GARMIN

GTN 725/750

Pilot's Guide

Map

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Terrain

Weather

Charts

Flight Plan

Procedures

Nearest

Waypoint Info

Services

Utilities

System

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This manual reflects the operation of System Software version 3.00, or later. Some differences in operation may be observed when comparing the information in this manual to later software versions.

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To obtain warranty service, contact your local Garmin Authorized Service Center. For assistance in locating a Service Center near you, visit the Garmin web site at http://www.garmin.com or contact Garmin Customer Service at 866-739-5687.

__WARNING:__ Navigation and terrain separation must NOT be predicated upon the use of the terrain function. The GTN 725/750 Terrain Proximity feature is NOT intended to be used as a primary reference for terrain avoidance and does not relieve the pilot from the responsibility of being aware of surroundings during flight. The Terrain Proximity feature is only to be used as an aid for terrain avoidance and is not certified for use in applications requiring a certified terrain awareness system. Terrain data is obtained from third party sources. Garmin is not able to independently verify the accuracy of the terrain data.

__WARNING:__ The displayed minimum safe altitudes (MSAs) are only advisory in nature and should not be relied upon as the sole source of obstacle and terrain avoidance information. Always refer to current aeronautical charts for appropriate minimum clearance altitudes.

__WARNING:__ The Garmin GTN 725/750 has a very high degree of functional integrity. However, the pilot must recognize that providing monitoring and/or self-test capability for all conceivable system failures is not practical. Although unlikely, it may be possible for erroneous operation to occur without a fault indication shown by the GTN 725/750. It is thus the responsibility of the pilot to detect such an occurrence by means of cross-checking with all redundant or correlated information available in the cockpit.

__WARNING:__ The altitude calculated by GPS receivers is geometric height above Mean Sea Level and could vary significantly from the altitude displayed by pressure altimeters, such as the output from the GDC 74A/B Air Data Computer, or other altimeters in aircraft. GPS altitude should never be used for vertical navigation. Always use pressure altitude displayed by pressure altimeters in the aircraft.

__WARNING:__ Do not use outdated database information. Databases used in the GTN 725/750 system must be updated regularly in order to ensure that the information remains current. Pilots using an outdated database do so entirely at their own risk.

__WARNING:__ Do not use basemap (land and water data) information for primary navigation. Basemap data is intended only to supplement other approved navigation data sources and should be considered as an aid to enhance situational awareness.

WARNING: *Traffic information shown on the GTN 725/750 is provided as an aid in visually acquiring traffic. Pilots must maneuver the aircraft based only upon ATC guidance or positive visual acquisition of conflicting traffic.*

WARNING: *Do not use data link weather information for maneuvering in, near, or around areas of hazardous weather. Information contained within data link weather products may not accurately depict current weather conditions.*

WARNING: *Do not use the indicated data link weather product age to determine the age of the weather information shown by the data link weather product. Due to time delays inherent in gathering and processing weather data for data link transmission, the weather information shown by the data link weather product may be significantly older than the indicated weather product age.*

WARNING: *For safety reasons, GTN 725/750 operational procedures must be learned on the ground.*

WARNING: *To reduce the risk of unsafe operation, carefully review and understand all aspects of the GTN 725/750 Pilot's Guide. Thoroughly practice basic operation prior to actual use. During flight operations, carefully compare indications from the GTN 725/750 to all available navigation sources, including the information from other NAVAIDs, visual sightings, charts, etc. For safety purposes, always resolve any discrepancies before continuing navigation.*

CAUTION*: The United States government operates the Global Positioning System and is solely responsible for its accuracy and maintenance. The GPS system is subject to changes which could affect the accuracy and performance of all GPS equipment. Portions of the Garmin GTN 725/750 utilize GPS as a precision electronic NAVigation AID (NAVAID). Therefore, as with all NAVAIDs, information presented by the GTN 725/750 can be misused or misinterpreted and, therefore, become unsafe.*

***CAUTION**: The Garmin GTN 725/750 does not contain any user-serviceable parts. Repairs should only be made by an authorized Garmin service center. Unauthorized repairs or modifications could void both the warranty and the pilot's authority to operate this device under FAA/FCC regulations.*

***CAUTION**: The GTN displays use a lens coated with a special anti-reflective coating that is very sensitive to skin oils, waxes, and abrasive cleaners. CLEANERS CONTAINING AMMONIA WILL HARM THE ANTI-REFLECTIVE COATING. It is very important to clean the lens using a clean, lint-free cloth and an eyeglass lens cleaner that is specified as safe for anti-reflective coatings.*

***NOTE**: Do not rely solely upon data link services to provide Temporary Flight Restriction (TFR) information. Always confirm TFR information through official sources such as Flight Service Stations or Air Traffic Control.*

***NOTE**: All visual depictions contained within this document, including screen images of the GTN bezel and displays, are subject to change and may not reflect the most current GTN software. Depictions of equipment may differ slightly from the actual equipment.*

***NOTE**: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

***NOTE**: Terrain data is not displayed when the aircraft latitude is greater than 75° North or 60° South.*

***NOTE**: This product, its packaging, and its components contain chemicals known to the State of California to cause cancer, birth defects, or reproductive harm. This notice is being provided in accordance with California's Proposition 65. If you have any questions or would like additional information, please refer to our web site at www.garmin.com/prop65.*

***NOTE**: Canadian installations: In accordance with Canadian Radio Specifications Standard 102 (RSS 102), RF field strength exposure to persons from an antenna connected to this device should be limited to 60 V/m for controlled environment and 28 V/m for uncontrolled environment.*

***NOTE:** Do not use SafeTaxi or Chartview functions as the basis for ground maneuvering. SafeTaxi and Chartview functions have not been qualified to be used as an airport moving map display (AMMD). SafeTaxi and Chartview are intended to improve pilot situational awareness during ground operations should only be used by the flight crew to orient themselves on the airport surface.*

NOTE: This device complies with Part 15 of the FCC limits for Class B digital devices. 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. Furthermore, 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 connecting the equipment to a different circuit than the affected equipment. Consult an authorized dealer or other qualified avionics technician for additional help if these remedies do not correct the problem.

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.

To obtain accessories for your unit, please contact your Garmin dealer.

Help us better support you by completing our on-line registration form today! Registration ensures that you will be notified of product updates and new products and provides lost or stolen unit tracking. Please, have the serial number of your unit handy, connect to our web site (www.garmin.com) and look for our Product Registration link on the Home page.

The display surface is coated with a special anti-reflective coating which is very sensitive to skin oils, waxes and abrasive cleaners. It is very important to clean the lens using an eyeglass lens cleaner which is specified as safe for anti-reflective coatings and a clean, lint-free cloth.

AC 90-100A Statement of Compliance: The Garmin navigational unit meets the performance and functional requirements of AC 90-100A.

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Product Registration and Support

Help us better support you by completing your online registration today! Have the serial number of your product handy and connect to the Garmin web site (www.garmin.com). Look for the Product Registration link on the Home page. Also, be sure to record your serial number in the space provided.

If you have any questions, the Garmin Product Support department may be reached Monday through Friday, 7:00 AM to 7:00 PM Central Time.

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US Toll Free: 1-866-739-5687

Canada Toll Free: 1-866-429-9296

Record of Revisions

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	A	02/04/11	Production Release
	B	03/16/11	Update information
	C	11/29/12	Updates for software version 3.0

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Welcome

Welcome to the GTN era of navigation. The Garmin GTN supports airway navigation and flexible flight planning, including arrival and departure procedures and precision approaches. All of these advanced features are easily accessed with an easy-to-use touchscreen display, another first for general aviation. You can be confident in knowing that this product has been designed to meet or exceed industry performance standards and is supported through a global network of Garmin Aviation Distributors.

About This Guide

Take a little time to review the various sections of this guide to familiarize yourself with it. First, read this section and the Getting Started section as an introduction to quickly get you started with the GTN. The other sections are not meant to necessarily be read in order, but provide detailed information on the subject they contain as you need them. Do take the time to review the information before using the product to assist you in getting the most out of your avionics.

Generally, a feature will be described in a section that provides a brief description, a graphic functional diagram, and step-by-step procedures. If read cover-to-cover sequentially, the information may seem repetitive. The guide is designed as a reference where you will generally skip around the document learning about a particular feature or function after becoming familiar with the unit.

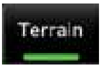
Conventions

The GTN display dynamically tailors the number and position of the controls for each function and are engaged by merely touching them.

Touch	Touch the key with your finger.
Drag	Touch the list or location on the map with your finger. Continue lightly holding your finger to the display surface and drag your finger in the intended direction to scroll through the list or move the location on the map.

In this pilot's guide, keys are noted by bold text. An image of the key used will be shown to the left of a procedure. Keys are outlined areas on the display. Figures in the guide will identify the available controls. A key may have a name of a control, such as **Enter**, **Terrain**, or **Back**. A key may also be an information field, such as a numeric value that can be changed.

Graphic Of Key



Text Description Of Key

While viewing the Map Menu, touch the **Terrain** Map Overlay key to toggle the view of Terrain data.

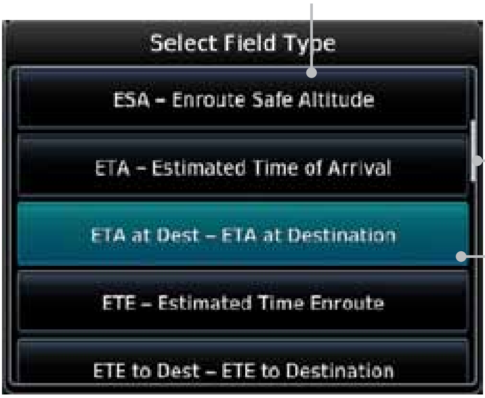
Graphic Of Key With Numeric Value

Fuel On-Board

Text Description Of Key

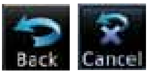
When the Fuel on Board value is selected, touch the **Fuel on Board** key to display the Fuel on Board values.

List "Keys." Touch To Select.


Select Field Type
ESA - Enroute Safe Altitude
ETA - Estimated Time of Arrival
ETA at Dest - ETA at Destination
ETE - Estimated Time Enroute
ETE to Dest - ETE to Destination

Scroll Bar Indicates More Selections Available. Touch Finger To An Item In The List And Drag Your Finger To View More Selections.

Selected Field Type


Back
Cancel

Touching the **Back** key returns to the previous display. The **Cancel** key cancels any information selected or entered and returns to the previous display.

1 GETTING STARTED

1.1 Model Descriptions

This guide covers the operation of the GTN 725 and 750. In general, all models will be referred to as the GTN 7XX, except where there are physical or operational differences. The GTN units are 6.25 inches wide and 6 inches high. The display is a 708 by 600 pixel, 6.9 inch diagonal color LCD with touchscreen controls. The units include one removable SD data card for the databases and software upgrades.

The GTN 7XX simplifies your workload with an easy-to-use touch panel that provides a visual display of both controls and functions. The required controls are displayed for the selected function. Keys on the display allow you to access and control their functions by a simple touch on the interactive display.

The GTN 7XX can integrate a variety of avionics that will not only simplify operation, but also save panel space. The GTN 725 and 750 have their own GPS/SBAS navigator and flight planning functions. The GTN 750 adds VHF Com and VHF Nav radios. Selected optional external equipment allows you to display and control active traffic systems, XM Entertainment Radio, XM Weather, audio panel, and a Mode S transponder directly from the GTN 7XX display, and more. When the optional audio panel and/or transponder are not installed, the area on the upper portion of the display is used for configurable navigation information.

1.1.1 GTN 725

The GTN 725 has a GPS/SBAS engine and is TSO C146c certified for primary domestic, oceanic, and remote navigation including en route, terminal, and non-precision approaches, and approaches with vertical guidance, such as LPV and LNAV/VNAV. The GTN 725 can simultaneously give aviators vital approach information and weather and traffic data in relation to their position on a large, color moving map display. Thanks to a high-contrast color display, the information can be easily read from wide viewing angles even in direct sunlight. Its color moving map features a built-in database that shows cities, highways, railroads, rivers, lakes, coastlines, and a complete Jeppesen database. The Jeppesen database (that can be updated with a front-loading data card) contains all airports, VORs, NDBs, Intersections, FSSs, Approaches, DPs/STARs, and SUA information.

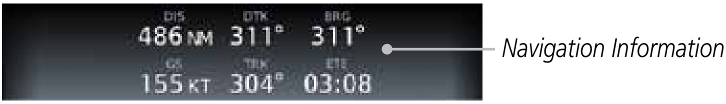

DIS
486 NM
DTK
311°
BRG
311°
GS
155 KT
TRK
304°
ETE
03:08
Navigation Information

Figure 1-1 GTN 725 Upper Display Without Optional Transponder or Audio Panel

Pilots will enjoy the GTN 725 as a flexible and powerful navigator, especially when it is coupled with traffic, lightning detection, and weather interfaces. With the PC-based FDE prediction program, the GTN 725 may be used for oceanic or remote operations. For the latest in graphic and text weather information, the GTN 725 can interface to XM Satellite Radio's XM Weather Service via the Garmin GDL 69/69A datalink receiver.

1.1.2 GTN 750

The GTN 750 includes all of the features of the GTN 725, and also includes a TSO'd airborne VHF communications transceiver and TSO'd airborne VOR/ Localizer and Glideslope receivers.

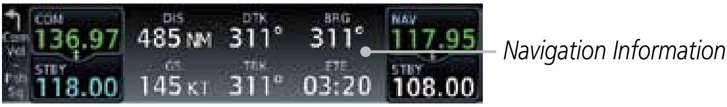

COM
136.97
STBY
118.00
DIS
485 NM
DTK
311°
BRG
311°
GS
145 KT
TRK
311°
ETE
03:20
NAV
117.95
STBY
108.00
Navigation Information

Figure 1-2 GTN 750 Upper Display Without Optional Transponder or Audio Panel

1.2 About This Pilot's Guide

1.2.1 Conventions

Bold text indicates a control. The **small right** knob is the smaller, inner knob of the two concentric rotary knobs on the lower, right corner of the bezel. The **large right** knob is the larger, outer knob.

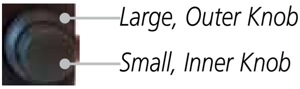

Large, Outer Knob
Small, Inner Knob

Figure 1-3 Large/Small Concentric Knobs

A graphic of a control on the side of the page refers to the control you should use for the associated step as shown below.

1.2.2 Using the Touchscreen

Most of the controls are operated by touching the display. Highlighted icons and keys may be simply touched to make a selection. A list of menu items may be scrolled by touching the screen and retaining pressure while sliding your finger up or down. Map displays may be panned by touching the screen and retaining pressure while sliding your finger in the desired direction.

You can return to the previous page or exit the current function by touching the **Back** key.

Quickly return to the Home page by pressing the **HOME** key. Press and hold the **HOME** key to reach the Map page.

1.3 Product Description

This section provides an overview of the GTN 7XX product and a quick look at some important features. The GTN 7XX presents a full-color moving map with navigation information to the pilot through a large-format display. Controls are a combination of rotary knobs and push-keys on the bezel with the color display providing information as well as a touchscreen controls. The GTN 7XX has a 708 x 600 pixel, 6.9 inch LCD display.

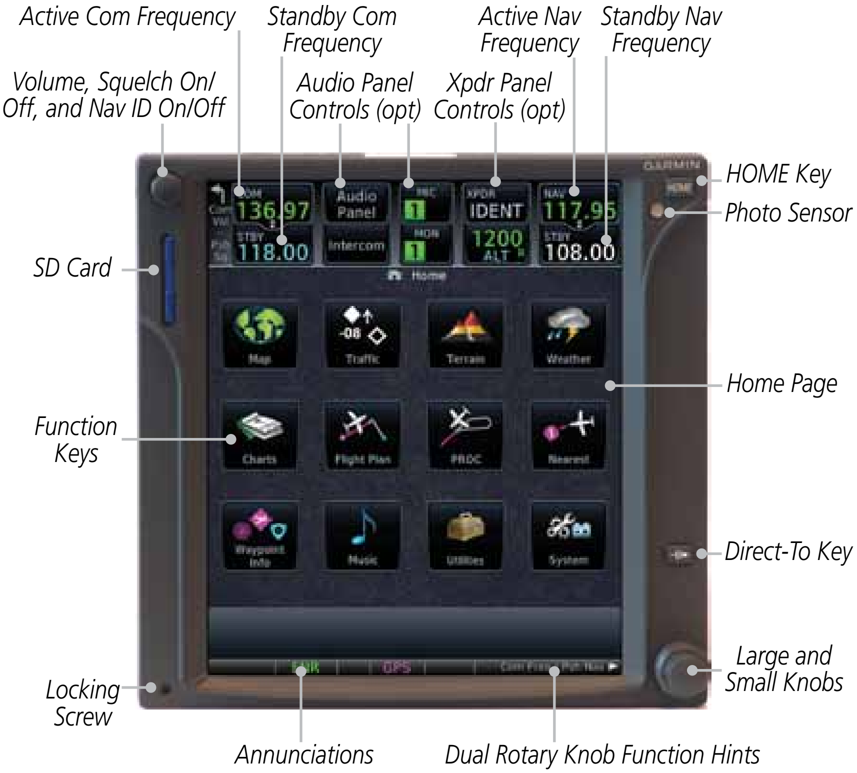

Active Com Frequency
Standby Com Frequency
Active Nav Frequency
Standby Nav Frequency
Volume, Squelch On/Off, and Nav ID On/Off
Audio Panel Controls (opt)
Xpdr Panel Controls (opt)
HOME Key
Photo Sensor
SD Card
Home Page
Function Keys
Direct-To Key
Large and Small Knobs
Locking Screw
Annunciations
Dual Rotary Knob Function Hints
136.97
118.00
Audio Panel
Intercom
IDENT
1200
ALT
117.95
108.00
Home
Map
Traffic
Terrain
Weather
Charts
Flight Plan
PROC
Nearest
Waypoint Info
Music
Utilities
System

Figure 1-4 GTN 750 Front Panel

1.3.1 Secure Data Card

The GTN 7XX uses a Secure Digital (SD) card to load and store various types of data. For basic flight operations, the SD card is required for Terrain, FliteChart, and ChartView database storage. An SD card is used for Obstacle, Basemap, SafeTaxi, Aviation, and ChartView database updates.

✓ ***NOTE:*** *Ensure the GTN 7XX is powered off before inserting or removing an SD card.*

✓ ***NOTE:*** *Refer to SD Card Use and Databases in the Appendix for instructions on updating databases.*

Inserting an SD Card

1. Insert the SD card in the SD card slot (the label side of the card should face the right edge of the display bezel).
2. To eject the card, gently press on the SD card to release the spring latch.

1.3.2 Pilot Controls

The GTN 7XX controls have been designed to simplify operation of the system and minimize workload and the time required to access sophisticated functionality. Controls are located on the bezel and on the touchscreen display. Controls are comprised of dual concentric knobs, volume/squelch knob, bezel keys, and active touch areas on the display.

1.3.2.1 Volume/Squelch Knob

The **Volume** knob located in the top left corner of the bezel controls audio volume for the selected Com radio or Nav receiver and external audio input devices that are controlled via the GTN interface to the optional remote-mounted audio panel, if installed. When the Com radio is active, press the **Volume** knob momentarily to disable automatic squelch control for the Com radio. When the Nav radio is active, press the **Volume** knob momentarily to enable/disable the ident tone for the Nav radio.

Figure 1-5 Volume/Squelch Knob

1.3.2.2 Large/Small Concentric Knobs

The **large right** and **small right** knobs are used for data entry, such as in the Waypoint or Direct-To functions, and to set the frequencies for the communications transceiver or the VOR/Localizer receiver in units so equipped.

Figure 1-6 Large/Small Concentric Knobs

1.3.2.3 HOME Key

Pressing the **HOME** key displays the Home page, the main screen for accessing the GTN features. Pressing and holding the **HOME** key will open the Map page from any other page.

Figure 1-7 HOME Key

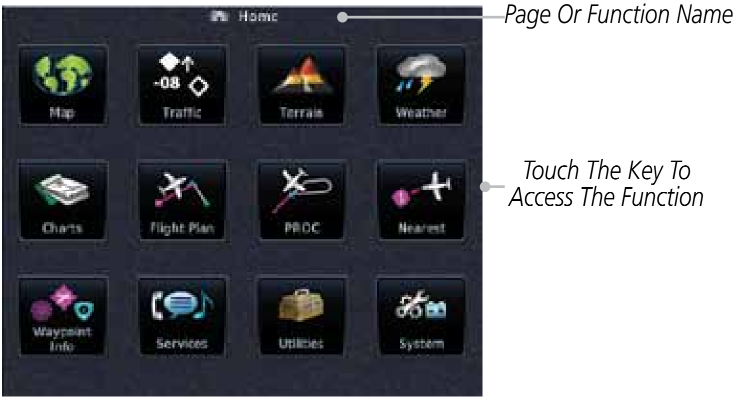

Home
Page Or Function Name
Map
-08
Traffic
Terrain
Weather
Touch The Key To Access The Function
Charts
Flight Plan
PROC
Nearest
Waypoint Info
Services
Utilities
System

Figure 1-8 Home Page

1.3.2.4 Direct-To Key

The **Direct-To** key provides access to the direct-to function, which allows you to enter a waypoint and establishes a direct course to the selected destination.

Figure 1-9 Direct-To Key

1.3.2.5 Touchscreen Keys

Touchscreen keys are placed at the lower portion of the display. The keys vary depending on the page selected. Touch the key to perform the function or access the described information.

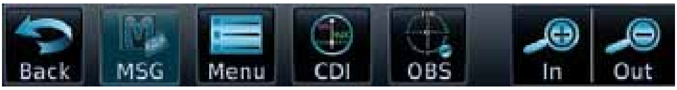


Figure 1-10 Touchscreen Key Control Example

1.4 Unit Power Up

The GTN 7XX System is integrated with the aircraft electrical system and receives power directly from electrical busses. The GTN 7XX and supporting sub-systems include both power-on and continuous built-in test features that exercise the processor, memory, external inputs, and outputs to ensure safe operation.

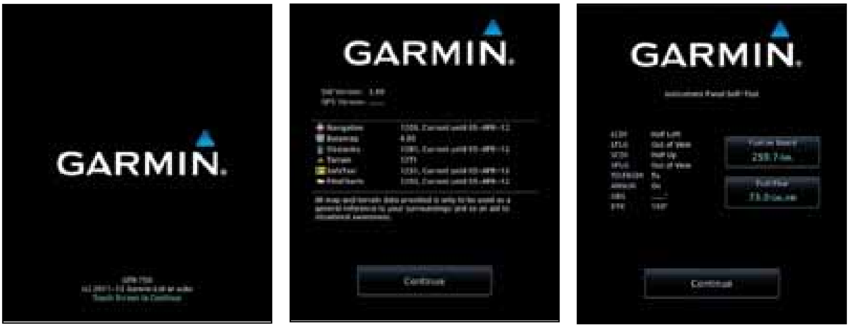
1.4.1 Start-Up Screens

During system initialization, test annunciations are displayed. All system annunciations should disappear typically within the first 30 seconds after power-up. Upon power-up, key annunciator lights also become momentarily illuminated on the GTN 7XX display bezel.

The splash screen displays the following information:

- Copyright
- Database List and System version
- Instrument Panel Self-Test

Current database information includes valid operating dates, cycle number, and database type. When this information has been reviewed for currency (to ensure that no databases have expired), the pilot is prompted to continue. Databases that are not current will be shown in amber.


GARMIN
GARMIN
GARMIN
Continue
Continue

1 - Copyright

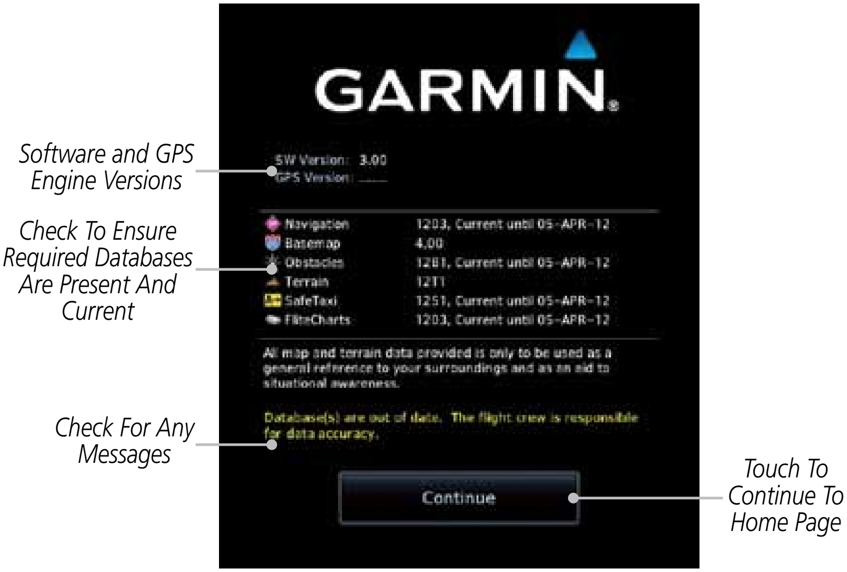
2 - SW & Database Versions & Dates

3 - Panel Self-Test

Figure 1-11 System Startup Pages

1.4.2 Database Verification and Fuel Settings

1. When the System and Database Version page appears, check to ensure databases are current. Then, touch **Continue**.


GARMIN
Software and GPS Engine Versions
Check To Ensure Required Databases Are Present And Current
Check For Any Messages
Touch To Continue To Home Page
Continue

SW Version: 3.00
GPS Version: ----

Navigation	1203, Current until 05-APR-12
Basemap	4.00
Obstacles	1201, Current until 05-APR-12
Terrain	1211
SafeTaxi	1251, Current until 05-APR-12
FliteCharts	1203, Current until 05-APR-12

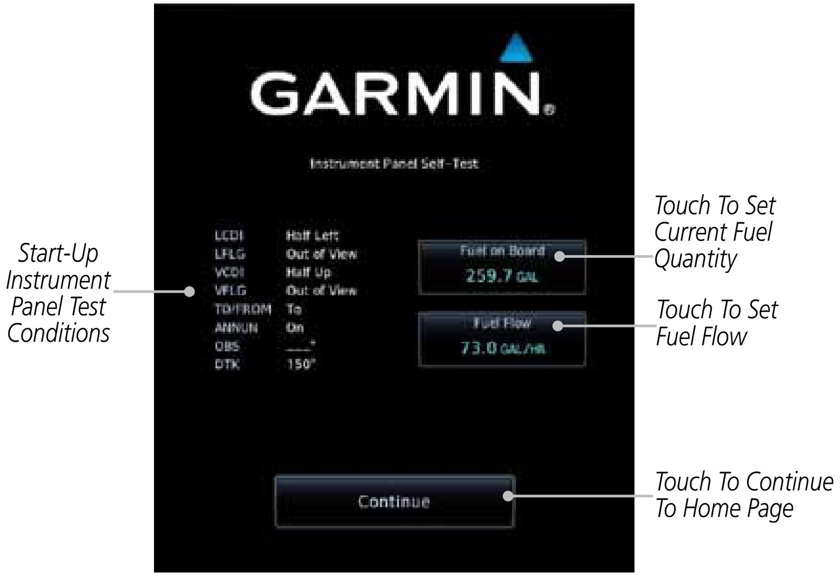
All map and terrain data provided is only to be used as a general reference to your surroundings and as an aid to situational awareness.

Database(s) are out of date. The flight crew is responsible for data accuracy.

Figure 1-12 System Startup Pages

2. When the Instrument Panel Self-Test and Fuel Setting page appears, check to ensure that the CDI/HSI outputs and other displayed data are correct on the external interfaced equipment.

3. Touch each of the Fuel value keys and set the appropriate values as desired. Fuel capacity is shown in either gallons or pounds as set in the Units feature of System mode.



GARMIN

Instrument Panel Self-Test

LCDI Half Left
LFLG Out of View
VCDI Half Up
VFLG Out of View
TO/FROM To
ANNUN On
OBS ___°
DTK 150°

Fuel on Board 259.7 GAL
Fuel Flow 73.0 GAL/HR

Continue
Start-Up Instrument Panel Test Conditions
Touch To Set Current Fuel Quantity
Touch To Set Fuel Flow
Touch To Continue To Home Page

Figure 1-13 Instrument Panel Self-Test & Fuel Settings Page

Fuel On-Board
____ GL

4. When the Fuel on Board value is selected, touch the **Fuel on Board** key to display the Fuel on Board values. Touch the **Full** or **Tabs** keys to display those values after they have been set.

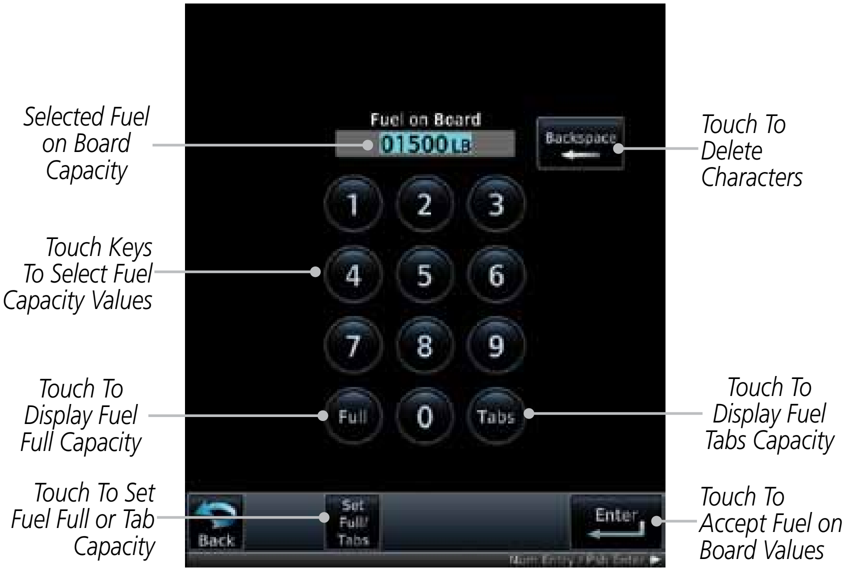

Selected Fuel on Board Capacity
Touch Keys To Select Fuel Capacity Values
Touch To Display Fuel Full Capacity
Touch To Set Fuel Full or Tab Capacity
Touch To Delete Characters
Touch To Display Fuel Tabs Capacity
Touch To Accept Fuel on Board Values
Fuel on Board
01500 LB
Backspace
1
2
3
4
5
6
7
8
9
Full
0
Tabs
Back
Set Full/ Tabs
Enter
Num Entry / Push Enter

Figure 1-14 Fuel On Board Page

Set Full/ Tabs

5. Touch the **Set Full/Tabs** key to set the fuel values for Fuel Full Capacity and Fuel Tab Capacity. After setting the fuel values, touch the **Back** and then the **Enter** keys to return to the Instrument Panel Self Test page.

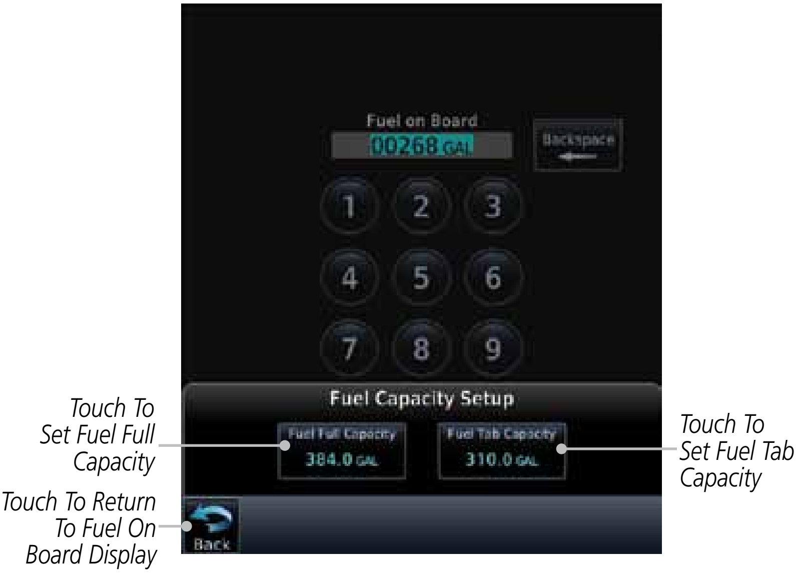

Touch To Set Fuel Full Capacity
Touch To Return To Fuel On Board Display
Touch To Set Fuel Tab Capacity
Fuel on Board
00268 GAL
Backspace
1
2
3
4
5
6
7
8
9
Fuel Capacity Setup
Fuel Full Capacity
384.0 GAL
Fuel Tab Capacity
310.0 GAL
Back

Figure 1-15 Fuel Capacity Setup Page

6. On the Instrument Panel Self Test page, touch the **Fuel Flow** key and then use the numeric keypad to set those values. Touch the **Enter** key after selecting the Fuel Flow values.

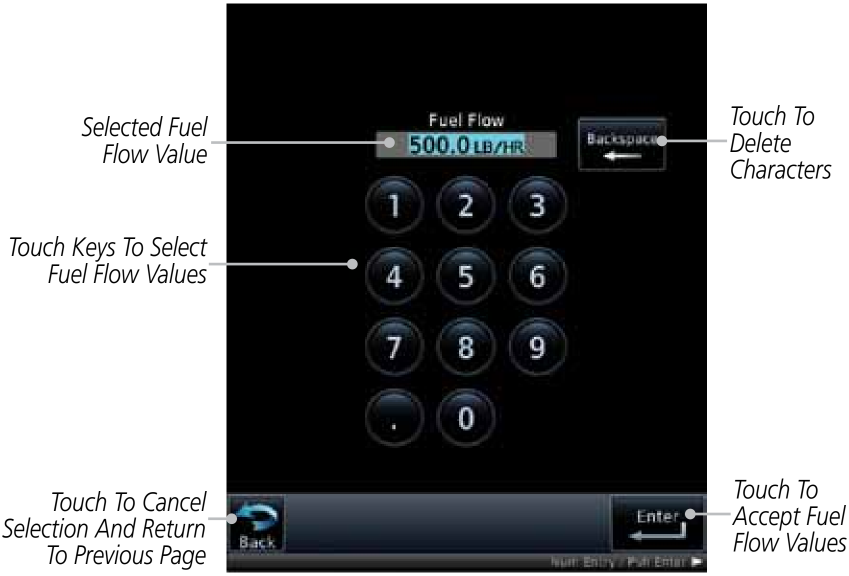

Selected Fuel Flow Value
Touch Keys To Select Fuel Flow Values
Touch To Cancel Selection And Return To Previous Page
Touch To Delete Characters
Touch To Accept Fuel Flow Values
Fuel Flow
500.0 LB/HR
Backspace
1
2
3
4
5
6
7
8
9
.
0
Back
Enter
Num Entry / Push Enter

Figure 1-16 Fuel Flow Setup Page

7. Touch the **Back** key to return to the Fuel on Board page. Touch the **Enter** key to accept the fuel values and return to the Instrument Panel Self-Test page. Then, touch the **Continue** key to advance to the Home page.

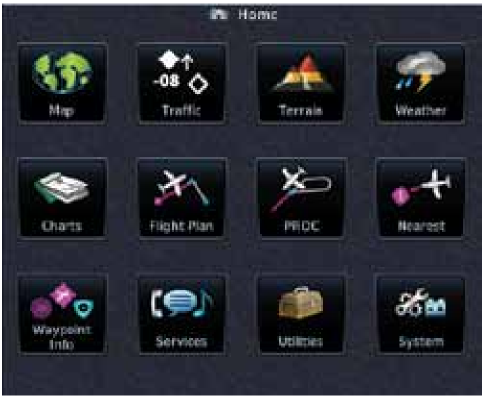

Home
Map
Traffic
Terrain
Weather
Charts
Flight Plan
PROC
Nearest
Waypoint Info
Services
Utilities
System

Figure 1-17 Home Page

1.5 System Operation

1.5.1 Using the Touchscreen Key Controls

Except for the knobs, the **HOME**, and **Direct-To** keys on the bezel, the controls for the GTN 7XX are located on the display and activated by your touch.

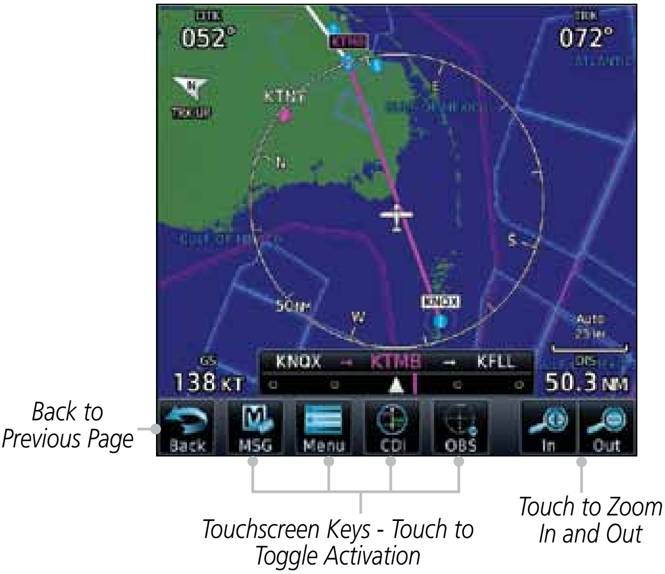

DTK
052°
TRK
072°
KTMB
KTNT
TRK UP
N
E
S
W
50NM
KNOX
GS
138 KT
KNOX → KTMB → KFLL
DIS
50.3 NM
Auto
Back
MSG
Menu
CDI
OBS
In
Out
Back to Previous Page
Touchscreen Keys - Touch to Toggle Activation
Touch to Zoom In and Out

Figure 1-18 On-Screen Keys and Active Display Areas

1.5.2 System Page

GTN 7XX system settings are managed in System Mode. The following features are available:

- System Status
- GPS Status
- External LRUs
- Setup
- Alerts Settings
- Units Settings
- Audio
- Ownship Symbol
- Backlight

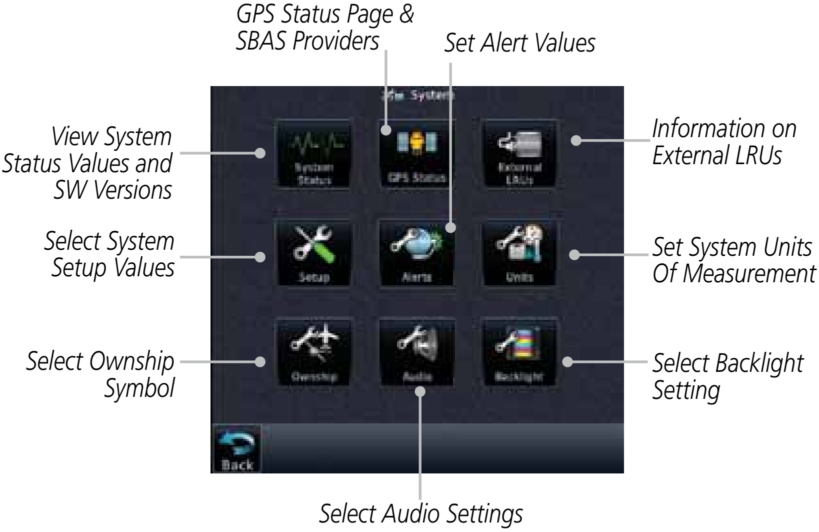

GPS Status Page & SBAS Providers
Set Alert Values
System
View System Status Values and SW Versions
Information on External LRUs
System Status
GPS Status
External LRUs
Select System Setup Values
Set System Units Of Measurement
Setup
Alerts
Units
Select Ownship Symbol
Select Backlight Setting
Ownship
Audio
Backlight
Back
Select Audio Settings

Figure 1-19 System Page

1.5.2.1 System Settings Values

1. From the Home page, touch **System** and then **Setup**.

Time Format
Local 12 hour
Local Offset
-07:00

2. Select the desired Time Format and Local Offset by touching the Time Format (**12 Hour, 24 Hour,** and/or **UTC**) keys and selecting the appropriate Local Time Offset after touching the **Local Offset** key.

Channel Spacing
25.0 kHz

3. Touch the **Com Channel Spacing** key to toggle between 8.33 and 25.0 kHz channel spacing.

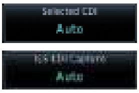
Runway Surface
Hard

4. For Nearest Airport filtering, touch the **Runway Surface** key and select the desired type of surface that will appear in the Nearest Airport list.

Minimum Runway Length
0 FT

5. Touch the **Minimum Runway Length** key to select the minimum runway length allowed for the Nearest Airport. Selecting 0 feet will show all airports regardless of runway length.

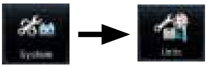
6. Touch the **Crossfill** key to enable or disable crossfill with a second GTN unit.



7. Select the CDI and ILS CDI Capture method with the **Selected CDI** and **ILS CDI Capture** keys.

1.5.2.2 Units Settings Values

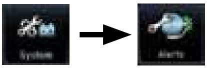
1. From the Home page, touch **System** and then **Units**.



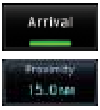
2. Touch the desired item key and select the desired value.
3. Continue to select the desired Units values and then touch the **Back** or **HOME** key to exit.

1.5.2.3 Alerts Settings Values

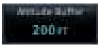
1. From the Home page, touch **System** and then **Alerts**.



2. Touch the Alert type key to toggle its active status. A lighted green bar under the label indicates that it is active.



3. Set arrival alerting. Touch the **Arrival** key. Touch the **Proximity** key and select the desired value with the keypad.



4. Touch the **Airspace Altitude Buffer** key and select the desired value for airspace alerting.
5. Continue to select the desired Alerts values and then touch the **Back** or **HOME** key to exit.

1.5.3 Dual GTN Installations

Dual GTN units when connected in the aircraft may be set up to communicate and share information by "Crossfilling" or synchronizing information between the two units.

The following Crossfill information is always synchronized between both GTN units:

- User Waypoints
- Flight Plan Catalog
- Alerts (traffic popup acknowledgement, missed approach waypoint popup acknowledgement, altitude leg popup acknowledgement)
- External sensors (transponder status and commands, synchro heading)
- System setup:
    - User-defined NAV frequencies to store favorites
    - Date/Time convention
    - Nearest airport criteria
    - Units (Nav angle, Distance/Speed, etc.)
    - User-defined COM frequencies to store favorites
    - Ownship icon
    - CDI Scale setting
    - ILS CDI Capture setting

This data is crossfilled only if crossfill is turned on by the pilot:

- Active navigation (flight plan)

***NOTE:** In dual GTN installations with crossfill on, the OBS course will only be updated real time on the GTN that is receiving the new OBS course. The course will be transferred to the other GTN when OBS is exited.*

1.6 Direct-To Navigation

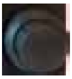
Press the **Direct-To** key to quickly navigate from your present position directly to a selected waypoint, flight plan waypoint, or nearest airport.

1.6.1 Direct-To a Waypoint

1. Press **Direct-To**.
2. Touch the Waypoint Identifier field and select the characters for the desired waypoint with the **large** and **small right** knobs or the touch keypad.

OR

Edit Wpt / Psh Activate



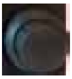
3. Touch **Activate** or press the **small right** knob. Text near the **small right** knob indicates its current function.

1.6.2 Direct-To a Flight Plan Waypoint

1. Press **Direct-To**.

2. Touch the **FPL** tab and then the desired Flight Plan waypoint.

OR



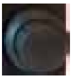
3. Touch **Activate** or press the **small right** knob.

1.6.3 Direct-To a Nearest Airport

1. Press **Direct-To**.

2. Touch the **NRST APT** tab and then the desired airport from the Nearest Airport list. Touch the **Up** or **Down** keys as needed to show more of the list.

OR



3. Touch **Activate** or press the **small right** knob.

1.7 Selecting Com/Nav Frequencies

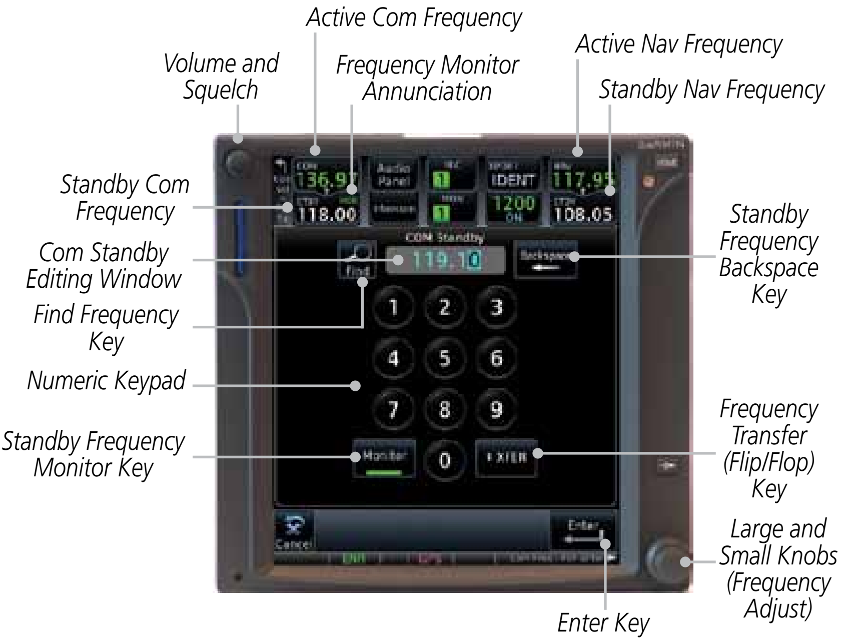
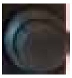

Active Com Frequency
Volume and Squelch
Frequency Monitor Annunciation
Active Nav Frequency
Standby Nav Frequency
Standby Com Frequency
Com Standby Editing Window
Find Frequency Key
Numeric Keypad
Standby Frequency Monitor Key
Standby Frequency Backspace Key
Frequency Transfer (Flip/Flop) Key
Large and Small Knobs (Frequency Adjust)
Enter Key
136.97
118.00
Audio Panel
IDENT
1200
ON
117.95
108.05
COM Standby
119.10
Find
Backspace
1
2
3
4
5
6
7
8
9
0
Monitor
XFER
Cancel
Enter

Figure 1-20 Com Radio Frequency Selection Page

To switch between Com and Nav frequency selection

Tuning control normally remains in the Com window and will return after 30 seconds of inactivity. If you wish to select a VOR/localizer/ILS frequency, press the **small right** knob momentarily to make the Nav window active for editing. The Standby Nav frequency will be highlighted briefly to indicate that it is active for editing. The standby frequency in blue is active for editing by the **large** and **small right** knobs.

Method 1: Select a Nav/Com frequency using the small and large right rotary knobs



1. Turn the **large right** knob to select the desired megahertz (MHz) value. For example, the “118” portion of the frequency “118.30”.
2. Turn the **small right** knob to select the desired kilohertz (kHz) value. For example, the “.30” portion of the frequency “118.30”.
3. Touch the Com or Nav window to flip/flop the Active and Standby frequencies. You can also press and hold the **small right** knob to transfer the standby frequency to the active window.

Method 2: Select a Nav/Com frequency using the numeric keypad

1. Touch the Standby window. A pull down keypad will appear with the current Standby frequency highlighted.

2. Touch the numeric keys to add the desired values and touch **Enter** to accept the displayed value and place it into the Standby window.

3. Touching the **XFER** key will place the selected frequency directly into the Active window.

To transfer the standby frequency to the active frequency

1. Touch the Active (top) frequency window.

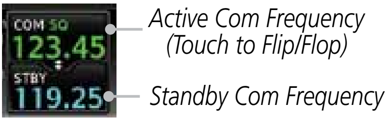


Figure 1-21 Com Radio Frequency Windows (Touch Active to Flip/Flop)

2. Each touch of the Active window will flip/flop the Active and Standby frequencies.

1.8 Flight Planning

1.8.1 Creating a Flight Plan

Flight Plan

1. From the Home page, touch the **Flight Plan** key. The Active Flight Plan page will be displayed.

2. If there is already an Active Flight Plan, touch **Menu** and then the **Delete** key to clear the existing flight plan. If there is not an Active Flight Plan, continue to the next step.

Add Waypoint

3. Touch **Add Waypoint.** Use the alphanumeric keypad to select the Waypoint Identifier for the first leg in your flight plan and then touch **Enter**.

4. Touch the next Waypoint Identifier field. Use the alphanumeric keypad to select the Waypoint Identifier for the first leg in your flight plan and then touch **Enter**.

5. Continue entering waypoints to complete the flight plan.

6. Touch the **Menu** key and then touch **Store**.
7. The screen will now display the Flight Plan Catalog and show the new flight plan. Flight plans are listed by the Departure and Destination waypoints.

1.9 IFR Procedures

Departures (SIDs), arrivals (STARs), non-precision and precision approaches are available using the **PROC** (Procedures) key.

Select an Approach

1. Touch the **PROC** key on the Home page.

2. Touch the **Approach** key and then touch the Airport key to select the desired airport if it is not present.
3. Touch the **Approach** key, if necessary. Select the desired approach.

Transition
Vectors

4. Touch the **Transition** key and then touch the key for the desired transition.

Load Approach

5. Touch the **Load Approach** key. The Active Flight Plan page will be displayed.

Activate Approach

6. Activate or Load the approach. "Activate" will go Direct-To the IAF, or provide guidance on the final approach course for vectored approaches. "Load" places the approach at the end of the active flight plan.

1.10 Dead Reckoning

Dead reckoning is a feature that enables the GTN to provide limited navigation using the last known position and speed after a loss of GPS navigation while on an active flight plan.

⚠ ***CAUTION:** Navigation using dead reckoning is only an estimate and should not be used as the sole means of navigation. Use other means of navigation, if possible.*

Dead reckoning becomes active after a loss of GPS position while navigating using an active flight plan and the flight phase is either En Route (ENR) or Oceanic (OCN).

"DR" will be overlayed on the ownship icon. The To/From flag is removed from the CDI. The Dead Reckoning annunciator (DR) appears on the lower left side of the map display and will replace ENR or OCN when a GPS position is unavailable and the unit is in Dead Reckoning mode. All external outputs dependent on GPS position are flagged.

Terrain will be noted as not available and new terrain advisory pop-ups will not occur. Traffic and StormScope information will not be shown on the Map page, but will continue to be available on their own dedicated pages. XM weather will still be available on the Map page.

Dead Reckoning mode will continue until GPS position is restored, when GPS navigation is restored Dead Reckoning mode is exited. The DR annunciations will be removed and GPS information will be used to compute navigation related information for the current flight phase.

Dead Reckoning is only allowed in En Route and Oceanic phases of flight. If the unit is in a Terminal or Approach phase of flight when Dead Reckoning takes place, "No GPS Position" will be displayed on the map pages and all navigation data will be dashed. If you are operating in Dead Reckoning mode and a transition to Terminal or Approach phases of flight would occur from the projected Dead Reckoning position, Dead Reckoning mode will be discontinued. "No GPS Position" will be displayed on the map pages and all navigation data will be dashed.

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2 AUDIO AND TRANSPONDER CONTROLS (OPTIONAL)

The GTN 7XX can perform the control and display for a remotely mounted audio panel (such as the GMA 35) and a transponder (such as one of the GTX family of transponders) functions. See your dealer for more information.

2.1 Transponder Operation

The GTN 7XX will operate as a control head for remotely connected optional, compatible transponders.

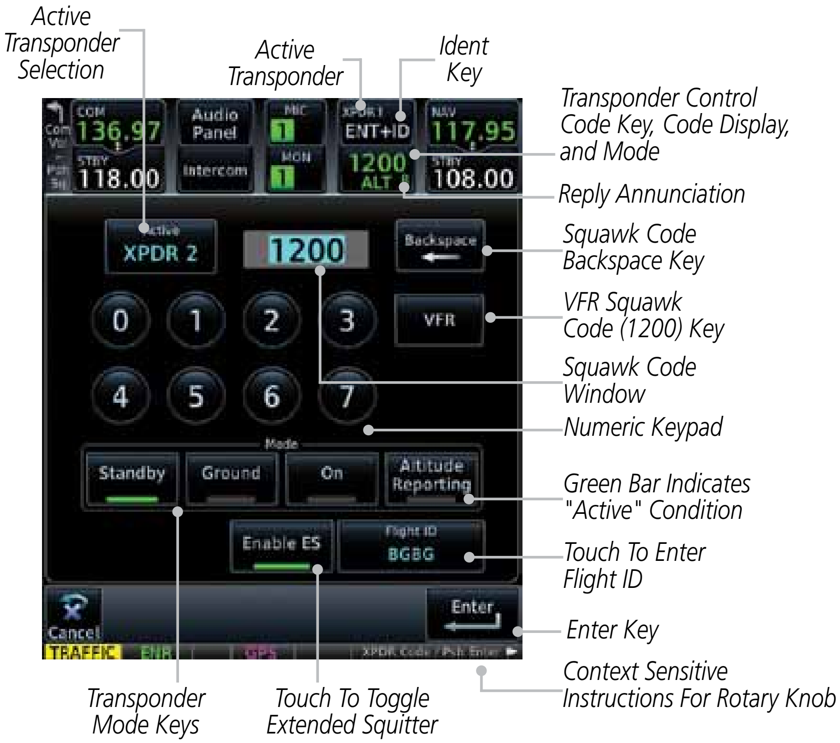

Active Transponder Selection
Active Transponder
Ident Key
Transponder Control Code Key, Code Display, and Mode
Reply Annunciation
Squawk Code Backspace Key
VFR Squawk Code (1200) Key
Squawk Code Window
Numeric Keypad
Green Bar Indicates "Active" Condition
Touch To Enter Flight ID
Enter Key
Context Sensitive Instructions For Rotary Knob
Transponder Mode Keys
Touch To Toggle Extended Squitter
COM 136.97
STBY 118.00
Audio Panel
Intercom
MIC 1
MON 1
XPDR1 ENT+ID
1200 ALT R
NAV 117.95
STBY 108.00
Active XPDR 2
1200
Backspace
0
1
2
3
VFR
4
5
6
7
Mode
Standby
Ground
On
Altitude Reporting
Enable ES
Flight ID BGBG
Cancel
Enter
TRAFFIC
ENR
GPS
XPDR Code / Psh Enter

Figure 2-1 XPDR Control Display

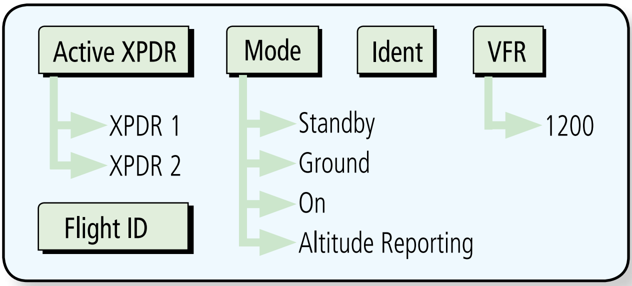

Active XPDR
XPDR 1
XPDR 2
Flight ID
Mode
Standby
Ground
On
Altitude Reporting
Ident
VFR
1200

Figure 2-2 XPDR Functional Diagram

2.1.1 Select Transponder

Active
XPDR 1

1. Touch the **Active XPDR** key to activate the desired transponder by stepping through the available transponders.

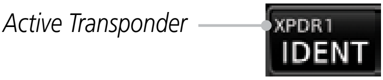

Active Transponder
XPDR1
IDENT

Figure 2-3 Active Transponder Indication

Active
XPDR 2

2. The active transponder will be shown on the key.

2.1.2 IDENT

XPDR1
IDENT

XPDR1 ID
IDENT

1. Touch the **IDENT** key once to reply with an identifying squawk code.
2. The **IDENT** key will show a green "ID" in the top right corner of the key to indicate active Ident.

2.1.3 Standby

Touch the **Standby** key to place the transponder into Standby mode. The transponder will still be powered, but will not transmit information. The active transponder indication and Ident annunciation will be grayed to show they are disabled.

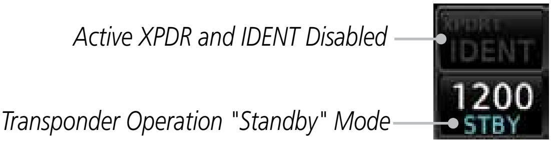

Active XPDR and IDENT Disabled
Transponder Operation "Standby" Mode
XPDR1
IDENT
1200
STBY

Figure 2-4 Transponder Mode "Standby" Indication

2.1.4 Ground

Touch the **Ground** key to place the transponder into Ground mode. Mode S replies will be allowed in Ground mode.

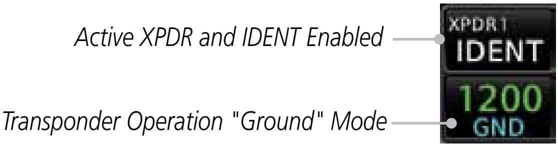

Active XPDR and IDENT Enabled
XPDR1
IDENT
1200
GND
Transponder Operation "Ground" Mode

Figure 2-5 Transponder Mode "Ground" Indication

2.1.5 On

Touch the **On** key for Mode A operation. The transponder is "On" and will transmit its squawk code when interrogated.

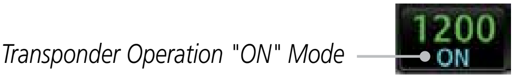

Transponder Operation "ON" Mode
1200
ON

Figure 2-6 Transponder Mode "ON" Indication

2.1.6 Altitude Reporting

Altitude Reporting

1. Touch the **Altitude Reporting** key for Mode C operation.

2. The transponder will be "On" and will transmit its squawk code and altitude when interrogated. An "ALT" annunciation will appear when the squawk code is transmitted.

2.1.7 VFR

Touch the **VFR** key to set the VFR squawk code (1200).

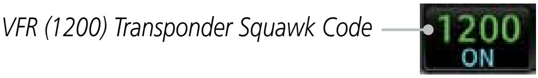

VFR (1200) Transponder Squawk Code
1200
ON

Figure 2-7 Transponder VFR Squawk Code

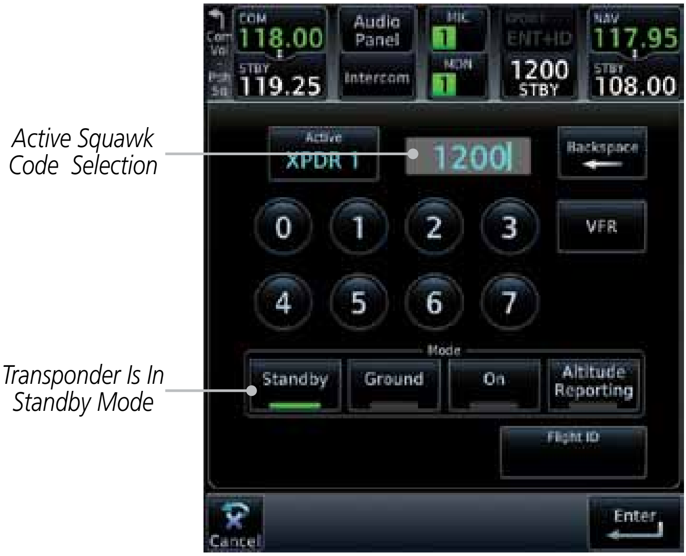
2.1.8 Selecting a Squawk Code

The selected squawk code will always be in use. As you change a squawk code, the original code will be used until you are finished selecting the new code.

Squawk Code	Description
1200	Default VFR code in the USA
7500	Hijacking
7600	Loss of Communications
7700	Emergency

Table 2-1 XPDR Special Squawk Codes

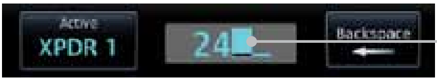
1. Touch the transponder squawk code window at the top of the display.
2. The XPDR page will be displayed. The Squawk Code value will be active for selection for use by the active Transponder.


Active Squawk Code Selection

Transponder Is In Standby Mode
Com Vol
Push Sq
COM
118.00
STBY
119.25
Audio Panel
Intercom
MIC
1
MON
1
ENT+ID
1200
STBY
NAV
117.95
STBY
108.00
Active
XPDR 1
1200
Backspace
0
1
2
3
VFR
4
5
6
7
Mode
Standby
Ground
On
Altitude Reporting
Flight ID
Cancel
Enter

Figure 2-8 XPDR Squawk Code Selection Display

3. Touch the numeric keypad, or use the rotary knobs, to select the desired Squawk Code.



Squawk Code Character Selected For Editing

Figure 2-9 Selected XPDR Squawk Code

4. Then, touch **Enter** or press the **small right** knob.

XPDR1
IDENT
2400
ON

5. The selected Squawk Code will be shown in the XPDR window at the top of the display.

2.1.9 Flight ID

1. While viewing the transponder page, touch the **Flight ID** key.

2. Touch the numeric keypad, or use the rotary knobs, to select the desired Flight ID number and then press **Enter**. The selected number will be shown in the Flight ID key.

2.1.10 GDL 88 ADS-B Reporting

One of the features of the optional GDL 88 is to send Automatic Dependent Surveillance – Broadcast (ADS-B) position reports for enhanced situational awareness. The GDL 88 is a remote-mount module that communicates with panel-mounted avionics for traffic and weather display, and for equipment control. The GDL 88 receives position information from the GTN GPS receiver. The display and control of the information sent depends on the equipment installation and configuration by the installer. Some installations allow control by the pilot of the information sent, while others do not.

The Anonymous Mode, when armed, will replace the Flight ID with a temporary randomized number for privacy while the position information will still be provided. The call sign will be sent as "VFR." To enable Anonymous Mode, the Squawk Code must be set to the VFR code (based on the GDL 88 configuration) and the **Anonymous** key must be selected.

Viewing the ADS-B Control Panel Without Manual Controls

1. Touch the Transponder window to view the ADS-B control panel.

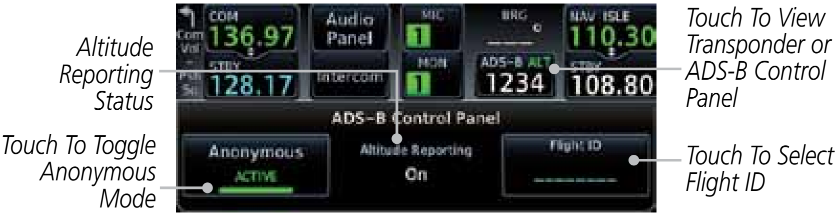

Altitude Reporting Status
Touch To Toggle Anonymous Mode
Touch To View Transponder or ADS-B Control Panel
Touch To Select Flight ID
COM 136.97
STBY 128.17
Audio Panel
Intercom
MIC 1
MON 1
BRG
ADS-B ALT 1234
NAV ISLE 110.30
STBY 108.80
ADS-B Control Panel
Anonymous
ACTIVE
Altitude Reporting
On
Flight ID

Figure 2-10 ADS-B Control Panel

2. Touch the Transponder window again to return to the previous display.

Viewing the ADS-B Control Panel With Manual Controls

1. Touch the Transponder window to view the ADS-B control panel.

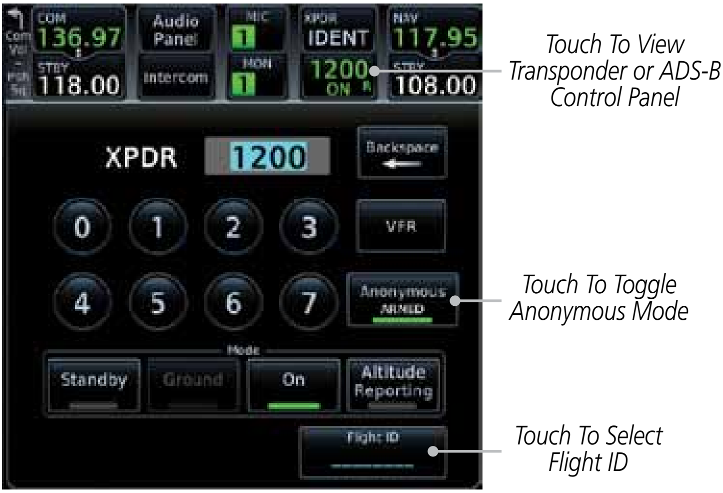

Touch To View Transponder or ADS-B Control Panel
Touch To Toggle Anonymous Mode
Touch To Select Flight ID
COM 136.97
STBY 118.00
Audio Panel
Intercom
MIC 1
MON 1
XPDR IDENT
1200 ON R
NAV 117.95
STBY 108.00
XPDR 1200
Backspace
0
1
2
3
VFR
4
5
6
7
Anonymous
ARMED
Mode
Standby
Ground
On
Altitude Reporting
Flight ID

Figure 2-11 ADS-B/Transponder Control Panel

2. Touch the **Anonymous Mode** key to toggle arming the Anonymous mode.
3. While viewing the transponder page, touch the **Flight ID** key.
4. Touch the numeric keypad, or use the rotary knobs, to select the desired Flight ID number and then press **Enter**.

NOTE: Changing the flight ID while in anonymous mode wouldn't actually change the flight ID because a randomized ID is being broadcast. If the ANONYMOUS key is armed, change the squawk code to the VFR code to activate Anonymous mode.

2.1.11 Extended Squitter Transmission

When “Enable ES” is selected, the GTX 33/330 turns on Extended Squitter (ES) transmissions. Extended Squitter technology improves situational awareness and flight safety. With Extended Squitter capabilities, position, velocity, and heading information are automatically transmitted to other aircraft and ground stations. The current air traffic control system depends on a transponder request for pertinent aircraft information and does not include 3D position. Extended Squitter provides automatic transmission of aircraft information without a request. “Enable ES” should be active for normal operations.

