light Blue-Green |
| Line Select Key States | White |

# GENERAL IFD OPERATIONS

## IFD440 BEZEL LAYOUT

Volume / Power / Squelch Knob

Frequency Swap

Dedicated Function Keys

CDI Nav Source Knob

Ambient Light Sensor

Cam Latch

Com/Nav Manual Tuning Knob

Line Select Keys

Page Function Keys

USB Port

Context Sensitive Knob

## IFD410 BEZEL LAYOUT

Power Button

Line Select Keys

Dedicated Function Keys

GPS/OBS Button

Ambient Light Sensor

Cam Latch

Page Function Keys

USB Port

Context Sensitive Knob

Starting in the top left corner and working counter-clockwise around the bezel, the IFD has:

- Power/Volume/Squelch knob **†** or Power Button **\***
- Frequency Swap dedicated button **†**
- Three (3) Line Select Keys (LSKs) that are page dependent with soft key labels adjacent to each
- Dual concentric rotary knob as a means of manually tuning communication and navigation frequencies **†**
- Mechanical cam latch access hole for installation
- Page keys along the bottom
- USB port for database updates, datalog downloads, software updates, and powering USB devices in-flight
- Dual concentric rotary knob that is page dependent
- Four (4) dedicated function keys consisting of:
  - Direct-To ("–D–>")
  - Procedure ("PROC")
  - Enter ("ENTR")
  - Clear ("CLR")
- CDI Navigation Source knob **†** or GPS/OBS Button **\***
- Ambient Light Sensor

**\*** Applicable only to the IFD410

POWER CONTROL

The IFD is typically powered by two circuit breakers; one for the VHF transceiver, and one for the remainder of the unit. The IFD will automatically start when the aircraft bus power is applied.  It will take several seconds for the IFD to complete the power-up process.

The power button in the top left corner can be used to turn the unit off and to turn the unit back on again.  To turn the unit off, press and hold the button.  A five second countdown will be displayed.  At the end of the countdown, the unit will be powered off.

*Manual Power Down*



| COOL FEATURE |
| --- |
| Briefly pressing and then releasing the power button is a convenient way to immediately disable Bluetooth and networking capabilities. |

BRIGHTNESS CONTROLS

Each IFD has brightness controls to control both the bezel and the display brightness.  Using the controls on the Setup Page, the user can specify whether brightness is controlled manually, using cockpit dimming controls, or using ambient light sensor (photocell) that is embedded in the bezel.

*Brightness Controls*
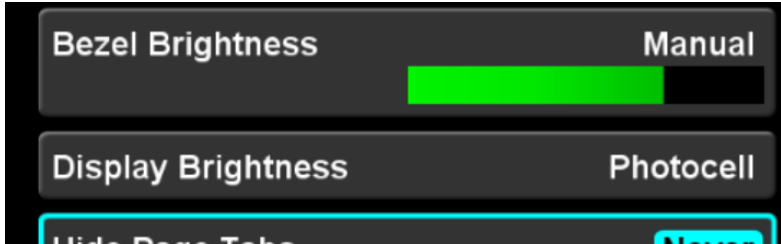


Depending on how the installer configured the brightness controls at time of installation, the "Photocell" setting will typically revert to the dimming bus setting in low ambient light conditions.

If the IFD appears to be inoperative or non-responsive from a lighting perspective, check the aircraft instrument lighting control to ensure it is not set to a night position.

START-UP SEQUENCE

The startup sequence of the IFD is as follows:

- An Avidyne logo will be displayed during system initialization and will be automatically removed when the IFD is initialized. The bezel keys will _**not**_ be illuminated while the splash screen is present.

- An agreement of the limitation of your legal rights must be made via the bezel "ENTR" button. While the agreement page is displayed, the IFD is activating the signals that connect with a remote annunciator panel as well as outputting self-test data to external devices, to be used as a lamp test and external signal check.

- If there is a third party weather or traffic sensor connected to the IFD, then a vendor mandated disclaimer page may be presented advising the pilot it is their responsibility to see and avoid traffic and determine weather conditions. There is no pilot action that must be performed on this page and it will automatically be removed after several seconds.

- A software version and database currency page is displayed _**only if**_ there any expired databases. Avidyne does not recommend operating with expired databases but the system will allow operation by pressing the "Proceed" followed by the "Confirm" LSKs.

- If the IFD has been configured to interface with a fuel flow system, then the IFD will automatically transition to the Fuel Management Page. If the fuel flow system is not capable of reporting the amount of fuel remaining (i.e. does not have a totalizer), the amount of fuel on board should be entered. If the fuel flow system does provide fuel remaining, this page provides the opportunity to verify that the total is correct.

  If there is no fuel flow system connected, then the IFD progresses directly to the FMS page and FPL tab, ready for a flight plan to be entered.

The agreement page, database expiration, and fuel management entries are not displayed if the unit is powered on in-flight.

**NOTE**

**Some Data May Be Delayed At Startup**
Some data such as fuel flow and fuel totalizer may experience a 5-10 second delay during post start initialization. For those aircraft configured with fuel totalizers, this may result in some fuel display changes on the Fuel Mgmt page during that period including prompting the pilot to enter in initial fuel. That should resolve itself within a few seconds. Another example concerns the FMS navigation database initialization, where the message "Loading nav database..." may be displayed on any of the FMS tabs for 10-30 seconds.

**TIPS AND TECHNIQUES**

**"GPS No Position" Message Possible at Startup**
If the GPS takes an unusually long time (e.g. more than 2 minutes) to acquire an initial position fix, the "GPS No Position" advisory message will be displayed. This message will automatically clear itself when a position fix is acquired. If the message does not remove itself by the time you are ready to taxi, it is a clear indication that your system has not determined its initial position and action may be required on your part.

**TIPS AND TECHNIQUES**

**Bluetooth/Networking Initialization Period**
The networking interface may experience a delay during post-start initialization before becoming functional. The icons in the upper right corner of the display will turn green when the interfaces are ready for use.

DATABASE CURRENCY STATES

The following table describes the various database currency states that may be observed at startup:

| Database Status | Message | Color |
|---|---|---|
| In Effect | Valid Thru <Month, Day, Year> | Light Green |
| Has Expired | Expired <Month, Day, Year> | Yellow |
| Not Yet Effective | Effective <Month, Day, Year> | Yellow |
| Invalid | <Type> Database Invalid | Yellow |

**NOTE**

**Use of Not Yet Effective Data**
If attempting to use not-yet-effective nav data, it is the responsibility of the pilot in command to verify there are no differences between the current data and the not-yet-effective data before it is permissible to use the not-yet-effective data.

**TIPS AND TECHNIQUES**

**Manual Check of Database Dates**
Even if the databases are all current, you can still view the date/status of each database from the AUX page, Database Status display as described in Section 4 (page 4-82).

## PAGE LAYOUT AND FORMATS

The context-sensitive line select keys, top datablocks and navigation source knob indication, and bottom edge set of page tabs are always displayed on every page.  The IFD440 will also show radio frequencies in the upper left corner.  The frequencies to be shown are configurable.  For the IFD410, that area can be configured to show other datablocks just like those on the right side of the page.

*Page Layout (IFD440 Shown)*
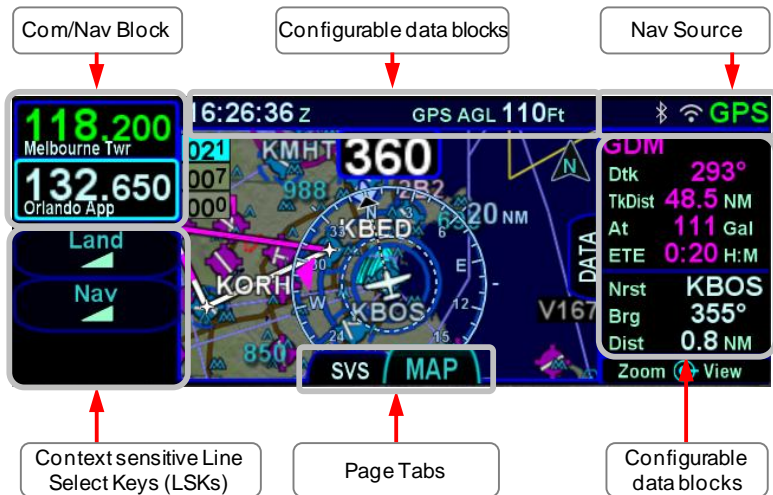


Use a combination of the page keys and the associated tabs, to change the contents of the rest of the display.

Each page has a number of associated tabs. Each page key has a left and right rocker nature to it.  To select a tab using the page key, press the left or right side of the key until the desired tab is selected.  To select a tab using the touchscreen, just touch the desired tab. The last tab selected on any given page is retained in memory and will be displayed when you return to that page.

**Split Page Layout**

Some pages can display datablocks along the right edge of the display. The FPL tab and NRST tab on the FMS page and the Map tab on the MAP page are prime examples.  In the cases

where this is available, a labeled side tab is displayed, as shown surrounded by gray boxes in the illustration below. The right side datablocks can be shown or hidden using any of the following methods:

- Touch the side tab
- Use a left or right swiping motion on the tab
- Press and hold the left or right side of the page key until the datablocks are shown or hidden

| *Map-Data Split* | *Map-FPL Split* | *Map-NRST Split* |
|---|---|---|
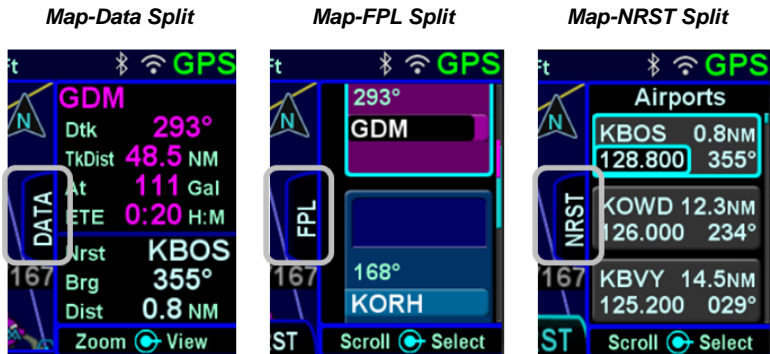
COM-NAV †

The VHF system consists of a communications transceiver that covers the frequency band from 118.0 MHz to 136.990 MHz and a navigation receiver that covers the frequency band from 108.0 MHz to 117.95 MHz. Both 25 kHz and 8.33 kHz spacing are supported. The IFD comes standard with a 10 watt transmitter, with an option to upgrade to a 16 watt transmitter.

**Display**

The active com frequency is the frequency that the radio will transmit on when the Push-To-Talk button is pressed. The standby frequency is the frequency that will become the active com frequency when the bezel Frequency Swap button is pressed. The active com frequency is displayed in green and the standby frequency is displayed in white.

| COOL FEATURE |
| --- |
| **Decoded Facility Identifier**<br>The facility (e.g. Ground, Tower, Approach) for the Active and Standby com frequencies are displayed in each com frequency slot. This is a handy reminder of the facility that is tuned in each slot. Similarly, if the frequency displayed is a navigation frequency, then the identifier decoded from Morse code will be displayed, which serves as a means to Tune-Identify-Monitor. |

If a slot is receiving a voice transmission, a "RX" indication will be displayed along the right edge of the given communications slot. When the active frequency is transmitting, a "TX" indication will be displayed along the right edge of the Active com slot.

> **NOTE**
>
> Stations such as ATIS, ASOS, and AWOS are expected to be transmitting continuously, causing an "RX" indication to be displayed continuously. However, if the "RX" is displayed when the tuned station is not expected to be continuously transmitting and background noise is continuously audible over the aircraft audio system, press the upper left knob to enable squelch.

> **COOL FEATURE**
>
> **Monitor Standby Com**
> The IFD will send the standby communications frequency audio to the audio panel for monitoring. This permits the pilot to monitor a second communications channel (e.g. ATIS) while still connected to the active communications channel. Not all audio panels can support this capability. However, the Avidyne AMX240 and several other third party panels do offer this feature.

### Switching Tuning Controls

The lower left knob is used to switch between display and control of communications radios, navigation radios, and a remote transponder (if equipped).  To switch between controls, push the lower left knob.  Subsequent tuning operations will be performed on the displayed transceivers.  Following 20 seconds of inactivity, the system will revert to control and display of communications radios.

*Cycling between Com, Nav, and Transponder Display*
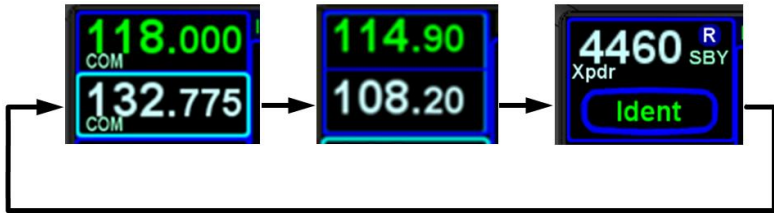


## Tuning

Radio tuning can be accomplished through several methods. Regardless of method, it's always the Standby that is tuned and then that frequency is swapped into the Active by pressing the bezel Frequency Swap button.

The Standby can be manually tuned by rotating the lower left knob on the bezel. The outer knob changes the digits to the left of the decimal point and the inner knob changes the digits to the right of the decimal point. The slot being tuned is highlighted in reverse video as shown below.

*Manual Com/Nav Tuning Reverse Video*



The Standby frequency can also be tuned by touching the block on the display. When using this method, a virtual keyboard is displayed. Enter the desired frequency into the numeric keypad and press ENTR (either on the virtual keypad or on the bezel). The virtual keyboard will be dismissed after ten seconds of inactivity.

The navigation radio may be tuned to a VOR using the identifier of the VOR (e.g. "GDM" for the Gardner VOR). Touch the nav radio block to display a virtual keyboard, and then enter the identifier. An automatic, geographic-based prediction algorithm ("Geofill") is running such that the most likely VOR station is filled in based on your geographic position.

*Manual Entry of VOR Identifier*



A more automated way to tune a communications frequency is to use the frequency list, which is presented when the left knob is turned to start a manual tuning. See the section on page 1-25 regarding operation of the frequency list.

The Standby can also be tuned from other pages on the IFD such as the INFO or NRST Tab on the FMS page.

**Invalid Frequency Entry Attempt**

Attempting to type an invalid frequency (e.g. typing a nav frequency in a communications slot) will produce a temporary error message indicating the mistake. This message is unavailable in dual IFD installations that have Keyboard Convenience mode turned on.

*Notification of Invalid Frequency Entry Attempt*

**COOL FEATURE**

**Shortcuts to Com Tuning**
Shortcuts are provided to aid speed and ease of manually entering a communications frequency in the IFD. For example, there is no need to type the leading "1" for frequencies, the decimal point, trailing zeros or the thousandth digit. For 121.700, type "217" and press Enter.

### Emergency Com Frequency

121.5 MHz can be quickly put into the Active communications slot by pressing and holding the bezel frequency swap button for approximately three seconds.  The frequency that had been active is swapped into the standby.

### Stuck Mic

If the IFD determines that there is a stuck mic situation (defined as 30 seconds or more of continuous transmission), a "Stuck Mic" CAS message will be displayed and the transmitter will be disabled until the stuck mic condition is resolved.

### Alternate Tuning Controls

The IFD has the capability to receive external inputs for tuning preset frequencies and swapping the standby frequency into the active.  These inputs are typically driven by dedicated buttons installed on the stick/yoke, allowing for radio control while the pilot's hands remain on the controls.  The inputs/buttons are as follows:

- Next frequency
- Previous frequency
- Swap frequency

The IFD contains a list of up to 16 user-configurable preset communications frequencies (see page 4-6). When the "next frequency" or "previous frequency" button is activated, the next or previous defined frequency in the list, respectively, will be placed

into the standby slot and a small dialog box will be presented indicating the number of the preset list item that is now showing.

*Standby tuned from Com Preset List*



The swap frequency button performs the same action as pressing the Frequency Swap button on the bezel, including holding it down to tune the emergency frequency.

## Remote IFD Tuning

In some dual IFD installations, it is desirable to allow one IFD to tune the radio of the other IFD.  This feature can be enabled from the Setup Page (see page 4-62), but is available only in a dual installation when cross sync is enabled.

When enabled, the remote IFD tuning feature introduces the other IFD Com and Nav radios into the cycle accessed by pressing the lower left knob.  The IFD1 radios will be identified as "COM1" and "NAV1", whereas the IFD2 radios will be identified as "COM2" and "NAV2".  So, instead of the normal Com-Nav-Transponder cycle described on page 1-19, the knob will cycle among Com1-Nav1-Com2-Nav2-Transponder.

Also when remote tuning is enabled, the facility displayed under the frequency will be preceded by the radio being shown (e.g. "COM1", "NAV2").  When frequencies from the remote IFD are being shown, the active frequency and the first part of the facility line will be displayed in yellow.

*Remote Com Radio Display*

## Third Party Radio Control Display Units

Other remote tuning and frequency swapping capability is present when dedicated third-party radio control display units are wired into the aircraft. Usually in these cases, when the radio control display unit is active, the Active and Standby frequencies are only displayed on that external control display unit and not on the IFD, even though the actual radio is still housed inside the IFD.

FREQUENCY LIST †

The frequency list is displayed by starting a manual tuning operation with the lower left knob. It has three tabs along the top edge of the page:

- **Airport** – the most logical com frequencies (e.g. ATIS, ASOS, AWOS, CTAF, Tower, Ground, Clearance Delivery) associated with either the origin airport or destination airport (when airborne and more than 5nm from the origin airport).

- **Enroute** – frequencies associated with airports, ARTCC, and FSS within 40nm of the aircraft

- **Recent** – a running list of the most recent 10 com frequencies that had been selected for the Active frequency (persists across power cycles).

*Frequency List Page*



The selected tab can be changed by rotating the right outer knob or by touching the desired tab. The airport and enroute tabs only populate when there is a GPS position.

The list under each tab can be scrolled by swiping up or down on the touchscreen or by rotating the right inner knob. To move the cursor to the desired frequency, turn the right inner knob or touch the frequency. To tune the Standby to the frequency surrounded by the cursor, either touch the frequency or press the right knob.

The frequency list will be dismissed after ten seconds of inactivity.

TRANSPONDER CONTROL AND DISPLAY

If the IFD has been configured to communicate with a remote transponder, then the IFD will provide display and control of both transponder mode and code.

**Transponder Display**

The transponder mode and code is displayed in a datablock that can be configured to be displayed along the right and top sides of the display.

A round "R" reply indication will light up in the transponder datablock area whenever the transponder is in an active Reply state.

If the IFD is unable to communicate with the remote transponder, an associated CAS message is displayed and the transponder data blocks may be replaced with a red-X.

*Typical Transponder Datablock Locations*



**Transponder Control**

The preferred method of controlling the transponder is using a keyboard. Touch a transponder data block to show the keyboard. If the data block contains an "Ident" soft LSK, touch anywhere in the data block except the soft LSK.

*Transponder Keyboard*



## Transponder Code Entry

To enter a transponder code using a keyboard, touch a transponder mode/code datablocks to display a transponder keyboard, and then enter the code. The new code is set after the fourth digit is entered. If an incorrect digit is entered, press the CLR button as required to backspace through the code. If the code entry is started, three seconds of inactivity will cause the keyboard to be dismissed and the original code will be restored.

Transponder code can also be entered using the lower left knob. First, press the knob until the transponder tuning data is displayed in the upper left corner of the display. Then turn the knob until the desired code is shown. The outer knob adjusts the first two digits and the inner knob adjusts the second two digits. During entry, the code will be highlighted. The new code will be set once the highlighting is removed. †

## Transponder Mode

To change the transponder mode, touch the key with the desired mode

- **ALT** - The transponder will respond to all interrogations
- **ON** - The transponder will respond to all interrogations, but altitude reporting is suppressed
- **GND** - The transponder will respond to Mode S ground interrogations from surface movement radar. This mode is only available in installations that send a ground/air discrete signal to transponder

- **SBY** - The transponder is on, but will not reply to any interrogations

Some aircraft installations include a ground/air state input, such as a gear squat switch or discrete input from an IFD. In those installations, the IFD will automatically select GND on landing or while taxiing and will automatically select ALT when airborne. Pilot selectable states will be limited to ALT-ON-SBY when in-air and GND-SBY when on-ground.

When airborne, the transponder should always be set to ALT unless otherwise directed by Air Traffic Control.

### VFR

To quickly set the regional VFR code, press the VFR key. To return to the previous code, press the VFR key again.

The regional VFR code can be set using the Setup Page (see page 4-67).

### IDENT

To perform an IDENT function, press the IDENT key. The "Ident" in transponder data blocks will be highlighted in green while the transponder is transmitting the Ident pulse.

If a transponder data block contains an "Ident" soft LSK, touching the soft LSK will activate the transponder IDENT function.

### Keyboard Dismissal

The keyboard will be dismissed through one of several methods:

- Touching one of the Mode soft keys
- Touching the IDENT soft key
- Touching the red-X in the top right corner of the keyboard
- Ten seconds of inactivity

DIRECT-TO OPERATIONS

A dedicated Direct-To key is located along the right edge of the IFD bezel.  Pressing that button from any page will display a green Direct-To dialog box that will be pre-populated with a logical waypoint.

**Direct-To Dialog and Confirmation Dialog Boxes**
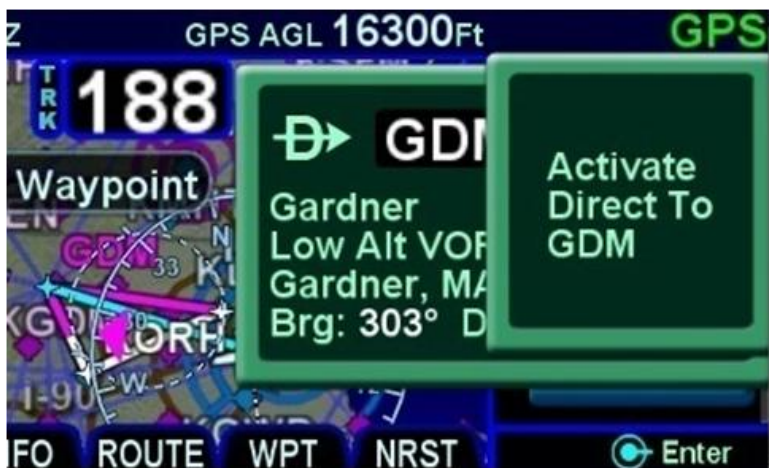


If that pre-populated waypoint is the desired waypoint, press the "ENTR" key along the right edge of the bezel twice (Direct-To, Enter, Enter) or touch the Activate dialog box that pops up on the display to accept.

If a different waypoint is desired, there are a number of ways in which the proper waypoint can be entered in that Direct-To dialog box:

- Turn the bottom right outer knob to populate the dialog box with by scrolling through the waypoints in the flight plan.  This technique will only include waypoints within a missed approach if the missed approach is enabled.  When the desired waypoint is displayed, press the knob button or ENTR key to accept

- Touch the waypoint field in the dialog box to generate a virtual keyboard and then use the keyboard to enter the desired waypoint identifier.  It may not be necessary to enter every character, since the field is managed by

Geofill. When the desired waypoint is displayed, press the knob button, the ENTR key, or "Enter" on the keypad to accept

- Turn the bottom right inner knob to start editing the identifier. Use the inner knob to change characters and the outer knob to change cursor position. It may not be necessary to enter every character, since the field is managed by Geofill. When the desired waypoint is displayed, press the knob button or the ENTR key to accept.

FUNCTION KEYS

In addition to the Direct-To and Frequency List keys that have already been described, the IFD has Nearest ("NRST"), Enter ("ENTR"), and Clear ("CLR") keys that perform the following functions:

- **NRST** – Simultaneously jumps to a Nearest page (if not already there) and presents a list of the nearest airports to your present position. Each additional press of the "NRST" key changes the nearest list to another category as defined in the list below:

  - Nearest Airports
  - Nearest Airports to Destination
  - Nearest VORs
  - Nearest NDBs
  - Nearest Intersections
  - Nearest ARTCCs
  - Nearest FSS
  - Nearest Airspace
  - Nearest User Waypoints

- **PROC** – The "PROC" key acts as a shortcut for attaching a published arrival or approach procedure to a waypoint in your flight plan. It can be used at any time. The first press of the key results in the IFD displaying the FPL tab of the FMS page with the Approach field of the next destination after the active leg highlighted in reverse video and a drop down list of available published approaches listed.



Pressing it a second time will step the reverse video over the Arrival field and present a drop down box of available

published arrivals.  Each subsequent press of the "PROC" key will step through all following destination airfield approaches and arrivals in the flight plan and wrap back around to the top of the flight plan.  When the drop down box appears over the intended data field, turn the bottom right knob to scroll up or down the list until the desired procedure is highlighted and then push the knob in to add that procedure to the flight plan.  If there is no flight plan, pressing the "PROC" key will present the FPL tab with an insert cursor at the top of the page but will not present any procedures.

- **ENTR** – The use can vary slightly depending on the scenario, but "ENTR" is always related to the Enter/Accept/Confirm use;

- **CLR** – The use can vary slightly depending on the scenario, but "CLR" is always related to Clear/Backspace/CAS Message Clear use.

TOUCH SCREEN

The IFD uses a capacitive touch screen technology that allows multi-touch operation (e.g. two-fingered pinch zoom).  Many types of gloves can be used during touch screen operations.

The IFD employs a "hybrid touch" design in that virtually every interaction can be accomplished either through bezel controls or touch.  This allows for flexibility in operational use.  Some features or functions naturally lend themselves to being easier to accomplish through touch (e.g. map panning) and some are naturally easier to do via physical bezel controls (e.g. changing pages or using dedicated functions like the frequency list).  Hybrid touch is useful during turbulent or bumpy flight conditions where it is often very difficult to precisely and reliably touch the desired point on the display. Having a physical bezel control provides an "anchor point or control" to hold on to and exercise the intended action.

| TIPS AND TECHNIQUES |
| --- |
| **Turn off the touch screen** |
| The Setup Page provides an option to disable the touch screen.  This can come in handy in excessively bumpy flight conditions when even attempting to use physical bezel controls can result in inadvertent touching of the screen and potentially causing unintentional display changes. |

Touch zone targets have been intentionally oversized wherever possible to aid in accurate touch screen behavior.

As noted above, virtually every feature or function of the IFD can be accomplished either by touch or by physical bezel control. The following table identifies the exceptions to that rule:

| Bezel-only Control Input Functions | Touch screen-only Control Input Functions |
|---|---|
| Selecting page keys (e.g. changing the "major" pages of FMS, MAP, AUX) | Map panning |
| Power on/off | Graphical Flight Planning ("Rubber banding") |
| Changing the Primary Navigation Source | Calling up a map page info box |
| Starting the Frequency List | Changing remote transponder mode |
| Frequency Swap | |

When editing data (e.g. FMS waypoint data, chart identifiers) using touch, virtual keyboards are displayed on the IFD. There are several virtual keyboard layouts, including a numeric keypad, to support the needs of the various entry fields throughout the system.

*Virtual Alpha Keyboard*

*Virtual Numeric Keyboard*



Each keyboard has a scratchpad in the lower right corner.  The scratchpad is a free text field for data entry with some data entry validity logic applied to the data that is trying to be entered.  For example, when trying to enter an invalid frequency, the IFD will immediately sense that entry to be invalid and present an alert box stating the entry is invalid.✝  Validity logic is not applied on cross-side keyboards in dual IFD installations.

*Invalid Keyboard Entry Alert*



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**TIPS AND TECHNIQUES**

**Optimal Touch Performance**
The touchscreen works best when the area being touched is maximized. Avoid using just fingernail contact or just the tip of a finger.  Increased pressure on the glass by your finger will not have any effect. Many types of gloves will work, but performance will likely be degraded (see "Use of Gloves" section on page 6-39).

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OPERATIONS WITH WIRELESS DEVICES

The IFD is capable of connecting to external devices over both Bluetooth and WiFi networks.

**Startup behavior**

When the IFD powers up, the IFD will attempt to configure the WiFi and Bluetooth interfaces just as they were when the IFD was last powered down.  The IFD may take up to 40 seconds to establish the connections.

**Quick Disconnect / Reconnect**

The IFD provides a quick method for disconnecting the WiFi and Bluetooth interfaces.  This is useful if there ever becomes a concern that a wireless device is interfering with the proper functioning of the IFD.

In order to quickly disconnect the WiFi and Bluetooth interfaces, press and hold the power button in the top left corner of the IFD until the countdown starts, then release the button.  At that point, a large green dialog box will appear showing two options – Accept and Ignore, as shown below.

*WiFi / Bluetooth Enable/Disable Confirmation Dialog*
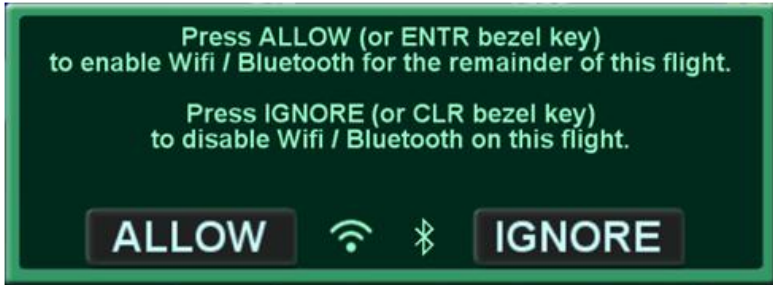


To disconnect WiFi and Bluetooth interfaces, either touch "Ignore" or press the CLR button.  From that point on, the IFD will not connect with devices over those two interfaces.

If the WiFi and Bluetooth interfaces are already disconnected, the same technique can be used to reconnect them.  Rather than selecting "Ignore", either touch "Allow" or press the ENTR button.

At that point, the IFD will go through the same reconnection process as it does upon power up.

**Bluetooth Connection**

The IFD is capable of taking input from a paired Bluetooth keyboard.  It is intended to be used in lieu of, or in conjunction with, the IFD touchscreen keyboard.  Anywhere and anytime the IFD touchscreen keyboard is used to enter data (e.g. waypoint names, building flight plans, entering frequencies✝, etc), the paired external keyboard can be used instead.

> **NOTE**
>
> **Dual IFD Installations Should Only Pair 1 IFD**
> To avoid issues arising from a keyboard only being able to pair with one device at a time, dual IFD installations should turn off Bluetooth in the Setup page on one IFD.

See page 6-69 for Bluetooth keyboard pairing procedures.

All labeled keys are fully functional.  The light bulb key turns on backlighting for the keyboard.  The vertical two-headed arrow key is primary/standby swap ✝.   The Avidyne logo key is a space bar. The up/down arrow keys can be used for page navigation in the same way the bottom right inner and outer knobs on the IFD can navigate through page fields.  Repeated presses of the FMS, MAP, and AUX keys will cause the next tab on the page to be displayed.

***Avidyne Bluetooth Keyboard***



## WiFi Connection

The IFD is capable of supporting WiFi operations.  Current supported functionality includes connectivity with third party applications running on WiFi capable devices including:

- Flight plan data streaming from the IFD to a third party application

- Approach and transition data streaming from the IFD to a third party application to allow automatic approach chart selection and display on the third party application

- Traffic data streaming from the IFD to a third party application for display on the third party application

- Weather data streaming from the IFD to a third party application for display on the third party application

- Traffic and weather data streaming from portable ADS-B devices for display on the IFD

- Flight plan route data transmitted by a third party application to the IFD for inclusion in the stored routes list

- Fully interactive copy of the IFD hosted on a mobile device (e.g. "IFD100")

The WiFi system can be configured as a client on an external network (e.g. using a Stratus®) or host its own Local Area

Network (LAN) with a DHCP server. See page 4-27 for instructions on configuring the WiFi system.

On IFD power up, if the IFD was connected to an external network at last power down and the IFD is unable to reconnect to that network, the IFD will continue to attempt connection to the next most recently known network.  If none of those connection attempts are successful, the IFD will select the LAN (hotspot).

> **TIPS AND TECHNIEQUES**
>
> **Dual IFD Installations Should Only Use One WiFi**
> For reliable WiFi operations, Avidyne recommends turning off WiFi on one of the IFDs (see the Setup Page).

### Bluetooth / WiFi Status Indications

Bluetooth and WiFi icons will be displayed at the top right corner of the display, just left of the nav mode, when the respective function has been enabled.

The WiFi and Bluetooth icons will change color depending on connection status.

- Icons will not appear when the user option is set to off.
- Icons will appear gray when WiFi/Bluetooth is on, networking is allowed, but the network is not ready for use.
- Icons will appear green when WiFi/Bluetooth is on, networking is allowed, and the network is connected / ready for use.

*WiFi and Bluetooth Active, Not Ready Icons*

***WiFi and Bluetooth Connected Icons***



If the user has disconnected WiFi / Bluetooth, the gray logos above are depicted with a slash through them indicating they are not connected due to being actively disabled by the user.

DUAL IFD OPERATIONS

Some installations may involve two IFDs that can work in a more integrated fashion.

**Method of Data Share (Dual IFD Operations)**

In a dual IFD installation, the IFDs can share information over the Byteflight digital data bus using RS232 Channel 3.  The aircraft must be wired per the installation manual, and "CrossSync" selected for RS232 Channel 3 from the Main RS232 Config page in Maintenance mode.  This configuration maintains compatibility with the vast majority of fielded GNS530/430 systems, which also use channel 3 for box-to-box communication.

**Keyboard Convenience Mode (Dual IFD Operations)**

When a field requires an alphanumeric data entry, the IFD can present a virtual keyboard in order to enter the value.  When "Keyboard Convenience" mode is enabled via the Setup Page and an entry is initiated on one IFD, the virtual keyboard will be displayed on the other IFD.  This feature allows the entry to be made without having the virtual keyboard obscure the field being entered.

**Shared Data (Dual IFD Operations)**

The following list of data will be shared between two IFDs if properly configured for data sharing:

- Enables the integration of the Crew Alerting System (CAS) to allow a single acknowledgement of any of the Global messages to be removed from both units by acknowledging them on either unit
- Enables flight plan synchronization, including modification of the flight plan to be reflected on both IFDs (this does allow for flight plan/procedure preview on the second IFD).  This requires identical nav databases to be loaded on each IFD
- Enables stored routes to be synchronized across both IFDs (this does allow for route preview on the second IFD)
- Enables fuel planning (e.g. initial fuel entry) to be synchronized across both IFDs

- Enables user waypoints to be synchronized across both IFDs
- Enables sensor settings and data (traffic, datalink, lightning, air data, etc) to be shared across both IFDs.

---

**NOTE**

**Full Data Sharing Requires Consistent SBAS**
For complete data sharing between dual IFDs, both units will need to have the same SBAS antenna configuration – either both are SBAS or both are non-SBAS.  If one IFD is set up with a SBAS antenna and one is set up with a non-SBAS antenna, then the FMS-related data (flight plans, waypoints, routes) will not be shared between IFDs.

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**NOTE**

**Dissimilar Weather & Traffic Data Not Shared**
Dissimilar weather data sources (e.g. GDL-69 data on one IFD and SkyTrax100 data on the other IFD) will not be shared between IFDs.  Each IFD will display its own weather data in this case

Likewise, dissimilar traffic data sources (e.g. TAS600 data on one IFD and SkyTrax100 data on the other IFD) will not be shared between IFDs.  Each IFD will display its own traffic data in this case.

---

> **NOTE**
>
> **Sensor and Control Data Sharing Requires Consistent Software Versions**
> For complete data sharing between dual IFDs, both units will need to have the same main software version. If the IFDs have different software versions, then the sensor and control data (e.g. weather, traffic, fuel, volumes, keyboard convenience mode, etc.) will not be shared between the IFDs.

So, in summary, to have full data sharing between dual panel-mount IFDs, the following rules must be satisfied:

- CrossSync must be turned on in both IFDs (this is a maintenance mode setting)
- Both IFDs must have the same SBAS antenna configuration
- Both IFDs must have the same navigation database cycle
- Both IFDs must have the same software version
- Both IFDs must have the same setting for whether RF Legs are enabled

**Independent Data (Dual IFD Operations)**

The following list of data will never be shared between two IFDs no matter how they are configured:

- IFD page and tab selection
- Map view, range, declutter, and overlay settings
- Navigation Source selection
- Com/Nav settings (e.g. 8.33 vs. 25 kHz spacing) †
- Navigation deviation data (therefore no navigation miscompare alerts are provided)
- Local CAS alerts
- Datablock configuration
- Electronic Checklists data and state

- Calculators and Utilities data
- User Profiles

---

**NOTE**

**Data Sharing Tolerates Inconsistent Databases**
While Avidyne strongly recommends the databases on each IFD be kept up-to-date and on the same cycle, data sharing between IFDs as defined above in "Data Sharing (Dual IFD Operations)" is not disabled when different data cycles are present on the two IFDs.  Flight plans do not share in that case but the rest of the data will be shared.

SBAS VS NON-SBAS OPERATIONS

The IFD supports both SBAS and non-SBAS operations.  In each case, the IFD is still considered a "/G" system for flight plan filing purposes.

When configured for and connected to an approved SBAS antenna at installation, the IFD serves as a fully-certified SBAS GPS navigator.  Published SBAS procedures will be available and presented in the various drop-down list choices in the FMS and SBAS glideslopes will be displayed, when appropriate.

When configured for or connected to a non-SBAS antenna or a non-approved SBAS antenna at installation, the IFD will not provide any SBAS functionality.  For example, SBAS approaches such as LPVs will not be presented as an available choice within the FMS.

For dual IFD installations in which one IFD is SBAS capable and the other IFD is non-SBAS capable (a perfectly acceptable combination under the STC), there are some limitations on the nature of data sharing between the IFDs.  In this case, FMS-related data is not shared between the IFDs (e.g. flight plans, stored routes and user waypoints).

INTERACTION WITH EXTERNAL DEVICES

Each IFD is capable of communicating with several hundred third-party devices.  Reference the Installation Manual for a complete list of devices supported and any hardware/software baseline restrictions.

As a condition for certification, the IFD is approved for integration with all equipment the GNS 530 is approved for, plus the IFD is approved for integration with additional equipment beyond those authorized for use with the GNS system.

> **NOTE**
>
> **Shared Data Between Panel IFD and IFD100** Almost all of the same data sharing rules apply between a panel mounted IFD and the IFD100 application running on a mobile device. Com/Nav tuning however is shared between these two devices.

BEFORE TAKEOFF TECHNIQUES

Set up the flight plan per your plans or the assigned ATC IFR clearance. If multiple pilots share the airplane, be sure to check the Setup page for your personal preferences.

Avidyne recommends creating and using the Checklist utility and including a Before Takeoff checklist that meets your personal needs.

> **TIPS AND TECHNIQUES**
>
> **Avoid The Use of Polarized Sunglasses**
> Avidyne recommends avoiding the use of polarized sunglasses when using the IFD due to likely washing out of colors and apparent dimming.

# 2 FMS Subsystem

The Flight Management System (FMS) pages are where flight plans are created, modified, stored, and deleted.  Ground operations are the ideal time to enter the intended flight plan into the FMS.

The FMS Page has five tabs, as shown below,



The FPL tab is used to manage the flight plan. The flight plan contains the sequence of legs to which the FMS will provide guidance.  The FMS expects the pilot to fly the legs as defined in the flight plan.

The INFO tab provides a method for showing information about aviation facilities contained in the navigation database.

The ROUTE tab provides a method for managing stored routes. Stored routes can be created, modified, and deleting using this page.  A stored route can also be "activated", which will copy it to the flight plan and activating it, thus making it the plan to which guidance will be provided.

The WPT tab provides a method for managing user defined waypoints.  Waypoints can be created using several methods, modified, and deleted.

The NRST tab provides a method to show facilities that are nearest to the aircraft at all times.  This page is very useful in order to be prepared for emergencies.

# FPL (FLIGHT PLAN) TAB

## FMS BASIC CONCEPTS

> **NOTE**
>
> **FMS-Centric Calculations**
> The FMS presumes the pilot intends to fly the flight
> plan as created.  All deviation data, most datablock
> data, and the times to go and fuel calculations are all
> based on that assumption.

### Flight Plan Rows

The flight plan is presented as a series of rows.  Depending upon
the view, a row can represent a single leg or an entire procedure
in the flight plan. A flight plan can consist of up to 128 legs.

Each row is laid out based on a "via-to" concept.  The path to be
taken is the "via" and is displayed in the upper left portion of the
row.  The terminus of the leg is the "to" and is displayed below
and slightly to the right of the "via".  Various statistics are
displayed to the right of the "to" field.

Each row in the flight plan is color-coded to aid in identifying
important features at a glance.  Overriding all other colors, the
active leg is always depicted with a magenta background.
Inactive legs that terminate at an airport are depicted with a blue
background.  All other inactive legs are depicted with a gray
background.

*Flight Plan Coloring*

### Flight Plan Views

The view of the flight plan can be adjusted to meet user preferences or mission requirements. Three controls are available to alter the view:

- "View" LSK
- Mini Flight Plan Format
- Split view tab

#### *View LSK*

The View LSK controls the content of flight plan rows. When the full flight plan page is displayed, the View LSK can be set to either "Expanded" or "Compact".

Typically, the view is set to "Expanded", which causes each row in the flight plan to represent a leg in the flight plan. This view is useful to track progress during the flight.

In expanded view, displayed to the right of the "to" field is a set of statistics for the leg, arranged in two lines. The first line contains the distance and time remaining on that leg (i.e. the remaining leg length and the ETE). The second line contains predicted fuel remaining (if equipped) and time (i.e. ETA) when the aircraft reaches the end of the leg.
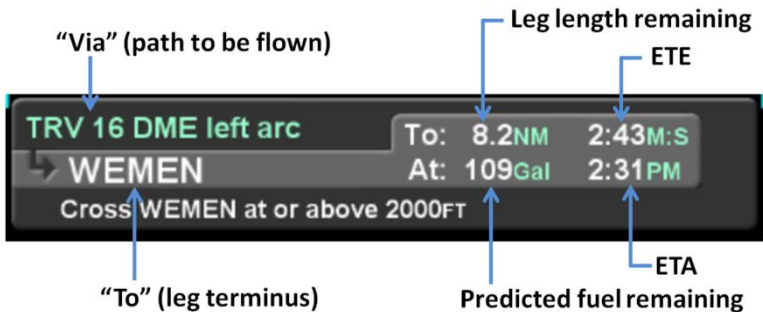
> **COOL FEATURE**
>
> **ETE Granularity**
> The ETE fields in the flight plan legs will be hours
> and minutes until the time is under 10 minutes, at
> which point it becomes minutes and seconds.

In the "Compact" view, when the flight plan is inactive, each row
represents a procedure in the flight plan. Therefore, airways,
departures, arrivals, and approaches all take up only a single row.
When the flight plan is active, however, the procedure that
contains the active leg is always expanded. The compact view is
useful for viewing flight plans in a format that more closely
resembles a clearance.

When a row represents an entire procedure, the layout is similar
to that of a leg, but the "via" field contains the name of the
procedure and the statistics are cumulative, covering all legs in
the procedure.
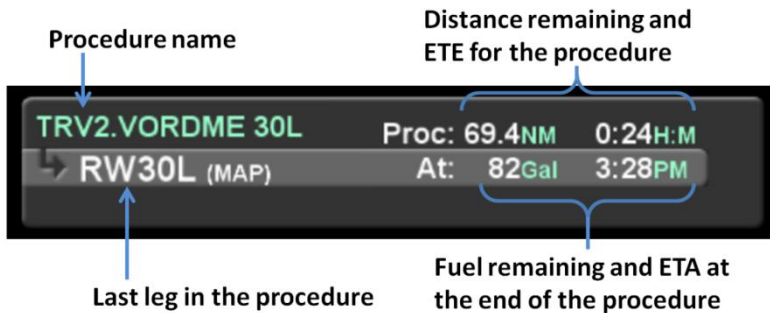


### Mini Flight Plan Format

"Mini Flight Plan Format" can be selected using the Setup Page.
When that option is "On", the flight plan rows are displayed in a
vertically shortened format, allowing for more rows to be
displayed on the screen at one time. Because of the reduced row
height, the "via" and "to" fields are shown side-by-side and the via
is abbreviated. Also, only the "To" statistics are displayed.

*Mini Flight Plan Format "On"*
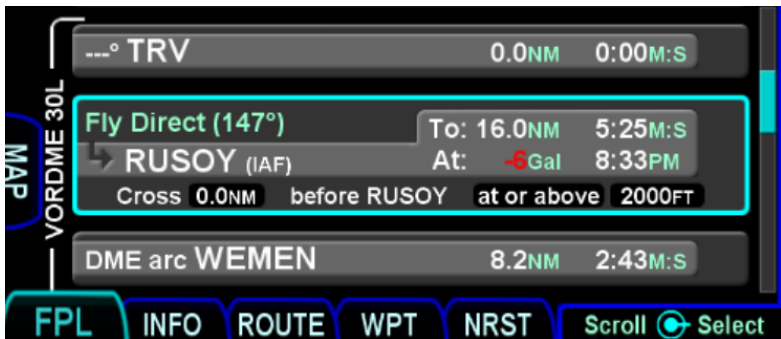


However, even when Mini Flight Plan Format is "On", the leg surrounded by the cursor is shown in the normal format, as if Mini Flight Plan Format were off.

### Split View

The "Map" tab, shown to the left side of the flight plan, can be used to split the screen so that both the map and the flight plan can be seen at once. In order to enable split view, either touch the Map tab or press and hold the right side of the FMS button. Once split view is active, the full FPL page can be restored by again touching the tab (which is now labeled "FPL") or by pressing and holding the left side of the FMS button.

Because of the reduced width available for displaying flight plan rows, the format of each row is changed to show minimal information and many of the editing facilities are inhibited.

*Split View Active*

The split view is useful when entering flight plans because a preview of the pending modification will be shown (see "Previewing Flight Plans" on page 2-9).

It is also useful for reviewing the flight plan leg-by-leg. When the split view is active, the View LSK has a third option named "Cursor". When that view is selected, the map side of the display will be centered on the terminating point of the leg surrounded by the cursor. As a reminder of the "Cursor" view being active, the legend "Cursor Centered" will be displayed near the top of the map. By moving the cursor through the flight plan and having an appropriate zoom level, a nice overview of the flight plan can be performed.

*Cursor View Active*



## Flight Plan Cursors

There are three types of cursors – an insert cursor, an edit cursor, and a field cursor. An insert cursor appears as a thin cyan horizontal line that appears between flight plan rows. This cursor allows you to insert new legs and procedures at that position. The edit cursor appears as a cyan box surrounding the entire row and allows you to perform operations on that row. A field cursor appears as a filled cyan ("reverse video") box within a row.

*Insert Cursor*
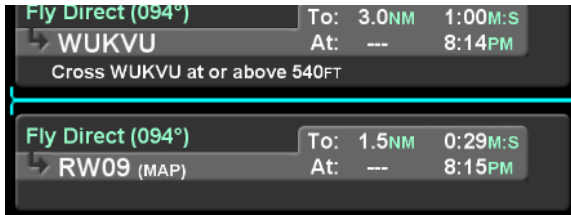


**Insert Cursor** – Thin cyan line

*Edit Cursor*
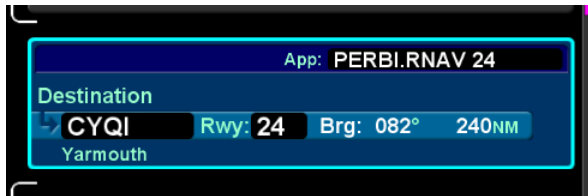


**Edit Cursor** – Cyan box surrounding the row

## Moving the cursor

Cursor movement can be controlled by the inner and outer knobs located at the bottom right side of the IFD. Rotation of the outer knob will move the cursor through the flight plan between insert and edit cursors for each row. Think of this as "coarse" control for moving quickly through the flight plan. Rotation of the inner knob will also move the cursor between insert and edit cursors, but also stop at each editable field. Think of this as "fine" control.

Cursor movement can also be controlled using the touchscreen. Touching between rows will move the insert cursor to that position. Touching a row that is not already surrounded by the edit cursor will move the edit cursor to that position. Touching a field within a row that is surrounded by the cursor will move the field cursor to that position.

## Flight plan editing

Throughout the FMS Subsystem section of this document, the word "select" is used to describe the initiation of an operation based on the cursor position. Unless otherwise specified, the field indicated (or "highlighted") by the cursor can be selected by pressing the inner knob, touching the cursor, or pressing the

ENTR button. The typical sequence of events to initiate an edit is to move the cursor to the desired position, then select the cursor.

Selecting the insert cursor will usually cause a dropdown to appear, though there are cases where a field edit will be immediately started. There are also several fields in the FMS that are edited using dropdowns (vs. entering a value). Whenever a dropdown is shown, editing is accomplished by moving the cursor to the desired item and then selecting it.

When a field contains an editable value, selecting the field using the inner knob will put the field into edit mode, allowing the value to be entered using the knobs. Selecting a field using the touch screen will cause a virtual keyboard to appear. At that point, either the keyboard or the knobs can be used to enter the value.

To "complete" an edit, press the right knob button, touch the ENTR key on the virtual keyboard, press the ENTR button on the right side of the IFD, or press the "Enter" LSK.