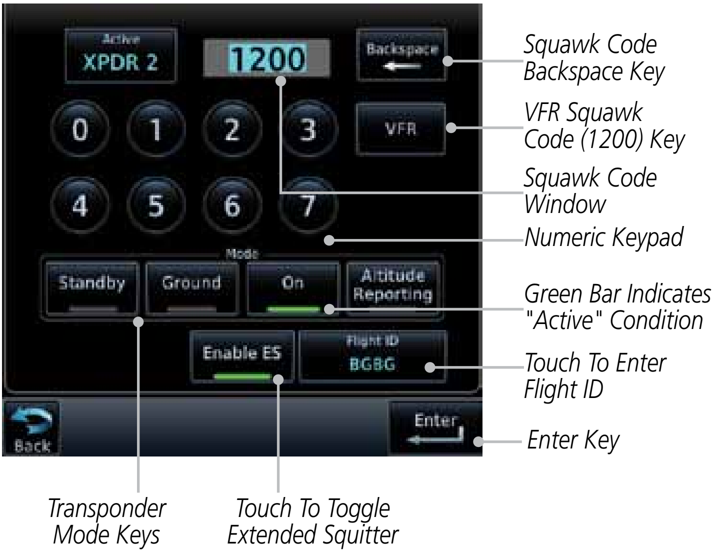

Active
XPDR 2
1200
Backspace
0
1
2
3
VFR
4
5
6
7
Mode
Standby
Ground
On
Altitude Reporting
Enable ES
Flight ID
BGBG
Back
Enter
Squawk Code Backspace Key
VFR Squawk Code (1200) Key
Squawk Code Window
Numeric Keypad
Green Bar Indicates "Active" Condition
Touch To Enter Flight ID
Enter Key
Transponder Mode Keys
Touch To Toggle Extended Squitter

Figure 2-12 Transponder Control Panel With Extended Squitter Capability

1. While viewing the Transponder (XPDR) page, touch the **Enable ES** key to toggle Extended Squitter Off and On.

2. Touch the **Flight ID** key and use the keypad to select a Flight ID and then touch **Enter**.

Flight ID
N12345

3. After selecting a Flight ID, the selected value will be shown in the **Flight ID** key.

2.2 Audio Panel Operation

The GTN 7XX will operate as a control head for remotely connected optional, compatible audio and intercom equipment (such as the Garmin GMA 35).

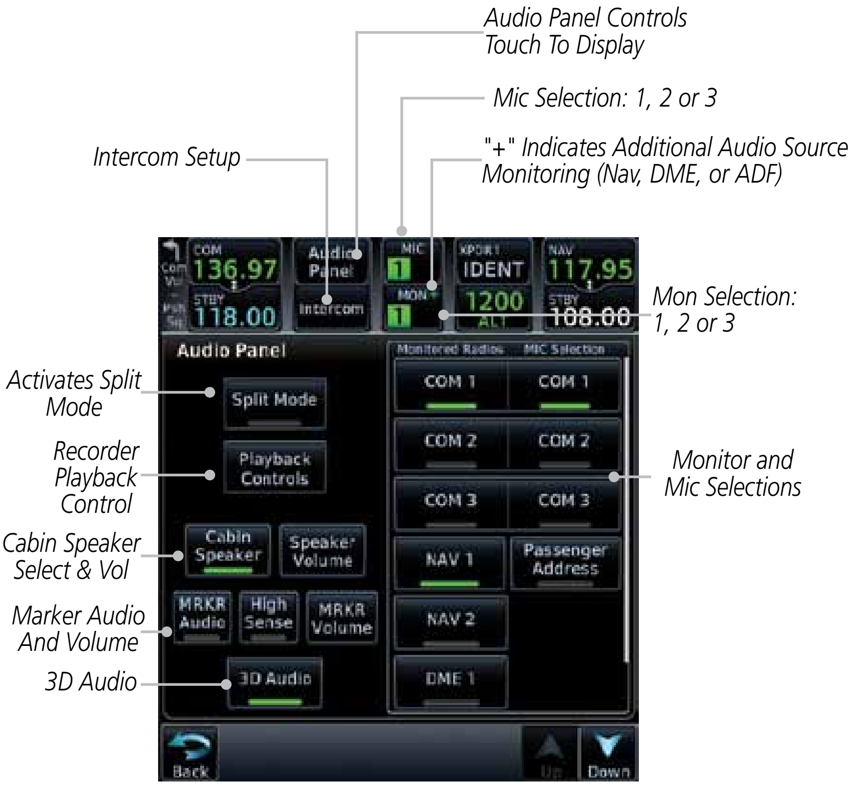

Audio Panel Controls Touch To Display
Mic Selection: 1, 2 or 3
"+" Indicates Additional Audio Source Monitoring (Nav, DME, or ADF)
Intercom Setup
Mon Selection: 1, 2 or 3
Activates Split Mode
Recorder Playback Control
Cabin Speaker Select & Vol
Marker Audio And Volume
3D Audio
Monitor and Mic Selections
COM 136.97
STBY 118.00
Audio Panel
Intercom
MIC 1
MON + 1
XPDR1 IDENT 1200 ALT
NAV 117.95
STBY 108.00
Audio Panel
Monitored Radios
MIC Selection
Split Mode
Playback Controls
Cabin Speaker
Speaker Volume
MRKR Audio
High Sense
MRKR Volume
3D Audio
COM 1
COM 1
COM 2
COM 2
COM 3
COM 3
NAV 1
Passenger Address
NAV 2
DME 1
Back
Up
Down

Figure 2-13 Audio Panel Controls

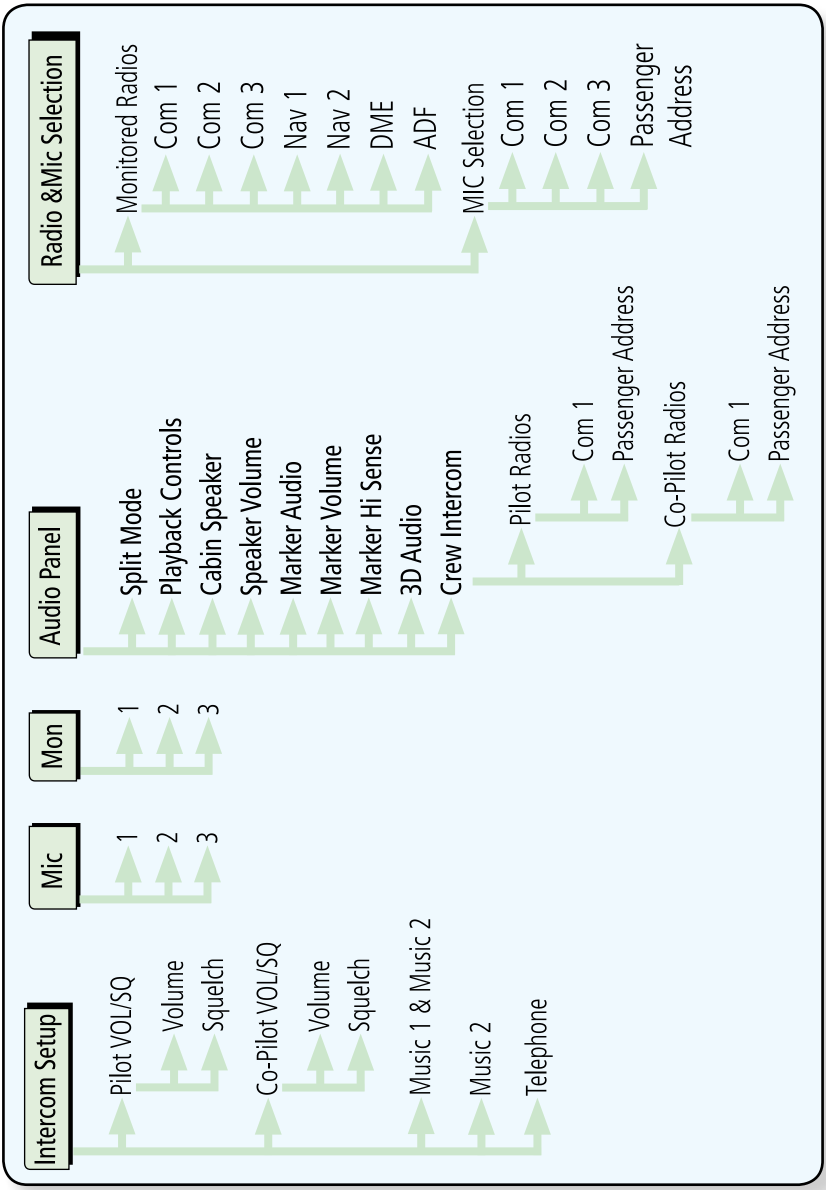

Intercom Setup
Pilot VOL/SQ
Volume
Squelch
Co-Pilot VOL/SQ
Volume
Squelch
Music 1 & Music 2
Music 2
Telephone
Mic
1
2
3
Mon
1
2
3
Audio Panel
Split Mode
Playback Controls
Cabin Speaker
Speaker Volume
Marker Audio
Marker Volume
Marker Hi Sense
3D Audio
Crew Intercom
Pilot Radios
Com 1
Passenger Address
Co-Pilot Radios
Com 1
Passenger Address
Radio &Mic Selection
Monitored Radios
Com 1
Com 2
Com 3
Nav 1
Nav 2
DME
ADF
MIC Selection
Com 1
Com 2
Com 3
Passenger Address

Figure 2-14 Audio Panel Functional Diagram

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

2.2.1 Mic Selection

Mic selection can be determined by two methods: the Mic window or by the Audio Panel page.

2.2.1.1 Mic Window Mic Selection

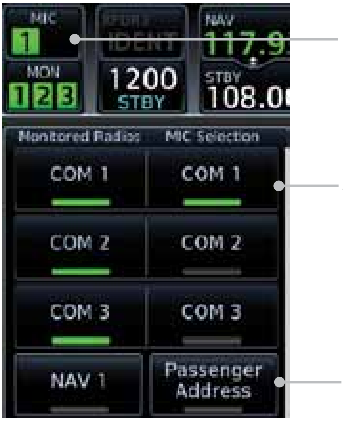
1. Touch the **Mic** window to toggle between Mic 1 and Mic 2.

2. Note that the selected Mic is automatically monitored.
3. If Mic 3 or Passenger Address (PA) are selected, touching the Mic window will revert to toggling between Mic 1 and Mic 2.

2.2.1.2 Audio Panel Page Mic Selection

Audio
Panel

1. Touch the **Audio Panel** key at the top of the display.


MIC
1
XPDR 1
IDENT
NAV
117.9
MON
1 2 3
1200
STBY
STBY
108.0
Monitored Radios
MIC Selection
COM 1
COM 1
COM 2
COM 2
COM 3
COM 3
NAV 1
Passenger Address

Mic Selection: 1, 2 or 3

Selected Mic

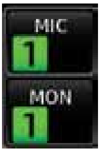
Passenger Address Mic Selection

Figure 2-15 Audio Panel MIC Selection

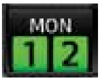
2. Touch the desired Mic (Com 1, Com 2, or Com 3) from the MIC Selection list on the right side of the display.
3. The selected Mic will be shown in the Mic window.

2.2.2 Monitor

The Monitor function indicates which radios are being listened to.



1. Monitor is automatically selected for the associated Com Mic Radio (1, 2, or 3). For example, when Com 1 is selected, Mon 1 is automatically active.



2. Touch the **Mon** key to toggle between the automatically selected monitored channel (selected Mic) and the other channels.

2.2.3 Passenger Address

The **Passenger Address** key toggles the passenger address system on and off.

Pass Address

Touch the **Passenger Address** key to toggle the passenger address system on and off.

2.2.4 3D Audio

Advanced processing adjusts audio in the headset to mimic how the human ear normally hears and registers sounds in space. This 3-D Audio feature makes it seem as though different audio sources are coming from different directions around you. Now it's much easier to focus on and understand one particular source from among many. For example, COM 1 will seem to be coming from the left while COM 2 may seem to be coming from the right. When 3D Audio is disabled, balance is restored.

***NOTE:** The stereo/mono headsets must be in the stereo position in order for 3D audio to function.*

Touch the **3D Audio** key to toggle the 3D Audio function on and off.

This is currently done such that audio sources will either be 30 degrees to your left (330 degrees), 30 degrees to your right, and directly in front (0 degrees). The following table details the left/right balance of the audio level depending on the selected Com:

Active Com	1	2	3
1,2,3	330	0	30
1,2	330	30	N/A
1,3	330	N/A	30
2,3	N/A	330	30
1	0	N/A	N/A
2	N/A	0	N/A
3	N/A	N/A	0

Table 2-2 3D Audio Left/Right Balance

2.2.5 Cabin Speaker Selection and Volume

The **Cabin Speaker** key turns the cabin speaker on and off. The **Speaker Volume** key sets the volume level.

Cabin Speaker

1. Touch the **Cabin Speaker** key to toggle the cabin speaker on and off.

Speaker Volume

2. Touch the **Speaker Volume** key to set the Cabin Speaker volume. Touch the **Speaker Volume** arrows to set the volume.

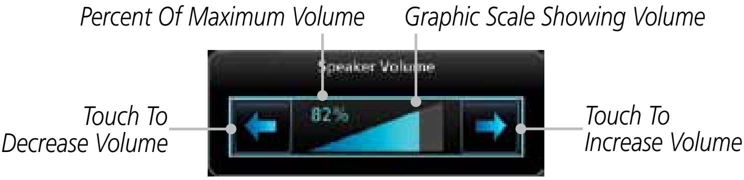

Percent Of Maximum Volume
Graphic Scale Showing Volume
Speaker Volume
82%
Touch To Decrease Volume
Touch To Increase Volume

Figure 2-16 Cabin Speaker Volume Selection

2.2.6 Marker Audio and Volume

The optional Marker Beacon Receiver uses an audio indicator to alert you when the aircraft passes over a Marker Beacon transmitter. The audio from the Marker Beacon Receiver can be heard unless disabled by selecting Marker Audio. When Marker is selected (green bar shown), the tones for Marker Beacons are heard. When Marker is not selected (green bar not shown), the tones for Marker Beacons are not heard.

The GMA 35 marker beacon receiver and indicators are part of the ILS system. The marker beacon lamps operate independently of any audio selection and cannot be turned off. The GMA 35 can drive external marker lamps if required and also provides an autopilot middle marker sense output.

Prior to beginning an ILS approach, select high or low marker sensitivity with the **Marker Hi Sense** key. The lighted green bar in the key illuminates for high sensitivity and remains off for low sensitivity.

Touching the **Marker Audio** key prior to an approach allows the marker audio tones to be heard in the headsets. When the green bar in the **Marker Audio** key shows, the marker audio will be heard when available. The **Audio Panel** key will change to a **Mute** key. Touching the Mute key while audio is heard will mute the marker audio until the next beacon is received. The marker beacon signal sensitivity threshold can be set in Configuration mode. Contact a Garmin-authorized service center for adjustment.

Marker
Audio

1. While the Audio Control page is displayed, touch the **Marker Audio** key to hear the current Marker Beacon tones.
2. Touch the **Marker Audio** key again to disable Marker Beacon tones.

Marker
Volume

3. Touch the **Marker Volume** key to set the Marker Beacon tone volume. Touch the **Marker Volume** arrows to set the volume.

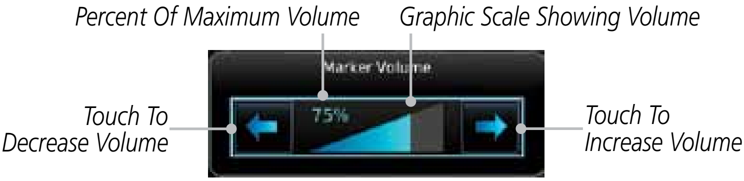


Figure 2-17 Audio Panel Marker Beacon Tone Volume Selection

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

2.2.7 Marker Hi Sense

The Marker Hi Sense setting allows detecting the outer Marker Beacon from a greater distance.

Marker
Hi Sense

1. While the Audio Control page is displayed, touch the **Marker Hi Sense** key to activate greater Marker Beacon sensitivity.

Marker
Hi Sense

2. Touch the **Marker Hi Sense** key again to return to normal sensitivity.

2.2.8 Marker Beacon Annunciations

A visual annunciation of marker beacons will be shown on the display when the aircraft flies over a marker beacon. The annunciation will appear in the lower left of the display.

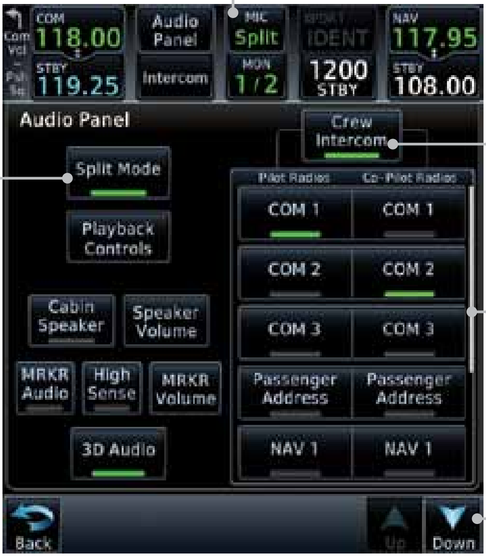
Current Beacon	Icon (Standard)	Icon (Blink)	Blink Interval
Inner Marker	IM	IM	250 ms
Middle Marker	MM	MM	333 ms
Outer Marker	OM	OM	750 ms
The marker beacon alternates between the standard icon and the blink icon at the blink interval corresponding to the current beacon.			

Table 2-3 Marker Beacons

2.2.9 Audio Split Mode

In Split Mode the pilot uses one radio for MIC audio while the copilot uses a different radio. The pilot and copilot can transmit simultaneously over separate radios. The pilot can still listen to their individually selected radios. In the Split mode, the pilot and co-pilot may talk and listen independently to the radios (or PA) as selected.

Split Mode Annunciation


Com Vol
Psh Sq
COM
118.00
STBY
119.25
Audio Panel
Intercom
MIC
Split
MON
1/2
IDENT
1200
STBY
NAV
117.95
STBY
108.00
Audio Panel
Crew Intercom
Split Mode
Playback Controls
Cabin Speaker
Speaker Volume
MRKR Audio
High Sense
MRKR Volume
3D Audio
Pilot Radios
Co-Pilot Radios
COM 1
COM 1
COM 2
COM 2
COM 3
COM 3
Passenger Address
Passenger Address
NAV 1
NAV 1
Back
Up
Down

Select Audio Split Mode

Crew Intercom Activation

Touch And Drag Finger To Scroll List of Radio Selections

Touch To Scroll List of Radio Selections

Figure 2-18 Audio Panel Split Mode Controls

Split Mode

1. While the Audio Control page is displayed, touch the **Split Mode** key to display the Crew Intercom selections.

Split Mode

2. Touch the **Split Mode** key again to toggle the Crew Intercom selection off.

Crew Intercom

3. Touch the **Crew Intercom** key to toggle activation of the Crew Intercom allowing the Pilot and Co-Pilot to talk to each other.
4. Touch the desired Pilot and Co-Pilot Radio selections.

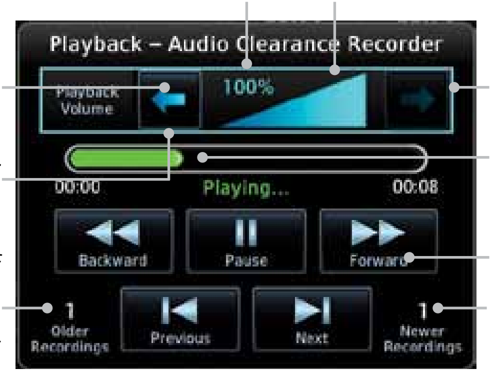
2.2.10 Playback Controls

The voice recorder feature records all the audio heard on any selected COM radio that is selected for transmission (the MIC selected COM) and not others selected for monitoring only. Playback is heard by anyone listening on the selected radios. The Clearance Recorder can record up to 2.5 minutes of Com audio.

Playback Controls

1. While the Audio Control page is displayed, touch the **Playback Controls** key to display the Playback Control selections.

Percent Of Maximum Volume
Graphic Scale Showing Volume



Touch To Decrease Volume

Heavy Outline Indicates The Upper Left Rotary Knob Controls Volume

Number Of Recordings Made Before The Current Selection

Touch To Increase Volume

Recording Time Line

Playback Controls

Number Of Recordings Made After The Current Selection

Figure 2-19 Audio Panel Playback Controls

2. Touch the **Playback Volume** arrows to set the volume.

Backward
Play
Forward

3. Touch the **Backward**, **Play**, or **Forward** keys to control the playback of the currently selected recording.

Previous
Next

4. Touch the **Previous** or **Next** keys to select a recording.

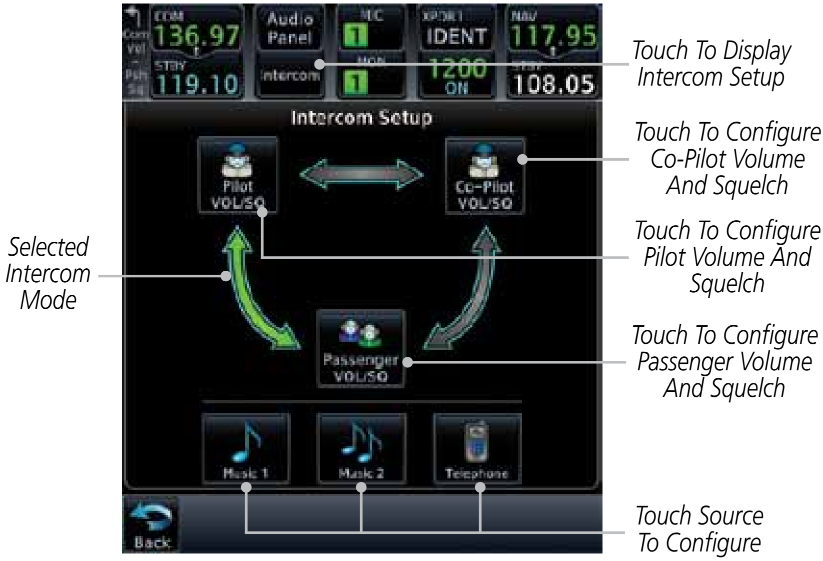
Back

5. Touch the **Back** key to return to the Audio Panel page.

2.3 Intercom Setup

The GTN 7XX will operate as a control head for remotely connected optional, compatible intercom equipment. The Internal Communication System (ICS) has several modes of operation that are selected on the display of the GTN 7XX to control communication in the aircraft. Passengers cannot transmit over the active Com radio, even if equipped with a PTT key.

1. Touch the **Intercom** window at the top of the display to display the Intercom Setup page.


COM
136.97
STBY
119.10
Com Vol
Psh Sq
Audio Panel
Intercom
MIC
1
MON
1
XPDR1
IDENT
1200
ON
NAV
117.95
STBY
108.05
Intercom Setup
Pilot VOL/SQ
Co-Pilot VOL/SQ
Passenger VOL/SQ
Music 1
Music 2
Telephone
Back

Touch To Display Intercom Setup

Touch To Configure Co-Pilot Volume And Squelch

Selected Intercom Mode

Touch To Configure Pilot Volume And Squelch

Touch To Configure Passenger Volume And Squelch

Touch Source To Configure

Figure 2-20 Intercom Setup

2. Touch the arrow between the intercom recipients to activate communication between those recipients. The arrow will be green when communication is active. Touch the arrow again to deactivate communication. Detailed information is shown in the Intercom Modes table.

3. Touch the key for a function to the make the desired changes to their configuration. Then, touch the **Back** key to return to the Intercom Setup page.

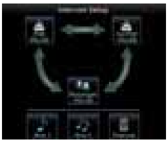
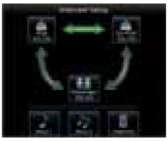
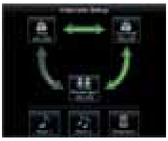
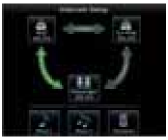
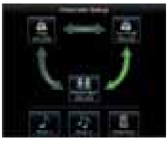
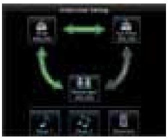
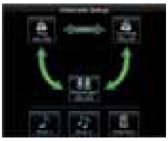
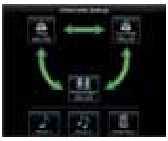
Mode	Pilot Hears	Co-Pilot Hears	Passengers Hear
	Selected radios, pilot	Selected radios, co-pilot	Passengers
	Selected radios, pilot, co-pilot	Selected radios, pilot, co-pilot	Passengers
	Selected radios, pilot, co-pilot	Selected radios, co-pilot, pilot, passengers	Co-pilot, passengers
	Selected radios, pilot, passengers	Selected radios, co-pilot	Pilot, passengers
	Selected radios, pilot	Selected radios, co-pilot, passengers	Co-pilot, passengers
	Selected radios, pilot, co-pilot, passengers	Selected radios, pilot, co-pilot	Selected radios, pilot, passengers
	Selected radios, pilot, passengers	Selected radios, co-pilot, passengers	Selected radios, pilot, co-pilot, passengers
	Selected radios, pilot, co-pilot, passengers	Selected radios, pilot, co-pilot, passengers	Selected radios, pilot, co-pilot, passengers

Table 2-4 Intercom Modes

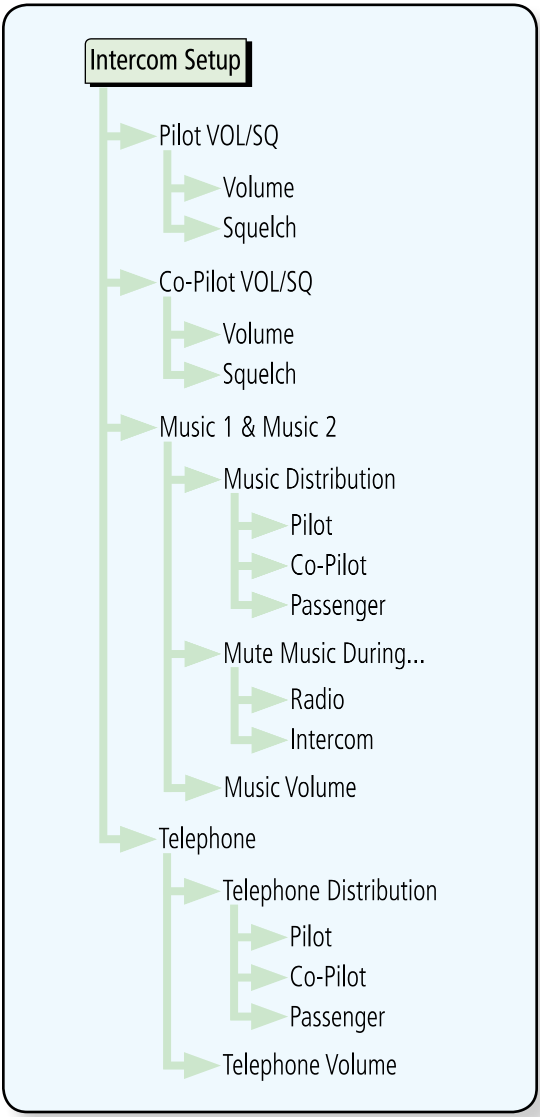

Intercom Setup
Pilot VOL/SQ
Volume
Squelch
Co-Pilot VOL/SQ
Volume
Squelch
Music 1 & Music 2
Music Distribution
Pilot
Co-Pilot
Passenger
Mute Music During...
Radio
Intercom
Music Volume
Telephone
Telephone Distribution
Pilot
Co-Pilot
Passenger
Telephone Volume

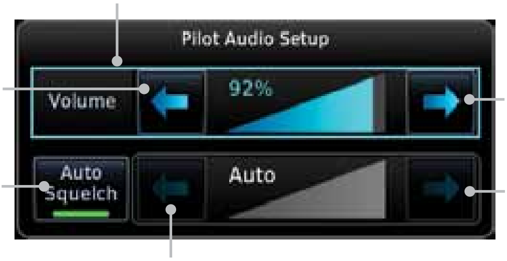
Figure 2-21 Intercom Setup Functional Diagram

2.3.1 Set Pilot, Co-Pilot, & Passenger Volume and Squelch

In the Intercom Setup function, the Volume and Squelch may be set separately for the Pilot, Copilot, and Passenger intercoms.

1. While viewing the Intercom Setup page, touch the **Pilot**, **Co-Pilot**, or **Passenger VOL/SQ** keys to set the Volume and Squelch for the selected item.

Heavy Outline Indicates The Upper Left Rotary Knob Controls Volume



Touch To Decrease Volume

Touch To Select Manual Or Auto Squelch

Touch To Increase Volume

With Manual Squelch, Touch To Increase Squelch

With Manual Squelch, Touch To Decrease Squelch

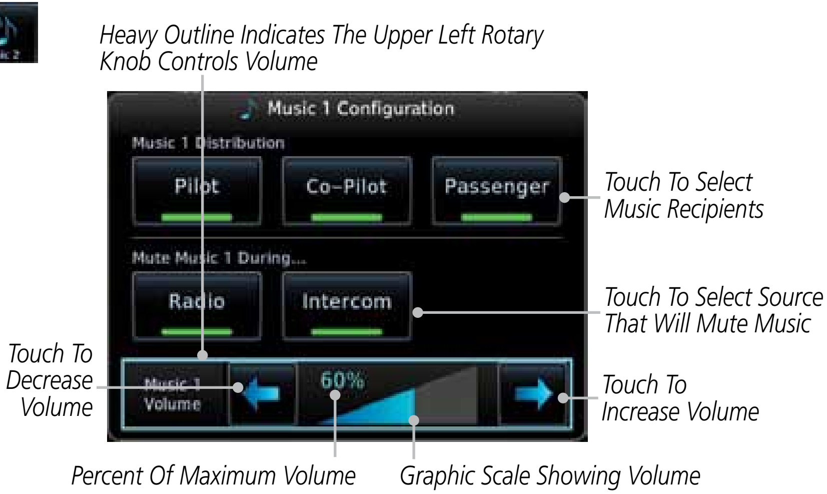
Figure 2-22 Pilot Audio Setup

2. Touch the **Volume** arrows to set the desired Volume level.
3. Touch the **Auto Squelch** key to allow the unit to set the Squelch level automatically. When enabled, the **Auto Squelch** key will display a green bar.
4. Touch the **Squelch** arrows to set the desired Squelch level.
5. Touch the **Back** key to return to the Intercom Setup page.

2.3.2 Music 1 and Music 2 Configuration

In the Intercom Setup function and Volume may be set separately for up to two music sources.

1. While viewing the Intercom Setup page, touch the **Music 1** or **Music 2** keys to set their configuration.


Music 1 Configuration
Music 1 Distribution
Pilot
Co-Pilot
Passenger
Mute Music 1 During...
Radio
Intercom
Music 1 Volume
60%

Heavy Outline Indicates The Upper Left Rotary Knob Controls Volume

Touch To Select Music Recipients

Touch To Select Source That Will Mute Music

Touch To Decrease Volume

Touch To Increase Volume

Percent Of Maximum Volume

Graphic Scale Showing Volume

Figure 2-23 Music 1 Configuration

2. Select the recipients for Music Distribution by touching any combination of the **Pilot**, **Co-Pilot**, or **Passenger** keys.

3. Touch the **Radio** and/or **Intercom** keys to select the function that when active Music will be muted.

4. Touch the **Volume** arrows to set the desired Volume level.

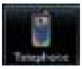
***NOTE:** At every power cycle, the "mute music during radio" selection will be active.*

2.3.3 Telephone Configuration

The GMA 35 provides a 2-way telephone interface. Operation depends on the state of the **TEL** key and ICS mode. Telephone communication is much like using the intercom, allowing both parties to talk at once.

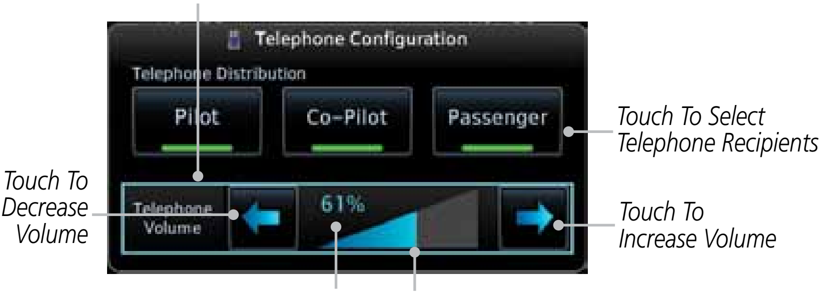
***NOTE:** Garmin recommends when using the GSR 56 Iridium phone system that the audio only be activated when on a phone call.*

The TEL channel may be disabled in Configuration mode. Contact a Garmin-authorized service center for details.



1. While viewing the Intercom Setup page, touch the **Telephone** key to set its configuration.

Heavy Outline Indicates The Upper Left Rotary Knob Controls Volume



Touch To Select Telephone Recipients

Touch To Decrease Volume

Touch To Increase Volume

Percent Of Maximum Volume

Graphic Scale Showing Volume

Figure 2-24 Telephone Configuration

Pilot
Co-Pilot
Passenger

2. Select the recipients for Telephone Distribution by touching any combination of the **Pilot**, **Co-Pilot**, or **Passenger** keys.

3. Touch the **Volume** arrows to set the desired Telephone Volume level.

2.4 Telligence™ Voice Command

Garmin's Telligence Voice Command voice recognition feature allows the pilot (and optionally copilot) to control the GTN 7xx connected to a GMA 35 using spoken commands. To activate Voice Recognition, push and hold the Push-to-Command (PTC) button while speaking a command. When the Push-to-Command button is released, the GTN 7xx will respond.

If a command is understood by the GTN 7xx, a positive acknowledgement chime will be played, and the relevant page will be displayed to reflect the change (if applicable). The pilot should verify that the correct response has occurred. If the desired change has not occurred, the pilot should repeat the command by using the Push-to-Command button, or by manually using the GTN 7xx touch screen.

If a command is not understood by the GTN 7xx, a negative acknowledgement tone will be played. The pilot should repeat the command by using the Push-to-Command button, or by manually using the GTN 7xx touch screen. In the event of any abnormal Voice Recognition operation, the front panel controls and touch screen may be used to override Voice Recognition and manually control the GTN 7xx.

***NOTE:** If Telligence Voice Command malfunctions and needs to be disabled, remove power to the GMA 35 audio panel by pulling the audio panel circuit breaker. This will force the audio panel into the fail-safe mode. The pilot will be able to communicate using the COM 2 radio only.*

The following table lists the available Voice Recognition commands, the associated actions, and the voice response if applicable:

Control	Example Phrase	Action
COM	"COM one"	Toggles COM1 audio
	"MIC one"	Selects MIC1/COM1 audio
	"COM one MIC"	Selects MIC1/COM1 audio
	"COM two"	Toggles COM2 audio
	"MIC two"	Selects MIC2/COM2 audio
	"COM two MIC"	Selects MIC2/COM2 audio
	"COM three"	Toggles COM3 audio
	"MIC three"	Selects MIC3/COM3 audio
	"COM three MIC"	Selects MIC3/COM3 audio
	"Split COM" OR "Split Mode"	Toggles split COM mode
NAV	"NAV one"	Toggles NAV1 audio.
	"NAV two"	Toggles NAV2 audio.
MUSIC	"MUSIC one mute" OR "Mute MUSIC one"	Mutes Music 1 on radio reception.
	"Disable MUSIC one mute" "MUSIC one mute disable" "Disable mute MUSIC one" OR "Mute MUSIC one disable"	Disables Music 1 mute on radio reception.
	"MUSIC two mute" OR "Mute MUSIC two"	Mutes Music 2 on radio reception.
	"Disable MUSIC two mute" "MUSIC two mute disable" "Disable mute MUSIC two" OR "Mute MUSIC two disable"	Disables Music 2 mute on radio reception.
Speaker	"Speaker" OR "Cabin Speaker"	Toggles Cabin Speaker on/off.
COM Clearance Recorder	"Play" "Read back" OR "Say again"	Opens Audio Clearance Recorder and plays the last received radio transmission.
PA	"P - A" OR "Passenger Address"	Toggles PA on/off.

<table>
<tr><th>Control</th><th>Example Phrase</th><th>Action</th></tr>
<tr><td>Marker Beacon</td><td>“Marker” OR "Marker Beacon"</td><td>Same action as pressing Marker Audio.</td></tr>
<tr><td rowspan="2">Volume Adjustments</td><td>“(Desired selection*) volume up”</td><td>Increases volume of desired selection.</td></tr>
<tr><td>“(Desired selection*) volume down”</td><td>Decreases volume of desired selection.</td></tr>
<tr><td>Volume Adjustments</td><td>“(Desired selection*) volume</td><td>Displays the current volume but does not change it.</td></tr>
<tr><td colspan="3">* Desired selection: "Speaker", “pilot”, “copilot”, “passenger”, “pass”, "phone", “marker”, “telephone”, “music one”, or “music two”.
NOTE: Finer volume adjustment may be made using the Volume knob on the GTN 7xx. The voice command “Up” or “Down” is equivalent to five clicks of the Volume knob.</td></tr>
<tr><td rowspan="3">Distribution (Blue Mode)</td><td>“Distribute telephone to (desired position(s) **)”
OR
“Distribute phone to (desired position(s) **)”</td><td>Distributes Telephone to desired positions.</td></tr>
<tr><td>“Distribute music one to (desired position(s) **)”</td><td>Distributes MUS1 to desired position(s).</td></tr>
<tr><td>“Distribute music two to (desired position(s)**)”</td><td>Distributes MUS2 to desired position(s).</td></tr>
<tr><td colspan="3">** Desired position(s): “All”, “none”, “pilot”, “copilot”, “passenger”, “pass”, or any combination of pilot, copilot, passenger, or pass.
NOTE: The word “to” may be omitted from distribution phrases.</td></tr>
<tr><td rowspan="2">3D Audio</td><td>“Three-D audio”</td><td>Enables 3D audio
Voice Response: “Three-D audio left, three-D audio right”.</td></tr>
<tr><td>“Standard audio”</td><td>Enables standard audio (disables 3D audio)
Voice Response: “Standard Audio”.</td></tr>
</table>

Table 2-5 Voice Recognition Commands

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3 NAV/COM

(GTN 750 NAV/COM)

The GTN 750 features a digitally-tuned VHF Com radio that provides a seamless transition from communication to navigation. The GTN 750's Com radio operates in the aviation voice band, from 118.000 to 136.975 MHz, in 25 kHz steps (default). For European operations, a Com radio configuration of 8.33 kHz steps is also available.

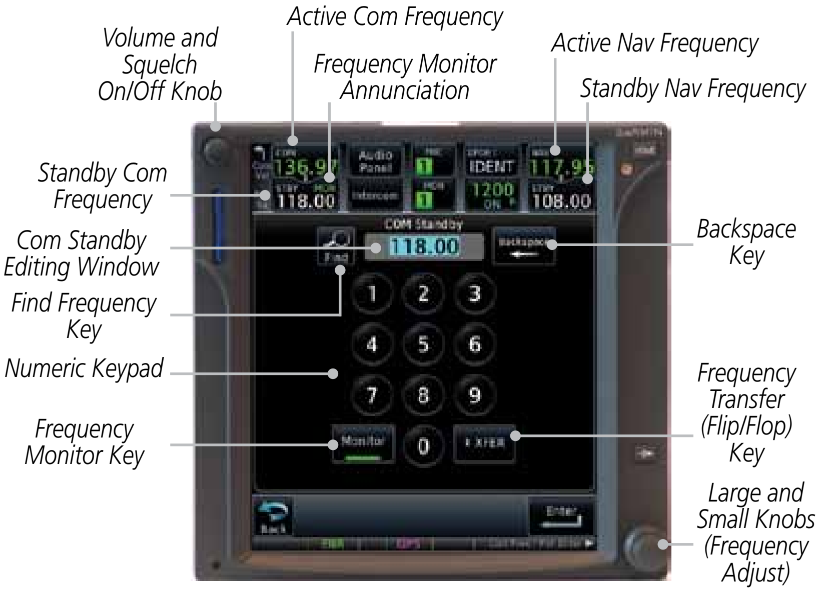

Volume and Squelch On/Off Knob
Active Com Frequency
Frequency Monitor Annunciation
Active Nav Frequency
Standby Nav Frequency
Standby Com Frequency
Com Standby Editing Window
Find Frequency Key
Numeric Keypad
Frequency Monitor Key
Backspace Key
Frequency Transfer (Flip/Flop) Key
Large and Small Knobs (Frequency Adjust)
136.97
118.00
Audio Panel
Intercom
IDENT
1200
117.95
108.00
COM Standby
118.00
Find
Backspace
1
2
3
4
5
6
7
8
9
Monitor
0
XFER
Back
Enter

Figure 3-1 Nav/Com Controls

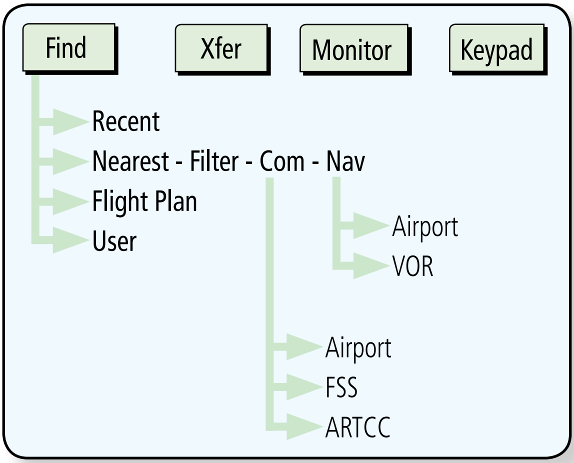

Find
Xfer
Monitor
Keypad
Recent
Nearest - Filter - Com - Nav
Flight Plan
User
Airport
VOR
Airport
FSS
ARTCC

Figure 3-2 Nav/Com Functional Diagram

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

3.1 Volume

Com radio volume is adjusted using the **Volume** knob. Turn the **Volume** knob clockwise to increase volume, or counterclockwise to decrease volume. The level will be maintained until changed or power is cycled.

1. Turn the **Volume** knob to set the Com volume.

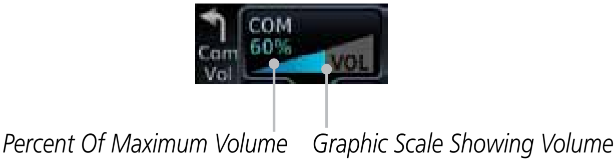

Com Vol
COM
60%
VOL
Percent Of Maximum Volume
Graphic Scale Showing Volume

Figure 3-3 Com Volume Setting

2. A bar graph showing the relative volume level will indicate the selected level and will disappear a few seconds after releasing the **Volume** knob.

3.2 Squelch

The Com radio features an automatic squelch to reject many localized noise sources. You may override the squelch function by pressing the **Volume** knob. This facilitates listening to a distant station or setting the desired volume level.

To override the automatic squelch, press the **Volume** knob momentarily. Press the **Volume** knob again to return to automatic squelch operation. A “SQ” indication appears above the active Com frequency window in the upper left corner of the display when automatic squelch is overridden.

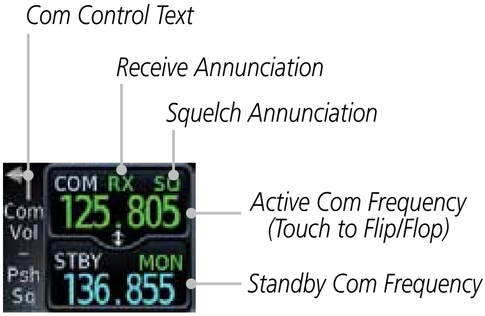

Com Control Text
Receive Annunciation
Squelch Annunciation
Com Vol
Psh Sq
COM RX SQ
125.805
STBY MON
136.855
Active Com Frequency (Touch to Flip/Flop)
Standby Com Frequency

Figure 3-4 Com Controls

While receiving a station, an “RX” indication appears in the Com frequency window to the immediate right of “Com.” A “TX” indication appears at this location while you are transmitting.

3.3 Com Window and Tuning

Communication frequencies are selected by using the **large** and **small right** knobs or by touching the value in the *standby* Com frequency field and using the subsequent keypad. The standby frequency always appears below the active frequency. The active frequency is the frequency currently in use for transmit and receive operations.

Once a frequency is selected in the standby field, it may be transferred to the active frequency by touching the active frequency field.

***NOTE:** The Com window is normally active for adjustment, unless the NAV window is made active by pressing the **small right** knob. The active state automatically returns to the Com window after 30 seconds of inactivity.*

To select a Com frequency using the small and large right knobs:

1. If the tuning cursor is not currently in the Com window, press the **small right** knob momentarily. The Standby Com frequency will be highlighted to indicate that it is active for editing.
2. Turn the **large right** knob to select the desired megahertz (MHz) value. For example, the "118" portion of the frequency "118.30".
3. Turn the **small right** knob to select the desired kilohertz (kHz) value. For example, the ".30" portion of the frequency "118.30".

To select a Com frequency using the numeric keypad:

1. Touch the Standby window.
2. A pull down keypad will appear with the current Standby frequency highlighted.

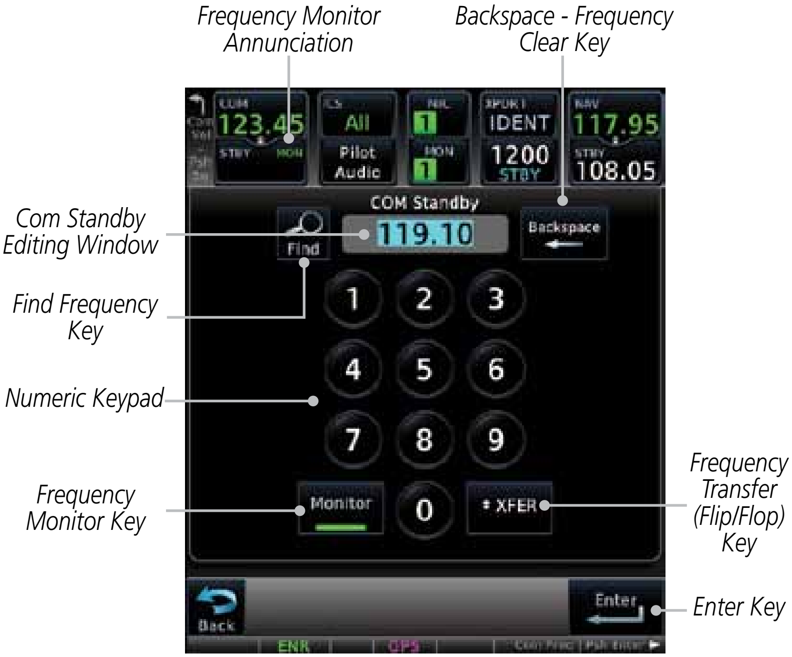

Frequency Monitor Annunciation
Backspace - Frequency Clear Key
Com Standby Editing Window
Find Frequency Key
Numeric Keypad
Frequency Monitor Key
Frequency Transfer (Flip/Flop) Key
Enter Key
COM 123.45
STBY MON
All
Pilot Audio
IDENT
1200
STBY
NAV 117.95
STBY 108.05
COM Standby
Find
119.10
Backspace
1 2 3
4 5 6
7 8 9
Monitor
0
XFER
Back
Enter
ENR
GPS

Figure 3-5 Com Standby Frequency Numeric Keypad

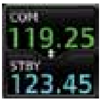
3. Touch the numeric keys to add the desired values and touch **Enter** to accept the displayed value and place it into the Standby Com window.

4. Touching the **Xfer** key will place the selected frequency directly into the Active window.

To make the standby frequency the active frequency:

COM
123.45
STBY
119.25

1. Touch the Com active frequency (top) window.


COM
119.25
STBY
123.45

2. The Active (top) and Standby frequencies will flip/flop.

3.3.1 Com Frequency Finding

The GTN 750's frequency finding feature allows you to quickly select any displayed database Com frequency as your standby frequency. The following are some examples of selecting Com frequencies from some of the main GPS pages.

To select a Com frequency for a User created frequency, Recent selected frequency, Nearest airport, or from your Flight Plan:

1. While viewing the numeric keypad touch the **Find** key. Categories for User, Recent, Nearest, and Flight Plan are available.

Recent
Nearest
Flight Plan
User

2. Touch **Recent**, **Nearest**, **Flight Plan**, or **User**. A list of frequencies for the Nearest airports will be displayed.

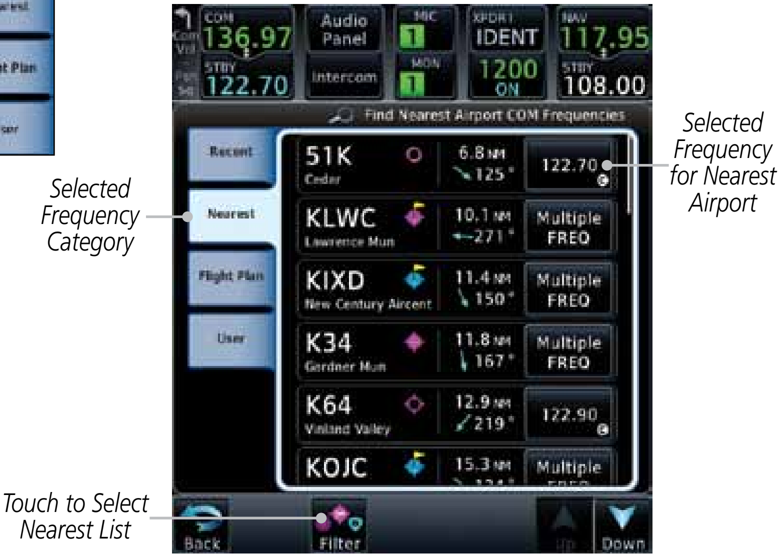

COM 136.97
STBY 122.70
Audio Panel
Intercom
MIC 1
MON 1
XPDR1 IDENT
1200 ON
NAV 117.95
STBY 108.00
Find Nearest Airport COM Frequencies
Recent
Nearest
Flight Plan
User
51K Cedar 6.8 NM 125° 122.70
KLWC Lawrence Mun 10.1 NM 271° Multiple FREQ
KIXD New Century Aircent 11.4 NM 150° Multiple FREQ
K34 Gardner Mun 11.8 NM 167° Multiple FREQ
K64 Vinland Valley 12.9 NM 219° 122.90
KOJC 15.3 NM Multiple
Back
Filter
Up
Down
Selected Frequency for Nearest Airport
Selected Frequency Category
Touch to Select Nearest List

Figure 3-6 Com Nearest Airport Frequency

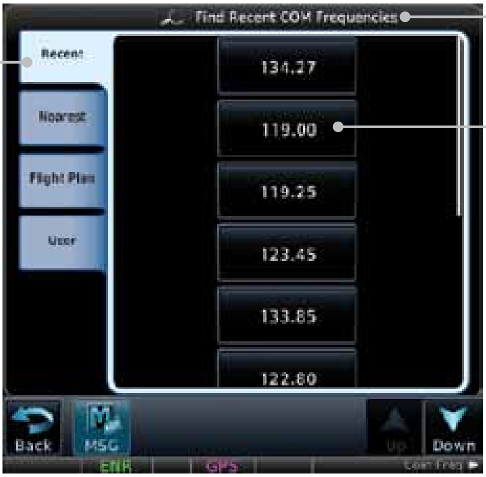
3. Touch the desired Com frequency to select it and place it into the Com Standby window of the numeric keypad display.

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

3.3.1.1 Find Recent Frequencies

Recent

1. While viewing the **Find** results, touch the **Recent** tab. A list of the recently selected frequencies will be displayed.


Find Recent COM Frequencies
Recent
Nearest
Flight Plan
User
134.27
119.00
119.25
123.45
133.85
122.80
Back
MSG
Up
Down
ENR
GPS
Com Freq

Recent Frequency Category

Selected Frequency Category

Touch Frequency From Recent List To Select Standby Frequency

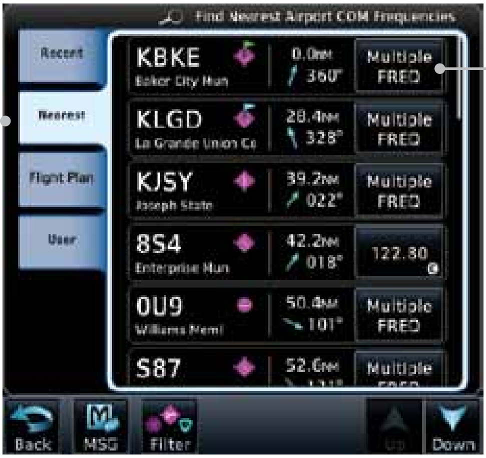
Figure 3-7 Recent Com Frequency List

2. Touch the desired frequency to select it and place it into the Standby window.

3.3.1.2 Find Nearest Frequencies

Nearest

1. While viewing the **Find** results, touch the **Nearest** key. A list of the nearest airport Com frequencies will be displayed.

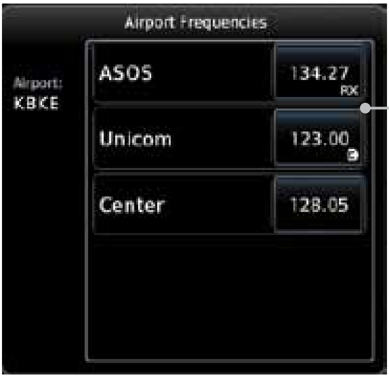

Find Nearest Airport COM Frequencies
Recent
Nearest
Flight Plan
User
KBKE
Baker City Mun
0.0NM
360°
Multiple FREQ
KLGD
La Grande Union Co
28.4NM
328°
Multiple FREQ
KJSY
Joseph State
39.2NM
022°
Multiple FREQ
8S4
Enterprise Mun
42.2NM
018°
122.80
0U9
Williams Meml
50.4NM
101°
Multiple FREQ
S87
52.6NM
Multiple
Back
MSG
Filter
Up
Down

Selected Frequency Category

Selected Frequencies For Nearest Airport

Figure 3-8 Com Nearest Airport Frequency

2. Touch the **Multiple FREQ** key to show the available frequencies.


Airport Frequencies
Airport:
KBCE
ASOS
134.27
RX
Unicom
123.00
Center
128.05

Touch A Frequency Key To Place It In The Standby Window

Figure 3-9 Nearest Airport Multiple Frequency List

3. Touch the **Filter** key to filter the Nearest List by Airports, FSS, or ARTCC.

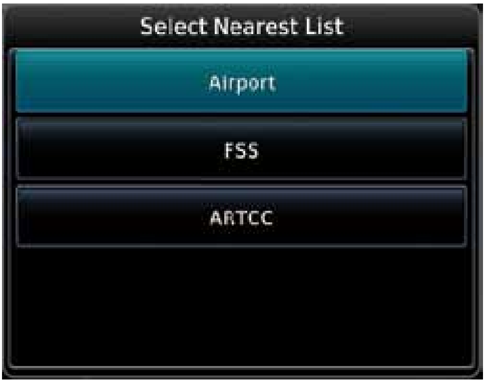
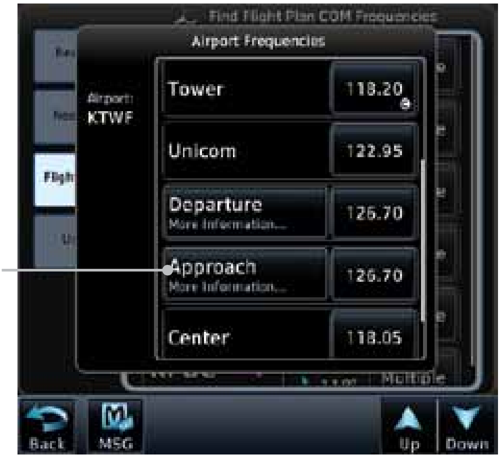

Select Nearest List
Airport
FSS
ARTCC

Figure 3-10 Nearest Com Frequency List

4. Touch the desired Frequency List. Then, touch the desired frequency to load it into the Standby window.

5. Some frequencies will have more information detail available. Touch the key that shows "More Information."

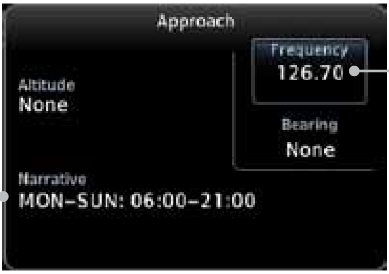

Find Flight Plan COM Frequencies
Airport Frequencies
Airport:
KTWF
Back
MSG
Up
Down

Tower 118.20
Unicom 122.95
Departure More Information... 126.70
Approach More Information... 126.70
Center 118.05

Touch For More Information

Figure 3-11 More Information Is Available For Some Frequencies

6. More detailed information is shown on the display. Touch the frequency key to load it into the Standby window.



Frequency 126.70
Altitude None
Bearing None
Narrative MON-SUN: 06:00-21:00

Touch To Insert Into Standby Window

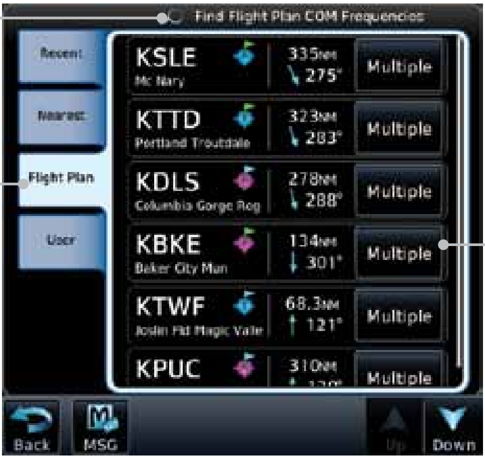
Additional Information Narrative

Figure 3-12 More Frequency Detail

3.3.1.3 Find Flight Plan Frequencies

Flight Plan

1. While viewing the **Find** results, touch the **Flight Plan** tab. A list of Com or Nav frequencies associated with the active flight plan will be displayed.



Airport	Name	Distance	Bearing	
KSLE	Mc Nary	335NM	275°	Multiple
KTTD	Portland Troutdale	323NM	283°	Multiple
KDLS	Columbia Gorge Rog	278NM	288°	Multiple
KBKE	Baker City Mun	134NM	301°	Multiple
KTWF	Joslin Fld Magic Valle	68.3NM	121°	Multiple
KPUC		310NM		Multiple

Selected Frequency Category

Selected Frequency Category

Touch To Select Frequency From List For Nearest Airport

Figure 3-13 Flight Plan Frequency List

Multiple FREQ

2. Touch the **Multiple FREQ** key to show the available frequencies, if present.
3. Touch the desired frequency to select it and place it into the Standby window.

3.3.1.4 Find User Frequencies

User

1. While viewing the **Find** results, touch the **User** tab. A list of User-created frequencies will be displayed.
2. Touch the desired frequency to load it into the Standby window.

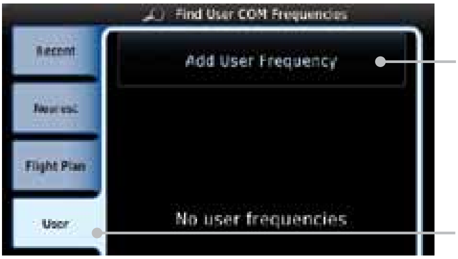
3.3.2 Adding a New User Frequency

Find

1. While viewing the numeric keypad touch the **Find** key at the bottom of the display.

User

2. Touch the **User** tab and then touch the **Add User Frequency** key.


Find User COM Frequencies
Recent
Nearest
Flight Plan
User
Add User Frequency

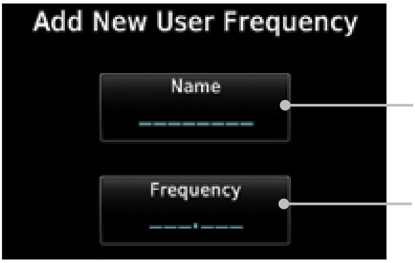
No user frequencies

Add User Frequency

User Frequency Selection

Figure 3-14 Add New User Frequency

3. The Add New User Frequency information window will now be displayed. Touch the **Name** key to select a name for the User frequency.


Add New User Frequency
Name

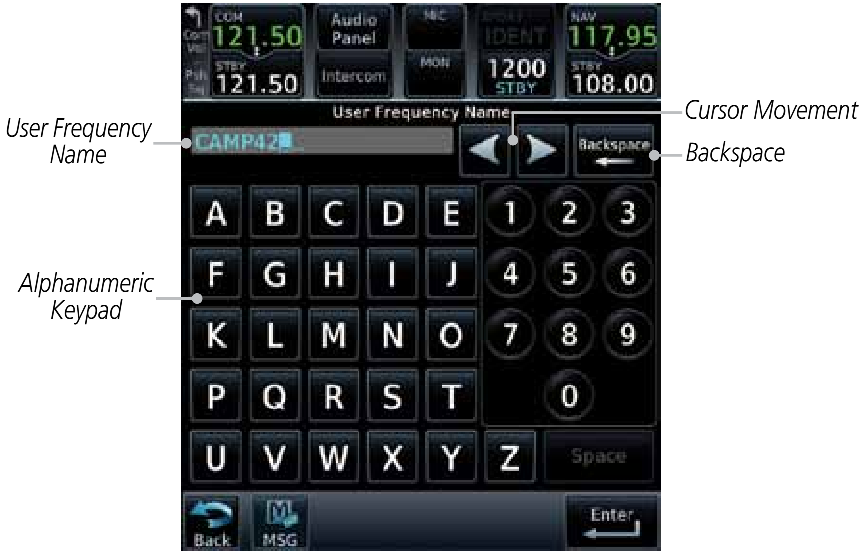
Frequency
---.---

User Frequency Name

User Frequency Value

Figure 3-15 Add New User Frequency Detail Window

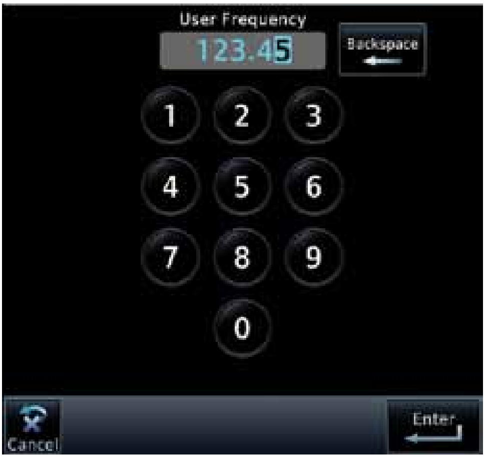
4. Select the characters from the alphanumeric keypad for the desired name. Touch the **Enter** key to accept the displayed Name.


User Frequency Name
CAMP42

User Frequency Name
Alphanumeric Keypad
Cursor Movement
Backspace
COM 121.50
STBY 121.50
Audio Panel
Intercom
MIC
MON
IDENT
1200 STBY
NAV 117.95
STBY 108.00
Backspace
A B C D E 1 2 3
F G H I J 4 5 6
K L M N O 7 8 9
P Q R S T 0
U V W X Y Z Space
Back
MSG
Enter

Figure 3-16 Select a Name for the New User Frequency

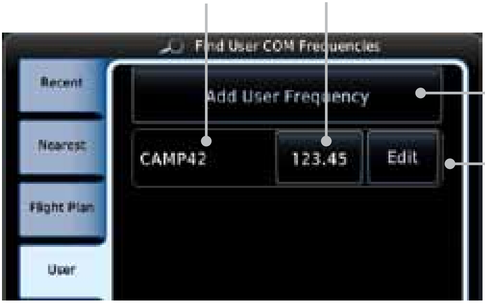
5. Touch the **Frequency** key and select the characters from the keypad for the desired frequency. Touch the **Enter** key to accept the displayed frequency.


User Frequency
123.45

Backspace
1 2 3
4 5 6
7 8 9
0
Cancel
Enter

Figure 3-17 Select a Frequency Value for the New User Frequency

6. Touch the **Enter** key to accept the displayed name and frequency. The new User Frequency will be added to the list.



User Frequency Name

User Frequency Value

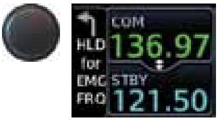
Touch to Add Another User Frequency

Touch to Edit/Remove the User Frequency

Figure 3-18 Completed New User Frequency

3.3.3 Emergency Frequency

The GTN 750's emergency frequency select provides a quick method of selecting 121.50 MHz as the active frequency in the event of an in-flight emergency. The emergency frequency select is available whenever the unit is on, regardless of GPS or cursor status, or loss of the display.



To quickly tune and activate 121.50, press and hold volume knob or the remote Com flip-flop key for approximately two seconds.

NOTE: *Pressing and holding the remote Com FLIP/FLOP key for approximately two seconds, on units so configured, will lock the COM board, preventing further changes in Com frequency until the Com board is unlocked, by pressing the remote Com FLIP/FLOP key again for two seconds. The following message will notify the pilot that the Com board has been locked: "COM LOCKED TO 121.5 MHZ. HOLD REMOTE COM TRANSFER KEY TO EXIT."*

NOTE: *Under some circumstances if the Com system loses communication with the main system, the radio will automatically tune to 121.50 MHz for transmit and receive regardless of the displayed frequency.*

3.3.4 Stuck Microphone

Whenever the GTN 750 is transmitting, a "TX" indication appears in the Com window. If the push-to-talk key on the microphone is stuck or accidentally left in the keyed position, or continues to transmit after the key is released, the Com transmitter automatically times out (or ceases to transmit) after 30 seconds of continuous broadcasting. You will also receive a "Com push-to-talk key stuck" message as long as the stuck condition exists.

3.3.5 Remote Frequency Selection Control

On units configured for remote Com frequency Recall, pressing the remote recall switch will load the next preset Com frequency into the unit's Standby frequency box. The remote recall switch can be pressed multiple times to scroll the entire preset frequency list through the Standby frequency box (the list will "wrap" from the bottom of the list back up to the top, skipping any empty preset positions).

The standby frequency isn't activated until a Com flip-flop switch (either remote- or bezel-mounted) is pressed. Remote Frequency Selection only functions on units configured for a remote Com Frequency recall switch.

3.4 Com Frequency Monitoring

The Frequency Monitoring function allows you to listen to the Standby frequency in the Com radio, while monitoring the Active frequency for activity.

1. Touch the **Monitor** key to listen to the standby frequency. A small "MON" annunciation is displayed to the right of the Standby frequency. A green bar will show on the **Monitor** key. When the Active frequency receives a signal, the unit will switch automatically to the Active frequency and then switch back to the standby frequency when activity ceases.

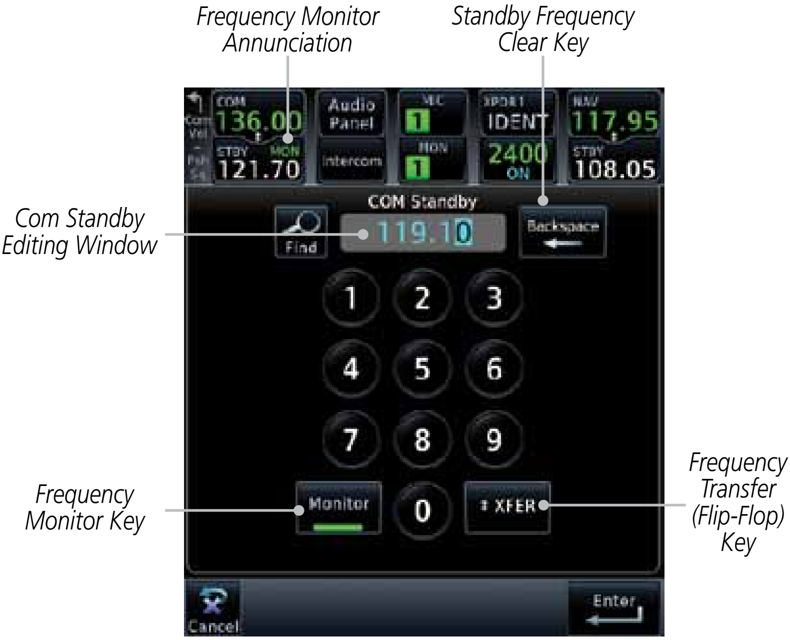

Frequency Monitor Annunciation
Standby Frequency Clear Key
Com Standby Editing Window
Frequency Monitor Key
Frequency Transfer (Flip-Flop) Key
COM
136.00
STBY
MON
121.70
Audio Panel
Intercom
VLC
1
MON
1
XPDR1
IDENT
2400
ON
NAV
117.95
STBY
108.05
COM Standby
Find
119.10
Backspace
1
2
3
4
5
6
7
8
9
Monitor
0
XFER
Cancel
Enter

Figure 3-19 Com Frequency Monitoring

2. The Monitor function is deactivated when you touch the **Monitor** key again and the green bar is extinguished.

NOTE: *The Com radio Monitoring function is different than the Monitor function of the Audio Panel.*

3.5 NAV (VOR/Localizer/Glideslope) Receiver Operations

The GTN 750 includes digitally-tuned Nav/localizer and glideslope receivers with the desired frequency selected on the *Nav window*, along the top right-hand side of the display. Frequency selection is performed by pressing the **small right** knob to activate Nav Standby frequency editing and then turning the **small** and **large right** knobs or keypad to select the desired frequency.

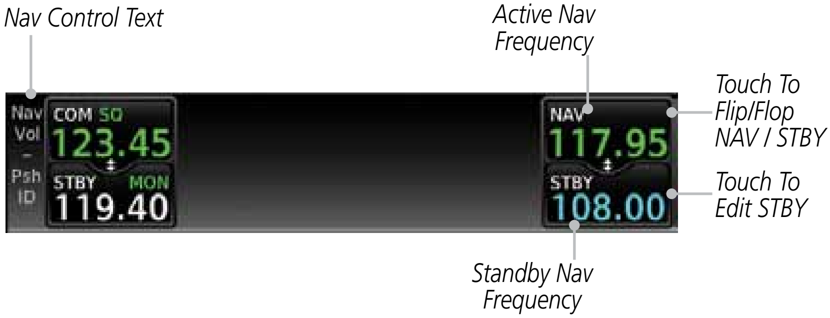

Nav Control Text
Active Nav Frequency
Touch To Flip/Flop NAV / STBY
Touch To Edit STBY
Standby Nav Frequency
Nav Vol - Psh ID
COM 50
123.45
STBY
MON
119.40
NAV
117.95
STBY
108.00

Figure 3-20 Nav Frequency Window

3.5.1 Ident Audio and Volume

Nav ident is enabled by pressing the **Volume** knob when the Nav window is active. When Nav ident is enabled, the ID annunciation will appear in the active Nav window. When the Nav function is enabled, the Nav Standby channel window will highlight briefly and then turn to blue text. The Nav Standby frequency will be active for editing for about 30 seconds before the Com Standby frequency becomes active for editing.

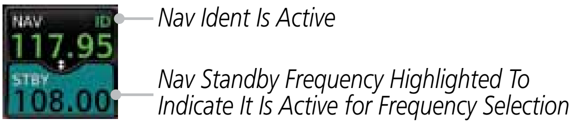

Nav Ident Is Active
Nav Standby Frequency Highlighted To Indicate It Is Active for Frequency Selection
NAV
ID
117.95
STBY
108.00

Figure 3-21 Nav Standby Frequency Window and Ident is Active

Nav audio volume is adjusted using the **Volume** knob. Turn the **Volume** knob clockwise to increase volume, or counterclockwise to decrease volume.

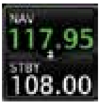
3.5.2 Nav Tuning Window

Nav frequencies are selected with the tuning cursor in the standby Nav frequency field, and using the **small** and **large right** knobs to dial in the desired frequency. The keypad may also be used for frequency entry after touching the Standby window. The standby frequency always appears below the active frequency. The active frequency is the frequency currently in use.

***NOTE:** Tuning is normally active in the Com window, unless placed in the Nav window by pressing the **small right** knob. When the tuning cursor is in the Nav window, it automatically returns to the Com window after 30 seconds of inactivity. The active frequency in either window cannot be accessed directly — only the standby frequency is active for editing.*

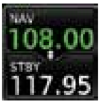
To select a VOR/localizer/ILS frequency:

1. Touch the **small right** knob momentarily to make the Nav Standby frequency value active for editing. The window will be highlighted momentarily.
2. Turn the **large right** knob to select the desired megahertz (MHz) value. For example, the “117” portion of the frequency “117.80”.
3. Turn the **small right** knob to select the desired kilohertz (kHz) value. For example, the “.80” portion of the frequency “117.80”.



NAV
117.95
STBY
108.00

4. Touch the Nav active (top) frequency to make the standby frequency.



NAV
108.00
STBY
117.95

5. The Active (top) and Standby frequencies will switch.

3.5.3 Nav Frequency Finding

The GTN 750's frequency finding feature allows you to quickly select any displayed database Nav frequency as your standby frequency.

To select a Nav frequency for a User created frequency, Recent selected frequency, Nearest airport, or from your Flight Plan:

1. While viewing the numeric keypad touch the **Find** key at the bottom of the display. Categories for User, Recent, Nearest, and Flight Plan are available.

Recent
Nearest
Flight Plan
User

2. Touch the **User**, **Recent**, **Nearest**, or **Flight Plan** key. A list of frequencies for the Nearest airports will be displayed.

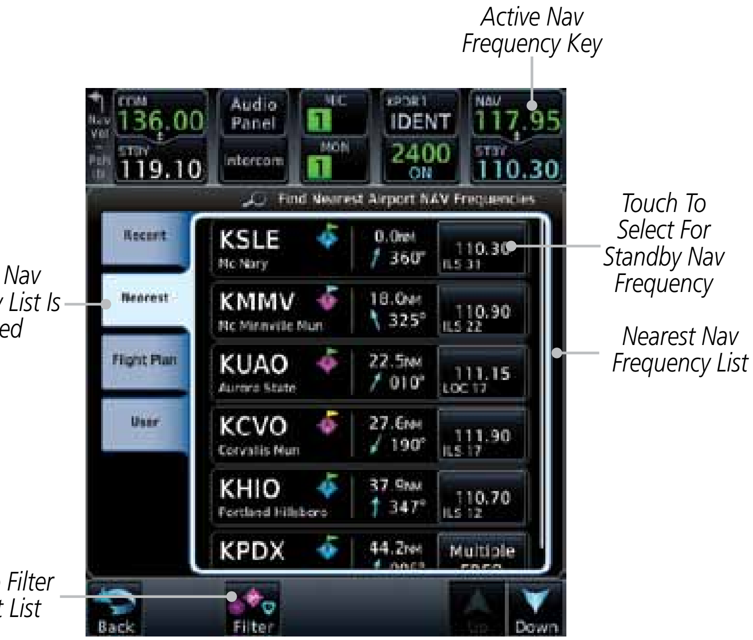
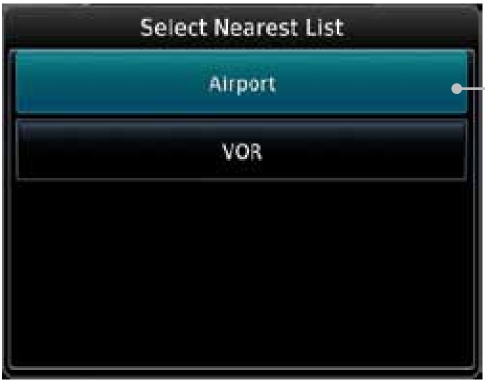

Active Nav Frequency Key
COM 136.00
STBY 119.10
Audio Panel
Intercom
REC 1
MON 1
XPDR1 IDENT
2400 ON
NAV 117.95
STBY 110.30
Find Nearest Airport NAV Frequencies
Recent
Nearest
Flight Plan
User
KSLE Mc Nary 0.0NM 360° 110.30 ILS 31
KMMV Mc Minnville Mun 18.0NM 325° 110.90 ILS 22
KUAO Aurora State 22.5NM 010° 111.15 LOC 17
KCVO Corvallis Mun 27.6NM 190° 111.90 ILS 17
KHIO Portland Hillsboro 37.9NM 347° 110.70 ILS 12
KPDX 44.2NM Multiple
Back
Filter
Up
Down
Nearest Nav Frequency List Is Selected
Touch To Select For Standby Nav Frequency
Nearest Nav Frequency List
Touch to Filter Nearest List

Figure 3-22 Nearest Airport Nav Frequency

3. Touch the desired Nav frequency to select it and place it into the Nav Standby window.

OR

4. Touch the **Filter** key to narrow the list by category, such as Airport and VOR, and then select a given frequency.



Touch To Select Nearest Frequency List Type

Figure 3-23 Nearest Nav Frequency List

4 FLIGHT PLANS

The GTN 7XX lets you create up to 99 different flight plans, with up to 100 waypoints in each flight plan. The Flight Plan function is accessed by touching the **Flight Plan** key on the Home page. The Flight Plan function allows you to create, store, edit, and copy flight plans.

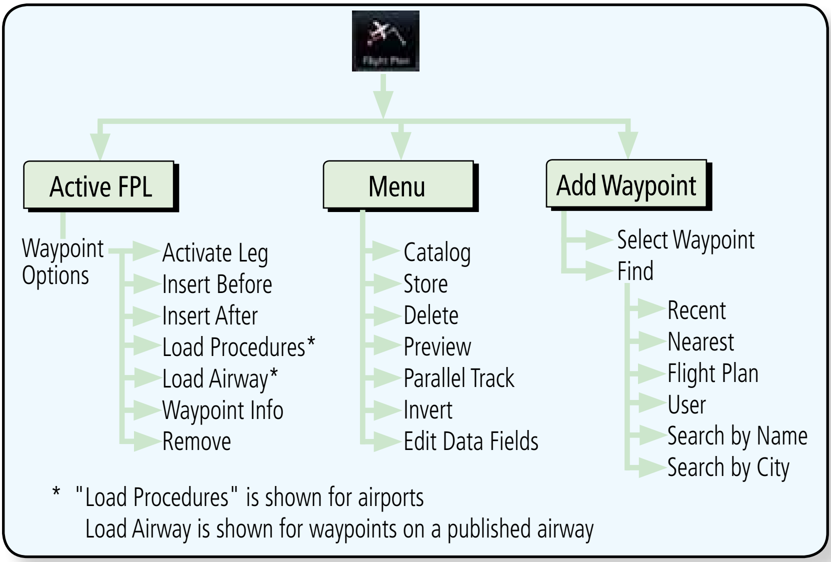

Flight Plan
Active FPL
Menu
Add Waypoint
Waypoint Options
Activate Leg
Insert Before
Insert After
Load Procedures*
Load Airway*
Waypoint Info
Remove
Catalog
Store
Delete
Preview
Parallel Track
Invert
Edit Data Fields
Select Waypoint
Find
Recent
Nearest
Flight Plan
User
Search by Name
Search by City
* "Load Procedures" is shown for airports
Load Airway is shown for waypoints on a published airway

Figure 4-1 Flight Plan Functional Diagram

***NOTE:** The Chart feature provides a digital representation of a paper chart and provides no vertical or lateral course guidance. Flight Plan and Procedures are separate from Charts, and do provide vertical and lateral course guidance for the loaded route or procedure shown on the Flight Plan page. The term "Chart Unavailable" means that the chart cannot be viewed on the Charts due to either a chart not being published, or an error in the Chart database, but does not preclude its availability or inclusion of the procedure in the Flight Plan or Procedures portion of the system. The absence of a chart for a particular Departure, Arrival, or Approach does not preclude its availability or inclusion in the Flight Plan or Procedures portion of the system. The absence of a particular Departure, Arrival, or Approach under the Flight Plan or Procedures portion of the system does not preclude the ability to view the Chart for that procedure under the Chart feature.*

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

4.1 Creating a New Flight Plan

4.1.1 Creating a New Flight Plan in the Catalog

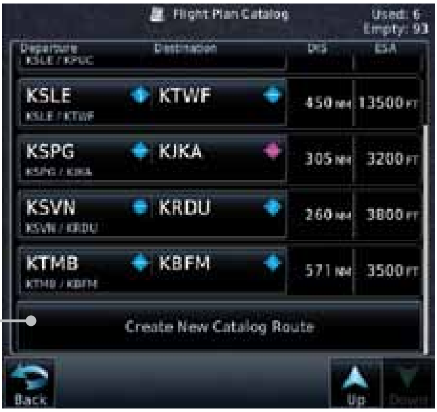
Flight Plan

1. From the Home page, touch **Flight Plan**.

2. Touch **Menu** and then the **Catalog** key.

Create New Catalog Route

3. Touch the **Create New Catalog Route** key at the end of the flight plan list in the Catalog.

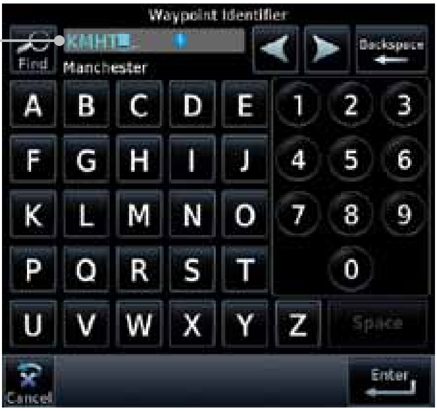

Flight Plan Catalog
Used: 6
Empty: 93
Departure
KSLE / KPUC
Destination
DIS
ESA
KSLE
KTWF
KSLE / KTWF
450 NM
13500 FT
KSPG
KJKA
KSPG / KJKA
305 NM
3200 FT
KSVN
KRDU
KSVN / KRDU
260 NM
3800 FT
KTMB
KBFM
KTMB / KBFM
571 NM
3500 FT
Create New Catalog Route
Back
Up
Down

Touch To Create New Flight Plan

Figure 4-2 Create a New Catalog Route (Flight Plan)

Add Waypoint

4. Touch the **Add Waypoint** key and select a waypoint identifier with the alphanumeric keypad. Then, touch **Enter**.


Waypoint Identifier
Find
KMHT
Manchester
Backspace
A
B
C
D
E
1
2
3
F
G
H
I
J
4
5
6
K
L
M
N
O
7
8
9
P
Q
R
S
T
0
U
V
W
X
Y
Z
Space
Cancel
Enter

Selected Flight Plan Waypoint

Figure 4-3 Select a Waypoint for the New Flight Plan

4.1.2 Creating a New Flight Plan from the Active Flight Plan

1. From the Home page, touch **Flight Plan**.

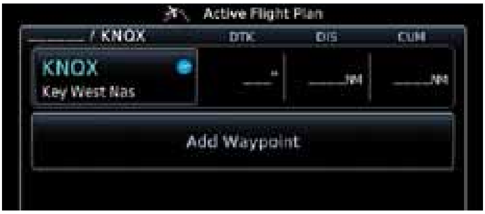
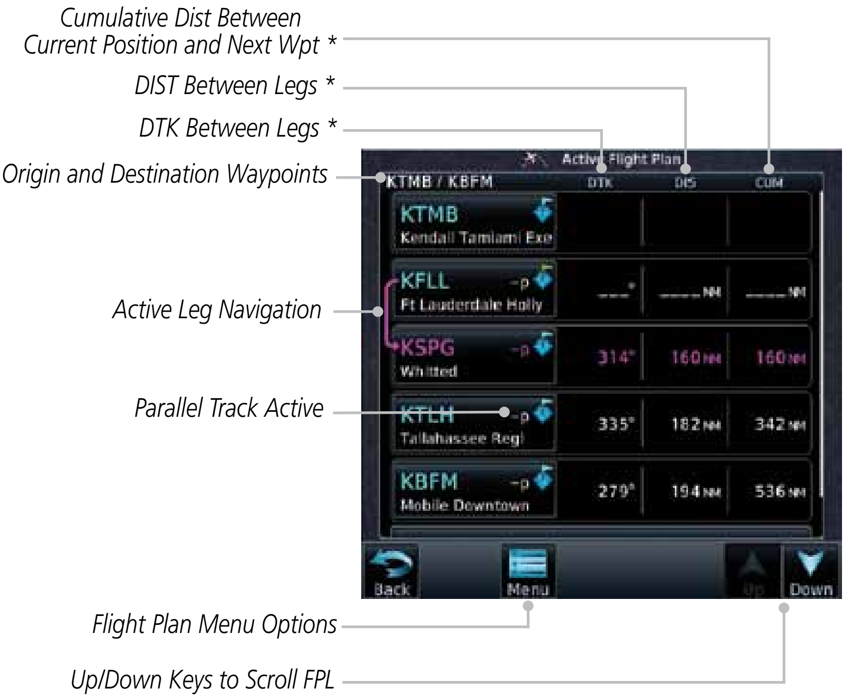


Figure 4-4 Create New Flight Plan by Clearing Active Flight Plan

2. If there is already an Active Flight Plan, touch **Menu** and then the **Delete** and **OK** keys to delete the existing active flight plan. The stored flight plan in the Catalog will not be deleted.
3. Touch the **Add Waypoint** key and select a waypoint identifier with the alphanumeric keypad. Then, touch **Enter**.
4. Touch the **Add Waypoint** key and select the waypoint identifier with the keypad for the next waypoint. Touch **Enter**.
5. Continue adding waypoints as needed.
6. Touch **Menu** and then touch **Store** to store the flight plan in the Catalog. The screen will now display the Flight Plan Catalog and show the new flight plan. Flight plans are listed by the Departure and Destination waypoints.

4.2 Active Flight Plan Page

The Active Flight Plan Page provides information and editing functions for the flight plan currently in use for navigation. Once you have activated a flight plan, the Active Flight Plan Page shows each waypoint for the flight plan, along with the Desired Track (DTK), Distance (DIST) for each leg and Cumulative Distance (CUM). The data fields are user-selectable and may be changed to display Cumulative Distance (CUM), Distance (DIST), Desired Track (DTK), En Route Safe Altitude (ESA), or Estimated Time of Arrival (ETA).


Cumulative Dist Between Current Position and Next Wpt *
DIST Between Legs *
DTK Between Legs *
Origin and Destination Waypoints
Active Leg Navigation
Parallel Track Active
Flight Plan Menu Options
Up/Down Keys to Scroll FPL
Active Flight Plan
Back
Menu
Up
Down

KTMB / KBFM	DTK	DIS	CUM
KTMB Kendall Tamiami Exe			
KFLL Ft Lauderdale Holly	---°	----NM	----NM
KSPG Whitted	314°	160NM	160NM
KTLH Tallahassee Regl	335°	182NM	342NM
KBFM Mobile Downtown	279°	194NM	536NM

Figure 4-5 Active Flight Plan Page

* The field types may be changed using the Edit Fields function in the Flight Plan page Menu.

4.2.1 Waypoint Options

KMHT
Manchester

1. While viewing the Active Flight Plan page, touch the desired flight plan waypoint. The Waypoint Options window will be shown.

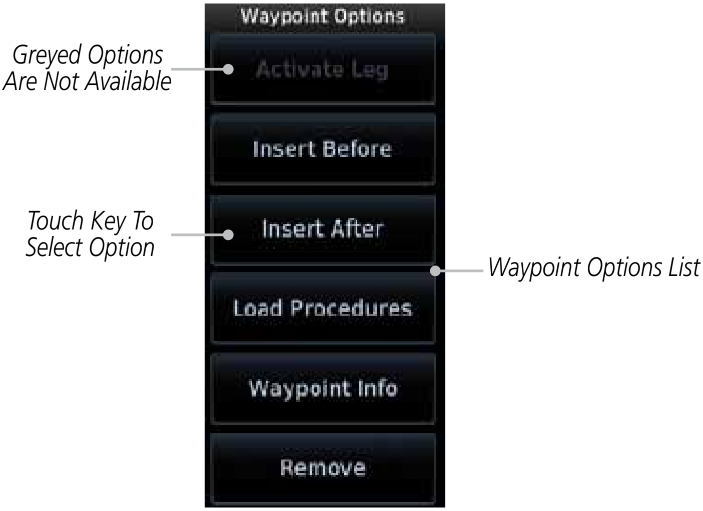

Waypoint Options
Activate Leg
Insert Before
Insert After
Load Procedures
Waypoint Info
Remove
Greyed Options Are Not Available
Touch Key To Select Option
Waypoint Options List

Figure 4-6 Active Flight Plan Wpt Options

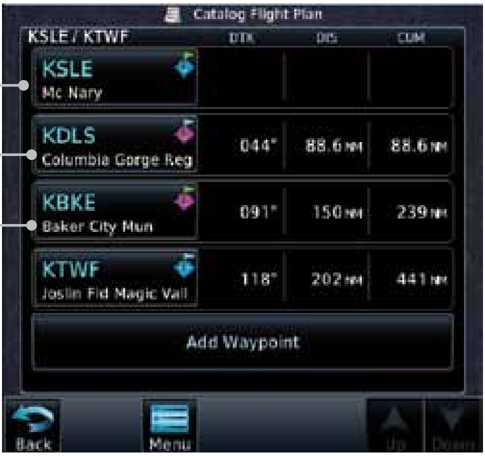
2. Touch one of the options to perform the selected action. Cancel the option selection by touching the **Back** key.

4.2.1.1 Activate Leg

The Activate Leg option allows you to change the active leg of a flight plan.

Activate Leg

1. On the Waypoint Options menu, touch the desired TO waypoint and then the **Activate Leg** key to select the TO waypoint as the active leg for navigation.


Catalog Flight Plan
Back
Menu
Up
Down

KSLE / KTWF	DTK	DIS	CUM
KSLE Mc Nary			
KDLS Columbia Gorge Reg	044°	88.6 NM	88.6 NM
KBKE Baker City Mun	091°	150 NM	239 NM
KTWF Joslin Fld Magic Vall	118°	202 NM	441 NM

Add Waypoint

Current Leg

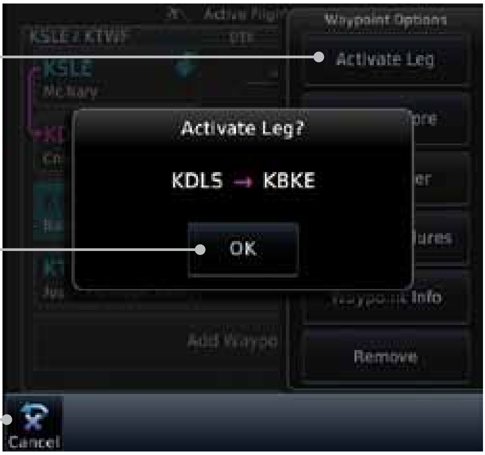
Current TO Wpt

Touch to Select As New TO Wpt and To Activate Leg

Figure 4-7 Active Flight Plan Activate Leg Option

OK

2. Touch the **OK** key to set the selected leg as the Active Leg, or **Cancel** to not select it.


Active Flight
KSLE / KTWF
DTK
KSLE
Mc Nary
Waypoint Options
Activate Leg
Remove
Waypoint Info
Add Waypo
Cancel

Activate Leg?

KDLS → KBKE

OK

Activate Leg Option Was Selected

Touch OK To Activate Leg

Touch Cancel To Cancel The Operation And Return To the Flight Plan View

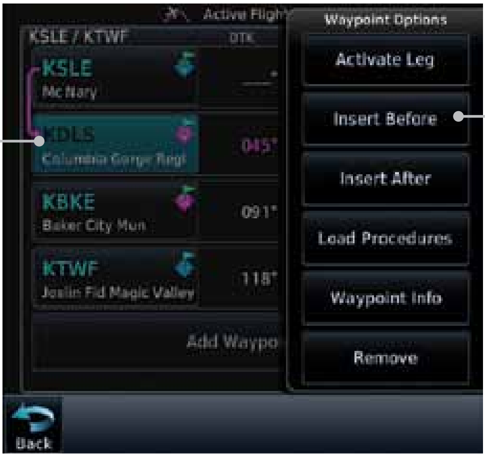
Figure 4-8 Active Flight Plan Activate Leg Option

4.2.1.2 Insert Before

The Insert Before option allows you to insert a new waypoint into the active flight plan before the selected waypoint.

KRTV
Burlington Intl

1. On the Active Flight Plan page, touch the desired waypoint in the flight plan. The Waypoint Options list will be displayed.


Active Flight
KSLE / KTWF
DTK
KSLE
Mc Nary
KDLS
Columbia Gorge Rgnl
045°
KBKE
Baker City Mun
091°
KTWF
Joslin Fld Magic Valley
118°
Add Waypo
Waypoint Options
Activate Leg
Insert Before
Insert After
Load Procedures
Waypoint Info
Remove
Back

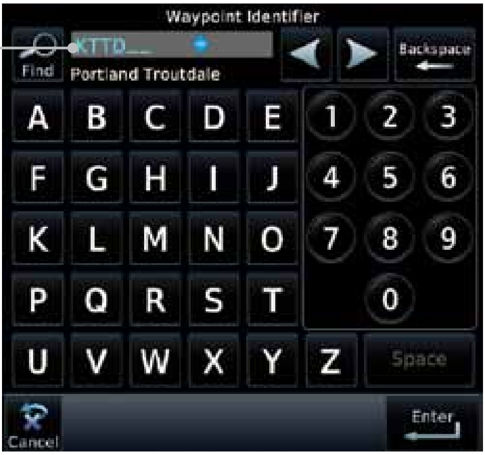
Option Will Insert New Waypoint Before This Selected Flight Plan Waypoint

Insert Before Option Was Selected

Figure 4-9 Active Flight Plan Insert Waypoint Before Option

Insert Before

2. Touch the **Insert Before** key to select a new waypoint before the selected waypoint.
3. Select a waypoint identifier with the alphanumeric keypad.

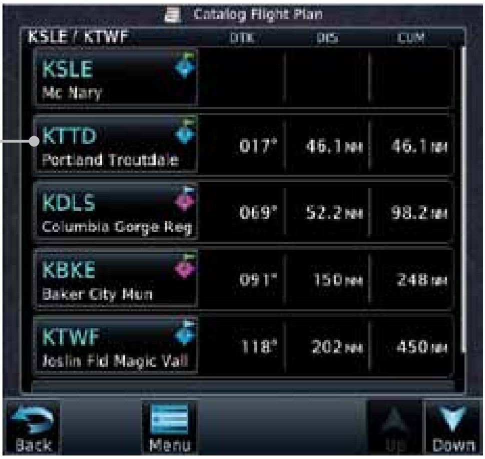

Waypoint Identifier
Find
KTTD
Portland Troutdale
Backspace
A
B
C
D
E
1
2
3
F
G
H
I
J
4
5
6
K
L
M
N
O
7
8
9
P
Q
R
S
T
0
U
V
W
X
Y
Z
Space
Cancel
Enter

Choose New Waypoint To "Insert Before" The Selected Flight Plan Waypoint

Figure 4-10 Use the Alphanumeric Keypad to Select Waypoint to Insert Before

4. Then, touch **Enter** to confirm the selection, or touch **Cancel** to cancel any changes. The new flight plan will be shown.

New Waypoint Inserted Before The Selected Flight Plan Waypoint



Catalog Flight Plan

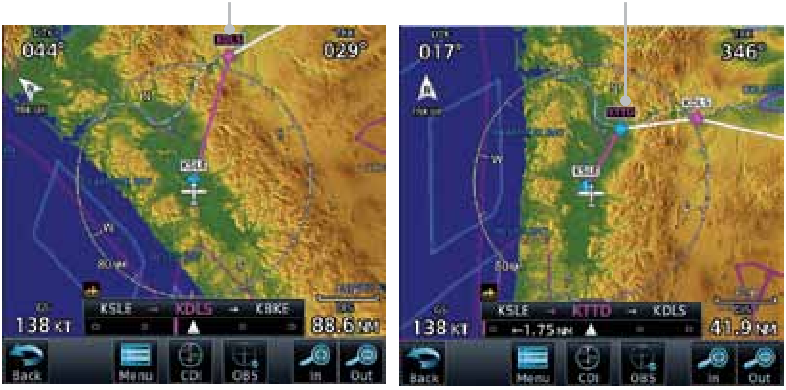
KSLE / KTWF	DTK	DIS	CUM
KSLE Mc Nary			
KTTD Portland Troutdale	017°	46.1NM	46.1NM
KDLS Columbia Gorge Reg	069°	52.2NM	98.2NM
KBKE Baker City Mun	091°	150NM	248NM
KTWF Joslin Fld Magic Vall	118°	202NM	450NM

Back
Menu
Up
Down

Figure 4-11 New Waypoint Is Inserted Before the Selected Waypoint

Selected Flight Plan Waypoint

New Flight Plan Waypoint



044°
029°
138KT
KSLE → KDLS → KBKE
88.6NM
Back
Menu
CDI
OBS
In
Out
017°
346°
138KT
KSLE → KTTD → KDLS
←1.75NM
41.9NM
Back
Menu
CDI
OBS
In
Out

Figure 4-12 Flight Plan Before and After New Waypoint Inserted

4.2.1.3 Insert After

The Insert Before option allows you to insert a new waypoint into the active flight plan after the selected waypoint.

1. On the Active Flight Plan page, touch the desired waypoint in the flight plan. The Waypoint Options list will be displayed.

Insert After

2. Touch the **Insert After** key to select a new waypoint after the selected waypoint.

Enter

3. Select a waypoint identifier with the alphanumeric keypad. Then, touch **Enter** to confirm the selection, or touch the **Cancel** key to cancel the operation and return to the Waypoint Options window.

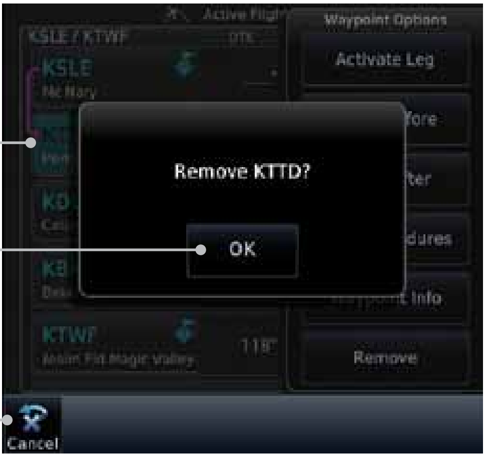
4.2.1.4 Remove

The Remove option allows you to remove the selected waypoint from the active flight plan.

1. On the Active Flight Plan page, touch the desired waypoint in the flight plan. The Waypoint Options list will be displayed.

Delete

2. On the Waypoint Options menu, touch the **Remove** key to delete the selected waypoint from the active flight plan.


Active Flight
KSLE / KTWF
DTK
KSLE
McNary
KO
KT
KTWF
Joslin Fld Magic Valley
118°
Waypoint Options
Activate Leg
fore
fter
dures
Waypoint Info
Remove
Remove KTTD?
OK
Cancel

Waypoint Selected To Be Removed

Touch OK To Remove Waypoint

Touch Cancel To Cancel The Operation And Return To the Flight Plan View

Figure 4-13 Active Flight Plan Remove Waypoint Option

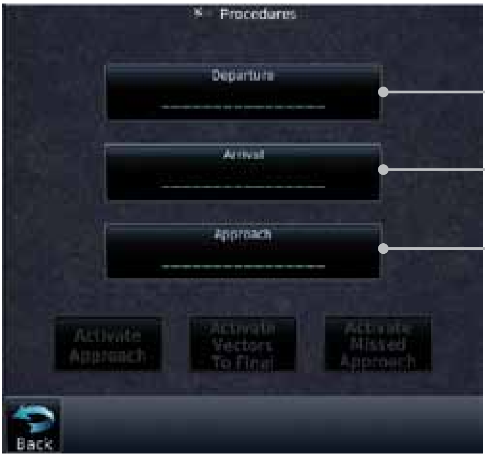
4.2.1.5 Load Procedures

The Load Procedure selection from the Waypoint Options will start the Procedures function. See the Procedures section for complete information.

1. On the Active Flight Plan page, touch the desired waypoint in the flight plan. The Waypoint Options list will be displayed.

Load Procedures

2. Touch the **Load Procedures** key to go to the Procedure function for adding procedures to the selected flight plan.


Procedures
Departure
Arrival
Approach
Activate Approach
Activate Vectors To Final
Activate Missed Approach
Back

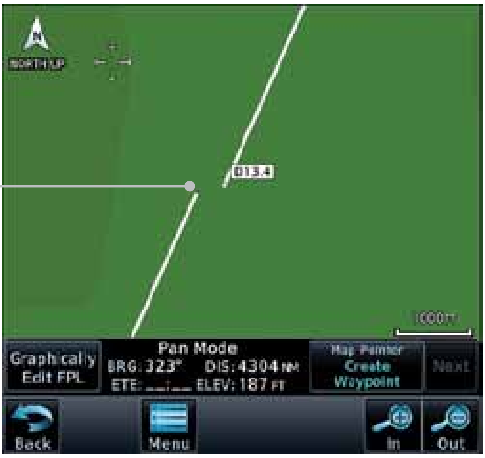
Touch to Select an Approach

Touch to Select an Arrival

Touch to Select a Departure

Figure 4-14 Load Procedures Wpt Option

***NOTE:** For some procedures, due to very small position differences in the database, consecutive flight plan legs do not match up. The total effect on navigational guidance is negligible. The LOC BC 14 at KSLE via UBG shown below is an example of this.*


NORTH UP
013.4
1000 FT
Graphically Edit FPL
Pan Mode
BRG: 323°
DIS: 4304 NM
ETE: __:__
ELEV: 187 FT
Map Pointer Create Waypoint
Next
Back
Menu
In
Out

Procedure Flight Plan Leg Discrepancy

Figure 4-15 Procedure Flight Plan Leg Position Difference

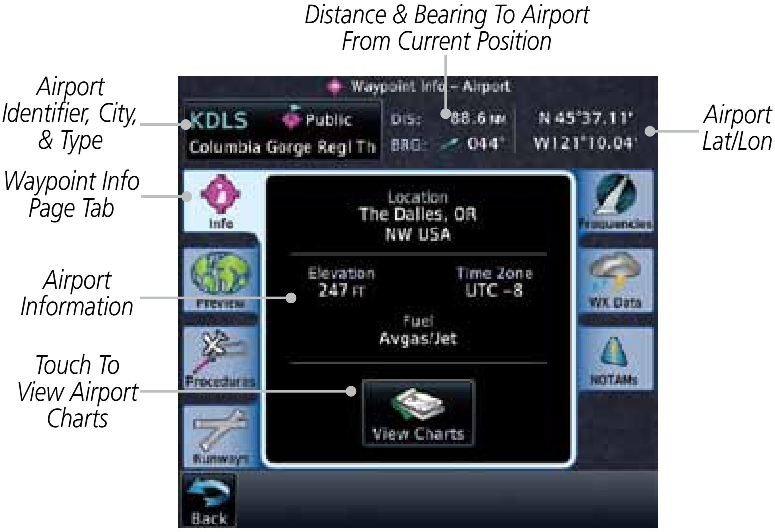
4.2.1.6 Waypoint Info

The Waypoint Info option allows you to view information about the selected waypoint in the Waypoint Info function. See the Waypoint Info section for complete information.

1. On the Active Flight Plan page, touch the desired waypoint in the flight plan. The Waypoint Options list will be displayed.

Waypoint Info

2. One Waypoint Options menu, touch the **Waypoint Info** key to view information about the selected waypoint.


Distance & Bearing To Airport From Current Position
Airport Identifier, City, & Type
Airport Lat/Lon
Waypoint Info Page Tab
Airport Information
Touch To View Airport Charts
Waypoint Info – Airport
Info
Preview
Procedures
Runways
Frequencies
WX Data
NOTAMs
View Charts
Back

KDLS Public
Columbia Gorge Regl Th
DIS: 88.6 NM
BRG: 044°
N 45°37.11'
W121°10.04'
Location
The Dalles, OR
NW USA
Elevation
247 FT
Time Zone
UTC -8
Fuel
Avgas/Jet

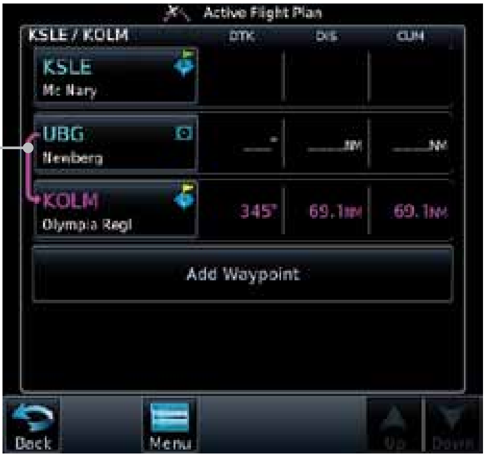
Figure 4-16 Active Flight Plan Wpt Info

3. Touch the **Back** key to return to the Active Flight Plan page.

4.2.2 Airways

Airways may be added as legs in flight plans with any waypoint that is part of an airway, such as a VOR.

1. On the Active Flight Plan page, touch the desired VOR entry waypoint in the flight plan. The Waypoint Options list will then be displayed.

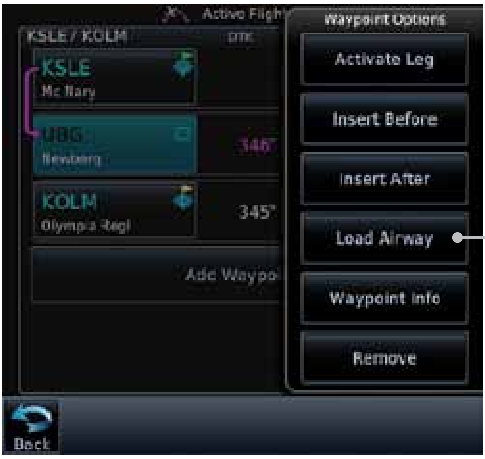

Active Flight Plan
KSLE / KOLM
DTK
DIS
CUM
KSLE
Mc Nary
UBG
Newberg
___°
___NM
___NM
KOLM
Olympia Regl
345°
69.1NM
69.1NM
Add Waypoint
Back
Menu
Up
Down

Touch VOR Entry Wpt To Insert Airway

Figure 4-17 Active Flight Plan with VOR Entry Wpt

Load Airway

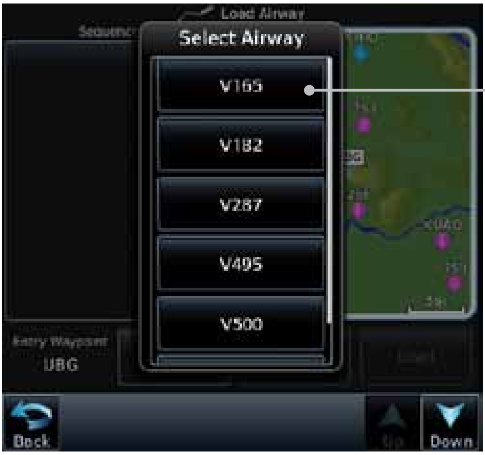
2. Touch the **Load Airway** key to select an airway for the selected entry waypoint.


Active Flight
KSLE / KOLM
DTK
KSLE
Mc Nary
UBG
Newberg
346°
KOLM
Olympia Regl
345°
Add Waypo
Waypoint Options
Activate Leg
Insert Before
Insert After
Load Airway
Waypoint Info
Remove
Back

Touch To Insert Airway

Figure 4-18 Select Load Airway from the Waypoint Options

3. Touch the desired airway to select it.

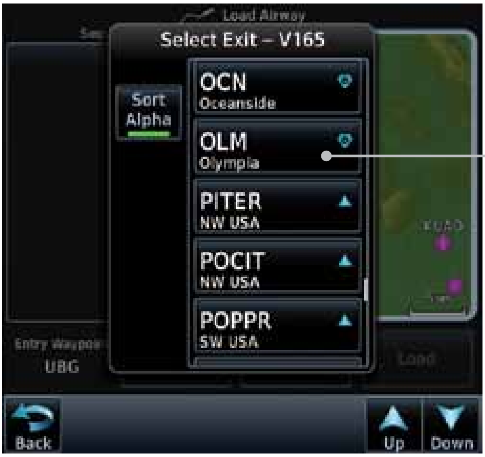

Load Airway
Sequence
Select Airway
V165
V182
V287
V495
V500
Entry Waypoint
UBG
Load
Back
Up
Down

Touch To Insert Selected Airway

Figure 4-19 Select an Airway from the List

Sort Alpha

4. Scroll through the list and touch the desired exit point from the airway. The Airway list can be sorted by distance or alphabetically. Touch the **Sort Alpha** key to toggle the sort setting.

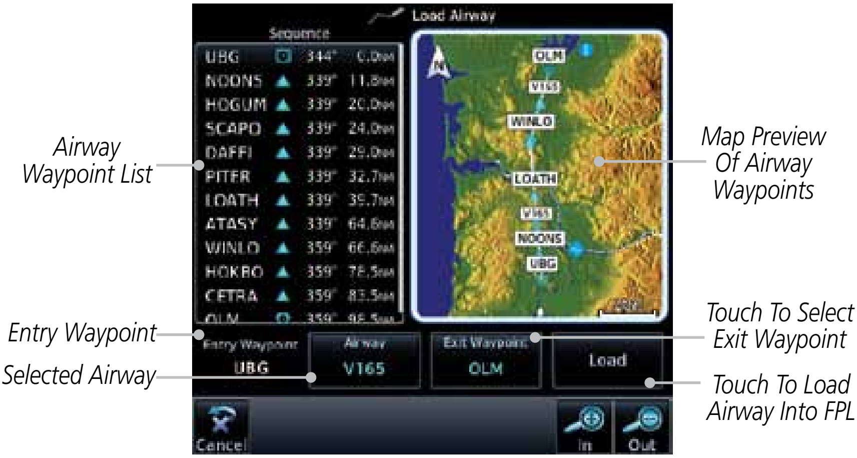

Load Airway
Select Exit – V165
Sort Alpha
OCN
Oceanside
OLM
Olympia
PITER
NW USA
POCIT
NW USA
POPPR
SW USA
Entry Waypoint
UBG
Load
Back
Up
Down

Touch To Select Exit Waypoint

Figure 4-20 Select an Exit Waypoint for the Airway

Load

5. Confirm the airway information and then touch **Load** to insert the selected airway into the flight plan. Use the **In** and **Out** keys, and drag the map with your finger to view the airway detail. If changes are desired, touch the **Airway** or **Exit Waypoint** keys to select alternate choices.


Load Airway
Airway Waypoint List
Map Preview Of Airway Waypoints
OLM
V165
WINLO
LOATH
V165
NOONS
UBG
Entry Waypoint
Selected Airway
Touch To Select Exit Waypoint
Touch To Load Airway Into FPL
Cancel
In
Out

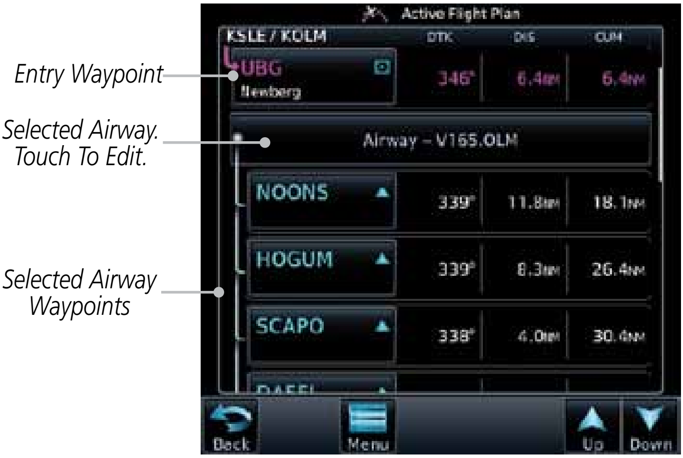
Sequence

UBG	344°	0.0NM
NOONS	339°	11.8NM
HOGUM	339°	20.0NM
SCAPO	339°	24.0NM
DAFFI	339°	29.0NM
PITFR	339°	32.7NM
LOATH	339°	39.7NM
ATASY	339°	64.6NM
WINLO	359°	66.6NM
HOKBO	359°	78.5NM
CETRA	359°	83.5NM
OLM	359°	96.5NM

Entry Waypoint: UBG
Airway: V165
Exit Waypoint: OLM
Load

Figure 4-21 Airway Information

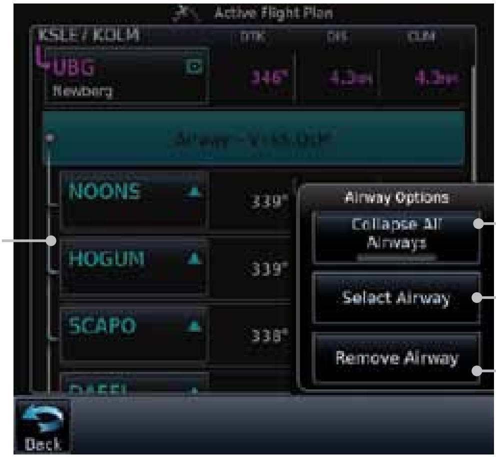
6. After loading the airway, it is inserted into the flight plan. The airway waypoints are shown below the **Airway** key on the display. Touch the airway to make any changes.


Active Flight Plan
Entry Waypoint
Selected Airway. Touch To Edit.
Selected Airway Waypoints
Back
Menu
Up
Down

KSLE / KOLM	DTK	DIS	CUM
UBG Newberg	346°	6.4NM	6.4NM
Airway - V165.OLM			
NOONS	339°	11.8NM	18.1NM
HOGUM	339°	8.3NM	26.4NM
SCAPO	338°	4.0NM	30.4NM
DAFFI			

Figure 4-22 Airway Waypoints in the Flight Plan

7. Touch the **Airway** key to display the Airway Options. Make the desired choice or touch **Back**.


Active Flight Plan
KSLE / KOLM
DTK
DIS
CUM
UBG
Newberg
346°
4.3nm
4.3nm
Airway - V165.OLM
NOONS
339°
HOGUM
339°
SCAPO
338°
DAEEL
Airway Options
Collapse All Airways
Select Airway
Remove Airway
Back

Airway Detail Shown

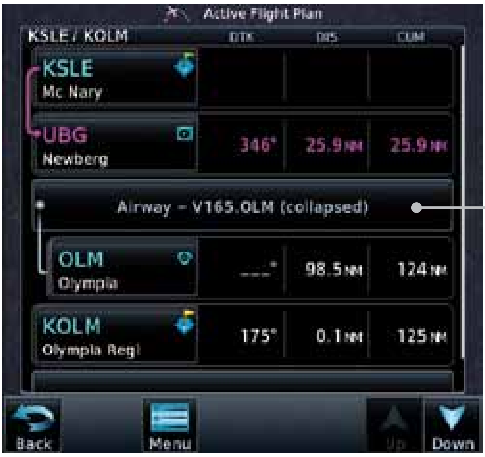
Touch To Collapse Airway Waypoints

Touch To Select New or Change Current Airway

Touch To Remove Airway From Flight Plan

Figure 4-23 Airway Options

8. Touch the **Collapse All Airways** key to collapse the list of points along the airway. Touch the **Collapse All Airways** key again to toggle the display of airway detail back on.


Active Flight Plan
KSLE / KOLM
DTK
DIS
CUM
KSLE
Mc Nary
UBG
Newberg
346°
25.9NM
25.9NM
Airway - V165.OLM (collapsed)
OLM
Olympia
___°
98.5NM
124NM
KOLM
Olympia Regl
175°
0.1NM
125NM
Back
Menu
Up
Down

Touch To Expand Airway Waypoints

Figure 4-24 Airways Collapsed In Flight Plan

4.3 Flight Plan Menu

The Flight Plan Menu provides access to functions to manage your flight plans. The functions included are: View Catalog, Store Flight Plan, Delete Flight Plan, Preview Flight Plan, Parallel Track, Invert Flight Plan, and Edit Data Fields.

Touch the **Menu** key to access the Flight Plan Menu options: View Catalog, Store Flight Plan, Delete Flight Plan, Preview Flight Plan, Parallel Track, Invert Flight Plan, and Edit Data Fields.

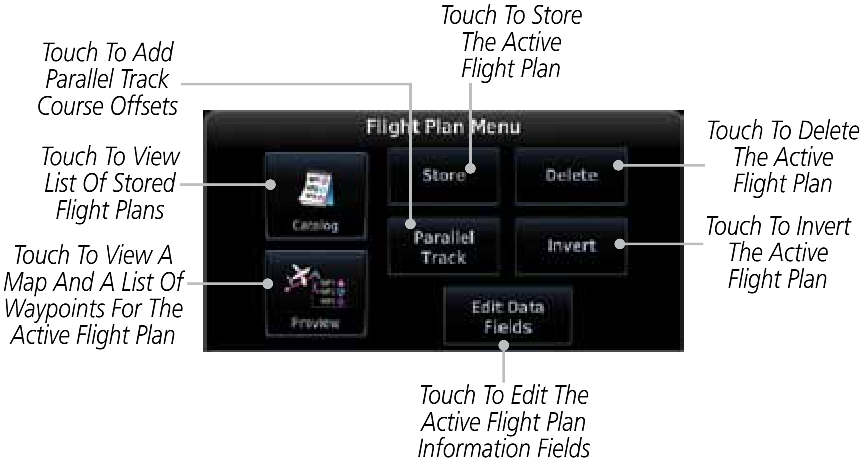

Touch To Store The Active Flight Plan
Touch To Add Parallel Track Course Offsets
Touch To View List Of Stored Flight Plans
Touch To View A Map And A List Of Waypoints For The Active Flight Plan
Flight Plan Menu
Catalog
Store
Delete
Parallel Track
Invert
Preview
Edit Data Fields
Touch To Delete The Active Flight Plan
Touch To Invert The Active Flight Plan
Touch To Edit The Active Flight Plan Information Fields

Figure 4-25 Flight Plan Menu

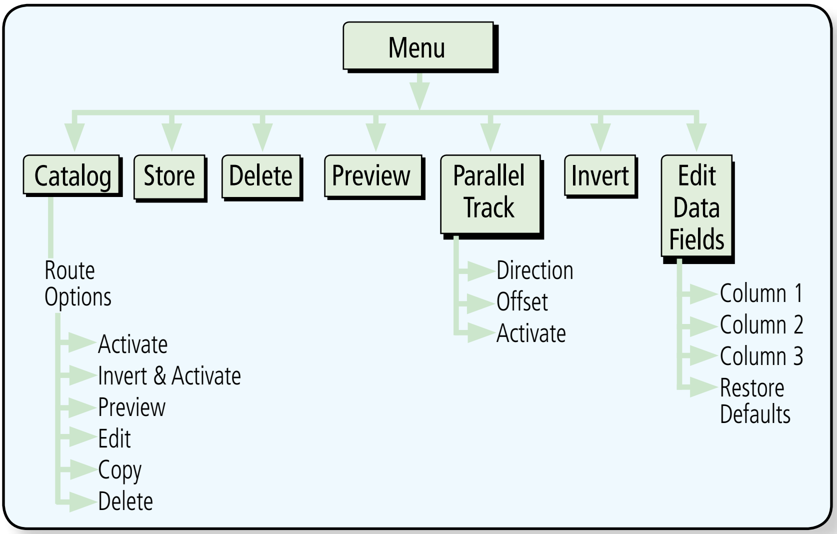
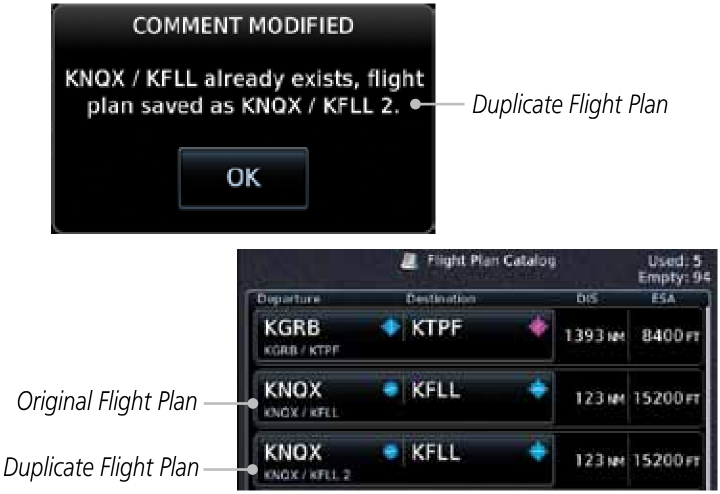

Menu
Catalog
Store
Delete
Preview
Parallel Track
Invert
Edit Data Fields
Route Options
Activate
Invert & Activate
Preview
Edit
Copy
Delete
Direction
Offset
Activate
Column 1
Column 2
Column 3
Restore Defaults

Figure 4-26 Flight Plan Menu Functional Diagram

4.3.1 Store Flight Plan

A newly created flight plan or one that has been modified must be saved to the Catalog to be used in future flights. The Store Flight Plan function will save the Active Flight Plan to the Catalog.

1. While viewing the Active Flight Plan page, touch the **Menu** key. The Flight Plan Menu will be displayed.
2. Touch the **Store** key to store the current Active Flight Plan into the Catalog. The flight plan will be named by the beginning and ending waypoints.
3. When a duplicate flight plan is created, a warning dialog will appear and the flight plan will be saved with a numeral at the end of the destination waypoint.



COMMENT MODIFIED

KNOX / KFLL already exists, flight plan saved as KNOX / KFLL 2.

Departure	Destination	DIS	ESA
KGRB KGRB / KTPF	KTPF	1393 NM	8400 FT
KNOX KNOX / KFLL	KFLL	123 NM	15200 FT
KNOX KNOX / KFLL 2	KFLL	123 NM	15200 FT

Figure 4-27 Duplicate Flight Plan Naming

4.3.2 Invert Flight Plan

The Invert Flight Plan option allows you to reverse the Active flight plan and use it for navigation guidance back to your original departure point. The original flight plan stored in the catalog is not affected.

1. While viewing the Active Flight Plan page, touch the **Menu** key. The Flight Plan Menu will be displayed.
2. Touch the **Invert** key to invert the current Active Flight Plan.

4.3.3 Parallel Track

Parallel Track allows you to create a parallel course offset of 1 to 99 NM to the left or right of your current flight plan. After setting a parallel track to your current flight plan, a magenta parallel track line will be drawn offset from the original by the selected distance. The original course line will be drawn in grey. The aircraft will navigate to the parallel track course line and external CDI/HSI guidance will be driven from the parallel track.

When you reach the end of the flight plan, a message will state, "Parallel offset terminating in X seconds." The message will be given when the aircraft reaches the offset distance from the end of the parallel track. This will give the pilot sufficient time to intercept the original course.

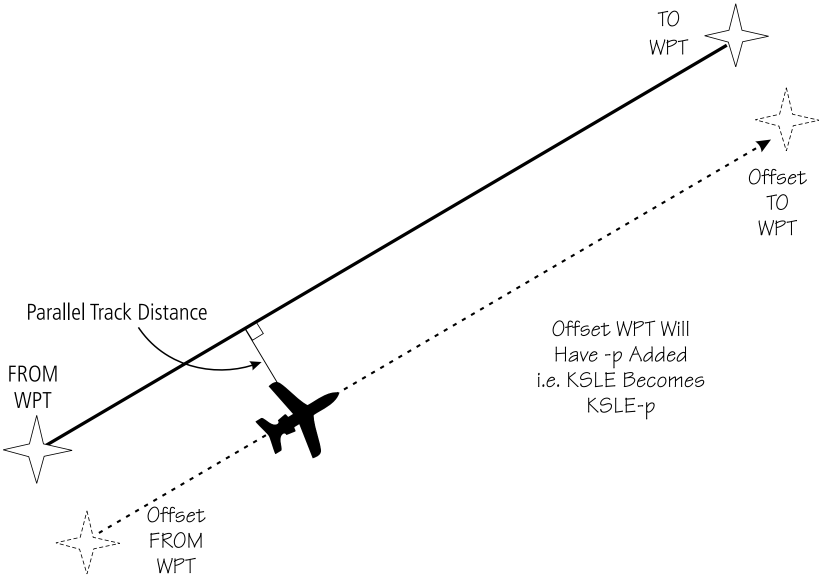


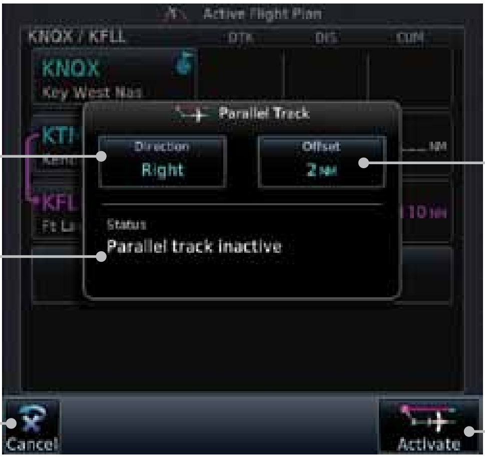
Figure 4-28 Parallel Track Description

NOTE: *Parallel track will be cancelled when graphically editing a flight plan.*

NOTE: Certain leg types (such as approach) or leg geometries (changes in desire track greater than 120 degrees), combined with large offset values do not support parallel track. Default direction and offset values may result in the status indicating that parallel track is not supported. The user must enter the desired parallel track offset and distance to determine whether that flight plan, combined with the offset and distance, support parallel track.

Parallel Track

1. While viewing the Flight Plan page, touch the **Menu** key, and then the **Parallel Track** key.


Active Flight Plan
KNOX / KFLL
DTK
DIS
CUM
KNOX
Key West Nas
KTI
KFL
Ft La
Parallel Track
Cancel
Activate

Direction Right

Offset 2 NM

Status Parallel track inactive

Touch To Set PTK Direction

PTK Status

Touch To Cancel Settings

Touch To Set PTK Distance

Touch To Activate PTK Settings

Figure 4-29 Parallel Track Selection

Direction
Right

2. Touch the **Direction** key to toggle the Parallel Track to be Left or Right of the current Flight Plan.

3. Touch the **Offset** key to select the Parallel Offset from the current Flight Plan. Select the desired distance on the numeric keypad. Touch **Enter** when finished.

4. Touch the **Activate** key. A magenta "-P" indication will appear to the right of the waypoint name on the Active Flight Plan page.

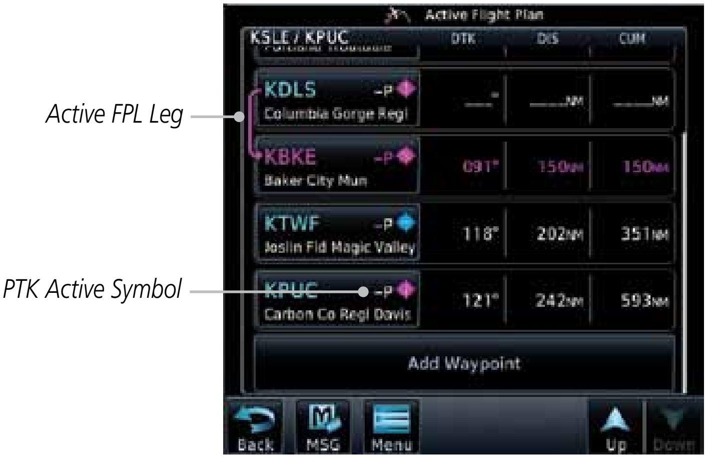

Active FPL Leg
PTK Active Symbol
Active Flight Plan
KSLE / KPUC
DTK
DIS
CUM
KDLS
Columbia Gorge Regl
KBKE
Baker City Mun
091°
150NM
150NM
KTWF
Joslin Fld Magic Valley
118°
202NM
351NM
KPUC
Carbon Co Regl Davis
121°
242NM
593NM
Add Waypoint
Back
MSG
Menu
Up
Down

Figure 4-30 Parallel Track Shown in the Active Flight Plan Page

Menu

Parallel Track

5. To deactivate Parallel Track, while viewing the Active Flight Plan touch the **Menu** key. With the Flight Plan Menu displayed, touch the **Parallel Track** key.

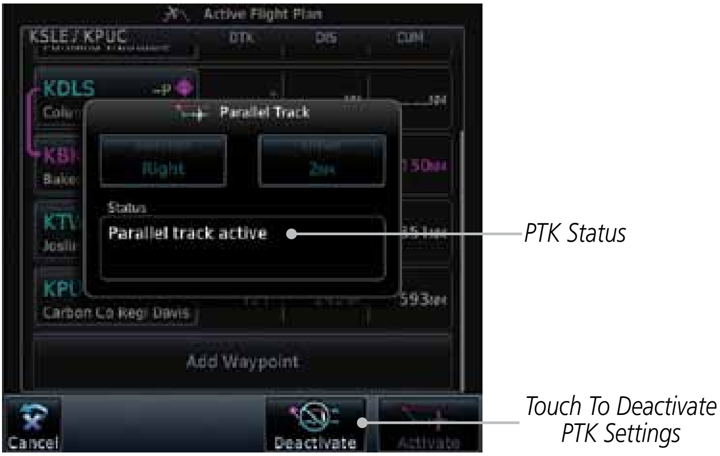

Active Flight Plan
KSLE / KPUC
DTK
DIS
CUM
Parallel Track
Right
2NM
Status
Parallel track active
Add Waypoint
Cancel
Deactivate
Activate
PTK Status
Touch To Deactivate PTK Settings

Figure 4-31 Deactivating Parallel Track

Deactivate

6. Touch the **Deactivate** key to cancel Parallel Tracking.

4.3.4 Edit Data Fields

The Active Flight Plan Page shows each waypoint for the flight plan, along with the Desired Track (DTK), Distance (DIS) for each leg and Cumulative Distance (CUM). The data fields are user-selectable and may be changed to display Cumulative Distance (CUM), Distance (DIS), Desired Track (DTK), En Route Safe Altitude (ESA), Estimated Time of Arrival (ETA), or Estimated Time En route (ETE).

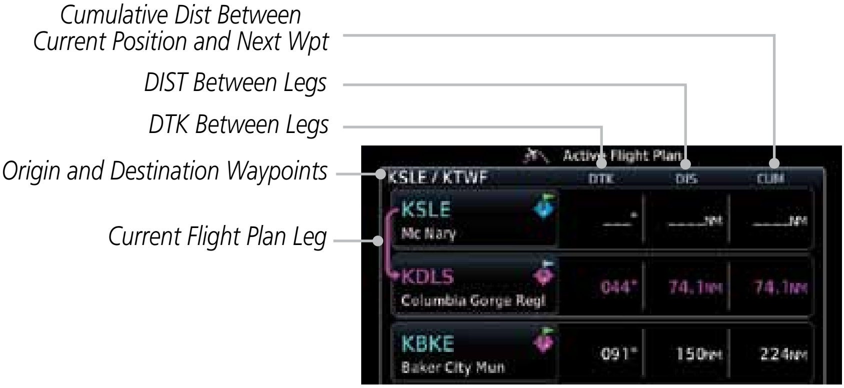

Cumulative Dist Between Current Position and Next Wpt
DIST Between Legs
DTK Between Legs
Origin and Destination Waypoints
Current Flight Plan Leg
Active Flight Plan
KSLE / KTWF
DTK
DIS
CUM
KSLE
Mc Nary
KDLS
Columbia Gorge Regl
044°
74.1NM
74.1NM
KBKE
Baker City Mun
091°
150NM
224NM

Figure 4-32 Flight Plan Data Fields

Menu
Edit Fields

1. While viewing the Flight Plan page, touch the **Menu** key, and then the **Edit Data Fields** key.

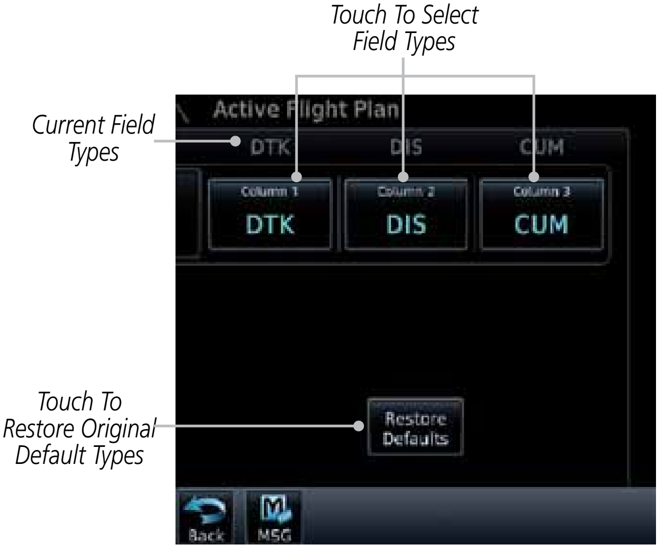
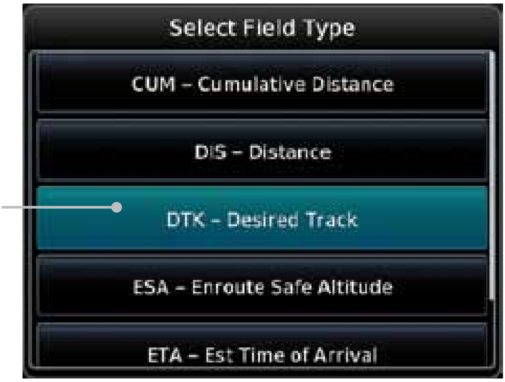

Touch To Select Field Types
Current Field Types
Touch To Restore Original Default Types
Active Flight Plan
DTK
DIS
CUM
Column 1
DTK
Column 2
DIS
Column 3
CUM
Restore Defaults
Back
MSG

Figure 4-33 Flight Plan Edit Data Fields Page

2. Touch one of the field keys to select from the list.


Select Field Type
CUM - Cumulative Distance
DIS - Distance
DTK - Desired Track
ESA - Enroute Safe Altitude
ETA - Est Time of Arrival

Selected Field Type

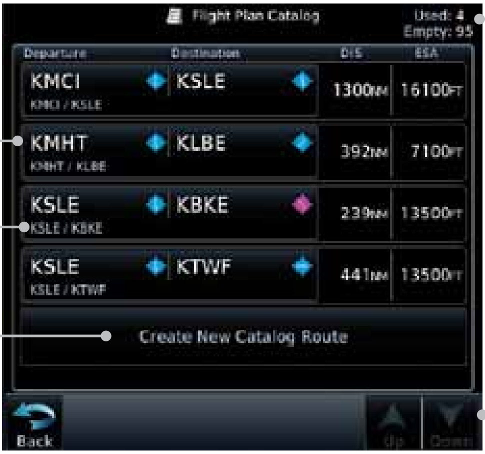
Figure 4-34 Flight Plan Data Fields List

3. Touch the **Up** or **Down** keys as needed, or touch and drag the list, to scroll through the list. Touch the desired Field Type to set it for the selected field.
4. Continue as desired for the other fields.