By turning and pressing only the bottom right knob, it is possible to enter an entire flight plan very quickly without ever removing your hand from the knob.

CREATING A NEW FLIGHT PLAN

When the IFD powers up on the ground, the flight plan is automatically populated with an origin. The origin will be the closest airport to the current GPS position or the airport from the previous power down if GPS position has not locked on yet. If the selected origin airport is not appropriate, it can be changed to a different airport or deleted, as necessary.

*Flight Plan and Scroll Bar*
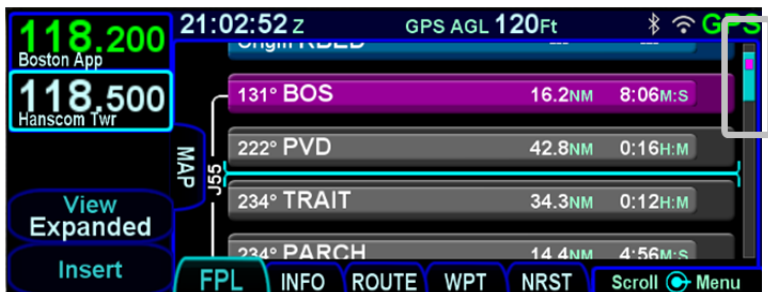
**COOL FEATURE**

**Geofill™** is a geographic prediction algorithm that significantly reduces the number of pilot actions for entering waypoints. Usually after the first character entry, the system uses existing characters to determine the most likely waypoint based on your geographic position or existing flight plan.

If a flight plan has more legs than can be displayed on a single page, a scroll bar is presented along the right edge of the flight plan. It indicates where the viewable window is with respect to the entire flight plan as well as where the active leg in the flight plan is. In the image above, the magenta vertical rectangle in the scroll bar indicates the active leg is just below the top of the screen. There are a number of flight plan legs out of sight below the bottom of the display.

PREVIEWING FLIGHT PLANS

Using the split view, flight plan modifications can be previewed as they are being modified on the FMS page.  As a flight plan is being built on the right side of the page, the map will automatically resize attempting to show the entire modification being made.  Those changes are shown on the map using a cyan color.  There may be a short delay in drawing the legs as the system determines the optimum map range for display.  This feature provides a graphical preview of the edited route before it is officially part of the flight plan to aid in situational awareness. The preview feature is available whether modifications are being made on the ground or airborne.  While a preview is being displayed, a temporary annunciation will be shown on the map describing the modification in progress.  Examples of those annunciations are "FMS Preview - Waypoint", "FMS Preview - Airway", or "FMS Preview – Approach.

*Previewing a Flight Plan While Building It*



## SELECTING A DEPARTURE

If a published departure exists for the origin airport, a "Departure" field will be displayed at the bottom of the row.  Select the departure field to display a dropdown containing available departures for the origin airport.

| TIPS AND TECHNIQUES |
| --- |
| **Vector Standard Instrument Departure (SID)** Vector (or Radar) SIDs are not likely to be part of the list of available departures in the FMS dropdown. This is due to the nature of the data encoding from the supplier.  They are however likely to be present in the list of available charts for the departure field. Vector (or Radar) SIDs are typically straight out departures on assigned headings. |

*Departures Dropdown*

When a departure is selected from the initial dropdown, a sequence of dropdowns may be presented to allow the selection of an enroute transition and a runway transition. The structure of the departure and the presence of a selected runway will impact whether a specific dropdown is presented.

The FMS processes enroute transitions first. If the departure has more than one published enroute transition, the FMS will present a dropdown showing those transitions and a transition must be selected. If the departure has only one published enroute transition, the FMS will automatically select that one and no dropdown for enroute transitions will be presented. There are departures that have no published enroute transitions. In those cases, this entire step is skipped.

*Departure Enroute Transition Dropdown*
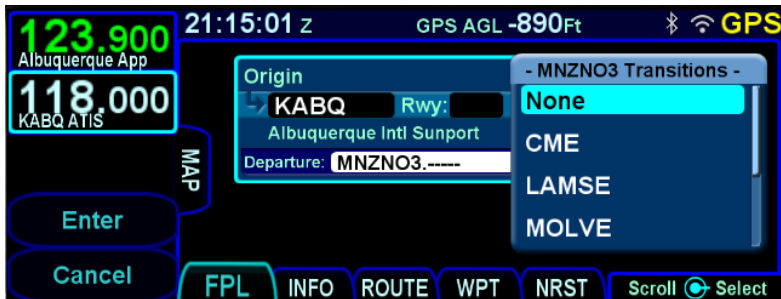


| COOL FEATURE |
| --- |
| If a departure has at least one enroute transition and the departure has a common segment after runway transitions from which all enroute transitions are started, the dropdown menu will contain an option for "None". Selecting "None" will cause the departure to terminate at the end of the common segment. |

Once the enroute transition has been selected, the FMS will process runway transitions. There are departures that do not have published runway transitions. For those cases, the rest of this process is skipped and the selected procedure and enroute transition are inserted into the flight plan. Otherwise, the FMS

proceeds differently based on whether the airport has a selected runway.

If the airport has a selected runway and that runway is applicable to the selected departure, then the FMS will choose the runway transition corresponding to the selected runway and the procedure is inserted into the flight plan without further pilot action. However, if the airport does not have a selected runway or if the selected runway is not applicable to the departure, then a runway transition must be selected. If the departure has only one published runway transition, the FMS will automatically select that one and then insert the procedure into the flight plan. If there is more than one published transition, the FMS will present a dropdown menu showing all of the runway transitions and the pilot will select the desired transition. Once that selection has been made, the procedure and all selected transitions will be inserted into the flight plan.

***Departure Runway Transition Dropdown***
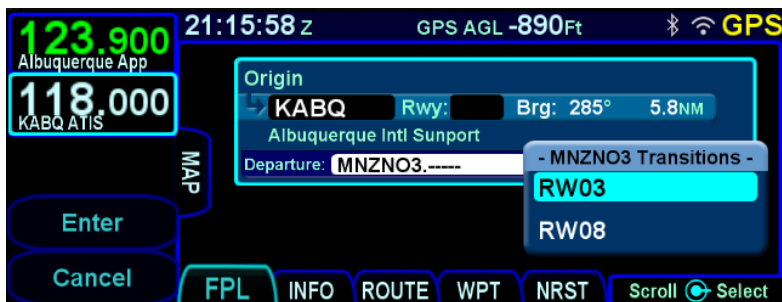


If the inserted departure had a selected runway transition and either the airport had no selected runway or the selected runway was not applicable to the departure, then the FMS will set the runway for the airport based on the runway transition that was selected. There are cases where a runway transition applies to all runways at the airport or to a set of parallel runways. In those cases, if there was no selected runway for the airport, the FMS will select the first runway (numerically) that is applicable.

INSERTING A WAYPOINT

To insert a waypoint into the flight plan, turn the right outer knob until an insert cursor is positioned where the new waypoint is to be inserted. Note that a waypoint can generally be inserted

anywhere in the flight plan except for within terminal area procedures (i.e. departures, arrivals, and approaches). Press the knob button to generate a dropdown. If the cursor is in a position where a waypoint can be inserted, "Waypoint" will be shown as the first entry in the dropdown. Generally, the cursor will be at the "Waypoint" selection to start. Select "Waypoint" and enter the waypoint identifier. Geofill™ will typically find the correct waypoint by the second character entered.

| COOL FEATURE |
| --- |
| When an insert cursor is displayed at a position where it is legal to insert a waypoint, pressing a letter on a Bluetooth keyboard will immediately start a waypoint identifier entry with that letter. |

| COOL FEATURE |
| --- |
| If you are on another FMS page and the cursor is around an identifier that can be used as a waypoint, a quick way to enter that identifier into the flight plan is provided by the "Paste" LSK.  Go directly to the FPL page, start the waypoint entry using the knob and the Paste LSK will appear at the topmost LSK. The LSK is also available when using the virtual keyboard, but the LSK is obscured on the screen by the keyboard. |

INSERTING AN AIRWAY

The FMS can use published airways in its database to quickly build long flight plans with few keystrokes.  When a flight plan waypoint is a valid airway entry or exit point, the list of available airways is presented in a drop down box.  The list is quickly scrolled to the desired exit point and then all intermediate intersections along that airway are automatically populated into the flight plan.

To insert an airway into the flight plan, move the cursor to a position after the leg where the airway will be joined.  It will be an

insert cursor.  Press the right knob button to bring up the dropdown menu containing the options available after that leg. Scroll the cursor down through the list until the desired airway name is selected.  Note that airways are always at the bottom of the list.

Once the desired airway is selected, press the right knob button or touch the selected airway and a list of exit points will appear in a secondary dropdown. The list of exit points is presented in the order along the airway, not in alphabetical order.  Select the desired exit point to insert the airway into the flight plan.

*Airway Dropdown*



*Airway Exit Points*
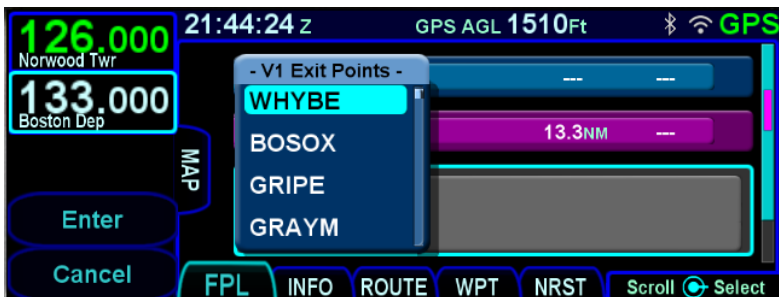


DELETING A WAYPOINT

From the FPL tab, use the bottom right knob on the IFD to scroll up and down the flight plan until the edit cursor surrounds the waypoint to be deleted. Press the "CLR" button on the right side of the bezel to delete the waypoint. Continue pressing the "CLR" button and it will walk up the flight plan deleting earlier waypoints

as you go. Waypoints can also be deleted by touching the waypoint to be deleted and then selecting the "Delete Waypoint" LSK.

> **NOTE**
>
> Not all waypoints within a published procedure are allowed to be deleted. Generally, legs that are surrounded by other legs that terminate at a fix can be deleted. Legs on a final approach cannot be deleted unless they are designated as step-down fixes.

EDITING A WAYPOINT

From the FPL tab, the bottom right knob on the IFD can be used to edit an existing waypoint. Using the knob, scroll up or down the flight plan until an edit cursor surrounds the waypoint to be modified. Use the inner knob to highlight one of the editable fields with reverse video. Pushing the knob provides a drop down box from which the changes can be made. Alternatively, touching the field to be edited will display a virtual keyboard which can be used to enter the desired data/changes.

ADDING ALTITUDE CONSTRAINTS

Most legs allow for the entry of an altitude constraint (e.g. cross the waypoint at or above a specific altitude). Non-window constraints are defined by the kind of constraint, the altitude, and a "cross" distance prior to the waypoint at which the constraint is to be met. Window constraints are defined only by the two altitudes, meaning that the constraint applies at the waypoint (no distance prior field). Altitude constraints are depicted on the map.

***Altitude Constraint Types***

| **Cross** | **Kind** | **Altitude** |
|---|---|---|
| Numeric field representing the distance prior to the waypoint that the constraint is to be achieved | At Or Below<br>At<br>At or Above<br>Between ("window") | Numeric field representing the target altitude. Minimum allowable value is 100 feet. Window constraints have an upper and lower altitude field. |

***Altitude Constraint Fields***



The default value for the crossing distance is 5.0nm for airports and 0.0nm for all other waypoints.

The only waypoints that do not permit altitude constraints are:

- Origin
- Destination, if it has an approach selected
- Missed Approach Point
- Altitude Terminated Legs

Altitude constraints are used to drive enroute VNAV functions (see page 5-34).

DIRECT-TO

"Direct To" clearances are sometimes issued to waypoints that are not currently in the flight plan, but often are issued as shortcuts to waypoints that have already been planned. The FMS seamlessly handles both of those situations using the Direct-To key to perform either an "offpath direct-to" or an "onpath direct-

to", respectively.  Whether a direct-to is onpath or offpath is determined by the FMS.  However, it is important for the pilot to recognize the difference because the effect on the flight plan differs.

### Selecting the direct-to waypoint

In either case, the process is started by pressing the dedicated Direct-To key on the IFD bezel.  At that point, a green dialog box appears and is populated with a waypoint identifier, determined as follows:

- If the currently displayed page is an FMS page specifically denoting an eligible fix, the identifier of the fix

- If the currently displayed page is not an FMS page or it does not specifically denote an eligible fix, and the flight plan has at least one leg, the identifier associated with the leg surrounded by the cursor on the FPL page

- The identifier of the closest airport

    * an eligible fix is an Airport, VOR, NDB, Intersection, or User Waypoint.

*Direct-To Dialog Box*



At this point, if desired, the waypoint identifier can be changed using several methods:

- Manual touch - Touch the identifier field in the dialog box to manually change the identifier.  Use the virtual keyboard to directly enter the identifier.

- Manual knob - Turn or push the right inner knob. A cursor will appear in the field. Turn the inner knob to change characters and turn the outer knob to change cursor position.

- Scrolling - Turn the right outer knob. With each click of the knob, the cursor will be populated with the next or previous item in the list being shown (e.g. the flight plan, the nearest list).

Once the desired waypoint identifier has been entered, accept the entry to display a confirmation dialog saying "Activate Direct To" and the selected identifier. Touch the dialog box, press ENTR, or press the Enter LSK to confirm the operation. Press CLR or the Cancel LSK to abort the operation.

*Direct-To Confirmation*



## Determining Offpath or OnPath

When the direct-to identifier is selected by scrolling through the flight plan, the direct-to will always be considered onpath. Otherwise, the FMS looks through the flight plan starting with the active leg and continuing downpath for a leg with a matching identifier. Note that legs in a missed approach are considered only if the missed approach is enabled. If a matching leg is found, then the direct-to is considered onpath. If no matching leg is found, then the direct-to is considered offpath. Note that because only legs downpath of the active leg are considered, entering the identifier of a leg *before* the active leg will cause the direct-to to be offpath.

### Offpath Direct-To

An offpath direct-to causes a new leg to be inserted into the flight plan immediately prior to the active leg and that new leg is followed immediately by a discontinuity (gap in route). This is done because the FMS only knows that the direct-to is an interruption of the currently active leg by proceeding direct to the new waypoint. The FMS does not know the pilot's intent after the direct-to, so it places the discontinuity afterward. Once the direct-to is active, the pilot has time to adjust the downpath flight plan to reflect the remainder of the clearance. That may be as simple as removing the discontinuity or it may include deleting and inserting other legs.

*Offpath Direct-To (gap inserted)*
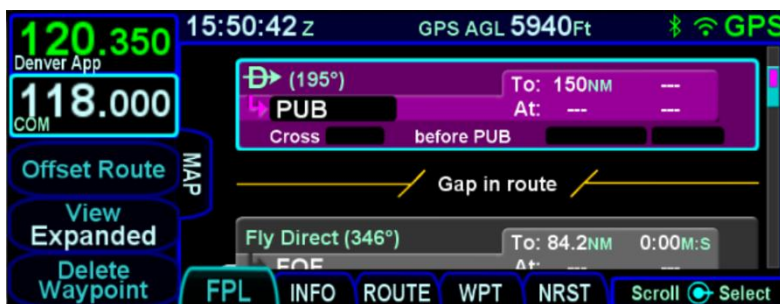


When the active leg is part of an arrival or an approach and an offpath direct-to is performed, the direct-to will be inserted after the end of the missed approach or after the destination if there is no associated missed approach. When the active leg is part of a departure and an offpath direct-to is performed, the direct-to will be inserted after the last leg of the departure.

### Onpath Direct-To

An onpath direct-to causes the specified leg to become active, but the path is temporarily changed to be direct from the aircraft position at the time the direct-to was initiated. No discontinuity is inserted. The FMS assumes that the direct-to was just a shortcut and that the intent is to resume guidance along the existing flight plan once the end of the direct-to leg is reached.

*Onpath Direct-To (no gap)*



> **COOL FEATURE**
>
> If the aircraft course is not aligned with the course to the direct-to waypoint, the FMS will generate a curved path to turn the aircraft on course. That curved path will be depicted on the map.

## ENTERING AND INTERCEPTING A RADIAL

### FMS Method

The FMS Course function will allow the pilot to navigate "To" or "From" the active waypoint while OBS is selected as the nav source. Press the Nav Source knob to make OBS the active nav mode and then adjust the FMS (OBS) course using the external course adjust knob (i.e. course set knob on a CDI or HSI or EFIS). If there is no installed external course setting device, then turn the IFD nav source knob to adjust the FMS Course value. For IFDs without a nav source knob (e.g. IFD510) the course can be adjusted by turning the inner knob, but *only on a page under the Map subsystem*.

FMS Course mode makes the current waypoint act like a VOR. Select the desired radial to fly inbound or outbound. Adjusting the course to or from the active waypoint will be reflected by the To/From flag as in a traditional HSI. The course deviation indicator will be presented in relation to the selected course.

As the FMS course is adjusted, the course will be shown in the upper right corner of the IFD (as part of the nav source), and the

active leg on the FPL tab will change to "Fly Course xxx°", as illustrated below.

*FMS Course – Active Leg*



The FMS Course function will always be armed (i.e. it will always intercept the flight plan) in a To intercept. If the airplane is in a From course, it will intercept only if the dialed course trajectory intercepts the flight plan. If the dialed course does not intercept the flight plan, the airplane will fly that course indefinitely.

The FMS Course function will be exited when the airplane intercepts the active waypoint in a To intercept or when intercepting a downpath leg in the From case. Pressing the nav source knob while the FMS course function is active will also cancel the FMS Course mode and return to GPS as the active nav source mode. The FMS Course will remain active if a From course is dialed and the airplane does not intercept the FPL.

**VLOC Method†**

If the Nav Source knob is set to VLOC as the active nav mode and a VOR station is tuned and received, then use the external course knob on the CDI/HSI/EFIS/etc to set the desired inbound or outbound radial as required.

DELETING A FLIGHT PLAN

Select the "Routes" tab of the FMS page. Use the bottom right knob to scroll to the desired flight plan in the list or touch the flight plan to highlight the route.  Press the "CLR" button on the bezel and a green confirm dialog box pops up. Press "Enter" or "Cancel" LSKs or use the bezel "ENTR" or "CLR" buttons to finish the deletion.

CREATING A HOLDING PATTERN

A hold can be put on any waypoint that has a fix terminated leg – waypoints that terminate with a lat/lon position such as navaids, enroute waypoints, user waypoints, airports, etc. Legs that terminate at an altitude, DME distance, radial crossings, etc. do not support attaching a hold. Hold fixes are always fly-over waypoints and not fly-by waypoints.

Use the edit cursor on the flight plan to select the waypoint of interest, then push the bottom right knob or touch the desired location to display a drop down list of options. Near the top of that list, you will see "Hold at <waypoint name>". Scroll to highlight that drop down list entry and push the knob again. You have just added a holding leg, populated with standard hold data.

Alternatively, use an insert cursor by positioning it where you want to insert a hold in your flight plan. Push in the bottom right knob or touch the position on the glass. Note that a hold is available via the drop down list. Scroll up or down the dropdown list as required and push the bottom right knob or touch the hold option in the list to insert a hold flight plan leg.

> **TIPS AND TECHNIQUES**
>
> **Using Holding Patterns**
> The hold pattern leg type has a field for the inbound course to the hold waypoint. The hold pattern turns left or right as specified in the hold pattern at the hold waypoint.  For example, if ATC issues a "Hold east of <waypoint>", a hold course of 270° should be entered in the hold leg.

The nav database may contain multiple published holding patterns for a given fix (e.g. enroute hold, high altitude hold, low altitude hold, SID hold, STAR hold, etc). The FMS will use a standard hold pattern when there is no defined published hold. For those fixes that have multiple published holds associated with them, a dropdown menu will be presented showing the various hold patterns, thereby allowing you to choose the desired or assigned hold pattern (course, turn direction, and leg length/time).

Once a published hold has been inserted, when the FMS cursor is on one of the hold parameters, the bottom LSK will display "Standard Hold".  Pressing that LSK will change the parameters to be standard (right turns, 1 min legs, and an inbound course matching the course of the leg before the hold).  If any of the parameters are different from what is published, the LSK will then display "Hold As Published" and pressing the LSK will restore the original parameters.  Note that this only applies to holds that are inserted versus holds that are defined as a leg in a terminal area procedure, the most common case being a course reversal on an approach – for those holds, there's no "Standard Hold" LSK since it is unlikely this would be a desired course of action.  If however, a hold parameter is manually changed, the "Hold As Published" LSK does appear.
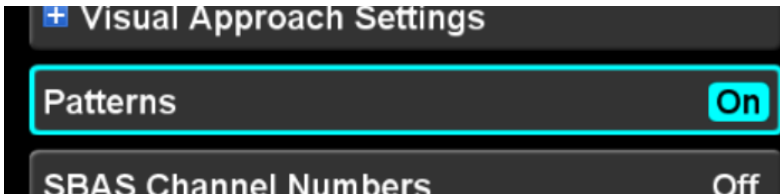
CIRCULAR ORBITS

If the SAR option is enabled, then circular orbits can be added to the plan.

*Circular Orbit Depiction on Map*



The function is activated on the Setup Page by setting the "Patterns" field to "On".

*Circular Orbit Pattern Selection on Setup Page*

Once on, the leg type is selected just like all other leg types but is only available after a leg that is not part of a terminal procedure. Select the "Orbit <waypoint>" option in the standard FMS insert cursor drop down list.

*Circular Orbit Dropdown Selection*



The orbit radius can range from 0.5nm to 100nm.  The FMS will not actually fly to the orbit fix and instead, will fly to the point where the leg to the fix intercepts the orbit.

*Orbit Row in Flight Plan*
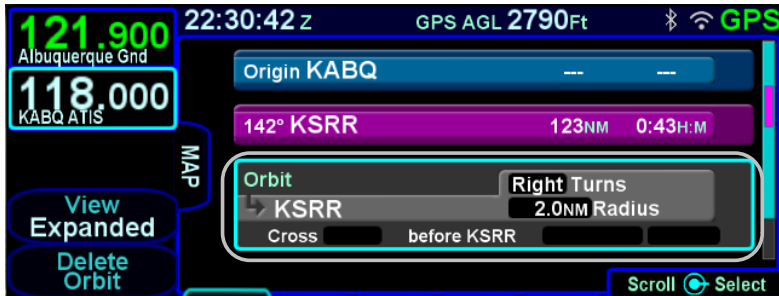


If the orbit radius is larger than the distance from the aircraft to the orbit fix, then the aircraft will intercept the orbit on the extended radial between the orbit fix and the aircraft.   Just like a traditional holding pattern, there is no insert cursor between a fix and a subsequent orbit.  The only way to get out of an orbit is to command a Direct-To or activate a different leg.   The orbit size can be changed while it is active but no path to reacquire the orbit is depicted on the map.

## DELETING A HOLDING PATTERN

To delete a holding pattern in your flight plan, turn the right knob
to scroll until an edit cursor surrounds the hold, or touch the hold
to be deleted then press the "Delete Hold" LSK or the CLR
button.

## EDITING A HOLDING PATTERN

To edit a holding pattern, turn the right outer knob to scroll until
an edit cursor surrounds the hold, or touch the hold to be edited.
Then turn the right inner knob or touch the field to be edited to
highlight the desired field (e.g. turn direction, leg length, leg units,
inbound leg course).  Press the right knob button or touch the
selected field to start making the edit.

---

**COOL FEATURE**

**Graphical Flight Plan Leg**
To aid in situational awareness, procedure turns and
holding patterns are shown in the flight plan with a
graphical representation, as illustrated below.

---

*Procedure Turn Leg*
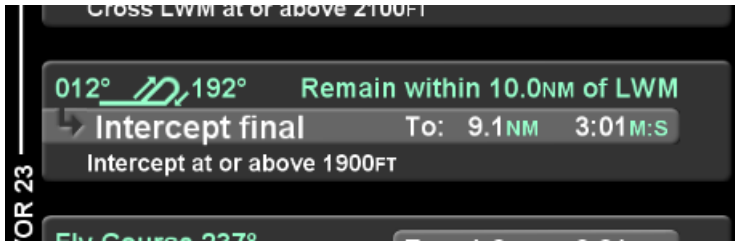


## ACTIVATING A FLIGHT PLAN

When a flight plan is entered on the ground, the flight plan will be
inactive and no guidance will be provided.  To activate the flight
plan, press the "Activate Route" LSK. If the flight plan is not
activated and the aircraft reaches a threshold groundspeed of
approximately 40 knots, the IFD will automatically activate the
flight plan.  A flight plan that was created by pressing the
"Activate Route" LSK for a stored route on the ROUTE tab will be
automatically activated.

FLIGHT PLAN SEQUENCING

The FMS assumes that the pilot will fly the flight plan as defined. If that does not occur, legs may not sequence as expected. Therefore, to manually sequence the desired leg, select it by either using the bottom knob or touch it and press the "Activate Leg" LSK followed by accepting the confirm dialog box when it is displayed. Doing so will turn that leg magenta, confirming that it is now the active leg.

| TIPS AND TECHNIQUES |
| --- |
| **Impending Turn Notification**<br>If flying the defined flight plan, the IFD will provide a message about an impending turn that includes the upcoming desired track (DTK) and a 10 second (30 second if the required turn is more than 120 degrees) count down. |

| COOL FEATURE |
| --- |
| The IFD is capable of generating an aural alert as waypoints are sequenced.  The aural alert can be enabled or disabled using the Setup Page (see page 4-25). |

**COOL FEATURE**

**Automatic VOR Tuning †**
"Auto-VLOC Tuning" can be selected from the Setup page.  When enabled, the FMS will automatically tune the next down-path VOR in the active flight plan into the primary nav frequency.

It may desirable to turn off this feature on one of the IFDs in a dual installation to allow depiction of a crossing radial for reference before crossing a VOR. Also when navigating using airways, it may be desirable to turn off this feature in order to check navigation using off-airway VORs.

LATERAL OFFSETS

The system supports a capability to create and fly a lateral offset from your flight plan. From the "FPL" tab of the FMS page with the cursor around or above the active leg, press the "Offset Route" LSK and use the right-hand knob on the IFD to dial in the desired offset. Use the outer knob to change the value in 1nm increments and the inner knob for 0.1nm increments. Turn the knob left for left offsets and right for right offsets. Once the intended offset has been entered, press the "Confirm Right/Left x.x NM" LSK. At that point, the original LSK will indicate "Offset Route Right/Left X.X NM". To delete a lateral offset, press the "Delete Offset" LSK. The maximum offset that can be dialed in is 20 NM. Lateral offsets are not available when in OBS mode. Lateral offsets are unaffected by graphical route planning ("rubber banding") operations.

*Lateral Offset Map Depiction*



FLIGHT PLAN DISCONTINUITIES

A discontinuity indicates that the FMS cannot provide guidance to the leg following the discontinuity.  If a discontinuity exists in the flight plan and the FMS reaches the end of the leg preceding the discontinuity, the FMS will not sequence the leg and will provide guidance outbound along the same course until some overt action is taken to change the active leg.  Several kinds of discontinuities exist, each discussed in the following sections.

**Gap In Route**

A "Gap In Route" discontinuity is typically caused by the entry of an approach when the preceding leg does not terminate at the same waypoint as the first waypoint in the approach.  This is because the FMS does not assume that it is safe to proceed directly from the last enroute waypoint to the first point on the approach.  If the pilot has confirmed that a direct path is indeed safe (and desired), then the right course of action is to manually close the gap.  This can be accomplished by moving the cursor to the gap and pressing CLR or the bottom LSK, which will be labeled as "Connect" with the two waypoint identifiers.  In this case, closing the gap will insert a direct leg from the last enroute waypoint to the first approach waypoint.

*Connecting Gap in Route*
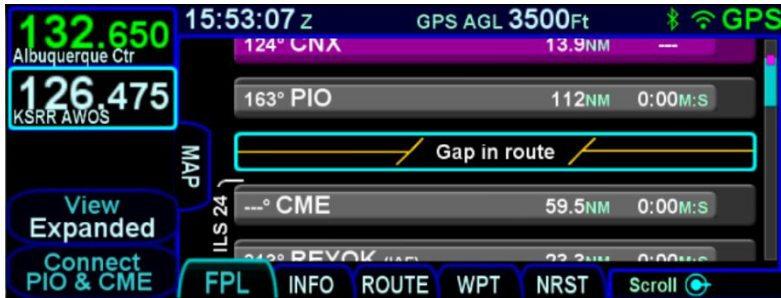


There are, however, other conditions which will cause "Gap In Route" discontinuities.  If a route modification results in two consecutive waypoints with the same identifier, but the two waypoints have incompatible altitude constraints, then a gap will be inserted.  In this case, one of the two altitude constraints must be removed.  At that point, the FMS will remove the gap.  In some cases, the two waypoints with the same identifier will be combined, leaving a single instance in the flight plan.  However, at the start of an arrival or an approach, the FMS will not combine the two waypoints.  This allows flexibility in flight planning because additional legs can then be inserted prior to the arrival/approach if necessary.  If no other waypoints are inserted and the aircraft arrives at the common waypoint (with the gap removed), the FMS will recognize that the two waypoints are the same and sequence both of them, thus activating the subsequent leg.

**Vectors To Final**

A Vectors To Final (VTF) discontinuity always precedes an approach that has been selected with the "Vectors" transition and cannot be removed.  See page 2-32 for further discussion of vectors to final operation.

**Visual Approach**

A Visual Approach discontinuity always precedes a visual approach and cannot be removed.  See page 2-36 for further discussion of visual approaches.

**Missed Approach**

A Missed Approach discontinuity always precedes the first leg of a missed approach. If the missed approach is enabled, then the discontinuity contains the word "Enabled" and acts as a visual cue in the flight plan, but is ignored by the FMS. If the missed approach is disabled, then the FMS treats it like a gap and will provide guidance outbound from the missed approach point (MAP) rather than providing guidance to the legs in the missed approach.

**FAF Intercept Too Sharp**

A FAF Intercept Too Sharp discontinuity will appear after the FAF when the pilot direct the FMS to go direct-to the FAF and the difference between the inbound course to the FAF and the final approach course exceeds 45 degrees. ATC should never provide such a clearance, but if that situation arises, the pilot will have to manually activate the leg after the FAF while approaching the FAF in order to continue FMS guidance on the approach. Extra caution should be taken to ensure that a stabilized approach can be conducted.

ENROUTE DESCENTS

A green circular top of descent (TOD) marker and label is drawn on the map when flying "on-path" along the FMS flight plan, giving a clear visual cue when it is appropriate to begin the enroute descent. The rules for determining the TOD are described the enroute VNAV section (see page 5-36). These rules are applicable even if enroute VNAV is disabled.

There is an associated CAS countdown message 10 seconds prior to reaching the TOD point. When the IFD is wired to the audio panel, an associated two tone chime is also generated.

The "TOD" label may be auto-decluttered from the map depending on map range and feature density. The TOD depiction and CAS message are removed from the map immediately after passing the TOD point.

**Top of Descent (TOD) Marker**



| COOL FEATURE |
| --- |

### Range to Altitude Indication

A small green arc will be drawn on the map that depicts the geographic point where, at the current vertical speed, the aircraft will reach the altitude target. The altitude target is any crossing restriction on a waypoint that is either manually entered or a part of a procedure.  It will be removed from the map when current aircraft altitude is within 150 feet of the target altitude.

> **COOL FEATURE**
>
> **Enter Approaches for Multiple "Destinations"**
> The FMS will allow multiple airfields or destinations
> to be built into the flight plan. Each can have the
> published approach and missed approach as part of
> the plan. This is useful in pre-building your primary
> destination with a missed approach, expected
> alternate and its published approach. Similarly, a
> training flight with multiple intended approaches and
> locations can all be created in a single flight plan,
> before takeoff.

> **TIPS AND TECHNIQUES**
>
> **Check Altitude Too Low CAS Message**
> The IFD contains a yellow caution CAS message
> that is active whenever an approach has been
> activated and the aircraft altitude is below the Final
> Approach Fix (FAF) published altitude.
>
> If your flight plan contains consecutive approaches
> and you activate the next approach during climb out
> from the previous approach and prior to reaching the
> next approach's FAF altitude, this "Check Altitude
> Too Low" message may be displayed.

ENTERING AN ARRIVAL AND APPROACH

To enter an arrival or an approach, use the right inner and outer
knob to move the cursor to a point where the procedure should
be inserted.  Arrivals can be inserted using an insert cursor
immediately above the destination airport or immediately above
an approach associated with that airport.  An arrival can also be
inserted using the right inner knob to select the "Arr" field on the
destination airport leg.  Approaches can be inserted using an
insert cursor immediately above the destination airport or using
the right inner knob to select the "App" field on the destination
airport leg.  Once the cursor is in the desired position, press the

right knob button to start inserting the procedure using a dropdown. If the insert cursor is positioned above the airport, the dropdown may contain more items than just arrivals and approaches. The examples below use destination field method for clarity. After pressing the knob, the FMS will present a dropdown from which to select the desired procedure. The process for using the dropdowns to select the arrival and/or approach and any enroute and runway transitions is the same as the process for selecting a departure.

*Arrivals Dropdown*
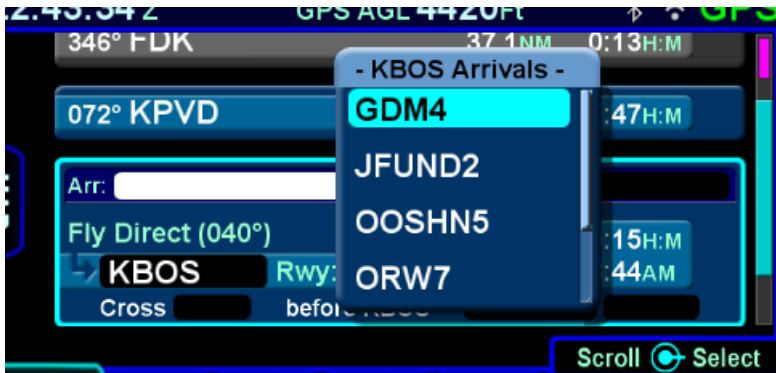


When an approach is being entered, Vectors-To-Final (VTF) will be presented in the dropdown containing approach transitions. Since approaches do not have defined runway transitions, no runway transition dropdown will be presented when entering an approach.

*Approach Transitions Dropdown*
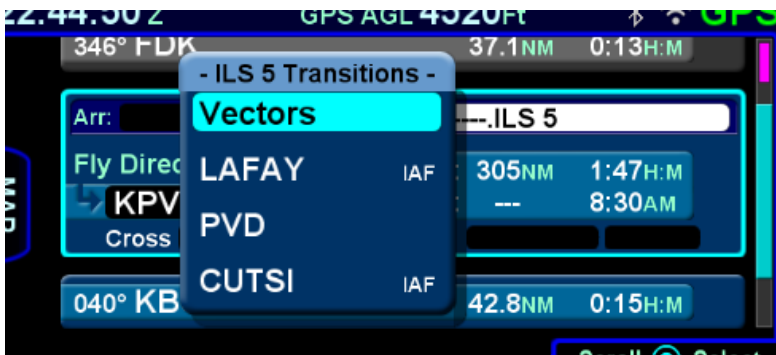
After having selected the procedure, including related transitions, the legs will be inserted into the flight plan and the corresponding destination airport field will contain the name of the procedure that was just inserted.  In expanded view, a white bracket will be presented along the left side of the legs in the procedure, labeled with the name of the procedure.

*Procedure Brackets*

**COOL FEATURE**

**PROC button**
The PROC key on the bezel acts as a shortcut for attaching a published arrival or approach procedure to a waypoint in your flight plan. It can be used at any time. The first press of the key results in the IFD displaying the FPL tab (Map-FPL view) of the FMS page with the cursor on the Approach field of the next destination after the active leg and a dropdown containing the available published approaches. Pressing PROC a second time will move the cursor to the Arrival field and present a dropdown of available published arrivals. Each subsequent press of the PROC key will step through all following destination airfields approaches and arrivals in the flight plan and wrap back around to the top of the flight plan. When the dropdown is presented for the intended field, use either the right knob button or touch to scroll the list until the desired procedure is selected, then push the right knob button to add that procedure to the flight plan.

If there is no flight plan, then pressing the PROC key will present the FPL tab on the IFD with an insert cursor at the top of the page but will not present any procedures.

**TIPS AND TECHNIQUES**

**Changing Selected Approach Type on Final †**
If a VHF approach has been activated and then is replaced with a new GPS approach prior to activating the missed approach, it may be necessary to manually change the nav source mode (e.g. manually change VLOC to GPS if switching from an ILS to a RNAV).

## VISUAL APPROACHES

A visual approach is a non-instrument procedure used as an aid for a stabilized approach to a runway. Visual approaches, one for each runway at an airport, are presented in the dropdown menu below all instrument approaches, as illustrated below.
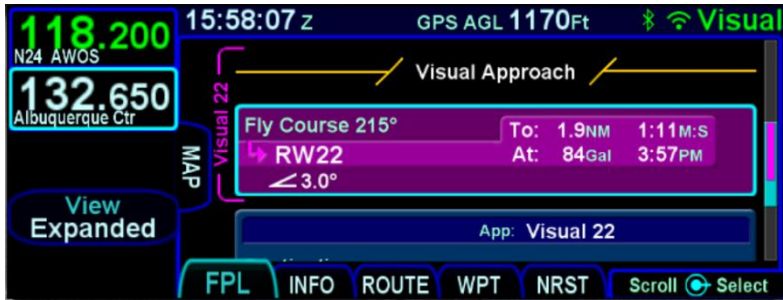
*Visual approach selection*



Once a visual approach has been selected, the familiar transition dropdown will appear. The dropdown contains selections for a straight-in approach and for base and downwind pattern entries using both left and right turns, as illustrated below.

*Visual approach entries dropdown*



A visual approach consists of a single flight plan leg aligned with the runway heading terminating at the runway threshold. Altitude constraints cannot be entered on the visual approach leg. The area typically used to display altitude constraints is instead used to show the glideslope angle associated with the visual approach.

*Visual approach in the flight plan*



Selection of a base or downwind entry adds no additional legs to the flight plan. However, to aid in situational awareness, the entry is shown on the map using dashed lines that intercept the final approach leg, as shown below:

*Visual approach depiction (left downwind to runway 22)*



When flying a visual approach, lateral deviations are provided to the final approach course. Advisory vertical deviations are also provided once the aircraft track is at most 90 degrees to the final approach course. Therefore, on a downwind entry the VDI will remain flagged until the aircraft completes the turn to base.

Visual approaches are activated exactly like instrument approaches. However, the LSK legend will show "Activate Visual" rather than "Activate Approach", providing a further reminder that a visual approach is in use.

**Configuring Visual Approaches**

Several user configurable settings are available on the Setup page to control the appearance and behavior of visual approaches (see page 4-55). The settings can be used to adjust for user preferences or aircraft performance.

- Pattern width – distance between the runway and a downwind leg
- Final length – distance from the runway threshold at which a base leg intercepts the final approach course
- Glideslope – the descent angle of the final approach

Additionally, there is a setting to enable or disable visual approaches. When set to disabled, visual approaches will no longer be presented in dropdown menus.

| IMPORTANT NOTE |
| --- |
| Once a visual approach has been inserted into the flight plan, it retains the settings that were in effect when it was inserted. To change the final length, pattern width, or glideslope of the approach in the flight plan, the settings must be changed on the Setup page, and then the approach must be reinserted into the flight plan. |

ACTIVATING A LEG

To activate a different leg of the flight plan from the FPL tab, either use the bottom knob or touch the desired leg to highlight it and then select the "Activate Leg" LSK.

*Activating a Leg*



TIPS AND TECHNIQUES

**Deleting an Approach From Active Flight Plan**
One of two techniques is recommended to delete a
an approach from an active flight plan – if you want
to replace the approach with another one for the
same airfield, press the PROC key and select a new
approach.  If you just want to delete the approach
altogether, scroll the flight plan to the blue airfield
leg, ensure the cyan highlight is on the approach
field and press the CLR button.

## USE OF THE MAP FPL SPLIT PAGE

The Map-FPL split tab on the FMS page presents the moving map on the left and the FMS flight plan in a thin strip on the right. While it can be useful in many phases of flight and scenarios, the split page is especially helpful during arrivals. This can be most useful to instantly correlate your flight plan with the graphical depiction on the map. This aids in error reduction and helps visually see options for diverts, weather avoidance, etc.

*Map-FPL Split Page*



**COOL FEATURE**

**METAR Flags in Flight Plan**
When a weather datalink device is installed in the airplane and providing METAR data to the IFD, color METAR flags will be included in the flight plan leg depiction along the right edge.  This is designed to give you a quick weather reference for the waypoint and/or its vicinity. The exact station to which that METAR applies is provided via the flag label and may be different than the actual waypoint identifier.
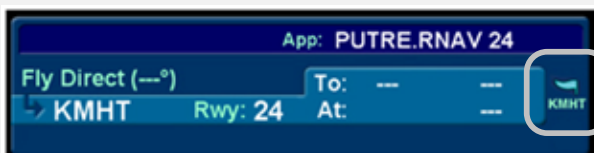
## INFO TAB

The INFO tab of the FMS page provides additional information about airports, navaids, and waypoints.

*Info Tab*



The facility (airport, navaid, waypoint) to which the information applies will always be displayed at the top of the page, and the identifier is an editable field. To edit the identifier, use the bottom right knob to move the cursor to the identifier field and the select the field. If the Info tab was accessed directly from a page where the cursor surrounded an applicable facility identifier, a Paste LSK will appear (e.g. NRST VORs). Pressing the Paste LSK will immediately change the contents of the identifier field. A search function, accessible via the Search LSK is also available to help find the identifier of the facility for which more information is desired.

If a nav frequency is associated with the facility displayed, then it will be displayed in that same top block with the facility identifier. The frequency can be nominated into the standby nav slot by either touching the frequency or by using the bottom right knob to highlight the frequency field and push the knob to nominate it into the standby slot. †

Depending on the type of facility being displayed, there are up to 7 category fields of information associated with the facility that can be expanded (via the + symbol) or compacted (via the – symbol) for additional details:

- **General** – describes the facility (e.g. "Public Towered Airport"), provides a thumbnail map of the facility (the orientation and range of the thumbnail map cannot be

adjusted), provides coordinates, elevation and magnetic variation data, provides sunrise/sunset, provides density altitude or access to a calculator to compute it, provides fuel information, if applicable

- **Communications** – provides a list of frequencies associated with the facility. Any VHF frequency in the list can be nominated into the standby slot by either touching it (first touch will highlight the field if necessary, second touch nominates it into the standby) or by using the bottom knob to highlight the desired frequency and then push the knob to nominate it into the standby slot **†**

- **Runways** – identifies the known runways at the airport to include orientation, length and width, and a thumbnail map of the runways.  When an individual runway row has been selected via touch or the bottom knob, it can further expand to provide surface type, coordinates of the endpoints, runway bearing and elevation and the graphical depiction will show lighting

- **Nearby Navaids** – when the info page fix is an airport, this panel is present and contains navaids within 40nm of the airport, up to a maximum of 10 navaids.  Each navaid row displays the navaid identifier, distance from the Info fix, cardinal direction from the Info fix, and navaid frequency. Possible navaids are VOR, VORTAC, TACAN, VOR/DME, DME and NDBs that are not marker beacons. If the navaid has a VHF frequency, the cursor will go to that field and the nav radio can be tuned by touch or using the bottom right knob.**†**  The navaid identifier is also a field and if selected with the cursor, changes the Info page to show information for that navaid.

- **Departures** – identifies the published departures associated with the airport and when an individual row has been selected via touch or the bottom knob, it can further expand to provide a thumbnail map depiction of the departure

- **Arrivals** - identifies the published arrivals associated with the airport and when an individual row has been selected via touch or the bottom knob, it can further expand to provide a thumbnail map depiction of the arrival

- **Approaches** - identifies the published approaches associated with the airport including any identifier and nav frequency, and when an individual row has been selected via touch or the bottom knob, it can further expand to provide a thumbnail map depiction of the approach.  If the nav frequency is selected by touch or by using the bottom right knob, it can be nominated (copied) into the standby slot **†**

- **Weather** – provides four additional rows of data if known: METAR, TAF, Winds Aloft, and Temps Aloft.  Selecting any of the additional rows via touch or the bottom knob will display additional sub-category data. Wind and temp data will represent data from the nearest known point within approximately 30nm.

---

**NOTE**

**Map Switches**
Switching between the thumbnail map on the INFO tab and the main map on the MAP tab may result in a 1-2 second delay as the new map re-sizes.

---

*Weather Data on Info Tab*
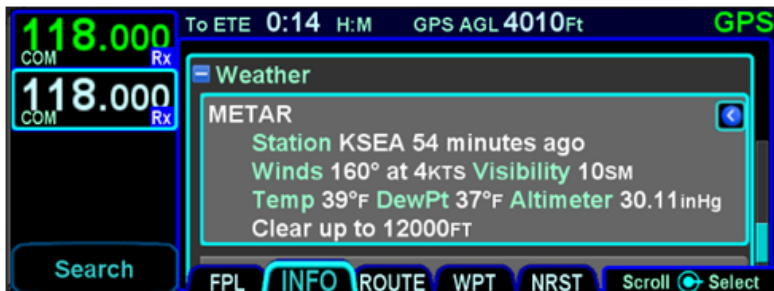
*Info Tab Nearby Navaids*
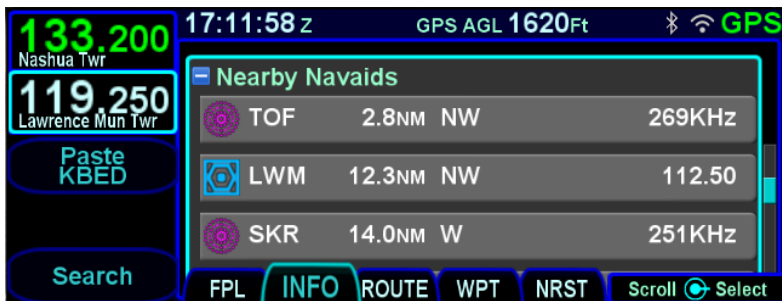
## ROUTE TAB

The ROUTE tab provides mechanisms for managing stored routes in the system. Up to 100 routes can be stored for later use, which is useful for frequently traveled routes.  A stored route must first be "activated" via the "Activate Route" LSK, which makes it the active flight plan and displays the flight plan (FPL) tab.

*Route Tab*
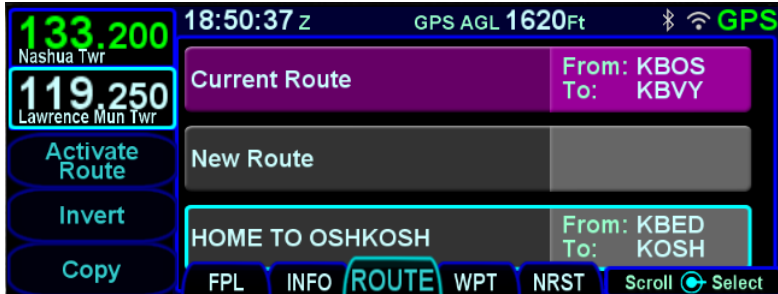


As indicated in the above image, each stored route is represented by a single row with the route name on the left and the "from" and "to" points identified on the right side of the row. Additionally, there are two special purpose rows shown at the top of the list.

The "Current Route" row represents the flight plan being used on the FPL page. This row is provided as a mechanism to allow the copying and inverting of the active flight plan.  Note that all active flight plan editing is performed on the FPL page.  Therefore, attempting to edit when this row is selected will have no effect.

The "New Route" row represents a new route to be created. Selecting this route will start the process of creating a new stored route.

A cyan cursor surrounds the row in the stored routes list on which operations are to be performed.  The cursor can be moved by rotating the right outer or inner knob or by touching a row.  When the cursor surrounds a given row, selecting that row by pressing an LSK, pressing the right knob, or touching the same row will perform the corresponding action on that row.  For instance, if the cursor surrounds the "New Route" row and then the right knob button is pressed, a new route will be created.

CREATING A NEW ROUTE

A new route can be created via the ROUTE tab by moving the cursor to the "New Route" row and then pressing the right inner knob button or touching the row again.

At that point, an empty flight plan will be shown and the route name field will be highlighted.  Entering a route name is optional (see "Naming A Route" on page 2-46).  To continue without entering a name, turn the right outer knob to show the familiar insert cursor.

Use the same methods as described on the FPL page to edit the stored route.  When editing is complete, press the "Back To Route List" LSK.

EDITING A ROUTE

To start editing an existing stored route, move the cursor to surround the route to be edited.  Then initiate editing by pressing the right knob button or touching the row again.

At that point, the route to be edited will appear.  Except for an additional row containing the route name at the top of the screen, the route will appear in the familiar format used on the FPL page.  Use the same methods as described on the FPL page to edit the stored route.  When editing is complete, press the "Back To Route List" LSK.