4.3.5 Flight Plan Catalog Route Options

The Flight Plan Catalog allows you to create, edit, activate, delete and copy flight plans. The catalog can hold up to 99 flight plans of up to 100 waypoints each. Flight plans are named by the Departure and Destination waypoint. Any time you activate a flight plan, a copy of the flight plan is automatically transferred to Active Flight Plan page and overwrites any previously active flight plan.

1. While viewing the Flight Plan page, touch the **Menu** key, and then the **Catalog** key. The list of currently stored flight plans will be displayed.


Flight Plan Catalog
Used: 4
Empty: 95
Create New Catalog Route
Back
Up
Down

Departure	Destination	DIS	ESA
KMCI KMCI / KSLE	KSLE	1300NM	16100FT
KMHT KMHT / KLBE	KLBE	392NM	7100FT
KSLE KSLE / KBKE	KBKE	239NM	13500FT
KSLE KSLE / KTWF	KTWF	441NM	13500FT

Flight Plan Catalog Total

Flight Plan Name

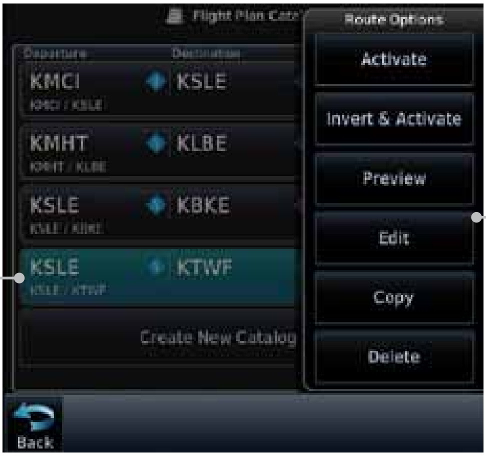
Flight Plan Comment

Touch To Create New Catalog Route (Flight Plan)

Touch Up/ Down Keys To Scroll List

Figure 4-35 Flight Plan Catalog

2. Touch a flight plan to display the Route Options.


Flight Plan Cata
Departure
Destination
KMCI
KSLE
KMCI / KSLE
KMHT
KLBE
KMHT / KLBE
KSLE
KBKE
KSLE / KBKE
KSLE
KTWF
KSLE / KTWF
Create New Catalog
Back
Route Options
Activate
Invert & Activate
Preview
Edit
Copy
Delete

Selected Flight Plan

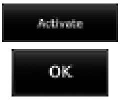
Flight Plan Route Options

Figure 4-36 Flight Plan Catalog Route Options

3. Touch the Route Option key for the desired option to act on the selected flight plan.

4.3.5.1 Catalog Route Option - Activate

1. While viewing the Flight Plan Catalog page, touch the desired flight plan to select it. The Route Options menu will be displayed.



2. Touch the **Activate** key and then touch **OK**. The selected flight plan will be activated.

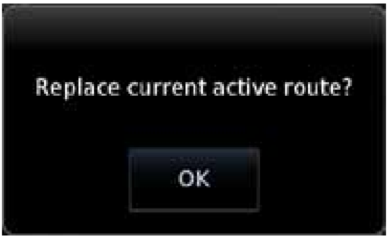

Replace current active route?

Figure 4-37 Touch OK to Replace the Existing Active Flight Plan

3. The Active Flight Plan page will now be displayed.

4.3.5.2 Catalog Route Option - Invert & Activate

1. While viewing the Flight Plan Catalog page, touch the desired flight plan to select it. The Route Options menu will be displayed.

Invert & Activate
OK

2. Touch the **Invert & Activate** key and then touch **OK**. The selected flight plan will be inverted and activated.

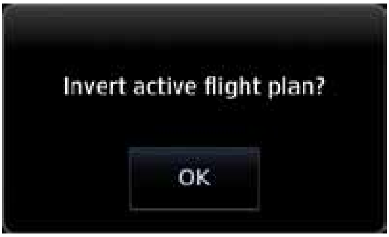

Invert active flight plan?

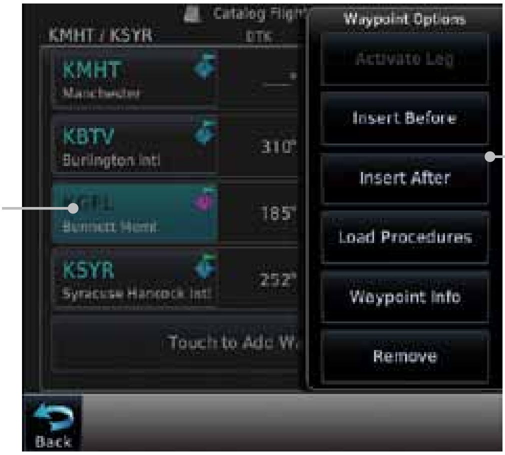
Figure 4-38 Touch OK to Invert and Activate the Selected Flight Plan

4.3.5.3 Catalog Route Option - Preview

1. While viewing the Flight Plan Catalog page, touch the desired flight plan to select it. The Route Options menu will be displayed.
2. Touch the **Preview** key. A map view of the flight plan and list of the waypoints will be displayed.
3. Touch the **Back** key to return to the Flight Plan Catalog.

4.3.5.4 Catalog Route Option - Edit

1. While viewing the Flight Plan Catalog page, touch the desired flight plan to select it. The Route Options menu will be displayed.
2. Touch the **Edit** key. The flight plan will be displayed. Make any changes necessary by touching the desired waypoint and using the Waypoint Options.


Catalog Flight
KMHT / KSYR
DTK
KMHT
Manchester
KBTV
Burlington Intl
310°
185°
KSYR
Syracuse Hancock Intl
252°
Touch to Add W
Waypoint Options
Activate Leg
Insert Before
Insert After
Load Procedures
Waypoint Info
Remove
Back

Selected Waypoint

Waypoint Options List

Figure 4-39 Use Waypoint Options to Edit the Selected Flight Plan

3. Touch the **Back** key to return to the Flight Plan Catalog.

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

4.3.5.5 Catalog Route Option - Copy

1. While viewing the Flight Plan Catalog page, touch the desired flight plan to select it. The Route Options menu will be displayed.

2. Touch the **Copy** key. You will be prompted to copy the selected flight plan.

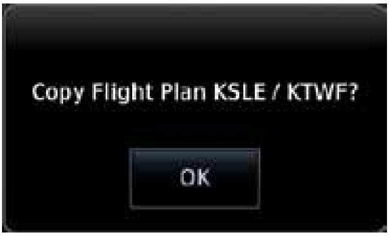
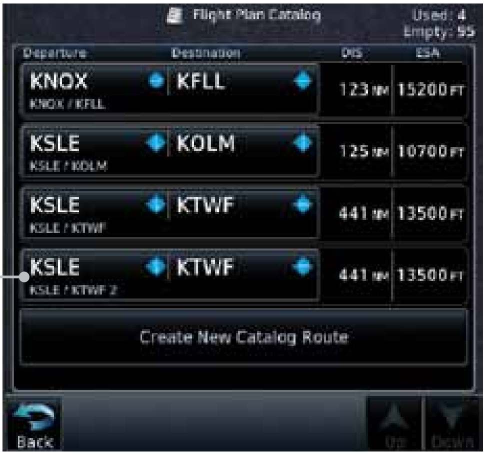

Copy Flight Plan KSLE / KTWF?

Figure 4-40 Flight Plan Catalog Route Copy Option

3. A copy of the selected flight plan will now be listed. If any changes are required for the copy, it can be used as a starting point for a similar flight plan. Use the Edit Route option to make the desired changes.


Flight Plan Catalog
Used: 4
Empty: 95

Departure	Destination	DIS	ESA
KNOX KNOX / KFLL	KFLL	123 NM	15200 FT
KSLE KSLE / KOLM	KOLM	125 NM	10700 FT
KSLE KSLE / KTWF	KTWF	441 NM	13500 FT
KSLE KSLE / KTWF 2	KTWF	441 NM	13500 FT

Duplicate Copy Of Selected Flight Plan

Figure 4-41 Copied Flight Plan

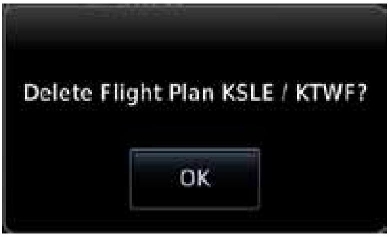
4. Touch the **Back** key to return to the Active Flight Plan.

4.3.5.6 Catalog Route Option - Delete

1. While viewing the Flight Plan Catalog page, touch the desired flight plan to select it. The Route Options menu will be displayed.

Delete
OK

2. Touch the **Delete** key and then touch **OK**.



Delete Flight Plan KSLE / KTWF?

Figure 4-42 Delete the Selected Flight Plan from the Catalog

Back

3. Touch the **Back** key to return to the Active Flight Plan.

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

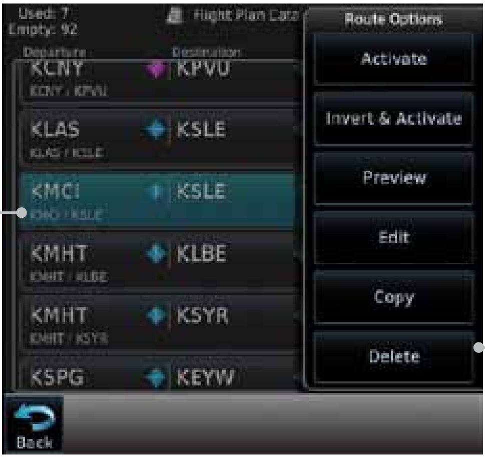
4.3.6 Delete Flight Plan

There are two methods for deleting a flight plan. Deleting the selected flight plan from the Catalog using the Route Options completely removes the flight plan. Deleting the Active Flight Plan using the Delete Flight Plan key on the Flight Plan menu clears the waypoints from the Active Flight Plan, but does not remove the flight plan from the Catalog.

4.3.6.1 Delete Flight Plan from Catalog

Menu
Catalog

1. While viewing the Flight Plan page, touch the **Menu** key, and then the **View Catalog** key. The list of currently stored flight plans will be displayed.


Used: 7
Empty: 92
Flight Plan Cata
Departure
Destination
KCNY KPVU
KCNY / KPVU
KLAS KSLE
KLAS / KSLE
KMCI KSLE
KMCI / KSLE
KMHT KLBE
KMHT / KLBE
KMHT KSYR
KMHT / KSYR
KSPG KEYW
Route Options
Activate
Invert & Activate
Preview
Edit
Copy
Delete
Back

Selected Flight Plan

Touch Delete To Remove The Waypoint From The Catalog

Figure 4-43 Select a Flight Plan from the Catalog

2. Touch the **Delete** and then the **OK** key. The selected flight plan will be removed from the Catalog.

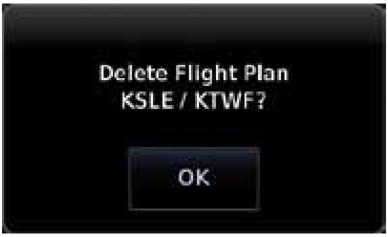
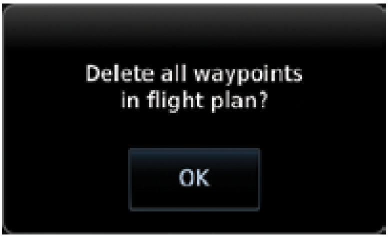

Delete Flight Plan
KSLE / KTWF?

Figure 4-44 Delete a Flight Plan from the Catalog

4.3.6.2 Delete Active Flight Plan

Menu
Delete

1. While viewing the Active Flight Plan page, touch the **Menu** key, and then the **Delete Flight Plan** key.



Delete all waypoints in flight plan?

OK

Figure 4-45 Delete a Flight Plan from the Active Flight Plan

OK

2. Touch **OK** to clear the waypoints from the Active Flight Plan. The flight plan will not be removed from the Catalog.

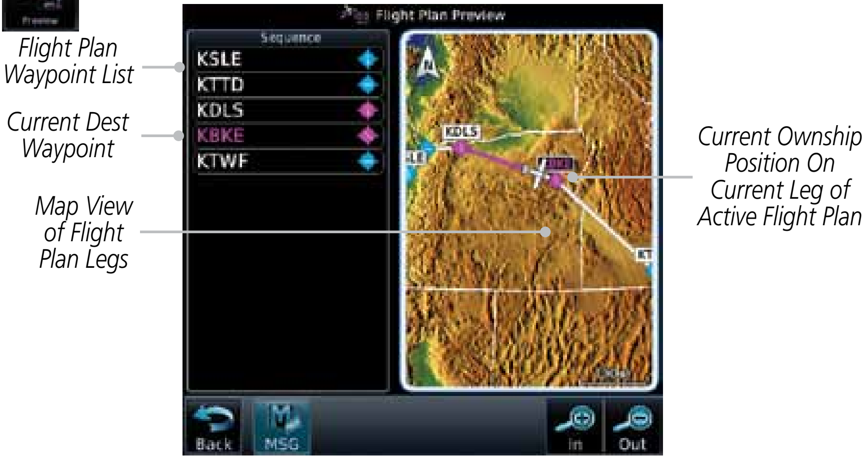
4.3.7 Preview Flight Plan

The Preview Flight Plan function provides a summary of a flight plan. A preview of the Active Flight Plan can be selected from the Flight Plan Menu's **Preview Flight Plan** key or selecting a flight plan from the catalog and choosing Preview from the Route Options menu.

4.3.7.1 Previewing the Active Flight Plan

Menu
Preview

1. While viewing the Flight Plan page, touch the **Menu** key, and then the **Preview** key. A preview of the Active Flight Plan will be shown.



Flight Plan Preview

Sequence
KSLE
KTTD
KDLS
KBKE
KTWF

Flight Plan Waypoint List
Current Dest Waypoint
Map View of Flight Plan Legs
Current Ownship Position On Current Leg of Active Flight Plan
KDLS
Back
MSG
In
Out

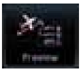
Figure 4-46 Active Flight Plan Preview

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

2. Touch the **Back** key to return to the Active Flight Plan page.

4.3.7.2 Previewing a Flight Plan in the Catalog

1. While viewing the Flight Plan page, touch the **Menu** key, and then the **Catalog** key. The list of currently stored flight plans will be displayed.
2. Touch the desired flight plan. The Route Options will now be displayed.



3. Touch the **Preview** key to display a preview of the selected flight plan.

4. Touch the **Back** key to return to the Flight Plan Catalog.

4.4 Graphically Editing a Flight Plan

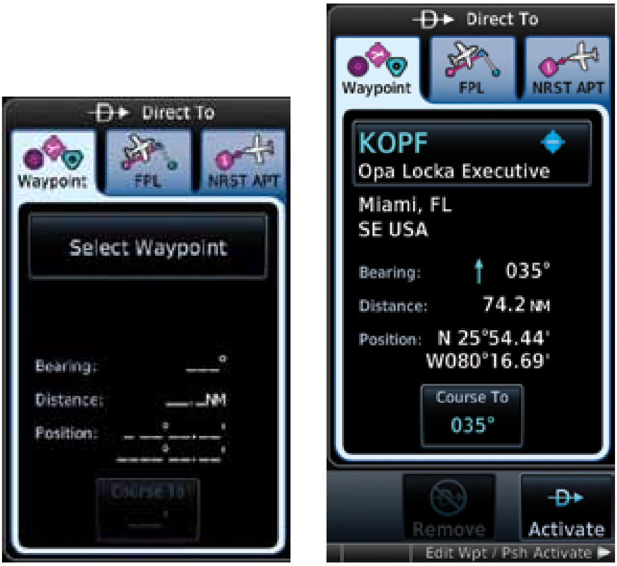
The Active Flight Plan may be edited graphically on the Map page. See Section 9.3.3 for details.

5 DIRECT-TO

The NRST pages can be used in conjunction with the GTN 7XX Direct-To function to quickly set a course to a nearby facility.

5.1 Direct-To Navigation

1. Press the **Direct-To** key on the right side of the unit. A flight plan must be activated or a Nearest Airport selected before information is provided in the Direct-To Wpt page.



Direct To
Waypoint
FPL
NRST APT
Select Waypoint
Bearing: ___°
Distance: __._NM
Position: _ __°__.__'
____°__.__'
Course To
___°
Direct To
Waypoint
FPL
NRST APT

KOPF
Opa Locka Executive
Miami, FL
SE USA
Bearing: 035°
Distance: 74.2 NM
Position: N 25°54.44' W080°16.69'
Course To 035°

Remove
Activate
Edit Wpt / Psh Activate

Figure 5-1 Direct-To Wpt Page

2. Select **Waypoint**, **FPL**, or **NRST APT** from the Direct-To window by touching the desired tab.

3. If a specific course is desired, touch the **Course To** key.

4. Use the numeric keypad to select the course and then touch the **Enter** key.

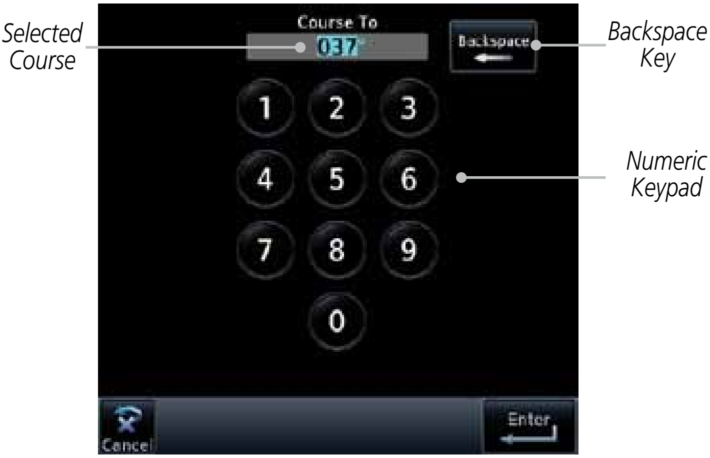
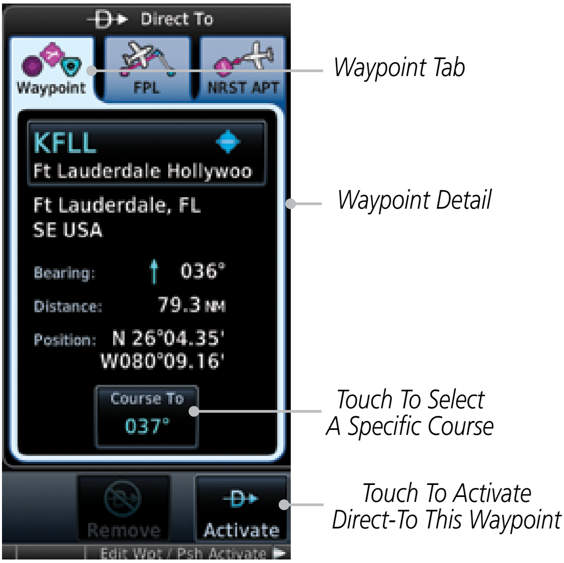

Course To
037°
Backspace
1
2
3
4
5
6
7
8
9
0
Cancel
Enter
Selected Course
Backspace Key
Numeric Keypad

Figure 5-2 Direct-To Course Selection

5. Touch the desired waypoint and touch the **Activate** key or press the **small right** knob.


Direct To
Waypoint
FPL
NRST APT
Course To
037°
Remove
Activate
Edit Wpt / Psh Activate
Waypoint Tab
Waypoint Detail
Touch To Select A Specific Course
Touch To Activate Direct-To This Waypoint

KFLL
Ft Lauderdale Hollywoo
Ft Lauderdale, FL
SE USA
Bearing: 036°
Distance: 79.3 NM
Position: N 26°04.35' W080°09.16'

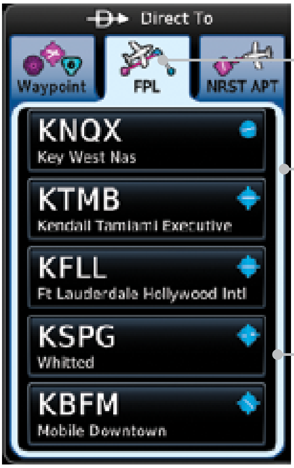
Figure 5-3 Direct-To Selection

6. The Map page will now be displayed with the new Direct-To course.

5.2 Direct-To a Flight Plan Waypoint

1. Press the **Direct-To** key on the right side of the unit.

2. Touch the **FPL** tab at the top of the Direct-To window.


Direct To
Waypoint
FPL
NRST APT
KNQX
Key West Nas
KTMB
Kendall Tamiami Executive
KFLL
Ft Lauderdale Hollywood Intl
KSPG
Whitted
KBFM
Mobile Downtown

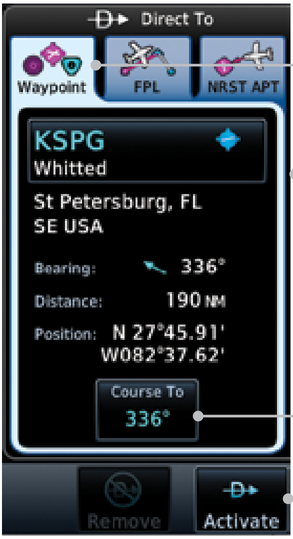
Flight Plan Tab

Flight Plan Waypoint List

Touch Waypoint Key To Select

Figure 5-4 Direct-To Flight Plan Leg Selection

3. Touch the flight plan waypoint you want to navigate directly to. The Direct-To Waypoint page will display information about the selected flight plan waypoint.


Direct To
Waypoint
FPL
NRST APT
KSPG
Whitted
St Petersburg, FL
SE USA
Bearing: 336°
Distance: 190 NM
Position: N 27°45.91'
W082°37.62'
Course To
336°
Remove
Activate

Waypoint Tab

Waypoint Detail

Touch To Select A Specific Course

Touch To Activate Direct-To This Waypoint

Figure 5-5 Selected Direct-To Flight Plan Leg

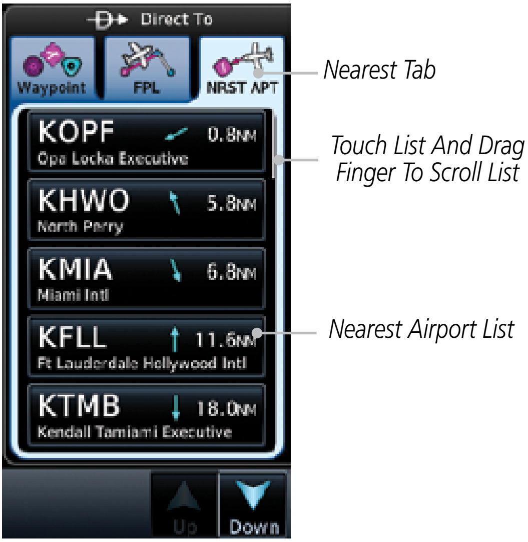
4. Touch the **Activate** key or press the **small right** knob to activate the selection.

5. The Map page will now be displayed with the new Direct-To course.

5.3 Direct-To a Nearest Airport

1. Press the **Direct-To** key on the lower right side of the unit.

2. Touch the **NRST APT** tab at the top of the Direct-To window. The nearest 25 airports within 200 NM will be listed. The airport at the top of the list is the nearest airport. To review the other nearest airports, touch the **Up** and **Down** keys to scroll through the list.



KOPF 0.8NM
Opa Locka Executive

KHWO 5.8NM
North Perry

KMIA 6.8NM
Miami Intl

KFLL 11.6NM
Ft Lauderdale Hollywood Intl

KTMB 18.0NM
Kendall Tamiami Executive

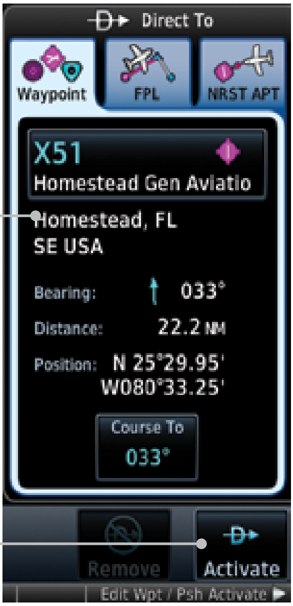
Nearest Tab

Touch List And Drag Finger To Scroll List

Nearest Airport List

Figure 5-6 Direct-To Nearest Airport Selection

3. Touch the desired airport to select it. The selected airport will be displayed in the Waypoint page.


Direct To
Waypoint
FPL
NRST APT
Remove
Activate
Edit Wpt / Psh Activate
Direct-To Waypoint
Activate Direct-To Course

X51
Homestead Gen Aviatio
Homestead, FL
SE USA
Bearing: 033°
Distance: 22.2 NM
Position: N 25°29.95' W080°33.25'
Course To 033°

Figure 5-7 Selected Direct-To Nearest Airport

4. Touch the **Activate** key or press the **small right** knob to activate the selection.

5. The Map page will now be displayed with the new Direct-To course.

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

5.4 Removing a Direct-To Course

When a Direct-To course is cancelled, the previously active flight plan will be reactivated and the nearest leg to the aircraft position will become the active leg. If there was no active flight plan, after cancelling the Direct-To course the aircraft will continue with the current heading.

1. Press the **Direct-To** key to display the Direct-To page.

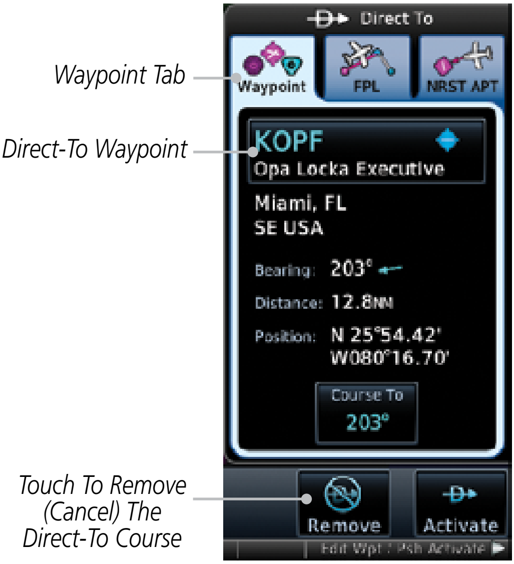

Direct To
Waypoint
FPL
NRST APT
Waypoint Tab
Direct-To Waypoint
KOPF
Opa Locka Executive
Miami, FL
SE USA
Bearing: 203°
Distance: 12.8NM
Position: N 25°54.42'
W080°16.70'
Course To
203°
Touch To Remove (Cancel) The Direct-To Course
Remove
Activate
Edit Wpt : Psh Activate

Figure 5-8 Cancel the Direct-To Course

2. Touch the **Remove** key.

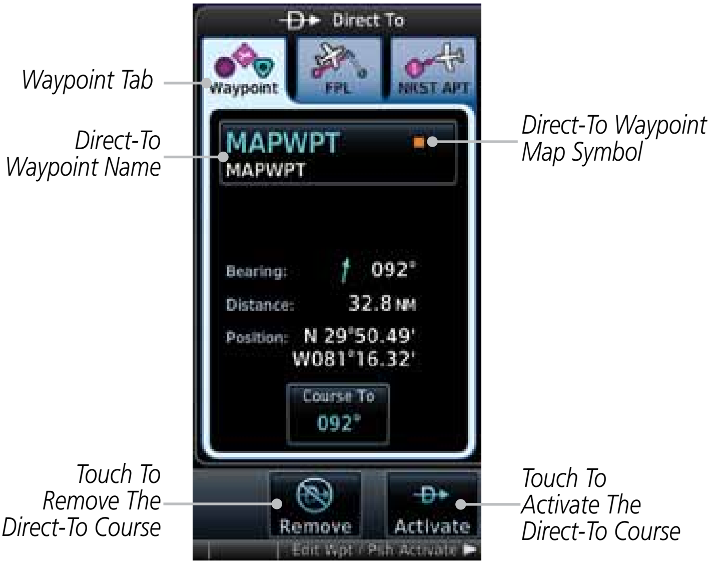
3. Navigation will now return to the active flight plan.

5.5 Direct-To Map Waypoint

A Direct-To course may be set to any waypoint selected on the Map page. The waypoint is selected by touching an item such as an airport, VOR, or NDB or any other location. Touching the map page at any place not having an existing location name will create a waypoint with the name "MAPWPT." Touching the **Direct-To** key will automatically insert the selected waypoint as the Direct-To waypoint. The MAPWPT will be saved as a User Waypoint.

1. On the Map page, touch the map at the location intended to be the Direct-To waypoint.

2. Press the **Direct-To** key on the right side of the unit.


Direct To
Waypoint
FPL
NRST APT
Course To
Remove
Activate
Edit Wpt / Push Activate
Waypoint Tab
Direct-To Waypoint Name
Direct-To Waypoint Map Symbol
Touch To Remove The Direct-To Course
Touch To Activate The Direct-To Course

MAPWPT
MAPWPT
Bearing: 092°
Distance: 32.8 NM
Position: N 29°50.49' W081°16.32'
Course To 092°

Figure 5-9 Touch the Map to Create a MAPWPT as the Direct-To Course Destination

3. Touch the **Activate** key or press the **small right** knob to activate the selection.

5.6 Off-Route Direct-To Course

An off-route Direct-To course may be selected by using the Waypoint tab, Nrst Apt tab, or selecting an airport on the map. When an off-route Direct-To course is activated, the existing active flight plan will be deactivated. The original active flight plan and waypoint sequencing is reactivated when the Direct-To course is removed.

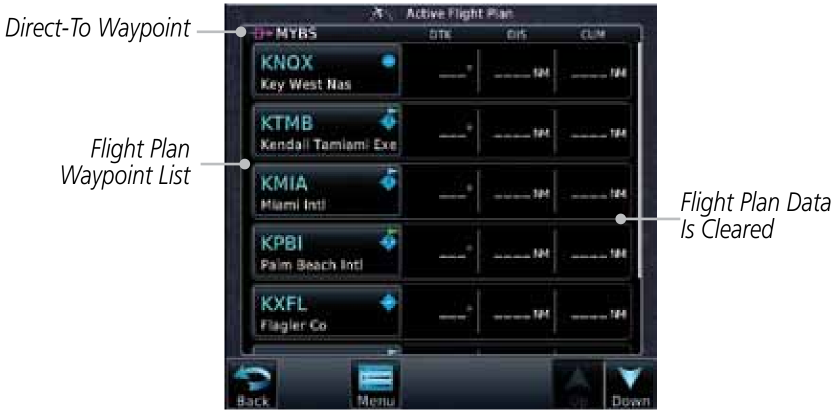

Direct-To Waypoint
Flight Plan Waypoint List
Flight Plan Data Is Cleared
Active Flight Plan
MYBS
DTK
DIS
CUM
KNOX
Key West Nas
KTMB
Kendall Tamiami Exe
KMIA
Miami Intl
KPBI
Palm Beach Intl
KXFL
Flagler Co
___°
____NM
Back
Menu
Up
Down

Figure 5-10 Active Flight Data is Removed When a Direct-To Course is Activated

5.7 Graphically Editing a Direct-To Route

Direct-To routes may be edited graphically on the Map page the same as a regular flight plan. See Section 9.33 for details.

6 PROCEDURES

The GTN 7XX allows you to fly non-precision and precision approaches to airports with published instrument approach procedures. All available approaches are stored on your Jeppesen NavData® card, and are automatically updated when the card's files have been updated. Approach procedures are not the same as the approach plates available in ChartView, which is a separate database. Subscription information for NavData cards is included in your GTN 7XX package.

The Procedures Page is displayed by touching the **PROC** key on the Home page. The Procedures Page provides direct access to approaches, departures and arrivals. Selections are also shown to: Activate Approach, Vectors to Final, and Activate Missed Approach.

***NOTE:** The Chart feature provides a digital representation of a paper chart and provides no vertical or lateral course guidance. Flight Plan and Procedures are separate from Charts, and do provide vertical and lateral course guidance for the loaded route or procedure shown on the Flight Plan page. The term "Chart Unavailable" means that the chart cannot be viewed on the Charts due to either a chart not being published, or an error in the Chart database, but does not preclude its availability or inclusion of the procedure in the Flight Plan or Procedures portion of the system. The absence of a chart for a particular Departure, Arrival, or Approach does not preclude its availability or inclusion in the Flight Plan or Procedures portion of the system. The absence of a particular Departure, Arrival, or Approach under the Flight Plan or Procedures portion of the system does not preclude the ability to view the Chart for that procedure under the Chart feature.*

6.1 Basic Approach Operations

The GTN 7XX provides precision vertical guidance as well as lateral and advisory vertical guidance using its built in GPS receiver for GPS or RNAV approaches. The moving map pages can also be used as a supplemental aid to situational awareness for ILS, VOR, and NDB approaches (and non-precision localizer-based approaches), but the appropriate radio navigational aid MUST be used for primary approach course guidance for non-GPS approaches.

Approaches designed specifically for GPS are often very simple and don't require overflying a VOR or NDB. Currently, many non-precision approaches have "GPS overlays" to let you fly an existing procedure (VOR, VOR/DME, NDB, etc.) more accurately using GPS.

Many overlay approaches are more complex (in comparison to GPS-only approaches). The GTN 7XX displays and guides you through each leg of the approach — automatically sequencing through each of these legs, up to the missed approach point (MAP). Approaches may be flown "as published" with the full transition — using any published feeder route or initial approach fix (IAF) — or may be flown with a vectors-to-final transition.

Phase of flight annunciations are provided on the bottom of the display indicating the current mode of flight.

Procedures are arranged around the existing flight plan in the following order: Departure, En Route, Arrival, and Approach. For example, Departure waypoints are inserted before the En Route waypoints in the flight plan and Arrival waypoints are inserted between the En Route waypoints and the approach waypoints. Always verify that the transition waypoints between each phase are correct.

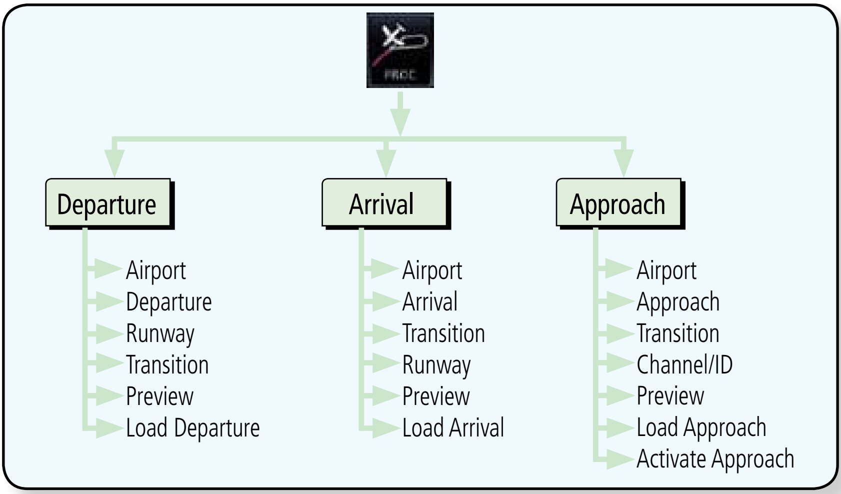

PROC
Departure
Airport
Departure
Runway
Transition
Preview
Load Departure
Arrival
Airport
Arrival
Transition
Runway
Preview
Load Arrival
Approach
Airport
Approach
Transition
Channel/ID
Preview
Load Approach
Activate Approach

Figure 6-1 Procedures Functional Diagram

Annunciation	Description
LPV	Localizer Performance with Vertical guidance (LPV) approach. Fly to LPV minimums.
LP	Localizer Performance with no vertical guidance. Fly to LP minimums.
L/VNAV	Lateral Navigation and Vertical Navigation (LNAV/VNAV) approach. Fly to LNAV/VNAV minimums.
LNAV+V	GPS approach using published LNAV minima. Advisory vertical guidance is provided. Fly to LNAV minimums.
LNAV	Lateral Navigation approach. Fly to LNAV minimums.
MAPR	Missed Approach indicates the system is providing missed approach integrity and CDI full-scale deflection ±0.3 NM.
ENR	En route, CDI full-scale deflection is 2.0 NM or current CDI scale selection, whichever is smaller.
TERM	Terminal, CDI full-scale deflection is 1.0 NM or current CDI scale selection, whichever is smaller.
DPRT	Departure, indicates the system is using non-precision approach integrity. CDI full-scale deflection is 0.3 NM.
OCN	Oceanic, CDI full-scale deflection is 2.0 NM.
LOW ALT (lower window)	For LNAV+V, LNAV/VNAV, or LPV approaches, the LOW ALT annunciation indicates the aircraft's estimated height is lower than the Final Approach Waypoint height by approximately 50 meters. This annunciation will not be active when TAWS is operational.

Table 6-1 Phase of Flight Annunciations

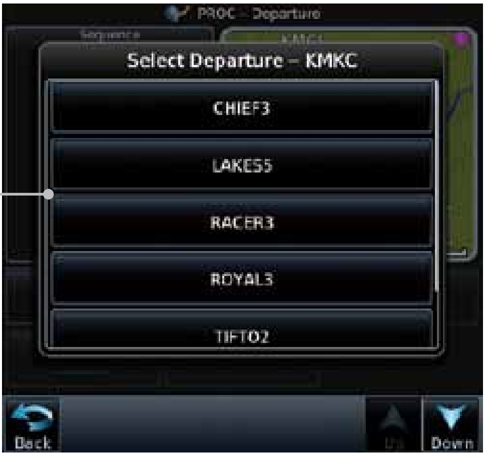
6.2 Selecting a Departure

A Departure Procedure (DP) is loaded at the departure airport in the flight plan. Only one departure can be loaded at a time in a flight plan. If a departure is loaded when another departure is already in the active flight plan, the new departure replaces the previous departure. The route is defined by selection of a departure, the transition waypoint, and a runway.

NOTE: *Vector-only departures are not available in the Procedures database as the GTN 7XX cannot provide navigational guidance on vectored legs.*

1. Touch the **PROC** key on the Home page and then touch the **Departure** key to display the Departure list.

2. If necessary, touch the **Airport** key and enter the departure airport. Touch the key for the desired Departure.



Touch To Select Desired Departure

Figure 6-2 List for Selecting a Departure

3. Touch the key for the desired Transition.

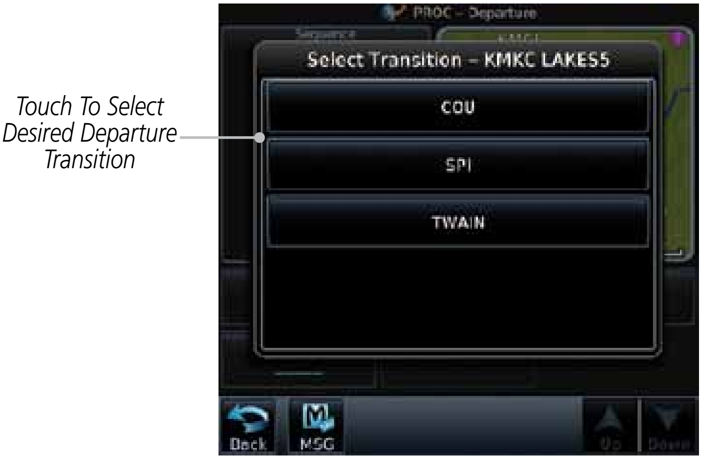

PROC - Departure
Select Transition - KMKC LAKES5
COU
SPI
TWAIN
Back
MSG
Up
Down
Touch To Select Desired Departure Transition

Figure 6-3 Selecting a Transition for a Departure

4. Touch the key for the desired Runway, if necessary. The Departure page with preview will be displayed.

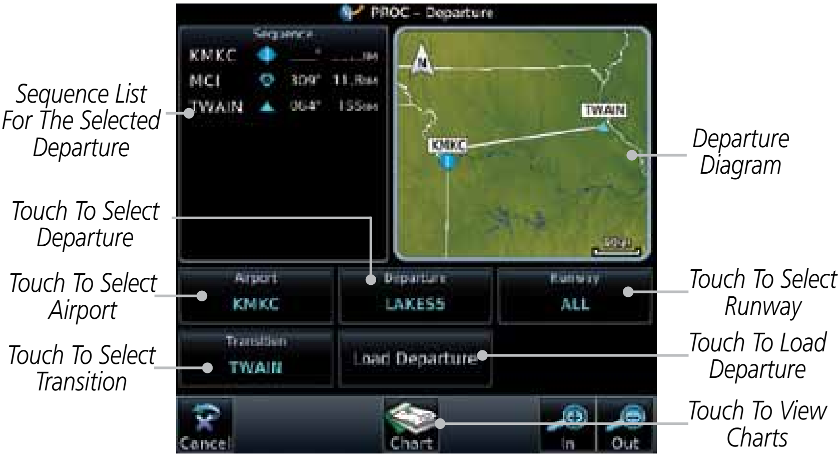
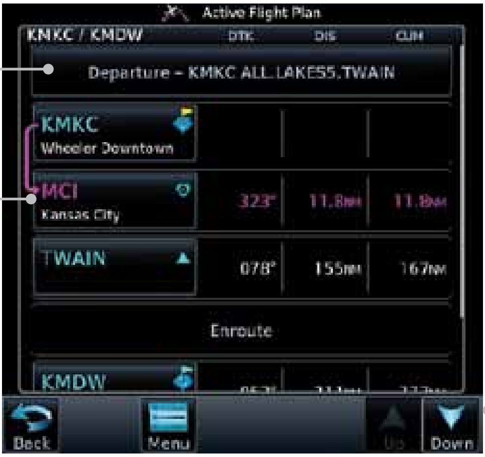

PROC - Departure
Sequence
KMKC
MCI 309° 11.8NM
TWAIN 064° 155NM
TWAIN
KMKC
Airport
KMKC
Departure
LAKES5
Runway
ALL
Transition
TWAIN
Load Departure
Cancel
Chart
In
Out
Sequence List For The Selected Departure
Touch To Select Departure
Touch To Select Airport
Touch To Select Transition
Departure Diagram
Touch To Select Runway
Touch To Load Departure
Touch To View Charts

Figure 6-4 Departure Selected

***NOTE:** If the selected runway is depicted as RW10B, for instance, this means both runways 10L and 10R.*

Load Departure

5. Touch the **Load Departure** key. The Active Flight Plan page will be displayed.


Active Flight Plan
KMKC / KMDW
DTK
DIS
CUM
Departure - KMKC ALL.LAKE55.TWAIN
KMKC
Wheeler Downtown
MCI
Kansas City
323°
11.8NM
11.9NM
TWAIN
078°
155NM
167NM
Enroute
KMDW
Back
Menu
Up
Down

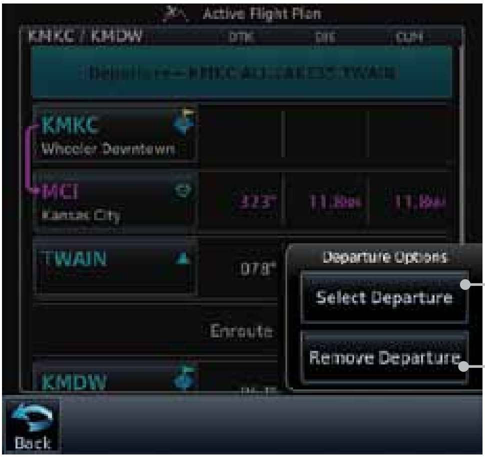
Touch To Change Or Remove Departure

Touch To Edit Waypoint

Scroll To View Flight Plan With Departure Waypoints

Figure 6-5 Flight Plan After Loading a Departure

6. Remove a departure or select a new one by touching the Departure key and selecting the desired choice.


Active Flight Plan
KMKC / KMDW
DTK
DIS
CUM
Departure - KMKC ALL.LAKE55.TWAIN
KMKC
Wheeler Downtown
MCI
Kansas City
323°
11.8NM
11.9NM
TWAIN
078°
Enroute
KMDW
Departure Options
Select Departure
Remove Departure
Back

Touch To Change A Departure

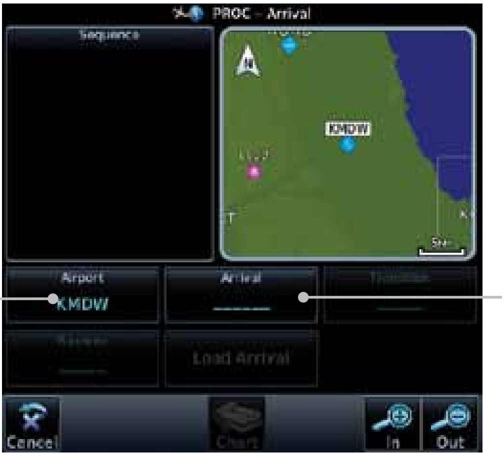
Touch To Remove Departure

Figure 6-6 Editing a Departure

6.3 Selecting an Arrival

A Standard Terminal Arrival (STAR) can be loaded at any airport that has one published. Only one arrival can be loaded at a time in a flight plan. If an arrival is loaded when another arrival is already in the active flight plan, the new arrival replaces the previous arrival. The route is defined by selection of an arrival, the transition waypoint, and a runway.

1. Touch the **PROC** key on the Home page and then touch the **Arrival** key.

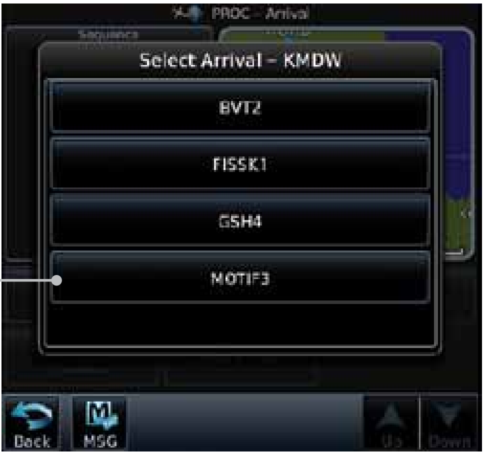

PROC - Arrival
Sequence
KMDW
Airport
KMDW
Arrival
Transition
Runway
Load Arrival
Cancel
Chart
In
Out

Touch To Select Airport

Touch To Show Arrival List

Figure 6-7 Arrival Page

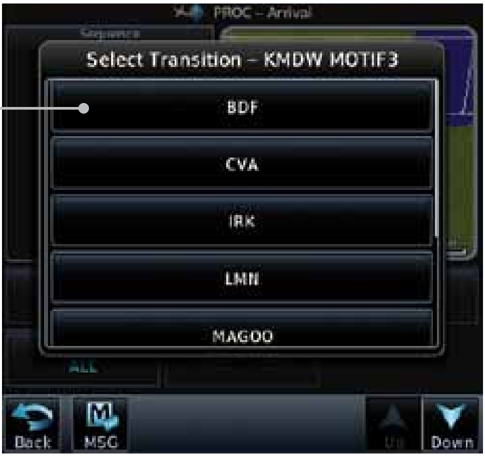
2. Confirm that the intended airport is shown or touch the **Airport** key and select the desired airport. Touch the key for the desired Arrival.


PROC - Arrival
Sequence
Select Arrival - KMDW
BVT2
FISSK1
GSH4
MOTIF3
Back
MSG
Up
Down

Touch To Select Arrival

Figure 6-8 Arrival List

3. Touch the **Transition** key and then touch the key for the desired transition.


PROC - Arrival
Sequence
Select Transition - KMDW MOTIF3
BDF
CVA
IRK
LMN
MAGOO
ALL
Back
MSG
Up
Down

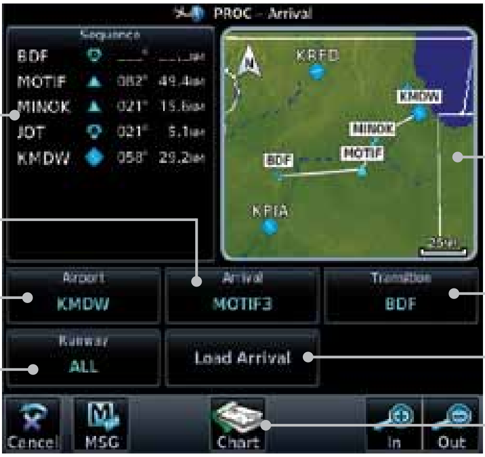
Touch To Select Desired Arrival Transition

Figure 6-9 Select Transition

4. Touch the key for the desired Runway, if necessary.

***NOTE:** If the selected runway is depicted as RW10B, for instance, this means both runways 10L and 10R.*

5. After selecting the runway, the Arrival page with map preview will be displayed.


PROC - Arrival
Sequence
BDF
MOTIF 082° 49.4NM
MINOK 021° 15.6NM
JOT 021° 5.1NM
KMDW 058° 29.2NM
KRFD
KMDW
MINOK
MOTIF
BDF
KPIA
Airport
KMDW
Arrival
MOTIF3
Transition
BDF
Runway
ALL
Load Arrival
Cancel
MSG
Chart
In
Out

Sequence List For The Selected Arrival

Touch To Select Arrival

Touch To Select Airport

Touch To Select Runway

Arrival Diagram

Touch To Select Transition

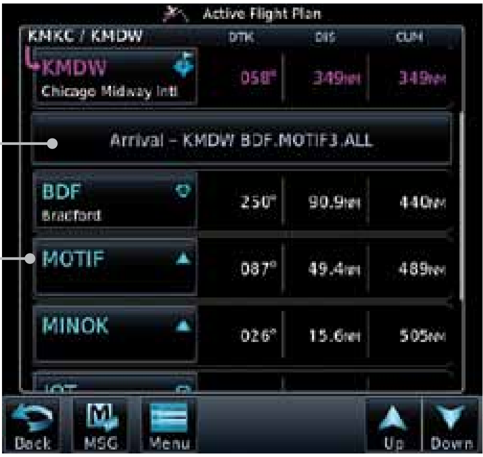
Touch To Load Arrival

Touch To View Charts

Figure 6-10 Previewing an Arrival

Load Arrival

6. Touch the **Load Arrival** key. The Active Flight Plan page will be displayed.



KMKC / KMDW	DTK	DIS	CUM
KMDW Chicago Midway Intl	058°	349NM	349NM
Arrival - KMDW BDF.MOTIF3.ALL			
BDF Bradford	250°	90.9NM	440NM
MOTIF	087°	49.4NM	489NM
MINOK	026°	15.6NM	505NM

Touch To Select Or Remove Arrival

Touch To Edit Waypoint

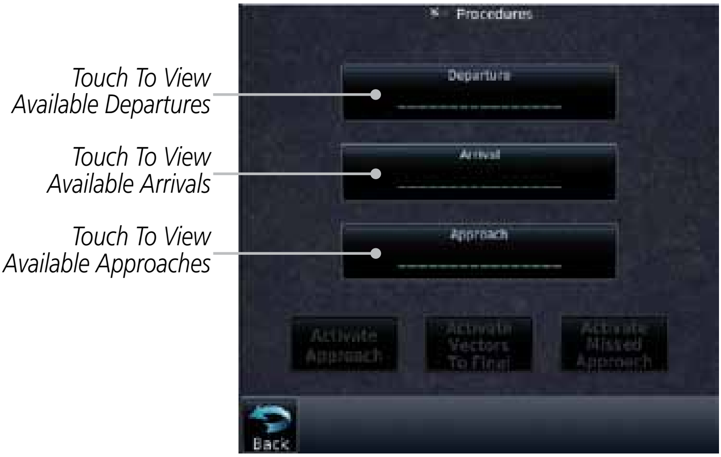
Scroll To View Flight Plan With Departure Waypoints

Figure 6-11 Flight Plan With Arrival Loaded

6.4 Selecting an Approach

Only one approach can be loaded at a time in a flight plan. If an approach is loaded when another approach is already in the active flight plan, the new approach replaces the previous approach. The route is defined by selection of an approach, the transition waypoint, and a runway.

1. Touch the **PROC** key on the Home page. The Approach, Arrival, and Departure fields will be dashed until a selection is made.


Procedures
Departure
Arrival
Approach
Activate Approach
Activate Vectors To Final
Activate Missed Approach
Back

Touch To View Available Departures

Touch To View Available Arrivals

Touch To View Available Approaches

Figure 6-12 Procedures Selection Window

2. Touch the **Approach** key on the Procedures page to select an approach for the destination airport. Confirm that the intended airport is shown or touch the **Airport** key and select the desired airport.

3. Touch the **Approach** key on the Procedures-Approach page and then touch the key for the desired approach.

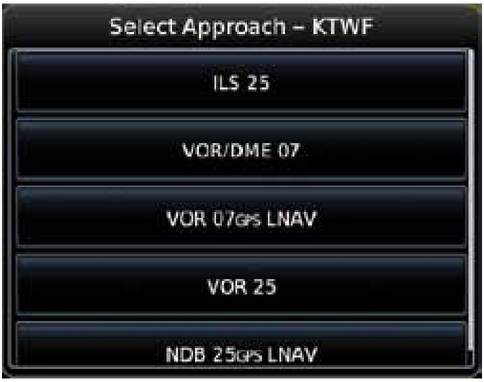
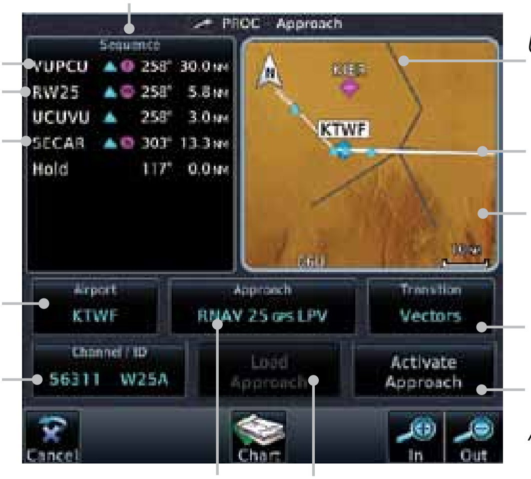

Select Approach – KTWF
ILS 25
VOR/DME 07
VOR 07GPS LNAV
VOR 25
NDB 25GPS LNAV

Figure 6-13 Selecting an Approach

4. After selecting the approach for the destination airport, the approach options will be displayed.

Sequence List For The Selected Transition


PROC Approach
Sequence
VUPCU 258° 30.0NM
RW25 258° 5.8NM
UCUVU 258° 3.0NM
SECAR 303° 13.3NM
Hold 117° 0.0NM
N
KTWF
Airport
KTWF
Approach
RNAV 25 GPS LPV
Transition
Vectors
Channel / ID
56311 W25A
Load Approach
Activate Approach
Cancel
Chart
In
Out

Final Approach Fix

Missed Approach Point

Missed Approach Hold Point

Current Dest Waypoint. Touch To Select Airport.

Touch To Select Channel/ID

Unselected Transition

Selected Transition

Approach Diagram

Touch To Select Transition

Touch To Activate Approach

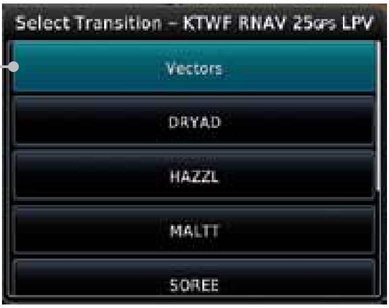
Touch To Select Approach

Touch To Load Approach

Figure 6-14 Selected Approach Options

Transition
Vectors

5. Touch the **Transition** key and then touch the key for the desired transition. The selected Transition will be shown in white on the Procedure page Approach diagram. Unselected Transitions will be shown in grey.


Select Transition - KTWF RNAV 25GPS LPV

Touch To Select Transition
Vectors
DRYAD
HAZZL
MALTT
SOREE

Figure 6-15 Select Approach Transition

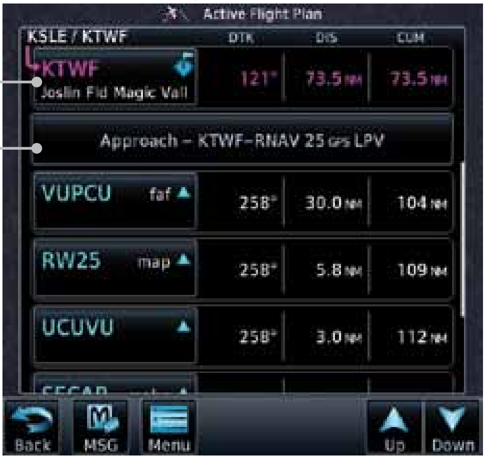
Channel / ID
40017 W10A

6. If desired, touch the **Channel/ID** key, then use the numeric keypad to select the channel number, and then touch the Enter key. The Channel and ID are typically loaded automatically if they are present.

***NOTE:** As an alternate means of loading an approach, the Channel ID key allows you to select the channel ID for a SBAS approach for the current destination. The channel ID for the SBAS approach is available from an approved approach chart. If duplicate numbers are available for a channel, a list will be available where you may select the desired approach.*

Load Approach

7. Touch the **Load Approach** key. The Active Flight Plan page will be displayed. The approach waypoints are placed at the end of the flight plan and the unit will automatically sequence to them after the en route waypoints.


Active Flight Plan

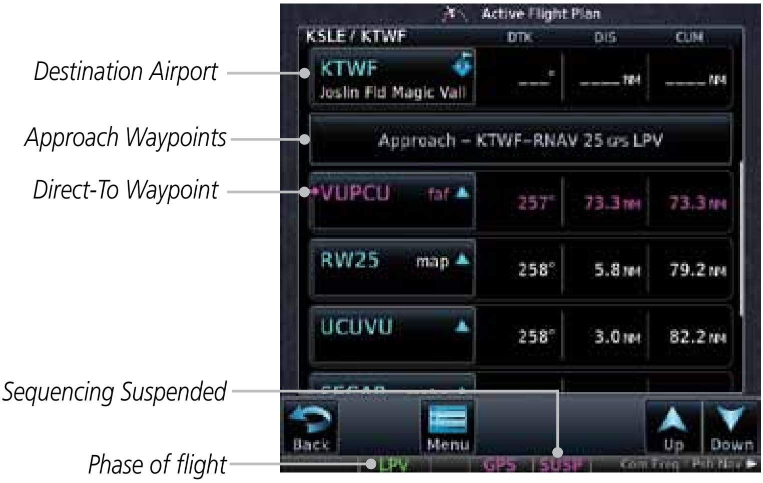
KSLE / KTWF	DTK	DIS	CUM
KTWF Joslin Fld Magic Vall	121°	73.5NM	73.5NM
Approach - KTWF-RNAV 25GPS LPV			
VUPCU faf	258°	30.0NM	104NM
RW25 map	258°	5.8NM	109NM
UCUVU	258°	3.0NM	112NM

Destination Airport
Approach Waypoints
Back
MSG
Menu
Up
Down

Figure 6-16 After Loading an Approach

Activate Approach

8. Touch the **Activate Approach** key, which makes the active leg Direct-To the IAF, or for Vector approaches to activate a leg that is an extended final approach course. You can also "activate" the selected procedure on the Procedures page, if the approach is not activated on this page.



Active Flight Plan

KSLE / KTWF	DTK	DIS	CUM
KTWF Joslin Fld Magic Vall	___°	____NM	____NM
Approach - KTWF-RNAV 25 GPS LPV			
VUPCU faf	257°	73.3 NM	73.3 NM
RW25 map	258°	5.8 NM	79.2 NM
UCUVU	258°	3.0 NM	82.2 NM

Figure 6-17 After Activating the Approach

***NOTE:** When re-activating an approach, the decision as to whether a hold is inserted at the IAF or not is assumed to be the same as the first time the approach was activated, regardless of current aircraft position. If the pilot wishes to have the hold inserted or removed from the procedure, the procedure must be re-loaded or activated from the PROC-Approach page.*

6.5 Approaches with Procedure Turns

The procedure turn portion of an approach is stored as one of the legs of the approach. For this reason, the GTN 7XX unit requires no special operations from the pilot — other than flying the procedure turn itself — beyond what is required for any other type of approach. Roll steering is provided to aircraft with compatible autopilots.

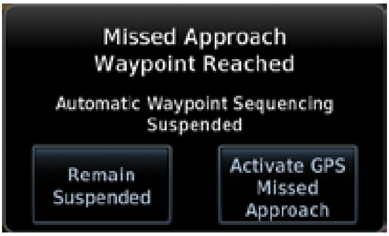
Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

6.6 Flying the Missed Approach

If you are at the MAP and the runway environment isn't in sight, you must execute a missed approach. The GTN 7XX unit continues to give guidance along an extension of the final course segment (FAF to MAP) until you manually initiate the missed approach procedure (as mentioned previously in reference to the "SUSP" advisory).

***NOTE:** If the unit is not configured for a CDI key, then the "activate GPS missed approach" will only resume automatic waypoint sequencing. The user must switch to GPS navigation, if desired, by using their external source selection method (this is typical an EFIS system).*

1. When the MAP is reached, a pop-up will appear.



Missed Approach Waypoint Reached

Automatic Waypoint Sequencing Suspended

Figure 6-18 Pop-Up Upon Reaching the MAP

Remain Suspended

Activate GPS Missed Approach

2. Touch the **Remain Suspended** key to continue with sequencing suspended or touch **Activate GPS Missed Approach** for guidance to the Missed Approach Hold Point.

6.7 Flying an Approach with a Hold

Upon activating an RNAV GPS approach, you are given the option to skip any non-required holding patterns during the initial transitions of the approach. In a GPS approach, you will not be given the option and you must manually reselect waypoint sequencing.

The Flight Plan Page displays a timer or distance, as appropriate, during the holding pattern. Use this timer or distance to fly the outbound portion of the holding pattern. (The holding pattern is displayed on the Map Page and indicated as the active leg on the Active Flight Plan pages.)

***NOTE:** If you need to lose extra altitude or speed by going around the holding pattern again, touch **SUSP** to manually suspend waypoint sequencing BEFORE crossing the holding waypoint the second time. If you've already passed this waypoint, re-activate the holding pattern.*

As you cross the MAP, a "SUSP" annunciation will appear, indicating that automatic sequencing of approach waypoints is suspended at the MAP. A "from" indication is displayed on the CDI and Default NAV Page, but course guidance along the final approach course continues.

6.8 Flying a DME Arc Approach

Approaches that contain DME arcs are supported by the GTN. The GTN will provide guidance (left / right) relative to the arc. If you wish to activate the DME arc leg manually, the aircraft must be near the arc, as shown in the shaded area below.

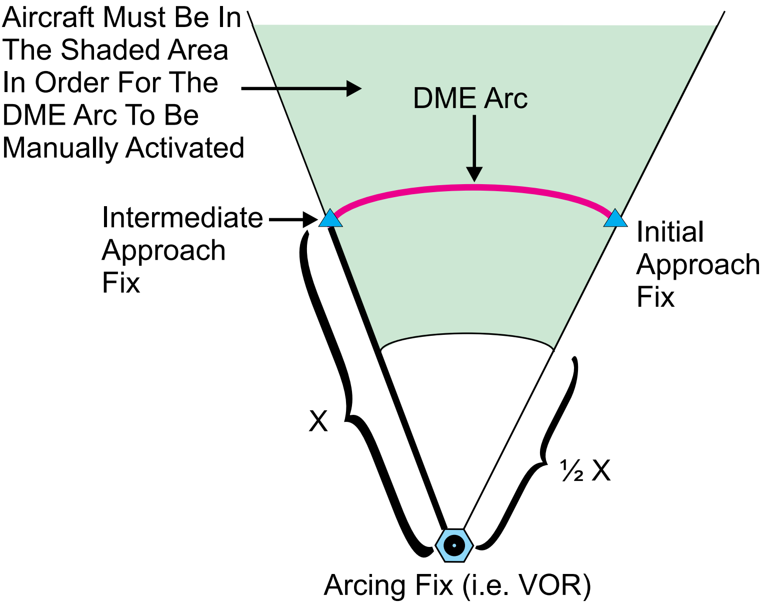

Aircraft Must Be In The Shaded Area In Order For The DME Arc To Be Manually Activated
DME Arc
Intermediate Approach Fix
Initial Approach Fix
X
½ X
Arcing Fix (i.e. VOR)

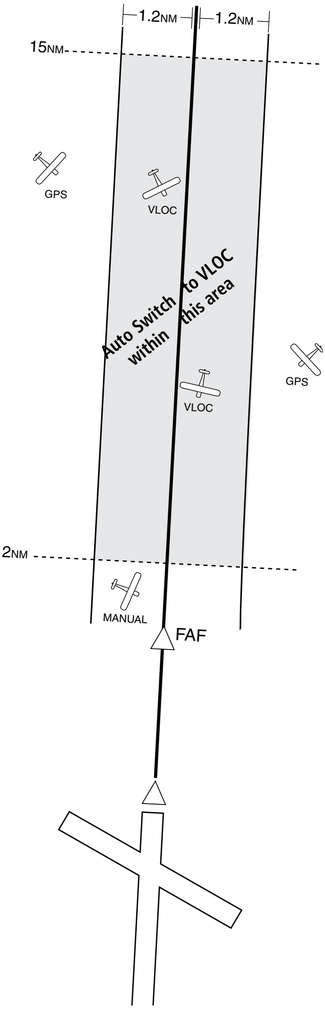
Figure 6-19 DME Arc Example

6.9 Vectors to Final

With "Vectors-To-Final" (VTF) selected, the CDI needle remains off center until you're established on the final approach course. With the approach activated, the Map Page displays an extension of the final approach course in magenta (remember, magenta is used to depict the active leg of the flight plan) and "vtf" appears as part of the active leg on the Map page (as a reminder that the approach was activated with vectors-to-final).

6.10 ILS Approaches (GTN 750 Only)

Precision ILS approaches can be performed with the built-in VLOC (VOR/localizer/glideslope) receivers. The GPS receiver can be used for guidance prior to reaching the final approach fix, but once there, the proper frequency must be selected on the VLOC window (right side of screen) and the CDI output set to “VLOC”.



The GTN 7XX can be set to automatically switch the external CDI output from GPS to VLOC as you intercept the final approach course (if used with a KAP140/KFC225 autopilot, you will need to manually enable outputs). See instructions in the "Enabling Autopilot Outputs for the King KAP140/KFC225" section. When the ILS approach is activated (and the correct ILS frequency is active in the VLOC window), the GTN 7XX automatically switches within 1.2 NM left or right of the final approach course. This switch can take place anywhere from 2.0 to 15.0 NM from the FAF.

The illustration shows multiple locations along the approach path and the CDI selection that you can expect: GPS or VLOC. Within the area of the shaded box, the automatic switch from GPS to VLOC should occur.

NOTE: *If you attempt to intercept the approach course at a distance less than 2.0 NM from the FAF, the GTN 7XX does not automatically switch the CDI to VLOC. In this case, touch the* ***CDI*** *key to manually switch from GPS to VLOC.*

The automatic switch from GPS to VLOC is not immediate, but instead occurs gradually to prevent abrupt CDI changes when coupled to an autopilot. The CDI selection can also be changed manually by touching the **CDI** key.

6.11 RNAV Approach Procedures

The GTN 7XX allows for flying LNAV, LNAV/VNAV, LNAV + V, LP, and LPV approaches according to the published chart.

Phase of flight Annunciation	Description	Minimums
L/VNAV	Lateral Navigation/Vertical Navigation. RNAV non-precision approach with vertical guidance.	Published LNAV/ VNAV minimums.
LNAV	Lateral Navigation. RNAV non-precision approach.	Published LNAV minimums.
LNAV + V	Lateral Navigation with Advisory Vertical Guidance. RNAV non-precision LNAV approach with advisory vertical guidance. The glidepath is typically denoted by a light dashed line on the vertical profile (Jeppeson only) with an associated glidepath angle (usually in the 3.00 degree range) and is provided to assist the pilot in maintaining a constant vertical glidepath, similar to an ILS glideslope.	Published LNAV minimums.
LPV	Localizer Performance with Vertical guidance (LPV) approach. RNAV precision approach.	Published LPV minimums.
LP	LP indicates Localizer Performance with no vertical guidance.	Published LP minimums.

Table 6-2 RNAV Approach Annunciations

6.12 Points to Remember for All Procedures

- The GTN 7XX Map page is designed to complement your approach plates and vastly improve situational awareness throughout the approach. However, *you must always fly an approach as it appears on the approach plate*.
- The active leg (or the portion of the approach currently in use) is depicted in magenta on the Map Page. As you fly the approach, the GTN 7XX automatically sequences through each leg of the approach unless "SUSP" appears at the annunciation bar at the bottom of the display. "SUSP" indicates that automatic sequencing of approach waypoints is *suspended* on the current leg and normally appears at holding patterns, upon crossing the missed approach point (MAP), for Climb to Altitude legs, and for Hold to Altitude legs.
- For roll steering autopilots: roll steering is terminated when approach mode is selected on the autopilot and is available once the missed approach is initiated.
- If Vectors-to-Final is activated while on the "FROM" side of the FAF, automatic waypoint sequencing is suspended and the SUSP annunciation will appear. Automatic waypoint sequencing will resume once the aircraft is on the "TO" side of the FAF and within full-scale deflection.
- For all procedures, make sure to check the runway, transition, and all waypoints.

6.13 Points to Remember for Localizer or VOR-based Approaches

- The default factory setting allows the CDI output to automatically switch from the GPS receiver to the LOC receiver. This may be changed to manual in some installations. If the "ILS CDI Selection" setting is changed to "Manual", *you* must determine when to select "GPS" or "VLOC" guidance during the approach. Remember, "VLOC" is required for the final course segment from Final Approach Fix (FAF) to MAP.

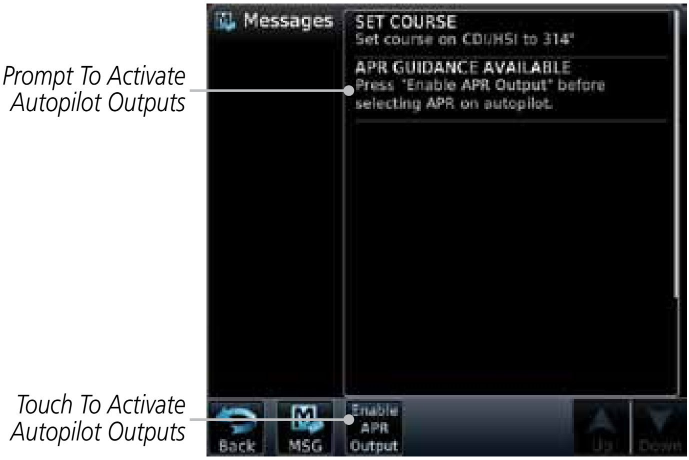
***NOTE:** Installations with certain autopilots, such as the KAP 140 and KFC225, do not allow automatic ILS CDI switching.*

***NOTE:** GPS phase of flight annunciations (LPV, ENR, etc.) are not applicable to the external CDI (or HSI) when VLOC is active.*

- If the CDI output has not automatically switched from GPS to ILS upon reaching the FAF, you must manually switch to the VLOC receiver by touching the **CDI** key. Verify that "VLOC" is displayed.
- Automatic switching of CDI output is available for ILS, localizer, SDF and LDA approaches. Automatic CDI switching is *not* available for backcourse approaches or VOR approaches.
- When flying an approach with the autopilot-coupled, you must monitor system functions at all times and verify that the autopilot and external CDI (or HSI) switch to the VLOC receiver with sufficient time to capture and track the approach course. Switching to "VLOC" late in the approach may not provide the autopilot enough time to respond and intercept the approach course prior to the FAF (depending upon the performance characteristics of your autopilot and aircraft). In such instances, you should manually fly the approach or refer to the documentation provided with your autopilot.
- When an ILS or VOR approach is first selected or executed, the frequency is automatically checked. If the frequency is incorrect, you will receive a message and you must place the correct ILS or VLOC frequency in the active frequency field.
- When flying a localizer-based approach (other than backcourse) with automatic CDI switching enabled:
    1. "GPS" guidance may be used while flying outbound and on the initial portion of the procedure turn.
    2. "VLOC" guidance is used on the remainder of the approach from the time you turn inbound on the procedure turn.
    3. The localizer frequency must be active to use "VLOC" guidance at the MAP.
- When flying a localizer-based approach with automatic CDI switching disabled.
    1. You may select "VLOC" guidance at any point on the approach prior to reaching the FAF.
    2. The localizer frequency must be active to use "VLOC" guidance.

6.14 Enabling Autopilot Outputs for the King KAP140/KFC225

Autopilot outputs for the King KAP140/KFC225 autopilots are activated manually by the pilot after being prompted during the approach procedure. After enabling outputs, the GTN 7XX will provide guidance information consistent with what the autopilot expects (i.e., angular CDI scaling and glideslope capture for an LPV or other vertically guided GPS approach).


Messages
Prompt To Activate Autopilot Outputs
Touch To Activate Autopilot Outputs
Back
MSG
Enable APR Output
Up
Down

SET COURSE
Set course on CDI/HSI to 314°

APR GUIDANCE AVAILABLE
Press "Enable APR Output" before selecting APR on autopilot.

Figure 6-20 Prompt To Activate Autopilot Outputs

7 CHARTS

***NOTE:** The availability of SafeTaxi, ChartView, or FliteCharts in electronic form may not preclude the requirement to carry paper charts aboard the aircraft. See the AFMS for more information.*

***NOTE:** The Chart feature provides a digital representation of a paper chart and provides no vertical or lateral course guidance. Flight Plan and Procedures are separate from Charts, and do provide vertical and lateral course guidance for the loaded route or procedure shown on the Flight Plan page. The term "Chart Unavailable" means that the chart cannot be viewed on the Charts due to either a chart not being published, or an error in the Chart database, but does not preclude its availability or inclusion of the procedure in the Flight Plan or Procedures portion of the system. The absence of a chart for a particular Departure, Arrival, or Approach does not preclude its availability or inclusion in the Flight Plan or Procedures portion of the system. The absence of a particular Departure, Arrival, or Approach under the Flight Plan or Procedures portion of the system does not preclude the ability to view the Chart for that procedure under the Chart feature.*

***NOTE**: Features that are selectable on the main map page, such as obstacles, airports, airspace, and other waypoint types that are not visible beneath the overlaid chart, remain selectable even when an approach chart is overlaid on the main map.*

The chart page will default to the nearest airport if no flight plan or destination airport is present. While you are on the ground, the displayed charts will default to the current airport location regardless of flight plan. The optional ChartView and FliteCharts provide on-board electronic terminal procedures charts. Electronic charts offer the convenience of rapid access to essential information. Either ChartView or FliteCharts may be configured in the system, but not both.

ChartView resembles the paper version of Jeppesen terminal procedures charts. The charts are displayed in full color with high-resolution. The MFD depiction shows the aircraft position on the moving map in the plan view of approach charts and on airport diagrams. Airport Hot Spots are outlined in magenta. The ChartView database subscription is available from Jeppesen, Inc. Available data includes:

- Arrivals (STAR)
- Departure Procedures (DP)
- Airport Diagrams
- NOTAMs
- Approaches

An enablement card that is purchased from Garmin is separate from the Jeppesen database and is required to enable ChartView.

***NOTE:** The chart for the destination airport or loaded approach will automatically be selected.*

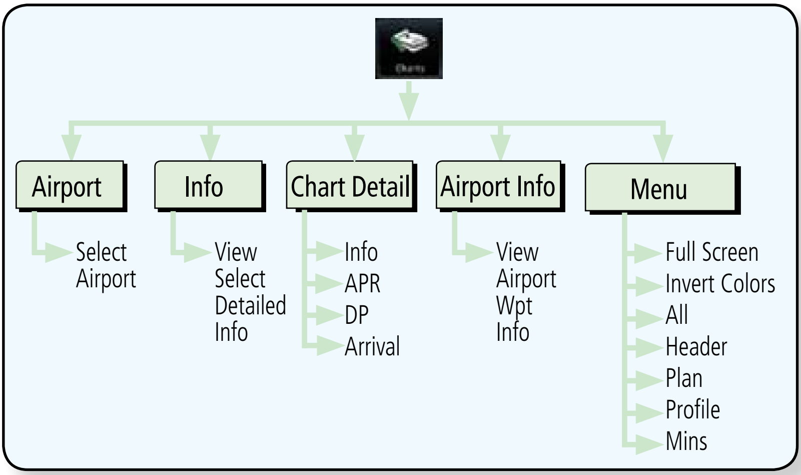

Charts
Airport
Select Airport
Info
View Select Detailed Info
Chart Detail
Info
APR
DP
Arrival
Airport Info
View Airport Wpt Info
Menu
Full Screen
Invert Colors
All
Header
Plan
Profile
Mins

Figure 7-1 Charts Functional Diagram

The following list describes the order in priority in which charts are auto-loaded in the system when the Chart page is displayed:

1. The most-recently selected chart during the current power cycle, if valid*,
2. The airport surface chart for the nearest airport, if on ground and nearest airport is found,
3. The approach chart for the approach in the active flight plan, if approach exists in the flight plan,
4. The airport surface chart for the last airport in the flight plan, if one exists,
5. The airport surface chart for the nearest airport, if nearest airport is found (same as #2 but aircraft could be in-air),
6. The airport surface chart for the first airport in the database, if found,
7. No chart.

* "Selected" does not include charts that were auto-selected. A selection must be made while on the charts page.

There following actions will invalidate #1:

- Changing the approach in the active flight plan
- Changing the on-ground status while not viewing the Charts page

7.1 Chart Page

1. From the Home page, touch the **Charts** key.

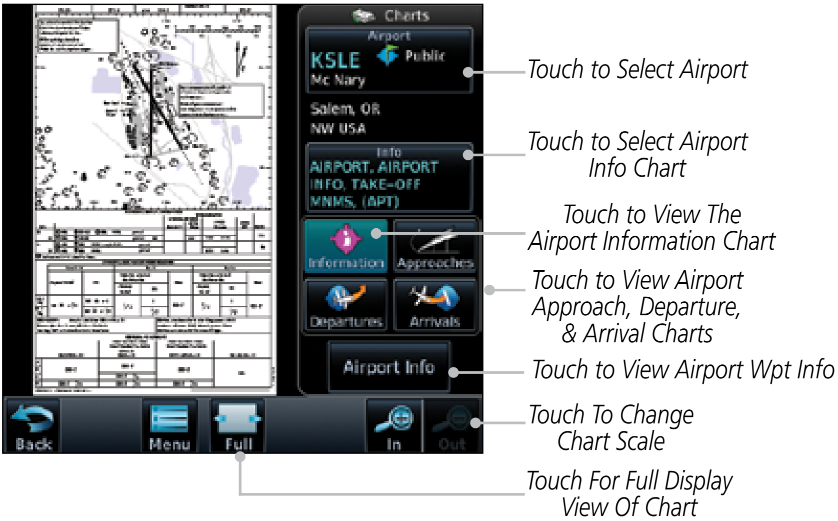

Charts
Airport
KSLE
Public
Mc Nary
Salem, OR
NW USA
Info
AIRPORT, AIRPORT INFO, TAKE-OFF MNMS, (APT)
Information
Approaches
Departures
Arrivals
Airport Info
Back
Menu
Full
In
Out
Touch to Select Airport
Touch to Select Airport Info Chart
Touch to View The Airport Information Chart
Touch to View Airport Approach, Departure, & Arrival Charts
Touch to View Airport Wpt Info
Touch To Change Chart Scale
Touch For Full Display View Of Chart

Figure 7-2 Charts Function Page

2. Various controls allow viewing of more available detail.

7.1.1 Airport Selection

KSLE
Public
Mc Nary

1. Touch the **Airport** selection key to select another airport.

2. Select the desired airport identifier with the keypad and touch **Enter**.

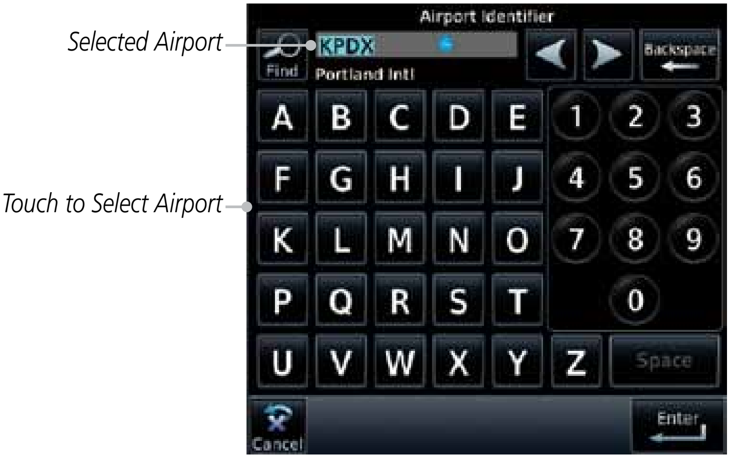
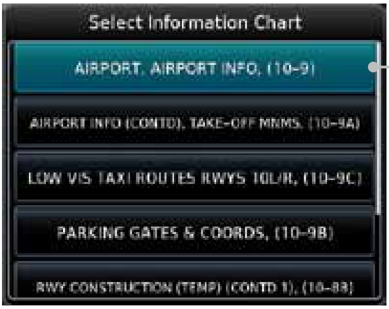

Selected Airport
Touch to Select Airport
Airport Identifier
Find
KPDX
Portland Intl
Backspace
A B C D E 1 2 3
F G H I J 4 5 6
K L M N O 7 8 9
P Q R S T 0
U V W X Y Z Space
Cancel
Enter

Figure 7-3 Airport Identifier Selection

7.1.2 Info

Info
AIRPORT, AIRPORT INFO, (10-9)

1. Touch the **Info** key to select the specific information chart.


Select Information Chart

AIRPORT, AIRPORT INFO, (10-9)

AIRPORT INFO (CONTD), TAKE-OFF MNMS, (10-9A)

LOW VIS TAXI ROUTES RWYS 10L/R, (10-9C)

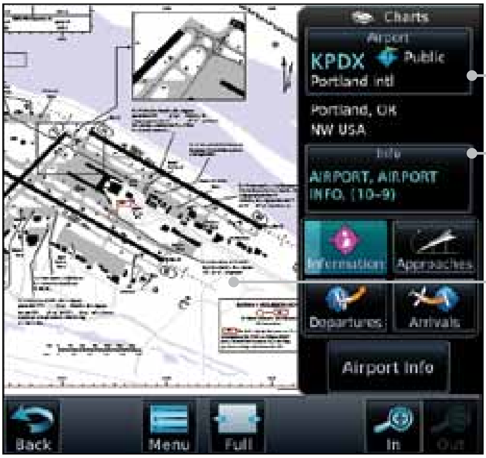
PARKING GATES & COORDS, (10-9B)

RWY CONSTRUCTION (TEMP) (CONTD 1), (10-8B)

Touch To View Selected Airport Info

Figure 7-4 Airport Info Selection

2. Touch an item from the list to view the chart.


Charts
Airport
KPDX
Public
Portland Intl
Portland, OR
NW USA
Info
AIRPORT, AIRPORT INFO, (10-9)
Information
Approaches
Departures
Arrivals
Airport Info
Back
Menu
Full
In
Out

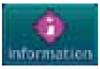
Selected Airport

Touch To View Selected Airport Info List

Detailed View Of Selected Airport Info

Figure 7-5 Airport Info Selection Detail

7.1.3 Information

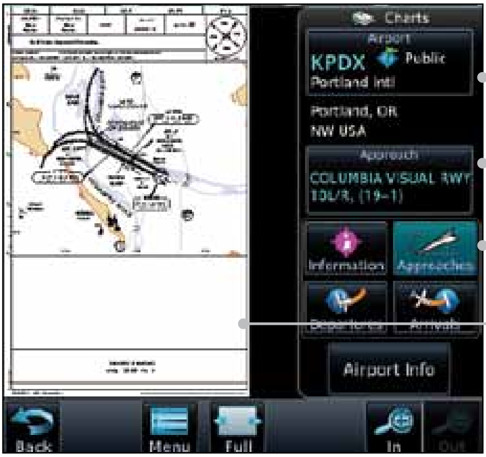

Information

1. Touch the **Information** key.
2. View the available airport information charts.

7.1.4 Approaches

Approaches

1. Touch the **Approaches** key to view available approaches.


Charts
Airport
KPDX
Public
Portland Intl
Portland, OR
NW USA
Approach
COLUMBIA VISUAL RWY 10L/R, (19-1)
Information
Approaches
Departures
Arrivals
Airport Info
Back
Menu
Full
In
Out

Selected Airport

Touch To View Approach List

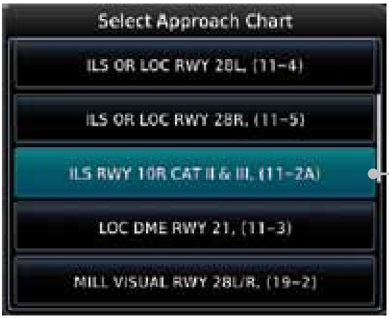
Touch To View Approach Charts

Detailed View Of Selected Approach

Figure 7-6 Approach Detail

Approach
COLUMBIA VISUAL RWY 10L/R, (19-1)

2. Touch the **Approach** key to select an approach chart.


Select Approach Chart
ILS OR LOC RWY 28L, (11-4)
ILS OR LOC RWY 28R, (11-5)
ILS RWY 10R CAT II & III, (11-2A)
LOC DME RWY 21, (11-3)
MILL VISUAL RWY 28L/R, (19-2)

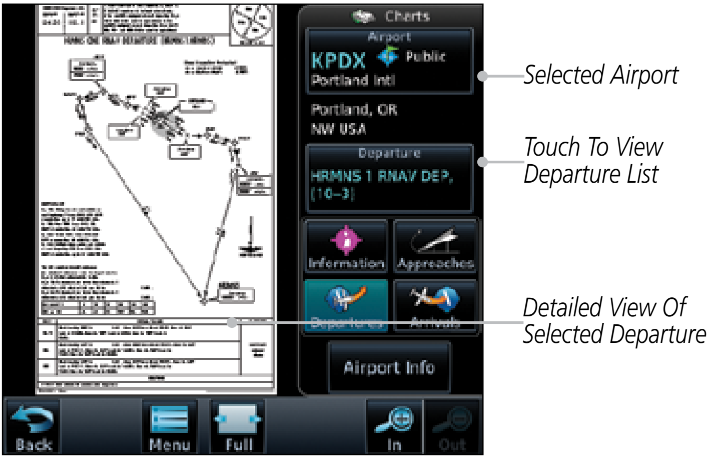
Touch To View Approach Chart

Figure 7-7 Approach List

3. Touch the desired approach to view detailed information.

7.1.5 Departures

1. Touch the **Departures** key to view available departures.


Charts
Airport
KPDX
Public
Portland Intl
Portland, OR
NW USA
Departure
HRMNS 1 RNAV DEP, (10-3)
Information
Approaches
Departures
Arrivals
Airport Info
Back
Menu
Full
In
Out

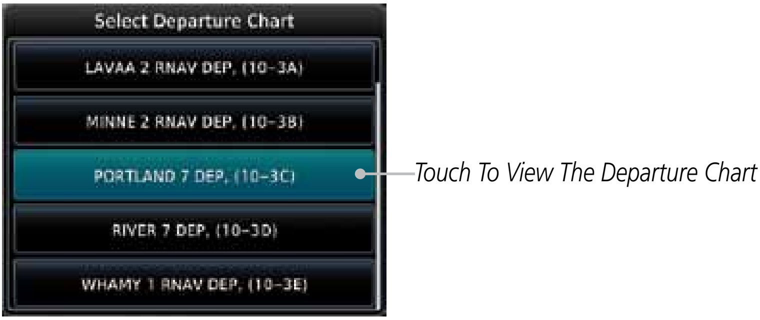
Selected Airport

Touch To View Departure List

Detailed View Of Selected Departure

Figure 7-8 Departure Detail

2. Touch the **Departure** key to change the selected Departure chart.


Select Departure Chart
LAVAA 2 RNAV DEP, (10-3A)
MINNE 2 RNAV DEP, (10-3B)
PORTLAND 7 DEP, (10-3C)
RIVER 7 DEP, (10-3D)
WHAMY 1 RNAV DEP, (10-3E)

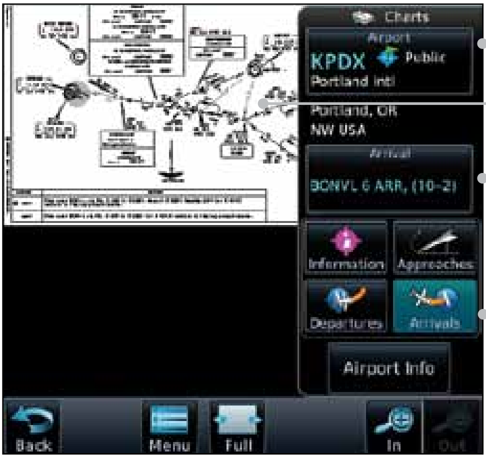
Touch To View The Departure Chart

Figure 7-9 Departure List

3. Touch the desired departure to view detailed information.

7.1.6 Arrivals

1. Touch the **Arrivals** key to view available arrivals.


Charts
Airport
KPDX
Public
Portland Intl
Portland, OR
NW USA
Arrival
BONVL 6 ARR, (10-2)
Information
Approaches
Departures
Arrivals
Airport Info
Back
Menu
Full
In
Out

Selected Airport

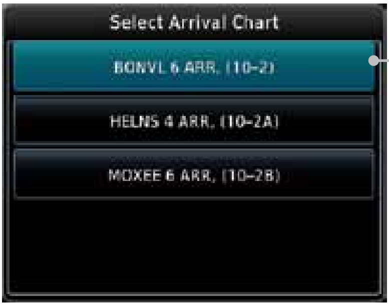
Detailed View Of Selected Arrival

Touch To View Arrival Chart List

Touch To View Arrival Charts

Figure 7-10 Arrival Detail

2. Touch the **Arrival** key to change the selected Arrival chart.


Select Arrival Chart
BONVL 6 ARR, (10-2)
HELNS 4 ARR, (10-2A)
MOXEE 6 ARR, (10-2B)

Touch To View Selected Arrival Info

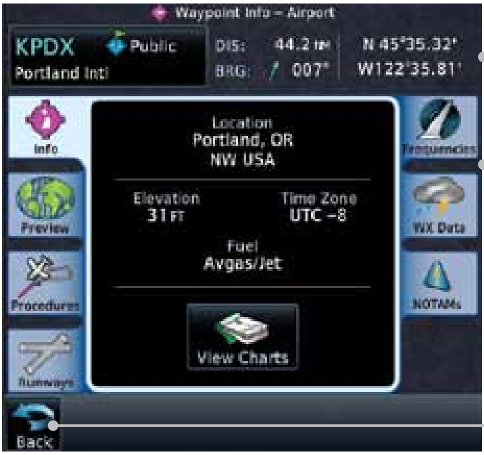
Figure 7-11 Arrival List

3. Touch the desired arrival to view detailed information.

7.1.7 Airport Info

Airport Info

1. Touch the Airport Info key to view the Waypoint Info for the selected airport.



Waypoint Info – Airport

KPDX Public
Portland Intl

DIS: 44.2 NM
BRG: 007°

N 45°35.32'
W122°35.81'

Location
Portland, OR
NW USA

Elevation
31 FT

Time Zone
UTC -8

Fuel
Avgas/Jet

Info
Preview
Procedures
Runways
Frequencies
WX Data
NOTAMs
View Charts
Back

Selected Airport Info

Touch Tabs To View More Details

Touch To Return To Charts Page

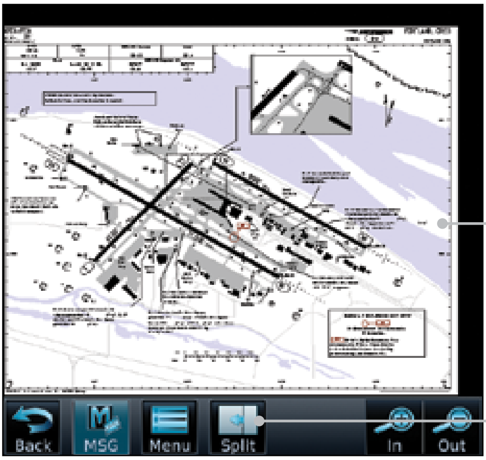
Figure 7-12 Selected Airport Detail

Back

2. Touch the **Back** key to return to the Charts page.

7.1.8 Full/Split Screen

1. Touch the **Full** key to display a full screen view of the current chart page.

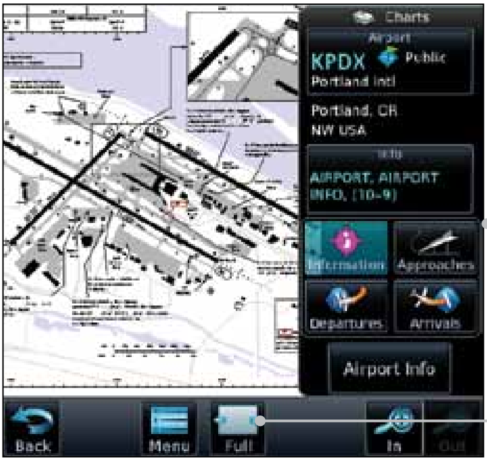

Back
MSG
Menu
Split
In
Out

Full Chart Page View

Touch To Return To Split Chart Page View

Figure 7-13 Full View of Chart Page

2. Touch the **Split** key to display a view of the current chart page split between the chart detail and chart page controls.


Charts
Airport
KPDX
Public
Portland Intl
Portland, OR
NW USA
Info
AIRPORT, AIRPORT INFO, (10-9)
Information
Approaches
Departures
Arrivals
Airport Info
Back
Menu
Full
In
Out

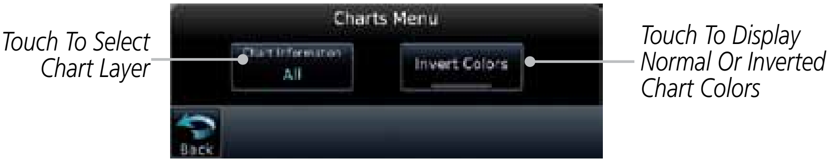
Split Chart Page View

Touch To Display Full Chart Page View

Figure 7-14 Split View of Chart Page

7.2 Chart Menu Options

1. From the Charts page, touch the **Menu** key.


Charts Menu
Chart Information
All
Invert Colors
Back

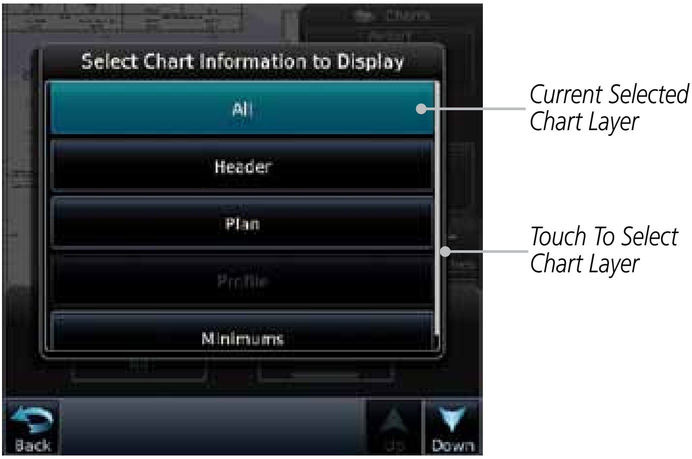
Touch To Select Chart Layer

Touch To Display Normal Or Inverted Chart Colors

Figure 7-15 Chart Options

Chart Information
All

2. Touch the **Chart Information** key to select a Chart Layer. Chart Layers are only available with ChartView.


Charts
Select Chart Information to Display
All
Header
Plan
Profile
Minimums
Back
Up
Down

Current Selected Chart Layer

Touch To Select Chart Layer

Figure 7-16 Select From Chart Layer List

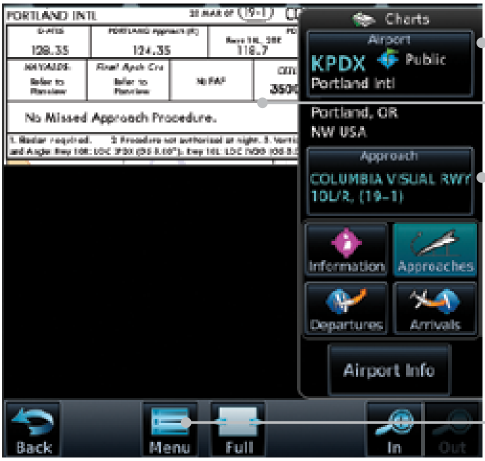
3. Touch the desired selection to display the selected Chart Layer.

7.2.1 Chart Layers - All

Touch the **All** key to view the composite of layers available for the selected chart.

7.2.2 Chart Layers - Header

Touch the **Header** selection from the Chart Layer list to view the header information for the selected approach chart.


PORTLAND INTL
128.35
124.35
116.7
No Missed Approach Procedure.
Charts
Airport
KPDX
Public
Portland Intl
Portland, OR
NW USA
Approach
COLUMBIA VISUAL RWY 10L/R, (19-1)
Information
Approaches
Departures
Arrivals
Airport Info
Back
Menu
Full
In
Out

Selected Airport

Detailed View Of Selected Header

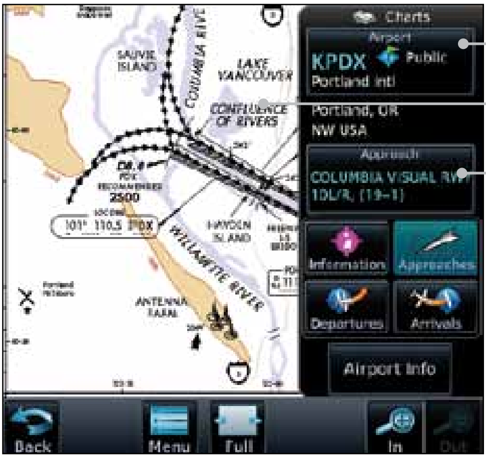
Selected Approach

Touch Menu To Select Layers

Figure 7-17 Header View of Chart for the Selected Approach

7.2.3 Chart Layers - Plan

Touch the **Plan** selection from the Chart Layer list to view the Plan View for the selected approach chart.


SAUVIE ISLAND
LAKE VANCOUVER
COLUMBIA RIVER
CONFLUENCE OF RIVERS
2500
IOI 110.5 IPDX
HAYDEN ISLAND
WILLAMETTE RIVER
ANTENNA FARM
Charts
Airport
KPDX
Public
Portland Intl
Portland, OR
NW USA
Approach
COLUMBIA VISUAL RWY 10L/R, (19-1)
Information
Approaches
Departures
Arrivals
Airport Info
Back
Menu
Full
In
Out

Selected Airport

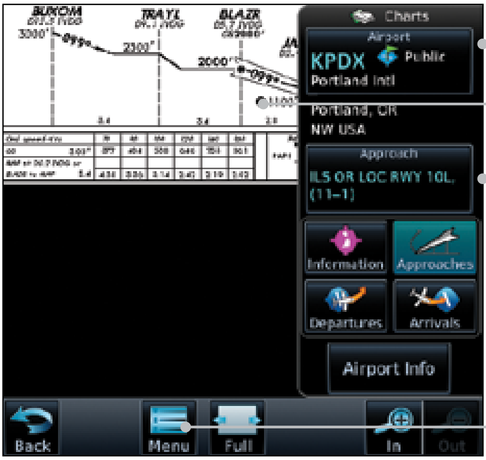
Detailed Plan View Of Selected Approach

Selected Approach

Figure 7-18 Plan View of Chart for the Selected Approach

7.2.4 Chart Layers - Profile

Touch the **Profile** selection from the Chart Layer list to view the vertical profile of the selected approach.


Charts
Airport
KPDX
Public
Portland Intl
Portland, OR
NW USA
Approach
ILS OR LOC RWY 10L (11-1)
Information
Approaches
Departures
Arrivals
Airport Info
Back
Menu
Full
In
Out

Selected Airport

Detailed View Of Selected Profile

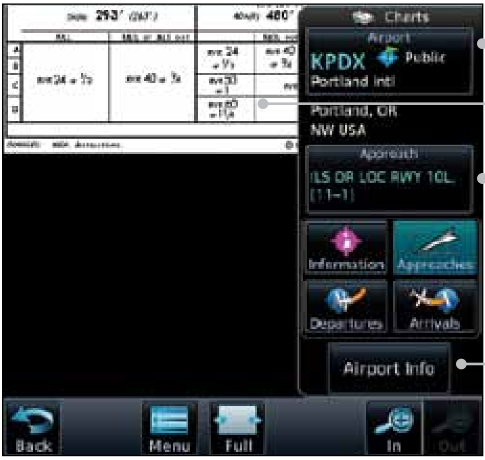
Selected Approach

Touch To Display Chart Info Options

Figure 7-19 Profile View of Chart for the Selected Approach

7.2.5 Chart Layers - Minimums

Touch the **Minimums** selection from the Chart Layer list to view the minimums for the selected approach.


Charts
Airport
KPDX
Public
Portland Intl
Portland, OR
NW USA
Approach
ILS OR LOC RWY 10L (11-1)
Information
Approaches
Departures
Arrivals
Airport Info
Back
Menu
Full
In
Out

Selected Airport

Detailed View Of Selected Minimums

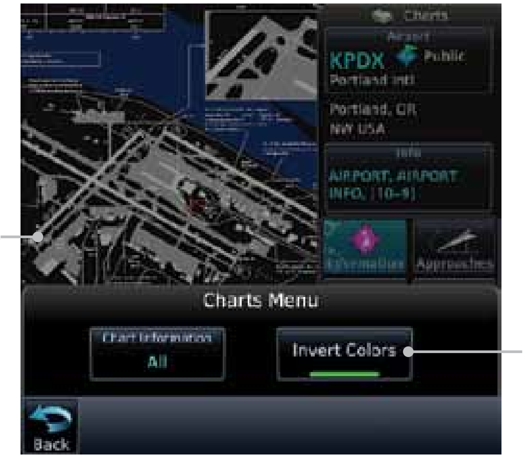
Selected Approach

Touch To Display Minimums

Figure 7-20 Minimums View of Chart for the Selected Approach

7.2.6 Invert Colors

While viewing the Charts Menu, touch the **Invert Colors** key to show an inverted color view of the display that enhances low light viewing.


Charts
Airport
KPDX Public
Portland Intl
Portland, OR
NW USA
Info
AIRPORT, AIRPORT INFO. (10-9)
Information
Approaches
Charts Menu
Chart Information
All
Invert Colors
Back

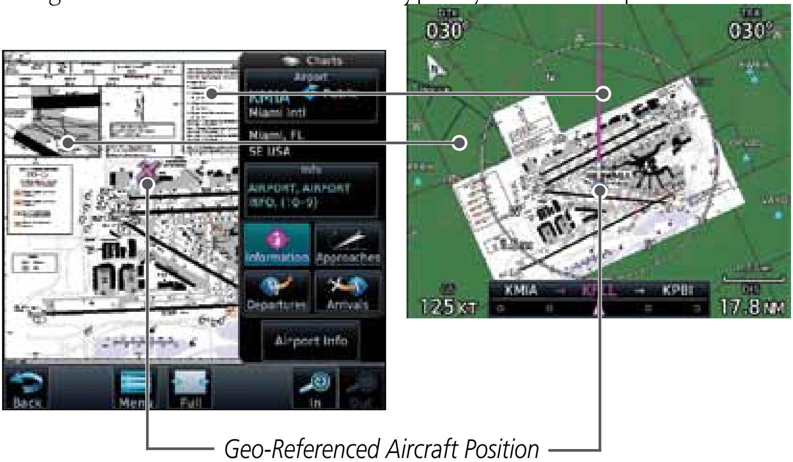
Inverted Color Chart Page View

Touch For Inverted Color Chart Page View

Figure 7-21 Inverted Chart Colors View

7.2.7 Geo-Referenced Aircraft Position

The geo-referenced aircraft position is placed on the chart when a position is established. On the Map page, the chart and geo-referenced position are shown when the aircraft is in the air (such as, speed is greater than 30 knots). When a chart is viewed on the Map page, areas of the chart that do not support geo-referencing, such as expanded details and text blocks, are removed. Typically, SIDs and STARs are not geo-referenced and thus will not typically have ownships on those charts.

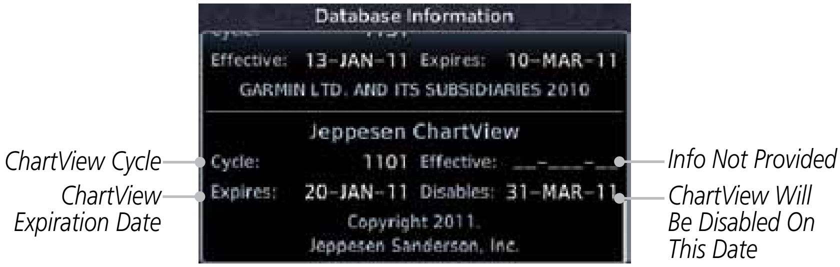

Charts
Airport
KMIA
Miami Intl
Miami, FL
SE USA
Info
AIRPORT, AIRPORT INFO. (10-9)
Information
Approaches
Departures
Arrivals
Airport Info
Back
Menu
Full
In
Out
030°
030°
125 KT
KMIA
KPBI
17.8 NM

Geo-Referenced Aircraft Position

Figure 7-22 Areas of Chart Info Removed For Map Overlay and Geo-Reference

7.3 ChartView Cycle Number and Revision

The ChartView database is revised every 14 days. Charts are still viewable during a period that extends from the cycle expiration date to the disables date. ChartView is disabled 70 days after the expiration date and is no longer available for viewing upon reaching the disable date. When turning on the GTN unit, the Power-up Page indicates the criteria for ChartView availability. An enablement card that is purchased from Garmin is separate from the Jeppesen database and is required to enable ChartView. Jeppeson does not provide the Effective date.



Database Information

Effective: 13-JAN-11 Expires: 10-MAR-11
GARMIN LTD. AND ITS SUBSIDIARIES 2010

Jeppesen ChartView
Cycle: 1101 Effective: __-___-__
Expires: 20-JAN-11 Disables: 31-MAR-11
Copyright 2011
Jeppesen Sanderson, Inc.

ChartView Cycle
ChartView Expiration Date
Info Not Provided
ChartView Will Be Disabled On This Date

Figure 7-23 System Status Database Information for ChartView

The database CYCLE number, EXPIRES, and DISABLES dates of the ChartView database appear in either white or yellow text. When the ChartView EXPIRES date is reached, ChartView becomes inoperative 70 days later. This is shown as the DISABLES date. When the DISABLES date is reached, charts are no longer available for viewing.

The ChartView database is provided directly from Jeppesen. Refer to Jeppesen Databases in Appendix A for instructions on revising the ChartView database.

7.4 FliteCharts®

FliteCharts® resemble the paper version of National Aeronautical Charting Office (NACO) terminal procedures charts. The charts are displayed with high-resolution and in color for applicable charts.

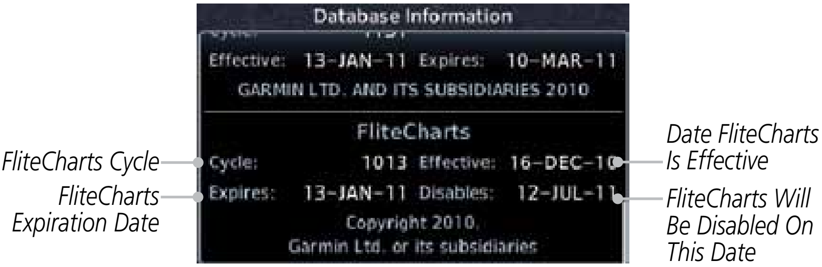
Garmin FliteCharts is an electronic version of the National Aeronautical Navigation Services Charts (AeroNav Services), which was formerly NACO. FliteCharts lets pilots quickly find and view all AeroNav Services Departure Procedures (DP), Standard Terminal Arrival Routes (STARs), approach charts, and airport diagrams. If the current approach is known, the GTN 7xx automatically selects the correct chart based on the flight plan. Pilots will have access to all approach plates currently published by AeroNav, which encompasses over 15,000 charts and over 2,900 airports in the U.S. FliteCharts updates are available from Garmin every 28 days, and the new geo-referenced capability will be included with the regular updates.

FliteCharts database subscription is available from Garmin. Available data includes:

- Arrivals (STAR)
- Departure Procedures (DP)
- Approaches
- Airport Diagrams

7.4.1 FliteCharts Cycle Number and Revision

FliteCharts data is revised every 28 days. Charts are still viewable during a period that extends from the cycle expiration date to the disables date. FliteCharts is disabled 180 days after the expiration date and are no longer available for viewing upon reaching the disables date. When turning on the GTN 7XX, the Power-up page indicates the criteria for chart availability. These indications are whether the databases are not configured, not available, current, out of date, or disabled.



Database Information

Effective: 13-JAN-11 Expires: 10-MAR-11

GARMIN LTD. AND ITS SUBSIDIARIES 2010

FliteCharts

Cycle: 1013 Effective: 16-DEC-10

Expires: 13-JAN-11 Disables: 12-JUL-11

Copyright 2010,
Garmin Ltd. or its subsidiaries

FliteCharts Cycle
FliteCharts Expiration Date
Date FliteCharts Is Effective
FliteCharts Will Be Disabled On This Date

Figure 7-24 System Status Database Information for FliteCharts

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

7.5 SafeTaxi®

SafeTaxi® is an enhanced feature that gives greater map detail when zooming in on airports. The airport display on the map reveals runways with numbers, taxiways with identifying letters/numbers, airport Hot Spots, and airport landmarks including ramps, buildings, control towers, and other prominent features. Resolution is greater at lower map ranges (zooming in). When the aircraft location is within the screen boundary, including within SafeTaxi ranges, an airplane symbol is shown on any of the navigation map views for enhanced position awareness.

***NOTE:** Do not use SafeTaxi or Chartview functions as the basis for ground maneuvering. SafeTaxi and Chartview functions do not comply with the requirements of AC 20-159 and are not qualified to be used as an airport moving map display (AMMD). SafeTaxi and Chartview are to be used by the flight crew to orient themselves on the airport surface to improve pilot situational awareness during ground operations.*

Designated Hot Spots are recognized at airports with many intersecting taxiways and runways, and/or complex ramp areas. Airport Hot Spots are outlined to caution pilots of areas on an airport surface where positional awareness confusion or runway incursions happen most often. Hot Spots are defined with a magenta circle or outline around the region of possible confusion.

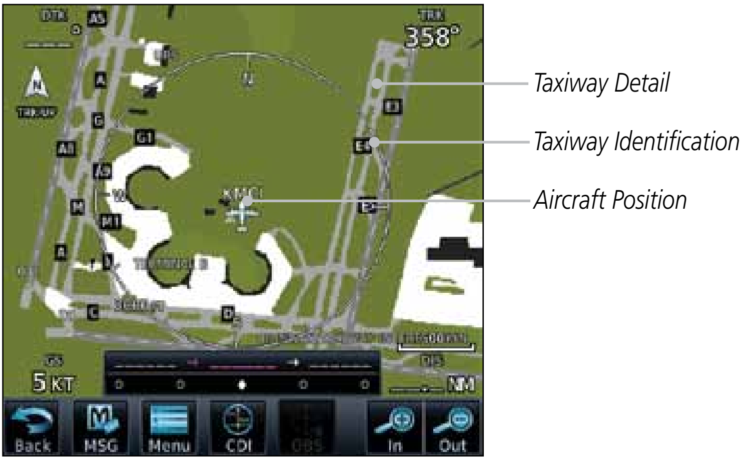


Figure 7-25 SafeTaxi Depiction on the Navigation Map Page

7.5.1 Using SafeTaxi®

Any map page that displays the navigation view can also show the SafeTaxi® airport layout within the maximum configured range. Charts and SafeTaxi are mutually exclusive. So, to view SafeTaxi and Hot Spots, the Charts feature must be turned off. Charts are displayed when the aircraft is in the air, but when on the ground, charts are removed and SafeTaxi will be shown automatically.

During ground operations the aircraft's position is displayed in reference to taxiways, runways, and airport features. The nose of the ownship symbol, not the center, depicts the current location of the aircraft.

7.5.2 Hot Spot Information

Hot Spot locations are identified by a magenta circle or outline.

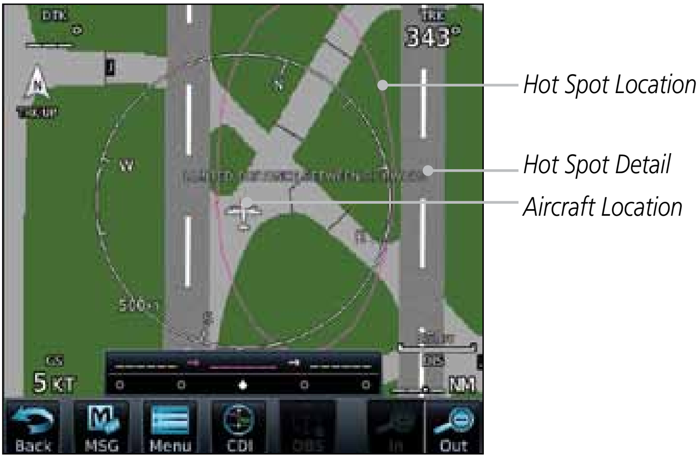


Figure 7-26 SafeTaxi Hot Spot Depiction

7.5.3 SafeTaxi® Cycle Number and Revision

The SafeTaxi database is revised every 56 days. SafeTaxi is always available for use after the expiration date. When turning on the GTN 7XX, the Power-up Page indicates whether the databases are current, out of date, or not available. The Power-up Page shows the SafeTaxi database is current when the "SafeTaxi Expires" date is shown in white. When the SafeTaxi cycle has expired, the "SafeTaxi Expires" date appears in yellow. The message "unknown" appears in white if no SafeTaxi data is available on the database card.

The SafeTaxi Region, Version, Cycle, Effective date and Expires date of the database cycle can also be found on the System - System Status page. SafeTaxi information appears in white and yellow text. The EFFECTIVE date appears in white when data is current and in yellow when the current date is before the effective date. The EXPIRES date appears in white when data is current and in yellow when expired. SafeTaxi REGION NOT AVAILABLE appears in white if SafeTaxi data is not available on the database card.

8 WAYPOINT INFO

The Waypoint Info function allows you to view information about the selected waypoint. The Waypoint Info page can be reached from the Home page, selected from a flight plan, or selected from the Nearest page.

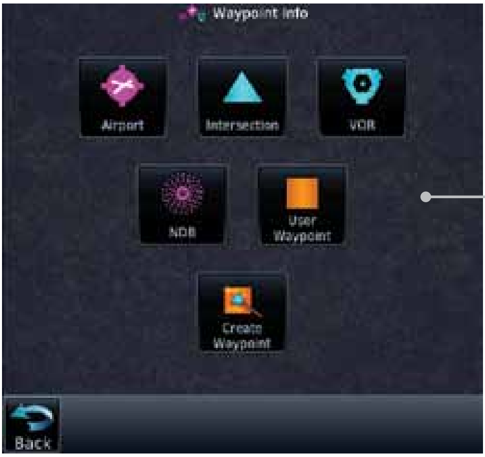

Waypoint Info
Airport
Intersection
VOR
NDB
User Waypoint
Create Waypoint
Back
Touch Key to Display Waypoint Type

Figure 8-1 Waypoint Info Page

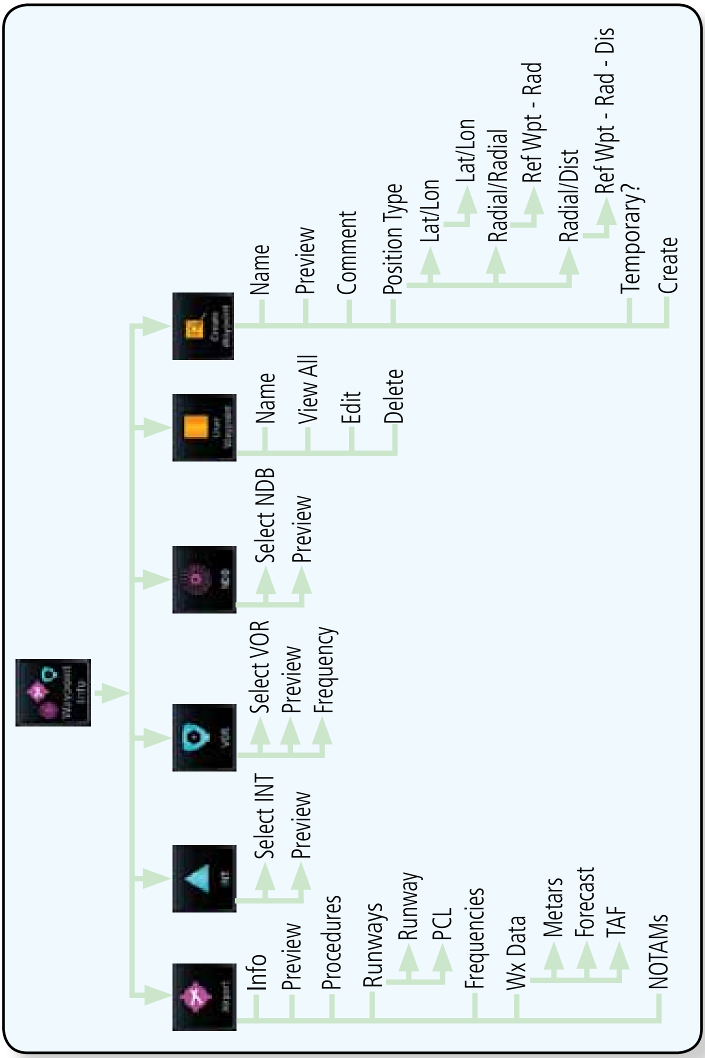

Waypoint Info
Info
Preview
Procedures
Runways
Runway
PCL
Frequencies
Wx Data
Metars
Forecast
TAF
NOTAMs
Select INT
Preview
Select VOR
Preview
Frequency
Select NDB
Preview
Name
View All
Edit
Delete
Name
Preview
Comment
Position Type
Lat/Lon
Lat/Lon
Radial/Radial
Ref Wpt - Rad
Radial/Dist
Ref Wpt - Rad - Dis
Temporary?
Create

Figure 8-2 Waypoint Info Functional Diagram

8.1 Waypoint Selection

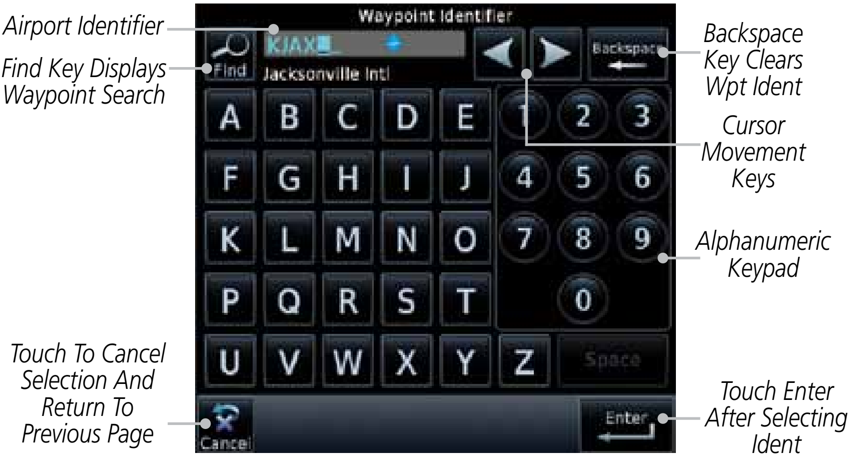
Waypoint Info

1. Touch the **Waypoint Info** key and then touch the desired waypoint type (Airport, INT, VOR, etc).

KSPG
Public
Whited

2. Touch the waypoint identifier.

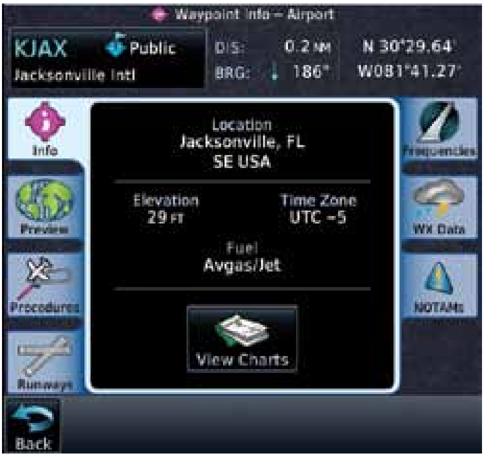
3. The waypoint identifier selection page will be shown and the waypoint identifier field will be active for selection. Touch the required keys on the alphanumeric keypad to select the desired waypoint identifier and then touch the **Enter** key.


Waypoint Identifier
Find
Backspace
A B C D E 1 2 3
F G H I J 4 5 6
K L M N O 7 8 9
P Q R S T 0
U V W X Y Z Space
Cancel
Enter
Airport Identifier
Find Key Displays Waypoint Search
Touch To Cancel Selection And Return To Previous Page
Backspace Key Clears Wpt Ident
Cursor Movement Keys
Alphanumeric Keypad
Touch Enter After Selecting Ident

KJAX
Jacksonville Intl

Figure 8-3 Waypoint Ident Selection

4. The information page for the selected waypoint will be displayed.


Waypoint Info – Airport
Info
Preview
Procedures
Runways
Frequencies
WX Data
NOTAMs
View Charts
Back

KJAX Public
Jacksonville Intl
DIS: 0.2 NM
BRG: 186°
N 30°29.64'
W081°41.27'

Location
Jacksonville, FL
SE USA

Elevation
29 FT

Time Zone
UTC -5

Fuel
Avgas/Jet

Figure 8-4 Waypoint Ident Selection Result

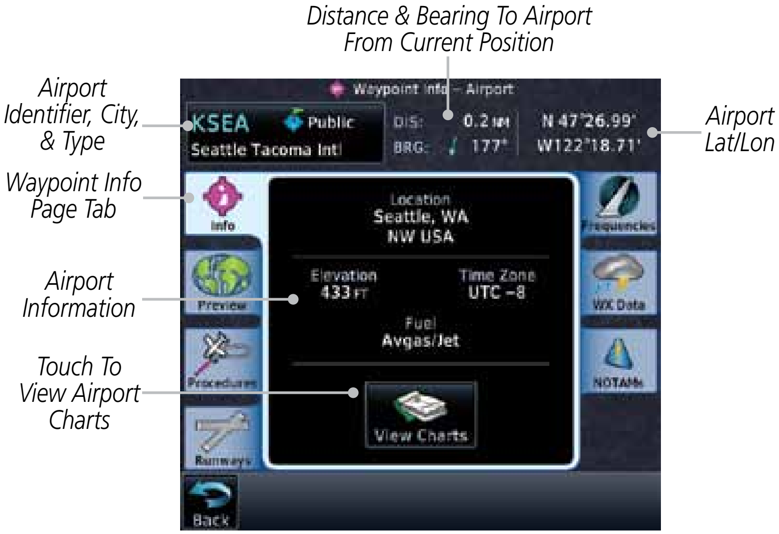
8.2 Airport

The Airport page of the Waypoint Info function provides a variety of detailed information about the airport.

8.2.1 Info

The upper part of the page shows the airport identifier and type, name, city and region, the lat/lon coordinates of the airport, and the bearing (and direction arrow) and distance to the airport from your present position. The center area shows the airport elevation, fuel availability, and time zone.

1. While viewing the Waypoint Info page, touch the **Airport** key.


Distance & Bearing To Airport From Current Position
Airport Identifier, City, & Type
Airport Lat/Lon
Waypoint Info Page Tab
Airport Information
Touch To View Airport Charts
Waypoint Info - Airport
Info
Preview
Procedures
Runways
Back
Frequencies
WX Data
NOTAMs
View Charts

KSEA Public
Seattle Tacoma Intl
DIS: 0.2 NM
BRG: 177°
N 47°26.99'
W122°18.71'
Location Seattle, WA NW USA
Elevation 433 FT
Time Zone UTC -8
Fuel Avgas/Jet

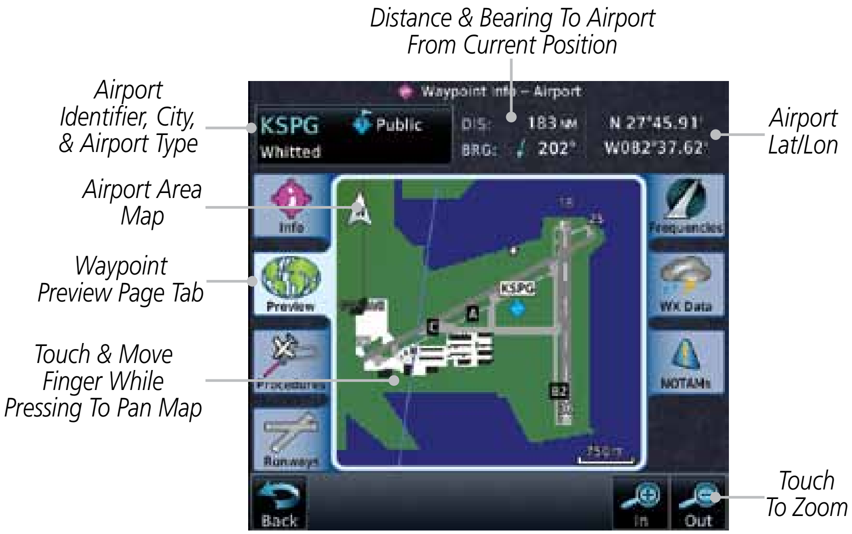
Figure 8-5 Waypoint Info Airport Page

2. Touch the **View Charts** key to display available charts for the airport.

8.2.2 Preview

The Waypoint Info Airport Preview page provides detailed information about the selected airport.

1. Touch the **Preview** tab to view a map of the airport and surrounding area.
2. Use the **In** and **Out** keys to zoom in and out on the Preview map.



Waypoint Info – Airport

KSPG Public
Whitted

DIS: 183 NM
BRG: 202°

N 27°45.91'
W082°37.62'

Distance & Bearing To Airport From Current Position
Airport Identifier, City, & Airport Type
Airport Area Map
Waypoint Preview Page Tab
Touch & Move Finger While Pressing To Pan Map
Airport Lat/Lon
Touch To Zoom
Info
Preview
Procedures
Runways
Frequencies
WX Data
NOTAMs
Back
In
Out
KSPG
250ft

Figure 8-6 Waypoint Info Airport Map Page

3. You may touch the map window and while pressing the display drag your finger to move the map view.

8.2.3 Procedures

1. Touch the **Procedures** page tab to view details about procedures for the selected airport.

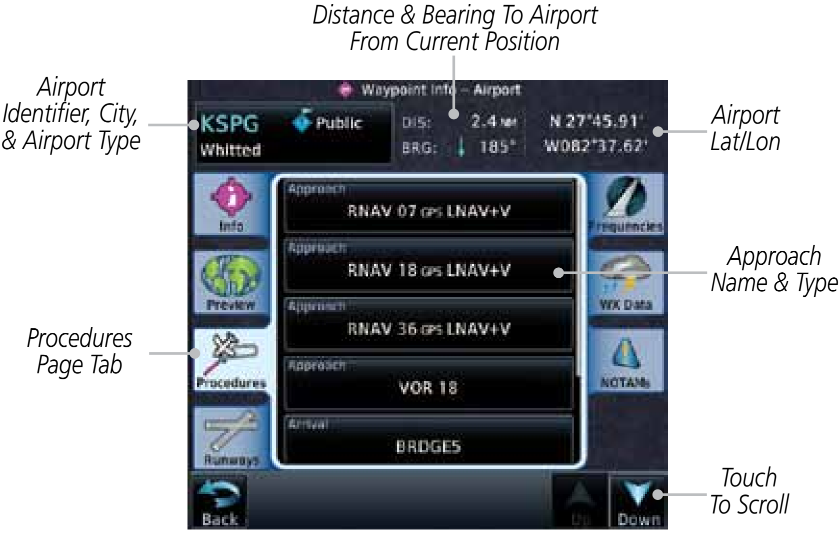

Distance & Bearing To Airport From Current Position
Airport Identifier, City, & Airport Type
Airport Lat/Lon
Approach Name & Type
Procedures Page Tab
Touch To Scroll
Waypoint Info – Airport
KSPG
Whitted
Public
DIS: 2.4 NM
BRG: 185°
N 27°45.91'
W082°37.62'
Info
Preview
Procedures
Runways
Frequencies
WX Data
NOTAMs
Approach
RNAV 07 GPS LNAV+V
Approach
RNAV 18 GPS LNAV+V
Approach
RNAV 36 GPS LNAV+V
Approach
VOR 18
Arrival
BRDGES
Back
Up
Down

Figure 8-7 Waypoint Info Airport Procedures Page

2. Touch the **Up** and **Down** keys to view additional procedures, as needed.

3. Touch one of the procedure keys to select it for the Procedures function.

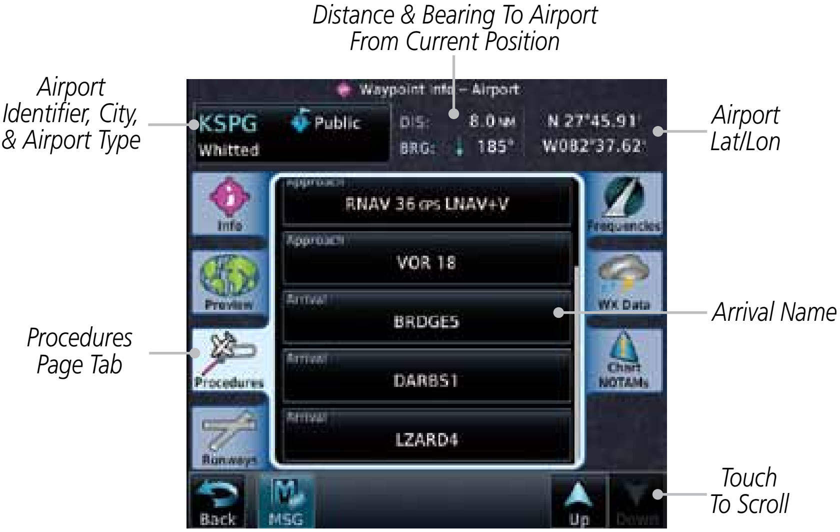
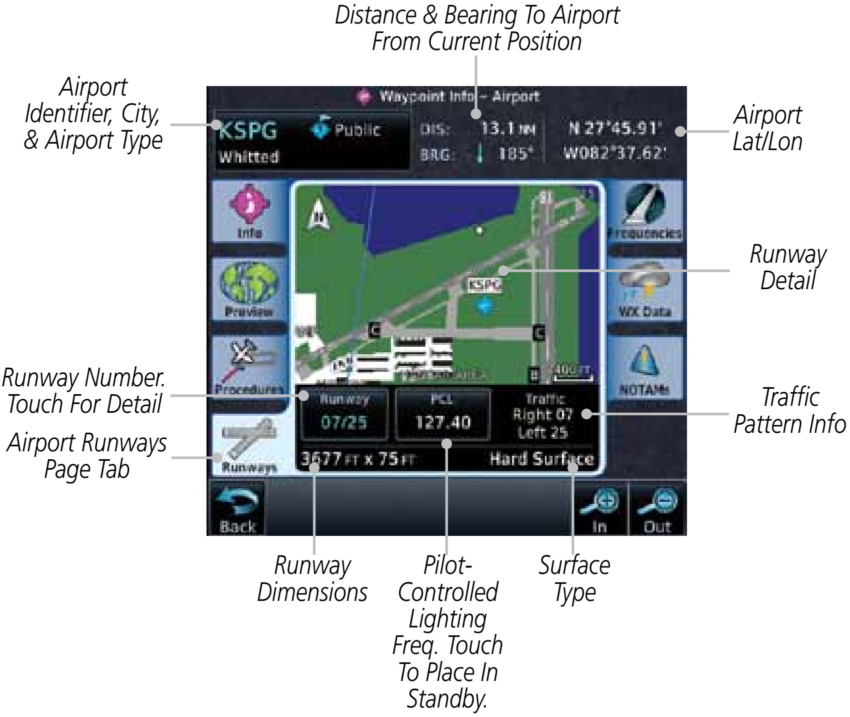

Distance & Bearing To Airport From Current Position
Airport Identifier, City, & Airport Type
Airport Lat/Lon
Arrival Name
Procedures Page Tab
Touch To Scroll
Waypoint Info – Airport
KSPG
Whitted
Public
DIS: 8.0 NM
BRG: 185°
N 27°45.91'
W082°37.62'
Info
Preview
Procedures
Runways
Frequencies
WX Data
Chart NOTAMs
Approach
RNAV 36 GPS LNAV+V
Approach
VOR 18
Arrival
BRDGES
Arrival
DARBS1
Arrival
LZARD4
Back
MSG
Up
Down

Figure 8-8 Waypoint Info Airport Arrival Information

8.2.4 Runways


Distance & Bearing To Airport From Current Position
Airport Identifier, City, & Airport Type
Airport Lat/Lon
Runway Detail
Runway Number. Touch For Detail
Airport Runways Page Tab
Traffic Pattern Info
Runway Dimensions
Pilot-Controlled Lighting Freq. Touch To Place In Standby.
Surface Type
Waypoint Info - Airport
Info
Preview
Procedures
Runways
Frequencies
WX Data
NOTAMs
Back
In
Out
KSPG
400 FT

KSPG Public
Whitted
DIS: 13.1 NM
BRG: 185°
N 27°45.91'
W082°37.62'
Runway 07/25
PCL 127.40
Traffic Right 07 Left 25
3677 FT x 75 FT
Hard Surface

Figure 8-9 Waypoint Info Airport Runway Information Page

Runways

1. Touch the **Runways** tab to view information about the available runways for the selected airport. The runway identifiers, surface type, lighting with Pilot Controlled Lighting (PCL) frequency, runway size, and Traffic Pattern direction are shown.