NAMING A ROUTE

A row containing the route name will be shown above the legs of the route.  The route name field in this row can be populated by the system or manually entered.  If not manually entered, the system will name a route using the identifiers of the first and last legs in the route (generally the origin and destination).

To manually set the route name, move the cursor to the route name field and then press the right knob button or touch the field.  Either use the keyboard or turn the right outer and inner knobs to enter the name.  When complete, press the "Enter" button on the keyboard or press the right knob button to accept the new route name.

---

**TIPS AND TECHNIQUES**

**Saving Altitude Constraints**
The system will save manually entered altitude constraints, but only for direct legs.  Manually entered altitude constraints on a leg within a published procedure (SID, STAR, Approach, or Airway) will not be saved.

---

COPYING A ROUTE

To make a copy an existing stored route, move the cursor to surround the route to be copied and then press the "Copy" LSK.

A copy of the route will have been created and the route will be presented for editing.  Note that the route name remains unchanged, so unless something is edited to cause the route name to be changed, upon return to the route list there will be two routes with the same name.

It is possible to save of the active flight plan by highlighting the "Current Route" row and pressing the "Copy" LSK.  Pressing the "Back To Route List" LSK with no changes will effectively save the flight plan into a stored route.  At that point, the saved version is like any other stored route.

*Copy Route LSK*

---
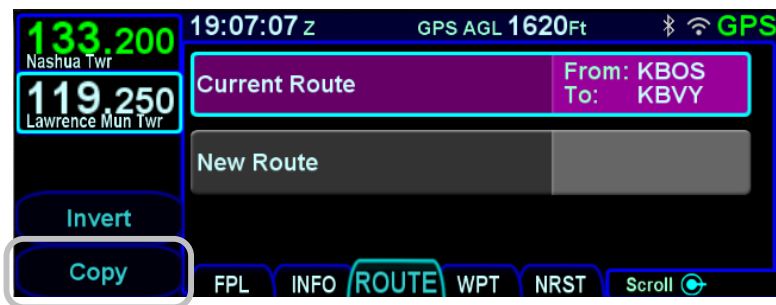
**TIPS AND TECHNIQUES**

**Route Previewing**
Experimentation with routes without altering the active route (e.g. setting up multiple arrival scenarios when still far from destination) can be accomplished by copying the active route on the Route tab, renaming it for clarity, and editing as desired. When ready, activate that newly edited route. In dual IFD installations, use one IFD to view potential changes without affecting the active route.

---

INVERTING A ROUTE

To make an inverted copy of an existing stored route, move the cursor to surround the route to be inverted and then press the "Invert" LSK.

An inverted copy of the route will have been created and the route will be presented for editing.

It is possible to invert the active flight plan by highlighting the "Current Route" row and pressing the "Invert" LSK. Pressing the "Back To Route List" LSK with no changes will effectively save the inverted flight plan into a stored route. At that point, the saved version is like any other stored route.

*Invert Route LSK*
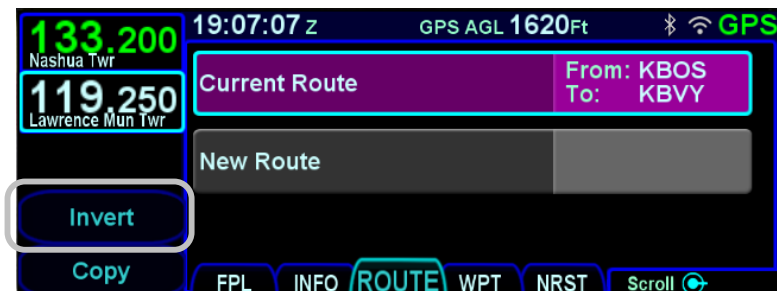


ACTIVATING A ROUTE

When a stored route is activated, a copy of that stored route will replace the flight plan and the aircraft will start providing guidance

to it.  To activate a stored route, from the stored routes list, highlight the desired route from the ROUTE tab by either touching the row or using the bottom knob.  Once the desired route to be activated is highlighted, press the "Activate Route" LSK along the left edge of the display.  The IFD will show the FPL tab with the desired route activated.

*Activate Route LSK*
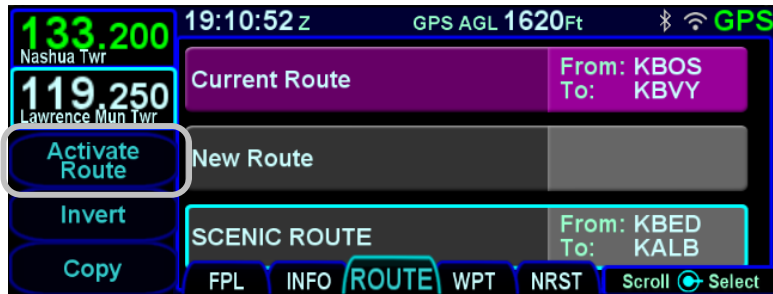


## DELETING A ROUTE

To delete a stored route, move the cursor to surround the route to be deleted, and then press the CLR key along the right edge of the display. A confirmation dialog box will then be displayed saying "Delete <name of flight plan>".  Confirm the deletion by either touching the dialog box or pressing the "ENTR" key along the right edge of the display.
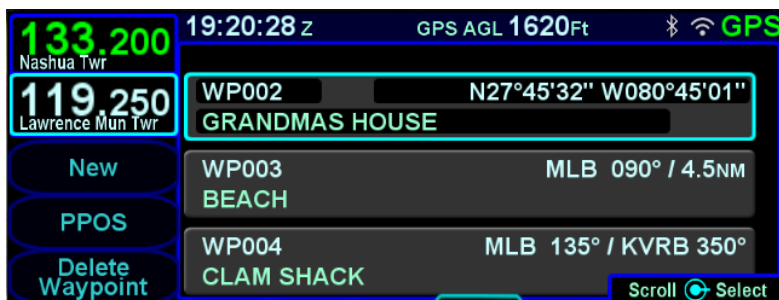
*Deleting a Route*
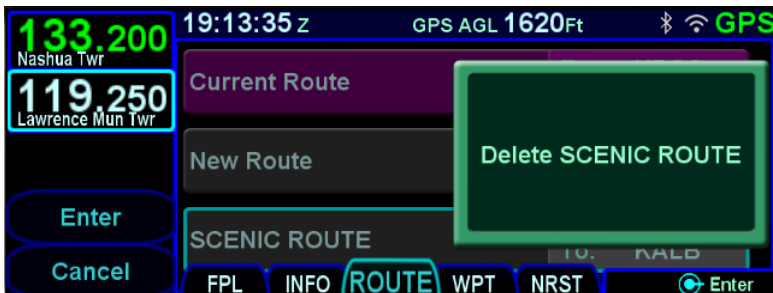
**COOL FEATURE**

The flight plan can be deleted by moving the cursor to surround the "Current Route" row, then pressing the CLR key.  The IFD will return to an empty FPL page.

## WPT (USER WAYPOINTS) TAB

The WPT tab will list all user waypoints in the IFD. Up to 500 user waypoints can be stored and accessed on this page.

*User Waypoints Tab*



CREATING A USER WAYPOINT

There are 4 methods of creating a user waypoint from the "WPT" tab of the FMS page:

- **Present Position** – Press the "PPOS" LSK to create a waypoint at the current aircraft position. No further action is required.
- **Enter Lat/Lon** – Press the "New" LSK then press the "Format" LSK until the "Lat/Lon" option appears. Enter the waypoint coordinates and then press the "Enter" LSK to save the waypoint.
- **Enter Radial/Radial (an intersection of two radials)** – Press the "New" LSK then press the "Format" LSK until the "Rad/Rad" option appears. Enter the fixes and radials. Then press the "Enter" LSK to save the waypoint.
- **Enter Radial/Distance** – Press the "New" LSK then press the "Format" LSK until the "Rad/Dist" option appears. Enter the fix, radial, and distance. Then, press the "Enter" LSK to save the waypoint.

Some external EFIS systems (e.g. Bendix King EFS 40/50, Collins Pro Line 21, etc) can also create and send user waypoints to the IFD. When the waypoint data is received from the external

EFIS, the IFD will automatically switch to the WPT tab if not already there.

## NAMING A USER WAYPOINT

Each user waypoint can be assigned a 5 character identifier that can be used in the FMS anywhere a nav database waypoint can be used. You can elect to use the automatically assigned 5 character identifier (format is "WP###") or re-name that as desired. A longer description can also be attached to each user waypoint using the "Name" field.  In each case, those names can be entered by either touching the specific field and using the virtual keyboard or by the bottom right knob.

## DELETING A USER WAYPOINT

There are two methods to delete an existing user waypoint. Either highlight the waypoint to be deleted and press the "CLR" button on the bezel, and then the "ENTR" button when the green confirm dialog box is displayed, or, use the "Delete Waypoint" LSK along the left edge of the display and then use the "ENTR" button when the green confirm dialog box is displayed (or touch the green box).

## DESIGNATING A USER WAYPOINT AS AN AIRFIELD

To designate a user waypoint as an airfield, the waypoint must be manually named using the format "AIRPORT XXXXFT" where XXXX is the field's elevation and note that the space is critical in naming the point.

*User Waypoint Airfield Naming Example*
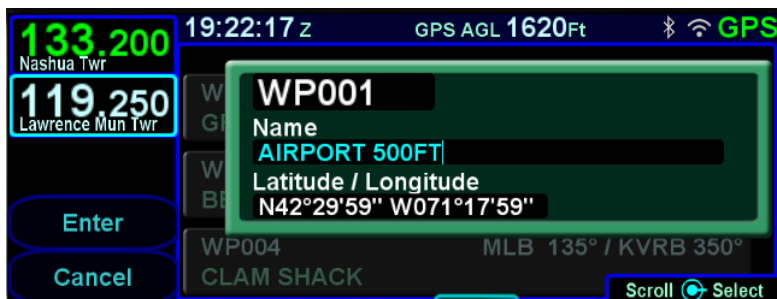


When used in a flight plan, the user-defined airport will display as an airfield with no known runway orientation.

*User Waypoint Airfield Depiction on Map*



**COOL FEATURE**

User waypoints can be uploaded to the IFD from a CSV file and downloaded to a CSV file from the IFD using Maintenance Mode. See "Transferring User Waypoints" on page 6-69 for details.

## NRST (NEAREST) TAB

The Nearest page has two display formats – full page Nearest and a split Map-Nearest combination. Switching between the two formats is accomplished by "opening" or "closing" the side tab when on the Nearest page.

*Full Nearest Tab*
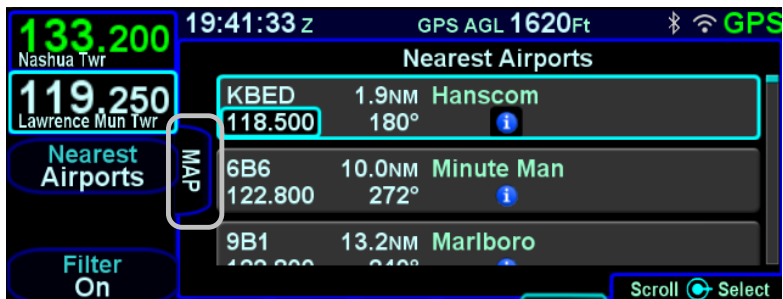


*Split Nearest Tab*



The "Nearest" LSK along the left edge can be used to cycle through the various nearest types. Choices include:

- Nearest Airports
- Nearest Airports to Destination
- Nearest VORs
- Nearest NDBs
- Nearest Intersections
- Nearest ARTCCs (out to 200nm from ownship)
- Nearest FSS

- Nearest Airspace
- Nearest User Waypoints

When using the split Map-Nearest view, the row that is highlighted in the Nearest list will also be highlighted in cyan on the map.

For those rows that contain a frequency, touching the frequency, or using the bottom knob to highlight it and then pushing the knob will nominate the frequency into the standby slot.

Some rows contain an $\mathbf{i}$ icon to indicate that more information about the facility is available on the Info tab. To quickly access the Info tab, either touch or rotate the inner knob to move the cursor to surround the icon. Then touch or push the knob to display the Info tab for the specified facility.

For airports that have a METAR associated with them, a colored METAR flag will be displayed on the right side.

Each Nearest type list can be scrolled either via touch (use a vertical swipe of the finger) or via the bottom knob.

If the highlighted item is an airport, pressing the Direct-To key on the bezel will display the Direct-To green dialog box with the highlighted airport pre-populated as the Direct-To location.

Pressing the NRST key will bring up the Nearest tab in the split Map-Nearest view. Each subsequent push of the "NRST" key will step to the next nearest data type.

If the Nearest page is left for 60 seconds or more and then is returned to, the Nearest Airports selection will be the active nearest data type no matter what the last nearest data type may have been. For example, if the Nearest VORs selection was the most recent display of nearest data, and then the pilot selects a map page for more than 60 seconds, when the Nearest tab is next selected, Nearest Airports data is now displayed and not Nearest VORs.

**TIPS AND TECHNIQUES**

**Emergency Return to Departure Airfield**
If on departure leg and an emergency return to the departure airfield is deemed necessary, the recommended technique is to press the –D-> button on the bezel, turn the bottom right knob counter-clockwise to pre-fill the departure airfield and press ENTR, ENTR to make that the active waypoint. Then press the PROC key to produce a dropdown list of approaches and select the desired one. To quickly get the tower frequency of that airfield, press the NRST button on the bezel and confirm the departure airfield is the highlighted row. You can then press the bottom knob to nominate that frequency into the standby slot for swapping.**†**

**NOTE**

**Nearest Lists Capped at 100nm**
Most Nearest lists will only display entries that are within 100nm of the current aircraft position. ARTCCs use 200nm.

# 3 Map Subsystem

The map subsystem contains several pages as shown below.



The SVS tab shows an exocentric synthetic vision view around the aircraft.

The MAP tab shows a plan view representation of the environment around the aircraft, much like a sectional chart.  The map can be panned away from the aircraft.

## MAP TAB

The map has several formats and views.  There is both a full map depiction as well as a datablock map depiction.  In both cases, you have the ability to control the map feature density as well as the various overlays, all via the LSKs along the left edge of the display.

The active FMS flight plan is always overlaid on the map as are any traffic depictions.

---

**COOL FEATURE**

**Next Leg Depiction on Map**
While the current leg of the active flight plan is always depicted in magenta on all moving maps, we've added an indication of the next leg using alternating magenta and white stripes.  This "candy cane" indication can come in handy during such circumstances as teardrop entries into a hold pattern.  It gives you a clear indication of what the system will do next. All future legs beyond the next leg will be depicted in white.

---

MAP CONTROLS

Turning the bottom right knob or using "pinch zoom" touch gestures will result in a map range change.

Map range choices extend from 2 nm up to 1000 nm.  Current map range is indicated on the outer map range ring at approximately the 1:30 position and as noted above, the map range can be adjusted by either turning the bottom knob or by using a two-fingered pinching gesture on the touch screen.  The depicted current range numeric is replaced by "Min" and "Max" for two seconds before timing back out to the actual range number when at the two range extremes.

Pressing the knob cycles through the various map views.  The map view selected is indicated at the top of the map next to the heading box.  No indication means Heading Up.  All other options are labeled next to that heading box.  Depending on the installation, map view options can be:

- Heading Up or Track Up (360°)

- Heading Up or Track Up (240° arc view)
- North Up (360°)

Heading vs. Track selection is made from the "Map Orientation" selection on the Setup Page.

*North-Up, 360 View Example*



North Up can be either Magnetic North or True North depending on the "Bearing Reference" selection on the Setup Page.

*Track-Up, Arc View Example*



---

**NOTE**

**Chart Data Reliance**
Always refer to current aeronautical charts for appropriate terrain and obstacle information. Do not rely on the IFD as your sole source of obstacle and terrain avoidance information.

**TIPS AND TECHNIQUES**

**Map Content Control**
Map features displayed are highly dependent on a combination of the map view, map range, map declutter settings, and user setup choices. For example, if the flight plan concludes at an airfield, the airfield identifier may be automatically decluttered in favor of the waypoint identifier that represents the airfield from the flight plan. In this example, both identifiers can be made visible by ranging in the map to under 4nm.

**NOTE**

**Heading vs. Track Depictions**
In configurations in which aircraft heading information is unavailable, the map display will orient the aircraft ownship symbol and other map data to the aircraft ground track and continue to display intruder aircraft oriented to heading.

**TIPS AND TECHNIQUES**

**Heading/Track Digital Display Can Be Removed**
The Setup Page provides a means to remove the heading/track digital readout box from the top of the map. This is intended to provide a method to increase usable map space, especially on dual IFD installations where cleaner maps are desired.

> **NOTE**
>
> **Map Orientation Without GPS**
> The map orientation will auto-switch from track-up orientation to north-up orientation when GPS is lost. Pilots who leave the map orientation in track-up during shutdown may notice the map will start up in north-up until a GPS position fix is available, at which time the map will auto-switch to track-up.

> **NOTE**
>
> **Terrain Resolution**
> The map uses 9 arc-sec terrain data globally.  There are however, some locations where the terrain database fills in missing terrain cell data and the map terrain will visually appear to be a lower resolution background in those locales.

OTHER MAP FEATURES

The table below defines other map features.

| Map Symbol | Item | Description |
|---|---|---|
|  | Desired Track | Solid magenta triangle on inside edge of map compass rose |
|  | Heading Pointer | Blue pointer on each side of the compass rose denotes the aircraft heading |

| Map Symbol | Item | Description |
|---|---|---|
|  | Heading Select ("Heading Bug") | For those installations where the IFD is receiving heading select (aka heading "bug") data, a hollow magenta heading bug is displayed for reference on the inside edge of the map compass rose |
|  | Projected track line | Dashed white line indicating actual track. Connects ownship symbol with compass rose. |
|  | Single Low Obstacle | 200' AGL up to 1000' AGL  (blue) |
|  | Grouping of low obstacles | 2 or more low obstacles (200' AGL up to 1000' AGL) within 1 nm of each other  (blue) |
|  | Single high obstacle | 1000' AGL or higher (blue) |
|  | Grouping of high obstacles | 2 or more high obstacles (1000' AGL or higher) within 1 nm of each other (blue) |

| Map Symbol | Item | Description |
|---|---|---|
| | Towered airport, hard<br><br>Towered airport, soft<br><br>Towered airport, water | If runway orientation is known, they are also depicted on the airfield symbol  (blue with white runway) |
| | Non-towered airport, hard<br><br>Non-towered airport, soft<br><br>Non-towered airport, water | If runway orientation is known, they are also depicted on the airfield symbol  (magenta) |
| | NDB | All NDBs in nav database (magenta diamond) |
| | VOR | All VORs in nav database  (blue) |
| | Intersection | All intersections in nav database  (gray) |
| | Flight plan, course waypoints | Each waypoint in flight plan  (white) |
| | Interstate highway | All interstate highways in the database  (solid brown) |

| Map Symbol | Item | Description |
|---|---|---|
|  | Class A | Each boundary of Class A airspace (solid red line) |
|  | Class B | Each boundary of Class B airspace (solid blue) |
|  | Class C | Each boundary of Class C airspace (solid magenta) |
|  | Class D | Each boundary of Class D airspace (dashed blue) |
|  | Victor or Jet Airways | All Victor and/or Jet airways (solid blue-gray) |
|  | Terrain scale | Indicates highest and lowest limits of the terrain in displayed area in hundreds of feet. Legend colors in between these values represent terrain elevations. Blue obstacle clearance number shows the top of the highest obstacle, when greater than the highest displayed terrain. |

| Map Symbol | Item | Description |
|---|---|---|
|  | Ownship symbol | Representation of present position.  Icon selection is made in Maintenance Mode (the two shown to the left are just examples) |

---

**COOL FEATURE**

**Optional Airspace Aural Alerting**
If selected on the Setup page, an aural alert "Airspace Ahead" will be issued when an imminent airspace penetration is anticipated.  This is designed to happen approximately 5 minutes (± 30 sec) prior to the projected airspace penetration.  The aural alert will repeat every 10 seconds until the condition is removed or the associated CAS message is acknowledged.

---

**TIPS AND TECHNIQUES**

**Scenarios for Airspace Aural Alerting**
A technique for the use of aural airspace alerting is to turn it on via the Setup page when flying in non-familiar areas, especially when operating under VFR.
Experience has shown that local area flights in familiar airspace or when operating under IFR can result in what may be considered nuisance calls.

---

FUEL RANGE RINGS

When the IFD is interfaced with a functioning fuel flow system, fuel range rings will be displayed on the map.  The fuel range rings depict the range of the aircraft given the current fuel quantity remaining and fuel flow.  Current winds are taken into account since the range calculation uses ground speed.  The range ring calculation is

performed assuming a 45 minute fuel reserve for fixed wing aircraft and a 20 minute reserve for helicopters.

A dashed green fuel range ring shows the maximum range of the aircraft while still retaining the reserves. In other words, when the aircraft reaches the dashed green line, only reserve fuel is left.

If there is fuel remaining in excess of the reserve, the maximum range of the aircraft is shown using a solid yellow ring beyond the extent of the dashed green ring. When the total remaining fuel quantity is less than the reserve, single ring is presented using an alternating red/yellow dashed style.

The fuel range rings are always displayed and cannot be turned off, though they can be hidden at low map ranges because of decluttering. Changes in power settings, changes in winds aloft, and remaining fuel quantity will alter the range depiction. Inaccurate manual entry of initial fuel quantity will result in an inaccurate fuel range ring depiction.

*Fuel range rings with remaining reserves*



*Fuel range rings with less than reserve remaining*

## DECLUTTERING THE MAP

Two LSKs along the left edge of the display allow for separate control of the information density of the land ("Land") map features (e.g. terrain, political boundaries, rivers, lakes, oceans, roads, etc.) and the navigational ("Nav") map features (e.g. airspace, Victor and Jet airways, airports, obstacles, navaids, etc.).

Use the "Land" and/or "Nav" LSK to select the preferred level of feature density.  The selected levels remain consistent across all maps shown on the IFD.

***Map Declutter Controls***



## MAP PANNING

Panning the map is accomplished by dragging a finger along the display in the direction of desired panning.  When panning away from the ownship depiction, a cross-hair cursor is displayed and a readout of the bearing and distance from present position to the cross-hair cursor position is displayed next to the cross-hair cursor.

The map will snap back to being centered on the present-position ownship depiction after 20 seconds of panning inactivity or if a quick double-tap on the touch-screen is made.

| NOTE |
| --- |
| **Map Panning Limited Geographic Boundaries**<br>Due to map projection limitations, map panning is limited to +/- 45 degrees of longitude and +/- 30 degrees of latitude from present position. |

> **NOTE**
>
> **Map Panning Only Via Touch**
> Map panning can only be accomplished via touch
> screen use.  There is no physical bezel control to
> support map panning.

GRAPHICAL FLIGHT PLANNING ("RUBBER BANDING")

A flight plan can be altered graphically by touching the desired leg or
the desired waypoint on the map depiction, placing your finger on the
leg for approximately 2 seconds until the leg turns cyan, and then,
without lifting your finger off the display, dragging your finger to the
desired location.  When you lift your finger off the display, a dialog
box is presented on the display for you to choose/confirm the new
waypoint being created.

If the new fix is in close proximity to a facility or facilities in the on-
board navigation database, then both the fix and the nearby facility or
facilities will appear in the dialog box list.

*Rubber Banding Dialog Box*



If the intended new waypoint is not listed in the dialog box to your
satisfaction, press the bezel "CLR" button to clear and restart as
required.

As soon as a fix from the presented list is selected, a new waypoint is
inserted in the FPL flight plan list and uses a default waypoint naming
mechanism ("RBxxx" where "RB" stands for Rubber Banding).  This
can easily be seen if the IFD were on the FPL tab of the FMS page
and using the split Map-FPL view.

**TIPS AND TECHNIQUES**

**Optimal Rubber Banding**
If you don't see the desired leg turn cyan within 2 seconds of placement of your finger on the location, try slightly adjusting the placement of the finger that is being used to designate a leg for rubber banding.  Move your finger slightly in a direction perpendicular to the leg.   Note that any leg can be rubber-banded including the active leg (the magenta one) unless the leg is part of a published instrument procedure.

Rubber banding is a handy feature to quickly alter a flight plan around airspace or a weather buildup while staying on the map.

**NOTE**

**Rubber Banding Only Via Touch**
Rubber banding can only be accomplished via touch screen controls.  There is no physical bezel control to support the feature.

**NOTE**

**Rubber Banding Not Functional in SVS View**
Rubber banding is not supported in the exocentric synthetic vision view of the flight plan on the SVS tab of the MAP page.

ALTITUDE CONSTRAINTS ON MAP

Any waypoint that has an altitude constraint defined for it in the flight plan, including all published procedures, will display a graphical indication of the altitude constraint on the map.  The types of altitude constraints are:

- **At or Below** (line above altitude)
- **At** (lines above and below altitude)
- **At or Above** (line below altitude)
- **Between** (lines above and below altitudes)

*Example Depictions of Altitude Constraints*



The altitude constraint depiction will also appear at the proper geographic position.  For example, if an altitude constraint were defined to be 5nm prior to a waypoint like it is for KGDM in the image above, the graphical representation of the altitude constraint on the map will be positioned 5nm prior to the waypoint, instead of at the actual waypoint.

MAP INFORMATION POP-UP BOXES

There are "hot spots" all over the map and include every depicted navaid, airport and airspace including TFRs. Touching one of these "hot spots" will generate an informational pop-up box that contains relevant information about that hot spot.  These boxes will time out in

20 seconds and can also be dismissed by tapping somewhere else on the display. A few examples are depicted in the images below. Note that in every case, there is a page count in the bottom right corner of each pop-up box. For those boxes that indicate more than one page (e.g. VOR co-located with an airfield), touching the pop-up box switches between the various pages of the pop-up box.

*Map Popup Info Boxes*







For those hotspots that are an airport and typically have METAR data associated with them, a METAR page can be appended to the map info popup boxes as shown in the middle example image above.

---

**TIPS AND TECHNIQUES**

**METAR page on Map Popup Pages Delayed**
If the airfield being touched to generate the map info popup box is not in your active flight plan or nearest list, there will be approximately a 1 second delay before the METAR page will created.  This can be avoided by dwelling your finger on the airfield of interest for approximately 1 second or touch the airfield a second time to give the system time to generate the METAR map info popup page.

---

**NOTE**

**Map Pop-Up Boxes Only Via Touch**
Map pop-up boxes can only be accomplished via touch screen use.  There is no physical bezel control to support the feature.

---

## DATALINK WEATHER OVERLAYS AND OPERATIONS

Several broadcast datalink weather receivers can be interfaced to the IFD.  Some datalink services require a monthly subscription (e.g. Sirius/XM), while others are free (e.g. SkyTrax100).  In either case, however, the weather data is received continuously.

The following tables show the set of weather products associated with different types of receivers.  For each product, the tables show:

- Short Name – the product name that is shown on the Datalink Status Page and in alerts.  If none is defined, then the short name is the same as the product name.

- Late Time – if the IFD does not receive the product within this time after power up, the IFD will indicate that the product is "overdue".

- Stale Time – if the elapsed time since the IFD has received the product exceeds this time, the IFD will indicate that the product is "stale".

**ADS-B Receiver (e.g. SkyTrax100)**

| Product | Short Name | Late (minutes) | Stale (minutes) |
|---|---|---|---|
| Regional Radar | Rgnl WxRadar | 15 | 75 |
| ConUS Radar | US WxRadar | 30 | 75 |
| METARs | | 15 | 20 |
| TAFs | | 20 | 40 |
| AIRMETs | | 15 | 20 |
| SIGMETs | | 15 | 20 |
| TFRs | | 40 | 40 |
| Lightning | | 15 | 75 |
| Icing | | 30 | 105 |
| Cloud Tops | | 30 | 105 |
| Winds & Temps | | 20 | 40 |
| Turbulence | | 30 | 105 |

**XMD-076**

| Product | Short Name | Late (minutes) | Stale (minutes) |
|---|---|---|---|
| Radar US | US WxRadar | 15 | 75 |
| Radar Canadian | CA WxRadar | 15 | 75 |
| METARs | | 15 | 75 |
| TAFs | | 15 | 90 |
| AIRMETs | | 15 | 90 |
| SIGMETs | | 15 | 90 |
| TFRs | | 45 | 90 |
| Lightning | | 15 | 18 |

*GDL-69*

| Product | Short Name | Late (minutes) | Stale (minutes) |
|---|---|---|---|
| Radar US | US WxRadar | 15 | 75 |
| Radar Canadian | CA WxRadar | 15 | 75 |
| Radar Puerto Rican | PR WxRadar | 15 | 75 |
| Radar Coverage US | US Radar Coverage | 15 | 75 |
| Radar Coverage Canadian | CA Radar Coverage | 15 | 75 |
| METARs  US | US METARs | 15 | 75 |
| METARs Canadian | CA METARs | 15 | 75 |
| TAFs US | US TAFs | 15 | 90 |
| TAFs Canadian | CA TAFs | 15 | 90 |
| AIRMETs | | 15 | 90 |
| SIGMETs | | 15 | 90 |
| TFRs | | 45 | 90 |
| Lightning | | 15 | 18 |
| Icing | | 45 | 120 |
| Storm Cells | Storms | 15 | 20 |
| Winds | | 45 | 120 |

NOTE

**Datalink Data Accuracy**
Avidyne does not control, review, or edit the information made available by the datalink products, and is therefore not responsible for the accuracy or timeliness of that information.

DATALINK RADAR

The Datalink radar is a composite image depicting precipitation as
seen by multiple ground weather radar sites.  The image is color-
coded to FAA definitions to show intensity levels and precipitation
types and is overlaid on top of any other map features, including
terrain alerting.

*Datalink Precipitation Example*

*Weather Data Legend*
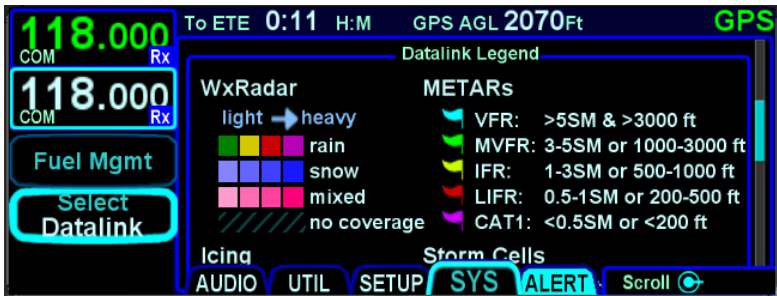


At large map ranges beyond 250nm from the aircraft, small areas of high-intensity radar returns may not be displayed; instead, larger areas of surrounding lower-intensity radar returns will be shown.

Diagonal stripes depict the boundary of available weather radar and also areas of no-coverage. In normal operation the boundary follows the outline of the Continental United States (CONUS). If, however, datalink radar is unavailable in a particular area for any reason, hatched lines appear in that area. In the mountains and off the coast, hatched lines may represent no coverage below 10,000 feet. If there are radar returns in that region above 10,000 feet, the returns will be displayed as "islands of precipitation" surrounded by the hatched lines.

ADS-B ("FIS-B") radar data coverage areas can be very irregular shaped areas – the geometry is dependent on how many transmission sites are in view and how much data has been received by the on-board receiver.

*No Datalink Coverage Area Hatched Lines*

Like ADS-B radar, ADS-B lightning has a defined coverage area. However, whereas the ADS-B radar coverage is shown by highlighted those areas that are **not** covered, the coverage area for ADS-B lightning is shown by highlighting the area that **is** covered. The coverage area for which lightning data has been received is depicted using a "shadow", as illustrated below. The shadow consists of a transparent, gray region on all Land declutter settings. This allows for quick distinction between two coverage areas when simultaneously displaying radar and lightning overlays.

*ADS-B Lightning Coverage Area Shadow*



WEATHER OVERLAYS ON MAP

The "Wx Overlay" LSK on the map page brings up a control page on which the layers can be turned on or off.

*Wx Overlay Selection*



The options vary with the installed datalink device and subscription level.

The Wx Overlay page is segmented into groupings of products. Products selected for overlay are indicated by a green lamp. Note that the products in the "Weather Layers" group are mutually exclusive. The table below represents the possible set of products available. Products that are not available due to the device type or subscription level will not be displayed as selectable choices.

| NOTE |
| --- |
| **ADS-B (FIS-B) US Weather Radar Data is Coarse** When compared to subscription Datalink service data and even ADS-B Regional data, the CONUS weather radar data appears as a noticeably coarser depiction – this is a function of the supplied data. |

| NOTE |
| --- |
| **Weather Source Selection** An individual IFD can only display weather data from one source (e.g. SkyTrax100, GDL-69). The supported provider/device is assigned at time of installation. For dual IFD installations with more than one type of weather source, one weather source must be wired to the first IFD only and the other weather source must be wired to the second IFD only. |

| Weather Product Grouping Title/Category | Possible Selections Within the Grouping |
| --- | --- |
| Weather Layers | Datalink radar<br>Storm Cells<br>Icing (incl. SLD and Probability)<br>Winds Aloft<br>Cloud Tops<br>Turbulence |
| Airport Reports | METARs |

| Weather Product Grouping Title/Category | Possible Selections Within the Grouping |
|---|---|
| Weather Reports | AIR/SIGMETs |
| Lightning | Datalink lightning<br>Sensor – Strike<br>Sensor – Cell<br>Sensor – Clear Strikes |

Selections can be made by either touching the desired product or by using the bottom knob.

Note that when there is an on-board lightning sensor selected (Avidyne TWX670 Tactical Weather System or L3 WX500 Stormscope), the "Lightning" grouping will also include a "Clear Strikes" key. A WX-500 Lightning sensor test is only available in maintenance mode.

Use the bottom right knob to adjust altitude slices for icing, winds, and turbulence. Note that the knob will only adjust the weather product slice if the product is being displayed and is valid; otherwise it still controls the map range and view.

Choices may include "METARS", "AIR/SIGMETS":

- **METARs** – These are available in both text and graphical formats and represent recent surface weather observations. Text METARs are presented on the "Info" tab of the "FMS" page. The graphical METARs are color-coded flag symbols that summarize a recent surface weather observation and can appear as overlays on the Map and embedded in the flight plan on the Flight Plan tabs and Nearest tabs. These flags allow an overview of general weather conditions in an area.

  *Graphical METAR Legend*

  METARs
  VFR:     >5SM & >3000 ft
  MVFR: 3-5SM or 1000-3000 ft
  IFR:      1-3SM or 500-1000 ft
  LIFR:    0.5-1SM or 200-500 ft
  CAT1:   <0.5SM or <200 ft

- **AIRMETs and SIGMETs** (US only) – These are areas where the National Weather Service has issued advisories for various types of hazardous weather. They are depicted on the Map page along with an abbreviated description of the hazard, such as "ICE" (icing), "MTN" (mountain obscuration), or "IFR" (instrument flight conditions).

*AIRMETs and SIGMETs Detail MAP Page*



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**COOL FEATURE**

**METAR Flags in Flight Plan**
The right edge of each leg in a flight plan presents a METAR flag for the closest reporting station, if the station is different from the previous leg's station. The station for which the METAR flag applies is decoded immediately beneath the flag and may not be exactly the same location as the leg itself.
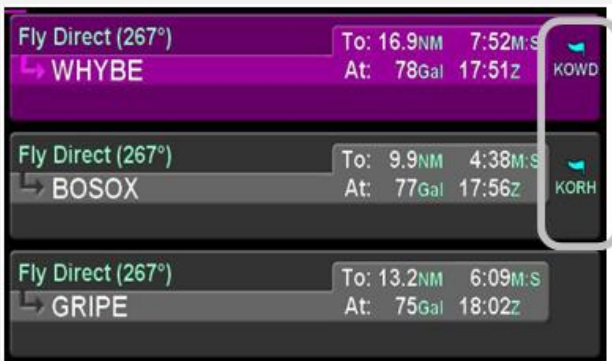
TFR

TFR data is also transmitted via Broadcast Datalink. Two types of TFRs are depicted – active and pending. Active TFRs are depicted as solid red lines and Pending TFRs are depicted as dashed red lines, which become solid when the TFR transition time rolls from pending to active. TFR data cannot be turned off.

*Active and Pending TFRs*
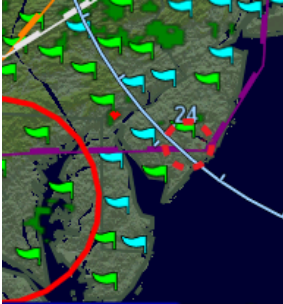


INDICATIONS OF DATA AGE

The multiple products transmitted as part of the broadcast datalink service can arrive at different intervals.  The age of the current overlay data is shown in the lower left corner of the map.  If a datalink icing product was selected for display via the "Wx Overlay" key, the radar age is replaced by the age of the icing altitude data currently being displayed; the icing altitude slice currently displayed is shown in the bottom right corner.

| NOTE |
| --- |
| **Datalink Data Position**<br>The in-cockpit radar display depicts where the weather WAS, not where it IS. The age indicator does not show the age of the actual weather conditions but rather the age of the mosaic image. The actual weather conditions could be up to 15 to 20 minutes OLDER than the age indicated on the display. Pilots should consider this potential delay when using in-cockpit radar capabilities, as the movement and/or intensification of weather could adversely affect safety of flight. |

> **IMPORTANT NOTE**
>
> **When connected to an ADS-B Receiver...**
> Winds and temperatures aloft depicted are only
> displayed as a 6 hour forecast. It is strongly
> recommended for the pilot to obtain the latest
> information through other approved sources for their
> operation. The 12 and 24 winds aloft forecast will need
> to be obtained via other approved sources.

*Data Age: RADAR and Icing*



TRAFFIC DISPLAY

When integrated with an optional traffic system (e.g. TAS, TIS-A, ADS-B, TCAS), the IFD will display traffic information for sensed aircraft and provide visual alerting for traffic considered a threat.

Traffic data will always be displayed as an overlay on the map and can also be selected as a datablock option on the left or right side of the display. The center of the traffic symbology represents the horizontal position reference point of the traffic.

The following symbols for traffic systems are displayed both on the map (all views) and in the traffic thumbnail

*Basic Traffic Symbols*

Unless otherwise noted, all traffic sensors can generate basic non-directional traffic symbols

| Symbol | Definition |
|--------|------------|
| | Traffic Advisory (TA) <br><br> Traffic which meets the alert criteria for the traffic sensor (solid yellow circle) |
| | Proximate Traffic (PA) <br><br> Traffic which does not meet the alert criteria but is "close" to the aircraft (within 6nm and 1200ft).  (solid cyan diamond) |
| | Other Traffic <br><br> Traffic that is detected by the traffic sensor, but determined not to be a current threat. (hollow cyan diamond) |

---

**CAUTION**

**No TA from Uncertified Devices**
The IFD can be configured to receive ADS-B traffic over WiFi.  Because the IFD cannot guarantee whether the transmitting device is certified, the IFD will display traffic targets as PA rather than TA.  Pilots should always exercise extra caution when a PA target from a WiFi connected source is presented.

---

*ADS-B Directional Traffic Symbols*

ADS-B traffic sensors can display directional versions of the basic traffic symbols when track or heading information is available.  The symbol is oriented to reflect the target's track.  If speed information is also available, a one minute Horizontal Velocity Vector (HVV) barb is shown on the map display of traffic.

| Symbol | Definition |
|--------|------------|
|  | ADS-B Traffic Advisory (TA)<br><br>Traffic which meets the alert criteria for the traffic sensor (solid yellow arrowhead surrounded by a ring). |
|  | ADS-B Proximate Traffic (PA)<br><br>Traffic which does not meet the alert criteria but is "close" to the aircraft (within 6nm and 1200ft).  (solid cyan arrowhead) |
|  | ADS-B Other Traffic<br><br>Traffic that is detected by the traffic sensor, but determined not to be a current threat. (hollow cyan arrowhead) |

***ADS-B Ground Traffic Symbols***

ADS-B traffic sensors can also show ground targets.  No additional traffic information (e.g. altitude, vertical trend) is shown with these targets.  If track or heading is available, the directional version of the symbol will be presented.

| Symbol | Definition |
|--------|------------|
|  | On-ground traffic (non-directional)<br><br>Traffic reporting an on-ground state (hollow brown diamond). |
|  | Ground vehicle (non-directional)<br><br>Traffic identifying as a ground vehicle  (hollow brown rectangle with four wheels) |

| Symbol | Definition |
|:---:|:---|
|  | On-ground traffic (directional)<br><br>Traffic reporting an on-ground state (hollow brown arrowhead). |
|  | Ground vehicle (directional)<br><br>Traffic identifying as a ground vehicle (hollow pointed brown rectangle with four wheels) |

Additional information is displayed adjacent to the traffic symbol to indicate relative altitude, in hundreds of feet, and vertical trend.

*Additional Traffic Information*



The Aircraft ID (tail number, call sign, or squawk code) may also be displayed adjacent to the traffic symbol on the Map display when it is available from the traffic sensor.

*Aircraft ID Depiction*



## TIS-A Directional Traffic Symbols

TIS-A Directional Traffic symbols are identical to the Basic Symbols for TA, PA, and Other traffic except that a 45° cardinal track pointer is added to the symbol pointing in the direction of travel. TIS-A track

lines only show direction, they do not convey any speed information about the sensed traffic's speed.

## Non-TA Traffic Range Filter

TA and PA traffic is always displayed on the map. However, to avoid display clutter at wide map zoom ranges, "other" and "ground" traffic is defined as a map layer that can be turned off. The "Non-TA Traffic" map layer is part of the Map settings on the Setup Page (see page 4-57) and can be turned on or off. If the layer is on, then the range below which the traffic will be displayed is also configurable.

*Setup Page Non-TA Traffic Layer Item*



## Traffic Thumbnail Datablock

For space reasons, the Traffic Thumbnail datablock does not show the traffic ID or ADS-B HVV barbs. TAs which are beyond the range of the traffic thumbnail will display as a half symbol at the edge of the thumbnail's outer range ring. The traffic thumbnail is always displayed with the ownship heading up (HDG) for TAS and TCAS sensors. For ADS-B and TIS-B, the traffic thumbnail may be displayed as track-up (TRK) if heading is not available.

| *TAS Traffic* | *TIS-B Traffic* | *Traffic Thumbnails* |
|:---:|:---:|:---:|



Traffic Advisories (TA) will generate a CAS message. Depending upon the type of traffic system installed, an aural alert may also be generated.

Most installations will ensure the traffic system is in Standby or Ground mode on the ground and will automatically toggle to one of the enroute altitude modes per the table below.

| Traffic Altitude Mode | Relative Altitude Window |
|---|---|
| Below | -9900' to 2700' |
| Normal | -2700' to 2700' |
| Above | -2700' to 9900' |
| Unrestricted | All known traffic |

To change the display range on the traffic thumbnail, touch the area showing the range rings, roughly the upper two-thirds of the thumbnail.

**TIS-A Specific Information**

TIS-A capable transponders are supported by the IFD including map depictions of the TIS track lines. These track "barbs" are only reported and indicated to 45° cardinal increments (e.g. 0°, 45°, 90°, 135°, etc.) and roughly point in the sensed traffic direction. TIS-A track lines do not convey any speed information about the sensed traffic.

*TIS-A Track Pointer*



Since TIS-A traffic data is re-radiated data from FAA ground stations, there are a few additional possible states of the data beyond normal operating state. The non-normal TIS-A status states will be displayed in the traffic thumbnail and as CAS messages and include:

| TIS-A Traffic Thumbnail Status | Definition |
|---|---|
| "Coasting" | TIS traffic communications have ceased for more than 6 seconds but less than 12 seconds |
| "Removed" | TIS-A traffic communications have ceased for more than 12 seconds |
| "Unavailable" | No TIS-A ground station is available or communications have ceased for more than 60 seconds |

*TIS-A Coasting Indication*



## ADS-B Specific Information

ADS-B traffic can come from several sources depending upon the equipment installed aboard the aircraft, equipment installed on target aircraft, and proximity to ADS-B ground stations.  ADS-B, ADS-R, and TIS-B traffic can all coexist within the ADS-B data stream.

When an ADS-B traffic sensor is installed, the traffic thumbnail can show status as follows:

| ADS-B Traffic Thumbnail Status | Definition |
|---|---|
| "Track Degraded" | The angular placement of intruders in the traffic thumbnail is not necessarily within 5 degrees of the nose.  This indication is normal on the ground in aircraft without a heading source. |
| "Pos Degraded" | The ownship GPS position accuracy (HFOM, VFOM) is worse than the normal limits for accurate placement of intruders. This indication is normal on the ground until a good GPS signal is acquired. |
| "ADS-B Degraded" | Indicates the receiver has not yet gotten a good enough GPS lock to update its internal clock or there is a problem with the ADS-B receiver's GPS position. |
| "Maint Required" | This message is sent by the ADS-B receiver.  If displayed, consult the ADS-B receiver manual. |

| ADS-B Traffic Thumbnail Status | Definition |
|---|---|
| "No TIS-B" | Indicates the ground is not providing TIS-B or ADS-R services to your aircraft. The primary causes of this are:<br><br>• The aircraft is not in range of a ground station<br>• the aircraft is not providing qualifying ADS-B Out information<br>• the ADS-B In device is not configured for the correct tail number<br><br>This indication is common and normal at low altitudes, but if you never get TIS-B service while in a known service area and at sufficient altitude (above 1500ft in most of CONUS), it likely means there is a misconfiguration of your ADS-B Out or ADS-B In device. |

If an individual intruder displays "DGRD" in yellow in the traffic thumbnail, then that intruder is reporting its own GPS position accuracy (HFOM, VFOM) as outside normal operating limits.

TRAFFIC SENSOR CONTROL

Because traffic sensor mode changes are automatic based on phase of flight, manual control of the sensor is generally unnecessary. However, if a manual mode change is desired, it can be changed using the traffic thumbnail. To change the sensor mode, touch the mode shown in the lower third of the thumbnail. Repeated touches will cycle through all available modes. If the thumbnail is displayed on the left side of the IFD, adjacent to the top LSK, then the LSK can also be used to cycle through the modes.

When the installed traffic sensor is a Skywatch and the aircraft is not airborne, "Standby" mode is included in the cycle of selectable modes. When the standby mode is selected, the thumbnail can be

used to command the Skywatch to perform a self test. The thumbnail will show the message "Touch for Self-Test" within the range rings typically used to show traffic. To initiate the self test, touch over the message. During the self-test, the thumbnail will show the message "Self-Test In Progress", as illustrated below.

*Skywatch Self Test*



---

**TIPS AND TECHNIQUES**

**More than one type of traffic sensor?**

If more than one type of traffic sensor is present in the aircraft, proper configuration is important.

For a single IFD installation, only a single traffic sensor will be used by the IFD. The priority is SkyTrax100 (RS232) Capstone, TAS6XX/TCAD, ARINC429 ADS-B Sensors, Skywatch, Other ARINC429 traffic sensor. There is no fail-over between traffic sensors and the priority may change in the future. Therefore, Avidyne recommends wiring only one traffic sensor to the IFD.

For a dual IFD installation, Avidyne recommends wiring one traffic source to one IFD and the other traffic source to the second IFD.

## TERRAIN AWARENESS

Terrain Awareness is a graphical representation of aircraft height above surrounding terrain and obstacles, shown as colored overlays on the map.  It is for general situational awareness purposes and is not intended to be the sole means of terrain or obstacle avoidance. Terrain Awareness is often abbreviated as "TA", but that is avoided in this document in order to prevent confusion with the same acronym being used for "Traffic Alert".  Terrain Awareness is based on GPS altitude, not baro corrected or radar altitude, and will not generate a CAS message or aural alert.

*Terrain Awareness*



Terrain Awareness coloring can be triggered by terrain within a 10nm radius of the aircraft and is displayed as follows, depending upon the installation:

| Fixed Wing Installation | Helicopter Installation | Displayed As |
|---|---|---|
| Terrain between 100 and 1000 feet below aircraft altitude | Terrain between 100 and 500 feet below aircraft altitude | Hatched yellow |
| Terrain less than 100 feet below aircraft altitude, including terrain above aircraft altitude | Terrain less than 100 feet below aircraft altitude, including terrain above aircraft altitude | Hatched red |

When the aircraft is more than 3000 feet above any surrounding terrain (1500 feet for helicopters), Terrain Awareness is turned off automatically.

Terrain Awareness coloring can also be triggered by obstacles as follows:

| Fixed Wing Installation | Helicopter Installation | Displayed As |
|---|---|---|
| Obstacles between 1000 and 2000 feet below aircraft altitude | Obstacles between 500 and 2000 feet below aircraft altitude | Cyan threat bubble over the obstacle |
| Obstacles between 100 and 1000 feet below aircraft altitude | Obstacles between 100 and 500 feet below aircraft altitude | Yellow threat bubble over the obstacle |
| Obstacles less than 100 feet below aircraft altitude, including above aircraft altitude | Obstacles less than 100 feet below aircraft altitude, including above aircraft altitude | Red threat bubble over the obstacle |

Terrain Awareness coloring is inhibited in an area immediately surrounding airports to allow for enhanced visual distinction of those facilities.  If the orientation of runways at the airport can be determined, then the inhibited area will be based on the outlines of the runways.  Otherwise, coloring will be inhibited in a circular area around the airport, including airports that have been designated as an airfield (see page 2-52).

*Inhibited Terrain Awareness Coloring*



Terrain Awareness coloring can be turned off via the Setup Page (see page 4-63), but that setting will not affect Terrain Awareness for obstacles, which cannot be turned off.

FORWARD LOOKING TERRAIN AVOIDANCE (FLTA)

The IFD comes standard with the "F500" option enabled.  When that option is enabled, the IFD will perform a Forward Looking Terrain Avoidance (FLTA) function. FLTA is based on GPS altitude, not baro corrected or radar altitude.

The FLTA function evaluates the aircraft trajectory to determine areas of conflict with terrain or obstacles.  Depending upon proximity to the aircraft, FLTA classifies conflict areas as "caution" or "warning", with warning representing the more immediate threat.

When FLTA has identified a conflict warning or caution area, the IFD will issue a CAS warning or caution message for the most imminent threat based on whether the conflict is with terrain or with an obstacle.  An aural alert will accompany the CAS message, based on the Setup Page selection (see page 4-64).

On the map, FLTA caution and warning areas are depicted as solid yellow and red regions, respectively, as illustrated in the figure below.

*FLTA Depiction (solid red and solid yellow)*



The area immediately surrounding an airport is considered an FLTA "exclusion area". If the aircraft position or an FLTA conflict area is anywhere within that exclusion area, the IFD will not generate the typical FLTA caution or warning alerts.  At an airport with no known runways, the airport exclusion area is a 1nm radius circle surrounding the airport reference point.  For each known runway at an airport, an exclusion area extends 1nm past each end and 0.75nm on each side of the centerline.  Therefore, at an airport with multiple runways, the airport exclusion area comprises the exclusion area for every runway.

If FLTA is turned off (via the Setup Page, TAWS Page, or external discrete), the IFD will issue a CAS advisory message of "FLTA Off".

*FLTA Off Message*
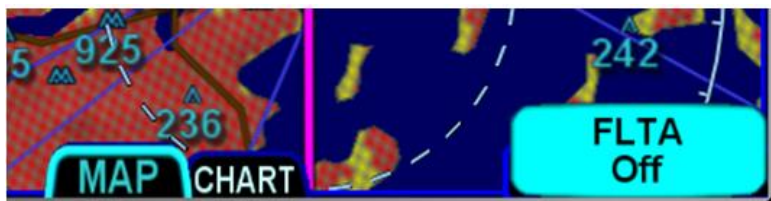


Should an FLTA alert be generated, there are several courses of action that can be taken and the specific scenario will dictate the optimum avoidance maneuver.  For example, sometimes the best course of action is to immediately add power and climb, yet sometimes the best course of action may be a small heading change, especially in the case of a single obstacle off the nose. The pilot in command must assess the specific circumstances presented and take action to avoid flight into terrain.

---

**NOTE**

**FLTA Disabled in External TAWS Equipped Aircraft**
In order to prevent conflicting information, when an external TAWS/EGPWS system is installed*, all FLTA functionality is turned off (including the "FLTA Off" CAS message).

*See "External TAWS" field on the "Main System Config" maintenance mode page.

---

ALTITUDE CALLOUT

When an IFD is configured with the F500 or HTAWS options enabled, an aural alert can be played anytime the aircraft descends through one of several defined AGL altitudes.  The AGL altitude is calculated by comparing GPS MSL altitude with elevation of either the destination runway threshold, if applicable, or the terrain directly beneath the aircraft.  Alerts exist at 1000', 500', 400', 300', 200', and 100' AGL.  The callout for each altitude can be enabled or disabled using Maintenance Mode.

These callouts are intended for use during approach to landing.  Therefore, they are not suppressed in FLTA exclusion area, but will not play while there is an active FLTA caution or warning.  The enabled callouts, as a set, can be turned on or off using the Setup Page.

## HELICOPTER TAWS (HTAWS)

When both the TAWS and HELO options are enabled (see page 4-80), the IFD provides an HTAWS function. HTAWS includes only FLTA and Altitude Callout functions.

When an HTAWS warning condition is active, the associated aural alert cannot be muted.

HTAWS has a "reduced protection" (RP) mode that reduces the protection limits in order to prevent nuisance alerts. The lower protection limits cause the IFD to generate alerts as late as possible, while still meeting the regulatory requirements.

When HTAWS is enabled, and HTAWS is in an other than nominal state, the HTAWS status overlays the upper left position in the data strip, as illustrated below.

*HTAWS Status Annunciation*
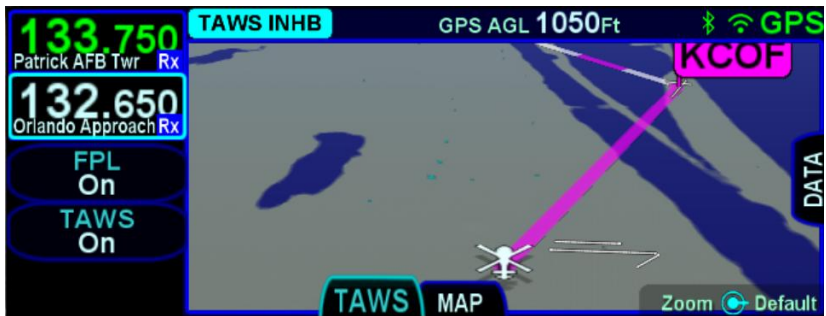


The status is displayed on a background indicating the severity of the condition; red for warnings, yellow for cautions, and cyan for advisories. The following table describes the possible annunciations that can be displayed.

| Annunciation | Condition |
|---|---|
| TERRAIN | FLTA imminent ground threat |
| OBSTACLE | FLTA imminent obstacle threat |
| TERRAIN | FLTA likely ground threat |
| OBSTACLE | FLTA likely obstacle threat |
| TAWS N/A | HTAWS failure due to invalid GPS |

| Annunciation | Condition |
|---|---|
|  | position/velocity |
| TAWS TEST | HTAWS self-test is in progress |
| TAWS INHB | HTAWS is turned off, aircraft is hovering, aircraft is within an FLTA exclusion area, or aircraft is on ground |
| RP MODE | HTAWS is in reduced protection mode |

HTAWS SELF-TEST

HTAWS self-test is conducted automatically at power up.  While the self-test is running, external HTAWS related annunciators are illuminated and the TAWS page will show "TAWS Self-Test In Progress".  Whether the self-test passed or failed will be annunciated using an aural message.

If HTAWS had passed self-test and then fails at some point later in the power cycle, a "bing-bong" chime is issued along with a CAS message.

## SYNTHETIC VISION (SVS) / TAWS TAB

The leftmost tab on the MAP page provides a hybrid view of your aircraft and flight plan from a virtual wingman flying above and behind your present position. This is an "exocentric" view.  When the TAWS option is enabled, this tab will be titled "TAWS".  When the TAWS option is not enabled, this tab will be titled "SVS".

The aircraft ownship symbol is displayed just like the 2D map as well as the shadow it casts on the ground.  The ground shadow represents the aircraft position over the ground.

The viewing position of the virtual wingman is directly above and behind the displayed ownship symbol. Turning the bottom right knob or pinch zooming the display will adjust the perceived distance above and behind the ownship symbol.  Pushing the knob restores the default zoom value.

*Map SVS - Zoomed out with Active Flight Plan and Waypoint*



Any traffic in the scene will cast a shadow on the ground to help with judging distance and relative closure rate.

Subtle grid lines, spaced every nautical mile, are drawn on the terrain for additional speed, distance, and depth cues.

Just like in the 2D map, the hatched red and yellow Terrain Awareness coloring can be displayed in the view (controllable via the same setting in the Setup page).  For those units with the FLTA active, the solid red warning and yellow caution areas are drawn in real-time on the map.

Note that datablocks can be displayed while viewing Map SVS.  To show the datablocks, either touch the "DATA" tab on the right side of

the display or hold the left side of the MAP button.  To hide the datablocks, either touch the "DATA" tab, or hold the right side of the MAP button.

> **NOTE**
>
> **SynVis Unavailable During GPS Acquisition**
> SynVis depictions will not be available until the GPS has reached SBAS or FDE state.

*Map SVS – Terrain Awareness and FLTA Coloring*
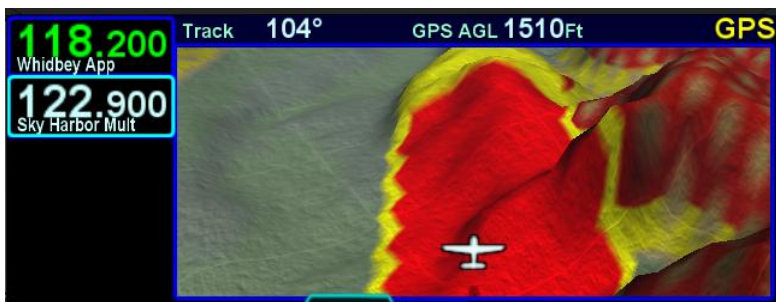


FLIGHT PLAN DISPLAY

The display of the flight plan on the Map SVS view is controlled by an LSK titled "FPL".  When the FPL selection is "Off", the flight plan legs will not be overlayed on the Map SVS view.

When the FPL selection is "On", the FMS flight plan will be overlayed on the Map SVS view.  The flight plan legs are displayed approximately 300 meters below the aircraft altitude and will also cast a conformal shadow across the terrain immediately below the flight plan.  Any part of a flight plan leg that would be drawn below ground level, will not be shown.  As a result, the flight plan may appear to go underground when descending or over variable terrain.

When the FPL selection is "Shadow", only the conformal shadow will be shown.

Flight plan legs are depicted using the same styles as on the 2D map view.  That is, the active leg is depicted in solid magenta, the next leg is a candy-striped magenta/white depiction, downpath legs are

depicted in white, and inactive missed approach legs are shown in dashed white.

The waypoint is shown displayed as a magenta flag pole. Downpath waypoints are not depicted in order to reduce map clutter. Fly-over waypoints typically depict the flight plan flying right through/over the waypoint whereas fly-by waypoints can turn inside the waypoint.

Airports and obstacles are also depicted on the SVS view.

*Map SVS - Curved Flight Path with Next Leg Depiction*
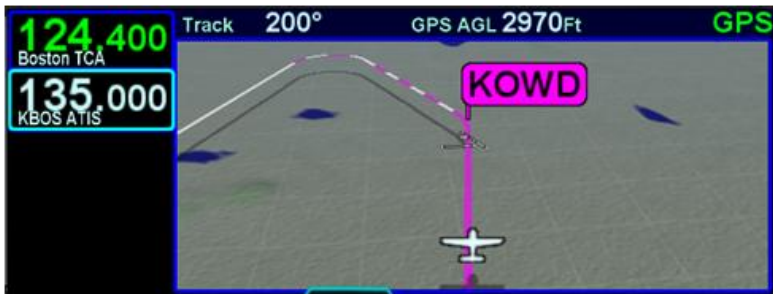


*Map SVS - Fly By Waypoint Depiction*

*Map SVS – Missed Approach (Not Activated)*



*Map SVS – Close in of Landing Runway*



*Map SVS – Missed Approach Enabled*



HTAWS CONTROL

When HTAWS is enabled and TAWS self-test is not in progress, an LSK is shown on the page in order to control HTAWS capability.

*Map TAWS Tab with LSKs*
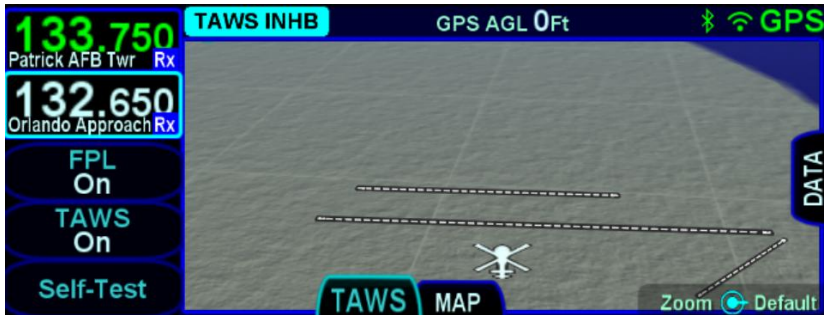


The LSK provides three selections:

- **On** – the full HTAWS capability is enabled
- **RP Mode** – the HTAWS function is operating in "reduced protection" mode, where protection limits are reduced to prevent nuisance alerts.
- **FLTA Off** – the FLTA function is disabled (which effectively disables the terrain alerting function)

Note that regardless of the LSK selection, the altitude callouts function remains enabled (subject to configuration and setup options).

SELF-TEST

When HTAWS is enabled and the aircraft is not airborne, a "Self-Test" LSK is shown on the page.  Press the LSK to manually initiate the same self-test procedure that is performed on power up (see page 3-42).  While the self-test is in-progress, the Map SVS view will show the message "TAWS Self-Test In Progress".

# 4 Aux Subsystem

The Aux subsystem contains several tabs, as shown below, to control various utilities, system setup, and the alert message center.



The AUDIO tab provides control and display of all system audio-related features.

The UTIL tab provides access to several timers, calculators, and checklists.

The SETUP tab provides options to allow the user to set preferences in the display and control of the system.

The SYS tab provides the means to review the status of software, databases, GPS, and datalink.

The ALERT tab shows details of active cautions, warnings, and advisories.

## AUDIO TAB

The AUDIO tab provides control and display of all system audio-related features such as radio volume, squelch settings, satellite radio channel tuning and com presets.

VOLUME CONTROL

Each subsystem for which the IFD has an ability to control volume (and squelch and ID on/off) is displayed as a separate line item when the "Volume Control" LSK is active.

The bottom right knob controls row selection, volume, squelch, ID on/off.  If configured for satellite radio, the knob also provides mute control.  To select one of the volume controls, turn the outer knob.  To adjust the volume, turn the inner knob.  To toggle squelch†, ID, or mute (as applicable) push the knob button (a 1-2 second delay is possible).

*Volume Control (IFD440 Shown)*
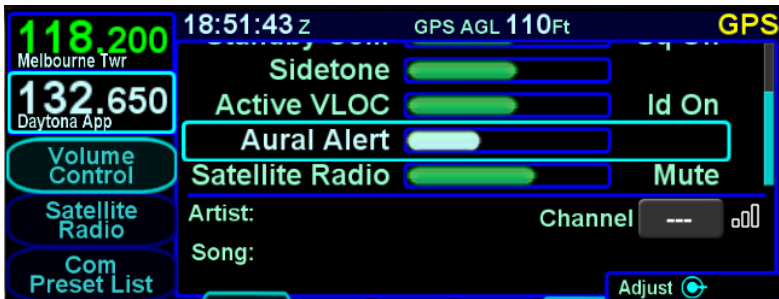


Touch control can also be used to make all those adjustments (e.g. selecting a row by touching, changing a volume level by touch dragging the bar, turning squelch on/off by tapping the correct area on the display, etc).

> **TIPS AND TECHNIQUES**
>
> **Adjusting Volume Plays Audio Test Aural**
> As the volume bar for the traffic alerts is adjusted,
> the IFD will play a double chime that represents the
> new volume level selected.  As the volume bar for
> the other aural alerts is adjusted, the IFD will play an
> aural that represents the new volume level also.

If Remote IFD Tuning is On (see page 4-62), the Audio tab will be
displayed with the identifier of the radio that will be affected by the
controls shown as a title at the top of the screen, as illustrated
below.  If the IFD being controlled is the remote IFD, the title will
be displayed in yellow.

*Volume Control with Remote IFD Tuning turned On*

SATELLITE RADIO TUNING

When a compatible audio-capable satellite radio system is installed, a "Satellite Radio" LSK is displayed along the left edge of the display.

*Satellite Radio Selection and Favorites*
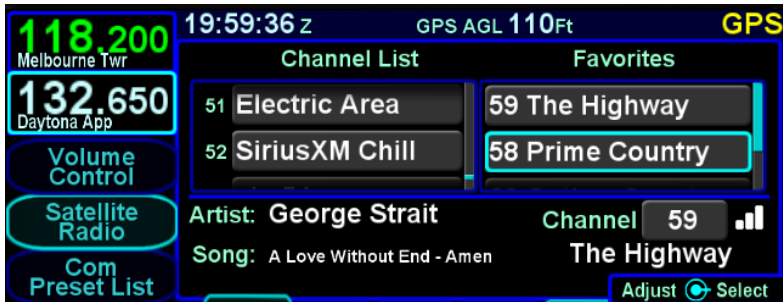


The page is divided into three parts. The left side of the page is a full channel list of all available satellite radio channels. The right side of the page is a numbered list titled "Favorites" and represents the satellite radio channels that have been programmed into a preset list for faster access. The bottom of the page contains a datablock indicating the artist, song, channel name and number, audio signal strength and a Quick Go To link to enter in a desired satellite audio channel.

To load a channel into the Favorites list, scroll the available channel list in the left column either via touch scroll or turning either bottom right knob counter-clockwise until the desired channel is highlighted and press the "ENTR" key on the bezel to push that channel into the next available Favorites list slot.

To delete a channel from a Favorites slot, highlight the desired Favorites slot to remove the channel via touch or using the bottom right knob. Then, with the Favorites slot highlighted, press the "CLR" button on the bezel.

To use the Favorites preset list, double tap the desired preset slot or push the bottom right knob to highlight the desired row and push the knob to select it or press the "ENTR" bezel key to select it. This will immediately make that channel the active satellite radio channel.

In lieu of using the Favorites preset list, just scroll the full channel list in the left column either using touch or the bottom right knob to highlight the desired channel and then touch a second time (double tap) or push in the bottom right knob to immediately make that channel the active satellite radio channel.

Finally, the "Go To" field in the bottom right corner of the page can be used to select a satellite radio channel as the active channel.  Highlight the field by touching it or using the bottom right knob to highlight and then activate the button by touching it a second time. Another way to accomplish this is to push in the bottom right knob to bring up a key pad and type or knob in the desired channel number.

All of these controls/edits can also be done via touch.

> **NOTE**
>
> **Competing Control of Audio Channel Tuning**
> In aircraft with multiple dissimilar devices capable of tuning satellite radio stations and adjusting volumes (e.g. G500 & IFD), a condition can occur where commands are ignored if they are made on both devices.  Avidyne strongly recommends making satellite radio channel selections and volume adjustment on one device and do not mix it up between devices.

## COM PRESETS †

The "Com Preset List" LSK can be used to nominate one of up to 10 selected preset frequencies into the standby frequency, typically using a dedicated switch in the cockpit.

*Com Presets Page*
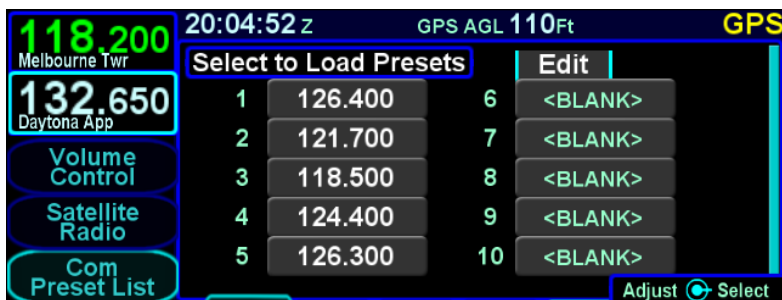


Preset frequencies can only be changed when the page is in edit mode.  To put the page in edit mode using the touchscreen, touch the "Edit" box in the top right corner of the display.  To put the page in edit mode using the right knob, move the cursor to the "Edit" box and press the knob button.  The "Edit" box will appear in dark blue to indicate that the page is in edit mode.

To enter a frequency into a preset, put the page into edit mode and then either touch or turn the right knob to move the cursor to the desired preset.  Touch the selected preset or press the right knob button to start entering a frequency.  If using the virtual keyboard to enter the frequency, note that shorthand frequency notation cannot be used when entering com presets.  Therefore, a complete frequency must be entered (e.g. "121.7" instead of "217").  Press ENTR or the right knob button to complete the entry and take the page out of edit mode.

To remove a preset frequency, put the page into edit mode and then either touch or turn the right knob to move the cursor to the desired preset.  Then press the CLR button to clear the frequency and take the page out of edit mode.

The com preset list is primarily designed to work with a cockpit control used to cycle through each entry in the com preset list.  The cockpit control is typically implemented as a dedicated com preset switch mounted on the yoke.  The IFD actually supports

two switches, one that will cycle forward and another that will cycle backward through the list.

Each actuation of the switch will nominate the next (or previous) frequency in the list to the standby frequency and cause the IFD to briefly display a small dialog box indicating which preset frequency was nominated.  A frequency from the preset list may also be nominated by touching the desired preset or pressing the ENTR button while the page is not in edit mode

*Standby Slot*



If the com preset page is displayed at the time the cockpit control is activated, a small arrow will indicate which preset is tuned.

*Com Preset Arrow*
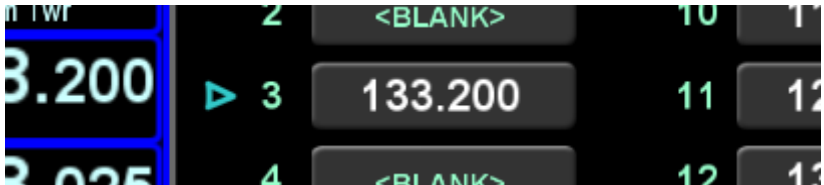
## UTIL (UTILITIES) TAB

TIMERS

For those timers that can expire, a CAS advisory will be displayed and will stay active even across power cycles until the timer is manually reset.

*Standard Timers*



**Generic Timer**

The "Generic Timer" can be used for a variety of purposes. Controls exist for count-up and count-down versions of timers (the active selection will be displayed in a blue background) along with a Start/Stop and Reset. When the count-down option has been selected, then the clock value can also be set by using the bottom right knob to select the clock field and edit the starting value or by touching the desired location on the display.

The generic timer values will reset after a power cycle (the timer is not continued from the previous power cycle).

**Trip Timer**

The "Trip Timer" provides an option to show elapsed trip time either from IFD power on or from take-off (the active selection will be displayed in a blue background).

When showing "From Pwr-On", the timer represents the elapsed time since the IFD was powered up and will count time continuously as long as the IFD is powered up.

When showing "From Takeoff", the timer represents the elapsed time since the IFD recognized that the aircraft went airborne.  The

timer will count up while the aircraft remains airborne, but will stop once it transitions to on-ground.  If the aircraft once again goes airborne, the timer will reset to zero and start counting again.

For the From Pwr-On timer, pressing the "Reset" button will cause the selected timer to reset to zero and continue counting. For the From Takeoff timer, the time will be reset to zero, but whether the time starts counting up is dependent upon whether the aircraft is airborne.

### Event Timer

The "Event Times" timer provides an option to start from either IFD power on or from take-off (the active selection will be displayed in a blue background) and indicates the clock time (Zulu or Local) associated with the active blue selection.

The selection of Zulu or Local is automatic and dependent on the "Time Format" choice made on the Setup Page.

### Custom Timer

Up to 10 custom timers can be created by inserting a new timer below the Departure Time slot. Typical uses include creating timers for 50 hour and 100 hour inspections, annual inspections, bi-annual air data system checks, flight reviews, etc.

To create a new timer, rotate the bottom right knob to create an insert cursor at the bottom of the current timers list and then push the knob.  The new timer will have a default name of "Event", but that can be changed by rotating the outer knob to select the field, then pushing the knob to start editing.  Use the virtual keyboard or the knobs to edit the name, then press Enter or push the knob to complete.

A custom timer can be defined to expire at a specific date and time or after a specified number of flight hours.

When a custom timer expires, the IFD will issue an alert containing the name of the timer.  If the name of the timer is blank, the alert will show "Timer".

To define a timer to expire at a specific date and time, select "Event" and then edit the time and date fields.

To define a timer to expire after a number of flight hours, select "One Time" or "Periodic" and then edit the number of flight hours. As the timer is running, the number of hours remaining until the timer expires is displayed below the time field.  If "Periodic" was selected, then the IFD will restart the timer when the time expires.

*Custom Timer Examples*



Acknowledging the alert when a custom timer has expired (via touch or pressing the CLR button) will clear the alert message, but will not delete the timer.

---

**TIPS AND TECHNIQUES**

**Separate "Switch Tank" Alert**
A specific Switch Tanks alert can be created using the Setup Page (see page 4-25).

---

CALCULATORS

Several calculators are included in the system and all can be accessed via the "Calculators" LSK on the UTIL tab of the AUX page.

| TIPS AND TECHNIQUES |
| --- |
| **Pre-Populated Data Fields** |
| Many data fields in the various IFD calculators will be populated automatically with sensor data in green if it is available, or can be manually edited/entered by the pilot.  The DEST field will be populated with the last airport in the active flight plan, not necessarily the last waypoint in that flight plan.  Non-airport waypoints are not permitted in the DEST field. |

If a pre-populated field had been manually altered, the sensor supplied data can be restored by pressing the CLR button on the bezel.

### Air Data Calculator

The air data calculator includes data fields for altitude, calibrated air speed, heading, total air temperature and barometric setting and will produce a wind computation.

*Air Data Calculator*



### Fuel Planner

The fuel planner includes fields for the type, origin (if type is Point to Point), destination, ground speed, fuel on board, and fuel flow, and will produce a computed fuel at destination value (straight line distance between the two points) and other fuel related data.

The "Type" field choices are "Present Pos" or "Point-to-Point".

*Fuel Planning Calculator*



### Weight Calculator

The weight calculator provides a means to compute current aircraft weight and to predict landing weight.  Prior to the flight, the pilot should enter the weight of all passengers and baggage.

The weight calculator computes the current aircraft weight using the basic empty weight of the aircraft, the entered weight of all passengers and baggage, and the computed weight of fuel on board from the fuel planning calculator. If the computed current aircraft weight exceeds the maximum takeoff weight, then the value will be displayed in a yellow color.

The weight calculator also computes a predicted aircraft landing weight using the current weight and fuel at the destination calculated by the fuel planning calculator. If the predicted landing weight exceeds the maximum landing weight, then the value will be displayed in a yellow color.

> **NOTE**
>
> The basic empty weight, maximum takeoff weight, and maximum landing weight, are all entered using Maintenance Mode, typically at time of installation.

If the IFD has been configured for a multi-engine aircraft, the weight calculator will show additional buttons $V_1$, $V_2$, $V_R$, and $V_{REF}$ in the bottom right corner of the calculator tile. While values can be entered into these fields, the IFD does not use those values for any other calculations or displays. They are only used for pilot reference.

*Weight Calculator*



## Trip Planner

The trip planner includes fields for type, destination, ground speed, departure time (departure time will track current time until

takeoff) and departure date and will produce values (straight line connecting start/end) for desired track, distance, ETE, ETA, sunrise and sunset, and enroute safe altitude (ESA) - defined as 1000' above the maximum elevation of displayed terrain (including obstacles) within a rectangular grid that measures 10 miles on each side of the centerline of the active leg or portion of the active leg that is currently displayed on the Map page.

The "Type" field choices are "Present Position" or "Point-to-Point". If Point-to-Point was selected, then there is also a field for origin.

*Trip Planner Calculator*



## RAIM Prediction

The GPS RAIM (Receiver Autonomous Integrity Monitoring) Prediction calculator includes fields for destination, arrival time and arrival date and will produce a RAIM status value for the destination location.

*RAIM Prediction Calculator*
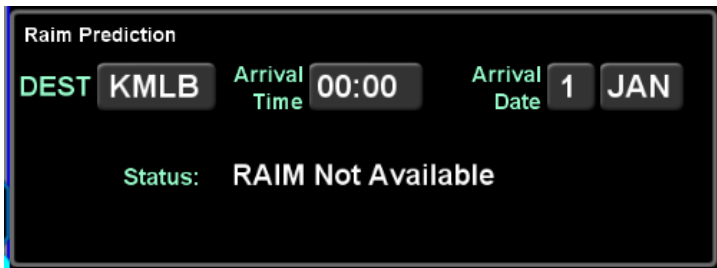
### Trip Statistics

The trip statistics calculator computes an odometer setting, maximum ground speed and average ground speed value, providing options to reset each computation individually or a master reset to reset all.

The trip statistics will continue to compute each data field across power cycles and until manually reset.  The "Reset All" selection will prompt a confirm dialog box that must be used to reset all.

*Trip Statistics Calculator*
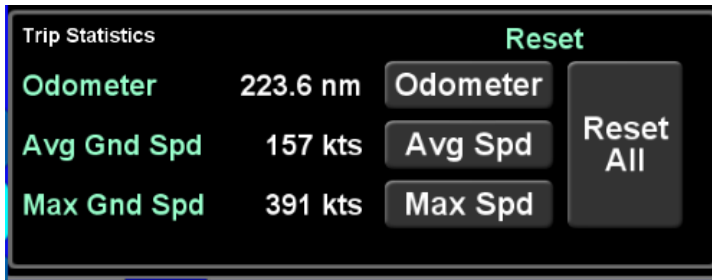
ELECTRONIC CHECKLIST

If enabled in Maintenance Mode, up to 9 custom checklists can be created and stored in the IFD via the "Checklist" LSK of the UTIL tab, each with up 50 steps. Each step can be up to 30 characters long.

**Creating a Checklist**

The first step is to create a checklist directory (list of named checklists to be created). From the "Checklist" LSK, put the system into checklist edit mode by highlighting the "Edit" box in the top right corner of the page, either by touching it or using the bottom right knob to highlight the box. The edit box will be displayed with a blue background and presents a numbered blank row when it is in edit mode.

When the system is put into checklist edit mode, the light blue wraparound cursor needs to be manually placed on the next available line in the checklist directory by touching the line or using the bottom right knob. Then touch the row in the directory list a second time or push the bottom right knob to generate a keypad for checklist naming.

***Creating a Checklist Directory***



When you have finished naming the new checklist, press the "Enter" button on the keypad or push the right knob. Repeat this process for naming new checklists until all desired checklist names are created.

When done naming checklists, press the "Edit" box again to get out of Edit mode (background of Edit box should now be gray).

The second step is to create the checklist content. To create the checklist content, select the checklist title that is to be filled out from the directory list.  First put the system back into checklist edit mode by touching the "Edit" box again or using the bottom right knob to select it and then pushing the knob.  This will produce an empty gray checklist step item.

Touch or use the bottom right knob to select the step to be created or edited and this will put a bright blue outline around the step.  Touch the highlighted row a second time or push in the bottom right knob to generate a keypad.  Type the desired text (Note: there is no ability to manually generate upper case characters) and then press the "Enter" button to accept.  This will generate another empty gray checklist step item below and repeat the process as required.  When done creating all the desired checklist steps, press the "Edit" button in the top right corner again to exit edit mode.

**Creating/Editing a Checklist**



### Editing a Checklist

To edit an existing checklist, touch or use the bottom right knob to select the "Edit" button, then touch again or push the knob putting the system in edit mode. This automatically creates a new step at the end of the checklist – if that's what you want, then just start typing on the keyboard. If instead, an existing step is to be edited, then select the checklist step to be edited by touching it or using the inner knob.  Touch the step a second time or push the knob to generate a keyboard, press the CLR button (keyboard or bezel) as required to clear characters and then re-type as required.  To insert a missing/extra step, type the step as desired as the last step of an existing checklist and then turn the outer knob to insert

the step in the desired location.  When done with editing the existing checklist, touch/select the "Edit" button again to exit edit mode.

Press the "CLR" button on the bezel to return to the checklist directory.

### Selecting a Checklist

From the checklist directory, highlight the desired checklist by either touching it or using the bottom right knob and then either touch the checklist title a second time or push the knob to select it.

The selected checklist will then be displayed with the checklist title along the top strip.

### Using a Checklist

When a checklist is selected for use, the first step will be highlighted by a bright blue wrap-around highlight.  Either touching a highlighted step or pushing the knob will toggle that step to bright green.  A green checkmark will appear along the right edge, indicating that checklist step has been accomplished.

Until all steps have been designated as accomplished, the bottom left edge of the checklist box will display "Checklist Not Completed".  As soon as all steps have been designated as accomplished, that text strip along the bottom edge will change to "Checklist Complete".

*Completed Checklist*

If a step inadvertently has been checked off as accomplished, it can be unchecked by selecting the step (touch it or use the bottom right knob) and then touching it a second time or pushing the knob to remove the checkmark.  This will also toggle the "Checklist Complete" text back to "Checklist Not Completed".

### Resetting Checklists

To quickly reset a completed or partially completed checklist, press and hold the bottom right knob while that checklist is open. All green completed checkmarks will be removed for that open checklist.

To quickly reset all completed or partially completed checklists, ensure the checklist directory (list of all checklists) is displayed and then press and hold the bottom right knob to reset the checklist and remove the gray or green checkmarks for that checklist and jump the cursor down to the next partial or fully completed checklist. At that point, press the knob again to clear the next checklist and jump the cursor to the next one.  Repeat the process as needed until all checklists are reset.

---

**TIPS AND TECHNIQUES**

**Backup Your Checklists**
For a variety of reasons including copying onto other IFDs, restoring post-service events, etc., Avidyne highly recommends backing up and storing electronic checklists by downloading checklists onto USB fobs.  Procedures are supplied later in this manual.

---

## SETUP TAB

The Setup Tab provides the capability for one or more users to tailor the look and feel of the IFD to best accomplish their mission.  Many of the setup options exist simply to adjust the format of data that is presented on the IFD (e.g. units of measure, whether page tabs are hidden).  However, there are many setup options that control the overall operation of the IFD, including com radio frequency spacing, display brightness, and WiFi connections.

CATEGORY STRUCTURE

The Setup Tab is organized using a set of categories.  Each category can be expanded to reveal settings relevant to that category.  Each setting within a category will be indented as a visual indication that it belongs to the category. Some categories contain further sub-categories, which can also be expanded.  The result is a hierarchical structure of settings which uses familiar "+" and "-" icons to indicate whether a category is expanded or condensed.  In order to limit the page to a manageable number of items, only one category can be displayed at a time.  Therefore, when one category is expanded, all other categories at that same level are condensed.

*Setup Tab – Single category expanded*
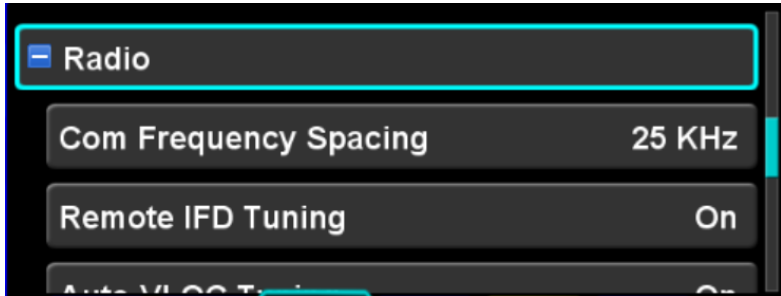


When an item represents a category that can be expanded, a "+" icon will be shown on the left side of the panel.  If the category is already expanded, a "-" icon will be shown on the left side.  To expand or condense a category, first move the cursor to the category either by touching the item or by rotating the inner or outer knob.  Once the cursor is surrounding the desired category,

either touch the icon on the left side or push the knob button to expand or condense that category.

ITEM STRUCTURE

Nominally, items representing a setting are shown with the title on the left and the current value of the setting on the right. For those typical cases, there are several kinds of settings, as follows:

- Enumerated – these are the most common kind of setting and are characterized by an enumerated list of choices. For instance, "On", "Off", and "Auto".

- Textual – these settings require the user to enter a textual value. Examples include a User Name and Flight ID.

- Numeric – these settings require the user to enter a numeric value. Examples include the visual approach glide slope and local time offset.

There are other kinds of settings that apply to specialized situations, such as map layers. Those kinds of settings are described in detail in the sections below.

ITEM EDITING

Rules for editing settings vary based on the kind of item being edited. To initiate editing for any item, turn either the inner or outer knob to the desired item or touch the desired item in order to select it. The selected item is surrounded by a cyan outline.

**Editing an enumerated setting**

Once selected, editing is initiated by either pushing the right knob button or touching the selected item. At this point, the selection will change from a cyan background to a white background. To change an enumerated setting, turn either the inner or outer knob to change to the next or previous selection, depending on the direction of the knob turn, or touch the item to change to the next selection. Once the desired selection is being shown, push the knob button or the ENTR button or the Enter LSK to accept. Push the CLR button or the Cancel LSK to abort the edit and return to the original selection.

**Editing a textual setting**

Once selected, editing is initiated by pushing the right knob button, pushing the ENTR button, or touching the selected item. At this point, the selection will change from a cyan background to a black background with cyan text.

If editing was initiated by pushing the right knob, then the text will be presented with a cyan cursor on the selected character. Turn the inner knob to change characters and turn the outer knob to change the cursor position.

If editing was initiated by touch or if the field was touched at any time while editing was active, a virtual keyboard will appear. Enter the desired text using the virtual keyboard.

The CLR key is used during editing as a backspace key. However, if the value being edited is empty, one more press of the CLR key will cancel the edit. At any time during the edit, pressing the Cancel LSK or pressing the virtual keyboard red-X will also cancel the edit.

Pressing the right knob button, the ENTR button, the ENTR key the virtual keyboard, or the Enter LSK will accept the edited value as the new setting.

**Editing a numeric setting**

Once selected, editing is initiated by either pushing the right knob button or touching the selected item. At this point, the selection will change from a cyan background to a white background.

Regardless of how editing was initiated, rotating the inner knob will change the numeric value by a "minor" increment. Rotating the outer knob will change the value by a "major" increment. In either case, rotating the knob counter clockwise will decrease the value and rotating the knob clockwise will increase the value.

If editing was initiated by touch or if the field was touched at any time while editing is active, a virtual keyboard will appear. The keyboard is used to enter the desired value. It is possible to enter values using the keyboard that are out of bounds for the setting. Therefore, once accepted, the edited value may be adjusted to be a valid value for the setting.

The CLR key is used during editing as a backspace key. However, if the value being edited is empty, one more press of the CLR key will cancel the edit.  At any time during the edit, pressing the Cancel LSK or pressing the virtual keyboard red-X will also cancel the edit.

Pressing the right knob button, the ENTR button, the ENTR key the virtual keyboard, or the Enter LSK will accept the edited value as the new setting.

## ALERTS CATEGORY

Items in this category control whether the IFD will issue visual and/or aural alerts for various events.
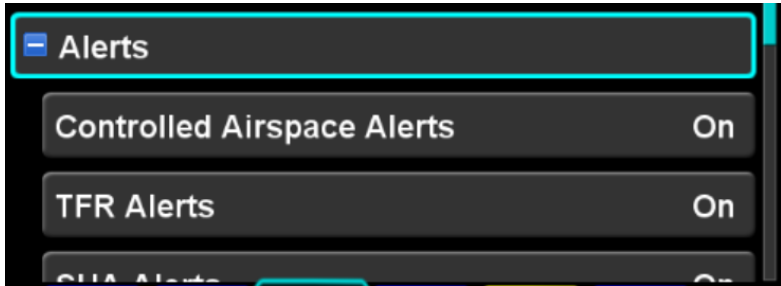


### Controlled Airspace Alerts

This setting controls whether the IFD will issue an airspace alert when the aircraft is on course to intercept a controlled airspace within the next five minutes.  The factory default setting is "On".

### TFR Alerts

This setting controls whether the IFD will issue an airspace alert when the aircraft is on course to intercept a Temporary Flight Restriction (TFR) airspace within the next five minutes.  The factory default setting is "On".

### SUA Alerts

This setting controls whether the IFD will issue an airspace alert when the aircraft is on course to intercept a special use airspace (SUA) within the next five minutes.  The factory default setting is "On".

### Transition Altitude/Level Alerts

This setting controls whether the IFD will issue an alert as the aircraft approaches the transition altitude and transition level. The factory default setting is "Off".

If the aircraft is below and then climbs to within 250 feet of the transition altitude, the IFD will issue the "Transition Altitude" alert. Once issued, the alert will not be eligible to be issued again

unless the aircraft has descended more than 500 feet below the transition altitude.

If the aircraft is above and then descends to within 250 feet of the transition level, the IFD will issue the "Transition Level" alert. Once issued, the alert will not be eligible to be issued again unless the aircraft has climbed more than 500 feet above the transition level.

### Switch Tanks Alert

This setting controls whether the IFD will issue an alert to switch fuel tanks. The setting varies the time interval between alerts. Time intervals of 15, 30, 45, and 60 minutes can be selected, or the alert can be disabled by selecting "Never". The factory default setting is "Never".

### Top of Descent (TOD) Aural

This setting controls whether the IFD will generate a chime when the aircraft reaches the top of descent point. The factory default setting is "On".

### Airspace Aural

This setting controls whether the IFD will generate an aural message saying "Airspace Ahead" whenever an airspace alert is issued. The factory default setting is "Off".

### Waypoint Aural

This setting controls whether the IFD will generate an aural message as waypoints in the flight plan are sequenced. The factory default setting is "Off".

If the waypoint being sequenced is the final approach fix, the aural is "Final Approach". If the waypoint being sequenced is the missed approach point, the aural is "Missed Approach". For all other waypoints, the aural is "Waypoint".

### Altitude Callouts

This setting controls whether the IFD will generate aural messages as the aircraft descends through certain AGL altitudes (see page 3-40). The factory default setting is "On". If the IFD is configured for use with an external TAWS, this setting will not be

shown and the altitude callouts will be inhibited as if the setting was "Off".

CONNECTIVITY CATEGORY

The items in this category are used to manage the Bluetooth and WiFi capabilities of the IFD.  Note that WiFi and Bluetooth are paid options.  If those options are not enabled, this category and the related items will not be shown.

When first expanded, the connectivity category will contain high level items as illustrated below.

*Connectivity category (expanded)*
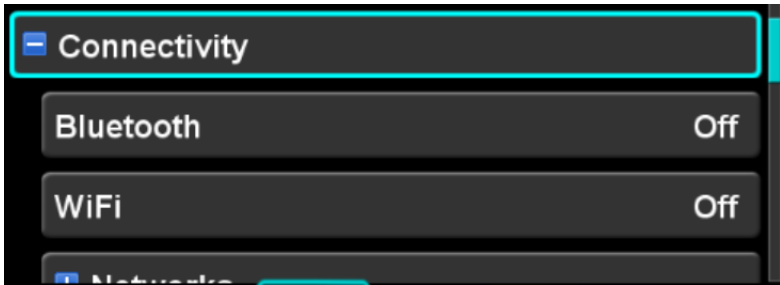


**Bluetooth**

When the Bluetooth selection is "On", the Bluetooth interface is enabled.  The factory default setting is "Off".

**WiFi**

When the WiFi selection is "On", the WiFi interface is enabled. The factory default setting is "Off".

**Networks subcategory**

The networks subcategory provides a means to view and select the networks that are available to the IFD.  The IFD can create its own local area network ("Hotspot") or it can connect as a client to an external network.

When the networks subcategory item is expanded, the items in the category each represent a network.  Each of those network items can be expanded in order to configure the network.

If the WiFi setup item is set to "Off", then no external networks will be shown.  However, the IFD Hotspot item will still be shown,

allowing the IFD LAN to be configured prior to enabling WiFi connections.

*Networks subcategory (expanded)*
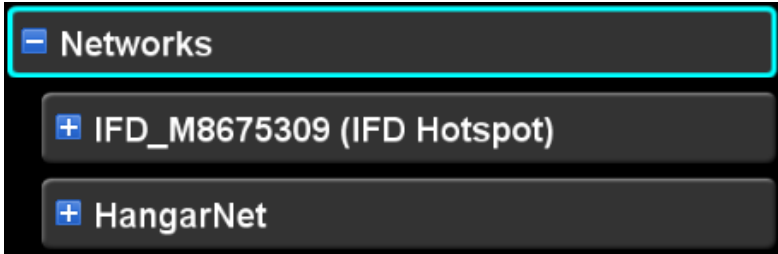


### IFD Local Area Network (LAN) (a.k.a. IFD Hotspot)

The IFD LAN is always shown as the first WiFi network in the category and is identified by "(IFD Hotspot)" next to the network name. The network name will default to "IFD_" suffixed with the serial number of the IFD. However, the network name and the password can be changed.

To change the name of the IFD local area network, first expand the item. Once expanded, items for the network name and password will be revealed. The items are edited using normal techniques for editing a textual field.

*IFD LAN Item (expanded)*
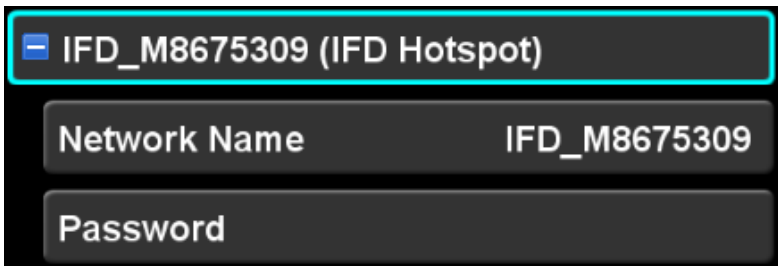
*IFD LAN Network Name Item (selected)*



Entry of a new network name will also be reflected on the IFD LAN item (i.e. the header).

*IFD LAN Password Item (selected)*



> **IMPORTANT NOTE**
>
> The IFD enforces the industry recommended minimum password length of 8 characters. As the field is being edited, if less than 8 characters have been entered, the IFD will ignore actions to complete the edit (e.g. **pressing the ENTR button will have no effect)**. The edit can be aborted by pressing CLR.

To start the IFD Local Area Network, move the cursor to either the network header, the network name, or the password and then press the "Connect" LSK.

*Connect LSK for IFD LAN*
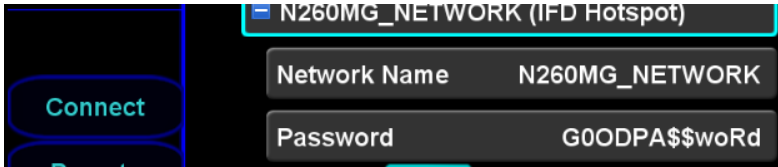


As the IFD is initializing the network, an animated gray WiFi icon will appear on the right side of the network header.  When the network is ready for use, the WiFi icon will become solid green and clients will be able to connect to the IFD.
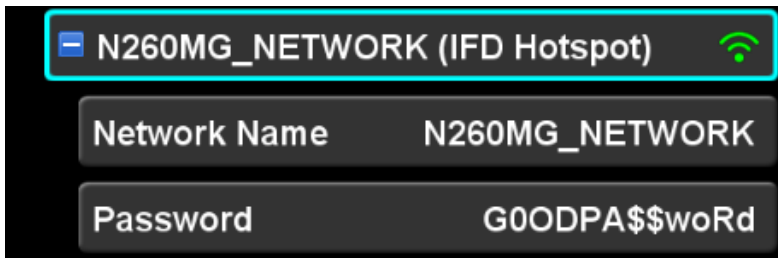
*IFD LAN Ready for Use*



### External Networks

When WiFi is "on", the IFD will continuously search for accessible external WiFi networks.  Each recognized network will be represented by a WiFi network item on the page.  The IFD can show up to twenty networks.

If a previously recognized external network has not been detected for five minutes, the IFD will remove that network from the list.

Like the IFD LAN item, the items for each external network can be expanded.  However, expanding the item will reveal only a password item associated with the network.

*External Network (expanded, no password entered)*
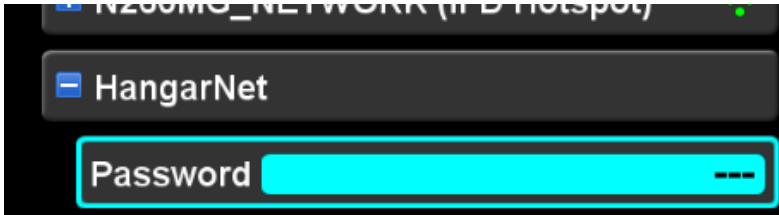


Editing the password for an external network is accomplished using the normal technique for a textual field.  If no password has been entered, then the field will show three dashes.  While the password is being edited, the characters will be shown.  However, as a security measure, once the password has been accepted, the field will be shown as four asterisks.

*External network (expanded, password entered)*
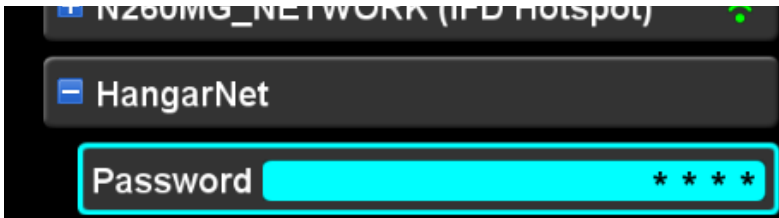


In order to connect to an external network, move the cursor to either the main item or the password item.  Then, press the "Connect" LSK.  As the IFD is negotiating the connection with the external network, the message "Connecting…" will be shown on the right side of the network item.  The IFD will attempt the connection for up to 60 seconds.  If the connection is successfully established, the message "Connected" will be shown in green on the right side of the network item.  If the connection is unsuccessful, the message "Failed to connect" will be shown in yellow on the right side of the network item, and that message will continue to be displayed until another network connection attempt is made.