PCL 127.40

2. Touch the **PCL** key to load the PCL frequency into the Com Standby location.

8.2.5 Frequencies

Frequencies

Up Down

1. Touch the **Frequencies** tab to view details about available frequencies for the selected airport.
2. Touch the **Up** and **Down** keys to view additional frequencies, as needed. A "c" symbol in a white circle will appear next to frequencies that also function as the Common Traffic Advisory Frequency (CTAF).

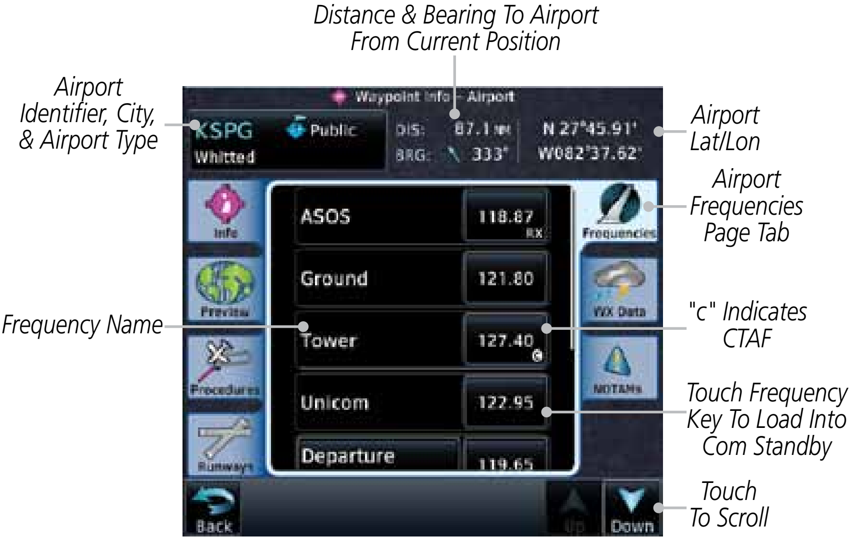

Distance & Bearing To Airport From Current Position
Airport Identifier, City, & Airport Type
Airport Lat/Lon
Airport Frequencies Page Tab
Frequency Name
"c" Indicates CTAF
Touch Frequency Key To Load Into Com Standby
Touch To Scroll
Waypoint Info - Airport
KSPG
Public
Whitted
DIS: 87.1
BRG: 333°
N 27°45.91'
W082°37.62'
Info
Preview
Procedures
Runways
Frequencies
WX Data
NOTAMs
ASOS 118.87 RX
Ground 121.80
Tower 127.40
Unicom 122.95
Departure 119.65
Back
Up
Down

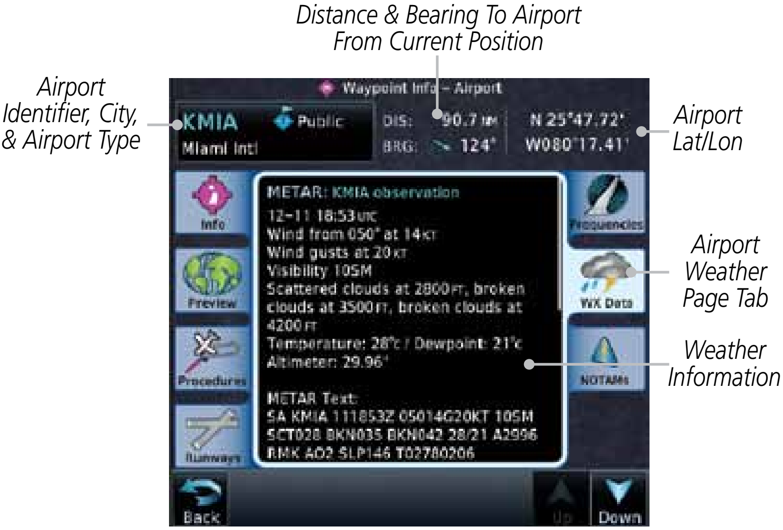
Figure 8-10 Waypoint Info Airport Frequency List Page

122.95

3. Touch the **Frequency** key next to the frequency name to load it as the Com or Nav standby frequency, depending on frequency type.

8.2.6 Weather (WX) Data

1. Touch the **WX Data** tab next to the center window to view textual METARs, City Forecast, and TAF weather information available for the selected airport.


Distance & Bearing To Airport From Current Position
Airport Identifier, City, & Airport Type
Airport Lat/Lon
Airport Weather Page Tab
Weather Information
Waypoint Info – Airport
Info
Preview
Procedures
Runways
Frequencies
WX Data
NOTAMs
Back
Up
Down

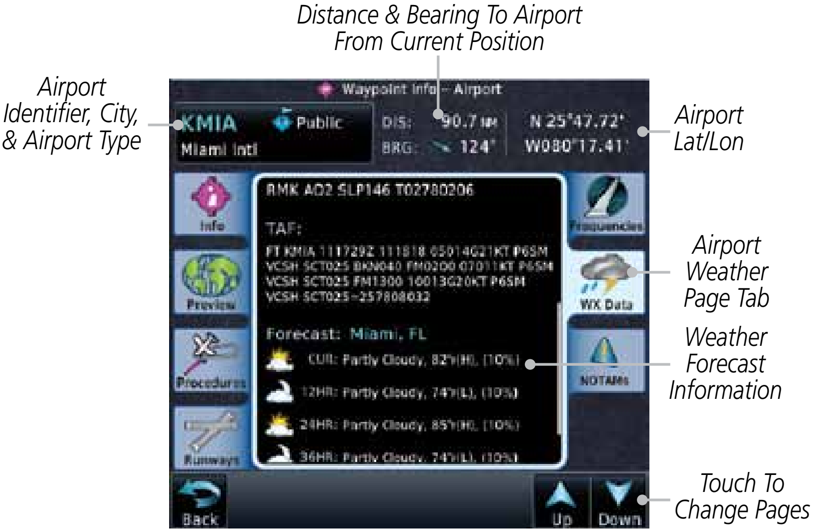
KMIA Public
Miami Intl
DIS: 90.7 NM
BRG: 124°
N 25°47.72'
W080°17.41'

METAR: KMIA observation
12-11 18:53UTC
Wind from 050° at 14KT
Wind gusts at 20KT
Visibility 10SM
Scattered clouds at 2800FT, broken clouds at 3500FT, broken clouds at 4200FT
Temperature: 28°C / Dewpoint: 21°C
Altimeter: 29.96"

METAR Text:
SA KMIA 111853Z 05014G20KT 10SM
SCT028 BKN035 BKN042 28/21 A2996
RMK AO2 SLP146 T02780206

Figure 8-11 Waypoint Info Airport Weather Page

2. Touch the **Up** and **Down** keys to scroll through the Weather page information.


Distance & Bearing To Airport From Current Position
Airport Identifier, City, & Airport Type
Airport Lat/Lon
Airport Weather Page Tab
Weather Forecast Information
Touch To Change Pages
Waypoint Info – Airport
Info
Preview
Procedures
Runways
Frequencies
WX Data
NOTAMs
Back
Up
Down

KMIA Public
Miami Intl
DIS: 90.7 NM
BRG: 124°
N 25°47.72'
W080°17.41'

RMK AO2 SLP146 T02780206

TAF:
FT KMIA 111729Z 111818 05014G21KT P6SM
VCSH SCT025 BKN040 FM0200 07011KT P6SM
VCSH SCT025 FM1300 10013G20KT P6SM
VCSH SCT025=257808032

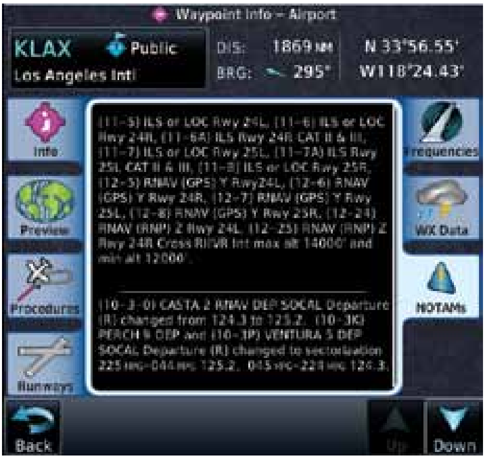
Forecast: Miami, FL
CUR: Partly Cloudy, 82°F(H), (10%)
12HR: Partly Cloudy, 74°F(L), (10%)
24HR: Partly Cloudy, 85°F(H), (10%)
36HR: Partly Cloudy, 74°F(L), (10%)

Figure 8-12 Waypoint Info Airport Weather Forecast Page

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

8.2.7 NOTAM Pages

1. Touch the **Chart NOTAMs** tab next to the center window to view any Chart NOTAMs available for the selected airport. This feature is supported with ChartView and FIS-B through the GDL 88.


Waypoint Info – Airport
KLAX
Public
Los Angeles Intl
DIS: 1869 NM
BRG: 295°
N 33°56.55'
W118°24.43'
Info
Preview
Procedures
Runways
Frequencies
WX Data
NOTAMs
Back
Up
Down

(11-5) ILS or LOC Rwy 24L, (11-6) ILS or LOC Rwy 24R, (11-6A) ILS Rwy 24R CAT II & III, (11-7) ILS or LOC Rwy 25L, (11-7A) ILS Rwy 25L CAT II & III, (11-8) ILS or LOC Rwy 25R, (12-5) RNAV (GPS) Y Rwy24L, (12-6) RNAV (GPS) Y Rwy 24R, (12-7) RNAV (GPS) Y Rwy 25L, (12-8) RNAV (GPS) Y Rwy 25R, (12-24) RNAV (RNP) Z Rwy 24L, (12-25) RNAV (RNP) Z Rwy 24R Cross RIIVR Int max alt 14000' and min alt 12000'.

(10-3-0) CASTA 2 RNAV DEP SOCAL Departure (R) changed from 124.3 to 125.2. (10-3K) PERCH 9 DEP and (10-3P) VENTURA 5 DEP SOCAL Departure (R) changed to sectorization 225 HDG-044 HDG 125.2, 045 HDG-224 HDG 124.3.

Figure 8-13 Waypoint Info Airport NOTAMs Page

2. Touch the **Up** and **Down** keys to view additional information, as needed.

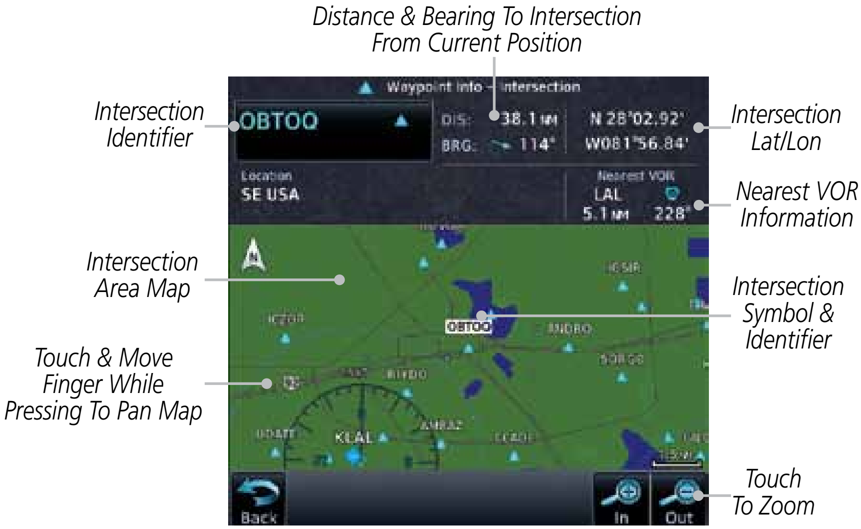
8.3 Intersection (INT)

The Intersection page of the Waypoint Info function provides a variety of detailed information about the intersection. The top left area of the page displays the Intersection identifier and region. The top center area shows the lat/lon coordinates of the Intersection and the bearing (with direction arrow) and distance to the Intersection from your present position.

Select another Waypoint by touching the **Waypoint Identifier** key, entering the characters for the desired name with the alphanumeric keypad, and then touching the **Enter** key. You may also search through the list by touching the **Find** key and then choosing from the existing list of waypoints by touching the desired waypoint from the list.

The center area of the page shows a map with the Intersection in the center.

1. While viewing the Waypoint Info page, touch the **Intersection** key.



Waypoint Info - Intersection

OBTOO

DIS: 38.1 NM

BRG: 114°

N 28°02.92'

W081°56.84'

Location SE USA

Nearest VOR LAL 5.1 NM 228°

Distance & Bearing To Intersection From Current Position
Intersection Identifier
Intersection Lat/Lon
Nearest VOR Information
Intersection Area Map
Intersection Symbol & Identifier
Touch & Move Finger While Pressing To Pan Map
Touch To Zoom
OBTOO
KLAL
Back
In
Out

Figure 8-14 Waypoint Info - Intersections

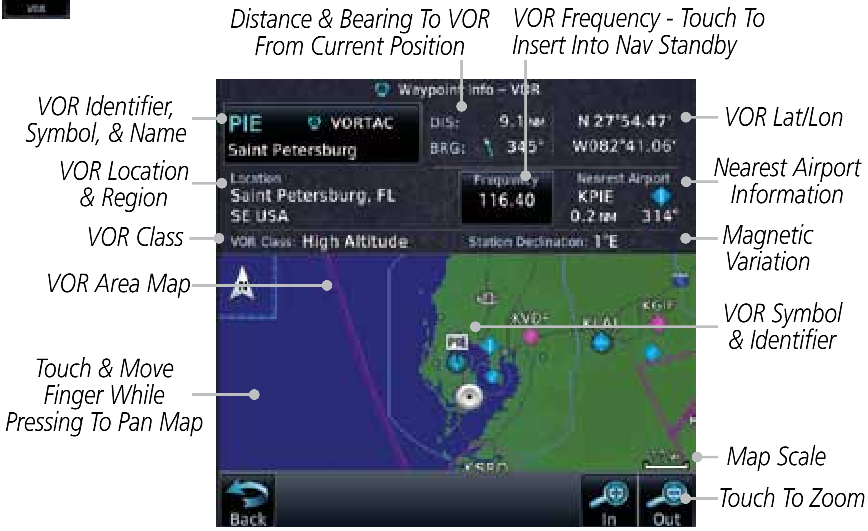
2. Use the **In** and **Out** keys to zoom in and out on the map. You may touch the map window and while lightly pressing the display, drag your finger to move the map view.

8.4 VOR

The VOR page of the Waypoint Info function provides a variety of detailed information about the VOR. The top left area of the page displays the VOR identifier, name, city and state, and region. The top center area shows the lat/lon coordinates of the VOR and the bearing (with direction arrow) and distance to the VOR from your present position. The top right area shows the frequency in a key. Select another Waypoint by touching the **Waypoint Identifier** key, entering the characters for the desired name with the alphanumeric keypad, and then touching the **Enter** key. You may also search through the list by touching the **Find** key and then choosing from the existing list of waypoints by touching the desired waypoint from the list.

The center area of the page shows a map with the VOR in the center.

1. While viewing the Waypoint Info page, touch the **VOR** key.


Distance & Bearing To VOR From Current Position
VOR Frequency - Touch To Insert Into Nav Standby
VOR Identifier, Symbol, & Name
VOR Lat/Lon
VOR Location & Region
Nearest Airport Information
VOR Class
Magnetic Variation
VOR Area Map
VOR Symbol & Identifier
Touch & Move Finger While Pressing To Pan Map
Map Scale
Touch To Zoom

Waypoint Info - VOR
PIE VORTAC
Saint Petersburg
DIS: 9.1 NM
BRG: 345°
N 27°54.47'
W082°41.06'
Location
Saint Petersburg, FL
SE USA
Frequency
116.40
Nearest Airport
KPIE
0.2 NM 314°
VOR Class: High Altitude
Station Declination: 1°E

Figure 8-15 Waypoint Info - VORs

2. Use the **In** and **Out** keys to zoom in and out on the map. You may touch the map window and while lightly pressing the display, drag your finger to move the map view.

3. Touch the **Frequency** key next to load it as the Nav standby frequency.

8.5 NDB

The NDB page of the Waypoint Info function provides a variety of detailed information about the NDB. The top left area of the page displays the NDB identifier, name, city and state, and region. The top center area shows the lat/lon coordinates of the NDB and the bearing (with direction arrow) and distance to the NDB from your present position. The top right area shows the frequency in a key.

Select another Waypoint by touching the **Waypoint Identifier** key, entering the characters for the desired name with the alphanumeric keypad, and then touching the **Enter** key. You may also search through the list by touching the **Find** key and then choosing from the existing list of waypoints by touching the desired waypoint from the list.

The center area of the page shows a map with the NDB in the center.

1. While viewing the Waypoint Info page, touch the **NDB** key.

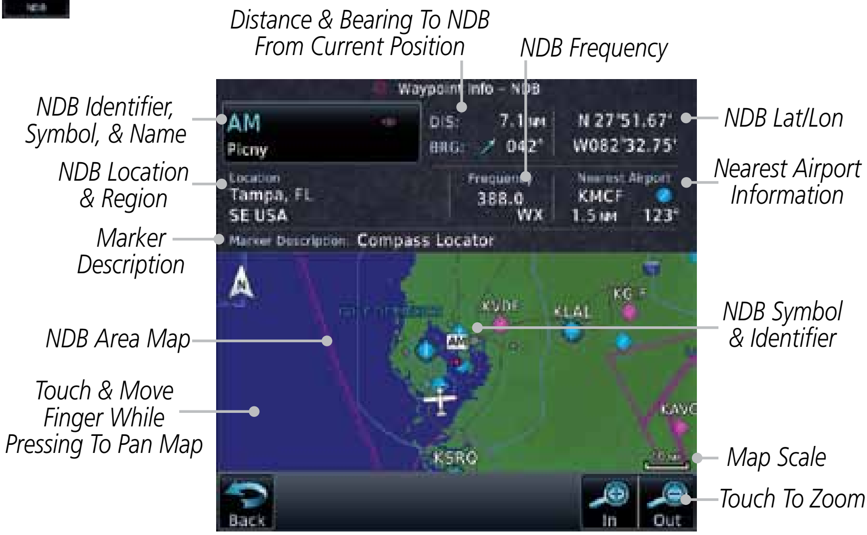

Distance & Bearing To NDB From Current Position
NDB Frequency
NDB Identifier, Symbol, & Name
NDB Lat/Lon
NDB Location & Region
Nearest Airport Information
Marker Description
NDB Symbol & Identifier
NDB Area Map
Touch & Move Finger While Pressing To Pan Map
Map Scale
Touch To Zoom
Waypoint Info - NDB
AM
Plcny
DIS: 7.1NM
BRG: 042°
N 27°51.67'
W082°32.75'
Location
Tampa, FL
SE USA
Frequency
388.0
WX
Nearest Airport
KMCF
1.5NM 123°
Marker Description: Compass Locator
KVDF
KLAL
KSRQ
Back
In
Out

Figure 8-16 Waypoint Info for NDBs

2. Use the **In** and **Out** keys to zoom in and out on the map. You may touch the map window and while lightly pressing the display, drag your finger to move the map view.

8.6 User Waypoints (User)

In addition to the airport, VOR, NDB and intersection information contained in your Jeppesen NavData® card, the GTN 7XX allows you to store up to 1,000 user-defined waypoints. The User Waypoint Page displays the waypoint name (up to six characters long), identifier and radial from two reference waypoints, distance from one reference waypoint, along with the user waypoint's lat/lon position.

The following descriptions and abbreviations appear on the User Waypoint Page:

- Ref Wpt — Reference waypoint identifier (name)
- Radial — Radial from reference waypoint, in degrees magnetic or degrees true (depending upon unit configuration)
- Distance — Distance from reference waypoint, in nautical miles/statute miles/kilometers (depending upon unit configuration)
- Lat/Lon — Latitude/Longitude (degrees/minutes or degrees/minutes/seconds)

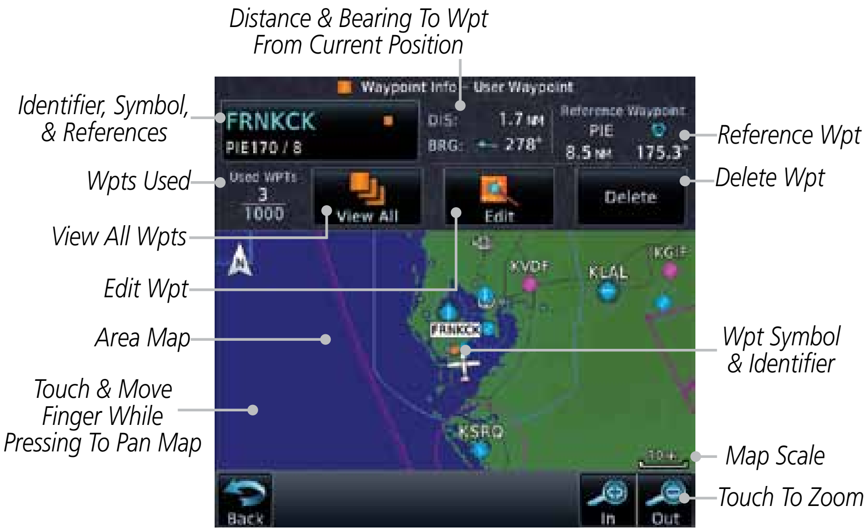

Distance & Bearing To Wpt From Current Position
Identifier, Symbol, & References
Wpts Used
View All Wpts
Edit Wpt
Area Map
Touch & Move Finger While Pressing To Pan Map
Reference Wpt
Delete Wpt
Wpt Symbol & Identifier
Map Scale
Touch To Zoom
Waypoint Info - User Waypoint
FRNKCK
PIE170 / 8
DIS: 1.7 NM
BRG: 278°
Reference Waypoint
PIE
8.5 NM 175.3°
Used WPTs 3 1000
View All
Edit
Delete
KVDF
KLAL
KGIF
FRNKCK
KSRQ
Back
In
Out

Figure 8-17 Waypoint Info for a User Waypoint

Select another Waypoint by touching the **Waypoint Identifier** key, entering the characters for the desired name with the alphanumeric keypad, and then touching the **Enter** key. You may also search through the list by touching the

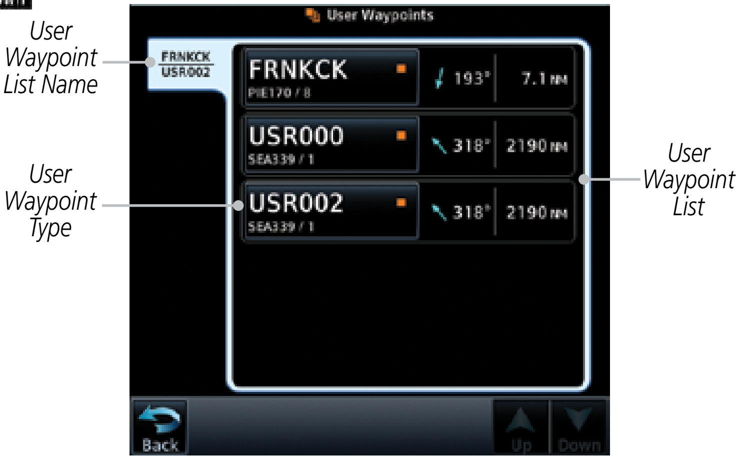
View All key and then choosing from the existing list of User waypoints by touching the desired waypoint from the list.

8.6.1 Select User Waypoint By Name

1. While viewing the User Waypoint page, touch the User Waypoint Name.
2. Use the keypad to select the characters for the name and then touch **Enter**.

8.6.2 Select User Waypoint From A List

1. While viewing the Waypoint Info page, touch the **User Waypoint** key.
2. Touch the **View All** key and then use the **Up** and **Down** keys to view the waypoints on the list.



FRNKCK PIE170 / 8	193°	7.1 NM
USR000 SEA339 / 1	318°	2190 NM
USR002 SEA339 / 1	318°	2190 NM

Figure 8-18 Waypoint Info User Waypoint List

8.6.3 Edit User Waypoint

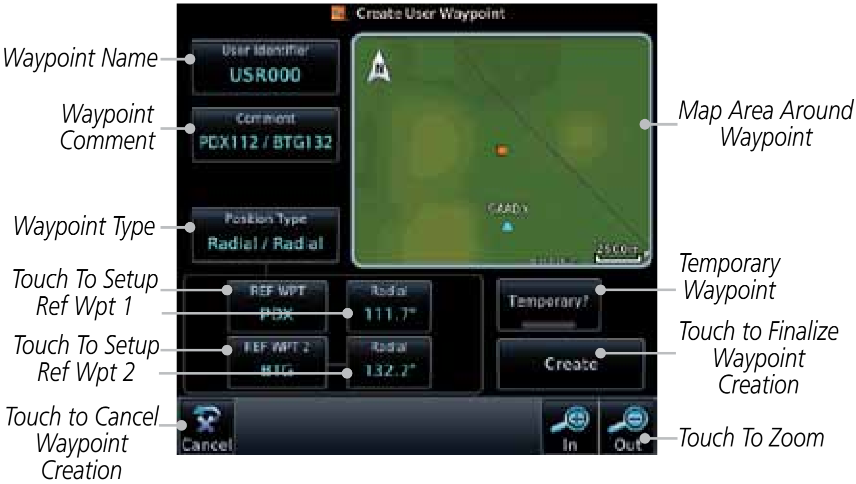
1. Select the desired User Waypoint and touch the **Edit** key.
2. Touch the key for the desired information and make changes as needed.

8.6.4 Delete User Waypoint

1. Select the desired User Waypoint and touch the **Delete** key.
2. Touch the **OK** key to confirm deleting the selected waypoint.

8.7 Create Waypoint

User waypoints are created from the Create User Waypoint page. To create a new user waypoint, simply enter its name (identifier) and position, or reference another waypoint by radial and distance.


Create User Waypoint

User Identifier: USR000

Comment: PDX112 / BTG132

Position Type: Radial / Radial

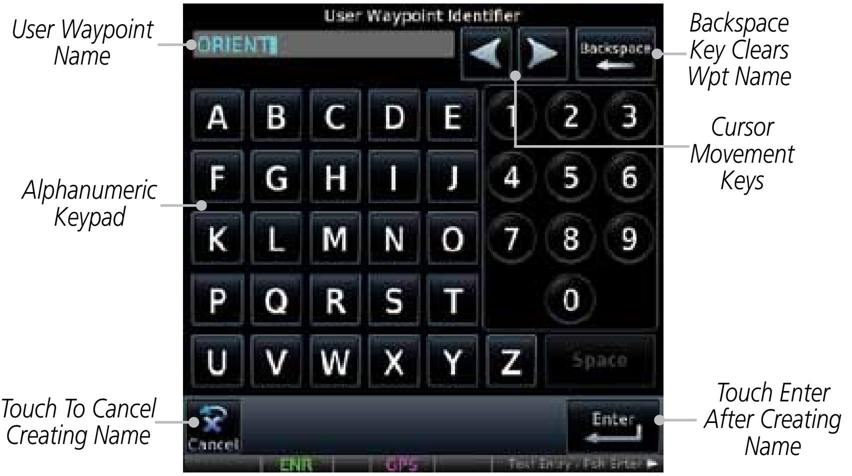
REF WPT: PDX — Radial: 111.7°

REF WPT 2: BTG — Radial: 132.2°

Waypoint Name
Waypoint Comment
Waypoint Type
Touch To Setup Ref Wpt 1
Touch To Setup Ref Wpt 2
Touch to Cancel Waypoint Creation
Map Area Around Waypoint
Temporary Waypoint
Touch to Finalize Waypoint Creation
Touch To Zoom
Temporary?
Create
Cancel
In
Out

Figure 8-19 Waypoint Info - Create User Waypoint

1. From the Waypoint Info page, touch the **Create Waypoint** key.
2. Touch the **User Identifier** key.
3. Use the alphanumeric keypad to make the waypoint name (up to six characters) and then touch the **Enter** key.


User Waypoint Identifier

ORIENT

User Waypoint Name
Alphanumeric Keypad
Touch To Cancel Creating Name
Backspace Key Clears Wpt Name
Cursor Movement Keys
Touch Enter After Creating Name
Backspace
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
1 2 3 4 5 6 7 8 9 0
Space
Cancel
Enter
ENR
GPS
Text Entry / Push Enter

Figure 8-20 Waypoint Info - Create User Waypoint Name

Comment
UBG161 / CV0009

4. Touch the **Comment** key to add a short comment for the new waypoint.

Position Type
Radial / Radial

5. Touch the **Position Type** key and then **Lat/Lon**, **Radial/Radial**, or **Radial/Distance** to assign the type. See the following instructions for more detail.

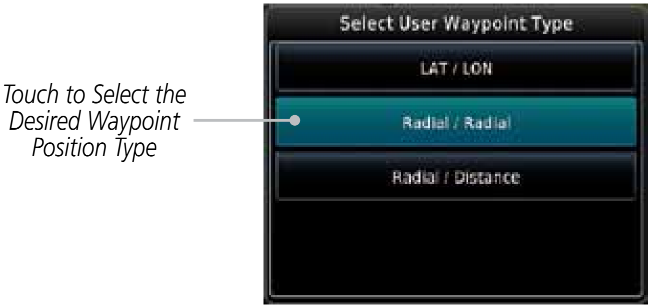

Select User Waypoint Type
LAT / LON
Radial / Radial
Radial / Distance
Touch to Select the Desired Waypoint Position Type

Figure 8-21 Waypoint Info - Create User Position Type

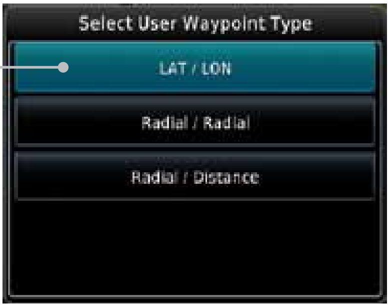
6. If desired, touch the **Temporary?** key to create the waypoint for only temporary use. Temporary waypoints will be removed when the power is cycled.

7. When finished with all selections, touch the **Create** key to create the new waypoint.

8.7.1 Waypoint Location Based on Lat/Lon Coordinates

Radial / Radial

1. From the Create User Waypoint page, touch the **Position Type** key and then the **Lat/Lon** key. Then, touch the **Latitude/ Longitude** value key.


Select User Waypoint Type
LAT / LON
Radial / Radial
Radial / Distance

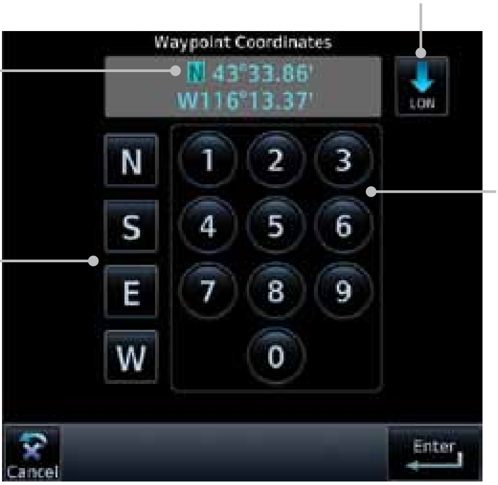
Touch to Select Lat/Lon Waypoint Reference Type

Figure 8-22 Waypoint Info - Create User Waypoint Type - Lat/Lon

2. The Lat/Lon coordinate values will be highlighted. Touch the **Lat** or **Lon** key to toggle selection of the hemisphere values and highlight the selected value.

Touch To Toggle Lat/Lon

When The Lat Key Is Touched, The Latitude Hemisphere Value Is Active For Selection


Waypoint Coordinates
LON
N
S
E
W
1
2
3
4
5
6
7
8
9
0
Cancel
Enter

N 43°33.86'
W116°13.37'

Touch to Select Numeric Values

Touch to Select Hemisphere Value

Figure 8-23 Lat/Lon Coordinate Selection

3. Touch the desired hemisphere keys to select the desired values. After selecting the hemisphere value, the cursor will advance to the first character of the adjacent numeric value for selection. Even when the hemisphere values are highlighted, touching the

numeric keys will always place the cursor at the first numeric value. The **Large** knob may also be used for cursor movement and characters are selected with the **Small** knob.

***NOTE:** When editing values, turn the Large knob counter-clockwise to backspace or move the cursor to the left.*

4. As each value is selected, the cursor will advance to the next character. Touch the necessary key for the desired values.

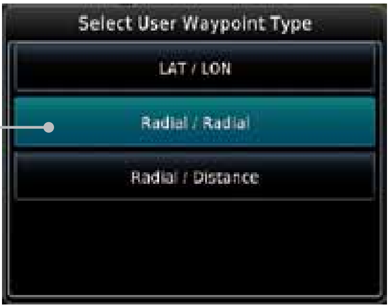
5. When finished with the Lat/Lon selections, touch the **Enter** key.

6. When finished with all selections, touch the **Create** key to create the new waypoint.

8.7.2 Waypoint Location Based on Two Radials

Position Type
Radial / Radial

1. From the Create User Waypoint page, touch the **Position Type** key and then the **Radial/Radial** key.



Touch to Select Radial/Radial Waypoint Reference Type

Figure 8-24 Waypoint Info - Create User Waypoint Type - Radial/Radial

2. Touch the **Ref Wpt** key and use the alphanumeric keypad to select the desired identifier.

3. Touch the upper **Radial** key and use the alphanumeric keypad to select the desired value.

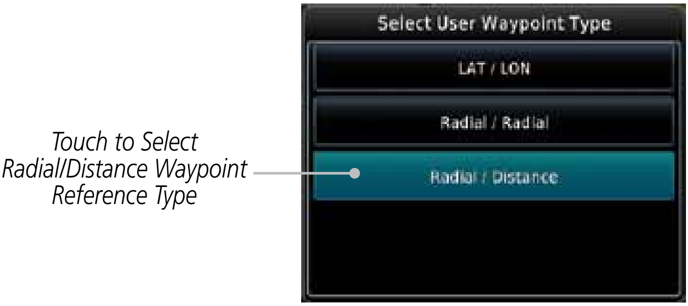
4. Touch the **Enter** key.

5. When finished with all selections, touch the **Create** key to create the new waypoint.

8.7.3 Waypoint Location Based on Radial and Distance

Position Type
Radial / Radial

1. From the Create User Waypoint page, touch the **Position Type** key and then the **Radial/Distance** key.


Select User Waypoint Type
LAT / LON
Radial / Radial
Radial / Distance

Touch to Select Radial/Distance Waypoint Reference Type

Figure 8-25 Waypoint Info - Create User Waypoint Type - Radial/Distance

2. From the Create User Waypoint page, touch the **Ref Wpt** key and use the alphanumeric keypad to select the desired identifier.

3. Touch the upper **Radial** key and use the alphanumeric keypad to select the desired value.

Distance
26.6NM

4. Touch the upper **Distance** key and use the alphanumeric keypad to select the desired value.

5. Touch the **Enter** key.

6. Touch the **Create** key to save the new waypoint.

9 MAP

The Map page is used to provide situational awareness in flight. The Map page can display the following information:

- Airports, NAVAIDs, airspace, airways, land data (highways, cities, lakes, rivers, borders, etc.) with names
- Wind direction and speed
- Icons for enabled map features
- Aircraft icon (with the nose representing present position)
- Nav range ring
- Flight plan legs
- Topography scale
- Topography data
- NEXRAD (or Precip) Weather (Opt.)
- ChartView or FliteChart Overlay
- Terrain Overlay
- Traffic Overlay
- Radar Overlay

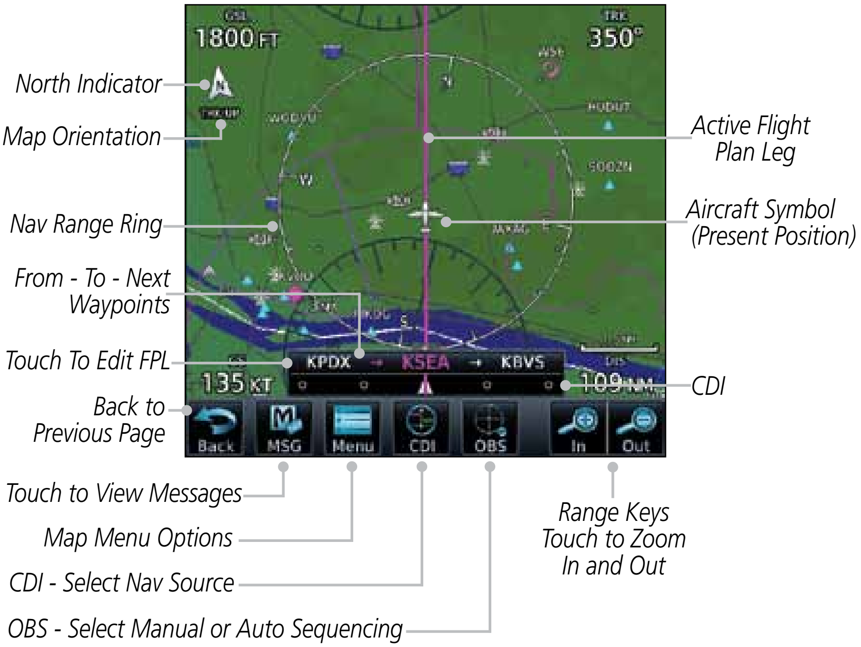

1800 FT
350°
North Indicator
Map Orientation
Active Flight Plan Leg
Nav Range Ring
Aircraft Symbol (Present Position)
From - To - Next Waypoints
Touch To Edit FPL
KPDX
KSEA
KBVS
135 KT
109 NM
CDI
Back to Previous Page
Back
MSG
Menu
CDI
OBS
In
Out
Touch to View Messages
Map Menu Options
CDI - Select Nav Source
OBS - Select Manual or Auto Sequencing
Range Keys Touch to Zoom In and Out

Figure 9-1 Map Page Description

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
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NOTE: *The electronic map is an aid to navigation and is designed to facilitate the use of authorized government charts, not replace them. Land and water data is provided only as a general reference. The accuracy of the land and water data is not suitable for use as a primary source of navigation and should only be used to supplement official government charts and notices.*

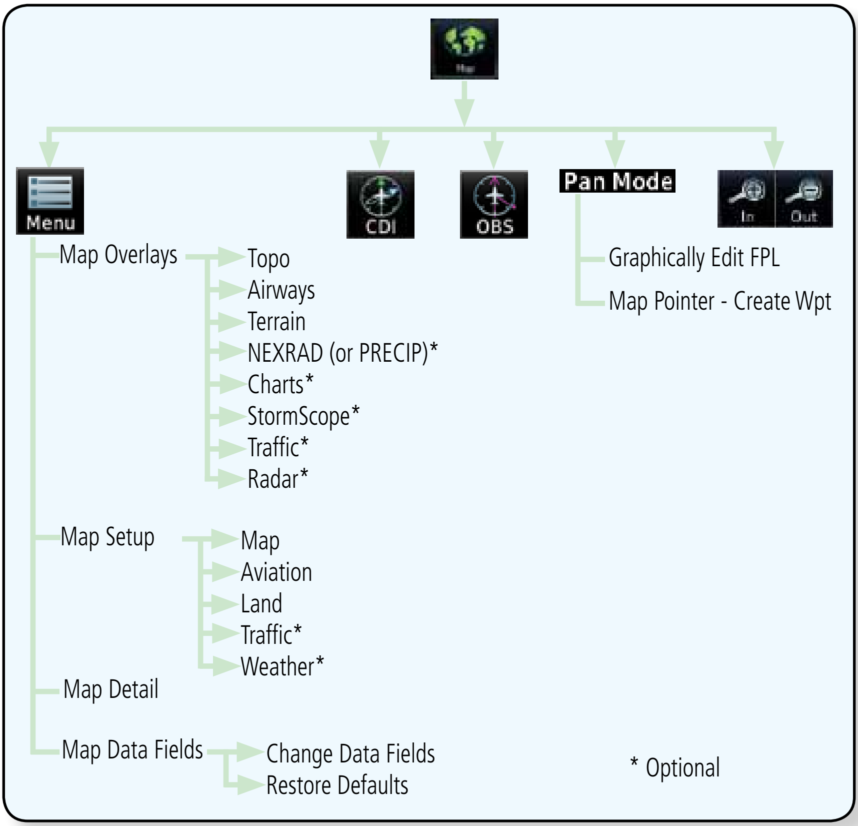

Map
Menu
CDI
OBS
Pan Mode
In
Out
Map Overlays
Topo
Airways
Terrain
NEXRAD (or PRECIP)*
Charts*
StormScope*
Traffic*
Radar*
Map Setup
Map
Aviation
Land
Traffic*
Weather*
Map Detail
Map Data Fields
Change Data Fields
Restore Defaults
Graphically Edit FPL
Map Pointer - Create Wpt
* Optional

Figure 9-2 Map Page Functional Diagram

NOTE: *NEXRAD (or PRECIP) and Radar may not be shown at the same time.*

9.1 Map Menu

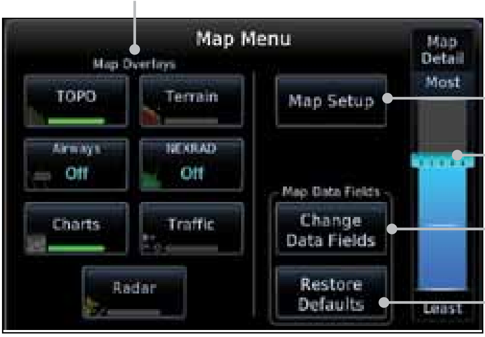
The Map Menu provides the ability to modify and control the information displayed on the Map page.

- Map Overlays are selected to overlay various types of information over the base map.
- Map Setup modifies the display of other map features.
- Map Data Fields determines whether or not the fields in the corners of the Map page are displayed and the data shown in each corner.
- Map Detail lets you control the amount of information displayed at different map ranges.
- Restore Defaults lets you start all over again with the default values for all Map page settings.

NOTE: *Changes made in the Map Menu take effect immediately on the map display.*

1. From the Home page, touch **Map** to reach the Map page, or press and hold the **HOME** key to go to the Map page from any function. On the Map page, touch the **Menu** key.

Map Overlay Selections


Map Menu
Map Overlays
TOPO
Terrain
Airways
Off
NEXRAD
Off
Charts
Traffic
Radar
Map Setup
Map Data Fields
Change Data Fields
Restore Defaults
Map Detail
Most
Least

Touch To Edit Map Setup

Touch and Slide Finger To Adjust Map Detail Level

Touch To Edit Map Data Fields (Corners)

Return Map Menu Settings To Default Values

Figure 9-3 Map Menu

2. Touch the key for the desired option to access its settings.
3. Touch the **Back** key to return to the Map page. Any changes made will be retained until changed or the **Restore Defaults** key is touched.

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

9.1.1 Map Overlays

Map Overlays are layers of information that are referenced to geographic location and are overlayed on the base map. A green bar will appear below the Map Overlay key text when the overlay is selected, except for Airways.

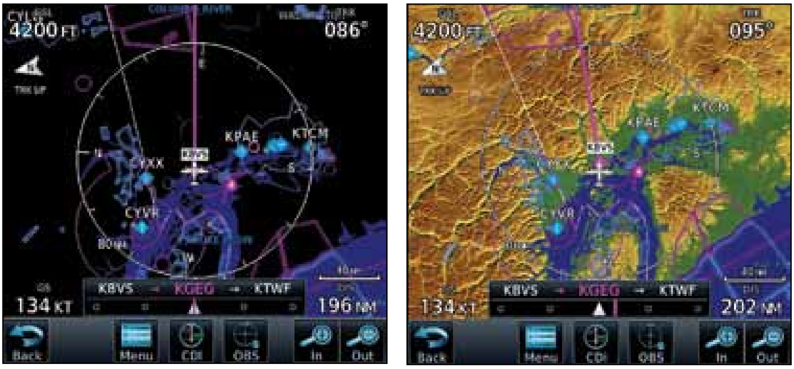
***NOTE:** Data linked weather (SiriusXM / FIS-B / Connext) is displayed below the chart overlay, Active onboard RADAR overlay is displayed above the chart overlay.*

***NOTE**: Map overlay keys do not turn on or activate equipment necessary for the overlay to function. Map overlay keys may remain available even if the information necessary for the overlay is not available. For example: the Radar overlay key is available even if the radar is turned off.*

9.1.1.1 Topo

The Topo Data option selects whether the colored topographical features are displayed. Traffic, Land Data, Terrain, and Obstacles will still be displayed even with Topo Data turned off.

1. While viewing the Map Menu, touch the **TOPO** Map Overlay key to toggle the Topo setting.


4200 FT
086°
KPAE
KTCM
CYXX
CYVR
134 KT
KBVS
KGEG
KTWF
196 NM
Back
Menu
CDI
OBS
In
Out
4200 FT
095°
KPAE
KTCM
CYVR
134 KT
KBVS
KGEG
KTWF
202 NM
Back
Menu
CDI
OBS
In
Out

Topo Map Overlay Off **Topo Map Overlay On**

Figure 9-4 Topo Map Overlay Selections

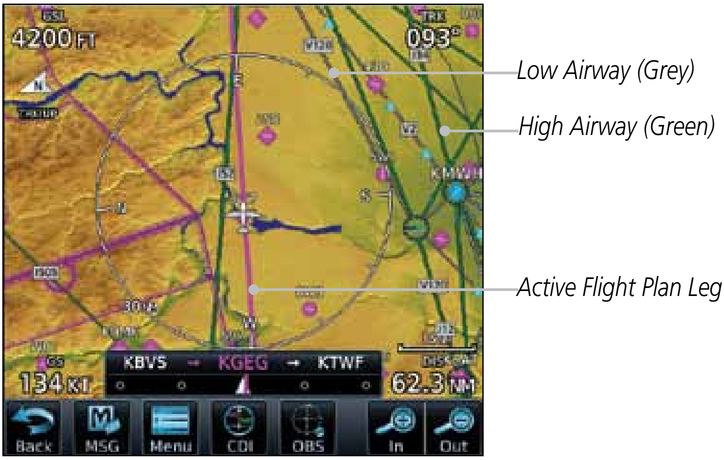
2. When the Topo Map Overlay is toggled off, all topographic color features are removed.

9.1.1.2 Airways

The Airways option allows you to select the airways that are shown on the Map page. All, Low only, and High only Airways may be selected. When Off is selected, airways will not be shown.

Airways
All

1. While viewing the Map Menu, touch the **Airways** Map Overlay key to select the Airways viewed. Selections are: Off, Low, High, and All.


GSL
4200 FT
TRK
093°
N
KBVS → KGEG → KTWF
GS
134 KT
DIS
62.3 NM
Back
MSG
Menu
CDI
OBS
In
Out

Low Airway (Grey)

High Airway (Green)

Active Flight Plan Leg

Figure 9-5 Map Menu Airways Map Overlay Selection

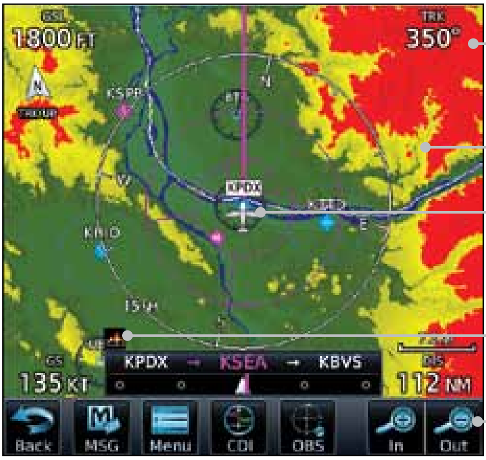
2. Low Airways are shown as grey lines. High Airways are shown as green lines.

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

9.1.1.3 Terrain

The Terrain Data option selects whether Terrain Data is shown on the Map page. Terrain and NEXRAD weather may not be displayed at the same time. Selecting one will disable the other. A Terrain icon will indicate that the Terrain overlay has been selected. Terrain overlay colors may or may not be shown depending on the altitude of the aircraft.

1. While viewing the Map Menu, touch the **Terrain** Map Overlay key to toggle the view of Terrain data.



Red Terrain - At or Within 100 ft below Aircraft Altitude

Yellow Terrain - Between 100 ft and 1000 ft below current aircraft altitude

Current Position

Icon Shows Terrain Overlay Is Active

Touch to Zoom Map Range

Figure 9-6 Map Menu Terrain Map Overlay "On" Selection

2. The colors of the terrain are referenced to your aircraft altitude.

9.1.1.4 NEXRAD (Optional)

The NEXRAD menu option allows the display of NEXRAD Precip weather information overlayed on the Map page. Terrain and NEXRAD Precip weather may not be displayed at the same time. Selecting one will disable the other. NEXRAD Precip weather is an optional feature that requires the installation of a GDL 69/69A, GDL 88, or GSR 56 and an appropriate Weather subscription. Only one weather source can be displayed at a time (i.e. FIS-B and XM cannot be displayed on the map simultaneously. See the Weather section for more detail.

While viewing the Map Menu, touch the **NEXRAD** Map Overlay key to toggle the view of NEXRAD weather data.

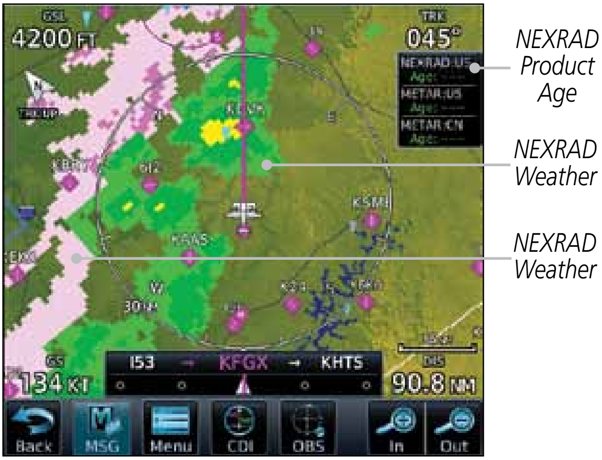

GSL
4200 FT
TRK
045°
NEXRAD US
Age: ----
METAR US
Age: ----
METAR CN
Age: ----
KBWG
KSME
KFGX
KHTS
GS
134 KT
153
DIS
90.8 NM
Back
MSG
Menu
CDI
OBS
In
Out
NEXRAD Product Age
NEXRAD Weather
NEXRAD Weather

Figure 9-7 Map Menu NEXRAD Map Overlay "On" Selection

9.1.1.5 Charts (Optional)

The Charts menu option allows the display of Charts overlayed on the Map page. The Charts Map Overlay option selects whether Chart data is shown on the Map page. Charts may or may not be shown depending on the other aircraft's location. The ownship icon will be shown over an available chart. See the Charts section for more detail.

NOTE: *Features that are selectable on the main map page, such as obstacles, airports, airspace, and other waypoint types that are not visible beneath the overlaid chart, remain selectable even when an approach chart is overlaid on the main map.*

NOTE: *Opaque charts are displayed on top of other overlays, such as NEXRAD.*

While viewing the Map Menu, touch the **Charts** Map Overlay key to toggle the view of the Charts overlay.

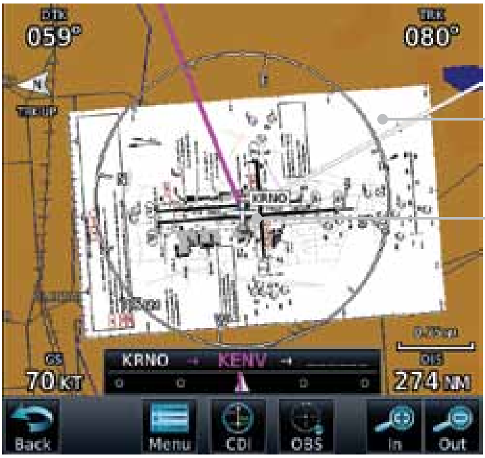


Chart Overlay Selected In The Map Menu

Ownship Located on Chart Overlay

Figure 9-8 Map Menu Charts Map Overlay "On" Selection

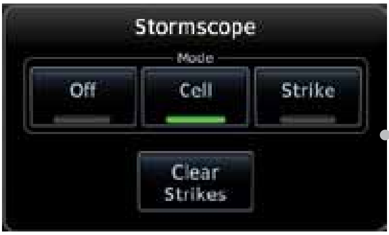
9.1.1.6 StormScope® (Optional)

The WX-500 StormScope Weather Mapping Sensor is a passive weather avoidance system that detects electrical discharges associated with thunderstorms within a 200 NM radius of the aircraft. The StormScope measures relative bearing and distance of thunderstorm-related electrical activity and reports the information to the display.

NOTE: Refer to the WX-500 Pilot's Guide for a detailed description of the WX-500 StormScope.

Stormscope

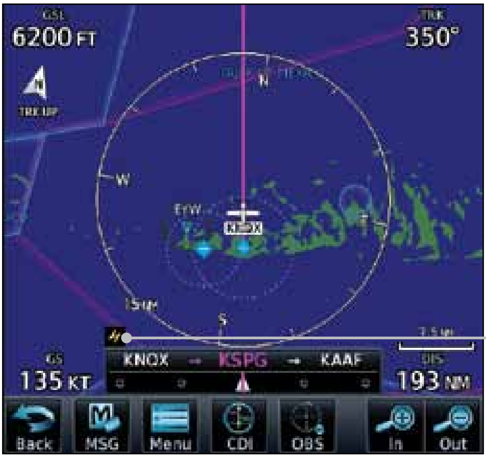
1. While viewing the Map Menu, touch the **StormScope** Map Overlay key to show the menu for selecting the StormScope radar weather data display mode (Cell, Strike, Off, or Clear Strikes).


Stormscope
Mode
Off
Cell
Strike
Clear Strikes

Select StormScope Data Display

Figure 9-9 Map Menu StormScope Map Overlay Selection

2. StormScope data will be overlayed on the Map page when Cell or Strike is selected. See the Weather section for more details.


GSL
6200 FT
TRK
350°
TRK UP
N
W
S
EYW
KNQX
15 NM
7.5 NM
GS
135 KT
KNQX
KSPG
KAAF
DIS
193 NM
Back
MSG
Menu
CDI
OBS
In
Out

Icon Shows StormScope Overlay Is Active

Figure 9-10 Map Menu StormScope Map Overlay On Selection

9.1.1.7 Radar (Optional)

The Radar setting set on the Weather Radar page, such as Tilt, Range, etc., will be used for the radar overlay on the Map page. NEXRAD/PRECIP and the Radar overlay may not be shown at the same time.

While viewing the Map Menu, touch the **Radar** Map Overlay key to toggle the view of airborne Radar data.

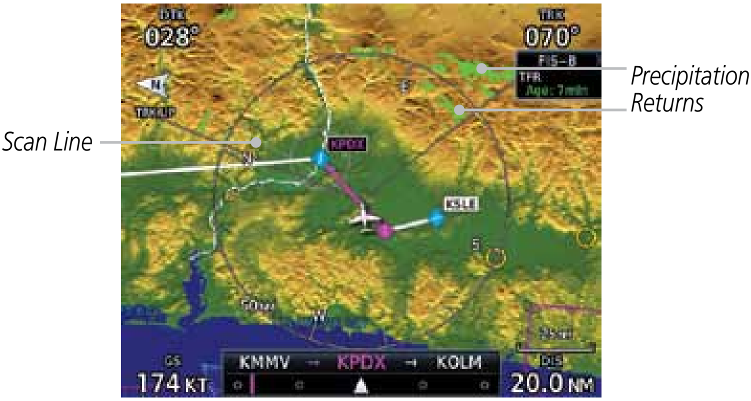

DTK
028°
TRK
070°
FIS-B
TFR
Age: 7min
KPDX
KSLE
60NM
25NM
GS
174KT
KMMV → KPDX → KOLM
DIS
20.0NM
Scan Line
Precipitation Returns

Figure 9-11 Map Menu Radar Map Overlay On Selection

9.1.1.8 Traffic (Optional)

The Traffic Map Overlay option selects whether Traffic data is shown on the Map page. A Traffic icon will indicate that the Traffic overlay has been selected. Traffic may or may not be shown depending on the other aircraft's location and equipment. See the Traffic section for more detail.

While viewing the Map Menu, touch the **Traffic** Map Overlay key to toggle the view of Traffic data.

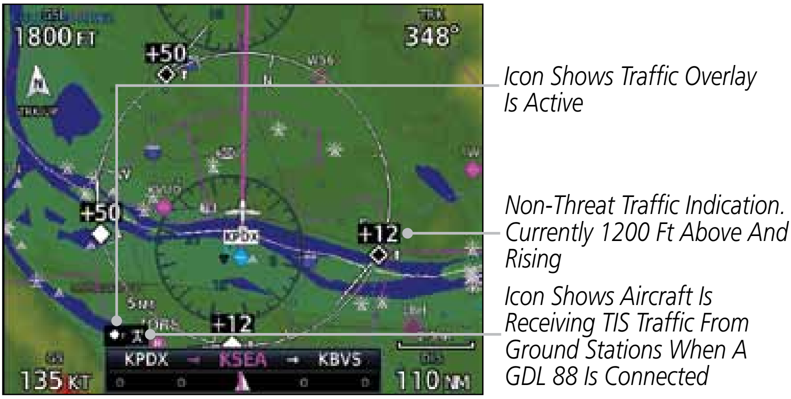

GSL
1800FT
TRK
348°
+50
+50
+12
+12
KPDX
5NM
GS
135KT
KPDX → KSEA → KBVS
DIS
110NM
Icon Shows Traffic Overlay Is Active
Non-Threat Traffic Indication. Currently 1200 Ft Above And Rising
Icon Shows Aircraft Is Receiving TIS Traffic From Ground Stations When A GDL 88 Is Connected

Figure 9-12 Map Menu Traffic Map Overlay On Selection

9.1.2 Map Setup

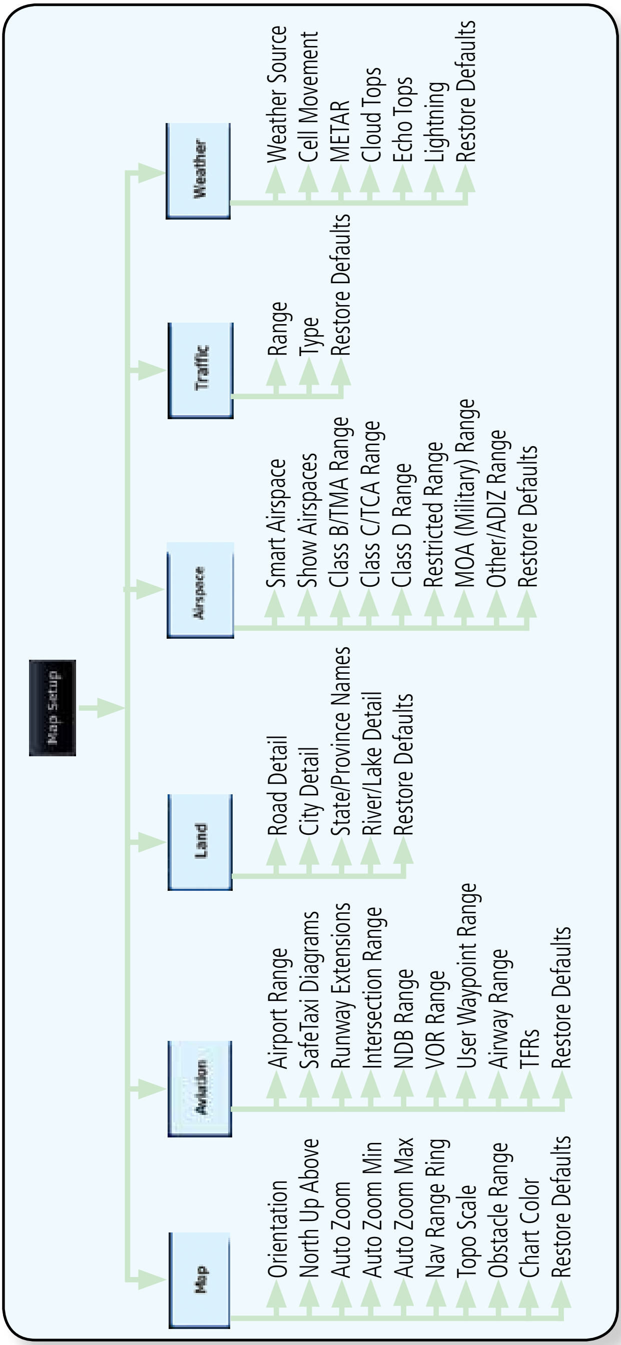
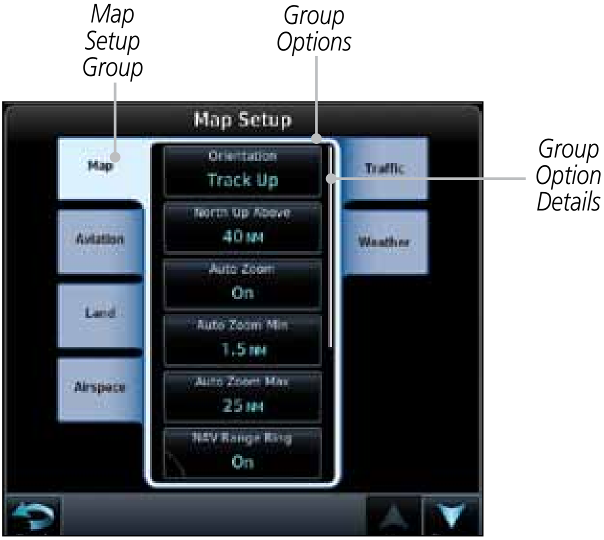

Map Setup
Map
Orientation
North Up Above
Auto Zoom
Auto Zoom Min
Auto Zoom Max
Nav Range Ring
Topo Scale
Obstacle Range
Chart Color
Restore Defaults
Aviation
Airport Range
SafeTaxi Diagrams
Runway Extensions
Intersection Range
NDB Range
VOR Range
User Waypoint Range
Airway Range
TFRs
Restore Defaults
Land
Road Detail
City Detail
State/Province Names
River/Lake Detail
Restore Defaults
Airspace
Smart Airspace
Show Airspaces
Class B/TMA Range
Class C/TCA Range
Class D Range
Restricted Range
MOA (Military) Range
Other/ADIZ Range
Restore Defaults
Traffic
Range
Type
Restore Defaults
Weather
Weather Source
Cell Movement
METAR
Cloud Tops
Echo Tops
Lightning
Restore Defaults

Figure 9-13 Map Setup Functional Diagram

The Map page is customized by selecting groups from the Map Menu. The Map Menu groups include choices for Map, Aviation, Land, Airspace, Traffic, and Weather groups depending on the installed equipment of a given aircraft. Each group has a list of options that vary with the group.

Menu
Map Setup

1. While viewing the Map page, touch the **Menu** key. Then, touch the **Map Setup** key. The Map Setup page will be displayed.



Orientation
Track Up
North Up Above
40 NM
Auto Zoom
On
Auto Zoom Min
1.5 NM
Auto Zoom Max
25 NM
NAV Range Ring
On

Figure 9-14 Map Setup Page

2. Touch the desired Map Setup Group tab (Map, Aviation, Airspace, Land, Traffic, or Weather) to display the set of group options.

Up Down

3. Touch the desired group key. A list of options for the selected group will be shown. (i.e. Map - Orientation, North Up Above, Auto Zoom, etc.) Touch the **Up** or **Down** keys as needed to scroll through the list.
4. Touch the key for the selected option.

Restore Defaults

5. Touch the **Restore Defaults** key to return to the original default values for the selected option.

9.1.2.1 Map

The Map option defines the behavior and display of information on the Map page such as: Orientation, North Up Above, Auto Zoom, Nav Range Ring, Topo Scale, Obstacle Range, and Restore Defaults. The default values are shown in **bold** type.

Feature	Selection
Orientation	North Up, **Track Up**, Heading Up
North Up Above	Off, 10 NM, 15 NM, 25 NM, **40 NM**, 50 NM, 75 NM, 100 NM, 150 NM, 250 NM
Auto Zoom	Off, **On**
Auto Zoom Min	250 ft, 400 ft, 500 ft, 750 ft, 1000 ft, 1500 ft, 2500 ft, 0.5 NM, 0.75 NM, 1 NM, **1.5 NM**, 2.5 NM, 4 NM, 5 NM, 7.5 NM, 10 NM, 15 NM, 25 NM, 40 NM, 50 NM, 75 NM, 100 NM, 150 NM, 250 NM, 400 NM
Auto Zoom Max	250 ft, 400 ft, 500 ft, 750 ft, 1000 ft, 1500 ft, 2500 ft, 0.5 NM, 0.75 NM, 1 NM, 1.5 NM, 2.5 NM, 4 NM, 5 NM, 7.5 NM, 10 NM, 15 NM, **25 NM**, 40 NM, 50 NM, 75 NM, 100 NM, 150 NM, 250 NM, 400 NM
Nav Range Ring	Off, **On**
Topo Scale	**Off**, On
Obstacle Range	Off, 4 NM, **5 NM**, 7.5 NM, 10 NM, 15 NM
Chart Color Scheme	**Day**, Night
Restore Defaults	Returns values to original factory settings

Table 9-1 Map Setup Map Options

Map Orientation

The Map Orientation selection sets the orientation of the Map page. Selections are North Up, Track Up, and Heading Up. A Map Orientation label is shown below the North indicator in the top left corner of the Map page.