*External network (connected)*
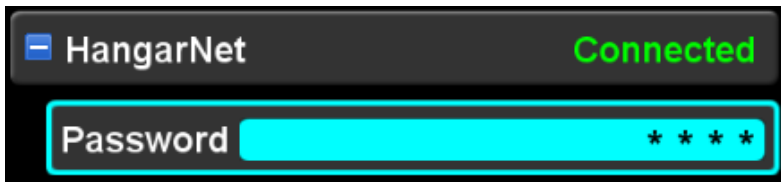


## Devices subcategory

The IFD provides the capability to transfer data to and from WiFi enabled devices.  Once a device is connected, it is capable of receiving the data being streamed from the IFD.  However, for security purposes, a device must be specifically approved by the pilot in order to enable the IFD to accept data transmitted by the device.

The devices subcategory provides a means to manage the WiFi enabled devices that are recognized by the IFD via the selected network.  Note that this subcategory will not be displayed when the WiFi setting is "Off".

Each device that is recognized by the IFD will be represented by a device item shown under the devices subcategory.  Each device item shows the name or IP address of the device and the "connection policy" for that device.  The connection policy is the means to control whether the IFD will accept data transmitted by the device.  Connection policies are as follows:

- Blocked – a device has made a request to connect to the IFD, but the pilot has not yet taken action to set the connection policy for the device

- Never – connection attempts by this device will automatically be rejected

- Once – this connection attempt will be accepted, but future connection attempts will require operator action to set the connection policy

- Always – connection attempts by this device will automatically be accepted

The IFD will retain the connection policy for the ten most recently recognized devices.  However, only five devices may be connected with the IFD simultaneously.

When a new device is recognized by the IFD, a device item will appear under this subcategory, its connection policy will be set to "Blocked", and a "Connect Request" alert will be issued. Communication with the device will be inhibited until the pilot sets the connection policy to something other than "Blocked".

In the example below, two devices have been recognized by the IFD; "Cockpit iPad" and "Kids iPad".  Although the devices have made requests to connect to the IFD, both are blocked from sending data to the IFD until the policy has been changed to either "Always" or "Once".

*Blocked devices*
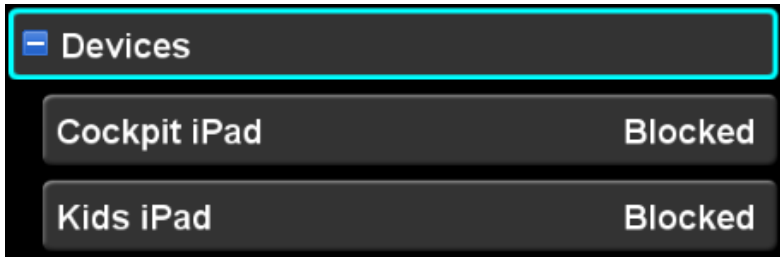


When a device is blocked, the pilot must take action to set the communication policy for that device.  If the device is trusted and will always be under control of the pilot, setting the connection policy to "Always" is appropriate.  If the pilot prefers to specifically determine whether that device should be allowed on every connection attempt, the connection policy should be set to "Once".  If this device is not known to the pilot, the connection policy should be set to "Never".

If the device is connected and the connection policy is set to "Always" or "Once", then the device name will be displayed in green.

*Device Connection Policy Set and Device Communicating*
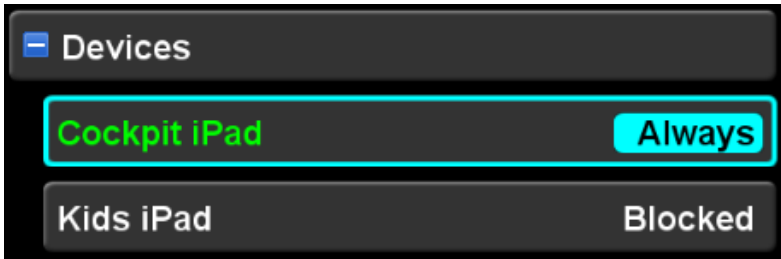


When a device attempts a connection, and the connection policy is either "Once" or "Blocked", the IFD will present a green informational alert containing the name of the device attempting the connection, as illustrated below:

*Connect request informational alert*



## ADS-B Over WiFi

When the ADS-B Over WiFi selection is "On", the IFD will forward data received from a wired ADS-B In source over the WiFi interface.  Most Electronic Flight Bag (EFB) applications will use this data to display weather and/or traffic.  Some EFBs can be configured to get ADS-B data over other interfaces (e.g. Bluetooth).  In those cases, this setting should be "Off".  The factory default setting is "On".

The ADS-B Over WiFi setting will only be shown if the IFD is configured to receive data from a wired ADS-B In source.

DATABLOCKS CATEGORY

The IFD defines "datablocks" containing focused data quantities that can be displayed around the edges of the display. Datablocks are meant to be used as full-time displays of desired data that can be accessed with a glance. See the figure in the Page Layouts section (page 1-16) for an illustration of datablocks.

The datablocks category is used to select which datablocks are displayed in each datablock "slot" that is available. While the space allocated for the set of datablocks is fixed, the number of datablocks that can be displayed is variable since not every datablock takes up the same amount of space.

When the datablocks category is expanded, the Setup Page cursor is limited such that only datablocks can be selected. **In order to return to normal operation of the Setup Page, the cursor must be returned to the Datablock category item at the top, and the category condensed.** If the datablocks category is expanded and a different page is selected on the IFD, then upon return to the Setup Page, the datablocks category will no longer be expanded.

*Datablocks Category expanded*



Once the datablocks category is expanded, the operation of the right knob is slightly different than the normal Setup Page operation. The outer knob selects the datablock "slot" to be affected. The inner knob selects the datablock that is to be displayed in the selected slot. The selected slot is shown with a blue background (except for the VLOC radio block). The selected datablock is shown with the typical cyan cursor surrounding the item.

*Datablock selected slot and block*



In order to change the datablock selected in a given slot, first turn the outer knob or touch to move the cursor to the desired slot. Then, use the inner knob or touch to select the datablock item to be displayed. Then, press the knob button or touch the datablock again to place it into the selected slot.

When a datablock has been selected for display in a slot, a check mark is displayed next to the name of that datablock. It is possible to select the same datablock for display in more than one slot, but that is often not desired. The check mark provides a quick method to identify that situation.

Keep in mind that the datablocks on the right side of the display are scrollable. Therefore, while a datablock may have an associated check mark, the slot to which it has been allocated may not be visible without scrolling the right side of the screen.

When a given datablock is not allowed to be placed into the selected slot, that row will be presented in a dim color and the datablock will not be selectable either with the knob or by touch.
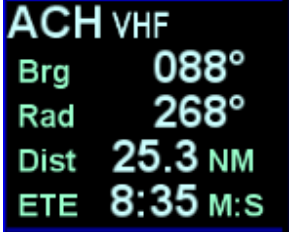
*Non selectable datablocks (dimmed rows)*
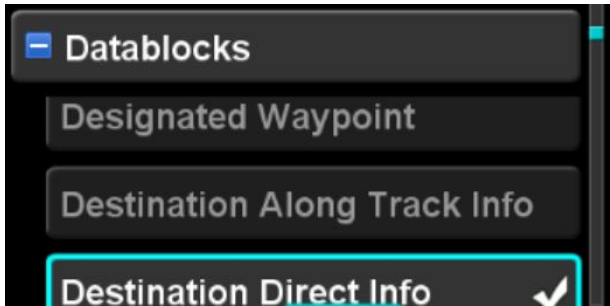


| COOL FEATURE |
| --- |
| **Scroll Your Datablocks**<br>Many more datablocks can be selected on the right side than can be viewed at any one time. This can be useful to optimize the displayed datablock groupings by phase of flight and repeating options.<br><br>Then scroll the list as necessary to reveal the appropriate set of datablocks. |
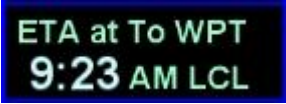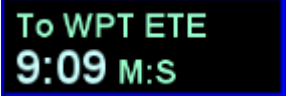
Potential datablock selections are listed below. When selected for a slot at the top of the screen, the format of some datablocks will change to fit in the limited space available.

| Datablock Item Title and Image | Content |
|---|---|
| Primary Com/VLOC (Note: This selection is permanently grayed out and is not actually selectable)† | Defines the position of the top two datablocks along the left side. These are permanently dedicated to Com/VLOC control and display. |
| Traffic Thumbnail  | A thumbnail depiction of the traffic sensor output. The range rings can be adjusted by touching the upper 2/3 of the block and the mode (e.g. Normal, Above, Below, etc) can be toggled by either using the adjacent bezel LSK (if on the left side of the IFD) or by touching the lower 1/3 of the block. When on the left side, only available in a fixed location aligned with the top line select key. |
| Transponder Thumbnail  | Provides a means to display and control the remote transponder mode and code as well as a Reply lamp. The Ident function will be performed by touching the Ident soft key. Touching the mode or code will produce the transponder specific keyboard for data entry. |

| Datablock Item Title and Image | Content |
|---|---|
| To Waypoint Information**<br><br>KFMN<br>Dtk 314°<br>TkDist 128 NM<br>ETE 0:46 H:M<br><br>SAF<br>Dtk 034°<br>TkDist 10.7 NM<br>At 91 Gal<br>ETE 3:37 M:S | To waypoint identifier, desired track to current waypoint along flight plan route, distance to current waypoint along the track[1], estimated remaining fuel at the current waypoint (if a fuel flow system is connected), and estimated time enroute to the current waypoint. The data will be displayed in magenta. (content varies depending on whether a fuel flow system is connected)<br><br>[1] Depending upon the relative geometry of the To waypoint and the aircraft position/direction of flight at the time of waypoint activation, track may not necessarily be a straight line but include a button hook at the beginning. |
| Next Waypoint Information<br><br>Next KLWM<br>Nxt Dtk 041°<br>TkDist 31.0 NM<br>ETE 0:18 H:M<br><br>Next LWM<br>Nxt Dtk 057°<br>TkDist 23.8 NM<br>At 116 Gal<br>ETE 0:08 H:M | Next waypoint identifier (the next leg of the flight plan, not the current leg), desired track to next waypoint along flight plan route, flight plan leg distance for the next waypoint, estimated remaining fuel at the next waypoint (if a fuel flow system is connected), and estimated time enroute of the next leg. (content varies depending on whether a fuel flow system is connected)<br><br>Note:  The data fields will be dashed if there is no flight plan, the active leg is the last leg of the flight plan or when performing a Direct-To, since there is no next waypoint in those cases. |

| Datablock Item Title and Image | Content |
|---|---|
| Designated Waypoint<br><br>ACH VHF<br>Brg 088°<br>Rad 268°<br>Dist 25.3 NM<br>ETE 8:35 M:S | Designated waypoint identifier, bearing from present position to the designated waypoint, radial from the designated waypoint to present position, straight line distance from present position to the designated waypoint, and estimated time enroute from present position to the designated waypoint.<br><br>Note: to change the designated waypoint, touch the datablock to display the virtual keyboard. Type in the designated waypoint identifier and press Enter. The designated waypoint will persist across power cycles. |
| Destination Along Track Info<br><br>Dest KALS<br>TkDist 250 NM<br>ETE 1:25 H:M<br><br>Dest OTO<br>TkDist 25.9 NM<br>At 77 Gal<br>ETE 8:45 M:S | Destination identifier, total distance to destination along the remaining flight plan legs, estimated fuel at destination (if fuel flow installed) and estimated time enroute to the destination.<br><br>Format of ETE in all datablocks is HH:MM until the ETE is less than 10 minutes. Then it goes to MM:SS. |

| Datablock Item Title and Image | Content |
|---|---|
| Destination Direct Info*  <br> Dest LWM <br> Brg 020° <br> Dist 26.9 NM | Destination identifier, bearing to destination from present position and distance to destination from present position. |
| Destination Waypoint <br> Dest LWM | Destination identifier. |
| Destination Direct Distance <br> LWM <br> 32.1 NM | Destination identifier and straight line distance to the destination from present position. |
| To Waypoint Direct Info <br> To MILTT <br> Brg 184° <br> Dist 22.9 NM | Active (To) waypoint identifier, bearing from present position to active waypoint, straight line distance from present position direct to the active waypoint with no button hook. |
| To Waypoint Direct Distance <br> MILTT <br> 22.9NM | Active (To) waypoint identifier and straight line distance from present position direct to the waypoint with no button hook. |

| Datablock Item Title and Image | Content |
|---|---|
| ETA at Destination<br><br>**ETA at Dest**<br>**9:24** AM LCL | Estimated time of arrival at the "Destination" waypoint. |
| To Waypoint ETA<br><br>**ETA at To WPT**<br>**9:23** AM LCL | Estimated time of arrival at the "To" waypoint. |
| Destination ETE<br><br>**Dest ETE**<br>**0:11** H:M | Estimated time enroute (along flight planned route) to the "Destination" waypoint. |
| To Waypoint ETE<br><br>**To WPT ETE**<br>**9:09** M:S | Estimated time enroute to the "To" waypoint. |
| GPS CDI**<br><br>**Trk** 320°<br>**Dtk** 001° | Current track, desired track for active flight plan leg and visual depiction of deviation.<br><br>Note that the CDI displayed in this datablock is *always* based on GPS and is *never* a VHF CDI. |

| Datablock Item Title and Image | Content |
|---|---|
| Track Angle Error<br><br>TKE 041°<br>→ | Track angle error (error in degrees between desired track and actual track) and an arrow indicating direction to fly to correct the error. |
| Desired Track<br><br>Dtk 001° | Desired track for active flight plan leg. |
| Cross Track Distance<br><br>Cross Track<br>2.0 NM Left | Cross track deviation from current flight plan leg. |
| Next Desired Track<br><br>Nxt Dtk 057° | Desired track for the next flight plan leg (not the active flight plan leg). |
| Vertical Speed Required<br><br>VSR -512 FPM | Vertical speed required to make next down-path altitude constraint. All constraints are considered "at" for purposes of this computation. |
| Navigation Mode*<br><br>Nav Mode<br>TERM | IFD navigation mode (e.g. OCN, ENRT, TERM, APPR) including the GPS Nav mode (e.g. LPV, LNAV/VNAV, LNAV+V, LNAV, LP). |

| Datablock Item Title and Image | Content |
|---|---|
| Active GPS Approach <br><br> Active GPS App <br> **RNAV 23** <br> **KLWM** | Approach identifier and airport. |
| Decoded VLOC Identifier **†** <br><br> VOR **MHT** <br> RAD **360°** <br> DIS **41.0**NM <br><br> ILS **IULJ** <br> Arpt **KBED** <br> RWY **29** | For VORs: <br> Navaid identifier, navaid radial currently on, distance to navaid. <br><br> For ILS/Localizers: <br> Localizer identifier, airport, runway. |
| Nearest Airport <br><br> Nrst **KBED** <br> Brg **312°** <br> Dist **4.3** NM | Nearest airport identifier, bearing and distance to the airport. |
| Aircraft Position <br><br> N 42°26'16" <br> W 71°12'13" | Aircraft position (ddd°mm'ss" format shown) |

| Datablock Item Title and Image | Content |
|---|---|
| GPS AGL Altitude<br><br>**GPS AGL Alt**<br>**3010** Ft | Computed AGL altitude based on GPS altitude. |
| Minimum Safe Altitude<br><br>**Min Safe Alt**<br>**2450** Ft MSL | Min Safe Altitude (defined as 1000' above the highest terrain or obstacle in a 10nm rectangle around the aircraft position). |
| Ground Speed<br><br>**GS    107** Kts | Ground speed. |
| Ground Track<br><br>**Track   351°** | Ground Track. |
| Wind Vector<br><br>**Wind**<br>**192° / 24** Kts | Wind speed and direction, and an arrow indicating direction of the wind relative to the nose of the airplane. Populates in air. Displays as "Calm" when 5 knots or less.<br><br>Note:  Requires TAS and Heading from an external device like an EFIS. |
| Radar Altitude<br><br>**Radar Alt**<br>**2630** Ft | AGL altitude from a radar altimeter.<br><br>Note: requires radar altimeter input |

| Datablock Item Title and Image | Content |
|---|---|
| Total Air Temperature<br><br>TAT 22°F | Total Air Temperature<br><br>Note: Requires TAT input from an external device like an EFIS or appropriate fuel flow system. |
| Static Air Temperature<br><br>SAT 15°F | Static Air Temperature<br><br>Note: Requires SAT input from an external device like an EFIS or appropriate fuel flow system. |
| Local Time<br><br>Local 9:28:02 AM | Local time. |
| UTC Time<br><br>14:28:02 z | UTC (Zulu) time |
| Flight Timer<br><br>Flight Timer 0:17 H:M | This timer automatically starts and is based on the system in-air determination. |
| Number of Alerts<br><br>Active Alerts 1 | Number of active red warnings, yellow cautions and cyan advisories. |

| Datablock Item Title and Image | Content |
|---|---|
| User Profile<br><br>User: **Jake** | Currently selected User Profile. |
| Fuel Amount Remaining<br><br>**Fuel Rmng**<br>**114.4** Gal | Total fuel as sent by the aircraft fuel flow system, if available.<br><br>Only presented as an option if the IFD is configured to communicate with an external fuel flow system |
| Fuel Time Remaining<br><br>**Fuel Time Rmng**<br>**8:00** H:M | Estimated fuel time remaining in HH:MM based on input from the aircraft fuel flow system.<br><br>Only presented as an option if the IFD is configured to communicate with an external fuel flow system |
| Fuel Flow<br><br>**Fuel Flow**<br>**14.3** Gal/Hr | Fuel flow as sent by the aircraft fuel flow system. For twin engine aircraft, this is the summed total.<br><br>Only presented as an option if the IFD is configured to communicate with an external fuel flow system |
| Fuel Used<br><br>**Fuel Used**<br>**5.6** Gal | Estimated fuel used as sent by the aircraft fuel flow system, if available. For twin engine aircraft, this is the summed total.<br><br>Only presented as an option if the IFD is configured to communicate with an external fuel flow system |

| Datablock Item Title and Image | Content |
|---|---|
| Fuel Economy  | Estimated fuel economy (e.g. nm/gal) based on input from the on-board fuel flow system.<br><br>Only presented as an option if the IFD is configured to communicate with an external fuel flow system |
| *** Blank *** | Single blank line. |

DISPLAY CATEGORY

The items in this category control appearance and behavior of the IFD front panel display.
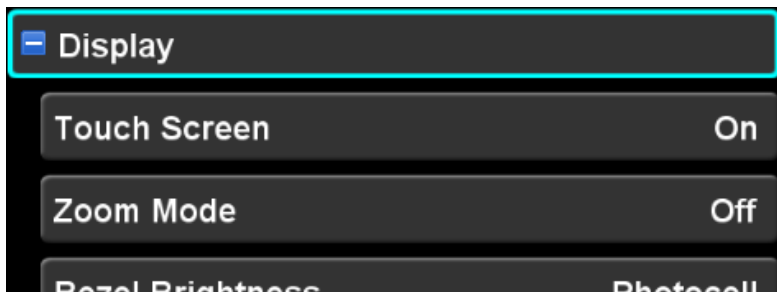


**Touch Screen**

This setting controls whether the IFD touch screen is enabled. Virtually all operations on the IFD can be accomplished without the use of the touch screen.  There are a few, however, that will be unavailable when the touch screen is disabled (e.g. panning the map, rubber-banding a flight plan).  The factory default setting is "On".

**Zoom Mode**

This setting controls whether some IFD display components are displayed in a bigger font.  This setting primarily affects the datablocks and the LSK legends.  The factory default setting is "Off".

**Bezel Brightness**

This setting specifies which of three methods are used to control the brightness of the bezel knob and button backlights.  The factory default setting is "Photocell".  Each of the selections is described below.

- **Dimming Bus** – the brightness is controlled using the aircraft dimming bus control

- **Photocell** – the brightness is controlled using the ambient light measured by the photocell on the bezel. Brightness is adjusted with no further pilot action.

- **Manual** – the brightness is set manually to the selected brightness level.  When "Manual" is selected, the Setup Page item expands to reveal a green sliding scale representing the brightness.



Move the cursor to surround the sliding scale by using the right knob or the touch screen controls, then select using the right knob button or the touch screen.  When the scale is being edited, the percentage brightness will be shown to the left of the scale.
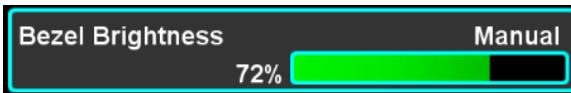


The scale can be modified by touching the bar, touching and dragging the bar, or by rotating the right knob.  Any of the normal controls can be used to complete the edit.

**Display Brightness**

This setting specifies which of three methods are used to control the brightness of the IFD display screen backlights.  The factory default setting is "Photocell".

Operation of the Display Brightness setting is identical to operation of the Bezel Brightness setting.  Refer to that section for details.

**Keyboard Convenience**

In a dual IFD installation, an edit can be initiated on one IFD and a virtual keyboard will be displayed on the other IFD.  This feature is known as "Keyboard Convenience" mode.  This setting is used to control whether keyboard convenience mode is enabled.  If it is not, then the virtual keyboard will be presented on the same IFD that was used to initiate the edit.  The factory default setting is "Off".

This setting will only be shown when the IFD is configured with cross-sync enabled.

**Hide Page Tabs**

This setting controls the amount of time that the page tabs at the bottom of the display are shown.  When the current page is changed, the tabs are displayed.  If this setting is set to "Never", the tabs will remain displayed at all times.  Otherwise, the tabs will scroll out of view after the selected number of seconds.  This feature is useful in order to reclaim some usable space at the bottom of the map pages.  The factory default setting is "Never".

## FMS CATEGORY

The items in this category are used to control the appearance and behavior of the FMS.



**VNAV**

Settings under this heading are used to define the method for computing the top-of-descent point, which directly affects the angle used by enroute VNAV (see page 5-35).

*Path Basis*

This setting defines whether the top-of-descent point is determined by a specified descent angle or on a descent rate (i.e. vertical speed). The factory default setting is "Descent Angle".

*Descent Angle*

This setting defines the angle to be used when determining the top-of-descent point. The value can range from 1.0° to 6.0° degrees. The factory default setting is 4.0°.

*Descent Rate*

This setting defines the rate of descent to be used when determining the top-of-descent point. The minimum and maximum values vary based on the selected Altitude/VS Units setting, but are based on a range of 50 feet per minute to 2000 feet per minute. The factory default setting is 500 feet per minute.

**Transition Altitude**

This setting defines the altitude above which the vertical position of the aircraft is specified by reference to flight levels. Altitudes above this value on the FMS pages will be displayed as flight levels. The value of this setting will also be used to generate the "Transition Altitude" alert.

The transition altitude setting can be either "manual" or "automatic". Whenever a value is specifically entered, the setting is considered to be in manual mode and the value will be displayed in white.

When the setting is automatic and the origin airport has an associated transition altitude, the FMS will set the transition altitude as specified for the airport. When the transition altitude is automatic, the value will be displayed in green.

To switch from manual mode back to automatic, position the cursor around the transition altitude setting and press the CLR key. At that point, the altitude will be displayed in green, but the value will only change if the origin airport has a specified transition altitude.

The factory default setting is 18000 feet, in automatic mode.

**Transition Level**

This setting defines the altitude below which the vertical position of the aircraft is specified by reference to MSL altitude. The value of this setting will be used to generate the "Transition Level" alert.

The transition level setting can be either "manual" or "automatic". Whenever a value is specifically entered, the setting is considered to be in manual mode and the value will be displayed in white.

When the setting is automatic and the destination airport has an associated transition level, the FMS will set the transition level as specified for the airport. When the transition level is automatic, the value will be displayed in green.

To switch from manual mode back to automatic, position the cursor around the transition level setting and press the CLR key. At that point, the level will be displayed in green, but the value will

only change if the destination airport has a specified transition level.

The factory default setting is FL180, in automatic mode.

**High Altitude Airways**

This setting controls whether the FMS will present high altitude airways (e.g. jet airways) in the dropdown menus when a flight plan is being entered. The factory default setting is "On".

**Low Altitude Airways**

This setting controls whether the FMS will present low altitude airways (e.g. victor airways) in the dropdown menus when a flight plan is being entered. The factory default setting is "On".

**Arrivals**

This setting controls whether the FMS will present instrument arrival procedures in the dropdown menus when a flight plan is being entered and whether the arrivals field is presented for airports. The factory default setting is "On".

**Departures**

This setting controls whether the FMS will present instrument departure procedures in the dropdown menus when a flight plan is being entered and whether the departures field is presented for airports. The factory default setting is "On".

**Approaches**

This setting controls whether the FMS will present instrument approach procedures in the dropdown menus when a flight plan is being entered and whether the approaches field is presented for airports. The factory default setting is "On".

**Visual Approaches**

This setting controls whether the FMS will include visual approach procedures in the dropdown menus containing approaches. The factory default setting is "On".

**Visual Approach Settings**

A visual approach primarily consists of a single leg along the final approach course, terminating at the runway threshold. All lateral guidance for the visual approach is based on that leg. Advisory vertical guidance on the visual approach is defined by a glideslope setting within this subcategory.

In order to increase situational awareness, however, a visual approach can be augmented on the map by drawing lines representing a base leg and a downwind leg. The placement of those legs is defined by settings in this subcategory for "final length" and "pattern width", as illustrated below

*Visual Approach Settings (Final Length, Pattern Width)*
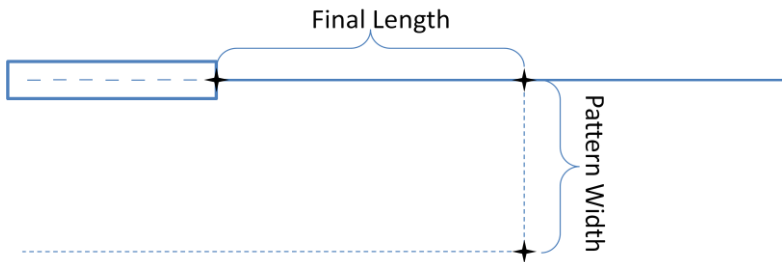


### *Visual Approach Settings – Final Length*

This setting controls the length of the final approach as depicted on the map when showing a visual approach with either a base or a downwind entry. The factory default setting is 1.0 nautical miles.

### *Visual Approach Settings – Pattern Width*

This setting controls the pattern width of the visual approach (i.e. the length of the base leg) when showing a visual approach with either a base or a downwind entry. The factory default setting is 1.2 nautical miles.

### *Visual Approach Settings – Glideslope*

This setting controls the glideslope used to generate advisory vertical guidance on a visual approach. The factory default setting is 4.0 degrees.

## Patterns

This setting controls whether the FMS will include search and rescue patterns in the dropdown menus when a flight plan is being entered.  Support for search and rescue patterns is a paid option.  This setting will only be shown on the Setup Page when the option is enabled.  At this point, the only search and rescue pattern supported is an "Orbit".  The factory default setting is "On".

## SBAS Channel Numbers

This setting controls whether the FMS will present SBAS channel numbers in the dropdown menus next to SBAS approaches.  When this setting is "On", the channel number will be displayed.  When this setting is "Off", the level of service will be displayed (e.g. LPV, LNAV, LNAV+V, etc.)  The factory default setting is "Off".

## Mini Flight Plan Format

This setting controls the appearance of flight plan legs and procedures on the FPL and ROUTE pages.  When the setting is "On", the flight plan is presented using an abbreviated format that allows more legs to be visible at one time.  The factory default setting is "Off".

## Advisory Glideslope

This setting controls whether the FMS will provide advisory vertical guidance on those approaches where it is available.  The factory default setting is "On".

## Auto Enable Missed

This setting controls whether the missed approach is automatically enabled once the aircraft sequences the final approach fix (FAF).  When this setting is "Off", the missed approach can still be enabled, but that operation must be performed manually in order for guidance to be provided to the missed approach procedure.  The factory default setting is "On".

MAP CATEGORY

Presentation of the IFD moving map is highly configurable using the settings under this category. Primarily, this category consists of a setup item for each available map layer. Other settings include airport filtering controls and on/off controls for high level features such as the compass rose.



**Map Orientation**

This setting controls whether the top of the map is oriented with the aircraft heading or with the aircraft track. The factory default setting is "Heading Up".

On power up, the orientation will be set to Track Up for 30 seconds in order to give the IFD time to determine whether a valid heading source is available.

At any time after the initial 30 seconds, if aircraft heading unavailable, the map orientation will be set to Track Up and this setting will not be shown on the Setup Page. If aircraft heading becomes available, and has remained available for 10 seconds, the setting will again be shown on the Setup Page.

**Airport Filter**

Many of the airports in the navigation database may not be suitable for use by a particular aircraft or a particular mission. There may be several reasons that an airport would be unusable including not having a runway with sufficient length and not having suitable fuel available. The airport filter item provides a means to define criteria which must be met in order for an airport to be depicted on the map.

The airport filter item consists of four criteria - tower, fuel, runway surface, and runway length. The criteria are arranged in order and worded such that the filter reads like a sentence, in order to provide clarity about what effect the filter will have.

Only an airport that meets **all** of the filter criteria will be displayed on the map.



Each of the settings is edited using the typical controls for enumerated items once the filter item has been expanded.

### *Tower Filter*

The tower criterion defines whether the filter should accept only towered airports, only non-towered airports, or any airport regardless of whether it is towered. The factory default setting is to accept any airport regardless of whether it is towered.

### *Fuel Filter*

The fuel criterion defines whether the filter should accept only those airports that have 100L fuel available, only those airports that have Jet-A fuel available, or any airport regardless of whether fuel is available or what kind of fuel is available. The factory default setting is to accept any airport regardless of whether fuel is available or what kind of fuel is available.

### *Runway Surface Filter*

The runway surface criterion defines whether the filter should accept only airports with a runway that has a specific kind of surface or any airport regardless of whether a given runway surface is present. Specific kinds of surface are "hard", "soft", "water", and "hard or soft". The factory default setting is to accept any airport regardless of what kind of runway surface is available.

### *Runway Length Filter*

The runway length criterion defines whether the filter should accept only airports with a specified minimum runway length or any airport regardless of runway length. The minimum runway length can be specified as one of several options ranging from 2000 feet to 5000 feet. The factory default setting is to accept any airport regardless of runway length.

### Altitude Filter

Several of the map layers have an altitude component defining when items in that layer are to be displayed. This setting controls whether the altitude component is to be considered when determining whether an item is to be displayed. The factory default setting is "On", thus enabling the use of the altitude component.

### Compass Rose

This setting controls whether the compass rose is displayed on the map. The factory default setting is "On".

### Heading Box

This setting controls whether the numeric aircraft heading (or track) is displayed at the top of the map. The factory default setting is "On".

### Map Layers

Each of the map layers is represented by an item with multiple conditions, in a fashion similar to the airport filter. The set of conditions varies with the layer since not all conditions are applicable to all layers.

Each layer has an overall on/off setting that controls visibility of the layer. When the layer is condensed, the overall visibility of the layer is shown on the right side of the item.

When the item is expanded and the layer is "On", the set of conditions for that layer are shown.  However, if the layer is off, none of the other conditions are shown.



Once the layer is turned "On", the set of conditions applicable to that layer are revealed.
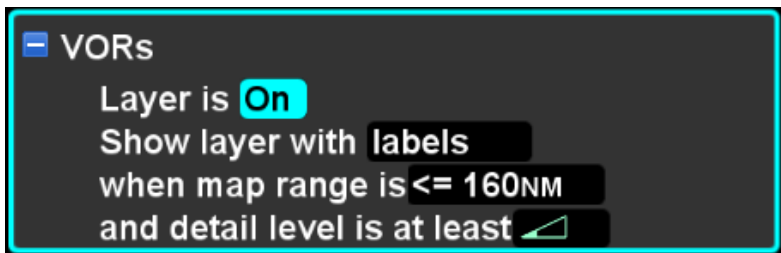


Like the airport filter, the layout and wording of conditions within a map layer is designed to make the set of conditions read like a sentence.   The sentence is structured to clearly specify the set of conditions that must be met in order for items in the layer to be shown.  Each of the possible criteria is described in the sections below.

Map layers have several possible default settings either corresponding to the intended mission or "factory" default.  See the "Presets" section for a discussion of those default settings.

### *Labels*

The labels criterion specifies whether items are displayed on the map with an associated label.  The label generally contains the identifier of the item being displayed.

### *Range*

The range criterion specifies the maximum map range at which items in the layer will be displayed.  At or below that range, items will be displayed.  Above that range, they will not.

### *Detail*

The detail criterion specifies the map detail level at or above which items in the layer will be displayed.  The symbol displayed corresponds to the detail level symbol shown on the Nav LSK of the Map page.  If the selected nav detail level is at the same level specified in the condition or higher (i.e. more filled in), then the item will be displayed.

### *Altitude*

The altitude criterion specifies a related altitude component defining whether an item in the layer is to be displayed.  The meaning of the altitude criterion varies based on the layer being processed.

In the case of an airspace layer, the altitude criterion specifies a number of feet above the airspace ceiling.  The airspace will be displayed when the aircraft is less than the specified number of feet above the airspace ceiling.

In the case of an obstacle layer, the altitude criterion specifies a number of feet above the obstacle.  An obstacle will be displayed when the aircraft is less than the specified number of feet above the obstacle.

In the case of an airway layer, the altitude criterion specifies an MSL altitude.  Victor airways will be shown when the aircraft is below the specified altitude.  Jet airways will be shown when the aircraft is at or above the specified altitude.

In the case of power lines, the altitude criterion specifies an AGL altitude.  Power lines will be shown when the aircraft is below the specified AGL altitude.

### Flight Plan Labels

This setting controls whether labels for flight plan waypoints are displayed on the map.  The factory default setting is "On".

RADIO CATEGORY †

Items in this category are used to control operation of the VHF Nav/Comm radio.  If the IFD does not contain a VHF radio (e.g. IFD545), then this category and the related settings will not be shown.
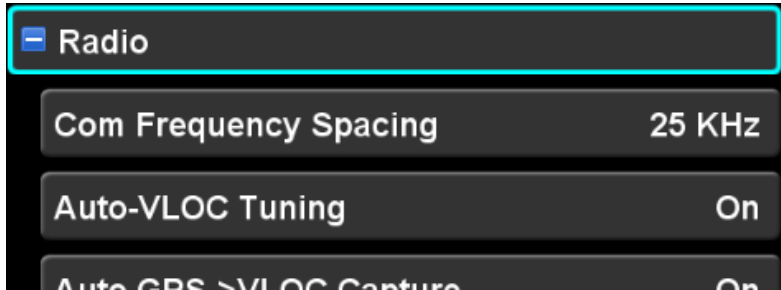


### Com Frequency Spacing †

This setting controls whether the comm. Radio uses 25 or 8.33 KHz spacing.  The factory default setting is "25 KHz".

### Remote IFD Tuning †

This setting controls whether this IFD is capable of tuning the radio on a second IFD.  The factory default setting is "Off".

Note that this setting is only available on the Setup page when the IFD is configured with cross-sync enabled.

### Auto-VLOC Tuning †

This setting controls whether the IFD will automatically tune the nav radios to the navaids recommended by the FMS.  The factory default setting is "On".

### Auto GPS->VLOC Capture †

This setting controls whether the IFD will allow the GPS->VLOC state for nav source and automatically transition to VLOC when the capture criteria are met.  The factory default setting is "On".

TERRAIN CATEGORY

Settings in this category control the behavior of terrain awareness/avoidance functions within the IFD.  If the IFD is configured with an external TAWS, the category and all of the related settings will not be shown.
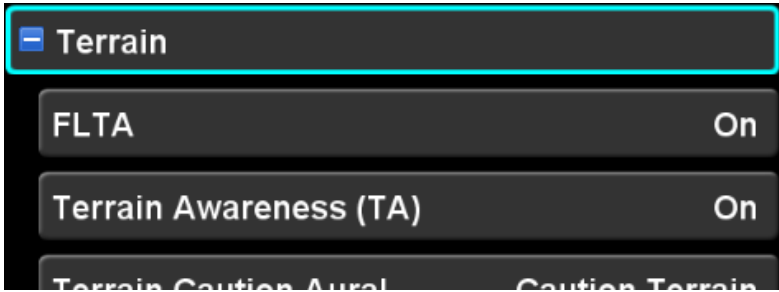


**FLTA**

This setting controls whether Forward Looking Terrain Avoidance (FLTA) function is enabled.  The factory default setting is "On".

**Terrain Awareness (TA)**

This setting controls whether Terrain Awareness function is enabled.  If the TAWS function is enabled, this setting also enables Premature Descent Alert (PDA).  The factory default setting is "On".

Note that in dual IFD installations, both units will need to be set to "Off" to disable the function.

**Terrain Caution Aural**

This setting controls the content of the aural message that is generated during FLTA caution conditions, with selections as follows:

- **Caution Terrain** – the aural message will say "Caution, Terrain; Caution, Terrain"
- **Terrain Ahead** – the aural message will say "Terrain Ahead; Terrain Ahead"

The factory default setting is "Caution Terrain".

**Terrain Warning Aural**

This setting controls the content of the aural message that is generated during FLTA warning conditions, with selections as follows:

- **Terrain Pull Up** – the aural message will say "Terrain, Pull Up; Terrain, Pull Up"
- **Terrain Terrain** – the aural message will say "Terrain, Terrain; Pull Up, Pull Up"

The factory default setting is "Terrain Pull Up".

**FLTA Exclusion Areas**

This setting controls whether FLTA Exclusion areas around airfields are enabled.  The factory default setting is "On".

If the FLTA setting is "Off", this setting will not be shown.

TIME CATEGORY

Settings in this category control the presentation of time throughout the system.



**UTC**

This item is not actually a setting and the cursor will skip it.  It is merely a display of the current UTC time to be used for reference with the other settings.

**Local Time Offset**

This setting defines the time difference between UTC and local time.  The value ranges from -12 hours to +14 hours, in increments of 15 minutes.  The factory default setting is 0:00 (no offset).

**Time Format**

This setting controls the display of time throughout the system. Selections are as follows

- **UTC** – time values are displayed as UTC times and will be suffixed with "Z"
- **12 Hr** – time values are displayed with respect to local time and will be suffixed with "AM" or "PM"
- **24 Hr** – time values are displayed with respect to local time, ranging from 0:00 to 23:59, and will have no suffix.

The factory default setting is "12 Hr".

**Local Time**

This item is not actually a setting and the cursor will skip it. It is merely a display of the current local time affected by the selected local time offset and time format settings.

TRANSPONDER CATEGORY

When configured to control a remote transponder, the IFD uses the settings in this category to configure and control the transponder.  If the IFD is not configured to control a remote transponder, the category and related settings will not be shown.

| ☐ Transponder | |
|---|---|
| Flight ID | N757AF |
| Default Transponder Code | 1200 |
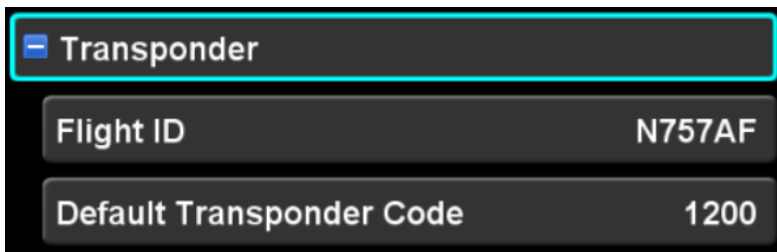
**Flight ID**

This setting defines the ADS-B flight ID to be transmitted by the transponder.  Typically, this is set to the aircraft tail number.

The factory default for this setting is "0000000".  Once a tail number has been defined (via Maintenance Mode), the default for this setting is the tail number.

If the flight ID is edited to be a blank value, the value will be reset to the tail number (or the factory default if no tail number has been defined).

**Default Transponder Code**

This setting defines the transponder code that will be used when the transponder is set to "VFR".  The factory default setting is "1200".

## UNITS CATEGORY

The settings in this category control the units in which different quantities throughout the system are displayed.
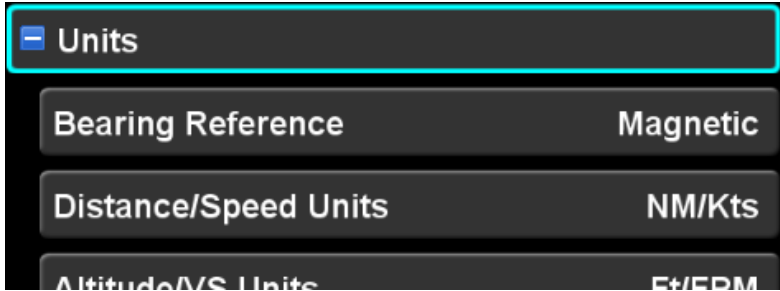


### Bearing Reference

This setting defines whether courses and headings are to be displayed with reference to true north or magnetic north.  The factory default setting is magnetic north.

### Distance/Speed Units

This setting defines the units in which distances and speeds are to be displayed.  Options are as follows:

- **NM/Kts** – Nautical miles and knots
- **KM/KPH** – Kilometers and kilometers per hour
- **MI/MPH** – Statute miles and miles per hour

The factory default setting is "NM/Kts".

### Altitude/VS Units

This setting defines the units in which altitudes and vertical speeds are to be displayed.  Options are as follows:

- **Ft/FPM** – Feet and feet per minute
- **M/MPM** – Meters and meters per minute
- **M/MPS** – Meters and meters per second

The factory default setting is "Ft/FPM".

**Pressure Units**

This setting defines the units in which atmospheric pressure is displayed.  Options are as follows:

- **InHg** – Inches of mercury
- **Millibars** – Millibars
- **hPa** – Hectopascals

The factory default setting is "InHg".

**Temperature Units**

This setting defines the units in which temperatures are displayed.  Options are as follows:

- **Fahrenheit**
- **Celsius**

The factory default setting is "Fahrenheit".

**Fuel Units**

This setting defines the units in which fuel quantities are displayed.  Options are as follows:

- **Gallons**
- **Imperial Gallons**
- **Liters**
- **Pounds**
- **Kilograms**

The factory default setting is "Gallons".

**Position Units**

This setting defines format in which positions are displayed. Options are as follows:

- **ddd°mm.mm'** – degrees, minutes, and tenths of minutes

- **ddd°mm'ss"** – degrees, minutes, and seconds
- **UTM** – Universal Transverse Mercator
- **MGRS** – Military Grid Reference System

The factory default setting is ddd°mm'ss".

USER PROFILE CATEGORY

Settings in this category define names for each of the several user profiles.
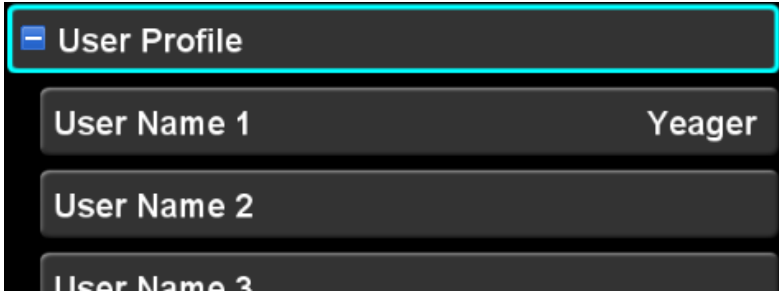


The IFD is capable of storing up to ten sets of setup options, each set stored in a separate "user profile".   Each user profile can be named.  This feature can be very useful in situations where an aircraft is shared among several pilots and each pilot has different preferences for viewing data on and interacting with the IFD. Another useful scenario is for a single pilot to have one profile for VFR flights and another profile for IFR flights.

From the factory, a single user named "User-1" is defined.  If no other profiles are created, all settings will be associated with that user.  The name of any profile can be changed using normal editing techniques, and the name is displayed on the right side of the row.

Changing the name of a user profile, however, does not change any of the settings associated with that profile.  In order to change the settings for a profile, the profile must first be selected.  At that point, all further settings will be associated with that profile, until a different profile is selected.

The "User" LSK is used to select among the defined profiles.  If there is only a single profile defined, the LSK will not be shown and the defined profile is considered the "selected profile".  If more than one profile is defined, however, successive presses of the "User" LSK will cycle through each of those profiles and the system will be configured to use settings associated with that profile. The profile being shown on the LSK denotes the "selected profile".

PRESETS

Presets provide a means to configure many IFD settings with one operator action. In order to configure the IFD using a preset, press the "Presets" LSK. The Setup Page will then present a list of possible presets to be selected using the same category/item organization as the main page, as illustrated below.

*Setup Presets*
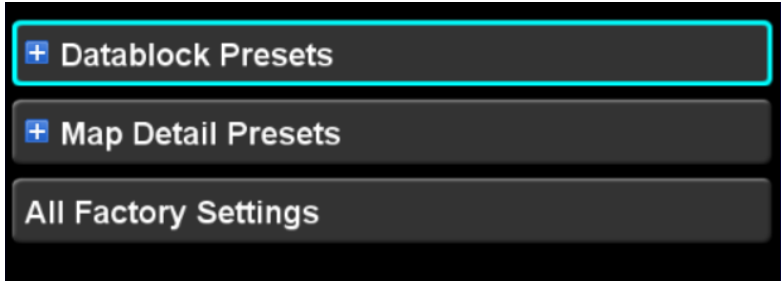


In the picture above, the "Datablock Presets" and "Map Detail Presets" are categories containing corresponding preset items. "All Factory Settings", however, is a preset item.

To configure the IFD using a preset, move the cursor to surround the desired preset item. Then, press the right knob button, press the ENTR button, or touch the item to select that preset. The IFD will then present a green dialog indicating which preset will be applied.

*Preset confirmation dialog*
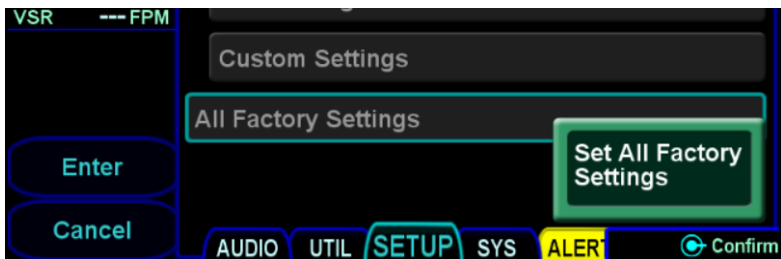


To apply the preset, press the right knob, the ENTR button, or the "Enter" LSK, or touch the green dialog. To abort the preset, press the CLR button or the "Cancel" LSK. Once a preset has been

applied, the list of presets will be dismissed and the normal Setup Page contents will again be displayed.

To return to normal Setup Page operation without applying a preset, press the "Exit" LSK.

> **IMPORTANT NOTE**
>
> When a preset is applied, it only affects settings for the currently selected user profile.  The user profile name is not affected by applying the preset.

**All Factory Settings**

Applying the "All Factory Settings" preset item will cause all of the settings on the Setup Page to be set to factory defaults, except the "User Profile" and any network names and passwords.

**Datablock Presets**

Expanding the "Datablock Presets" item reveals several presets that affect only the configuration of datablocks.

*Datablock presets (expanded)*
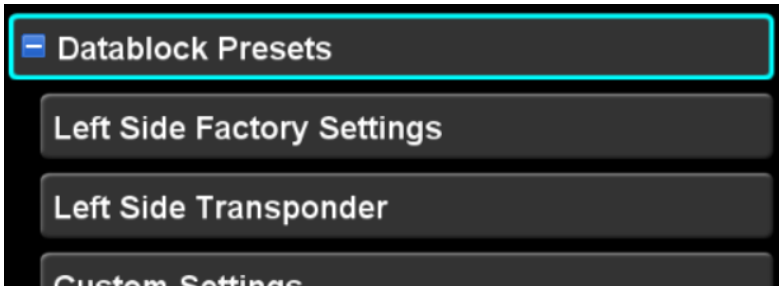


*Left Side Factory Settings*

The "left side factory settings" preset returns only the datablocks on the left side to the factory defaults, as follows:

| IFD with radio | IFD without radio |
|---|---|
| Primary Com/VLOC | To Waypoint Direct Info |

### *Custom Settings*

The "custom settings" preset consists of the complete set of datablock settings that have been most recently modified by the pilot.  For instance, say the IFD is factory new and then the pilot changes the upper right datablock.  The pilot then applies the "factory settings" preset.  If the pilot then comes back to the presets page and then selects "custom preset", the set of datablocks with the upper right one changed will be displayed.  Whenever any single datablock is changed, the custom settings preset is updated.

> **IMPORTANT NOTE**
>
> When applying factory defaults, it is possible to revert back to the most recent settings by selecting "custom settings".  However, if just one datablock is changed after having applied factory defaults, those settings become the "custom settings".  Therefore, returning to that original set of custom settings is no longer possible.