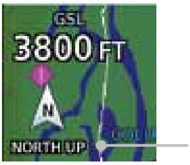


Figure 9-15 Map Orientation Label

North Up Above

The North Up Above option allows you to select the map range where at and above the selected value the Map Orientation will automatically change to North Up as a default. When the map range is 500 NM or more, the map orientation will automatically become North Up.

Auto Zoom

With a valid flight plan, the Auto Zoom feature will automatically change the Map page range depending on the distance to the next waypoint in the flight plan. If enabled, it will also automatically zoom to the SafeTaxi zoom range when the aircraft is on the ground. Auto Zoom can be overridden at any time by manually zooming with the **In** and **Out** keys. The Auto Zoom Min selection sets the minimum range that the display will Zoom in. The Auto Zoom Max value sets the maximum range the display will Zoom out.

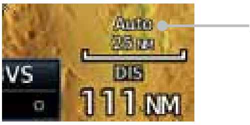


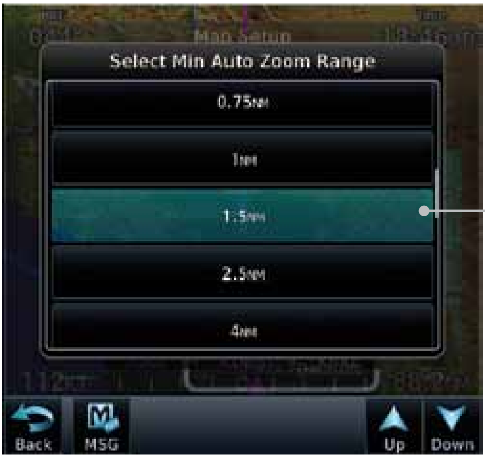
Figure 9-16 Auto Zoom Active Indication

Auto Zoom is re-enabled once one of the following conditions is met:

- A waypoint is sequenced
- the aircraft transitions from “on ground” to “in air”
- a point is reached where the Auto Zoom range matches the manual override range (known as auto-sync) and will be noted as “Auto” above the map range value on the map page
- Auto Zoom is toggled off and back on in the Map Setup page

Auto Zoom Min

Set the limit that the display will zoom in automatically.

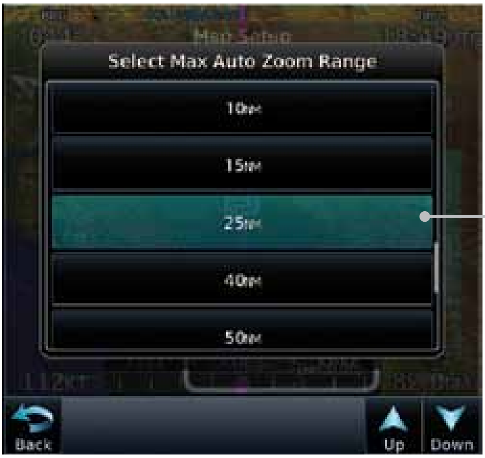

Select Min Auto Zoom Range
0.75NM
1NM
1.5NM
2.5NM
4NM
Back
MSG
Up
Down

Selected Minimum Auto Zoom Range

Figure 9-17 Map Setup Minimum Auto Zoom Range

Auto Zoom Max

Set the limit that the display will zoom out automatically.

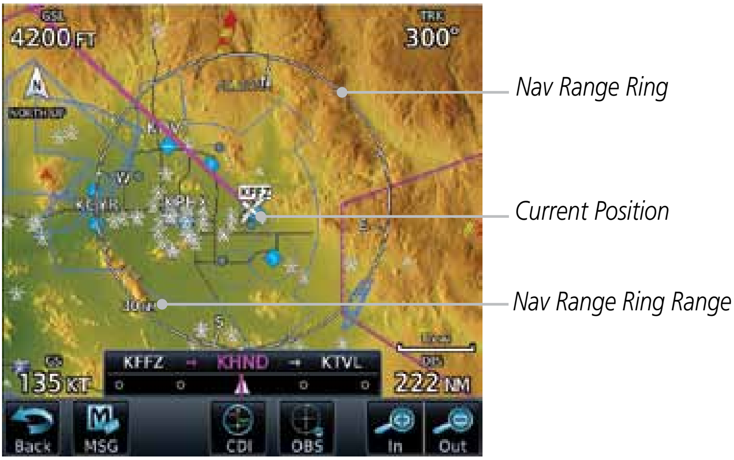

Select Max Auto Zoom Range
10NM
15NM
25NM
40NM
50NM
Back
Up
Down

Selected Maximum Auto Zoom Range

Figure 9-18 Map Setup Maximum Auto Zoom Range

Nav Range Ring

When turned on, the Nav Range Ring option will show a ring with a compass rose around your present position on the Map page.


GSL
4200 FT
TRK
300°
NORTH UP
KFFZ
30 NM
GS
135 KT
KFFZ → KHND → KTVL
DIS
222 NM
Back
MSG
CDI
OBS
In
Out

Nav Range Ring

Current Position

Nav Range Ring Range

Figure 9-19 Nav Range Ring

TOPO Scale

The Topo Scale option selects whether the elevation scale for topographical features on the Map page is displayed. The scale will be located on the right side of the display.

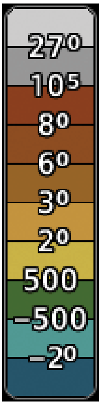

270
105
80
60
30
20
500
-500
-20

Figure 9-20 Map Page Topo Scale

Obstacle Range

The Obstacle Range option selects whether the Obstacle Data is shown on the Map page at and below the selected Obstacle range. Map ranges above this value will not show the Obstacle Data.

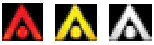
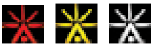
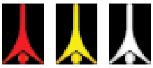
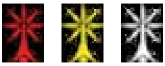
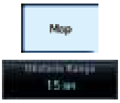
Unlighted Obstacle (Height is less than 1000 ft AGL)	Lighted Obstacle (Height is less than 1000 ft AGL)	Unlighted Obstacle (Height is greater than 1000 ft AGL)	Lighted Obstacle (Height is greater than 1000 ft AGL)
			

Figure 9-21 Navigation Map Obstacle Icons

1. While viewing the Map function, touch the **Menu** key.

2. Touch the **Map Setup** key.


Map
Obstacle Range
15 nm

3. Under the **Map** tab touch the **Obstacle Range** key and select the maximum range where obstacles will be displayed.

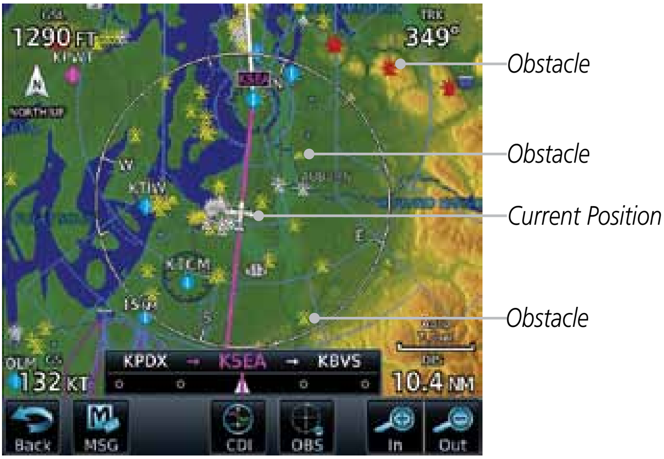
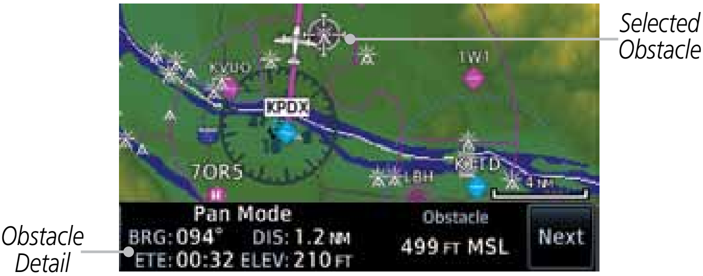

1290 FT
349°
NORTH UP
KTIW
KTCM
KPDX → KSEA → KBVS
132 KT
10.4 NM
Back
MSG
CDI
OBS
In
Out
Obstacle
Obstacle
Current Position
Obstacle

Figure 9-22 Navigation Map Obstacles

4. Touch an obstacle on the map and the elevation will be shown. If there are nearby or overlayed objects (obstacle, airspace, airport, etc), touch the **Next** key to step through the nearby objects. Touch the **Back** key to return to the normal map view.


Selected Obstacle
KVUO
KPDX
1W1
7OR5
KTTD
LBH
4 NM
Next
Obstacle Detail

Pan Mode
BRG: 094° DIS: 1.2 NM
ETE: 00:32 ELEV: 210 FT
Obstacle
499 FT MSL

Figure 9-23 Obstacle Detail

Chart Color Scheme

The Chart Color Scheme setting changes the day and night view of the Chart Overlay colors on the Map page.

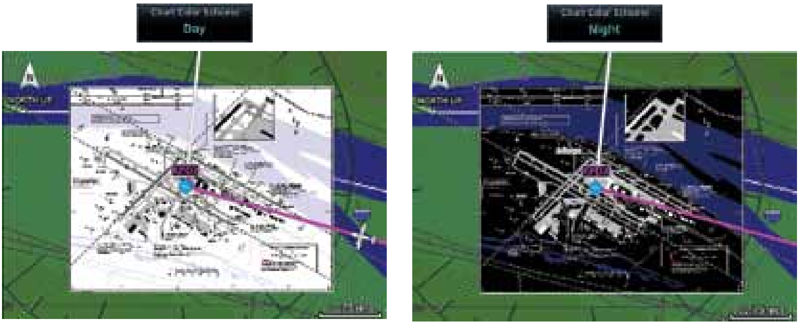


Figure 9-24 Chart Color Scheme Settings

Restore Defaults

Returns values to the original factory settings.

9.1.2.2 Aviation

The Aviation group selection from the Map Setup Page Menu allows you to customize the display of Active Flight Plan, Active Flight Plan Waypoints, Airport size range, SafeTaxi information, Runway Extensions, Intersection/NDB locations, VOR locations, Airspace Detail, and TFR icons on the Map page. The feature will be shown at map ranges of the selected value and lower. The options for each feature are shown in the following table. The default values are shown in **bold** type.

Feature	Selection
Airport Range	Off, 7.5 NM, 10 NM, 15 NM, **25 NM**, 40 NM, 50 NM, 75 NM, 100 NM, 150 NM
SafeTaxi Diagrams	Off, 1000 ft, 1500 ft, 2500 ft, 0.5 NM, 0.75 NM, **1 NM**, 1.5 NM
Runway Extensions	Off, 1 NM, 1.5 NM, 2.5 NM, 4 NM, **5 NM**
Intersection Range	Off, 0.75 NM, 1 NM, 1.5 NM, 2.5 NM, **4 NM**, 5 NM, 7.5 NM, 10 NM
NDB Range	Off, 0.75 NM, 1 NM, 1.5 NM, 2.5 NM, 4 NM, **5 NM**, 7.5 NM, 10 NM
VOR Range	Off, **10 NM**, 15 NM, 25 NM, 40 NM, 50 NM, 75 NM, 100 NM
User Wpt Range	Off, 0.75 NM, 1 NM, 1.5 NM, 2.5 NM, 4 NM, **5 NM**, 7.5 NM, 10 NM, 15 NM, 25 NM, 40 NM, 50 NM, 75 NM, 100 NM
Airway Range	2.5 NM, 4 NM, 5 NM, 7.5 NM, 10 NM, 15 NM, **25 NM**
TFRs	**Off**, On
Restore Defaults	Returns values to original factory settings

Table 9-2 Map Setup Aviation Options

***NOTE:** The term "intersection range" means any GPS waypoint included in the navigation database, and includes waypoints that may not be intersections of two VOR radials.*

9.1.2.3 Land

The Land Data option selects whether detailed land features, such as Lat/Lon Grid, Freeways, National Highways, Local Roads, Cities, States/Provinces, and Rivers/Lakes are displayed. Topo features, traffic, terrain, and obstacles will still be displayed, even with Land Data turned off. The options for each feature are shown in the following table. The default values are shown in **bold** type.

Feature	Selection
Road Detail	None, Least, Less, **Normal**, More, Most
City Detail	None, Least, Less, **Normal**, More, Most
State/Province Names	Off, **On**
River/Lake Detail	None, Least, Less, **Normal**, More, Most
Restore Defaults	Returns values to original factory settings

Table 9-3 Map Setup Land Options

9.1.2.4 Airspace

The Airspace viewing range options select whether the Airspaces are shown on the Map and at and below the selected map ranges. The Smart Airspaces selection filters airspaces to show the ones appropriate for your altitude.

Feature	Selection
Smart Airspace	**Off**, On
Show Airspaces	Off, 1000 ft, 1500 ft, 2500 ft, 0.5 NM, 0.75 NM, **1 NM**, 1.5 NM
Class B/TMA Range	Off, 1 NM, 1.5 NM, 2.5 NM, 4 NM, **5 NM**
Class C/TCA Range	Off, 0.75 NM, 1 NM, 1.5 NM, 2.5 NM, **4 NM**, 5 NM, 7.5 NM, 10 NM
Class D Range	Off, 0.75 NM, 1 NM, 1.5 NM, 2.5 NM, 4 NM, **5 NM**, 7.5 NM, 10 NM
Restricted Range	Off, **10 NM**, 15 NM, 25 NM, 40 NM, 50 NM, 75 NM, 100 NM
MOA (Military) Range	Off, 0.75 NM, 1 NM, 1.5 NM, 2.5 NM, 4 NM, **5 NM**, 7.5 NM, 10 NM, 15 NM, 25 NM, 40 NM, 50 NM, 75 NM, 100 NM
Other/ADIZ Range	None, Least, Less, **Normal**, More, Most
Restore Defaults	Returns values to original factory settings

Table 9-4 Map Setup Airspace Options

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

Smart Airspaces:

Garmin's Smart Airspace™ feature aids visual clarity on-screen by de-emphasizing airspace that's well above or below the aircraft's current altitude. The vertical separation is 1000 feet at sea level and the vertical separation will gradually increase to 2000 feet until the aircraft reaches 10,000 feet. Anything above 10,000 feet keeps the 2000 feet vertical separation.

***NOTE:** Smart Airspace only changes the depiction of the airspace on the moving map display. It does not alter the Airspace Alerts that can be set on the System-Alerts portion of the system.*

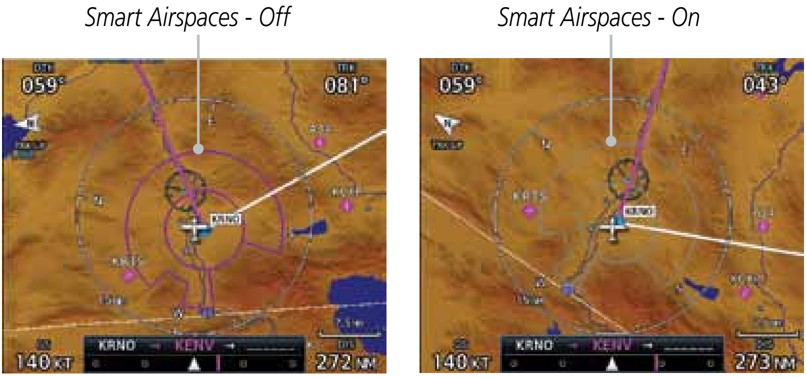

Smart Airspaces - Off
Smart Airspaces - On
059°
081°
140 KT
KRNO
KENV
272 NM
059°
043°
140 KT
KRNO
KENV
273 NM

Figure 9-25 Display of Smart Airspaces (Airspace Borders Grayed)

To control the display of European airway airspaces:

OTHER/ADIZ Range
25 nm

1. While viewing the Map Setup Airspaces option, touch the **Other/ADIZ Range** key and select a value.

OTHER/ADIZ Range
Off

2. Select **Off** for the Other/ADIZ Range to turn off the display of airway airspaces.

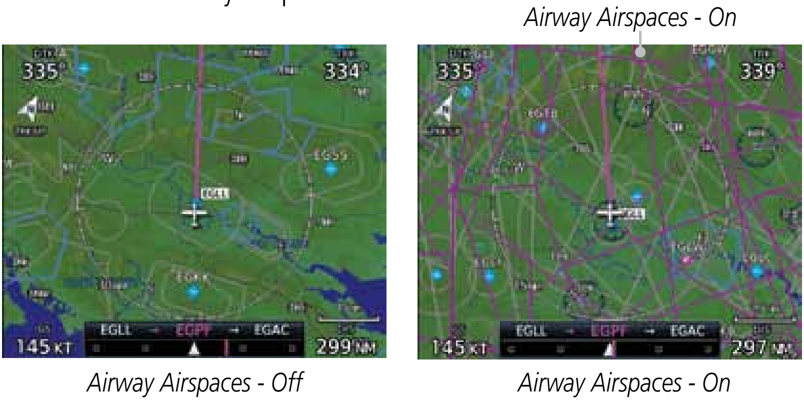

Airway Airspaces - On
335°
334°
145 KT
EGLL
EGPF
EGAC
299 NM
335°
339°
145 KT
EGLL
EGPF
EGAC
297 NM
Airway Airspaces - Off
Airway Airspaces - On

Figure 9-26 Selecting the Display of European Airway Airspaces

9.1.2.5 Traffic (Optional)

The Traffic group selection from the Map Setup Page Menu allows you to customize the display of traffic on the Map page. The Traffic function requires the installation of the appropriate traffic device. Only one traffic source can be configured for the GTN and this traffic source will be overlaid on the main map. Coverage follows the airplane. In the Navigation Map page setup you can select the maximum range at which traffic symbols are shown. Once outside of the selected range, traffic will be decluttered. The default values are shown in **bold** type.

Traffic Selection	Display Result
Range	1 NM, 1.5 NM, 2.5 NM, 4 NM, 5 NM, 7.5 NM, 10 NM, 15 NM, **25 NM**
Traffic	**All Traffic**, Alerts & Advisories, Alerts Only
Restore Defaults	Returns values to original factory settings

Table 9-5 Map Page Traffic Display Options

9.1.2.6 Weather (Optional)

The Weather group selection from the Map Setup Page Menu allows you to customize the overlay of the available weather information on the Map page. Weather is an optional feature that requires an external weather source, which must be selected to allow the overlay.

Feature	Selection
Weather Source	SiriusXM, Connext, or FIS-B
Cell Movement	**Off**, On
METAR	**Off**, On
Cloud Tops	**Off**, On
Echo Tops	**Off**, On
Lightning	**Off**, On
Restore Defaults	Returns values to original factory settings

Table 9-6 Map Setup SiriusXM Weather Options

***NOTE**: Map overlay keys may remain available even if the information necessary for the overlay is not available. For example: the Radar overlay key is available even if the radar is turned off.*

Feature	Selection
Weather Source	SiriusXM, Connext, or FIS-B
METAR	**Off**, On
IR Satellite	**Off**, On
Lightning	**Off**, On
Restore Defaults	Returns values to original factory settings
Connext Settings	Selectable Connext Settings

Table 9-7 Map Setup Connext Weather Options

Feature	Selection
Weather Source	SiriusXM, Connext, or FIS-B
METAR	**Off**, On
Restore Defaults	Returns values to original factory settings

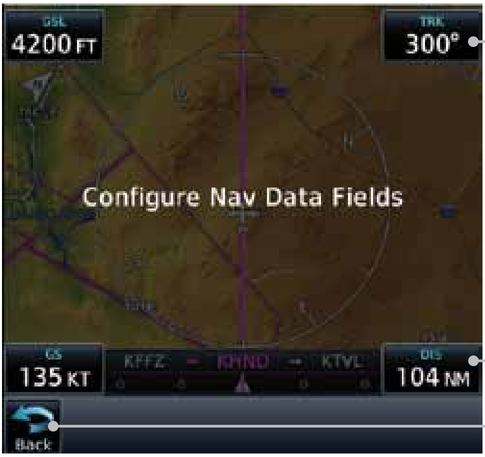
Table 9-8 Map Setup FIS-B Weather Options

9.1.3 Map Data Fields

The Map Data Fields selection allows you to configure the data field type shown in each of the four corners of the Map page. The data shown in each field may be selected from a list after *Change Data Fields* is selected.

1. While viewing the Map page, touch the **Menu** key.

2. From the Map Menu screen, touch the **Change Data Fields** key.


GSL
4200 FT
TRK
300°
Configure Nav Data Fields
GS
135 KT
KPFZ
KHND
KTVL
DIS
104 NM
Back

Touch To Select Data Field (TRK Currently Shown)

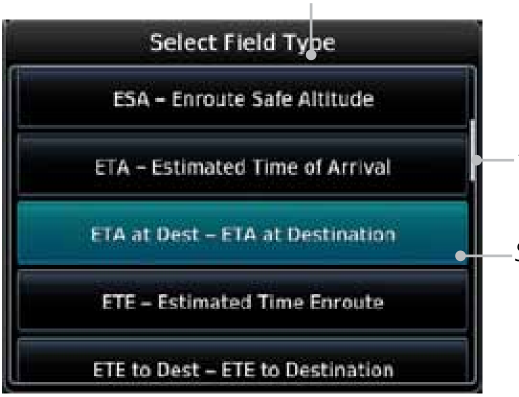
Touch To Select Data Field (DIS Currently Shown)

Touch To Cancel Any Changes

Figure 9-27 Map Data Fields Selection

3. Touch the corner data field key you want to select. A list of information types will be displayed.

Field Type List. Touch To Select Data Field


Select Field Type
ESA – Enroute Safe Altitude
ETA – Estimated Time of Arrival
ETA at Dest – ETA at Destination
ETE – Estimated Time Enroute
ETE to Dest – ETE to Destination

Slider Indicates More Selections Available. Press Finger and Slide To View More Selections.

Selected Field Type

Figure 9-28 Map Data Field Type Selections

4. Touch the **Up** or **Down** keys or touch the display and drag your finger to scroll through the list. Touch the desired item to select it or touch the **Back** key to cancel selection.

Map Data Field Type	
BRG - Bearing to Current Waypoint	GSL - GPS Altitude
DIS - Distance to Current Waypoint	MSA - Minimum Safe Altitude
DIS to Dest - Distance to Destination	OAT (static) - Static Air Temperature
DTK - Desired Track	OAT (total) - Total Air Temperature
ESA - Enroute Safe Altitude	Time - Current Time
ETA - Estimated Time of Arrival	TKE - Track Angle Error
ETA at Dest - ETA at Destination	Trip Timer - Timers (Utilities)
ETE - Estimated Time Enroute	TRK - Track
ETE to Dest- ETE to Destination	VSR - Vertical Speed Required
Fuel Flow - Total Fuel Flow	Wind - Wind Speed and Direction
Generic Timer - Timers (Utilities)	XTK - Cross Track Error
GS - GPS Ground Speed	OFF - Do Not Display Data Field

Table 9-9 Map Data Field Types of Information

9.1.4 Map Detail

The Map Detail feature allows four levels of decluttering to remove map information. The declutter level is displayed in the **DCLTR** key. There are four levels of decluttering. Level 0 shows the most detail and level 3 shows the least detail.

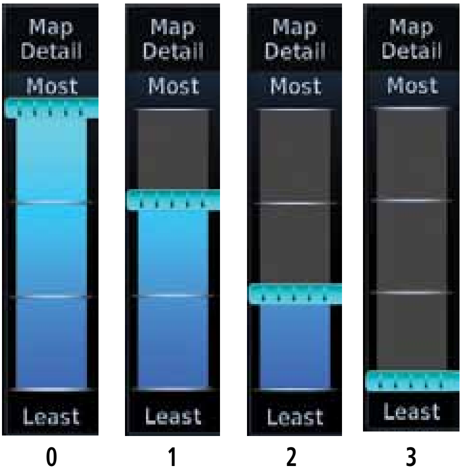

Map Detail
Most
Least
0
Map Detail
Most
Least
1
Map Detail
Most
Least
2
Map Detail
Most
Least
3

Figure 9-29 Map Detail Levels

1. While viewing the Map page, touch the **Menu** key.
2. While viewing the Map Menu, touch the **Map Detail** scale and slide your finger to adjust the level. Features marked with a • are shown at the indicated Map Detail Level.

Feature	0	1	2	3	Feature	0	1	2	3
					Tower	•	•		
River/Lake Names	•				TRSA	•	•		
Land/Country Text	•				ADIZ	•	•		
Large City	•				Alert Areas	•	•		
Medium City	•				Caution Areas	•	•		
Small City	•				Danger Areas	•	•		
Small Town	•				Warning Areas	•	•		
Freeways	•				Large Airports	•	•	•	
Highways	•				Medium Airports	•	•	•	
Roads	•				Restricted Areas	•	•	•	
Railroads	•				Prohibited Areas	•	•	•	
Political Boundaries	•				MOAs	•	•	•	
User Waypoints	•	•			Runway Labels	•	•	•	
Lat/Lon Grids	•	•			Lightning Strike Data	•	•	•	
VORs	•	•			NEXRAD Data	•	•	•	
NDBs	•	•			Traffic Symbols	•	•	•	
Intersections	•	•			Traffic Labels	•	•	•	
Class B Airspace	•	•			Water Detail	•	•	•	•
Class C Airspace	•	•			Active FPL Legs	•	•	•	•
Class D Airspace	•	•			Airways	•	•	•	•

Table 9-10 Features Shown at Each Map Detail Level

9.2 Map Panning

In the Map Page function, panning allows you to move the map beyond its current limits without adjusting the map scale. The panning function is selected by simply touching the Map display. The **In** and **Out** keys at the lower right corner of the page control the map range. Touching the display momentarily switches the display to Map Pan Mode. While in Map Pan Mode, touch the display gently and drag your finger to pan around the map.

1. Touch the Map page display.

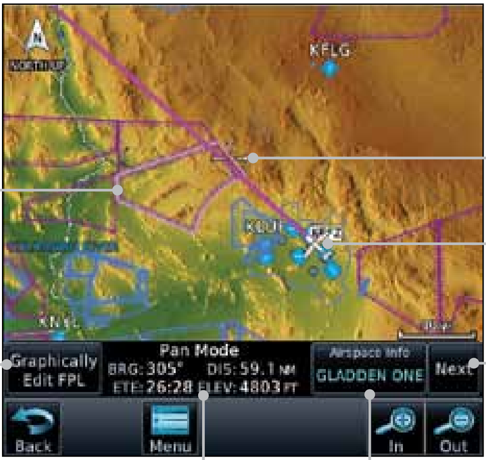
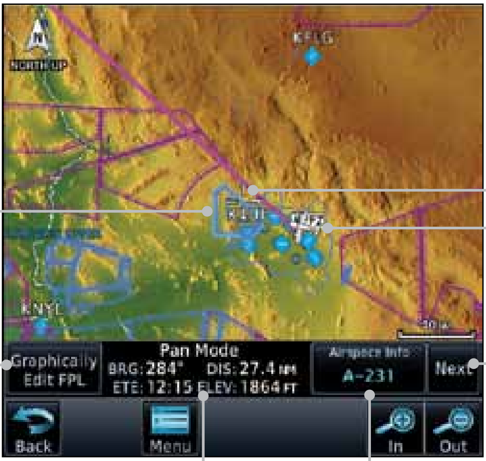

KFLG
NORTH UP
KLUF
KNYL
Graphically Edit FPL
Pan Mode
BRG: 305°
DIS: 59.1 NM
ETE: 26:28
ELEV: 4803 FT
Airspace Info
GLADDEN ONE
Next
Back
Menu
In
Out
Selected Item
Map Pointer Location
Aircraft Present Position
Touch To Edit FPL On The Display
Touch To Step To Items Near The Map Pointer
Pan Mode Annunciation and Bearing and Distance To The Map Pointer From Present Position
Info On Selected Item

Figure 9-30 Map Panning With Airspace Highlighted

2. If you touch an item on the display (waypoint, airspace, obstacle) there may be other items very close that are difficult to see at a given zoom level. Touch the **Next** key to annunciate and highlight the next item. Each touch of the **Next** key steps to another item near the Map Pointer.


NORTH UP
KFLG
KNYL
Graphically Edit FPL
Pan Mode
BRG: 284° DIS: 27.4 NM
ETE: 12:15 ELEV: 1864 FT
Airspace Info
A-231
Next
Back
Menu
In
Out

Next Nearest Item Highlighted

Cursor Location

Aircraft Present Position

Touch To Edit FPL On The Display

Touch To Step To Items Near The Cursor

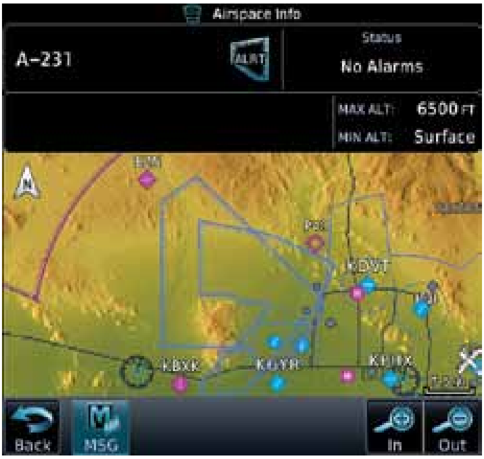
Pan Mode Annunciation and Bearing and Distance To The Cursor From Present Position And Elevation At The Cursor

Info On Selected Item

Figure 9-31 Map Panning With Next Airspace Shown

Airspace Info A-231

3. Touch the **Airspace Info** (Item) key for more information about the selected item. Touch the **Back** key to return to the Map Panning display.


Airspace Info

A-231

Status: No Alarms

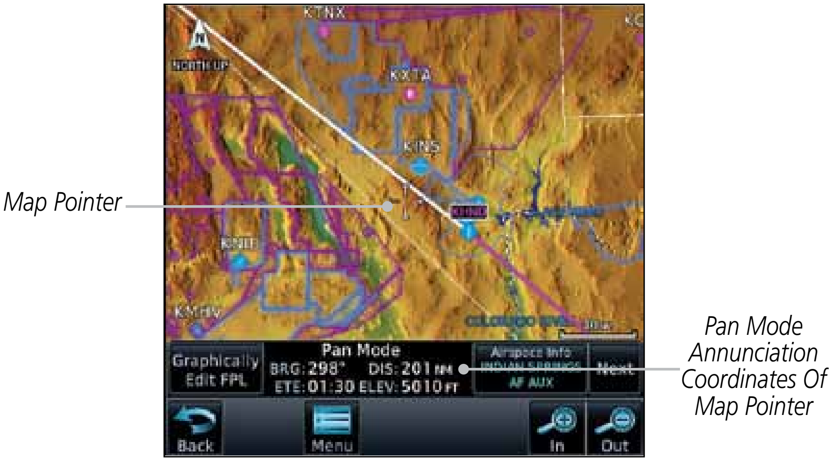
MAX ALT: 6500 FT

MIN ALT: Surface

ALRT
KBXK
KGYR
KPHX
KDVT
Back
MSG
In
Out

Figure 9-32 Map Panning Selected Item Information

4. While pressing your finger gently against the display, drag your finger across the display to scroll the display in the direction of your finger movement. The Map Pointer cross hair location is based on where your finger touches the display, but after dragging your finger the Map Pointer will be centered on the map when your finger is lifted from the display.



Pan Mode
BRG: 298° DIS: 201 NM
ETE: 01:30 ELEV: 5010 FT

Map Pointer
Pan Mode Annunciation Coordinates Of Map Pointer
KTNX
KXTA
KINS
NORTH UP
Graphically Edit FPL
Airspace Info
INDIAN SPRINGS AF AUX
Next
Back
Menu
In
Out

Figure 9-33 Map Panning With Map Pointer

***NOTE:** Pressing the Direct-To key will use the Map Pointer location as the destination.*

5. Touch the **Back** key to return to the normal map display.

9.3 Map Controls

While in the Map page function, several controls are available to manage the view and display of information. The **In** and **Out** keys at the lower right corner of the page control the map range. Touching the display momentarily switches the display to Map Pan Mode.

While in any of the Map function pages, touching the display starts **Pan Mode.** Options are available to Create a waypoint at the Map Pointer position and to Graphically Edit Flight Plan.

9.3.1 Pan Map Mode

The Pan Map mode allows you to move the map display to view the surrounding area.

1. Touch the Map page display.

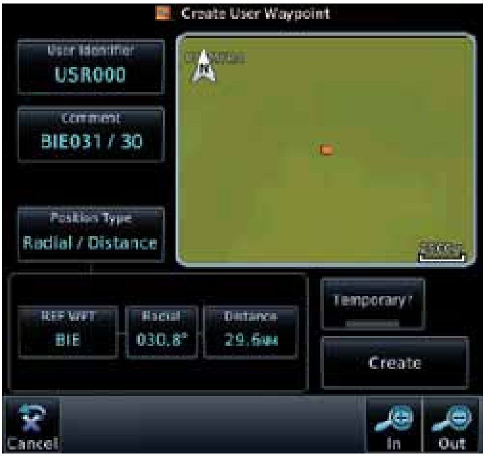
2. See the description in the Map Panning section for details of using this feature. Touch the **Back** key to return to the normal Map display.

9.3.2 Create Waypoint

The Create Waypoint function will create a User Waypoint at the Map Pointer location when that location is not an already named object, such as an airport or airspace.

Map Pointer
Create
Waypoint

1. In Pan Mode, touch the **Create Waypoint** key.
2. Follow the directions in the Waypoint Info section for Creating User Waypoints.



Create User Waypoint

User Identifier
USR000

Comment
BIE031 / 30

Position Type
Radial / Distance

REF WPT
BIE

Radial
030.8°

Distance
29.6NM

Figure 9-34 Create User Waypoint While Map Panning

9.3.3 Graphically Edit Flight Plan Mode

The Edit Flight Plan Mode allows making quick changes to the active flight plan directly on the display. The process is simply touching the display to start Map Pan Mode, touching the **Graphically Edit FPL** key, dragging the desired leg to a new waypoint or airway, and touching the **Done** key. At any point, a step may be removed by touching the **Undo** key or the whole process ended by touching the **Cancel** key. The **Undo** key will remove up to nine steps.

9.3.3.1 Adding a Waypoint Within an Existing Flight Plan

Graphically Edit FPL

1. Touch the Map page display. The Map Mode selection keys will appear. Touch the **Graphically Edit FPL** key.

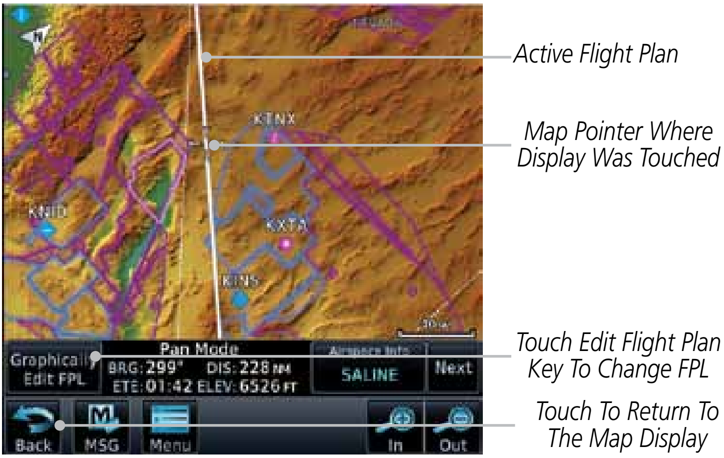

KTNX
KNID
KXTA
KINS
Graphically Edit FPL
Pan Mode
BRG: 299° DIS: 228 NM
ETE: 01:42 ELEV: 6526 FT
Airspace Info
SALINE
Next
Back
MSG
Menu
In
Out
Active Flight Plan
Map Pointer Where Display Was Touched
Touch Edit Flight Plan Key To Change FPL
Touch To Return To The Map Display

Figure 9-35 Edit Flight Plan Mode

2. Touch and hold the desired leg of the flight plan.

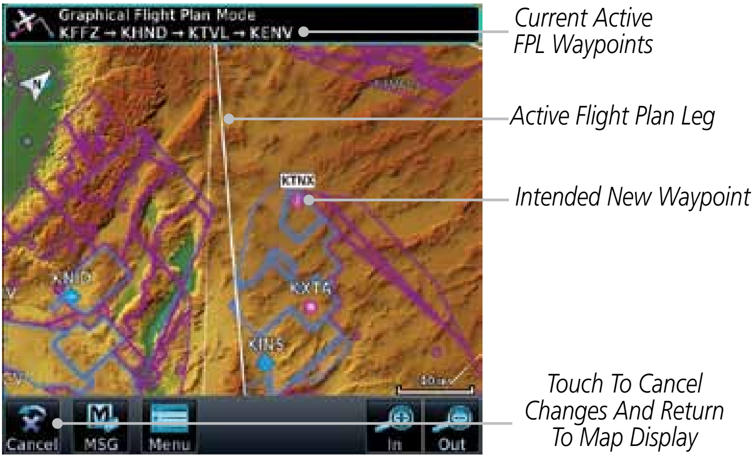

Graphical Flight Plan Mode
KFFZ → KHND → KTVL → KENV
KTNX
KNID
KXTA
KINS
Cancel
MSG
Menu
In
Out
Current Active FPL Waypoints
Active Flight Plan Leg
Intended New Waypoint
Touch To Cancel Changes And Return To Map Display

Figure 9-36 Select Leg of Flight Plan to Change

3. Drag the flight plan leg to a new waypoint, or airway, to add a waypoint, or airway, to the active flight plan. The flight plan leg being edited will turn cyan.

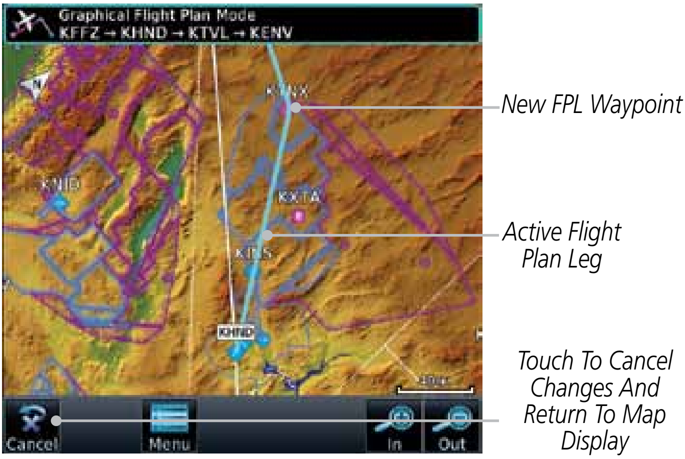

Graphical Flight Plan Mode
KFFZ → KHND → KTVL → KENV
KTNX
KNID
KXTA
KTPS
KHND
Cancel
Menu
In
Out
New FPL Waypoint
Active Flight Plan Leg
Touch To Cancel Changes And Return To Map Display

Figure 9-37 Drag Selected Leg of Flight Plan to New Waypoint

Done

4. Touch the **Done** key. The aircraft will now navigate according to the new flight plan.

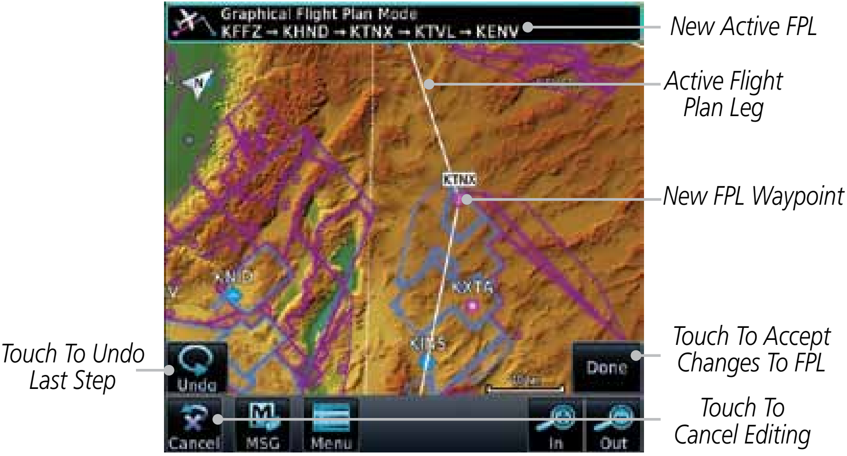

Graphical Flight Plan Mode
KFFZ → KHND → KTNX → KTVL → KENV
KTNX
KNID
KXTA
KTPS
Undo
Done
Cancel
MSG
Menu
In
Out
New Active FPL
Active Flight Plan Leg
New FPL Waypoint
Touch To Undo Last Step
Touch To Accept Changes To FPL
Touch To Cancel Editing

Figure 9-38 Completed Flight Plan with New Waypoint

***NOTE:** Parallel track will be cancelled when graphically editing a flight plan.*

***NOTE:** It is not possible to graphically add an intermediate waypoint between the current position and a direct-to waypoint unless that waypoint is in the flight plan. Garmin recommends deleting any flight plan prior to graphically editing a direct to waypoint.*

9.3.3.2 Adding a Waypoint to the End of an Existing Flight Plan

Graphically Edit FPL

1. Touch the Map page display. The Map Mode selection keys will appear. Touch the **Graphically Edit FPL** key.
2. Touch a waypoint that you want to add to the end of the flight plan.
3. Touch the **Done** key to accept the changes and return to the Map page.

Done

9.3.3.3 Removing a Waypoint from an Existing Flight Plan

Graphically Edit FPL

1. Touch the Map page display. The Map Mode selection keys will appear. Touch the **Graphically Edit FPL** key.
2. Touch a waypoint, or airway, on the flight plan that you want to remove.
3. Drag the flight plan line away from the waypoint, or airway, and release the line. The waypoint, or airway, will be removed from the flight plan.
4. Touch the **Done** key to accept the changes and return to the Map page.

Done

9.3.3.4 Creating a Flight Plan Without an Existing Flight Plan

Graphically Edit FPL

1. Touch the Map page display. The Map Mode selection keys will appear. Touch the **Graphically Edit FPL** key.
2. Touch a waypoint on the map to set the first waypoint in the flight plan. If there are several nearby waypoints, touch the desired waypoint to select it.

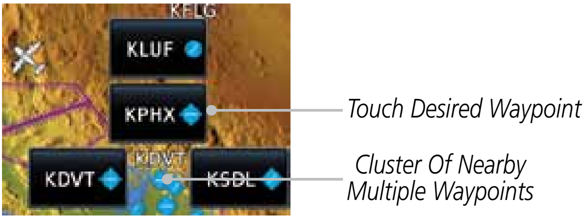


Figure 9-39 Select the Desired Waypoint From Multiple Waypoints

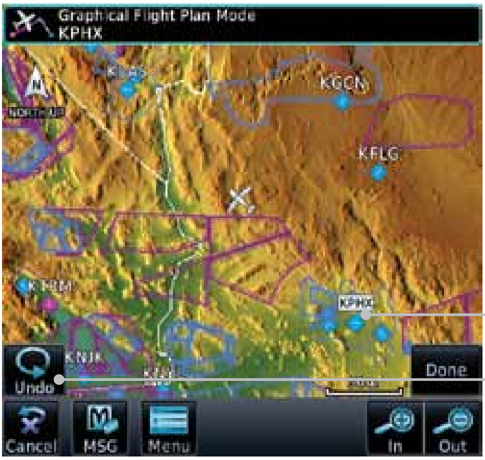

Graphical Flight Plan Mode
KPHX
KGCN
KFLG
KTRM
KPHX
KNJK
KNYL
NORTH UP
Undo
Done
Cancel
MSG
Menu
In
Out
New FPL Waypoint
Touch To Undo Last Step

Figure 9-40 Start New Flight Plan with Origin Waypoint

3. Touch a waypoint, or airway, on the map for the next waypoint, or airway, in the flight plan. Continue adding waypoints, or airways, as needed.

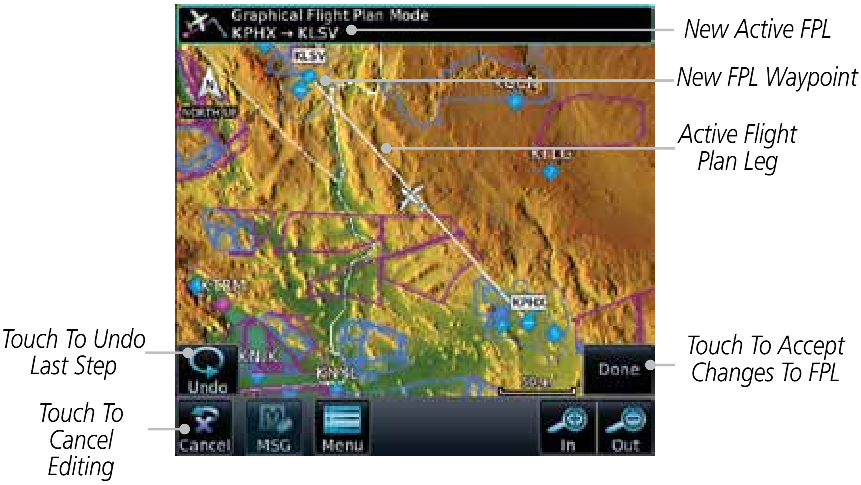

Graphical Flight Plan Mode
KPHX → KLSV
KLSV
KGCN
KFLG
KTRM
KPHX
KNJK
KNYL
NORTH UP
Undo
Done
Cancel
MSG
Menu
In
Out
New Active FPL
New FPL Waypoint
Active Flight Plan Leg
Touch To Accept Changes To FPL
Touch To Undo Last Step
Touch To Cancel Editing

Figure 9-41 Add New Waypoint to Flight Plan

Done

4. Touch the **Done** key to accept the changes and return to the Map page.

9.4 CDI (GTN 750 only)

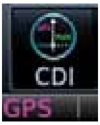
The GTN 750's **CDI** key is used to couple the GPS or VLOC receiver to the external CDI (or HSI). When the external CDI (or HSI) is connected to the GPS receiver, "GPS" appears below the **CDI** key in the annunciation bar. When the external CDI (or HSI) is being driven by the VLOC receiver, "VLOC" appears instead.

***NOTE:** The external CDI (or HSI) must be coupled to the VLOC receiver for approaches which are not approved for GPS. See the ILS example in the Procedures section for more information.*

***NOTE**: GPS phase of flight annunciations (LPV, ENR, etc.) are not applicable to the external CDI (or HSI) when VLOC is active.*

***NOTE:** The internal on-screen CDI information is based on GPS data and cannot be used for primary navigation.*

***NOTE**: If the unit is not configured for a CDI key, then the "activate GPS missed approach" will only resume automatic waypoint sequencing. The user must switch to GPS navigation, if desired, by using their external source selection method (this is typical an EFIS system).*



1. The navigation source is annunciated under the **CDI** key.

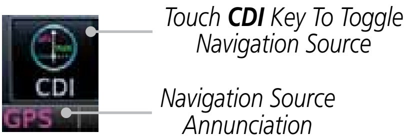
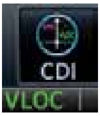

CDI
GPS
Touch **CDI** Key To Toggle Navigation Source
Navigation Source Annunciation

Figure 9-42 Navigation Source Selection



2. Touch the **CDI** key to toggle between sources.

9.5 OBS

The **OBS** key is used to select manual or automatic sequencing of waypoints. Touching this key selects OBS mode, which retains the current “active to” waypoint as your navigation reference even after passing the waypoint (i.e., prevents sequencing to the next waypoint). Touching the **OBS** key again returns to normal operation, with automatic sequencing of waypoints. Whenever OBS mode is selected, you may set the desired course To/From a waypoint using the pop-up window on the GTN 7XX or with the external OBS selector on your HSI or CDI. For leg types that do not support OBS, this key will be shown as a **SUSP** key. This key will then also function as an **Unsuspend** key for legs that auto-suspend, such as holds, missed approaches, etc.

***NOTE**: In dual GTN installations with crossfill on, the OBS course will only be updated real time on the GTN that is receiving the new OBS course. The course will be transferred to the other GTN when OBS is exited.*

1. Touch the **OBS** key to enable the OBS function.
2. Enter the desired OBS heading using the keypad and touch **Enter**.
3. The OBS heading will be shown in the flight plan annunciation above the CDI in the lower portion of the display. The OBS function annunciation will show.

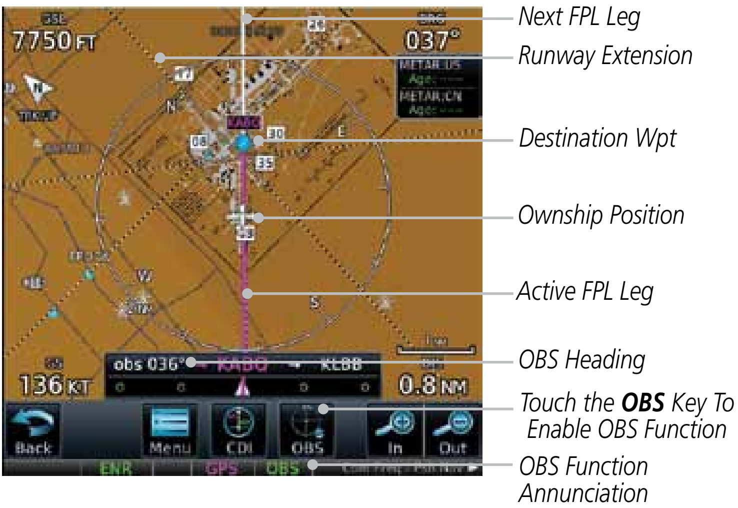

7750 FT
037°
obs 036°
KABQ
KLBB
136 KT
0.8 NM
Back
Menu
CDI
OBS
In
Out
ENR
GPS
OBS
Next FPL Leg
Runway Extension
Destination Wpt
Ownship Position
Active FPL Leg
OBS Heading
Touch the OBS Key To Enable OBS Function
OBS Function Annunciation

Figure 9-43 OBS Course Selection

9.6 Map Symbols

Various symbols are used to distinguish between waypoint types. The identifiers for any on-screen waypoints can also be displayed. Special-use and controlled airspace boundaries appear on the map, showing the individual sectors in the case of Class B, Class C, or Class D airspace. The following symbols are used to depict the various airports and navaids on the Map Page:

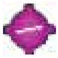
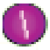
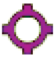
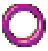
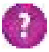
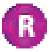
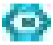
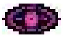
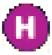
Symbol	Description
	Airport with hard surface runway(s); Serviced, Primary runway shown
	Airport with hard surface runway(s); Non-Serviced, Primary runway shown
	Airport with soft surface runway(s) only, Serviced
	Airport with soft surface runway(s) only, Non-Serviced
	Unknown Airport
	Restricted (Private) Airfield
	Intersection
	VOR
	VORTAC
	VOR/DME
	TACAN
	DME
	NDB
	Locator Outer Marker
	Heliport

Table 9-11 Map Symbols

10 TRAFFIC

The Traffic function displays available traffic information depending on your installed equipment to assist in situational awareness. The features and operation depend on the capabilities and options of each type of traffic system.

***NOTE:** The reference point for the ownship is the nose of the ownship aircraft symbol (either miniature aircraft or triangle). The reference point for all traffic icons is the center of the depicted traffic.*

1. From the Home page, touch the **Traffic** key.
2. Use the active areas on the display and the Menu options to set up the Traffic display.

10.1 Traffic Pop-Up

When the GTN 7XX is displaying any page (other than the Traffic page) and a traffic alert becomes active, the Traffic Warning pop-up will be displayed.

***NOTE:** The traffic pop-up will not appear when your aircraft is on the ground.*

1. The traffic pop-up will appear on pages other than the Traffic page when a traffic alert occurs.

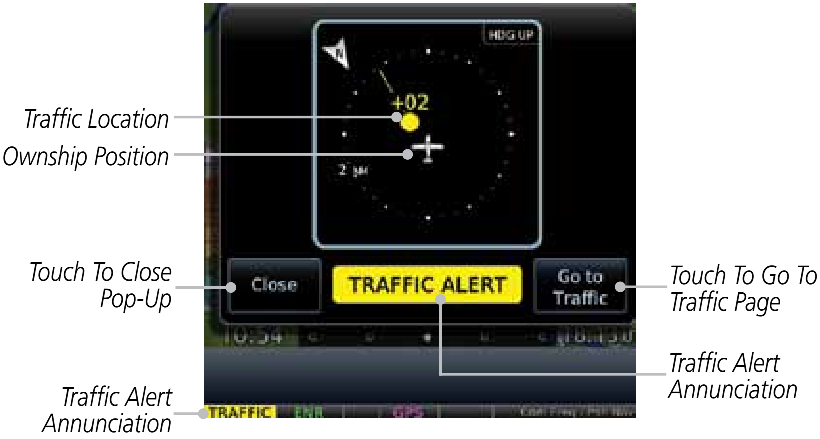

HDG UP
+02
2 NM
Close
TRAFFIC ALERT
Go to Traffic
TRAFFIC
Traffic Location
Ownship Position
Touch To Close Pop-Up
Touch To Go To Traffic Page
Traffic Alert Annunciation
Traffic Alert Annunciation

Figure 10-1 Traffic Pop-Up On the Map Page

2. Touch the **Go to Traffic** key to view the Traffic page.

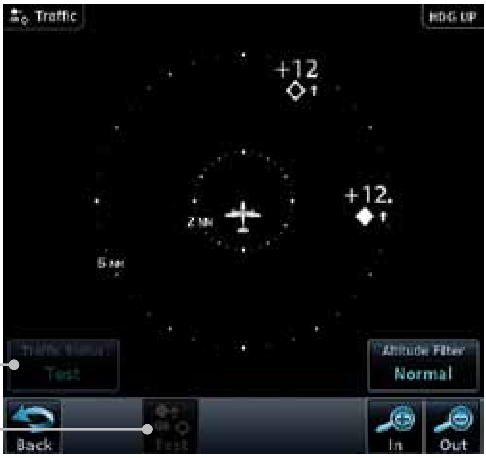
OR

3. Touch the **Close** key to close the pop-up. The pop-up will return if the traffic alert persists.

10.2 Traffic Test

The Traffic Test function is only available on some traffic systems. The aircraft must be on the ground and Traffic Status must be in Standby.

1. Touch the **Test** key to activate the test function in the Traffic equipment.


Traffic
HDG UP
+12
+12
2 NM
5 NM
Traffic Status
Test
Altitude Filter
Normal
Back
Test
In
Out

Test Traffic Status

Touch For Traffic Test While In Standby Traffic Status

Figure 10-2 Traffic Test Mode

2. The unit will return to normal operation mode after the test process is successfully completed.

10.3 Traffic Information Service (TIS) (Optional)

***WARNING**: The Traffic Information Service (TIS) is intended for advisory use only. TIS is intended to help the pilot locate traffic visually. It is the responsibility of the pilot to see and maneuver to avoid traffic.*

***NOTE:** TIS is available only when the aircraft is within the service volume of a TIS-capable terminal radar site. Aircraft without an operating transponder are invisible to both Traffic Advisory Systems (TAS) and TIS. Aircraft without altitude reporting capability are shown without altitude separation data or climb/descent indication.*

***NOTE:** TIS and Traffic Advisory System (TAS) may not both be configured at the same time.*

Traffic Information Service (TIS) is designed to help in detection and avoidance of other aircraft. TIS uses the Mode S transponder for the traffic data link. TIS receives traffic information from ground stations, and is updated every five seconds. The GTN 7XX displays up to eight traffic targets within a 7.5 NM radius, from 3000 feet below to 3500 feet above the requesting aircraft.

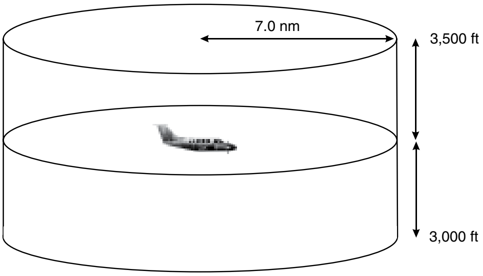


Figure 10-3 TIS Coverage Volume (not to scale)

10.3.1 TIS Symbology

Traffic is displayed according to TCAS symbology using three different symbols.

TIS Symbol	Description
◇	Non-Threat Traffic
●	Traffic Advisory (TA)
◐	Traffic Advisory Off Scale

Table 10-1 TIS Traffic Symbols

Traffic Advisories (TA) alert the crew to intruding aircraft. When traffic meets the advisory criteria for the TA, a solid yellow circle symbol is generated. A Non-threat Advisory, shown as an open white diamond, indicates that an intruding aircraft is at greater than ±1200 feet relative altitude or the distance is beyond five NM. A Traffic Advisory that is beyond the selected display range is indicated by a half TA symbol at the edge of the screen at the relative bearing of the intruder.

TIS also provides a vector line showing the direction in which the traffic is moving, to the nearest 45°. Traffic information for which TIS is unable to determine the bearing (non-bearing traffic) is displayed in the center of the Traffic Page or in a banner on maps other than the Traffic Map Page on which traffic can be displayed.

The altitude difference between the requesting aircraft and other intruder aircraft is displayed above/below the traffic symbol in hundreds of feet. If the other aircraft is above the requesting aircraft, the altitude separation appears above the traffic symbol with a "+" sign; if below, the altitude separation appears below. Altitude trend is displayed as an up/down arrow (for speeds greater than 500 fpm in either direction) to the right of the target symbol. Traffic symbols for aircraft without altitude reporting capability appear without altitude separation or climb/descent information.

Always remember that TIS cannot alert you to the presence of aircraft that are not equipped with transponders, nor can it alert you to aircraft that may be nearby, but obscured from the ground surveillance radar by interfering terrain.

10.3.2 Traffic Page

The Traffic Map Page is configured to show surrounding TIS traffic data in relation to the aircraft's current position and altitude, without clutter from the basemap. Aircraft orientation on this map is always heading up unless there is no valid heading.

The traffic mode is annunciated in the upper left corner of the Traffic Map Page. When the aircraft is on the ground, TIS automatically enters Standby Mode. Once the aircraft is airborne, TIS switches from Standby to Operating Mode and the GTN 7XX begins to display traffic information.

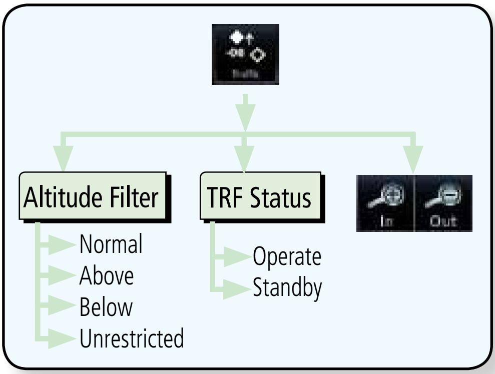

Traffic
Altitude Filter
Normal
Above
Below
Unrestricted
TRF Status
Operate
Standby
In
Out

Figure 10-4 Traffic Page Functional Diagram

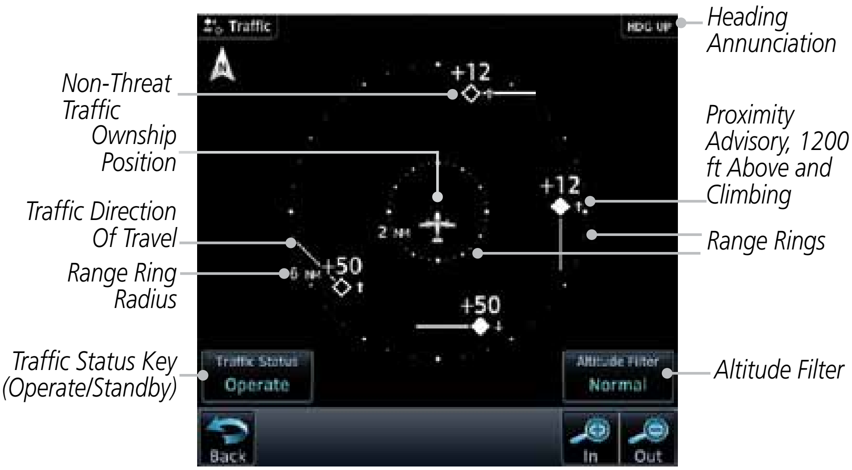

Traffic
HDG UP
+12
+12
2 NM
6 NM
+50
+50
Traffic Status
Operate
Altitude Filter
Normal
Back
In
Out
Non-Threat Traffic
Ownship Position
Traffic Direction Of Travel
Range Ring Radius
Traffic Status Key (Operate/Standby)
Heading Annunciation
Proximity Advisory, 1200 ft Above and Climbing
Range Rings
Altitude Filter

Figure 10-5 Traffic Page

10.3.3 Displaying Traffic on the Traffic Page

1. From the Home page, touch the **Traffic** key.

Traffic Status
Operate

2. Confirm TIS is in Operating Mode.

Traffic Status
Standby

3. Touch the **Traffic Status** key to toggle between Operate and Standby mode.

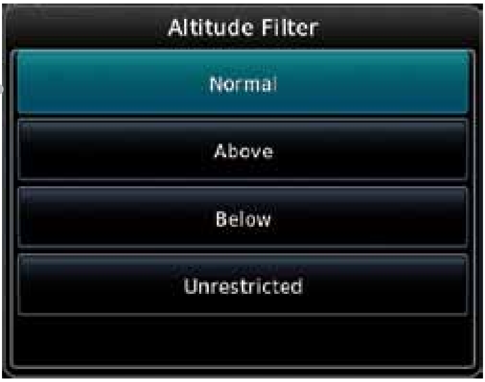
10.3.4 Altitude Display

Traffic Status
Operate

1. While viewing the Traffic page, touch the **Operate** key to begin displaying traffic. “Operate” is displayed in the Traffic Status field.

Altitude Filter
Normal

2. Touch the **Altitude Filter** key to change the altitude volume. Select the desired altitude volume by touching the **BELOW**, **NORMAL**, **ABOVE**, or **UNRESTRICTED** keys. The selection is displayed in the Altitude mode field.


Altitude Filter
Normal
Above
Below
Unrestricted

Selected Altitude Filter

Figure 10-6 Traffic Altitude Filter Page

Altitude Mode	Displayed Traffic Range
Below	-9900 ft to 2700 ft
Normal	-2700 ft to 2700 ft
Above	-2700 ft to 9900 ft
Unrestricted	All Traffic Shown

Table 10-2 Displayed Traffic Range

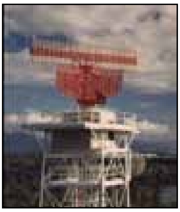
10.3.5 TIS Limitations

***NOTE:** This section on TIS Limitations is not comprehensive. Garmin recommends the user review the TIS Limitations section of the Aeronautical Information Manual, Section 1-3-5.*

TIS is NOT intended to be used as a collision avoidance system and does not relieve the pilot of responsibility to "see and avoid" other aircraft. TIS should not be used for avoidance maneuvers during IMC or other times when there is no visual contact with the intruder aircraft. TIS is intended only to assist in visual acquisition of other aircraft in VMC. No recommended avoidance maneuvers are provided for, nor authorized, as a direct result of a TIS intruder display or TIS advisory.

While TIS is a useful aid to visual traffic avoidance, it has some system limitations that must be fully understood to ensure proper use. Many of these limitations are inherent in secondary radar surveillance. In other words, the information provided by TIS will be no better than that provided to ATC. TIS will only display aircraft with operating transponders installed.

TIS relies on surveillance of the Mode S radar, which is a "secondary surveillance" radar similar to the ATCRBS. TIS operation may be intermittent during turns or other maneuvering. TIS is dependent on two-way, "line-of-sight" communication between the aircraft and the Mode S radar. Whenever the structure of the client aircraft comes between the transponder antenna (usually located on the underside of the aircraft) and the ground-based radar antenna, the signal may be temporarily interrupted. Other limitations and anomalies associated with TIS are described in the AIM, Section 1-3-5.



Garmin is not responsible for Mode S geographical coverage. Operation of the ground stations is the responsibility of the FAA. Refer to the Aeronautical Information Manual for a Terminal Mode S Radar Site Map covering the U.S.

***NOTE:** TIS will be unavailable at low altitudes in many areas of the U.S., particularly in mountainous regions. Also, when flying near the "floor" of radar coverage in a particular area, intruders below the client aircraft may not be detected by TIS.*

TIS information is collected one radar scan prior to the scan during which the uplink occurs. Therefore, the surveillance information is approximately five seconds old. In order to present the intruders in a "real time" position, the TIS ground station uses a "predictive algorithm" in its tracking software. This algorithm uses track history data to extrapolate intruders to their expected positions consistent with the time of display in the cockpit. Occasionally, aircraft maneuvering will cause this algorithm to induce errors in the display. These errors primarily affect relative bearing information and traffic target track vector (it will lag); intruder distance and altitude will remain relatively accurate and may be used to assist in "see and avoid." Some of the more common examples of these errors follow:

- When client or intruder aircraft maneuvers excessively or abruptly, the tracking algorithm may report incorrect horizontal position until the maneuvering aircraft stabilizes.
- When a rapidly closing intruder is on a course that crosses the client aircraft course at a shallow angle (either overtaking or head on) and either aircraft abruptly changes course within 0.25 NM, TIS may display the intruder on the opposite side of the client than it actually is.

These are relatively rare occurrences and will be corrected in a few radar scans once the course has stabilized.

10.3.6 TIS Alerts

When the number of Traffic Advisories (TAs) on the Traffic Map Page increases from one scan to the next, the following occur:

- A single "Traffic" voice alert is generated.
- A TRAFFIC Annunciation appears at the bottom of the display, flashing for 5 seconds and remaining displayed until no TAs are detected in the area.

  To reduce the number of nuisance alerts due to proximate aircraft, the "Traffic" voice alert is generated only when the number of TAs increases. For example, when the first TA is displayed, a voice and visual annunciation are generated. As long as a single TA remains on the display, no additional voice alerts are generated. If a second TA appears on the display or if the number of TAs initially decreases and then subsequently increases, another voice alert is generated.

A "Traffic Not Available" (TNA) voice alert is generated when the TIS service becomes unavailable or is out of range.

Traffic may not be displayed in the radar coverage area due to the following:

- Radar site TIS Mode S sensor is not operational or is out of service.
- Traffic or requesting aircraft is beyond the maximum range of the TIS-capable Mode S radar site.
- Traffic or requesting aircraft is above the radar site in the cone of silence and out of range of an adjacent site.
- Traffic or requesting aircraft is below radar coverage. In flat terrain, the coverage extends from about 3000 feet upward at 55 miles. Terrain and obstacles around the radar site can further decrease radar coverage in all directions.
- Traffic does not have an operating transponder.