### *Factory Settings*

The "factory settings" preset returns the set of datablocks back to the factory defaults, as follows:

| Left Side Datablocks | |
|---|---|
| **IFD with radio** | **IFD without radio** |
| Primary Com/VLOC | To Waypoint Direct Info |

| Top Strip Datablocks | |
|---|---|
| **IFD with radio** | **IFD without radio** |
| UTC Time | UTC Time |
| GPS AGL Altitude | GPS AGL Altitude |

| Right Side Datablocks | |
|---|---|
| **IFD with radio** | **IFD without radio** |
| To Waypoint Information | Next Waypoint Information |
| Nearest Airport | Nearest Airport |
| Destination Direct Info | Destination Direct Info |
| Fuel Amount Remaining* | Fuel Amount Remaining* |
| Fuel Time Remaining* | Fuel Time Remaining* |
| Minimum Safe Altitude | Minimum Safe Altitude |
| Groundspeed | Groundspeed |
| GPS CDI | GPS CDI |
| Flight Timer | Flight Timer |
| Aircraft Position | Aircraft Position |
| Number of Alerts | Number of Alerts |

* Only presented if the IFD is configured to communicate with an external fuel flow system

**Map Detail Presets**

Expanding the "Map Detail Presets" item reveals several presets that affect only the map layers.

*Map Detail Presets (expanded)*
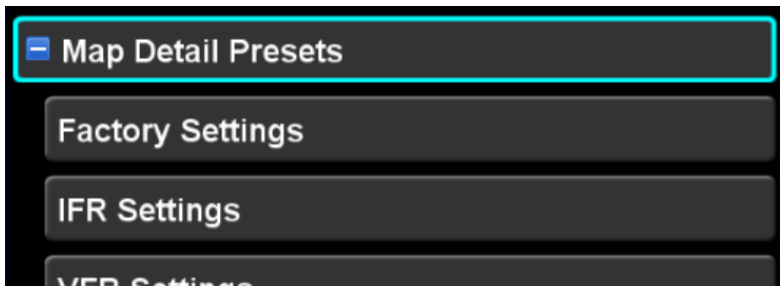


Note that selecting any of these presets only affects map layers, not the other map settings such as compass rose on/off, airport filter on/off, etc.

## *Factory Settings*

Factory settings for map layers are as follows:

| Layer | Visible | Labels | Range | Detail | Alt Filter |
|---:|:---:|:---:|:---:|:---:|---:|
| SUA | On | | 160 | Hi | |
| VOR | On | On | 160 | Low | |
| Towered Apts | On | On | 100 | Low | |
| NonTowered Apts | On | On | 80 | Med | |
| Class A/B/C | On | | 100 | Med | > 0 |
| Class D | On | | 30 | Hi | < 2000 |
| High Obstacles | On | On | 50 | Med | < 1500 |
| Low Obstacles | On | On | 40 | Hi | < 1500 |
| Intersections | Off | Off | 40 | Hi | |
| Victor Airways | On | On | 50 | Med | < 19000 |
| Jet Airways | Off | On | 50 | Hi | >= 17000 |
| VFR Waypoints | Off | Off | 40 | Hi | |
| NDBs | Off | Off | 50 | Hi | |
| Flight Plan | | On | | | |
| Non-TA Traffic | On | | 40 | n/a | |
| Power Lines | On | | 10 | n/a | < 1500 |
| Interstates | On | On | 100 | n/a | |

## *IFR Settings*

IFR settings for map layers are the same as factory settings except for the following changes:

| Layer | Visible | Labels | Range | Detail | Alt Filter |
|---:|:---:|:---:|:---:|:---:|:---:|
| NonTowered Apts | | | 50 | | |
| Low Obstacles | | | 50 | | |
| Intersections | On | On | 30 | | |
| Victor Airways | | | 40 | | |
| Jet Airways | On | | | | |
| NDBs | On | On | | | |
| Interstates | | | 30 | | |

## *VFR Settings*

VFR settings for map layers are the same as factory settings except for the following changes:

| Layer | Visible | Labels | Range | Detail | Alt Filter |
|---:|:---:|:---:|:---:|:---:|:---:|
| VOR | | | 100 | | |

| | | | | | |
|---|---|---|---|---|---|
| Towered Apts | | | 160 | | |
| High Obstacles | | | 160 | | |
| Low Obstacles | | | 20 | | |
| Victor Airways | Off | | | | |
| VFR Waypoints | On | | | | |

### *Custom Settings*

The "Custom settings" preset item represents the most recent map settings that have been modified by the pilot. Every time a setting is changed manually, the custom settings are updated. Selecting a different preset does not change the custom settings. However, if a different preset is selected and then at least one settings change is made, the custom settings will be updated to reflect the complete set of new settings.

## SYS (SYSTEM) TAB

The "SYS" (System) tab provides access to various system status pages, a means to enter initial fuel (if configured with a recognized fuel flow system) and a means to access IFD data logs, update IFD software and update IFD databases.

FUEL MANAGEMENT

The "Fuel Mgmt" LSK will be displayed if the IFD has been configured to interface with an aircraft fuel flow system. When the LSK is pressed, the IFD will display the Fuel Management Page.

The fuel management page shows data being reported by the fuel flow system, as follows.

- **Flow** – the current fuel flow rate
- **Used** – the amount of fuel that has been used during this flight
- **Rmng** – the total usable fuel remaining on board the aircraft
- **Time** – the aircraft endurance based on the total fuel remaining and current total fuel flow
- **Econ** – the fuel economy based on total fuel flow and groundspeed

The fuel management page will show either one or two fuel "Flow" and "Used" fields based on whether the IFD is configured for a single-engine or a multi-engine aircraft.

*Fuel Management Dialog Box (configured for multi-engine)*

If the fuel flow system is not capable of reporting the amount of fuel remaining (i.e. does not have a totalizer), then the IFD will present two controls allowing the fuel quantity to be manually adjusted.

- **Fuel Added** – use this control to increment the fuel quantity by an amount that was added since the last flight.
- **Total** – use this control to set the total quantity of usable fuel on board.

When one of the controls is used, the value in the other control will be adjusted accordingly.  For instance, if the "Total" control is showing 50 gallons and then "30" is entered using the "Fuel Added" control, the total will be updated to show 80.

SYSTEM STATUS

The "Status" LSK is a multiple state LSK that provides access to software status page, weather datalink status page (if datalink is installed and properly configured), GPS status page, and the IFD databases status page. Pushing the adjacent bezel key or touching the label soft key will cycle through the various status pages.

**Software Status Page**

The "Software" selection will present the top level software part number information and some system-level parameters which can be useful during service calls and IFD feature descriptions.

*Software Status Page*



When the aircraft is not airborne, the Software Status Page will also show a "Download Logs" LSK. Pressing that LSK will put the IFD into Maintenance Mode where the datalogs can be downloaded (see page 6-63 for instructions).

The software status page also shows whether IFD options are enabled. Some of the options are standard, but others require a specific enablement. Contact Avidyne sales in order to enable those options.

- **VID** – although shown on the page, this option is unavailable for IFD400 series units.

- **RDR** – although shown on the page, this option is unavailable for IFD400 series units.

- **TAWS** – although shown on the page as a standalone option, it is only available when coupled with HELO to provide HTAWS functions.
- **SVS** – although shown on the page, this option is unavailable for IFD400 series units.
- **F500** – standard option to enable FLTA with 500 foot callout.
- **ENET/IO** – standard option to enable WiFi.
- **16W** – enable 16 watt radio. Only available for 28V aircraft.
- **SAR** – enable search and rescue patterns
- **BT** – standard option to enable Bluetooth.
- **HELO** – enable helicopter operations (aircraft symbol, database procedures). When coupled with the TAWS option, the IFD performs HTAWS functions.
- **GLAS** – enable GPS Legacy Avionics Support for business jet class aircraft
- **PORTS** – enables a feature that allows use of a WiFi connected ADS-B input device (e.g. Stratus 3). The feature will only be operational if the IFD is not configured to receive traffic/weather from a wired sensor and the Maintenance Mode option for Capstone portables is enabled.

### Database Status Page

The "Databases" selection on the "Status" LSK of the SYS tab will display the currently loaded version of the Nav data, Obstacles data, and Terrain data and will indicate valid date ranges or if/when a given database is expired.

*Database Status Page*



> **NOTE**
>
> **Database Currency**
> It is critical that you update the data regularly and that you ensure the databases are current prior to conducting flight operations.

Pressing the "Update Databases" LSK will put the IFD into Maintenance Mode where the databases can be uploaded to the IFD (see page 6-56 for instructions).

## GPS Status Page

The "GPS" selection will provide a number of GPS status parameters, including the GPS navigation state and GPS derived current altitude as well as the active GPS approach (if appropriate), and a graphical depiction of the satellite vehicles (SV) being tracked by the IFD GPS receiver.

*GPS Status Page - Upper Half*
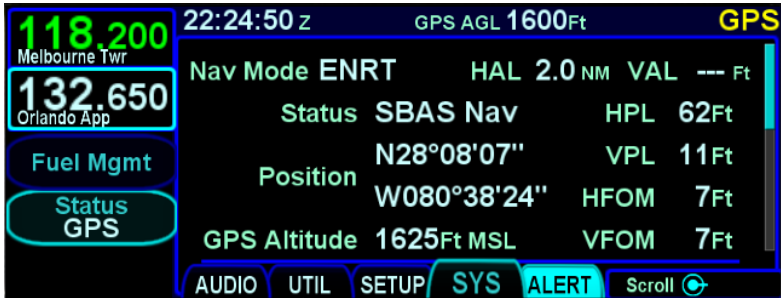


*GPS Status Page- Lower Half*
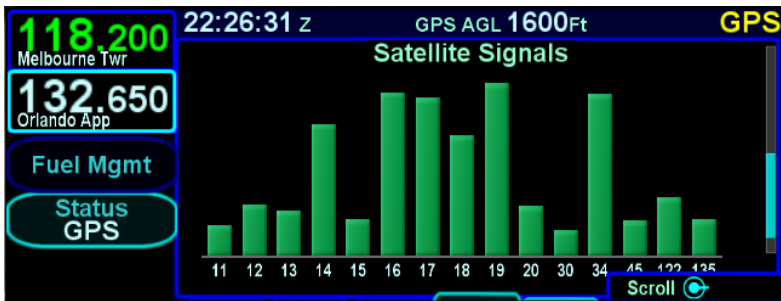
> **NOTE**
>
> **Global SBAS Support**
> Wide area/regional satellite based augmentation system (SBAS) support provided by the IFD include WAAS (Continental US, Alaska, Canada and most of Central America), EGNOS (most of Europe and North Africa), MSAS (Japan) and GAGNAN (India). These are regional augmentations of the GPS satellite constellation and should not be interpreted as meaning the IFD is compatible with other GNSS constellation systems such as Galileo (Europe), GLONASS (Russia), or Compass (China).

The GPS navigation states possible are:

| GPS Navigation State | Operational Meaning |
|---|---|
| Self Test | System performing self test. This is the initial state value but happens so quickly it is rarely observed. |
| Init | System is initializing – this state is also very quick and is rarely observed. |
| Search | Satellite acquisition mode. |
| Basic Nav | System has acquired enough satellites to conduct basic navigation but without integrity. |
| FDE Nav | System has acquired enough satellites to conduct navigation with fault detection and exclusion integrity. |
| SBAS Nav | System is capable of navigation with satellite-based augmentation (e.g. the WAAS platform in the US). |

| GPS Navigation State | Operational Meaning |
|---|---|
| Fault | System has detected an internal fault and does not have a satellite navigation solution.<br>This may require a manual power cycle of the IFD to restore a GPS lock. |

The graphical bars represent the relative signal strength of each individual SV as well as the SV identification number.   SV numbers above 100 represent the SBAS satellites.  It typically requires three SBAS satellites before full SBAS functionality can be realized.

The internal GPS receiver will automatically de-select satellite vehicles from inclusion in the position fix if poor satellite health or maintenance information is available in the satellite data stream. However, there may be times, or geographic locations in the world, where it is desirable to manually de-select a satellite vehicle or series of satellite vehicles from the GPS solution.  For example, most locations in Australia can see a US WAAS satellite and a Japanese MSAS satellite, neither of which are used for Australian precision approach flying.  In that case, it may be desirable to de-select those specific satellite vehicles from the GPS position fix algorithm.

Satellite vehicles (SVs) can be manually de-selected via the Maintenance Mode pages.  The de-selected SVs persist across power cycles.

## Datalink Status Page

The "Datalink" selection will be available if the IFD has been properly configured to integrate with a compatible on-board datalink weather system.

The upper part of this page shows the weather products supported by the datalink system (and subscription level, if applicable) with their age and receipt status. For each weather product, the status will show one of the following for "age":

- The numeric age, in minutes, of the weather product. This is typically the elapsed time since the weather product was last received. However, for forecast products (e.g. winds aloft) this is the forecast time.
- "---" (dashes) – the product is not available with the current subscription level
- "Not Xpctd" – the product is not expected to be received. The IFD will not issue an "Overdue" alert for this product
- "Not Rcvd" – the IFD is expecting the product, it has not been received, but the time elapsed since IFD power up has not exceeded the "late" timeout period (see page 3-16).
- "Overdue" – the IFD was expecting the product, but it was not received within the "late" timeout period.

The lower part of the page shows a legend containing the various symbols used in the datalink data depictions on the maps.

*Datalink Status Page*

### ADS-B Status Pages

When the IFD is configured to integrate with an ADS-B system that provides FIS-B (weather) service, a series of ADS-B specific pages is presented to allow details of various received products. The ADS-B specific status pages are accessed using the L5 LSK, which is titled "Datalink" with the specific page name shown under the title. Pressing the LSK will cycle through the available ADS-B specific pages.

### *ADS-B Stations Page*

This page shows the ADS-B stations from which data is being received. For each station in the list, the page shows the station's ID, location, data reception rate, and look-ahead ranges for TFRs, AIRMETs, and SIGMETs. The data reception rate, expressed as a percentage, is a measure of recent activity compared to the maximum activity that has been observed from the station. The look-ahead range is the radius for which a given product is provided from that station.

Each FIS-B station periodically broadcasts a "Current Report List" (CRL) that indicates whether the station is broadcasting TFRs, AIRMETs, and SIGMETs. Using that list, the IFD can determine whether it has received all of the reports that it is supposed to have received. When all of the expected data of a given type has been received, its look-ahead range will be presented in green.

*ADS-B Stations Page*



### *ADS-B TFRs Page*

The ADS-B TFRs page shows a list of Temporary Flight Restrictions (TFRs) that have been received over FIS-B. Using

the right knob or the touchscreen, a cursor can be moved to surround each of the TFRs in the list.  Selecting one of the TFRs, either by pressing the right knob button, pressing the ENTR button, or touching the TFR surrounded by the cursor, will cause the ADS-B Product Text page (see page 4-89) to appear, showing the text for the selected TFR.

*ADS-B TFRs Page*



## ADS-B AIRMET/SIGMET Page

The ADS-B AIRMET/SIGMET Page shows a list of AIRMETs and SIGMETs that have been received over FIS-B. Using the right knob or the touchscreen, a cursor can be moved to surround each of the reports in the list.  Selecting one of the AIRMETs or SIGMETs, either by pressing the right knob button, pressing the ENTR button, or touching the report surrounded by the cursor, will cause the ADS-B Product Text page (see page 4-89) to appear, showing the text for the selected report.

*ADS-B AIRMET/SIGMET Page*
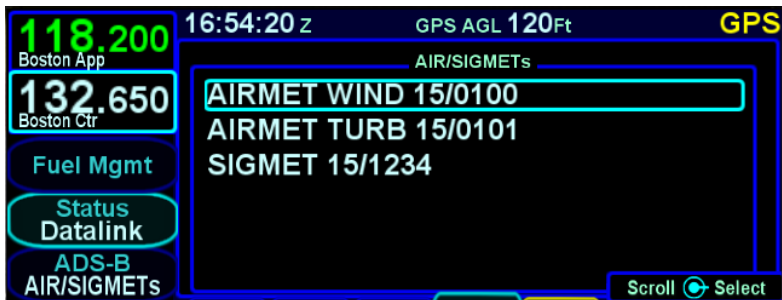
### ADS-B Product Text Page

The ADS-B Product Text page shows the detailed report for TFRs, SIGMETs, and AIRMETs. Unless one of those reports has been selected on either the ADS-B TFRs page or the ADS-B AIRMET/SIGMETs page, this page will not be populated, and will instead show "No Text Selected" at the top of the page. Once one of those reports has been selected, this page will continue to show that report until a different report is selected.

To return to the list page containing the corresponding report, touch the screen, press the right knob button, or press the ENTR button.
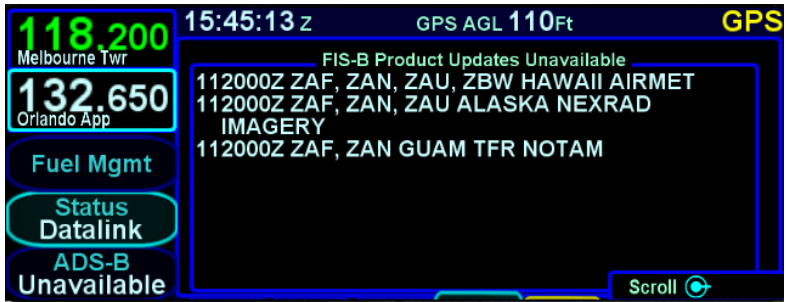
*ADS-B Product Text Page*
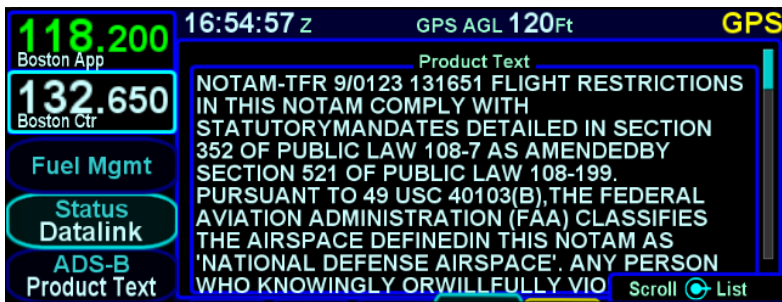


### ADS-B Unavailable Products Page

The ADS-B Unavailable Products Page shows the contents of the FIS-B Product Updates Unavailable Report. That report provides notification to users of outage of individual FIS-B product updates or the entire FIS-B service. If 20 minutes has elapsed since the IFD last received the FIS-B Product Updates Unavailable report, the report will be removed.

*ADS-B Unavailable Products Page*

## ALERT TAB

The ALERT tab keeps a running tally of all active alerts, grouping them by level.  If there is an active alert in the system, pressing the AUX button will cause the ALERT tab to be displayed rather than the last tab that was selected in the AUX subsystem.

*Systems Alerts Tab*
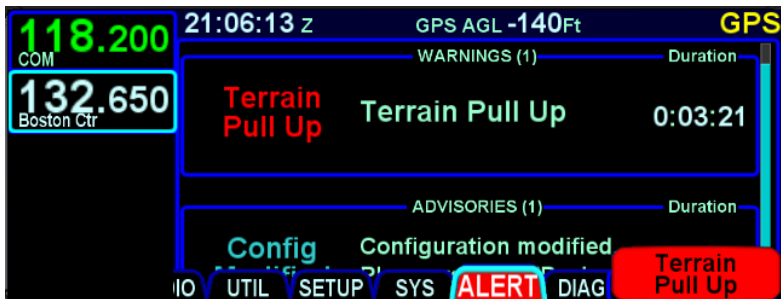


Each section in the page is organized into three columns.

- "Short Text" - A short description of the condition.  This text also appears in the message bar.
- "Long Text" - A longer description of what caused the condition.  In some cases, there is nothing further to be added, so the long text is the same as the short text.
- Duration - The elapsed time since the alert was first issued.

A complete list of warning, caution, and advisory alerts is given in section 6 .

# 5 Navigation

The IFD is an IFR certified GPS that has been specifically designed to support single-pilot IFR operations. When operating under IFR, in all cases, fly your clearance.  The IFD's FMS provides features and functions that can make flying your clearance easier, but it is important to remember that doing so is ultimately the pilot's responsibility.  Be careful to fully understand how the IFD and your autopilot operate together to fly your chosen lateral and vertical flight path.  Beware of using advanced IFD functions such as VNAV if you are not thoroughly familiar with these features, as using them incorrectly may result in your violating your clearance.

The IFD has been designed for both retrofit and clean installations, meaning that it can have different capabilities depending on the nature of the aircraft integration.  The various levels of integration are described in the following table.

| Integration Category | Description | IFD Functionality |
|---|---|---|
| No external nav indicator | There is no form of external CDI, HSI, or EFIS in the airplane and therefore, no external course input available to the IFD. | VFR operations only.<br><br>No way to externally set course.<br><br>All course setting is conducted on the IFD (e.g. –D->, push OBS and turn nav source knob, auto-nominate a course by selecting a procedure, etc). **†**<br><br>Nav source modes available:<br>**GPS**<br>**VLOC †**<br>**GPS** → **VLOC †**<br>**OBS**<br>**OBS** → **VLOC †** |

| Integration Category | Description | IFD Functionality |
|---|---|---|
| Basic electro-mechanical nav indicator | There is at least one external CDI or HSI in the airplane and the IFD has access to the course data from it. | Set the course on the external unit and the IFD will display that value.<br><br>No auto-slew capability of the course on the IFD.<br><br>The nav source knob/button is used only to toggle between the available states.<br><br>Nav source modes available:<br>**GPS**<br>**VLOC †**<br>**GPS → VLOC †**<br>**OBS**<br>**OBS → VLOC †** |
| "Non-cooperative" electronics<br><br>**For Example**<br>G500/600<br>Aspen EFD1000<br>Avidyne EXP5000<br>Dynon Skyview<br>EFIS 40/50 | The IFD can receive course input from this external device(s).<br><br>The IFD can send commands to set course (e.g. "auto-slew") on those external device(s). | The nav source knob/button is used only to toggle between the available states.<br><br>Nav source modes available:<br>**GPS**<br>**VLOC †**<br>**GPS → VLOC †**<br>**OBS**<br>**OBS → VLOC †** |

| Integration Category | Description | IFD Functionality |
|---|---|---|
| "Cooperative" electronics | The "cooperative" system is even more capable than the IFD and, therefore, is the primary navigation control device.<br><br>All nav source selection and course setting is performed on the external device.<br><br>The IFD becomes a "slave" to the external device. | Course values will display on the IFD but are set on the external device(s).<br><br>Nav source modes available: None (the nav source knob/button will appear to be non-functional). |

| NOTE |
|---|
| **Manual Sequencing May Be Required**<br>In Electro-mechanical installations where the IFD does not have an altitude input, a CAS message ("Manual Sequence Req'd") prompting the pilot to manually sequence legs of the flight plan will be presented on Heading-to-Altitude leg types (e.g. some missed approach legs).  Since the IFD does not know altitude in this case, it does not know when to sequence to the next leg.  Failure to manually sequence to the next leg will result in the IFD maintaining the leg heading indefinitely. |

## NAV SOURCE KNOB/BUTTON

For all models except the IFD410, the knob located in the upper right hand corner of the bezel is the dedicated Navigation (Nav) Source knob.  For IFD410, the knob is replaced by a button labeled "OBS".  In the description below, any references to capability requiring a VHF radio are not applicable.

Think of the nav source knob as a channel selector to choose which Nav source the pilot wants depicted on the moving map. The chosen source will also be sent to other on-board systems like an EFIS (e.g. Aspen PFD) and in-turn, the autopilot, as well as driving any conventional CDI or RMI or HSI indicator.  VLOC and GPS course and deviation data may all be coming into the IFD continuously but the channel selector acts as a filter to determine which one gets used in the nav solution and displayed on the IFD.   The nav source knob must typically be turned to select the desired state.  The selected nav mode indication will flash for several seconds before taking effect; thereby giving you time to visually confirm the desired state.

*Nav Source Knob State Indication (except IFD410)*



The IFD410 nav source button is similar to the nav source knob, except that it toggles only between GPS based navigation to the flight plan and an OBS course to the active waypoint.

*Nav Source Button Indication (IFD410)*
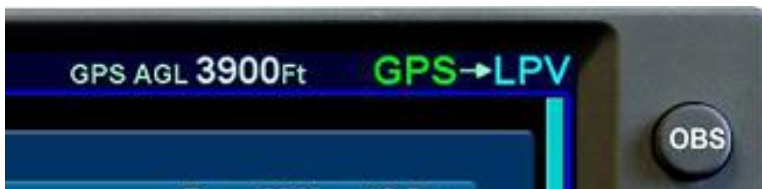


As described earlier in this section, multiple levels of aircraft system integration are possible, and will affect the possible states

of the Nav Source knob. The table below describes all possible nav sources:

| Nav Source | Description |
|---|---|
| **GPS** | GPS is active (green), and all external deviation data being transmitted by the IFD is in reference to the active GPS leg.<br><br>Note that if no GPS leg is active or if no GPS lock, the nav source will be displayed in yellow. |
| **LPV**<br>**L/VNAV**<br>**LP**<br>**LP+V**<br>**LNAV**<br>**LNAV+V** | If performing an RNAV approach, "GPS" gets replaced with the approach type when the leg to the FAF becomes active and either the approach is VTF or the course to the FAF is within 45° of the final approach course. |
| **GPS → LPV**<br>**GPS → L/VNAV**<br>**GPS → LP**<br>**GPS → LP+V**<br>**GPS → LNAV**<br>**GPS → LNAV+V** | Basic GPS is active (green), and the approach type is armed (blue). |
| **Visual** | A visual approach is active (green) |
| **GPS → VLOC†** | GPS is active (green), and VLOC is armed (blue).<br><br>If the GPS flight plan contains a VHF procedure or leg (e.g. localizer final), then the nav source will automatically transition from GPS to VLOC when the capture criteria have been met.  While GPS is active, all external deviation data being transmitted by the IFD is in reference to the active GPS leg. That transitions to VHF deviation data when the switch to VLOC is made. |

| Nav Source | Description |
|---|---|
| **VLOC†** | VLOC is active (green), and all external deviation data being transmitted by the IFD is in reference to the tuned VHF navaid (e.g. Inbound VOR course, localizer deviation, etc). Note that if no VHF data is being received (e.g. out of range, improperly tuned nav radio, etc), the nav mode will be displayed in yellow. It will also stay yellow until the nav channel is fully decoded as an indication to manually tune-identify-monitor. |
| **OBS** | OBS is active (green) and deviation data being transmitted by the IFD is reactive to the external course setting knob (or the Nav Source knob if no external course control is present or when a KI-208A or KI-209A is present) for the inbound/outbound course. Note that this state is accessed by pushing in the Nav Source knob, and then it takes the place of pure **GPS** mode as described earlier in this table. |
| **OBS** → **VLOC†** | OBS is active (green) and VLOC is armed (blue). Deviation data being transmitted by the IFD is reactive to the external course setting knob (or the Nav Source knob if no external course control is present or when a KI-208A or KI-209A is present) for the inbound/outbound course. Note that this state is accessed by pushing in the Nav Source knob and then it takes the place of **GPS** → **VLOC** mode as described earlier in this table. |

> **NOTE**
>
> **Aircraft Integration**
> The nav sources available in your airplane will be dependent on the level of integration with other on-board systems. Avidyne strongly recommends practice operations in VMC conditions before any use in IMC, to understand the level of integration between the IFD and the other on-board systems and, therefore, the nav sources available.

The nav source knob is labeled "CDI" above the knob and is designed to allow you to toggle the CDI and system nav source between the active and armed states defined above.

## OBS MODE

"PUSH OBS" is the label underneath the knob (or the button label in the case of IFD410) and is active when you can put the system in To/From course setting mode for a waypoint. There is no need for "suspend" functionality in the IFD paradigm – the IFD will continue sequencing to the next waypoint and exit OBS mode at that time.

| NOTE |
| --- |
| **GPS and OBS**<br>If GPS or OBS are not the active Nav state (annunciated in green), then pushing the Nav Source knob will have no effect. When one of them is the active Nav state, pushing the Nav Source knob will toggle between the two states. |

| NOTE |
| --- |
| **OBS Can Not Be Activated Inside the FAF**<br>OBS is prevented from being selected on a published approach when inside the Final Approach Fix (FAF). |

When in OBS mode, the depiction on the map will vary depending upon whether the system has determined the airplane to be in TO or FROM orientation.

In OBS TO (defined as when the difference between the selected OBS course and the aircraft course to the fix is less than 90°), the map will display only the magenta leg to be flown to the fix. There is no white leg depiction for the outbound leg because the assumed intent is to fly to the fix and automatically sequence legs as normal from there.

*OBS TO Depiction*



In OBS FROM (defined as when the difference between the selected OBS course and the aircraft course to the fix is greater than or equal to 90°), the system will activate the reciprocal course away from the station with guidance away FROM the fix. The previously active TO leg will change to white and remain in pivot. The assumption here is that you will want to fly the leg on the 180° plane between the aircraft and the fix. If the TO leg is within this plane, you will fly to the station. If you swing the TO leg to the opposite plane, the FROM leg would now be in the 180° plane between you and the fix, and that is the leg to fly – away from the station.

*OBS FROM Depiction*

**TIPS AND TECHNIQUES**

### OBS "Final"
OBS mode can be used to create a user-defined course into a waypoint/fix or an airfield.  Once in OBS mode, use the external course knob to set the desired inbound course to the fix or airfield.  All guidance, including that sent to an autopilot, will now be with respect to that user-defined course.

**NOTE**

### OBS Leg Depiction on External Moving Maps
The depiction of the OBS course line on external moving map displays may vary by device.  Some external displays may depict the OBS leg and some may not.  For example, in IFD software releases prior to Release 10.1.1.0, the Avidyne EX5000, EX500, and EX600 MFDs would not depict the OBS course line/leg but do depict a 200nm OBS course line/leg in Release 10.1.1.0 and later.  Changes can take up to 7 seconds to display on the map and east-west legs may show some curvature.

**NOTE**

### OBS Behavior in Dual IFD Operations
For those installations that include dual IFDs that are separately wired to two different nav indicators, the #2 IFD will automatically switch into OBS mode when #1 IFD Nav Source has been put into OBS and the #2 nav indicator will flag invalid.  This is because the FMS stays synchronized between the two IFDs.  The #2 IFD will display the selected course as set by the #1 nav indicator on the map page.

## VOR COURSE DEPICTION †

When the IFD is receiving selected course from an external indicator, the Nav Source on the IFD is VLOC, and the IFD is tuned to a VOR station, the IFD will display the inbound and outbound radials for the selected course.  The radials will be displayed once the VOR station is decoded and will be 50nm long.

When the aircraft is on the near side of the perpendicular course ("To" geometry), the line will be green for the ***inbound*** radial and white for the outbound radial.

When the aircraft position is on the far side of the perpendicular course ("From" geometry), the line will be green for the ***outbound*** radial and white for the inbound radial.

*VOR Course Depiction*



> **NOTE**
>
> If the IFD is configured to "Ignore SEL CRS for VLOC" in Maintenance mode, the selected course will not be depicted on the map.

# ARMED VS ENGAGED/ACTIVE INDICATIONS

The active IFD nav mode is displayed in the upper right corner of the display. If there is an "armed" IFD nav mode, it will be displayed in cyan, to the right of the active mode, preceded by an arrow. The illustration below shows the system in GPS mode, with VLOC armed.

*Nav Source Mode Armed and Engaged Depiction*



As the armed mode is captured, the previously active nav mode will be removed and the previously armed state will turn green and begin to flash. The mode will flash for approximately five seconds and then turn green. When the green indication stops flashing, the IFD will be in the new nav mode.

To trigger the transition from armed VLOC to active VLOC, all of the following capture criteria must be met:

- The tuned frequency in the nav radio matches that of the approach navaid
- The Morse code decoded by the tuned nav radio matches the identifier of the approach navaid
- The aircraft track is within 15° of the final approach course
- The course to the active waypoint is within 45° of the final approach course
- The radio deviations are at most 50% of full scale for 5 consecutive seconds
- The active leg is part of the approach up to and including the final approach fix

## FMS HOOKS

There are shortcuts to accomplish typical FMS actions on the FPL tab of the FMS page.  The bottom LSK will present the most appropriate selection from the table below based on the flight state or scenario at the moment. Pressing the LSK or the soft key label adjacent to the LSK will accomplish the action.

| LSK Label | Comments |
| --- | --- |
| **Activate Approach** | Displayed if either the next downpath approach in the flight plan is preceded by a discontinuity (gap in flight plan) and the aircraft is within 40 nm of the FAF OR the next leg of the flight plan is the first leg of a published approach and there is a discontinuity or a Vectors-To-Final approach is selected. |
| **Retry Approach** | Displayed when the active leg of the flight plan is part of a published missed approach and you were conducting a Vectors-To-Final approach. Selecting this option will activate the first leg of the VTF approach (i.e. the leg into the FAF). This option will not be displayed if you were conducting a full published approach. |
| **Enable/ Activate Missed** | Displayed when the next leg of the flight plan is the first leg of a published missed approach. Typically this occurs immediately after the FAF.  Pressing the LSK will activate the published missed approach for that approach if it is in the flight plan. Not pressing the button prior to reaching the Missed Approach Point (MAP) results in guidance outbound from the MAP using the same course as the final approach course. The message automatically toggles to Activate Missed when crossing the MAP. |
| **Continue/ Exit Hold** | Displayed when the active leg of the flight plan is a hold and is not the last leg of the route. Pressing the LSK will either command the FMS to continue the hold or exit it. |

| LSK Label | Comments |
|-----------|----------|
| **Skip Hold** | Displayed when the aircraft is within 5 nm of the FAF and the next leg is a database procedure hold.  Pressing the LSK will sequence the active leg past the hold without entering it when the aircraft reaches the FAF. The leg after the hold will become active. |
| **Sequence Leg** | Displayed when there is no altitude source and the active leg terminates at an altitude. Pressing the LSK upon reaching the altitude is required to sequence to the next leg. |
| **Enable A/P Approach** | Displayed for specific autopilots (e.g. KAP140, KFC225) when the FMS determines it is time for the autopilot to be in Approach mode but does not have any control or knowledge of the actual autopilot state. This case is just a prompt, and no pilot action must be taken on the IFD. |

**TIPS AND TECHNIQUES**

**FMS Philosophy**

The FMS treats the flight plan as a continuous sequence of legs, regardless of whether they are part of a terminal area procedure or are in the enroute structure. If you had chosen an IAF and the last waypoint before the approach was the same as the IAF, then the flight plan would naturally sequence right into the approach with no further pilot action required. If the last waypoint before the approach were not the same as the IAF, then a discontinuity would precede the approach. The typical course of action, in that case, is to close the gap and then the flight plan would sequence right onto the approach with no further operator action.

The operation with VTF is slightly different, however. In that case, you really have no choice but to intervene when it's time to start the approach. There are several options, including activating the leg to the FAF, direct-to the leg to the FAF, or the convenient FMS hook on the bottom LSK that says "Activate Approach". That FMS hook is just a shortcut for activating the leg to the FAF.

## COURSE CHANGES AND HOLDS

If the course change at a waypoint is more than 120°, the IFD will issue an alert approximately 30 seconds prior to the turn. For course changes less than 120°, the alert will be issued approximately 10 seconds prior to the turn.

For normal leg transitions, the alert text will be "Next Leg xxx° in x seconds" where xxx is the course and x is the number of seconds left until the turn. When the next leg is a hold, however, the alert text shows the entry type as either "Teardrop Entry", "Parallel Entry", or "Hold Course xxx°", where xxx is the inbound course of the hold, representing a direct entry.

If the course change at a waypoint is greater than 135°, then the FMS will treat the waypoint as a "fly-over" waypoint. If the course change at a waypoint is less than or equal to 135°, then the FMS will treat the waypoint as a "fly-by" waypoint meaning lead turns beginning up to a maximum of 2.5nm can be expected.

## AUTO VLOC TUNING †

Auto-VLOC tuning is a user option which enables the automatic tuning of the active nav frequency slot to follow the governing navaid in the flight plan.

If the active leg is part of a VHF approach, the FMS will auto-tune the navaid that defines the final approach.

If the active leg is not part of a VHF approach, and if the active leg has a recommended navaid in the nav database, the FMS will auto-tune that navaid.  Otherwise, from the active leg, the FMS will look backward through the route and forward through the route for legs with a recommended navaid or that are defined by a navaid, in which case, the FMS auto-tunes the one of those two navaids that is closer to the aircraft.

## TRANSITION ALTITUDES/LEVELS

Transition altitude/level alerts can be optionally turned on via the Setup Page.  When set to On, an advisory CAS message will be displayed as the transition altitude is being approached from below or when the transition level is approached from above.

If the origin airport has a published transition altitude in the nav database and the transition altitude has not been manually set, the system will automatically set the transition altitude.

If the destination airport has a published transition level in the nav database and the transition level has not been manually set, the system will automatically set the transition level.

The transition *altitude* can be manually set on the Setup Page by turning the bottom right inner knob or by typing in a value in the virtual keyboard.  Each click of the inner knob adjusts the value by 100 feet and keyboard entries can be made down to the foot.  The allowable range is from 1,000 feet to 60,000 feet.

Similarly, the transition *level* can be manually set on the Setup Page by turning the bottom right inner knob or by typing in a value in the virtual keyboard.  Each click of the inner knob adjusts the value by one flight level (i.e. 100 feet).  The allowable range is from FL010 to FL600.

When the transition altitude/level has been automatically set by the system, it is displayed in green.  If the transition altitude/level has been manually entered, it is displayed in white.  When the transition altitude/level has been manually set, pressing the bezel "CLR" button will allow the value to be set by the system, turning it from white to green.

*Transition Altitude and Level Setting*

The transition altitude advisory CAS message is displayed when the aircraft climbs to within an altitude 250 feet below the transition altitude.  Once issued, the alert will not be eligible to be issued again unless the aircraft has descended more than 500 feet below the transition altitude.

Likewise, the transition level advisory CAS message is displayed when the aircraft descends to an altitude 250 feet above the transition level.  Once issued, the alert will not be eligible to be issued again unless the aircraft has climbed more than 500 feet above the transition level.

*Transition altitude/level alerts*
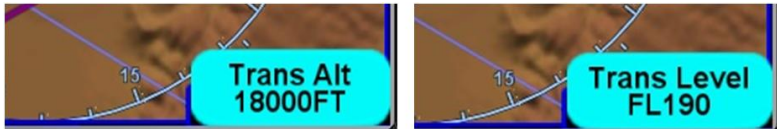
## NAVIGATION MODE/CDI SCALE CHANGING

Each navigation mode has an associated CDI scaling associated with it per the table below:

| Navigation Mode | CDI Full Scale Value |
|---|---|
| Oceanic | 4.0 NM |
| Enroute | 2.0 NM |
| Terminal | 1.0 NM |
| Approach | 0.3 NM or 2°, whichever is less at the FAF |

In order to prevent abrupt changes to CDI deflection (especially important during autopilot-coupled operation), the mode changes and CDI full scale deflection changes are gradual.

Automatic transitioning between the navigation modes occurs in accordance with the following diagram:
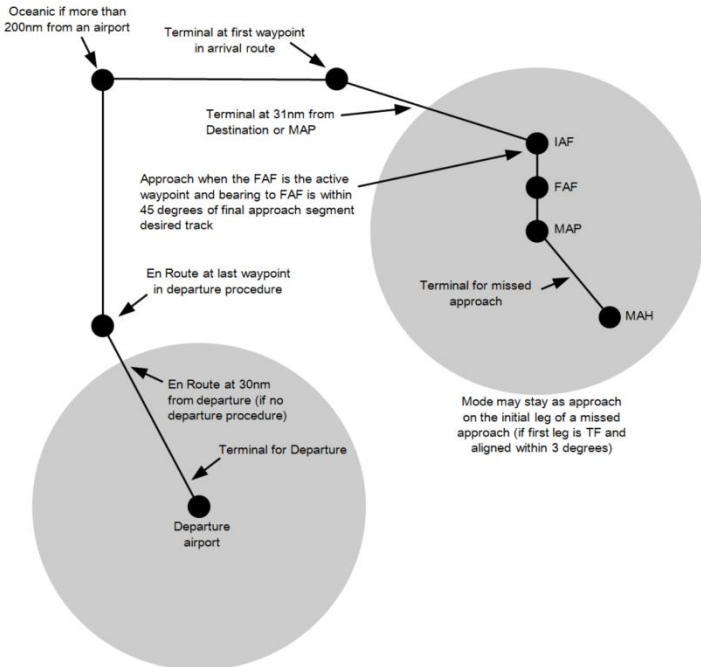
## APPROACH PROCEDURES

Ensure the approach has been entered into the FMS flight plan, and that it is currently active in the IFD.

Using the transition dropdown menu in the FMS, an approach can be selected and flown as a full published procedure starting at an IAF or as "Vectors" (i.e. vectors-to-final).

When an IAF is selected, unless the leg preceding the approach ends at the IAF, the approach will be preceded by a discontinuity. If it is appropriate and safe to proceed direct from the last leg before the approach to the IAF, then just close the gap and the flight plan will naturally sequence onto the approach without further intervention.  Otherwise, when appropriate, use either the "Activate Leg" or "Activate Approach" LSKs or "Direct-To" to activate a leg on the approach.

When Vectors is selected, the approach is preceded by a discontinuity saying "Vectors To Final – Inactive".  That discontinuity cannot be closed, so operator intervention is required.  When cleared for the approach, the typical action is to activate the leg to the FAF using one of the following techniques:

- Press the "Activate Approach" LSK
- Move the cursor to the leg to the FAF and press the "Activate Leg" LSK
- Move the cursor to the discontinuity and press the "Activate VTF" LSK

Once a leg in the approach is active, "Inactive" will be removed from the discontinuity.

| NOTE |
| --- |
| **Displayed Inbound Course**<br>Due to mathematical rounding, it is possible that course being sent to an EFIS for digital display may be 1 degree off from the published approach chart. |

---

**NOTE FOR THE IFD410 ONLY**

**VHF based Approaches**
Although the IFD410 has no VHF radio, ILS, LOC and VOR approaches will still be displayed in the dropdown list of available approaches at your destination. Though the unit will allow the user to select those approaches, it will only give GPS overlaid lateral guidance. The unit will provide no vertical guidance on an ILS approach. Any guidance is advisory only as these types of approaches should be flown with the NAV radio and not the IFD.

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AUTOMATIC MODE SWITCHING †

Automatic mode switching to VLOC (e.g. GPS→VLOC transition), including automatically setting the inbound course, will occur if the capture criteria defined above are met and the primary nav frequency can be auto-identified. If auto tuning has not been enabled on the setup pages, or a station cannot be identified, automatic mode switching will not occur.

---

**TIPS AND TECHNIQUES**

**Exception to Automatic Nav Mode Switching**
If VLOC mode had been previously manually selected to be the nav mode (e.g. cross-tuning a VOR) and then an approach is activated in the flight plan that would have normally resulted in a GPS→VLOC nav mode indication, the nav mode will NOT toggle to GPS→VLOC. Instead, it will stay at VLOC since it is assumed the pilot intended to keep using the previous function. Likewise, the approach nav frequency will be inserted into the standby nav frequency slot but not the active nav frequency position. Both the nav mode transition and the swapping of the nav frequencies will have to be manually performed by the pilot.

---

With the proper inbound course set, including on localizer or ILS approaches where the course pointer is just for reference, the course and glide slope deviation data will be transmitted as appropriate from the IFD for display on compatible cockpit third-party devices such as CDIs, HSIs, EFISs, etc.  In the ILS/Localizer case, the CDI deflection will be driven by the localizer signal itself, regardless of the course setting.

PRECISION APPROACHES

**VHF Based Precision Approaches †**

On ILS/LOC approaches (Vectors-to-Final transition or the full published procedure), the IFD will automatically toggle the nav mode to VLOC when all of the following conditions have been met for 5 consecutive seconds:

- The next leg or the active leg terminates at the FAF
- The aircraft is on the front side of the approach
- The aircraft course is within 15 degrees of the final approach course
- Cross track deviation is less than half a dot
- The correct station is tuned and identified

Lateral and vertical deviation data will be transmitted by the IFD for use by any integrated autopilot and external indicators. Conversely, the IFD will toggle the nav source from VLOC back to GPS when executing the missed approach at the Missed Approach Point.

**GPS Based Precision Approaches**

Lateral and vertical deviation data will be transmitted by the IFD for use by any integrated autopilot and external indicators.  For all models except IFD410, precision SBAS approaches are flown with the nav source knob set to GPS (which will automatically change to the GPS approach type).  For IFD410, precision SBAS approaches are flown when OBS has not been selected using the nav source button.

NON-PRECISION APPROACHES

As with the case in precision approaches, as long as the published approach is entered into the FMS as part of the active flight plan, the inbound course is done automatically. All switching between GPS and VLOC (if appropriate) is also done automatically.✝

Procedure turns and holds-in-lieu-of-procedure-turn, when part of a published procedure, appear as normal legs in the flight plan and therefore have no special or different procedures – just fly them as part of the flight plan.

DME arc legs and approaches are supported by the system.

> **TIPS AND TECHNIQUES**
>
> **CDI Deflection During VOR Approaches**
> When VOR and GPS inbound courses are not co-aligned, a large CDI deflection may occur when the Nav Source transitions from GPS to VLOC.

BACK COURSE APPROACHES ✝

This system is designed to fully support flying back course localizer approaches.

If the published back course approach is entered into the FMS, the IFD nav source will automatically toggle from "GPS→VLOC" to "VLOC" when all transition criteria have been met outside the FAF and it will automatically tune the localizer frequency into the active nav channel. The Nav Mode datablock should display the localizer ID, landing airfield ID and the front course runway ID.

When integrated with an EFIS (e.g. Avidyne PFD, Aspen PFD, etc), the front course may need to be manually entered and then "Back Course" should be displayed on the EFIS.

SBAS APPROACHES

LPV (RNAV) approaches are the preferred approach for the IFD, if available. On installation, a configuration setting determines whether the IFD is SBAS-capable. If the IFD is not capable of SBAS, the following procedures do not apply.

When GPS has been selected as the nav source, and one of the RNAV/GPS approach types with vertical guidance (LPV, L/VNAV, LNAV+V, LP+V) is selected in the FMS, the IFD will transmit horizontal and vertical deviation for use by any integrated external display device.

There are several types of SBAS approaches. The FMS will automatically select the best available approach based on current GPS integrity and will indicate the selection in the Nav Mode datablock field.

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**TIPS AND TECHNIQUES**

**Nav Mode Datablock**
The Nav Mode datablock (see page 4-43) indicates the current navigation mode (e.g. Enroute, Terminal, Approach).  Instead of showing "Approach", however, the datablock shows the approach type (e.g. LNAV, LPV, LNAV+V).

---

The pilot must monitor the IFD throughout the approach and use charted minimums appropriate to the approach type.  If an approach type is not indicated by the time the final approach fix (FAF) is reached, ***do not descend*** – the conditions required to fly the approach have not been met and you must fly the missed approach procedure.

SBAS approach types in the Nav Mode datablock and the nav source indication in the top right corner of the display include:

**LNAV (Lateral Navigation)**
An LNAV approach provides lateral (horizontal) guidance only, with standard GPS precision of 0.3 NM full-scale deflection. This is essentially the same as a non-SBAS GPS approach. It is flown as any other non-precision approach – observing step down restrictions, descend to MDA, fly at MDA altitude to the missed approach point (MAP); and execute the missed approach procedure if appropriate. Since there is no vertical guidance associated with this type of approach, the IFD will not transmit any vertical deviation information.  The Nav Mode datablock will display "LNAV" for the approach type.

**LNAV+V (Lateral Navigation with Advisory Vertical Guidance)**
 An LNAV+V approach provides the same lateral navigation as LNAV, but also presents an advisory glideslope deviation for display on the external deviation indicator. Vertical deviations are based on a glidepath angle that is published with the approach.  However, it is the pilot's responsibility to ensure compliance with all published stepdown constraints. This type of approach remains non-precision.  The Nav Mode datablock will display "LNAV+V" for the approach type.

**LNAV/VNAV (Lateral Navigation with Vertical Navigation)**
An LNAV/VNAV approach provides lateral navigation with more accurate guidance than regular LNAV but easier to follow indications than a localizer. The vertical navigation is driven by GPS signals. LNAV/VNAV approaches are operationally different from LNAV+V in that the glide path is protected from obstructions but attention still must be applied to step down fixes. Also, the minimum altitude presented is a decision altitude/height (DA/DH) – DA being what is on the altimeter, and DH being the height of the DA above the touchdown zone elevation. This is not a MDA, thus, fly it just as though it were an ILS approach: follow the glide slope all the way to the DA before initiating a missed approach, if appropriate. The Nav Mode datablock will display "L/VNAV" for the approach type.

**LPV (Localizer Precision with Vertical Guidance)**
An LPV approach provides lateral guidance that is significantly more precise than LNAV, and equivalent to that of a localizer. Vertical guidance is provided to minimums as low as 200' AGL above the touchdown zone. Lateral tolerance starts out at 0.3 NM full-scale (slightly tighter than a localizer at the FAF), transitioning to 350 feet either side at the runway threshold. The steering remains linear all the way without the difficult to follow swings of a VHF localizer. The vertical guidance is precise and has a DA/DH (shown as "DA(H)" on approach charts) rather than a MDA. The Nav Mode datablock will display "LPV" for the approach type.

**LP (Localizer Performance)**
An LP approach has localizer performance but no vertical guidance associated with them.  Use the published "LP"

minimums.  The Nav Mode datablock will display "LP" for the approach type.

**LP+V (Localizer Performance with Advisory Vertical Guidance)**

An LP+V approach provides the same lateral navigation as LP, but also presents an advisory glideslope deviation for display on the external deviation indicator Vertical deviations are based on a glidepath angle that is published with the approach.  However, it is the pilot's responsibility to ensure compliance with all published stepdown constraints.. This type of approach is non-precision and uses the published "LP" minimums. The Nav Mode datablock will display "LP+V" for the approach type.

---

**COOL FEATURE**

**FPL Bottom LSK**

Think of the bottom LSK on the FPL page as your "hook" into the FMS. The button changes functionality based on the phase of flight or instrument procedure you are on. This is described in more detail in the FMS HOOKS section on page 5-14.

---

> **CAUTION**
>
> **VTF Transitions**
> VTF transitions in the IFD provide guidance to the extended final approach course.
>
> When assigned a VTF clearance on an SBAS approach (LPV, LP and LNAV/VNAV) with an offset leg into the Final Approach Fix (FAF) where the leg to the FAF is not aligned with the final approach course (i.e. an angled entry to the FAF), the pilot should ask the ATC controller to clarify if those vectors are to extended final or the published offset inbound leg to the FAF.
>
> In the case where ATC responds with the extended final scenario, Avidyne recommends the pilot select the "Vectors" transition option in the FMS approach dropdown. In the case where ATC responds with the published offset leg scenario, Avidyne recommends the pilot activate the inbound leg to the FAF from the FMS FPL tab to ensure the offset leg is accounted for.

VISUAL APPROACHES

Visual approaches are non-precision for use in VMC only and are intended to provide enhanced situational awareness. A visual approach is flown the same way as LNAV+V (i.e. including advisory vertical deviations). However, the glideslope angle is controlled by a user setting. Advisory vertical guidance will be provided until the aircraft reaches a point 0.1nm from the runway threshold. During a visual approach, the Nav Mode datablock will display "Visual" for the approach type.

**COOL FEATURE**

If there are no legs in the flight plan after the destination associated with a visual approach, the visual approach will remain active even after passing the runway threshold.  Therefore, you can stay in a closed traffic pattern and continue to receive guidance to the final approach course without ever touching the FMS.

## MISSED APPROACH

The simplest and safest way to properly fly a missed approach is to ensure it is part of the active flight plan. It can be activated anytime inside the FAF by pressing the "Enable Missed" LSK on the FPL tab.  This label changes to "Activate Missed" when crossing the Missed Approach Point (MAP) if it hadn't been pressed prior to the MAP.

Alternatively, the system can be configured to automatically enable the published missed approach for an active procedure by selecting the Auto Enable Missed selection on the Setup page. When this is selected, the system will automatically sequence to the published missed approach when crossing the FAF.

The following sequence of images show the map depiction of the missed approach procedure before it has been enabled, followed by an image showing the "Enable Missed" LSK on the FPL tab, and then finally the map depiction of the now enabled published missed approach procedure.

*Disabled Missed Approach on Map*



*Enable Missed LSK*
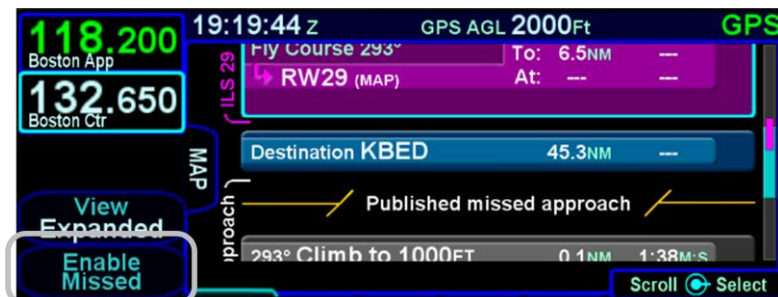
**Enabled Missed Approach in Flight Plan**
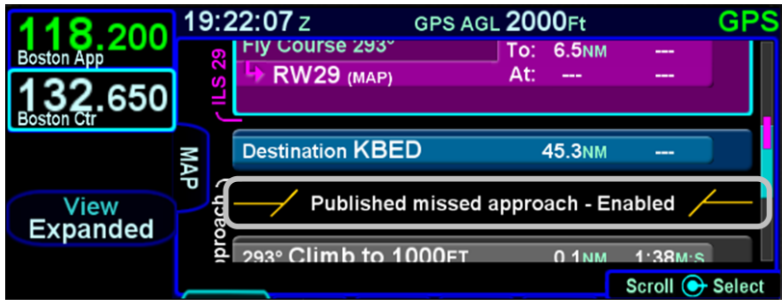


**Enabled Missed Approach on Map**



When executing the missed approach, apply go-around power, establish a climb attitude, reconfigure the aircraft as necessary, ensure the aircraft is trimmed properly, and consider using the autopilot to smoothly execute the assigned or published missed approach.

The Nav Source will automatically toggle back to "GPS" shortly after crossing the MAP, if it weren't already set to "GPS" unless you had manually switched the Nav Source to "VLOC" prior to being established on final with the localizer tuned and identified – in that case, it will stay in "VLOC" until you manually change it.†

## RETRY APPROACH

If you had been flying a Vectors-To-Final (VTF) approach, and the active leg of the flight plan is part of a published missed approach, a "Retry Approach" LSK will appear.  Pressing that LSK will put the same VTF approach in the FMS flight plan and activate the inbound leg to the FAF.

> **NOTE**
>
> **Activating Missed Approach Past MAP**
> If the missed approach was activated after the Missed Approach Point (MAP), the first non-altitude terminated leg of the published missed approach procedure will become the active leg, regardless of where the airplane is geographically.

**NOTE**

**Autopilot Integration**

Autopilot integration and capability can vary widely. Avidyne strongly recommends flying practice approaches and missed approaches in VMC conditions to understand the level of integration between the IFD and the autopilot before any flight in IMC conditions. For example, many roll-steering capable autopilots will terminate the roll steering capability when approach mode is selected on the autopilot. As another example, some autopilots such as the KAP-140 and the KFC 225 do not support automatic switching to VLOC; switching the nav mode and entering the in-bound course must be manual operations with those autopilots.

In the case of KFC-225 and KAP-140 autopilots, depending on how the IFD was configured, a prompt is provided when GPS is the nav source to enable the approach ("Enable A/P Approach" CAS message displayed which directs a pilot selection along the left side of the FPL tab). At that point, APPR mode can then be selected on the autopilot. This setting will also ignore the GPS→VLOC Capture option on the Setup page.

## ENROUTE VERTICAL NAVIGATION (VNAV)

The IFD is capable of providing vertical navigation during descent operations. Vertical navigation is driven by a "descent path" that is defined by the altitude constraints in the flight plan and a descent angle specified on the Setup page. When enroute VNAV is active, the IFD will provide vertical deviations to the descent path. The enroute VNAV capability must be enabled by the installer after it is determined that the aircraft is equipped to perform the function.

ALLOWING ENROUTE VNAV

The following conditions must be satisfied in order for enroute VNAV to be allowed:

- Enroute VNAV is enabled by the installer
- The flight plan has an active leg
- The aircraft is airborne
- The IFD is receiving a valid baro corrected altitude

If enroute VNAV is not allowed, enroute vertical deviations will not be generated. However, the IFD will still compute the top-of-descent (TOD) point using VNAV descent angle or rate.

DEFINING THE ENROUTE VNAV ALTITUDE TARGET

Altitude constraints entered into the flight plan define the potential altitude targets for enroute VNAV. The IFD evaluates each successive leg of the flight plan, starting with the active leg, to determine the active enroute VNAV altitude target. If the leg begin evaluated meets any of the following criteria, the IFD stops searching and there is no enroute VNAV altitude target:

- The leg terminates at an altitude
- The leg is a hold
- The leg terminates at a FAF
- The leg is preceded by a discontinuity (except the active leg)

If the leg has an associated altitude constraint whose altitude is lower than the aircraft altitude, the IFD uses that altitude as the

active enroute VNAV altitude target.  Note that if the constraint is a window constraint, the lower altitude is used as the target.

DEFINING THE DESCENT PATH

Enroute VNAV always uses an angle to define the descent path. Using the Setup page, the desired angle can either be set directly or set by specifying a target vertical speed and having the FMS compute the angle.

*Setup Page Descent Angle Selection*



Using the enroute VNAV altitude target and the associated waypoint, the IFD will project that angle along the flight path all the way to the current aircraft altitude.  That point is depicted on the map as a green circle labeled "TOD" (top-of-descent).  When enroute VNAV is allowed and the aircraft reaches the TOD point, the IFD will automatically commence enroute VNAV.

*Top Of Descent Marker*

When a target vertical speed is specified, the IFD will compute the TOD point using current groundspeed and the desired descent rate. However, when the aircraft reaches the TOD point and enroute VNAV is allowed, the IFD will compute the angle required to reach the desired altitude, then commence with enroute VNAV using that angle.

*Setup Page Descent Rate Selection*
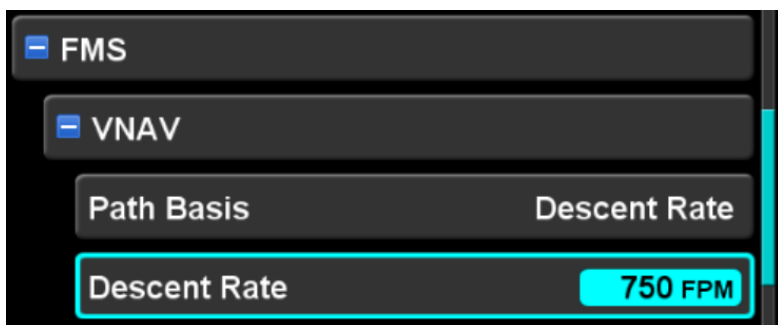


## VERTICAL DIRECT-TO

Vertical direct-to provides a means to immediately start a descent to the altitude target associated with a specific flight plan leg. The IFD will compute the descent angle required to reach the selected altitude target and immediately commence enroute VNAV using that angle.

Vertical direct-to is commanded using an LSK on the FMS FPL page. When the cursor is moved onto any of the altitude constraint fields on a leg (offset, kind, or altitude) and vertical direct-to is allowed, then the LSK showing a vertical direct-to symbol will appear.

Vertical direct-to is allowed only under the following conditions:

- Enroute VNAV is allowed
- No discontinuities exist between the active leg and the selected leg
- The selected leg does not terminate at or beyond the FAF on an approach
- The selected leg is not defined by a heading

- The leg has an associated altitude constraint that is lower than the aircraft altitude
- Lateral deviation from the active leg is less than 2nm
- Course deviation from the active leg is less than 45°
- The IFD is receiving valid baro corrected altitude

*Vertical Direct-to LSK*
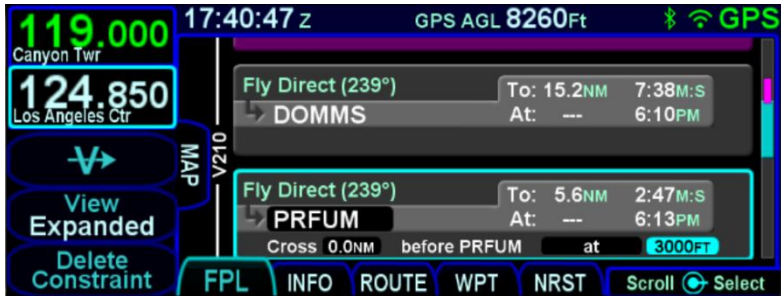


## ENROUTE VNAV INDICATIONS

When enroute VNAV is active, the IFD will suffix the navigation mode with "+V", indicating that associated vertical deviations are being provided.

*Enroute VNAV Active "+V" Indication*



Enroute VNAV deviations can be displayed on some external indicators and will continue to be provided along the descent until the target altitude has been reached.  During descent, if the aircraft deviates from the intended flight path by more than 2nm or if the aircraft course deviates by more than 45 degrees from the desired track, enroute VNAV deviations will be flagged until the aircraft resumes flight along the flight plan.

**CAUTION**

It is the pilot's responsibility to configure the aircraft (e.g. reduce power, set trim) to remain within all airspeed limits during the descent.

## RECOMMENDED ICAO EQUIPMENT CODES

Avidyne recommends the following set of ICAO codes when filing for aircraft equipped with at least one IFD:

> B – LPV
>
> G - GPS
>
> R – PBN Approved
>
> S – VHF, VOR, ILS †
>
> Y – VHF w/8.33 kHz spacing †

With a PBN string of:

> A1 – RNP10 (Oceanic) (may require a LOA)
>
> B2 – RNAV-5 (Enroute)
>
> C2 – RNAV-2 (RNAV Q-Routes and T-Routes over land)
>
> D2 – RNAV-1 (Terminal)
>
> L1 – RNP4  (Oceanic) (may require a LOA)
>
> O2 – RNP1 (Terminal)
>
> S1 – RNP APCH

And if combined with an AXP340 or AXP322 transponder, the surveillance codes are:

> E – Mode S, including aircraft ID, pressure altitude, extended squitter
>
> B1 – ADS-B with dedicated 1090 MHz ADS-B Out capability

And if a SkyTrax100 (MLB100) receiver is installed,

> U2 – 978 (UAT) In receiver

# 6 General

In addition to a comprehensive list of alerts that can be generated by the system, this section contains information relevant to managing the overall operation of the IFD, including:

- Handling system failures
- Operations at night
- Operations under hot/cold temperatures
- Operations with high/low power
- Operations using gloves
- Charging from the USB port
- Integration with the IFD100 mobile app
- Regulatory statements

The section also contains information regarding maintenance of the IFD, including:

- Database updates
- Software updates
- Downloading logs
- Configuring WiFi and Bluetooth
- Backup/Restore
- Cleaning the display
- Slide-in Replacement details

# CREW ALERTING SYSTEM (CAS) / ALERTS

See the individual aircraft Pilot Operating Handbook (POH) Supplement for any limitations with respect to IFD operations.

A crew alerting system (CAS) has been included in this system. There are four levels of message alerting:

- **Warnings (Red)**
  Immediate action should be performed
- **Cautions (Yellow)**
  Immediate attention should be applied
- **Advisories (Cyan)**
  A change in system state that may require attention
- **Notices (Green)**
  An event occurred that may require attention when it's convenient

MASTER CAUTION LAMP

A "Master Alert" system has been created where any active caution or warning will cause the bezel "AUX" button to be lit using the color of the highest level alert. Each time a new alert is issued, the AUX button will flash the corresponding color until either it is acknowledged by the pilot or the condition goes away. When there is at least one active alert, the AUX button will stay lit with the color corresponding to the active alert with the highest level. If the AUX page is already the current page, then the AUX lamp stays green and the ALERT tab will be colored according to the alert with the highest level. Note that if there is an active alert and a new alert of a lower priority becomes active, the master indication color will not change (e.g. a new advisory will not cause the AUX button or the tab color to change from red to yellow).

For those aircraft that have a remote annunciator panel installed, the IFD will trigger a "MSG" lamp or its equivalent on the remote annunciator unit for each new caution and warning.

In all cases, basic airmanship should be exercised and fundamentals utilized such as maintain aircraft control, analyze the situation, and take proper action.

ALERT MESSAGE BAR

Alert messages are shown on the lower right corner of the IFD using a background color corresponding to the level of the alert. If more than one unacknowledged alert is active, the most recent alert with the highest level will be shown.

*Warning Message*



Pressing the "CLR" bezel key or touching the message bar on the display will acknowledge the message, causing the message bar for that alert to disappear. Note that acknowledging the message does not eliminate the condition that caused the alert. However, some alert messages are issued in response to an event, and acknowledging the alert effectively clears the condition.

After all active messages have been acknowledged, the AUX lamp will remain illuminated with the color of the message with the highest level.

Alerts are either "global" or "local" in nature. In a single IFD installation, the difference is irrelevant. In a dual IFD installation, however, global alert messages are displayed on all IFDs, whereas local alert messages are displayed only on the issuing IFD. A global message can be acknowledged on any IFD and that will cause the message to disappear on all IFDs. Because a local message is only displayed on one IFD, it must be acknowledged on the same IFD. The table of system CAS messages that appears later in this section denotes global messages using an asterisk.

The tables below show the warnings, cautions, advisories, and notices that can be issued.  Each entry in the table is organized as illustrated in the example below.

| **Short Text** | **Long text** |
|---|---|
| * <br> Ψ | Detailed explanation of the conditions that may cause the alert and, in some cases, a recommended action to be taken. |

Note that an asterisk to the left of the detailed explanation is an indication that the alert is "global" in a dual IFD installation.

Note that a " Ψ " symbol to the left of the detailed explanation is an indication that the alert will be deleted on acknowledgement.

## WARNINGS

| | |
|---|---|
| **Low Volts Off In <x> sec** | **Low Volts, IFD powers down in <x> sec**<br><br>Main supply voltage has fallen below 9 VDC and the IFD will power down in <x> seconds (counting down from 60). Contact a local dealer for service. |
| **Pull Up** | **Excessive Descent Rate**<br><br>\* The TAWS Excessive Descent Rate algorithm has detected a CFIT potential – initiate an immediate recovery maneuver. |
| **Terrain Pull Up** | **Terrain Pull-Up**<br><br>\* The FLTA algorithm has detected an imminent ground collision - Initiate an immediate recovery maneuver |
| **Unit Overtemp** | **IFD operation unreliable: <internal component name>**<br><br>The listed internal components have exceeded the maximum design temperature and reliability cannot be ensured until the unit is tested by the Avidyne Service Center. Contact the Avidyne Service Center or a local dealer for service. |
| **Unit Overtemp** | **Return IFD for service. Operation unreliable: <n>**<br><br>One or more of the internal components has exceeded its maximum design temperature <n> times and reliability cannot be ensured until the unit is tested by the Avidyne Service Center. This message will be present on every subsequent power cycle until reset by the Avidyne Service Center. Contact the Avidyne Service Center or a local dealer for service. |

**Warning Obstacle**

**Warning, Obstacle**

\*     The FLTA algorithm has detected an imminent obstacle collision - Initiate an immediate recovery maneuver.

**CAUTIONS**

| | |
|---|---|
| **ADS-B Traffic Sensor Fault** | **No communication with traffic sensor** |
| \* The IFD is not receiving messages from the ADS-B traffic sensor. Contact a local dealer for service. This message is local if independent traffic sensors are installed. | |
| **ADS-B Traffic Sensor Fault** | **Traffic sensor has failed** |
| \* The ADS-B traffic sensor is reporting a failure or the IFD is receiving invalid messages from the sensor. Contact a local dealer for service. This message is local if independent traffic sensors are installed. | |
| **Caution Obstacle** | **Caution Obstacle** |
| \* The FLTA algorithm is predicting a likely obstacle collision with approximately 60 seconds – initiate a proper recovery maneuver. | |
| **Caution Terrain** | **Caution Terrain** |
| \* The FLTA algorithm is predicting a likely ground collision within approximately 60 seconds – initiate a proper recovery maneuver. | |
| **Check Altitude Too Low** | **Aircraft is below the glide slope altitude at FAF** |
| Correct aircraft altitude as required to safely conduct the approach or initiate a climb to a published safe altitude and abort the approach. | |

| **COM Stuck TX** | **Stuck mic timeout, transmitter disabled** |

† Requires 35 seconds of continuous transmission. Verify the PTT is stuck and contact a dealer for service as required.

| **COM TX Fault** | **Transmitter Fault, no TX ability** |

† Transition to a backup VHF com radio (if available) or initiate lost communication procedures. Contact the Avidyne Service Center or a dealer for service.

| **Configuration Error** | **Configuration Error – IFD Requires Service** |

The IFD has encountered an internal error while determining the system configuration. Contact the Avidyne Service Center or a local dealer for service.

| **Don't Sink** | **Negative climb rate or altitude loss** |

TAWS NCR algorithm has determined corrective action should be taken immediately.

| **GPS Fault** | **GPS Fault** |

The GPS has stopped providing a navigation solution. If GPS is the only navigation solution source available, then expect degraded IFD operation (e.g. no map, no FMS guidance, etc.)

| **GPS Integrity Lost** | **GPS Integrity Lost Crosscheck Nav** |

This is alerting about imminent exceedance of horizontal fault detection limits or protection levels. Crosscheck the nav solution and determine the best course of action but if on an approach, a Missed Approach is recommended.

| | |
|---|---|
| **Low Volts** | **Reduced backlight maximum** |
| | Main supply voltage has fallen to approximately 11VDC. Check the aircraft alternators are on and functional. Consider load shedding the bus that is powering the IFD. |
| **LP Unavailable Use LNAV MDA** | **GPS integrity is insufficient for LP Approach** |
| | Transition to a non-LP approach and the appropriate minima. |
| **LPV Unavailable Use L/VNAV DA** | **GPS integrity is insufficient for LPV Approach** |
| | Transition to a non-LPV approach and the appropriate minima. |
| **LPV Unavailable Use LNAV MDA** | **GPS integrity is insufficient for LPV Approach** |
| | Transition to a non-LPV approach and the appropriate minima. |
| **L/VNAV Unavail. Use LNAV MDA** | **GPS integrity is insufficient for L/VNAV Approach** |
| | Transition to a non-L/VNAV approach and the appropriate minima. |
| **Manual Sequence Req'd** | **Altitude invalid - leg will not auto sequence** |
| | In basic E-M aircraft where the IFD does not have altitude input, this message will appear when the FMS active leg terminates at an altitude. In this case, the FMS flight plan will need to be manually sequenced to the next leg. Failure to do so will cause the FMS to fly the course/heading indefinitely. |

| **No ADS-B Position** | **AXP322 Lost GPS Position Data** |
|---|---|
| | ADS-B position data had previously been valid and then transitioned to invalid. Check the ADS-B position source. |

| **No Comm with VHF** | **No communication with the VHF radio** |
|---|---|
| **†** | Transition to a backup VHF com radio (if available) or initiate lost communication procedures. Contact the Avidyne Service Center or a dealer for service. |

| **No Comm with Xpdr** | **No Communication with Remote Transponder** |
|---|---|
| | No data has been received from the remote transponder for greater than 2 seconds. Contact the Avidyne Service Center if this persists across power cycles. |

| **No Position** | **No position available** |
|---|---|
| | The IFD cannot compute a navigation solution. IFD operation will be degraded (e.g. no map, no FMS guidance, etc.) Transition to alternative navigation sources. |

| **Sink Rate** | **Excessive Descent Rate** |
|---|---|
| | TAWS EDR algorithm has determined a potential CFIT scenario is developing - recover the aircraft. |

| **TAWS Fail** | **Invalid GPS Position/Velocity** |
|---|---|
| | The GPS solution is lost or the GPS velocity quality parameters dropped below required accuracy limits. A "bing-bong" chime is played if this condition occurs. Contact the Avidyne Service Center if this persists across power cycles. |

| **TAWS System Failure** | **TAWS Failed Self-Test <reason>** |
|---|---|
| | TAWS failed self-test for the <reason> provided and TAWS will be degraded or not available for the duration of this power cycle. Contact the Avidyne Service Center if this persists across power cycles. |
| **TIS Removed** | **TIS Traffic Removed** |
| | TIS traffic communications have ceased for more than 12 seconds. |
| **TIS Unavailable** | **TIS Traffic Unavailable** |
| | No TIS ground station is available or communications have ceased for more than 60 seconds. |
| **Too Low, Terrain** | **Premature Descent, below glide path** |
| | TAWS PDA algorithm has determined the aircraft is below glide path. |
| **Traffic Sensor Fault** | **No communication with traffic sensor** |
| * | The IFD is not receiving messages from the traffic sensor. Contact a local dealer for service. This message is local if independent traffic sensors are installed. |
| **Traffic Sensor Fault** | **Traffic sensor has failed** |
| * | The traffic sensor is reporting a failure or the IFD is receiving invalid messages from the sensor. Contact a local dealer for service. This message is local if independent traffic sensors are installed. |

| | |
|---|---|
| **Traffic High**<br>**2:00 3NM** | **Traffic 2:00 3NM 800FT** |

\* The above alert is just an example. After "Traffic" will be either "Low" or "High", then the bearing in clock direction, then the distance in nautical miles. The long text omits Low/High and instead shows target altitude in feet.

This is a traffic advisory with bearing information. Establish visual contact with conflicting traffic in order to facilitate avoidance maneuvers as necessary.

| | |
|---|---|
| **Traffic**<br>**Low 4NM** | **Traffic 4NM -200FT** |

\* The above alert is just an example. After "Traffic" will be either "Low" or "High", then the distance in nautical miles. The long text omits Low/High and instead shows signed relative target altitude in feet.

This is a traffic advisory with no bearing information. Establish visual contact with conflicting traffic in order to facilitate avoidance maneuvers as necessary.

| | |
|---|---|
| **Traffic**<br>**12:00 3NM** | **Traffic 12:00 3NM** |

\* The above alert is just an example. After "Traffic" will be the bearing in clock direction, then the distance in nautical miles.

This is a traffic advisory with no relative altitude information. Establish visual contact with conflicting traffic in order to facilitate avoidance maneuvers as necessary.

**Traffic 2NM**

### Traffic 2NM

\*    The above alert is just an example.  After "Traffic" will be the distance in nautical miles.

This is a traffic advisory with no relative altitude information and no bearing information.  Establish visual contact with conflicting traffic in order to facilitate avoidance maneuvers as necessary.

**Unit Overtemp - Check Cooling**

### Unit Overtemp: <component>

<component> will show the name of the component(s) that have exceeded temperature limits.

One or more of the internal components has exceeded 80°C. Contact the Avidyne Service Center or a dealer for service – consider adding a source of cooling and/or improving air flow in and around the IFD.

**Xpdr Fault**

### Transponder Fault

The remote transponder is reporting a fault other than loss of ADS-B GPS position. Contact the Avidyne Service Center if this persists across power cycles.

## ADVISORIES

| | |
|---|---|
| **ADS-B GPS Position Invalid** | **ADS-B Traffic Sensor lacks GPS position** |
| | The ADS-B sensor is reporting that it does not have a GPS position to support ADS-B Out. If the condition persists, contact a local dealer for service. |
| **ADS-B In Unavailable** | **NGT9000 ADSB input unavailable** |
| | The NGT9000 is reporting that ADS-B In functions have failed or that the ADS-B In functions are unavailable due to not having a GPS position of sufficient quality. If the condition persists, contact a local dealer for service. |
| **ADS-B Out Degraded** | **ADS-B Out Degraded** |
| | The NGT9000 is reporting that the ADS-B Out function is operating in a degraded condition. If the condition persists, contact a local dealer for service. |
| **<Airspace> Ahead** | **[Airspace name][Lower Altitude Limit] - [Upper Altitude Limit] FT** |
| * | The aircraft will intercept an airspace within 5 minutes (±30 seconds). This advisory can be enabled or disabled on the Setup Page. |
| | <Airspace> will be one of the following: Class A, Class B, Class C, Class D, Controlled Airspace, Prohibited Area, Restricted Area, Warning Area, Alert Area, Caution Area, Danger Area, MOA, ADIZ |

| **Begin Descent In xx Seconds** | **Approaching Top Of Descent** |
|---|---|

**\***      xx is the number of seconds before the top of descent point and counts down from an initial value of 10 seconds.  Upon reaching 0, "Now" will be displayed instead of "in 0 seconds".  This message is accompanied by an aural TOD chime.

| **Checklist Error** | **IFD Requires Service** |
|---|---|

Contact the Avidyne Service Center for service.

| **Checklist Load Fail** | **Retype checklist(s) to resolve** |
|---|---|

Ψ      The IFD was unable to retrieve the checklists.  Enter the checklists again.  If the problem persists, contact the Avidyne Service Center for service.

| **Check Init Fuel** | **Fuel Used reset.  Check initial fuel setting** |
|---|---|

Ψ      Fuel used reset has been detected from the fuel sensor and the pilot has not set initial fuel at startup.

| **Check Nav Frequency** | **Tuned frequency does not match approach navaid** |
|---|---|

**†**      Indicates that the active approach is based on a localizer or a VOR and that approach is not authorized for GPS overlay, the aircraft course is within 45 degrees of the final approach course, the course to the active waypoint is within 45 degrees of the final approach course, the distance to the final approach fix (FAF) from the current position is less than 4 NM, and the frequency tuned by the nav radio does not match the frequency of the approach navaid

| **Check Navaid Identifier** | **Decoded navaid identifier did not match approach navaid** |
|---|---|

**†** Indicates that the active approach is based on a localizer or a VOR and that approach is not authorized for GPS overlay, the aircraft course is within 45 degrees of the final approach course, the course to the active waypoint is within 45 degrees of the final approach course, the distance to the final approach fix (FAF) from the current position is less than 4 NM, the frequency tuned by the nav radio matches the frequency of the approach navaid, and the identifier decoded by the nav radio does not match the identifier of the approach navaid.

| **COM Stuck Mic** | **COM stuck mic, release PTT** |
|---|---|

**†** 25 seconds of continuous transmission have elapsed. Release the push-to-talk button.

| **Config Modified** | **Configuration modified. Please restart IFD when possible.** |
|---|---|

CrossSync is enabled in a dual IFD installation and a configuration with external devices has changed on one of the IFDs since the last power cycle.  Restart the IFD to allow automatic reconfiguration so that sensor information can be shared.

| **CrossSync Fault** | **Attempting to re-establish CrossSync** |
|---|---|

Ψ Dual IFDs have been installed and configured to share data between the units, but there is no communication between the IFDs.  If both units are powered on, contact the Avidyne Service Center or a local dealer for service.

**Datalink Data Overdue**          **See Datalink Status Page**

\*      One or more datalink weather products were expected but
Ψ      not received within the timeout period.  The Datalink Status
        Page will show those that are overdue.

        The tables in the "Datalink Weather Overlays And
        Operations" section on page 3-16 show the products and
        their associated "late" timeout periods.

**Datalink Receiver Fault**          **Broadcast datalink receiver failure**

\*      The IFD has lost communication with the datalink receiver
        or the receiver is reporting a fault.  Datalink weather will be
        unavailable.  If the condition persists, contact a local dealer
        for service.

**Datalink <p> Stale**          **<p> Age is greater than <x> minutes**

\*      The datalink product <p> has been received at least once
Ψ      but has not been updated for <x> minutes and is now
        considered stale.

        The tables in the "Datalink Weather Overlays And
        Operations" section on page 3-16 show the products and
        their associated "stale" timeout periods.

**Dead Reckoning**          **Position updated using dead reckoning**

        The system will use the last known position and
        groundspeed (and heading if available) to estimate the
        aircraft position following loss of GPS for up to 5 minutes.
        Since Dead Reckoning assumes no directional or
        groundspeed change, it will not be reliable even during
        those first 5 minutes if either or both of these factors have
        changed.

| | |
|---|---|
| **Enable A/P APR** | **Use bottom LSK on FPL tab before A/P APR** |

Applicable only when GPS Select is set to "Prompt" in Maintenance Mode.  Indicates that the FMS is ready to provide approach guidance for the autopilot.  The proper action is to press the "Enable A/P Approach" LSK on the FPL page, then put the autopilot into approach mode.

| | |
|---|---|
| **Exiting Hold At Fix** | **Exiting Hold At Fix** |

Ψ    The hold is armed for exit and is set to sequence upon crossing the hold fix.

| | |
|---|---|
| **Exiting Hold At Intercept** | **Exiting Hold At Intercept** |

Ψ    The active HF leg (hold in lieu of procedure turn) is armed for exit and set to sequence at the completion of the inbound turn.

| | |
|---|---|
| **FLTA Off** | **Disabled in Setup Options** |

Ψ    FLTA has been turned off via the Setup page or via external TERR INHB discrete input.

| | |
|---|---|
| **FLTA Unavailable** | **Invalid GPS Position/Velocity** |

Ψ    FLTA is inhibited due to invalid GPS data.

| | |
|---|---|
| **<app> Function Lost** | **<app> Function is not responding** |

The <app> software application (e.g. Datalink) within the IFD has stopped working.  If the problem persists, contact a local dealer for service.

| **GAD 42 Needs Service** | **GAD 42 Needs Service** |
|---|---|
| | Contact the Avidyne Service Center for service. |
| **Gap In Route Ahead** | **Gap In Route Ahead** |
| | Ψ   The time to an upcoming flight plan discontinuity is 3 minutes. |
| **Hold Course xxx°** | **Hold Course xxx°** |
| | Ψ   The next leg is a hold with a direct entry and there are 10 seconds or less until the aircraft reaches the hold fix.  xxx is the holding inbound course. |
| **IFD Fan Failure** | **IFD Fan Inop** |
| | Contact a local dealer for service. |
| **Intercept Too Sharp** | **Must Intercept Within 45° of Final Approach Course** |
| | *   A Direct-To was initiated to the FAF and the resulting intercept angle at the FAF is greater than 45 degrees. |
| **Lateral Offset End Ahead** | **Approaching End of Flight Plan Lateral Offset** |
| | Ψ   The time to the end of the lateral offset is 60 seconds. |
| **Lightning Sensor Config** | **Lightning Sensor Antenna: [Bottom | Top]** |
| | Ψ   Present only on the first power cycle after configuring the IFD for a WX500.  This message is principally for installers. |

| | |
|---|---|
| **Lightning Sensor Error** | **Recoverable fault: <cc>** |
| * | An internal warning condition within the lightning sensor has occurred and it may clear itself or clear after a power cycle of the lightning sensor. <cc> is the fault code(s) from the sensor |
| **Lightning Sensor Fault** | **No communication with lightning sensor** |
| | Recommend cycling power to the lightning sensor.  If the problem persists, contact a local dealer for service. |
| **Lightning Sensor Fault** | **Lightning sensor fatal fault: <cc>. Try cycling lightning sensor power.** |
| * | <cc> is the fault code(s) from the sensor. Recommend cycling power to the lightning sensor.  If the problem persists, contact a local dealer for service. |
| **Lightning Sensor Fault** | **No sensor data: <ff>** |
| * | <ff> is a description of the fault, specific to the kind of sensor. |
| | Recommend cycling power to the lightning sensor.  If the problem persists, contact a local dealer for service. |
| **Lightning Sensor Fault** | **Lightning sensor recoverable fault: <cc>** |
| * | If the problem persists, contact a local dealer for service. |
| **Nav Database Invalid** | **An error occurred while loading the nav database** |
| | Consider cycling power to the IFD or loading a navigation database.  If the problem persists, contact the Avidyne Service Center or a local dealer for service. |

| New TFR Data Ignored | **Datalink TFRs reception failure** |

\* The number of TFR records exceeds 105. The most likely potential for this to occur is during an excessively active fire season in the mountain west of North America. Refer to non-datalink sources for TFR data.

| Next Leg ccc° in xx sec | **Next Leg ccc°** |

\* ccc is the desired track of the next leg. xx is the number of
Ψ seconds before the start of the turn and counts down from an initial value. For turns up to 120°, the initial value is 10 seconds. For turns more than 120°, the initial value is 30 seconds. Upon reaching zero, "Now" will be displayed instead of "0 sec".

| No Comm <dau> | **Communication lost <dau>** |

Ψ Communication has been lost with the <dau> (e.g. Shadin FADC). Contact the Avidyne Service Center or a local dealer for service.

| Parallel Entry | **Parallel Entry** |

Ψ The next leg is a hold with a parallel entry and there are 10 seconds or less until the aircraft reaches the hold fix.

| Route Not Loaded | **Route Not Loaded** |

Ψ The selected route could not be loaded because it is corrupted or there is an internal error. If the problem persists across a power cycle of the IFD, contact the Avidyne Service Center for service.

| | |
|---|---|
| **Route Not Stored** | **Route Not Stored** |
| Ψ    The route cannot be stored due to an internal error.  If the problem persists across a power cycle of the IFD, contact the Avidyne Service Center for service. | |
| **Route Upload Ready** | **A route has been received** |
| A stored route has been received from an external source (e.g. WiFi).  This message is displayed for 5 seconds and then removed. | |
| **Self-test Fault** | **NGT9000 self-test fault** |
| The NGT9000 is reporting that the most recent self test detected a failure in the unit.  Contact a local dealer for service. | |
| **Service Required** | **IFD on board battery requires replacement** |
| Ψ    The on-board battery used for maintaining system time during power-off periods is no longer performing that function.  IFD performance, such as datalink and GPS acquisition, will be degraded.  Contact the Avidyne Service Center for service. | |
| **Set course to <x>°** | **Selected course / DTK mismatch** |
| The selected course on the external course pointer is more than 10 degrees off of desired track <x> and the aircraft course is within 3 degrees of that desired track.   Adjust the course knob as directed. Only displayed in GPS mode. | |

| | |
|---|---|
| **Switch Tanks** | **Switch fuel tanks** |
| \*<br>Ψ | The user configurable "switch tanks" timer has expired.  The time between advisories is controlled using the Setup page. |
| **Teardrop Entry** | **Teardrop Entry** |
| Ψ | The next leg is a hold with a teardrop entry and there are 30 seconds or less until the aircraft reaches the hold fix. |
| **TFR Ahead** | **TFR Ahead** |
| \* | The aircraft will intercept a TFR within 5 minutes (±30 seconds).  This advisory can be enabled or disabled on the Setup Page. |
| **Timer Expired** | **Timer Expired** |
| Ψ | The generic countdown timer has expired. |
| **<name> Timer** | **<name> Timer Expired** |
| | The <name> custom timer has expired (see page 4-9). This message will persist until the timer has been manually reset. |
| **TIS Coasting** | **TIS Traffic Coasting** |
| | TIS traffic communications have ceased for more than 6 seconds but less than 12 seconds |
| **Traffic Sensor Fault** | **Traffic sensor failed to start self-test** |
| \*<br>Ψ | If the problem persists, contact a local dealer for service. |

| | |
|---|---|
| **Traffic Sensor Fault** | **Traffic sensor altitude unavailable** |

\*    If the problem persists, contact a local dealer for service.
Ψ

| | |
|---|---|
| **Trans Alt xxxFT** | **Trans Alt xxxFT** |

Ψ    The aircraft is climbing through 250 feet below the transition altitude xxx as defined in the Setup Page.  The message is displayed for 5 seconds and then removed.  It will not be enabled for display again until the aircraft has descended more than 500 feet below the transition altitude.

| | |
|---|---|
| **Trans Level FLxxx** | **Trans Level FLxxx** |

Ψ    The aircraft is descending through 250 feet above the transition level xxx as defined in the Setup Page.  The message is displayed for 5 seconds and then removed.  It will not be enabled for display again until the aircraft has climbed more than 500 feet above the transition level.

| | |
|---|---|
| **Unsupported Bluetooth Input** | **Unsupported Bluetooth Input  - <f>** |

Ψ    Bluetooth keyboard key <f> was pressed but is not functional with the type of IFD being used.

| | |
|---|---|
| **UTC Mismatch** | **UTC Time Mismatch. Please restart IFD when possible** |

Ψ    The internal clock does not match the time received from the GPS.  Power cycling the IFD will update the time.

| | |
|---|---|
| **VNAV Suspended** | **Cross track error limit exceeded** |

Enroute VNAV is no longer available because the cross track error exceeds 2NM.

| **VNAV Suspended** | **Course error limit exceeded** |
|---|---|
| | Enroute VNAV is no longer available because the difference between aircraft course and desired track exceeds 45° |

| **VNAV Terminated** | **Baro altitude lost** |
|---|---|
| | Enroute VNAV is no longer available because the IFD is not receiving baro corrected altitude. |

| **VNAV Terminated** | **Unable to meet altitude constraint** |
|---|---|
| | Enroute VNAV is no longer available the descent angle required to meet the next altitude constraint exceeds 6° |

| **Waypoint Upload Ready** | **A user waypoint has been received** |
|---|---|
| | A user waypoint has been received from an external source (e.g. WiFi). This message is displayed for 5 seconds and then removed. |

| **Waypoint Upload Rejected** | **Waypoint Upload Rejected** |
|---|---|
| Ψ | A user waypoint has been received from an external source (e.g. WiFi) but the waypoint was rejected as invalid. Possible causes include a referenced fix that is not found in the IFD database or doesn't match database coordinates. |

| **429 Data Not Rcvd** | **No 429 from input: <ports>** |
|---|---|
| | ARINC-429 data is not being received on the listed ports. <ports> will contain one or more of "#1", "#2", and "VHF". Contact the Avidyne Service Center for service. |

**Notices**

| | |
|---|---|
| **Connect Req <device>** | **WiFi connect Request from <device>** |

Ψ   <device> has attempted to connect to the IFD over WiFi.  To accept the connection, use the Setup Page to set the connection policy to "Once" or "Always"

## SELF TEST OUTPUT

For the duration that the notification of legal rights page is displayed during normal power up on the ground, all remote annunciator lamps are lit up and the system generates a specific set of electrical outputs for the purpose of self-test and troubleshooting. The table below defines the outputs transmitted during this time.

| Parameter | Self-test Value |
|---|---|
| Course Deviation | Half-scale left deviation, TO indication, flag stowed |
| Glideslope/Vertical Deviation | Half-scale up deviation, flag stowed |
| Annunciators | All on |
| Bearing to Waypoint (RMI) | 135° |
| Selected Course (OBS) | 150° when interfaced to an HSI with course pointer |
| Desired Track | 150° |
| Distance To Go | 10.0 NM |
| Time To Go | 4 minutes |
| Active Waypoint | "AVDYN" |
| Groundspeed | 150 knots |
| Present Position | N39°04.05', W094°53.86' |
| Waypoint Alert | Active |
| Phase of Flight | Enroute |
| Message Alert | Active |
| GPS Integrity | Invalid |
| Roll Steering (if applicable) | Flight Director commands 0° bank (level flight) for 5 seconds; commands increasing right bank at 1°/second for 5 seconds; commands 5° right bank for 5 seconds; commands decreasing right bank at 1°/second for 5 seconds, until command is 0° bank again.   This cycle repeats continuously. |

## SYSTEM FAILURES

> **NOTE**
>
> **Good Airmanship**
> In all cases, basic airmanship should be exercised and fundamentals utilized such as: maintain aircraft control, analyze the situation, and take proper action.

POWER DISTRIBUTION

Each IFD draws a total of 2 amps in nominal operation and up to 4 amps under peak conditions for 28V aircraft. This rises to 4 and 8 amps respectively for 14V aircraft. The system is designed to operate without degradation on a single power bus, including single functioning alternator.

Each IFD is controlled by a pair of circuit breakers which need to be pulled out to remove power to an IFD, or the top left knob can be pushed and held to power the unit down (recommended method).

LOSS OF IFD

**Failure Indication:**

The simplest method of determining that a loss of an IFD has occurred is a loss of both the bezel backlighting and the display going black.

**Functionality Lost:**

When the failure of an IFD is indicated by loss of both the bezel backlighting and the display going black, this is a total loss of function for this unit: There will be no VHF, GPS, ADS-B position output, deviation output, etc. In a dual IFD system, loss of an IFD may also result in loss of some sensor data on the remaining IFD if that sensor data was only wired to the failed IFD and therefore cannot be shared with the remaining IFD.

**Recommended Pilot Actions:**

The pilot's plan of action will vary based on the pilot, aircraft configuration, phase of flight and other factors. Taking into account those variations, pilots should consider the following actions:

- Establish safe separation from terrain, traffic and hazardous weather, using ATC assistance as necessary
- If the affected IFD is in use for primary nav or com, transition to secondary GPS or VHF Nav/Com unit(s), if available
- Consider cycling power on the affected IFD via the top left power knob/button
- After the flight, notify an Avidyne Service Center or Avidyne Customer Support to coordinate for a repair action

LOSS OF DISPLAY

**Failure Indication:**

The first indication that an IFD has experienced a loss of the display (LCD) is the appearance of a black display but the bezel backlighting is still present. Assuming the cockpit dimming control/rheostat hasn't been activated to the dimmest setting and the display has actually failed, the easiest indication that just the display has failed is a continued backlighting of the bezel keys.

**Functionality Lost:**

All the basic functionality is intact (e.g. VHF com and nav radios, FMS navigation and deviation output, etc.) but is not visible.

**Recommended Pilot Actions:**

- Check the cockpit dimming control/rheostat to ensure it is not in the "night" position
- Use other cockpit displays (e.g. CDI, HSI, etc) for crosschecking deviation and position
- Consider cycling power on the affected IFD via the top left power knob

- After the flight, notify an Avidyne Service Center or Avidyne Customer Support to coordinate for a repair action

LOSS OF BEZEL CONTROLS

**Failure Indication:**

All knobs and buttons are non-functional and not respondent to use.

**Functionality Lost:**

There will be no ability to change major pages ("FMS", "MAP", "AUX") nor any ability to change the nav source or swap frequencies between the active and standby frequencies.

**Recommended Pilot Action:**

- Use touch screen controls to perform all other functions that are still available
- Consider cycling power on the affected IFD via the top left power knob
- After the flight, notify an Avidyne Service Center or Avidyne Customer Support to coordinate for a repair action

LOSS OF TOUCHSCREEN CONTROL

**Failure Indication:**

All touch screen inputs are ignored.

**Functionality Lost:**

There will be no ability to pan the map, perform graphical flight planning ("rubber banding"), call up a map popup info box, or select a #2 or #3 standby frequency for swapping into the active frequency slot.

**Recommended Pilot Action:**

- Use bezel controls to perform all other functions that are still available
- Verify that touch screen control is not turned off on the Setup page

- Consider cycling power on the affected IFD via the top left power knob
- After the flight, notify an Avidyne Service Center or Avidyne Customer Support to coordinate for a repair action

LOSS OF GPS (DEAD RECKONING)

**Failure Indication:**

A "Dead Reckoning" yellow CAS Caution message is issued and the map will display "Dead Reckoning" along the top left edge of the map.

**Functionality Lost:**

Following loss of GPS navigation, Dead Reckoning (DR) provides limited navigation capability for up to 5 minutes.  The IFD will use speed and last known position at the time of GPS loss along with any heading data it may have to provide an estimate of aircraft position.  At the end of that 5 minute period, if GPS lock has not been reacquired, the system will transition to No GPS and provide the appropriate CAS message and remove the ownship symbol from the moving map.

All GPS-based navigation should remain unaffected during DR mode, albeit with less accuracy and LPV approaches will be terminated due to loss of integrity so higher minimums for the less accurate GPS-based approaches will need to be used.

Some safety and alerting functions will be lost if GPS is unavailable including TAWS, FLTA, and altitude callouts.

**Recommended Pilot Action:**

In the event of a GPS position fix loss, the pilot's plan of action will vary based on the pilot, aircraft configuration, phase of flight and other factors.  Taking into account those variations, pilots should consider the following actions:

- Establish safe separation from terrain, traffic and hazardous weather, using ATC assistance as necessary
- If the affected IFD is in use for primary nav or com**†**, transition to secondary GPS or VHF Nav/Com unit(s), if available

- Transition to aircraft guidance from a secondary receiver, if available
- Plan on higher-minimum GPS RNAV approaches if in the terminal area
- If successful with GPS reacquisition, normal use of the affected IFD may be resumed
- After the flight, notify an Avidyne Service Center or Avidyne Customer Support to coordinate for a repair action

OTHER ANOMALIES

Other system anomalies are indicated to the pilot in the form of a CAS message. In all of those cases, be cognizant of possible increased workload situations and, if the condition persists across a power cycle, notify an Avidyne Service Center or Avidyne Customer Support to coordinate for a repair action.

## SUBSCRIPTIONS

Nav and Obstacle data are supplied by Jeppesen via JDM subscriptions.  Refer to the Jeppesen product website for the various geographic and bundling options available.

For those aircraft equipped with external weather and music satellite radio systems, subscriptions are managed via that data provider.

## NIGHT OPERATIONS

There are several controls to assist selection of the proper and usable brightness level for night operations.

### IFD DISPLAY BRIGHTNESS

Each IFD individually controls its own display brightness through settings on the Setup page.  The choice of which option to use is one of personal preference and/or optimal choice for the specific airplane but Avidyne recommends using the dimming bus control for cockpit lighting consistency. Displays can never be dimmed to be completely off. The lowest dimmable setting may appear to be off during daylight conditions but is actually set for a proper low setting in a dark environment after your eyes have fully dark adapted.

### IFD BEZEL BRIGHTNESS

Each IFD individually controls the bezel brightness (backlighting of knobs and buttons) through settings on the Setup page.  The choice of which option to use is one of personal preference and/or optimal choice for the specific airplane but Avidyne recommends using the dimming bus control for cockpit lighting consistency. Bezel lighting can never be dimmed to be completely off. The lowest dimmable setting may appear to be off during daylight conditions but is actually set for a proper low setting in a dark environment after your eyes have fully dark adapted.

### DISPLAY OF TERRAIN ON MAP

The display of terrain on the moving maps is not affected by the Day/Night lighting controls. For those pilots who prefer to remove the display of terrain from the map during night operations, use the "Land" part of the map declutter LSK to deselect terrain from being displayed.

## HIGH TEMPERATURE OPERATIONS

Like all similar units, the IFD tends to generate a lot of heat, especially if equipped with a transmitting radio.  There is extensive internal temperature monitoring on all of the electrical components, and alerts in the form of CAS messages if the internal temperature gets too high.  Part of the temperature mitigation design is that the metal bezel is intentionally designed to radiate heat away from the internal components and out of the unit.  This can have the effect of a bezel that may be warm to the touch.  This is considered normal.  Note that the rubber bezel buttons will not conduct this heat and should not be warm.  This condition will be more noticeable on hot days or during long ground runs.  The IFD does not require external or forced cooling air but is designed to accept cool air intake in those installations where excessive heat is generated by surrounding avionics or there is significant blockage of air flow behind the panel.

## COLD TEMPERATURE OPERATIONS

If the IFD had been exposed to very cold temperatures, responsiveness of the display and to touch or bezel input may take longer than normal until the IFD has warmed up.

## LOW POWER OPERATIONS

The following actions are taken as input power is reduced to the IFD:

| Input Voltage | IFD Operation Impact |
|---|---|
| 19.9VDC | 16W VHF radio output power reduces to 10W.† |
| 18VDC | Lose high power (2.1A) USB charging. USB charging reduces to 1A. |
| 12.75VDC | Lose all USB charging. |
| 11.5VDC | Bezel lighting and display lighting maximum values are reduced. |
| 10.9VDC | VHF radio output power reduces to 6W.† |
| 10.0VDC | VHF radio output power reduces to 4W. † |
| 9VDC | 60-second countdown to IFD shutdown begins (countdown message displayed on the IFD). |
| 6VDC – 8 VDC | Internal components power down. |

Function is restored by rising above those voltage thresholds by 1VDC for more than 1 second.  A rapid decay below 10 VDC to 6-8 VDC will result in a power down prior to the 60-sec countdown being displayed or completed.

| NOTE |
|---|
| **16W VHF Transmission Power Requires 28VDC** 16W radio transmission power is only available as an option in 28VDC aircraft. † |

## HIGH POWER OPERATIONS

The following actions are taken as input power is increased to the IFD:

| Input Voltage | IFD Operation Impact |
|---------------|----------------------|
| 32.3VDC | VHF radio shuts down to protect itself from over-voltage events.  Note that input voltage up to 33VDC will not damage the VHF but it will not function above 32.3VDC.† |

## USE OF GLOVES

Many types of gloves can be used with the IFD touch screen display. The key parameter for the effectiveness of a glove with touch screen is the distance between the finger and the glass and to a lesser extent, the type of material separating the skin from the glass. The thinner the glove or the more compatible the material (e.g. leather, fine cotton, etc), the greater the likelihood of success will be. Likewise, the more surface area that comes in contact with the glass, the greater the success may be. Each glove must be qualified for compatibility with the display and those glove calibration procedures (specific to the glove and the pilot combination) are immediately below. If all test steps are marked as a "Pass" then the glove/pilot combination is considered to be a qualified pair.

## IFD Glove Qualification Procedure

| Pilot Name | | |
|---|---|---|
| Description of Glove | | |
| Test Step | Circle one | |
| Touch the standby frequency window and verify a virtual keyboard is displayed. † | Pass | Fail |
| Type 121.7, press the "ENTER" button on the virtual keyboard and confirm 121.700 is the displayed frequency in the standby Com window. † | Pass | Fail |
| Press each of the page tabs displayed on the present page and verify the IFD changes to the selected tab. | Pass | Fail |
| With the FMS FPL tab displayed, use touch to type in a typical flight plan and verify that all entries were recognized. | Pass | Fail |
| With the Map page and tab displayed, attempt to pan the map. | Pass | Fail |
| With the Map page and tab displayed, attempt to pinch zoom (in or out) the map to produce a range change. | Pass | Fail |
| With the Map page and tab displayed, attempt to graphically flight plan ("rubber band") and verify the intended change was made. | Pass | Fail |
| Press the "Freq" key on the bezel and then double tap a frequency from the list to place it into the standby slot. † | Pass | Fail |

## CHARGING FROM THE USB

The USB port on the front of the IFD bezel is a USB v1.1 compatible USB port which can be used as a power source for charging devices.

The capacity of the USB port is dependent upon the installation. For 14V installations, the USB port will function as a low power charging port, delivering up to 1 amp. For 28V installations, the USB port will function as a high power charging port, delivering up to 2.1 amps.

High power devices, such as iPads, can be charged using a low power port. However, in order to continue using the device while it is being charged, the device must be connected to a high power port (therefore, only in a 28V installation).

| TIPS AND TECHNIQUES |
| --- |
| **Use of USB Port at Startup**<br>If a device is plugged into the bezel USB port at IFD startup, the unit will boot into maintenance mode. Unless you are intentionally trying to enter maintenance mode at startup, ensure there are no devices inserted in the bezel USB port at startup. The USB port can be used immediately after IFD initialization. |

## INTEGRATION WITH THE IFD100 MOBILE APP

The Avidyne IFD100 mobile application is designed to fully interact with the panel-mount IFDs. That is to say, the IFD100 behaves as if it were another panel-mount IFD and all of the data sharing functionality and rules of two panel mount IFDs are in practice.

The IFD100 does not have its own GPS or VHF but all other capabilities and functions of the panel-mount IFD is present. In fact, the VHF (com and nav) of the panel-mount IFD can be tuned/changed/edited from the IFD100 mobile app.†

Up to two IFD100 apps can be connected to a panel-mount IFD at a time over WiFi.

The IFD100 application can be downloaded as a free download from the Apple Store. It does not provide any usable functionality without a WiFi connection to an operating panel-mount IFD.

---

**TIPS AND TECHNIQUES**

**IFD100 Can Connect to IFD Training App**
The IFD training app (separate free download from the Apple Store) is capable of transmitting data over WiFi just like the panel-mount IFD units. Therefore you can use the IFD training app to connect to the IFD100 mobile app for practice or training activities.

Although some iPads may support running both apps, the experience will be more realistic if the trainer and the IFD are running on separate iPads, each connected to the same WiFi network.

---

## DEMO MODE

The IFD can be put into demo mode at any time while on the ground for familiarization purposes. Entry into demo mode is accessed by inserting a USB fob with a dummy file called "DEMO" (no file type suffix and no quotes) prior to power application. Power up the IFD with that fob inserted and the IFD will boot to the following screen.

*Demo Mode Splash Screen*
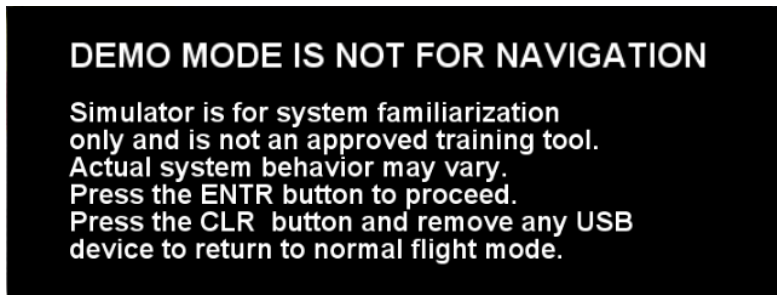


Pressing the bezel "ENTR" button will proceed into demo mode while pressing "CLR" and removing the USB fob will exit demo mode and proceed into normal flight mode.

Demo mode can also be exited by removing the USB fob and cycling power to the IFD.

While in demo mode, the IFD will "fly" the active flight plan in the FMS including any altitude constraints that may be part of the flight plan. The starting point of demo mode is whatever location is entered in the flight plan origin and changing the origin location while in demo mode will jump the location to the origin coordinates.

| TIPS AND TECHNIQUES |
| --- |
| **Flying Behavior in Demo Mode**<br>Demo mode will fly a straight line if no flight plan is entered or when reaching the end of the flight plan unless the last leg of the flight plan or missed approach is a hold, in which case the aircraft will stay in the hold indefinitely. |

> **TIPS AND TECHNIQUES**
>
> **Altitude Constraints Retained**
> Altitude constraints entered into a flight plan will be retained across power cycles in stored routes for direct legs but changes to altitude constraints in terminal area procedures will not be retained in stored routes.

> **TIPS AND TECHNIQUES**
>
> **Flight Above Terrain in Demo Mode**
> To ensure flight above the terrain in demo mode, enter altitude constraint(s) in the flight plan that are above the terrain along the flight plan.

Once in demo mode, both the Map and Chart will display a "Not For Navigation" watermark.

*Demo Mode Watermark*



To return to flight mode, remove the USB fob and cycle power to the IFD.

**TIPS AND TECHNIQUES**

**Some Elements Simulated in Demo Mode**
Some aspects of IFD behavior are completely simulated in demo mode.  For example, on models equipped with a VHF radio, the radios can be "tuned" in demo mode which will display the entered frequency and the station identifier but the radio isn't actually channelized to that entered frequency.

## DATA TRANSFER TO/FROM EXTERNAL DEVICES

Data can be transferred to and from the IFD and a number of external devices via several methods (USB, WiFi, Bluetooth).

Data that can be transferred is expected to grow over time but the basic functions are summarized in the table below

| Data | Transfer Description | Transmission Method(s) |
|------|---------------------|------------------------|
| Present Position | Ownship position is streaming out of the IFD for use by third party device/applications. Outbound from IFD only. | WiFi |
| Active Flight Plan | The active flight plan, and any real-time modifications to it is streaming out of the IFD for use by third party device/applications. Outbound from IFD only. | WiFi |
| Stored Routes | Stored flight plan routes are a bi-directional transfer between the IFD and approved third party device/applications. Routes can be created off-board and imported into the IFD, and/or can be created on the IFD and transmitted off-board for third party device/application use. | WiFi |

| Data | Transfer Description | Transmission Method(s) |
|---|---|---|
| Traffic | Traffic data known by the IFD (TAS sensor, TIS receiver, TIS-B receiver, etc) is streaming out of the IFD for use by third party device/applications. Outbound from IFD only. | WiFi |
| Weather | ADS-B weather information received by the IFD is streaming out of the IFD for use by third party device/applications. Outbound from IFD only. Note that data from other weather sources will be streamed to the IFD100. | WiFi |
| User Waypoints | User waypoints are a bi-directional transfer between the IFD and approved third party device/applications. User waypoints can be created off-board and imported into the IFD, and/or can be created on the IFD and transmitted off-board for third party device/application use. | WiFi, USB |
| Instrument Approach and Transition | Instrument approach and selected transition data is streaming out of the IFD to facilitate automatic chart and transition selection and display ("chart popping") on third party device/applications. Outbound from IFD. | WiFi |

| Data | Transfer Description | Transmission Method(s) |
|------|--------------------|----------------------|
| Fully interactive IFD | The panel mount IFD has complete bi-directional communication with the IFD100 application hosted on a mobile tablet. | WiFi |
| User Data (User settings, user checklists, user waypoints, stored routes) | User data can be stored on a USB fob device and imported for later use on any IFD. | USB |
| Data Entry and IFD manipulation | Data can be entered (e.g. frequencies, waypoint names, checklist data, etc) from a properly paired external Bluetooth keyboard.  In addition, bezel controls and other IFD manipulation can be accomplished (e.g. activating keys, page keys, changing map range, volume, etc) via the paired keyboard.<br>Inbound to IFD only. | Bluetooth |
| Data Logs | Datalogs can be downloaded from an IFD onto a fob device for importing and use on external devices (e.g. PC download, tech support evaluation, etc).<br>Outbound from IFD only. | USB |

| Data | Transfer Description | Transmission Method(s) |
|------|---------------------|------------------------|
| Database Updates | On-board databases (e.g. nav, chart, obstacle, terrain) can be uploaded to an IFD from a fob device.<br>Inbound to IFD only. | USB |
| Software Updates | IFD software updates can be uploaded to an IFD from a fob device.<br>Inbound to IFD only. | USB |

# REGULATORY COMPLIANCE STATEMENTS

RADIO REGULATORY COMPLIANCE STATEMENTS**†**

This device complies with Part 15 of the FCC limits for Class B digital devices and Industry Canada license-exempt RSS standard(s). This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference, the user is encouraged to try to correct the interference by relocating the equipment or receiving antenna or by connecting the equipment to a different circuit than the affected equipment. Consult an authorized dealer or other qualified avionics technician for additional help. Operation of this device is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This transmitter must be restricted to work related operations in a Controlled RF exposure environment.  All qualified end-users of this device must have the knowledge to control their exposure conditions and/or duration, and the exposure conditions and/or duration of their passengers and bystanders, to comply with the General Population / Uncontrolled MPE limit and requirements.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 0.911m (2.99 ft) from all persons.

## DÉCLARATION(S) DE CONFORMITÉ RÉGLEMENTAIRE†

Cet appareil est conforme aux limites de l'article 15 de la FCC pour les appareils numériques de classe B et aux normes RSS exemptes-de-licence d'Industrie Canada. Cet équipement génère, utilise et peut émettre une énergie de fréquence radio et, s'il n'est pas installé et utilisé conformément aux instructions, peut causer des interférences nuisibles aux communications radio. Cependant, rien ne garantit que des interférences ne se produiront pas dans une installation particulière. Si cet équipement provoque des interférences nuisibles, l'utilisateur est encouragé à essayer de corriger les interférences en déplaçant l'équipement ou l'antenne de réception ou en connectant l'équipement à un circuit différent de celui de l'équipement concerné. Consultez un installateur agréé ou un autre technicien en avionique qualifié pour obtenir de l'aide supplémentaire. L'utilisation de cet appareil est soumise aux conditions suivantes: (1) Cet appareil ne doit pas provoquer d'interférences nuisibles et (2) cet appareil doit accepter toute interférence reçue, y compris les interférences pouvant entraîner un fonctionnement indésirable.

Cet émetteur doit être limité aux opérations liées au fonctionnement dans un environnement d'exposition RF contrôlé. Tous les utilisateurs qualifiés de cet appareil doivent avoir les connaissances nécessaires pour contrôler leurs conditions d'exposition et / ou leur durée, ainsi que les conditions d'exposition et / ou la durée, pour leurs passagers et passants, afin de se conformer à la limite et les exigences de la population générale / MPE non contrôlée.

L'antenne ou les antennes utilisées pour cet émetteur doivent être installées pour assurer une distance de séparation d'au moins 0,911 m (2.99 pi) de toutes personnes.

FIS-B WEATHER

FIS-B information may be used for pilot planning decisions focused on updating the pilot's awareness of the dynamic flight environment; including avoiding areas of inclement weather that are beyond visual range and pilot near term decisions where poor visibility precludes visual acquisition of inclement weather. FIS-B weather and NAS status information may be used as follows:

(a) To promote pilot awareness of ownship location with respect to reported weather, including hazardous meteorological conditions; NAS status indicators to enhance pilot planning decisions; and pilot near-term decision-making.

(b) To cue the pilot to communicate with Air Traffic Control, Flight Service Station specialist, operator dispatch, or airline operations control center for general and mission critical meteorological information, NAS status conditions, or both.

FIS-B information, including weather information, NOTAMs, and TFR areas, are intended for the sole purpose of assisting in long- and near-term planning and decision making. The system lacks sufficient resolution and updating capability necessary for aerial maneuvering associated with immediate decisions.

In particular, in extreme scenarios, the oldest weather radar data on the display can be up to 15 to 20 minutes older than the display's age indication for that weather radar data. Therefore, do not attempt to use FIS-B weather information to maneuver the aircraft at minimum safe distances from hazardous weather. FIS-B information may be used to support preflight preparation required by regulation. However, depending on the intended operation, FIS-B may not provide all available aeronautical or meteorological information concerning the flight. Regulatory compliant preflight preparation may be accomplished using automated resources or by contacting Flight Service.

FIS-B uplink is an FAA approved source for METAR, TAF, Winds, PIREPs, NEXRAD, AIRMET, SIGMET, and TFR information subject to the range limits for the broadcast of these products. FIS-B uplink is not an FAA approved source for NOTAMs.

# MAINTENANCE MODE

During normal operation, when power is applied to the IFD it starts up in "flight mode". However, there is a separate built-in "maintenance mode" that is used for various reasons including changing the configuration of the IFD interfaces, uploading databases, downloading logs, and performing software updates.

Typically, the only reason to get into maintenance mode is during initial IFD installation and then periodically to update navigation, obstacle, and chart databases. A detailed explanation of the maintenance mode features that are used during IFD installation is given in the IFD installation manual. Features that are reasonably used by the pilot are described elsewhere in this pilot's guide. This section describes only the method for starting maintenance mode and the method to return to flight mode.

STARTING MAINTENANCE MODE AT POWER UP

If the IFD is powered off, maintenance mode can be started by inserting a USB fob into the USB port located on the front panel of the IFD. Once the fob has been inserted, apply power to the IFD and the unit will power up into maintenance mode. If the fob is empty, the "Logs" tab will be selected. Otherwise, the "Update" tab will be selected.

STARTING MAINTENANCE MODE FROM FLIGHT MODE

If the IFD is already powered up in flight mode **_and_ the IFD can determine that the aircraft is on the ground**, maintenance mode can be started using one of two LSKs located on the AUX SYS tab.

| COOL FEATURE |
|---|
| The maintenance mode PIN exists to prevent accidental changes to configuration settings, but it has no effect on the ability to update databases or download logs.<br><br>Note that defining a PIN is not required. Just skip over that page and settings changes are unrestricted. Once defined, though, it can only be cleared by contacting tech support. |

### Download Logs LSK

The Download Logs LSK is intended for use when downloading logs. The IFD logs several parameters and events during normal IFD operation. Those logs are often useful for technical support. Press the Status LSK until Software is selected. Then press "Download Logs", which will have appeared by the bottom left LSK. At that point, the LSKs will be changed to "Confirm" and "Cancel". Press Confirm to switch to maintenance mode. When the system restarts into maintenance mode, the "Logs" tab will be selected.

*Download Logs LSK*



*Confirm/Cancel LSKs*

**Update Databases LSK**

The Update Databases LSK is intended for use when updating databases. Press the Status LSK until Databases is selected. Then press "Update Databases", which will have appeared by the bottom left LSK. At that point, the LSKs will be changed to "Confirm" and "Cancel". Press Confirm to switch to maintenance mode. When the system restarts into maintenance mode, the "Update" tab will be selected.

*Update Databases LSK*



EXITING MAINTENANCE MODE

To return to flight mode from maintenance mode, select the Update tab either by touching that tab or by pressing the left side of the AUX button until that tab is selected. At that point, a "Done" LSK will be presented on the right side of the display, adjacent to the ENTR button. When the Done button is pressed, either by touchscreen or by the ENTR key, the display will show a countdown. Pressing CLR or Cancel will cause the system to remain in maintenance mode. Once the countdown expires, the IFD will reboot back into flight mode.

## DATABASE UPDATES

Periodic updates to nav, chart, obstacle, and terrain databases are all made through the USB port on the front of each IFD. Updates must be performed in accordance with 14 CFR Part 43, Appendix A. Note that data updates require the use of Maintenance Mode, which is permitted only on the ground.

| NOTE |
| --- |
| **Database Currency** <br> It is critical that you update the data regularly and that you ensure the databases are current prior to conducting flight operations. |

The table below summarizes the database update periods:

| Database | Update Cycle | Comments & Source |
| --- | --- | --- |
| Chart Data | 14 days | Expiration watermark displayed after 14 days indefinitely until data updated (Jeppesen) |
| Nav Data | 28 days | Airport, airway, navaid, airspace, and FMS data (Jeppesen) |
| Obstacle Data | 56 days | Displayed on map and used for Terrain Awareness and FLTA functions (Jeppesen) |
| Terrain Data | As required | Displayed on map and used for Terrain Awareness and FLTA functions (Jeppesen).  The IFD is shipped from the factory with this database already loaded and updates are anticipated to be a rare occurrence. |

It is recommended to use one of the formatted fobs supplied by Avidyne (marked by the Avidyne logo printed on one side).

However, most USB drives that can be formatted using FAT32 will be acceptable. Alternatively, replacement fobs can be purchased directly from Avidyne.

To perform a data update, ensure the data to be updated is placed onto one of the acceptable USB fobs and then start the IFD in maintenance mode (see Maintenance Mode section on page 6-53).

Maintenance mode is organized similarly to flight mode using a tabbed interface. Databases are updated using the "Update" tab. If the IFD is powered up in maintenance mode or maintenance mode is entered using the "Update Databases" LSK, then the Update tab will already be selected.

*Maintenance mode Update tab*
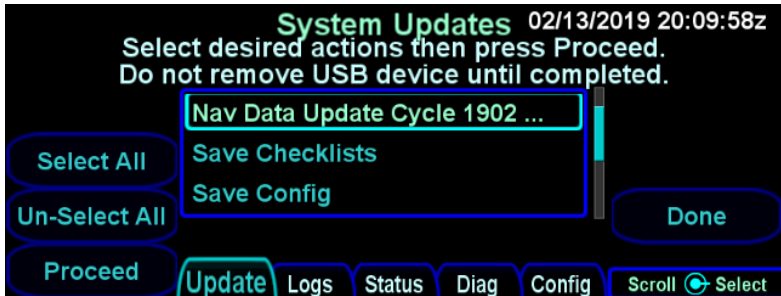
The Update tab in maintenance mode shows a list in the center of the display containing the files on the USB fob (and some other options for saving that are not discussed here). Turn the right inner or outer knob to scroll the cursor up and down and then press the knob button to select the item surrounded by the cursor. The cursor can also be moved by touching items in the list and an item can be selected by touching the item surrounded by the cursor. When an item is selected, a checkmark will appear on the right side of the list. Pressing the right knob button or touching an item when the item surrounded by the cursor is already selected will cause the item to be deselected. All items in the list can be selected or deselected at once by pressing the "Select All" and "Un-Select All" LSKs, respectively.

***Update tab with items selected***
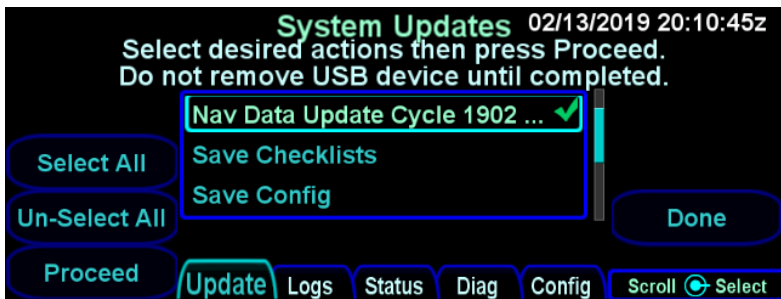


Once the set of items to be loaded has been selected, press the Proceed LSK to start the load.

| TIPS AND TECHNIQUES |
| --- |
| **Select Only Desired Files For Upload**<br>If you keep reusing the same fob for database uploads, be sure to either delete all out-of-date and non-desired files or take care in selecting/de-selecting files from the IFD display list. Not doing so may extend data upload times considerably by uploading unintended files. |

| CAUTION |
| --- |
| **Do Not Power Off the IFD During Data Update**<br>Cycling power to the IFD during a database update may result in a corruption of the memory device that stores the databases.  If this happens, a service action may be required to restore the data integrity. Use of a ground power unit is recommended. |

A progress bar will be presented as the loading process proceeds.  During the process, various messages may appear and disappear.  The progress bar will reset and be updated for each item to be loaded.

*Upload progress bar*
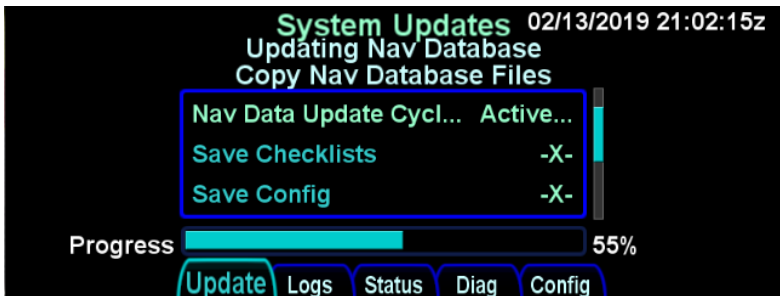


| NOTE |
| --- |
| **Each IFD Requires Separate Upload**<br>In multiple IFD installations, the database uploads must be performed individually for each IFD to be updated. |

> **TIPS AND TECHNIQUES**
>
> Due to some of the upload durations, Avidyne recommends creating a fob for each IFD to be updated so that the updates can happen in parallel and not stacked serially, thereby extending the overall time to accomplish a full update.

Once the loading process is complete, the list will be shown with the load status of each item in the list. If an item was not selected, the status will be "Skipped". If an item was successfully loaded, the status will be "OK". If an error occurred, the status will be "ERROR". If all items loaded successfully, a message to that effect will the shown above the list. If not, an error message will be displayed above the list.

Note that all of the LSKs along the left side will be removed and that no cursor will be presented. If there is a need to get the cursor and the LSKs back, either remove and reinsert the USB fob, or just change tabs by touching the tab or using the AUX button and then go back to the Update tab.

If the load was not successful, either try again using the error message as a guide or contact Avidyne technical support.

***Upload Complete Indications***
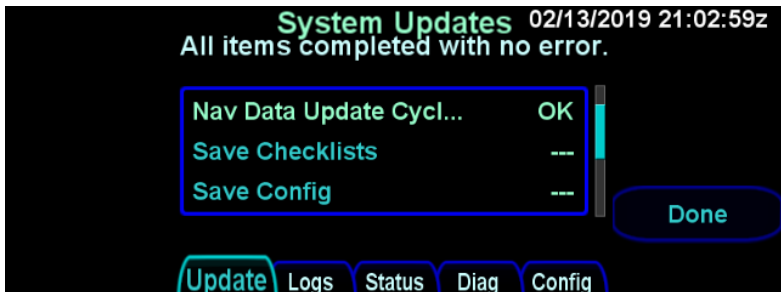


When all loading operations have been completed, press the "Done" LSK to restart the IFD in flight mode. Remove the USB fob and store it in a safe place. If the USB fob is inadvertently left in the USB port during flight mode, there will be no adverse affect as the USB fob is ignored during flight mode.

Once the IFD is back into flight mode, It is highly recommended to verify that the data was updated by going to the AUX-SYS tab, selecting "Databases" with the "Status" LSK, and then checking the identifying characteristics of the databases that were loaded (e.g. name, cycle dates).

---

**NOTE**

**Report Observed Discrepancies**
Avidyne requests that any observed database discrepancies get reported.  These discrepancies may be in the form of an incorrect procedure, incorrectly identified terrain, obstacles, navigation fixes, or any other displayed item used for navigation or communication in the air or on the ground.  Use the Service Hotline defined on the inside back cover.

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**NOTE**

**Database Accuracy and Completeness**
Avidyne accurately processes and validates the database data, but cannot guarantee the accuracy and completeness of the data provided by various state sources and their suppliers.

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**NOTE**

**Consistent Nav Database Required for Sharing**
In dual IFD installations, the nav database loaded on each IFD must be the same in order to allow flight plan sharing between the IFDs.

## SOFTWARE UPDATES

With very few exceptions, all software inside the IFDs is capable of being updated via the USB connections as well. This means the IFD does not need to be returned to the factory for any future software updates. The Avidyne position is that any shop that holds a repair station certificate, an A&P, or an Experimental Aircraft owner with log book signoff authority can perform the update.  The person performing the update must follow the provided Service Bulletin explicitly and mail/fax/email back in the completed update sheet that is part of the Service Bulletin but Avidyne does not restrict this to just Avidyne Service Centers.

## DATALOGS DOWNLOAD

Extensive data logging is performed automatically on all IFDs. These datalogs can be accessed post-flight and used for a number of purposes.

> **NOTE**
>
> **Datalogs Usable But Avidyne Property**
> The contents of the data logs and the storage devices that record and store data remain the property of Avidyne. However, you are free to download and use the data for your own training and safety improvement purposes.

There are seven types of datalogs employed in the IFDs:

- **System Log** – This log provides a record of the navigation state. From this log, you can re-create many aspects of the FMS output and IFD state. It logs at a rate of approximately 1Hz

- **Flight Log** – This log provides a detailed record of your aircraft state as measured by the various IFD sensors. It logs at a rate of approximately 5Hz

- **Engine Log** – This log provides details on fuel flow system data (if configured). It logs at a rate of approximately ¼ Hz

- **Event Log** – This log contains miscellaneous data such as all alerts, keystrokes, system status and error messages, etc. It is designed to be a diagnostics log for Avidyne Service Center technicians and not expected to be used by owners/operators. It logs at an on-condition rate

- **Voltage Log** – This log contains internal diagnostic data such as the voltages and currents on sub-system boards, temperatures and internal fan status. It logs at a rate of approximately 1Hz

- **GPS Log** – This log contains extensive internal state data for the GPS

- **Configuration Log** – This set of .txt files contains various system settings, states, and calibrations at power down.

To download logs, start the IFD in maintenance mode (see Maintenance Mode section on page 6-53). Once maintenance mode has started, press the right side of the AUX page key to select the "Logs" tab. Note that if maintenance mode was started using the "Download Logs" button, the "Logs" tab will already be active. Insert a USB fob into the USB port.

*Datalogs Download Page (Maintenance Mode)*



The Logs tab in maintenance mode shows a list in the center of the display containing the list of logs that can be downloaded. Use the right knob on the IFD to scroll the cursor up and down and then use the knob button to select the item surrounded by the cursor to be downloaded. You can also move the cursor by touching items in the list and then touch the item surrounded by the cursor again to select it. When an item is selected, a checkmark will appear on the right side of the list. Pressing the knob button or touching an item when the item surrounded by the cursor is already selected will cause the item to be deselected. All items in the list can be selected or deselected at once using the "Select All" and "Un-Select All" LSKs.

The "Logs" LSK provides two options - "Full" and "Since Last". The "Full" option causes **all** of the data each selected log to be downloaded. The "Since Last" option causes only that data which has been logged **since the last time a download was completed** to be downloaded. Since the logs contain a large

amount of data, the second option will be a quicker option in almost every case.

Once the desired set of logs to download have been selected, press the "Proceed" LSK to start the download process.

Download times are highly dependent on the number and types of logs being downloaded and the length of time since the last download. Times can range from a few seconds to more than 15 minutes. The more often logs are downloaded, the shorter the download times will be.

A progress bar will be presented as the download process proceeds. As the list is processed, each item will show a status of "OK", "In progress…", "Pending", "Skipped", "Active", or "Failed".

Once the download is complete, press the "Done" LSK to exit maintenance mode.

When downloaded to the USB fob, the data logs will be saved in .csv files with a unit number prefix (e.g. "1_" or "2_"). This can be imported into newer versions of Microsoft Excel® in a table format. The data can then be plotted or analyzed by several third-party tools. Note that files can easily contain 50MB or more of data.

Data included in the files are as follows:

**System Log**

| | |
|---|---|
| Date/Time stamp | GPSS state |
| Power On | OBS value |
| OAT, if available | Desired track |
| Localizer deviation | Nav frequency |
| Glideslope deviation | Course select value, if known |
| Ground speed | Nav type |
| Ground track | VOR course |
| Crosstrack deviation | GPS altitude |
| Vertical deviation | Distance to active waypoint |
| Display mode | FMS course |
| Nav mode | Active waypoint information |

| GPS parameters | FLTA Status |
|---|---|
| Magnetic Variation | |

**Flight Log**

| Date/Time stamp | Indicated airspeed, if available |
|---|---|
| Power on | True airspeed, if available |
| Turn rate, if available | Vertical speed, if available |
| Pressure altitude, if available | Lat/Lon |

**Engine Log**

| Date/Time stamp | Fuel Remaining (gal) |
|---|---|
| Power on | Fuel Time Remaining (min) |
| Fuel Flow (gal/hr) | Fuel Economy (nm/gal) |
| Fuel Used (gal) | |

**Voltage Log**

This log contains more than 50 voltages and temperatures of each individual component.  It is designed to be a diagnostics log for Avidyne Service Center technicians.

**Event Log**

This log contains miscellaneous data such as all alerts, keystrokes, system status and error messages, etc. It is a diagnostics log for Avidyne Service Center technicians.

**GPS Log**

This log contains miscellaneous internal GPS state data. It is a diagnostics log for Avidyne Service Center technicians.

**Configuration Log  (Number of parameters in parenthesis which are saved in the form of multiple text ".txt" files)**

| Local Unit Port Configurations (47) | Cross-side Port Configurations (47) |
|---|---|
| GPS Antenna (x) | System Configuration – SW versions, part numbers, chassis ID (145) |

| | |
|---|---|
| Dimming Settings (23) | Aircraft Tail Number (1) |
| Chart State – validity dates, identifier (6) | Datablock selections (32) |
| User Options selections (33) | FMS Setup settings (38) |
| Map Setup settings (80) | Map Declutter selections (58) |
| System Time Since Power On (1) | Frequency List values (80) |
| Com Preset values (16) | Com-Nav Audio States (21) |
| GDL69 Settings (2) | VHF Com Values (5) |
| VHF Nav Values (5) | Lightning Sensor Configuration (4) |
| OBS Cal Bias data (2) | Video Settings (16) |
| Paid Options (11) | Radar Settings (6) |
| WiFi Settings (5) | |

## USER DATA BACKUP/RESTORATION PROCEDURE

Use the following procedure to store and reload user checklists, user settings, waypoints, and routes.  The original user data must be generated on an IFD and backed up using this procedure.  Then, they can be reloaded onto any IFD or multiple IFDs via this procedure.

*User Data Save and Restore Options*
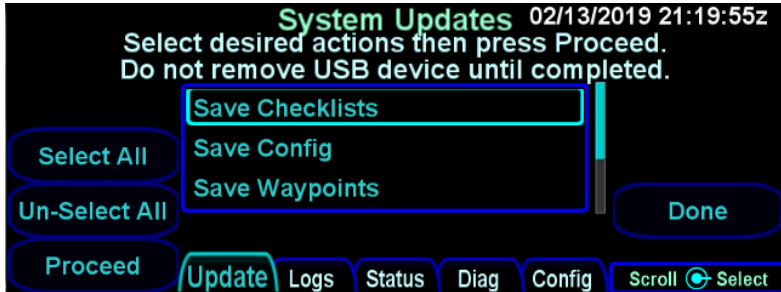


SAVING USER DATA

Ensure a properly formatted fob is installed in the IFD.

Start the IFD in maintenance mode (see Maintenance Mode section on page 6-53).  From the Update tab, ensure the desired "Save <data type>" option(s) has a checkmark and then press the "Proceed" LSK option.

---

**TIPS AND TECHNIQUES**

**Additional Means of Recording Configurations**
Avidyne highly recommends recording your user preferences and configuration settings (including Maintenance Mode "Config" pages) in an alternate form (e.g. smart phone photographs of the page settings) as an additional precaution.

---

When the download is complete (should take a matter of seconds), store the fob and/or the files on the fob somewhere secure.

RELOADING PREVIOUSLY STORED USER DATA

Ensure the fob containing the previously stored user data is installed in the IFD.

Start the IFD in maintenance mode (see Maintenance Mode section on page 6-53).

From the Update tab, ensure the dated file(s) of interest ("Restore <data type> YY.MM.DD-##") has a checkmark and then press the "Proceed" LSK option.

When the upload is complete (should take a matter of seconds), exit Maintenance Mode via pressing the "Done" LSK and then select the appropriate page (e.g. UTIL option of the SYS tab on the AUX page) to verify the restored data is present.

It is possible to import user data from IFD simulators but they must be individually selected for saving onto the fob via the simulator.

The possible states that can displayed during user data save and restore operations are:

| Save or Restore State | Indication |
|---|---|
| Not selected | -X- |
| Selected but hasn't started yet | Pending … |
| Save or Restore underway | Active … |
| Save or Restore passed over | Skipped … |
| Completed with no error | OK |
| Completed with error | ERR |

## TRANSFERRING USER WAYPOINTS

User waypoints can be completely edited using the IFD. However, when there are more than just a few of them to manage, it is often easier to manage them offline. Therefore, the IFD provides a mechanism to upload and download the set of user waypoints using a comma separated value (CSV) file. These operations are accomplished using Maintenance Mode.

UPLOADING USER WAYPOINTS

User waypoints to be uploaded to the IFD must be contained in a file with an extension of ".CSV". The first line of the file must contain "userwpts", followed by a comma, followed by a description of the file contents, as shown in the example below:

        userwpts, Around home airport

Each subsequent line in the file contains a user waypoint, defined as follows, with each field separated by a comma.

- Identifier – this field must contain at least one character and at most 5 characters. Allowable characters are letters A through Z and numerals 0 through 9.
- Name – this field can either be blank or contain at most 20 characters. Allowable characters are letters A through Z, letters a through z, numerals 0 through 9, dash, apostrophe, period, and space.
- Latitude – this field must contain a decimal value in the range of -90.0 to 90.0
- Longitude – this field must contain a decimal value in the range of -180.0 to 180.0

Only the first 500 waypoints in the file will be accepted.

The following is a sample user waypoint file containing 4 waypoints:

```
userwpts, Famous courses - 4/1/2020
PEBL,Pebble Beach,36.569407,-121.949466
STAND,St. Andrews – 1st, 56.343525,-2.802973
RLMLB,Royal Melbourne G.C.,-37.969795,145.030681
MSTRS,Augusta National,33.494563,-82.023049
```

User waypoints are uploaded to the IFD using the same technique as is used for uploading navigation data. CSV files containing user waypoints will be displayed on the System Updates page just like DSF files are. The description on the first line of the CSV file will be shown in the list, as illustrated below for the sample file above.

*System Update tab showing user waypoints file*
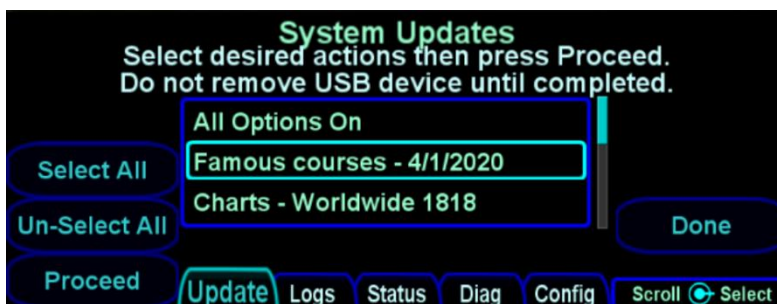


**IMPORTANT NOTE**

When uploading user waypoints from a CSV file, it is important to remember that the set of user waypoints in the CSV file will completely replace the set of user waypoints in the IFD.

The IFD cannot detect inaccurate data in the CSV file. It is the pilot's responsibility to check the accuracy of each user waypoint after loading and before its first use.

DOWNLOADING USER WAYPOINTS

To save the set of user waypoints currently contained in the IFD, start Maintenance Mode, go to the Update tab, and then select the "Save Waypoints" item. After pressing the Proceed button, the IFD will save the set of waypoints to a file named "SAVEWPTS.CSV". The saved file will have the same format required for uploading user waypoints, and the description on the first line will contain the date on which the waypoints were downloaded.

**IMPORTANT NOTE**

If the USB fob already contains a file named SAVEDWPTS.CSV when user waypoints are downloaded, the IFD will overwrite the contents of the file.  To prevent data loss, consider transferring the file to a personal computer or renaming the file on the USB fob.

# PAIRING A BLUETOOTH® KEYBOARD

The IFD has built-in Bluetooth capability that allows pairing with a remote keyboard.  The keyboard can be used to easily enter waypoint identifiers, but it can also be used to change pages, move cursor, and tune radios.

As with all Bluetooth devices, a keyboard must be paired with the IFD before use.  This pairing only needs to be done once and then that specific keyboard can be used every time the IFD is powered up.

> **NOTE**
>
> **Dual IFD Installations Should Only Pair 1 IFD**
> To avoid issues arising from a keyboard only being able to pair with one device at a time, dual IFD installations should turn off Bluetooth on the Setup page on one IFD.

> **NOTE**
>
> **Acceptable Bluetooth Keyboards**
> Due to certification constraints, only Avidyne supplied Bluetooth keyboards will be functional.

Before attempting to pair a Bluetooth keyboard, ensure the keyboard has adequate charge, then turn it on using the switch on the left side.  Then, ensure that the Bluetooth option is turned on in the Setup page.

To start the pairing process, start the IFD in maintenance mode (see Maintenance Mode section, page 6-53).  Select the "Config" tab by either using the AUX button or by touching the tab.  Then, turn the right outer knob until the Bluetooth Setup page is displayed.  Wait until the IFD has been powered on for at least one minute.

Press the button on the back of the keyboard to make it discoverable.  Then, press the "Start Scan" LSK on the IFD.  After

a while, the IFD will discover the keyboard and it will appear on the list of devices shown on the screen.  At that point, press the "Stop Scan" LSK.

After "Stop Scan" has been pressed, turn the right outer knob to move the cursor to the desired device.  Press the "Pair Device" LSK and wait for a numeric pairing code to appear.

*Bluetooth pairing - Start Scan LSK*
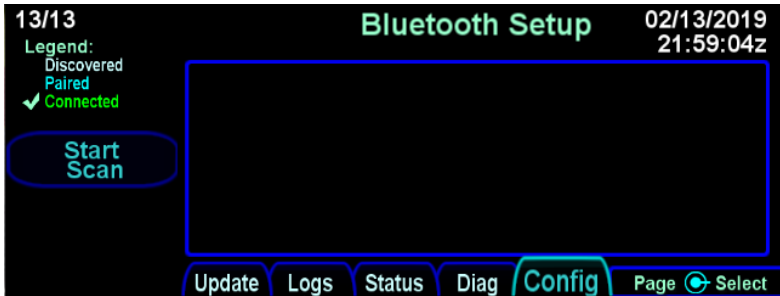


*Bluetooth pairing - keyboard discovered*
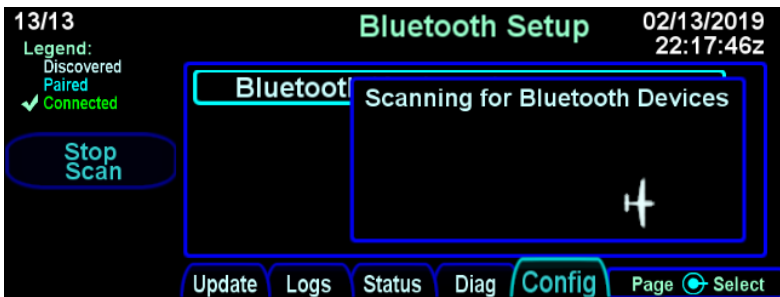


*Bluetooth pairing - Pair Device LSK*
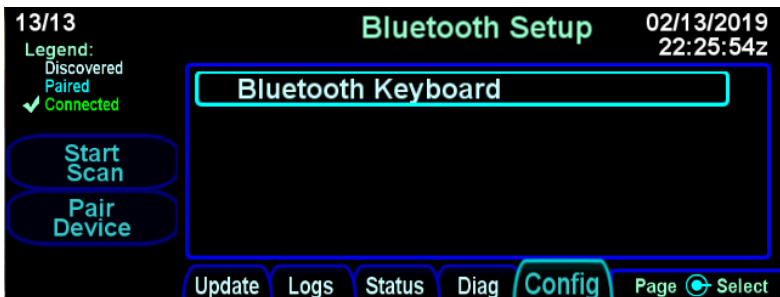
*Bluetooth pairing - pairing code*



On the keyboard, enter the numeric code followed by the ENTR key. If pairing was successful, the selected device in the list will be shown in green.

*Bluetooth pairing - pairing successful*
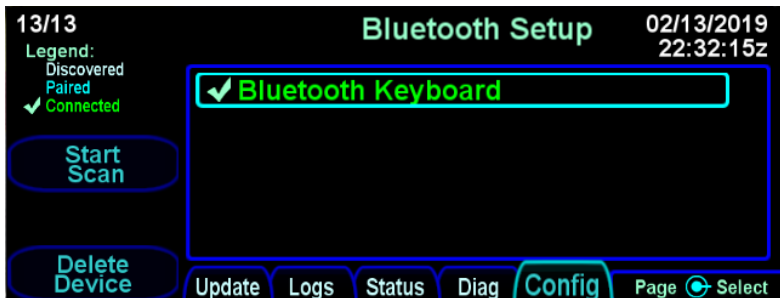


If the device is not shown in green or if the device name disappears from the display, restart the pairing process with pressing the button on the back of the keyboard. If repeated attempts to pair are unsuccessful, contact Avidyne Technical Support.

After successful pairing, exit maintenance mode by pressing the "Done" LSK on the Update tab.

VERIFICATION OF SUCCESSFUL PAIRING

Start the IFD in flight mode and then go to the Connectivity category in the Setup Page. Ensure that the Bluetooth option is "On" and then verify that the Bluetooth symbol in the upper right corner of the display is green (this may take several seconds).

Test that the pairing was successful by any of several methods, including:

- Press FMS several times on the Bluetooth keyboard. Verify that the FMS page changes with each key press.

- Select the FMS FPL page on the IFD. Repeatedly press the down arrow key on the Bluetooth keyboard until the cursor is at the end of the flight plan (insert cursor). Press a letter on the Bluetooth keyboard and verify that a waypoint entry is initiated.

---

**TIPS AND TECHNIQUES**

**Common Mistake with Bluetooth Legend**
A common mistake is to interpret the Bluetooth Setup status legend in the top left corner of the Bluetooth Setup page as the actual state of Bluetooth.

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**TIPS AND TECHNIQUES**

**"Inoperative" Bluetooth Keyboards**
The most likely reasons why a previously paired keyboard appears non-functional or inoperative is due to lack of charge or the Bluetooth setting on the Setup page is set to Off.

---

**TIPS AND TECHNIQUES**

**Physically Secure the Keyboard**
A common and effective technique to physically secure the keyboard in the cockpit is to apply Velcro to the back surface and find somewhere accessible but out-of-the-way for the mating Velcro material.

---

**TIPS AND TECHNIQUES**

**Connect/Disconnect Keyboard Connection**
Pressing the pair key on an already connected keyboard will disconnect it.  If this happens, the keyboard will need to be power cycled to reconnect. A paired keyboard normally tries to connect when it is turned on, but will also retry if any key is pressed.

A keyboard can only be paired to one device. If it is paired to something other than an IFD, it will have to be paired again with the specific IFD.

**TIPS AND TECHNIQUES**

**Keyboard Status Indications**
A solid green LED lamp indicates the keyboard is connected.   A flashing green LED indicates it is trying to pair.  A yellow LED is lit every time a keystroke is sent to the IFD. While charging, the red LED turns on and grows dimmer as the charge increase.  When fully charged, the red LED is extinguished.  Leaving the keyboard plugged in after the charge is complete will decrease the battery life.

## CLEANING THE DISPLAY

If the IFD screen should become dirty due to fingerprints or dust, clean the screen using a clean, soft lint-free cloth, such as 3M Ultra-Brite Cloth #2011 or similar, and a cleaning solution composed of de-ionized water or other liquid solvents such as isopropyl alcohol (IPA).  Use caution, as it may be flammable. Always apply the cleaning solution directly on the cloth.  Never spray cleaner directly on the screen.

In general, isopropyl alcohol is a safe and effective cleaner. Methanol and most acidic solutions can be toxic or damaging to glass coatings if misused.

Excessive or unnecessary cleaning should be avoided to prevent damage to the coated optical filter surfaces.  Never allow excess amounts of cleaning agents to dry if they have formed into pools, streaks or droplets to help avoid spotting of the glass surface.

The use of any third-party screen protector, especially those that adhere directly to the IFD display glass, is not endorsed by Avidyne due to the touch-screen nature of the display and may void the warranty for any display related issue.

## SLIDE-IN REPLACEMENT DETAILS

The IFD is designed as a slide-in replacement of the following equipment:

| Avidyne Product | Garmin Product | Garmin SW Baseline | Comments |
|---|---|---|---|
| IFD440 | 430<br>430A<br>430W<br>430AW | 5.03 (Main) | |
| IFD410 | 400<br>400W | 5.03 (Main) | |

The following table represents the complete list of unsupported Garmin functionality in the IFD:

| Unsupported 500/530 Functionality | Comments |
|---|---|
| Manual entry of fuel flow | Fuel totalizer data and computed fuel at waypoints/destinations are only supported in installations that integrate a fuel flow system.  In no cases can you manually enter fuel flow in the IFD. |

> **NOTE**
>
> **TAWS/Other Audio Output Wiring to Audio Panel**
> To take full advantage of FLTA and other IFD aural alerting (e.g. TOD chime), ensure the audio output signals are wired to the audio panel.  For 500/530 replacement installations, if TAWS audio output was already wired to the audio panel, then no further action will be required.  If the TAWS audio output was not already wired to the audio panel, then that wiring will need to be added with IFD installation.

> **NOTE**
>
> **ADS-B and Air/Ground Output Wiring to Transponder**
> To take full advantage of the IFD ADS-B compliant position and automatic air-ground transitions, ensure the proper IFD output signals are wired to a compatible transponder.

> **TIPS AND TECHNIQUES**
>
> **Multiple Integration Options**
> Discuss integration options with your installer.  There are several options that can be added to the system for added capability.  There is a dedicated section in the IFD Installation Manual that identifies these options.

# INDEX

**Website** There is a dedicated website that provides more information on this product at http://www.ifd440.com

**Service Hotline** A hotline has been established to service questions or issues regarding Avidyne products. The U.S. Toll Free number is 1-888-723-7592.

**Email** Customer/product support issues can be emailed as well at techsupport@avidyne.com

When calling or emailing for product-related help, please have the following information available, if able:

- Customer Name/Account Information
- Aircraft tail number, IFD serial number, and software versions.
- A good description of the problem or question.
- A copy of your data logs.

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