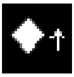
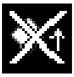
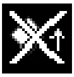
10.3.7 TIS System Status

The GTN 7XX performs an automatic test of TIS during power-up. If TIS passes the test, TIS enters Standby Mode on the ground or Operating Mode in the air. If TIS fails the power up test, an annunciation is shown in the center of the Traffic Map Page. Contact a service center or Garmin dealer for corrective action for a failure message.

Traffic Page Annunciation	Description
No Data	Data is not being received from the transponder
Failed	The transponder has failed
Unavailable	TIS is unavailable or out of range

Table 10-3 TIS Failure Annunciations

The Traffic mode is annunciated in the bottom left corner of the Traffic Page. When the aircraft is on the ground, TIS automatically enters Standby Mode. Once the aircraft is airborne, TIS switches to Operating Mode and traffic information is displayed. The mode can be changed manually using the **Traffic Status** key.

Traffic Status	Traffic Mode Annunciation (Traffic On Map Page)	Traffic Display Enabled Icon (Other Maps)
TIS Operating	**Operate**	
TIS Standby	**Standby**	
TIS Failed*	**TIS Fail**	

* *Contact a service center or Garmin dealer for corrective action*

Table 10-4 TIS Modes Shown on the Map Page

The annunciations that indicate the status of traffic information appear in a banner at the bottom center of maps on which traffic can be displayed.

Traffic Status Banner Annunciation	Description
Traffic Coast 9 SEC	The displayed data is not current (6 to 12 seconds since last message). The quality of displayed traffic information is reduced when this message is displayed.
Traffic Removed	Traffic is removed because it is too old for coasting (12 to 60 seconds since last message). Traffic may exist within the selected display range, but it is not displayed.

Table 10-5 TIS Traffic Status Annunciations

10.4 TAS Traffic (Optional)

***NOTE:** TIS and Traffic Advisory System (TAS) may not both be configured at the same time.*

TAS data comes from a TAS unit such as a Garmin GTS 800 or 820, Skywatch 497, KTA 810, or other unit.

Refer to the appropriate Traffic Advisory System's Pilot's Guides for a detailed discussion of the respective traffic advisory system.

The type of traffic systems that is installed is described by the Traffic Page keys. If a Traffic Advisory System (TAS) is configured, a **Traffic Mode** and **Altitude Filter** key will be displayed.

***NOTE:** Pilots should be aware of TAS system limitations. TAS systems require transponders of other aircraft to respond to system interrogations. If the transponders do not respond to interrogations due to phenomena such as antenna shading or marginal transponder performance, traffic may be displayed intermittently, or not at all. Aircraft without altitude reporting capability are shown without altitude separation data or climb descent indication. Pilots should remain vigilant for traffic at all times.*

***WARNING:** The Traffic Advisory System (TAS) is intended for advisory use only to aid the pilot in visually acquiring traffic. No avoidance maneuvers should be based solely upon TAS traffic information. It is the responsibility of the pilot in command to see and maneuver to avoid traffic.*

A Traffic Advisory System (TAS) enhances flight crew situational awareness by displaying traffic information for transponder-equipped aircraft. The TAS also provides visual and aural traffic alerts including voice announcements to assist in visually acquiring traffic.

When the TAS is in Operating Mode, the unit interrogates the transponders of intruding aircraft while monitoring transponder replies. The TAS uses this information to derive the distance, relative bearing, and if reported, the altitude and vertical trend for each aircraft within its surveillance range. The TAS then calculates a closure rate to each intruder based on the projected Closest Point of Approach (CPA). If the closure rate meets the threat criteria for a Traffic Advisory (TA), visual and aural alerting is provided.

10.4.1 TAS Symbology

Traffic Advisory System (TAS) is designed to help in detection and avoidance of other aircraft. TAS uses an on-board interrogator-processor to detect traffic. Only aircraft with operating transponders will be detected. Traffic is displayed according to TCAS symbology using four different symbols.

TAS Symbol	Description
◈	Non-Threat Traffic (intruder is beyond 5 NM and greater than 1200 ft vertical separation)
◆	Proximity Advisory (PA) (intruder is within 5 NM and less than 1200 ft vertical separation)
●	Traffic Advisory (TA) (closing rate, distance, and vertical separation meet TA criteria)
◐	Traffic Advisory Off Scale

Table 10-6 TAS Intruder Symbol Description

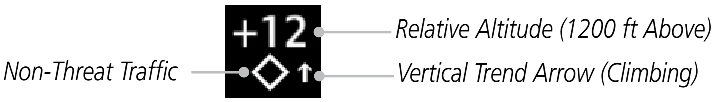

+12
Relative Altitude (1200 ft Above)
Non-Threat Traffic
Vertical Trend Arrow (Climbing)

Figure 10-7 Intruder Type, Altitude, and Vertical Trend

10.4.2 Displaying and Operating Traffic (TAS Systems)

The unit must be in Operating mode for traffic to be displayed. The ability to switch from Standby to Operating mode on the ground is especially useful for scanning the airspace around the airport before takeoff.

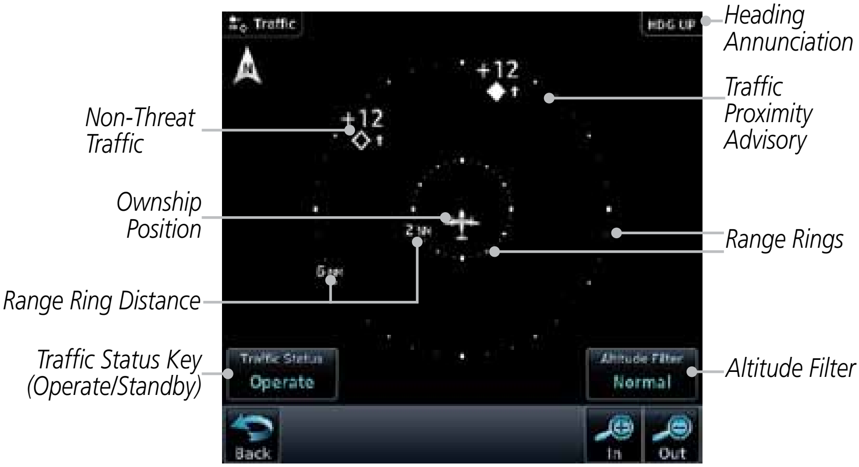

Traffic
HDG UP
Heading Annunciation
+12
Traffic Proximity Advisory
Non-Threat Traffic
+12
Ownship Position
2 NM
Range Rings
6 NM
Range Ring Distance
Traffic Status Key (Operate/Standby)
Traffic Status
Operate
Altitude Filter
Normal
Altitude Filter
Back
In
Out

Figure 10-8 Traffic Page

10.4.2.1 Switching from Standby Mode to Operating Mode

1. From the Home page, touch the **Traffic** key.

Traffic Status
Operate

2. Confirm TAS is in Operating Mode.

Traffic Status
Standby

3. Touch the **Traffic Status** key to toggle between Operate and Standby mode.

Altitude Filter
Normal

4. Touch the **Altitude Filter** key to change the altitude volume.

***NOTE:** Not all TAS systems can be set to "Standby" mode while in the air.*

The Traffic Page shows surrounding TAS traffic data in relation to the aircraft's current position and altitude without basemap clutter. Aircraft orientation is always heading up unless no valid heading is received. The Traffic Status is annunciated in the lower left corner and the Altitude Filter is annunciated in the lower right corner.

10.4.2.2 Range Ring

Touching the **In** and **Out** keys will zoom in and out in preset steps depending on the installed equipment as shown in the following table.

Traffic Device	Map Ranges
Garmin GTS 800, Skywatch (SKY497/SKY889)	2 NM, 6 NM, 12 NM
Garmin GTS 820 and 850, Honeywell KTA 810 TAS, KTA 910 TAS, KMH 820 IHAS, KMH 920 IHAS, and Avidyne TAS 620 (Ryan 9900BX)	2 NM, 6 NM, 12 NM, 24 NM, 40 NM

Table 10-7 Available Traffic Range Ring Steps

10.4.3 Altitude Display

Traffic Status
Operate

1. While viewing the Traffic page, touch the **Traffic Status** key to begin displaying traffic. “TAS OPERATING” is displayed in the Traffic mode field.

Altitude Filter
Normal

2. Touch the **Altitude Filter** key to change the altitude volume. Select the desired altitude volume by touching the **BELOW**, **NORMAL**, **ABOVE**, or **UNRESTRICTED** keys. The selection is displayed in the Altitude mode field.

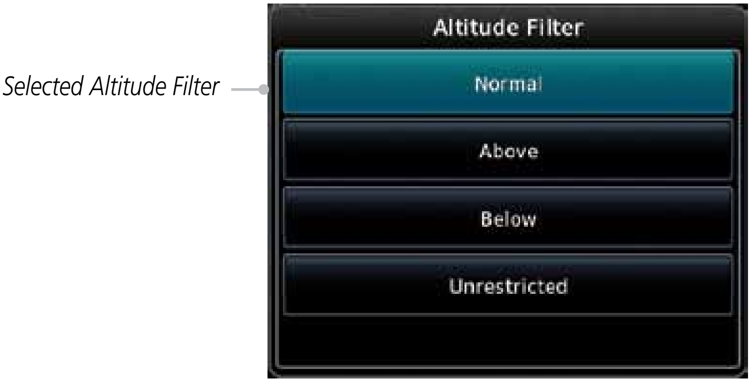

Selected Altitude Filter
Altitude Filter
Normal
Above
Below
Unrestricted

Figure 10-9 Traffic Altitude Filter Page

Altitude Mode	Displayed Traffic Range
Below	-9900 ft to 2700 ft
Normal	-2700 ft to 2700 ft
Above	-2700 ft to 9900 ft
Unrestricted	All Traffic Shown

Table 10-8 Displayed Traffic Range

10.4.4 Traffic System Status

NOTE: *Refer to the equipment documentation for information on the self-test and operating modes.*

The Traffic Status is indicated in the lower left corner of the Traffic Page.

Mode	Traffic Mode Annunciation (Traffic Page)	Traffic Display Enabled Icon (Other Maps)
TAS Self-test Initiated	Test	☒
TAS Operating	Operate	◆↑
TAS Standby	Standby	☒
TAS Failed	TAS Fail	☒

Table 10-9 TAS Modes

If the unit fails, an annunciation as to the cause of the failure is shown in the center of the Traffic Page.

Traffic Page Annunciation	Description
No Data	Data is not being received from the TAS unit
Data Failed	Data is being received from the TAS unit, but the unit is self-reporting a failure
Failed	Incorrect data format received from the TAS unit

Table 10-10 TAS Failure Annunciations

The annunciations to indicate the status of traffic information appear in a banner at the lower left corner of maps on which traffic can be displayed.

Traffic Status Banner Annunciation	Description
TA 6.0 + 03 ↓	System cannot determine bearing of Traffic Advisory. Annunciation indicates distance in NM, altitude separation in hundreds of feet, and altitude trend arrow (climbing/descending).
Failed	Traffic data has failed.
Data Fail	Data is being received from the transponder, but a failure is detected in the data stream.
No Data	Traffic has not been detected.

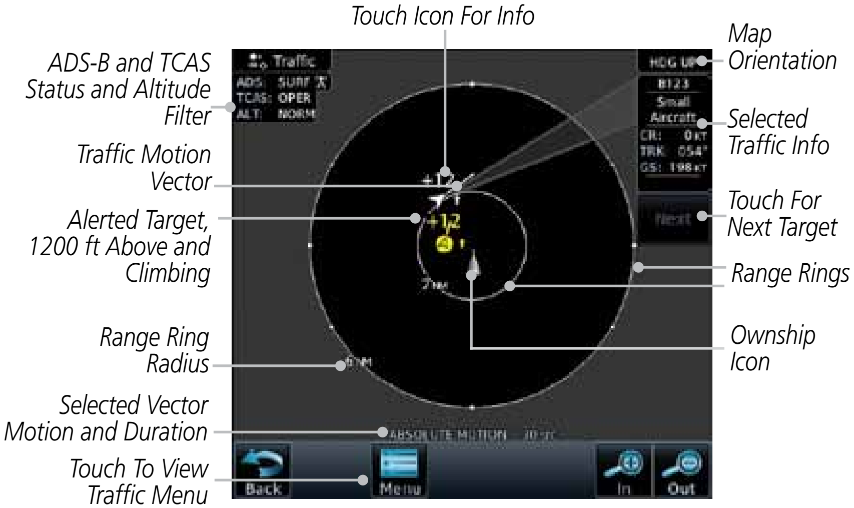
Table 10-11 TAS Traffic Status Annunciations

10.5 ADS-B Traffic

ADS-B technology is an important part of the FAA's Next Generation Air Transportation System (NextGen), allowing for enhanced safety, efficiency, and the ability of the system to handle greater numbers of aircraft. ADS-B In allows a properly-equipped aircraft to access FAA broadcast services such as TIS-B and FIS-B. With ADS-B Out, the avionics transmit an aircraft's precise location, as well as specific information about that aircraft, to ground stations and other aircraft equipped with 978 MHz ADS-B technology.

If more than one target is occupying the same area of the screen, the GTN will combine the two traffic targets into one traffic group. The group symbol maintains the iconology of the highest priority traffic target in the group and indicates a grouped symbol by the presence of an asterisks to the left of the grouped traffic target.

Traffic targets displayed on the dedicated traffic page may be selected in order to obtain additional information about a traffic target or to view all targets in a grouped target. When a grouped target is selected, the **Next** key on the dedicated traffic page will cycle through all targets located in close proximity to where the screen has been touched.


Touch Icon For Info
ADS-B and TCAS Status and Altitude Filter
Traffic Motion Vector
Alerted Target, 1200 ft Above and Climbing
Range Ring Radius
Selected Vector Motion and Duration
Touch To View Traffic Menu
Map Orientation
Selected Traffic Info
Touch For Next Target
Range Rings
Ownship Icon
Traffic
HDG UP
+12
7NM
6NM
Next
Back
Menu
In
Out

ADS: SURF
TCAS: OPER
ALT: NORM

8123
Small Aircraft
CR: 0KT
TRK: 054°
GS: 198KT

ABSOLUTE MOTION 30 s

Figure 10-10 ADS-B Traffic Page

***NOTE:** The "Next" key on the dedicated traffic page will cycle through all targets located in close proximity to where the pilot has touched the screen.*

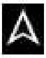
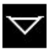
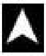
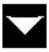
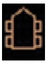
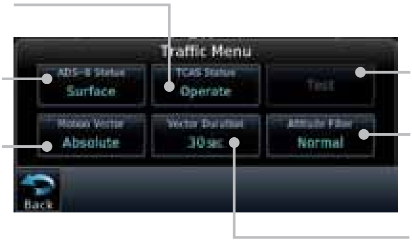
Symbol	Description
	Basic Non-Directional Traffic
	Basic Directional Traffic
	Basic Off-scale Selected Traffic
	Proximate Non-Directional Traffic
	Proximate Directional Traffic
	Proximate Off-scale Selected Traffic
	Non-Directional Alerted Traffic
	Off-Scale Non-Directional Alerted Traffic
	Directional Alerted Traffic
	Off-Scale Directional Alerted Traffic
	Non-Directional Surface Vehicle
	Directional Surface Vehicle

Table 10-12 ADS-B Traffic Symbols

NOTE: *Color of basic and proximate traffic is dependent on configuration (cyan or white) and airborne/on-ground status of target (target is brown when on the ground, see the surface vehicles).*

10.5.1 ADS-B Traffic Menu

The Traffic Menu allows control of the traffic information display.


Traffic Menu
ADS-B Status
Surface
TCAS Status
Operate
Test
Motion Vector
Absolute
Vector Duration
30 sec
Altitude Filter
Normal
Back

Select TCAS Status: Operate and Standby

Select ADS-B Status: Off, Surface, or Airborne

Select Motion Vector: Absolute, Relative, Off

Touch To Perform Traffic Test

Select Altitude Filter: Normal, Above, Below, Unrestricted

Select Vector Duration: 30 sec, 1 min, 2 min, 5 min

Figure 10-11 ADS-B Traffic Menu

10.5.1.1 ADS-B Status

ADS-B Status displays the current status of traffic application: Off, Surface, or Airborne.

ADS-B Status
Surface

Touch the **ADS-B Status** key to toggle the ADS-B Status.

10.5.1.2 TCAS Status

This shows the current status of the TCAS system. The modes reported by the traffic device are "Operate" while in the air and "Standby" while on the ground. This control allows the pilot to manually select the TCAS Status.

TCAS Status
Operate

Touch the **TCAS Status** key to toggle the TCAS Status.

10.5.1.3 Motion Vector

When Absolute Motion Vectors are selected, the vectors extending from the traffic targets depict the target reported track and speed over the ground. When Relative Motion Vectors are selected, the vectors extending from the traffic targets display how the traffic target is moving relative to your aircraft. These vectors are calculated using the traffic targets track and ground speed and your aircraft's track and ground speed. These two values are combined to depict where the traffic target is moving purely with respect to your aircraft and give a forecast of where the traffic target will be, relative to your aircraft, in the near future.

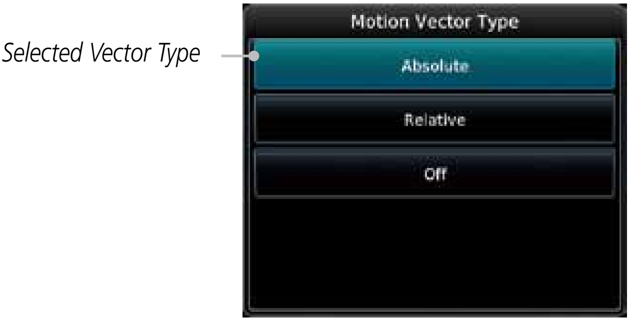


Figure 10-12 Traffic Motion Vector Type Selection

NOTE: *Absolute motion vectors are colored either white or cyan. Relative motion vectors are always green. The annunciation on the bottom of the dedicated traffic page indicates which vector type is selected and their length.*

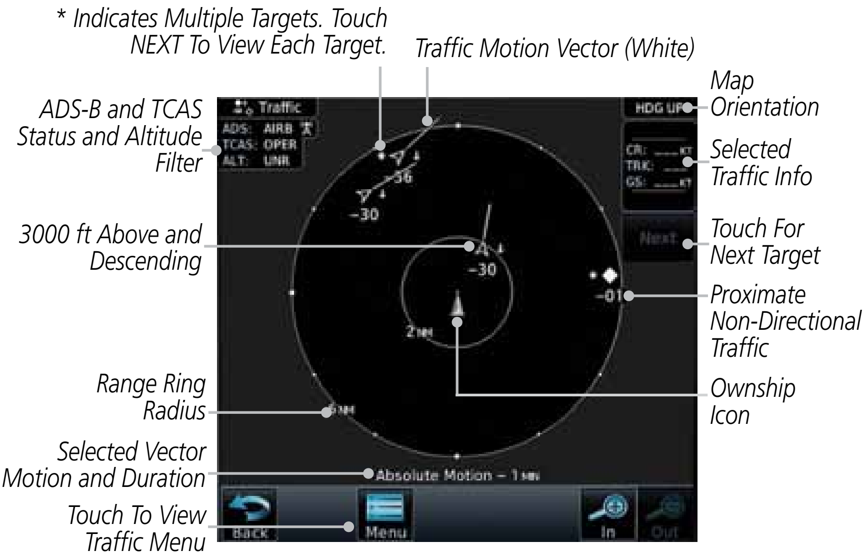

* Indicates Multiple Targets. Touch NEXT To View Each Target.
Traffic Motion Vector (White)
ADS-B and TCAS Status and Altitude Filter
3000 ft Above and Descending
Range Ring Radius
Selected Vector Motion and Duration
Touch To View Traffic Menu
Map Orientation
Selected Traffic Info
Touch For Next Target
Proximate Non-Directional Traffic
Ownship Icon
Traffic
ADS: AIRB
TCAS: OPER
ALT: UNR
HDG UP
CR: KT
TRK:
GS: KT
Next
-36
-30
-30
-01
2 NM
6 NM
Absolute Motion – 1 MIN
Back
Menu
In
Out

Figure 10-13 Absolute Motion (White Vectors)

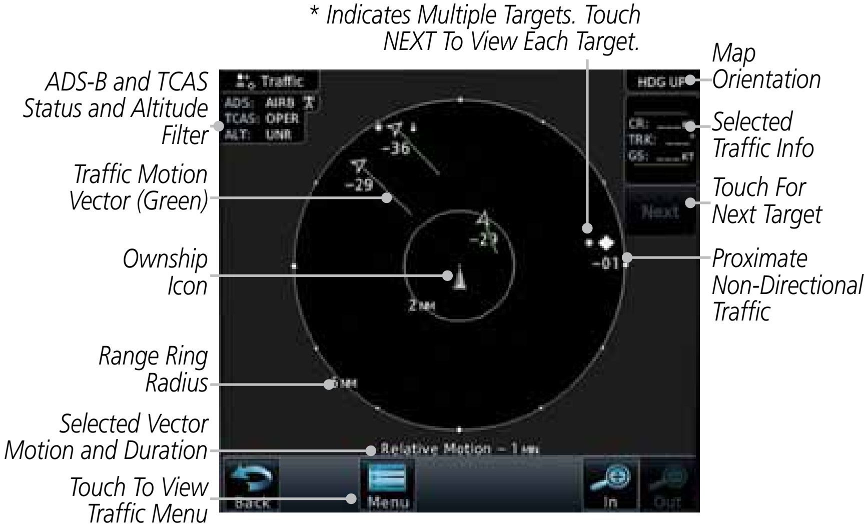

* Indicates Multiple Targets. Touch NEXT To View Each Target.
ADS-B and TCAS Status and Altitude Filter
Traffic Motion Vector (Green)
Ownship Icon
Range Ring Radius
Selected Vector Motion and Duration
Touch To View Traffic Menu
Map Orientation
Selected Traffic Info
Touch For Next Target
Proximate Non-Directional Traffic
Traffic
ADS: AIRB
TCAS: OPER
ALT: UNR
HDG UP
CR: KT
TRK:
GS: KT
Next
-36
-29
-29
-01
2 NM
6 NM
Relative Motion – 1 MIN
Back
Menu
In
Out

Figure 10-14 Relative Motion (Green Vectors)

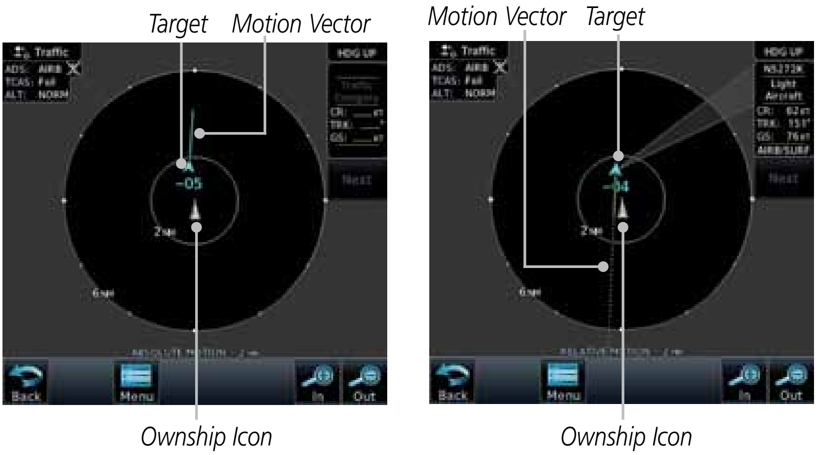

Target
Motion Vector
Motion Vector
Target
Traffic
ADS: AIRB
TCAS: Fail
ALT: NORM
HDG UP
-05
-04
2 NM
6 NM
N5272K
Light Aircraft
ABSOLUTE MOTION
RELATIVE MOTION
Next
Back
Menu
In
Out
Ownship Icon
Ownship Icon

Figure 10-15 Comparison of Absolute and Relative Motion Vectors With a Single Target

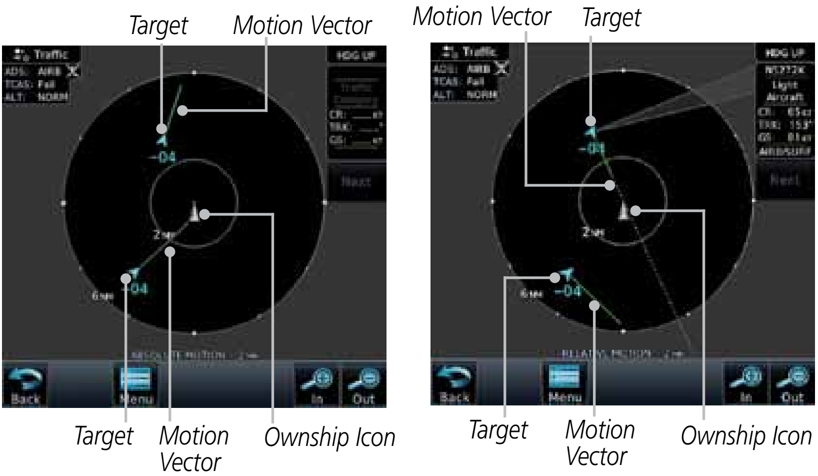

Target
Motion Vector
Motion Vector
Target
Traffic
ADS: AIRB
TCAS: Fail
ALT: NORM
HDG UP
-04
-04
2 NM
6 NM
N5272K
Light Aircraft
ABSOLUTE MOTION
RELATIVE MOTION
Next
Back
Menu
In
Out
Target
Motion Vector
Ownship Icon
Target
Motion Vector
Ownship Icon

Figure 10-16 Comparison of Absolute and Relative Motion Vectors With a Two Targets

10.5.1.4 Vector Duration

The Vector Duration selection sets the time that the vector will show the calculated distance and direction of the traffic target. A longer duration will result in a longer vector.

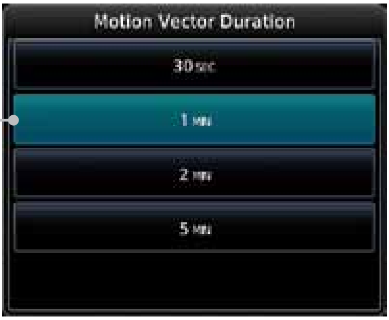

Selected Vector Duration
Motion Vector Duration
30 sec
1 min
2 min
5 min

Figure 10-17 Traffic Motion Vector Duration Selection

10.5.1.5 Altitude Filter

Altitude Filter
Normal

1. Touch the **Altitude Filter** key to change the altitude volume.
2. Select the desired altitude volume by touching the **BELOW**, **NORMAL**, **ABOVE**, or **UNRESTRICTED** keys. The selection is displayed in the Altitude mode field.

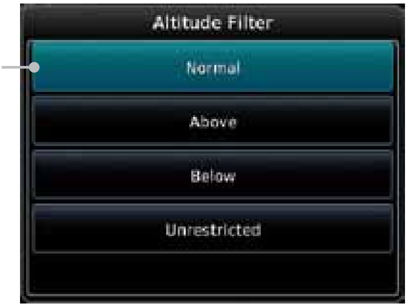

Selected Altitude Filter
Altitude Filter
Normal
Above
Below
Unrestricted

Figure 10-18 Traffic Altitude Filter Selection

Altitude Mode	Displayed Traffic Range
Below	-9900 ft to 2700 ft
Normal	-2700 ft to 2700 ft
Above	-2700 ft to 9900 ft
Unrestricted	All Traffic Shown

Table 10-13 Displayed Traffic Range

10.6 RYAN TCAD 9900BX with the GDL 88

Ryan TCAD is a system that provides audio and visual alerts for traffic near your aircraft. The information from this system can be interfaced through the GTN series. Operating instructions and details on the modes of operation are described in the Ryan TCAD operator's handbooks.

- TCAS-like symbols are used in the 9900BX.
- Altitude modes are available (normal, look up, look down, unrestricted).
- Ranges are manually controlled for the current shield.
- Traffic display range selections:
    - Ryan 9900BX — 1 NM, 1 and 2 NM, 2 and 6 NM, 6 and 12 NM, and 12 and 24 NM.

10.6.1 Ryan TCAD Description

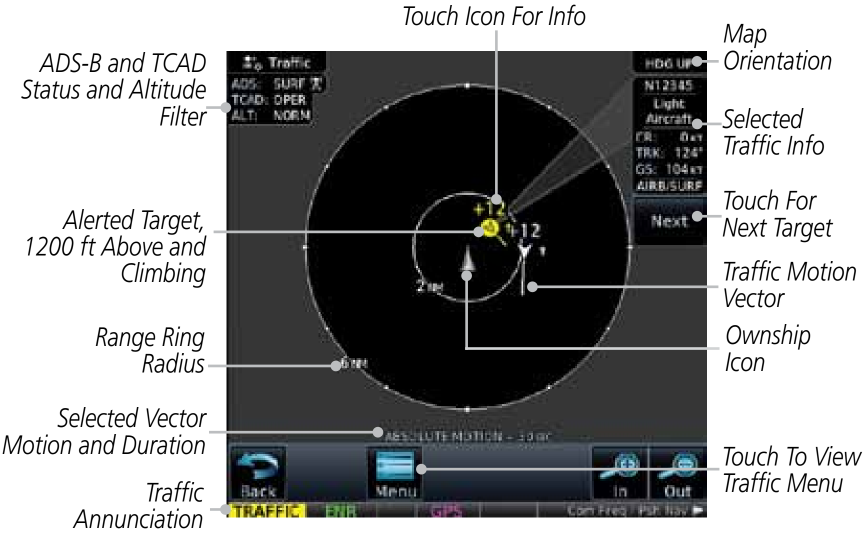
***NOTE:** Refer to the Ryan TCAD Pilot's Guide for a detailed description of the Ryan TCAD System.*

The Ryan TCAD (Traffic and Collision Alert Device) is an on-board air traffic display used to identify potential collision threats. TCAD computes relative altitude and range of threats from nearby Mode C and Mode S-equipped aircraft. TCAD will not detect aircraft without operating transponders or those that are beyond radar coverage. TCAD, within defined limits, creates a "shield" of airspace around the aircraft that detected traffic cannot penetrate without triggering an alert.

TA: Traffic Advisory. This is traffic with 500 feet, or less, of altitude separation that is converging or maintaining altitude separation.

PA: Proximity Advisory. This is traffic with 500 feet of altitude separation that is not a TA.

TRFC: Other traffic.


Touch Icon For Info
Map Orientation
ADS-B and TCAD Status and Altitude Filter
Selected Traffic Info
Touch For Next Target
Alerted Target, 1200 ft Above and Climbing
Traffic Motion Vector
Ownship Icon
Range Ring Radius
Selected Vector Motion and Duration
Touch To View Traffic Menu
Traffic Annunciation
Traffic
HDG UP
Next
2NM
6NM
+12
Back
Menu
In
Out
TRAFFIC
ENR
GPS
Com Freq
Pwr Nav

ADS: SURF
TCAD: OPER
ALT: NORM

N12345
Light Aircraft
FR: 0NM
TRK: 124°
GS: 104KT
AIRB/SURF

ABSOLUTE MOTION - 30 sec

Figure 10-19 Traffic Page for Ryan TCAD with GDL 88

10.6.2 Altitude Mode

The GDL 88 has four altitude display modes: Normal (±2,700 feet, Above (-2,700 feet to +9,000 feet), Below (-9,000 feet to +2,700 feet), and Unrestricted (±9,900 feet). The GDL 88 continues to track up to 30 intruder aircraft within its maximum surveillance range, regardless of the altitude display mode selected.

The selected altitude display mode is displayed in the upper left-hand corner of the Traffic page.

Altitude Filter
Normal

While viewing the Traffic page, touch the **Altitude Filter** key to change the altitude volume. Select the desired altitude volume by touching the **BELOW**, **NORMAL**, **ABOVE**, or **UNRESTRICTED** keys. The selection is displayed in the Altitude mode field.

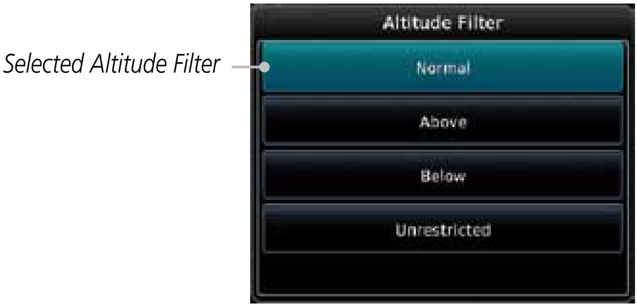

Selected Altitude Filter
Altitude Filter
Normal
Above
Below
Unrestricted

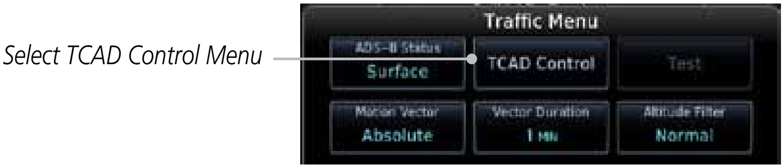
Figure 10-20 Traffic Altitude Filter Selection

Altitude Mode	Displayed Traffic Range
Below	-9900 ft to 2700 ft
Normal	-2700 ft to 2700 ft
Above	-2700 ft to 9900 ft
Unrestricted	All Traffic Shown

Table 10-14 Displayed Traffic Range

10.6.3 TCAD Control Menu

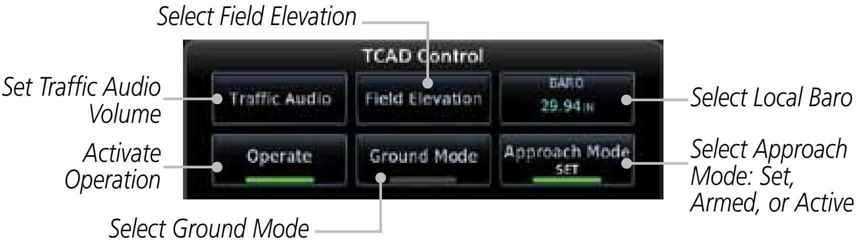
The TCAD Control Menu allows control over the settings for the TCAD Traffic display.


Select TCAD Control Menu
Traffic Menu
TCAD Control
Test

ADS-B Status: Surface
Motion Vector: Absolute
Vector Duration: 1 MIN
Altitude Filter: Normal

Figure 10-21 TCAD Traffic Menu

1. While viewing the Traffic menu, touch the **TCAD Control** key.


Select Field Elevation
Set Traffic Audio Volume
Activate Operation
Select Ground Mode
Select Local Baro
Select Approach Mode: Set, Armed, or Active
TCAD Control
Traffic Audio
Field Elevation
Operate
Ground Mode

BARO: 29.94 IN
Approach Mode: SET

Figure 10-22 TCAD Control Menu

2. Touch the desired key from the menu to make any settings.

10.6.3.1 Traffic Audio

1. While viewing the TCAD Control menu, touch the **Traffic Audio** key.

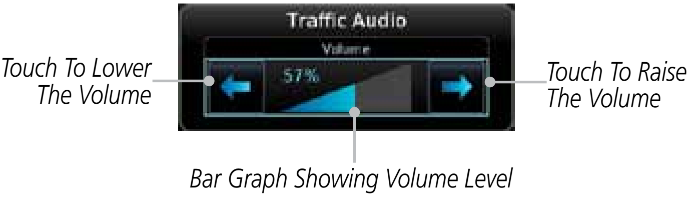

Touch To Lower The Volume
Touch To Raise The Volume
Bar Graph Showing Volume Level
Traffic Audio
Volume
57%

Figure 10-23 TCAD Traffic

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

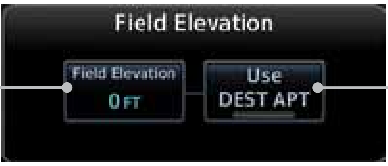
2. Touch the arrow keys to raise or lower the TCAD Traffic Audio level. The selected volume will be shown as a percentage value and graphically with a bar graph.

3. Touch the **Back** key to return to the TCAD Control menu.

10.6.3.2 Field Elevation

Field Elevation

1. While viewing the TCAD Control menu, touch the **Field Elevation** key.



Touch To Manually Set Field Elevation

Touch To Automatically Select The Destination Airport Field Elevation

Figure 10-24 TCAD Traffic Field Elevation Selection

Field Elevation
0 FT

2. With the **Use DEST APT** key deactivated (no green bar), touch the **Field Elevation** key to manually select the Field Elevation for traffic reporting. Use the keypad to select the elevation value.

3. Touch the **Enter** key to accept the selected value. The selected value will be shown in the **Field Elevation** key.

Use
DEST APT

4. Touch the **Use DEST APT** key to automatically use the field elevation of the destination airport of the active flight plan for traffic reporting.

***NOTE:** Activating the Use DEST APT feature automatically uses the elevation for the current destination airport for the TCAD. If no destination airport is present in the GTN system, the TCAD will not receive a field elevation and therefore not automatically enter approach mode.*

10.6.3.3 Baro

1. While viewing the TCAD Control menu, touch the **BARO** key to manually select the barometric pressure.
2. Use the keypad to select the barometric pressure value.

3. Touch the **Enter** key to accept the selected value. The selected value will be shown in the **BARO** key.

10.6.3.4 Operate

1. While viewing the TCAD Control menu, touch the **Operate** key to activate TCAD traffic.
2. Touching the **Operate** key toggles TCAD traffic operation on and off.

10.6.3.5 Ground Mode

Ground Mode

1. While viewing the TCAD Control menu, touch the **Ground** key to activate Ground Mode TCAD traffic.
2. Touching the **Ground** key toggles Ground Mode on and off.

10.6.3.6 Approach Mode

Approach Mode

1. While viewing the TCAD Control menu, touch the **Approach** key to activate Approach Mode TCAD traffic.
2. Touching the **Approach** key toggles Approach Mode on and off.

10.7 TCAD 9900B Operation

The TCAD 9900B provides a passive system that uses transponder replies from other aircraft to acquire traffic information.

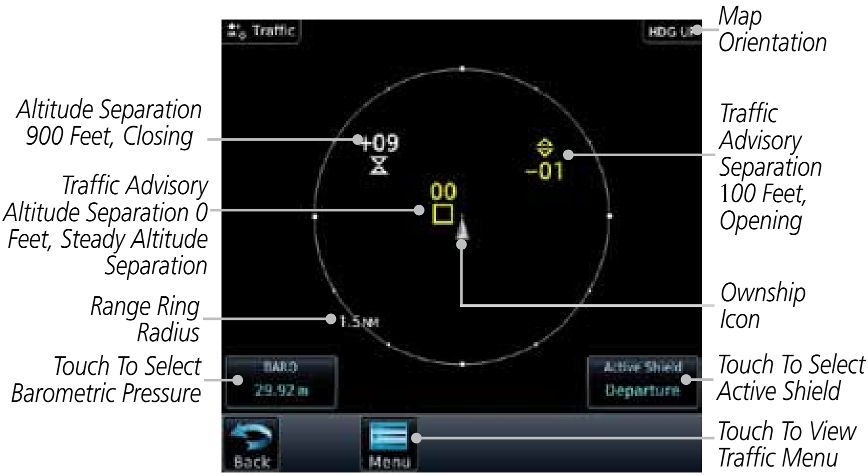

Traffic
HDG UP
+09
00
-01
1.5NM
BARO
29.92in
Active Shield
Departure
Back
Menu
Map Orientation
Altitude Separation 900 Feet, Closing
Traffic Advisory Separation 100 Feet, Opening
Traffic Advisory Altitude Separation 0 Feet, Steady Altitude Separation
Ownship Icon
Range Ring Radius
Touch To Select Barometric Pressure
Touch To Select Active Shield
Touch To View Traffic Menu

Figure 10-25 Traffic Page for Ryan TCAD 9900B

Symbol		Description
Imminent Traffic (Traffic within ±500 feet AND 1.0 NM; OR no altitude AND within 1.0 NM)	Non-Imminent Traffic	
⧗	⧗	Traffic Closing Vertically
◇	◇	Traffic Diverging Vertically
□	□	Traffic not Closing or Diverging Vertically

Table 10-15 9900B TCAD Symbols

10.7.1 Select Local Barometric Pressure

1. While viewing the TCAD display, touch the **Baro** key to select the local barometric pressure.
2. Use the keypad to select the values and touch **Enter** to save the values.

10.7.2 Select Active Shield

BARO
29.92 IN

1. While viewing the TCAD display, touch the **Active Shield** key to select the Active Shield values (Departure, Enroute, or Ground).

2. Touch the desired setting to save the values.

10.7.3 TCAD 9900B Traffic Menu

The TCAD 9900B Menu allows control over the settings for the TCAD Traffic display.

TCAD Control

1. While viewing the Traffic page, touch the **Menu** key.

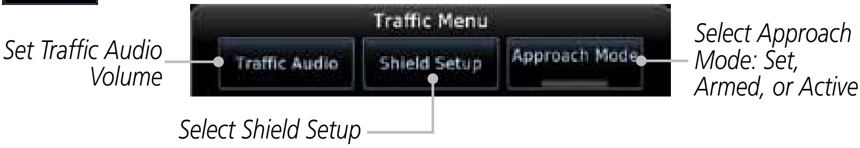

Traffic Menu
Traffic Audio
Shield Setup
Approach Mode
Set Traffic Audio Volume
Select Approach Mode: Set, Armed, or Active
Select Shield Setup

Figure 10-26 TCAD 9900B Traffic Menu

2. Touch the desired key from the menu to make any settings.

10.7.3.1 Traffic Audio

Traffic Audio

1. While viewing the TCAD Control menu, touch the **Traffic Audio** key.

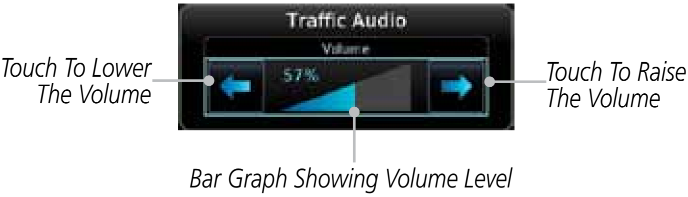

Traffic Audio
Volume
57%
Touch To Lower The Volume
Touch To Raise The Volume
Bar Graph Showing Volume Level

Figure 10-27 TCAD Traffic Audio

2. Touch the arrow keys to raise or lower the TCAD Traffic Audio level. The selected volume will be shown as a percentage value and graphically with a bar graph.

3. Touch the **Back** key to return to the TCAD Control menu.

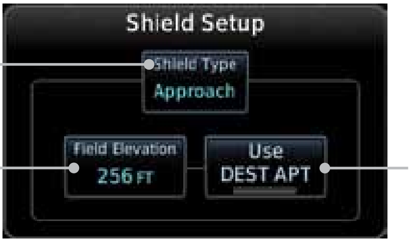
10.7.3.2 Shield Setup

The Shield Setup function allows you to select the Shield Type (mode of operation) and the size of the shield volume that will provide alerts when entered by aircraft.

Approach Shield Type

Shield Type
Approach

1. While viewing the TCAD Control menu, touch the **Shield Type** key and touch the Approach Shield Type.



Touch To Select Shield Type: Approach or Standard

Touch To Manually Set Field Elevation

Touch To Automatically Select The Destination Airport Field Elevation

Figure 10-28 TCAD 9900B Shield Setup for Approach

Field Elevation

2. Touch the **Field Elevation** key.

Field Elevation
0 FT

3. With the **Use DEST APT** key deactivated (no green bar), touch the **Field Elevation** key to manually select the Field Elevation for traffic reporting. Use the keypad to select the elevation value.

4. Touch the **Enter** key to accept the selected value. The selected value will be shown in the **Field Elevation** key.

Use
DEST APT

5. Touch the **Use DEST APT** key to automatically use the field elevation of the destination airport of the active flight plan for traffic reporting.

***NOTE:** Activating the Use DEST APT feature automatically uses the elevation for the current destination airport for the TCAD. If no destination airport is present in the GTN system, the TCAD will not receive a field elevation and therefore not automatically enter approach mode.*

En Route, Standard, or Terminal Shield Type

Shield Type
Approach

1. While viewing the TCAD Control menu, touch the **Shield Type** key and touch the desired Shield Type: Enroute, Standard, or Terminal.

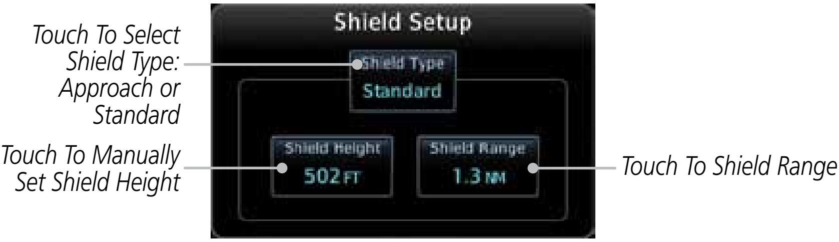

Shield Setup
Shield Type
Standard
Shield Height
502 FT
Shield Range
1.3 NM
Touch To Select Shield Type: Approach or Standard
Touch To Manually Set Shield Height
Touch To Shield Range

Figure 10-29 TCAD 9900B Shield Setup for En Route, Standard, and Terminal

Shield Height
500 FT

2. Touch the **Shield Height** key and use the keypad to select the Shield Height value. The selected value will be shown in the **Shield Range** key.

Shield Range
1.0 NM

3. Touch the **Shield Range** key and use the keypad to select the Shield Range value. The selected value will be shown in the **Shield Range** key.

10.7.3.3 Approach Mode

Approach Mode

1. While viewing the TCAD Control menu, touch the **Approach** key to activate Approach Mode TCAD traffic.
2. Touching the **Approach** key toggles Approach Mode between Set, Armed, or Active.

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

10.8 TCAD 9900BX Operation

The TCAD 9900BX provides an active system that interrogates other aircraft to acquire traffic information.

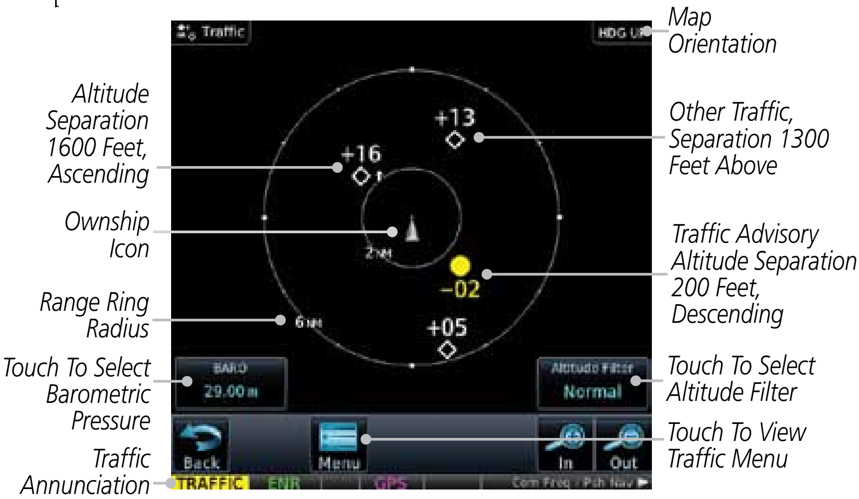

Traffic
HDG UP
+13
+16
2 NM
6 NM
−02
+05
BARO
29.00 in
Altitude Filter
Normal
Back
Menu
In
Out
TRAFFIC
ENR
GPS
Com Freq / Pth Nav
Map Orientation
Altitude Separation 1600 Feet, Ascending
Other Traffic, Separation 1300 Feet Above
Ownship Icon
Traffic Advisory Altitude Separation 200 Feet, Descending
Range Ring Radius
Touch To Select Barometric Pressure
Touch To Select Altitude Filter
Traffic Annunciation
Touch To View Traffic Menu

Figure 10-30 Traffic Page for Ryan TCAD 9900BX

Symbol	Description
●	Traffic Advisory
◆	Proximity Advisory (color may be configured as cyan)
◇	Other Traffic (color may be configured as cyan)
◗	Out-of-Range Traffic Advisory

Table 10-16 9900BX (TCAS) Symbols

10.8.1 Select Local Barometric Pressure

1. While viewing the TCAD display, touch the **Baro** key to select the local barometric pressure.
2. Use the keypad to select the values and touch **Enter** to save the values.

10.8.2 Select Altitude Filter

Altitude Filter
Normal

While viewing the Traffic page, touch the **Altitude Filter** key to change the altitude volume. Select the desired altitude volume by touching the **Normal**, **Above**, **Below**, or **Unrestricted** keys. The selection is displayed in the Altitude Filter field.

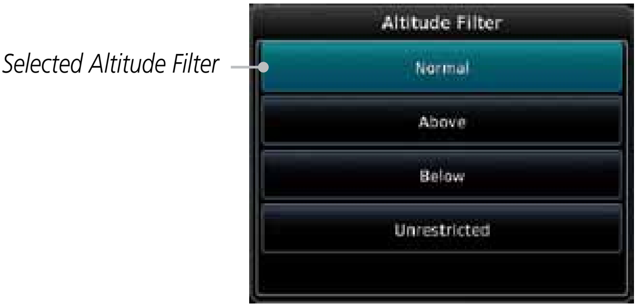

Selected Altitude Filter
Altitude Filter
Normal
Above
Below
Unrestricted

Figure 10-31 Traffic Altitude Filter Selection

Altitude Mode	Displayed Traffic Range
Below	-9900 ft to 2700 ft
Normal	-2700 ft to 2700 ft
Above	-2700 ft to 9900 ft
Unrestricted	All Traffic Shown

Table 10-14 Displayed Traffic Range

10.8.3 TCAD 9900BX Traffic Menu

The TCAD 9900BX Menu allows control over the settings for the TCAD Traffic display.

TCAD Control

1. While viewing the Traffic page, touch the **Menu** key.

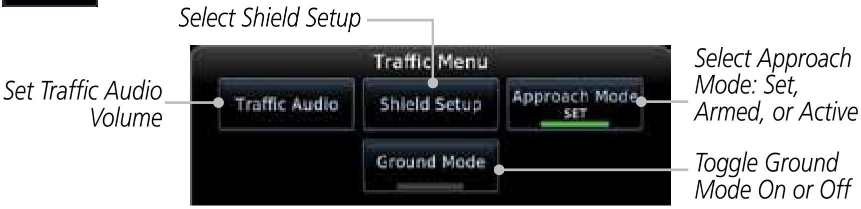

Select Shield Setup
Set Traffic Audio Volume
Select Approach Mode: Set, Armed, or Active
Toggle Ground Mode On or Off
Traffic Menu
Traffic Audio
Shield Setup
Approach Mode
SET
Ground Mode

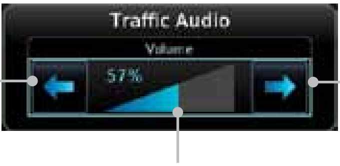
Figure 10-32 TCAD 9900BX Traffic Menu

2. Touch the desired key from the menu to make any settings.

10.8.3.1 Traffic Audio

Traffic Audio

1. While viewing the TCAD Control menu, touch the **Traffic Audio** key.


Traffic Audio
Volume
57%

Touch To Lower The Volume

Touch To Raise The Volume

Bar Graph Showing Volume Level

Figure 10-33 TCAD Traffic Audio

2. Touch the arrow keys to raise or lower the TCAD Traffic Audio level. The selected volume will be shown as a percentage value and graphically with a bar graph.

3. Touch the **Back** key to return to the TCAD Control menu.

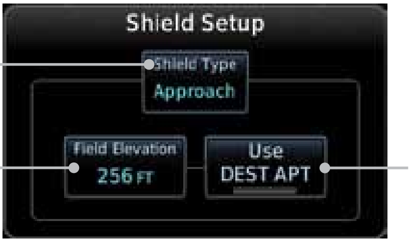
10.8.3.2 Shield Setup

The Shield Setup function allows you to select the Shield Type (mode of operation) and the size of the shield volume that will provide alerts when entered by aircraft.

Approach Shield Type

Shield Type
Approach

1. While viewing the TCAD Control menu, touch the **Shield Type** key and touch the Approach Shield Type.


Shield Setup
Shield Type
Approach
Field Elevation
256 FT
Use
DEST APT

Touch To Select Shield Type: Approach or Standard

Touch To Manually Set Field Elevation

Touch To Automatically Select The Destination Airport Field Elevation

Figure 10-34 TCAD 9900BX Shield Setup for Approach

Field Elevation

2. Touch the **Field Elevation** key.

Field Elevation
0 FT

3. With the **Use DEST APT** key deactivated (no green bar), touch the **Field Elevation** key to manually select the Field Elevation for traffic reporting. Use the keypad to select the elevation value.

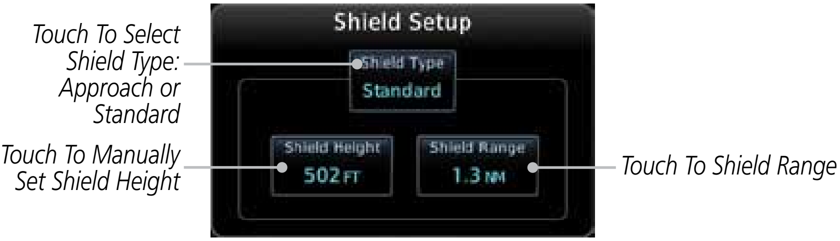
4. Touch the **Enter** key to accept the selected value. The selected value will be shown in the **Field Elevation** key.

5. Touch the **Use DEST APT** key to automatically use the field elevation of the destination airport of the active flight plan for traffic reporting.

NOTE: Activating the Use DEST APT feature automatically uses the elevation for the current destination airport for the TCAD. If no destination airport is present in the GTN system, the TCAD will not receive a field elevation and therefore not automatically enter approach mode.

En Route, Standard, or Terminal Shield Type

1. While viewing the TCAD Control menu, touch the **Shield Type** key and touch the desired Shield Type: Enroute, Standard, or Terminal.



Touch To Select Shield Type: Approach or Standard

Touch To Manually Set Shield Height

Touch To Shield Range

Figure 10-33 TCAD 9900BX Shield Setup for En Route, Standard, and Terminal

2. Touch the **Shield Height** key and use the keypad to select the Shield Height value. The selected value will be shown in the **Shield Range** key.

3. Touch the **Shield Range** key and use the keypad to select the Shield Range value. The selected value will be shown in the **Shield Range** key.

10.8.3.3 Approach Mode

1. While viewing the Traffic menu, touch the **Approach** key to activate Approach Mode TCAD traffic.

2. Touching the **Approach** key toggles Approach Mode between Set, Armed, or Active.

10.8.3.4 Ground Mode

1. While viewing the Traffic menu, touch the **Ground** key to activate Ground Mode TCAD traffic.
2. Touching the **Ground** key toggles Ground Mode between On and Off.

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11 TERRAIN

11.1 Terrain Configurations

During power-up of the GTN 7XX, the terrain/obstacle database versions are displayed along with a disclaimer. At the same time, the Terrain system self-test begins. A failure message is issued if the terrain test fails.

Garmin provides the following terrain awareness solutions within the GTN 7XX environment:

- Terrain Proximity - This is the standard Terrain function and refers to the display of the relative terrain elevations on the moving map. No aural alerts of any type are provided by a Terrain Proximity configuration.
- TAWS-B (Optional) - A system developed to meet the terrain alerting and ground proximity requirements for Class B TAWS systems as defined in TSO-C151b. Garmin's GTN 7XX Terrain Awareness and Warning System (TAWS-B) is an optional feature and is intended to provide the flight crew with both aural and visual alerts to aid in preventing inadvertent Controlled Flight Into Terrain (CFIT).

NOTE: Obstacles are removed from the Terrain and TAWS pages at ranges greater than 10 NM.

11.2 Terrain Proximity

Garmin Terrain Proximity is a non-TSO-C151b-certified terrain awareness system provided as a standard feature of GTN 7XX to increase situational awareness and help reduce controlled flight into terrain (CFIT). Terrain may be displayed on the Map and Terrain pages.

Terrain Proximity uses information provided from the GPS receiver to provide a horizontal position and altitude. GPS altitude is derived from satellite measurements. GPS altitude is converted to a Mean Sea Level (MSL)-based altitude (GSL altitude) and is used to determine Terrain alerts. GSL altitude accuracy is affected by factors such as satellite geometry, but it is not subject to variations in pressure and temperature that normally affect pressure altitude devices. GSL altitude does not require local altimeter settings to determine MSL altitude. Therefore, GPS altitude provides a highly accurate and reliable MSL altitude source to calculate terrain and obstacle alerts.

Terrain utilizes terrain and obstacle databases that are referenced to mean sea level (MSL). Using the GPS position and GSL altitude, Terrain displays a 2-D picture of the surrounding terrain and obstacles relative to the position and altitude of the aircraft. In this manner, Terrain Proximity can provide advanced alerts of predicted dangerous terrain conditions.

Terrain requires the following to operate properly:

- The system must have a valid 3-D GPS position solution.
- The system must have a valid terrain/obstacle database.

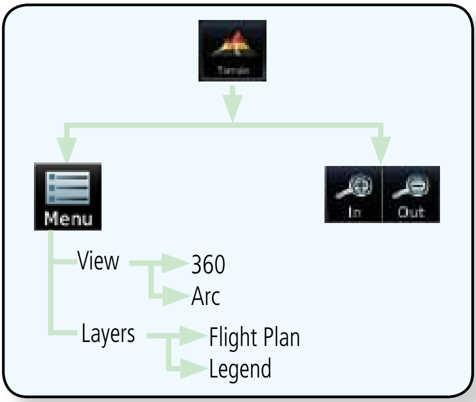


Figure 11-1 Terrain Proximity Page Functional Diagram

11.2.1 Displaying Terrain Proximity

The Terrain page is in the Terrain function.

1. Touch the **Terrain** key on the Home page.

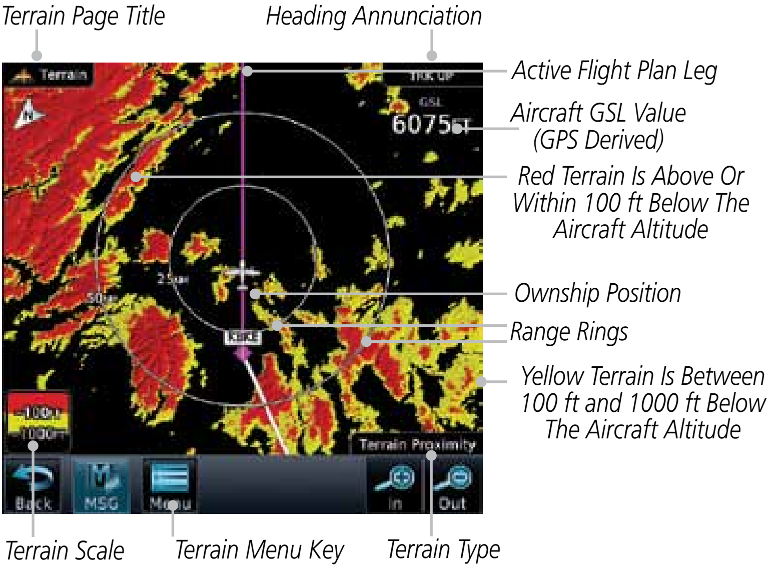

Terrain Page Title
Heading Annunciation
Active Flight Plan Leg
Aircraft GSL Value (GPS Derived)
Red Terrain Is Above Or Within 100 ft Below The Aircraft Altitude
Ownship Position
Range Rings
Yellow Terrain Is Between 100 ft and 1000 ft Below The Aircraft Altitude
Terrain Scale
Terrain Menu Key
Terrain Type
Terrain
TRK UP
GSL
6075FT
25nm
50nm
100ft
1000ft
Terrain Proximity
Back
MSG
Menu
In
Out

Figure 11-2 Terrain Page

2. Touch the **Menu** key for options.

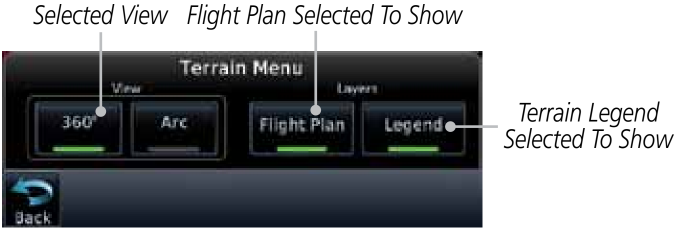

Selected View
Flight Plan Selected To Show
Terrain Legend Selected To Show
Terrain Menu
View
Layers
360°
Arc
Flight Plan
Legend
Back

Figure 11-3 Terrain Menu Options

11.2.1.1 Terrain Page 120° Arc or 360° Rings

Select the 120º Arc or 360º rings overlay for the Terrain page with either the **360** or **Arc** keys from the Menu.

Menu

1. While viewing the Terrain page, touch the **Menu** key.

360°

Arc

2. Touch the **360º** or **Arc** key.

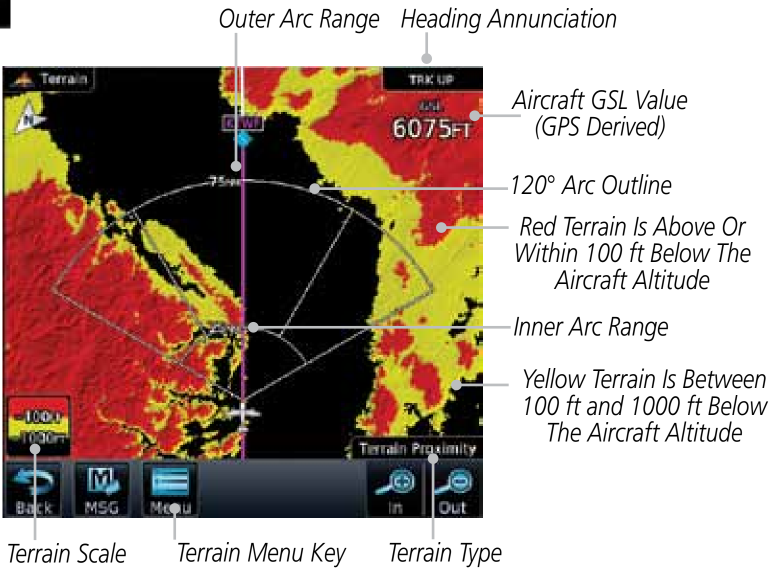

Outer Arc Range
Heading Annunciation
Aircraft GSL Value (GPS Derived)
120º Arc Outline
Red Terrain Is Above Or Within 100 ft Below The Aircraft Altitude
Inner Arc Range
Yellow Terrain Is Between 100 ft and 1000 ft Below The Aircraft Altitude
Terrain Scale
Terrain Menu Key
Terrain Type
Terrain
TRK UP
GSL
6075FT
75nm
100ft
1000ft
Terrain Proximity
Back
MSG
Menu
In
Out

Figure 11-4 Terrain 120° Arc View

11.2.1.2 Display Flight Plan on Terrain Page

Select the display of the active flight plan on the Terrain page.

Flight Plan

Touch the **Flight Plan** key to toggle the display of active flight plan on or off.

11.2.1.2 Display Terrain Legend

Select the display of the Terrain Legend on the Terrain page.

Legend

Touch the **Legend** key to toggle the display of the Terrain Legend on or off.

11.2.2 Terrain Limitations

Terrain Proximity displays terrain and obstructions relative to the altitude of the aircraft. The displayed alerts are advisory in nature only. Individual obstructions may be shown if available in the database. However, all obstructions may not be available in the database and data may be inaccurate. Terrain information should be used as an aid to situational awareness. Never use this information for navigation or to maneuver to avoid obstacles.

Terrain Proximity uses terrain and obstacle information supplied by government sources. The displayed information should never be understood as being all-inclusive.

***NOTE:** The data contained in the Terrain databases comes from government agencies. Garmin accurately processes and cross-validates the data but cannot guarantee the accuracy and completeness of the data.*

11.3 Terrain Awareness and Warning System (TAWS-B) Optional

TAWS (Terrain Awareness and Warning System) is an optional feature to increase situational awareness and aid in reducing controlled flight into terrain (CFIT). TAWS provides visual and aural annunciations when terrain and obstacles are within the given altitude threshold from the aircraft.

TAWS satisfies TSO-C151b Class B requirements for certification. Class B TAWS is required for all Part 91 turbine aircraft operations with six or more passenger seats and for Part 135 turbine aircraft operations with six to nine passenger seats (FAR Parts 91.223, 135.154).

11.3.1 TAWS-B Requirements

TAWS requires the following to operate properly:

- A valid terrain/obstacle database
- A valid 3-D GPS position solution

11.3.2 TAWS-B Limitations

NOTE: *The data contained in the TAWS databases comes from government agencies. Garmin accurately processes and cross-validates the data but cannot guarantee the accuracy and completeness of the data.*

TAWS displays terrain and obstructions relative to the altitude of the aircraft. Compliance with TAWS B alerts and warnings is MANDATORY. When a TAWS B "pull up" annunciation is issued, the pilot is required to pull up.

TAWS uses terrain and obstacle information supplied by government sources. Terrain information is based on terrain elevation information in a database that may contain inaccuracies. Individual obstructions may be shown if available in the database. The data undergoes verification by Garmin to confirm accuracy of the content, per TSO-C151b.

11.3.3 Computing GPS Altitude for TAWS

TAWS uses information provided from the GPS receiver to provide a horizontal position and altitude. GPS altitude is derived from satellite measurements. GPS altitude is converted to a Mean Sea Level (MSL)-based altitude (GSL altitude) and is used to determine TAWS alerts. GSL altitude accuracy is affected by factors such as satellite geometry, but it is not subject to variations in pressure and temperature that normally affect pressure altitude devices. GSL altitude does not require local altimeter settings to determine MSL altitude. Therefore, GPS altitude provides a highly accurate and reliable MSL altitude source to calculate terrain and obstacle alerts.

The terrain and obstacle databases used by TAWS are referenced to Mean Sea Level. Using the GPS position and GSL altitude, TAWS displays a 2-D picture of the surrounding terrain and obstacles relative to the position and altitude of the aircraft. Furthermore, the GPS position and GSL altitude are used to calculate and "predict" the aircraft's flight path in relation to the surrounding terrain and obstacles. In this manner, TAWS can provide advanced alerts of predicted dangerous terrain conditions.

11.3.4 Baro-Corrected Altitude Versus GSL Altitude

Baro-corrected altitude (or indicated altitude) is derived by adjusting the altimeter setting for local atmospheric conditions. The most accurate baro-corrected altitude can be achieved by frequently updating the altimeter setting to the nearest reporting station along the flight path. However, because actual atmospheric conditions seldom match the standard conditions defined by the International Standard Atmosphere (ISA) model (where pressure, temperature, and lapse rates have fixed values), it is common for the baro-corrected altitude (as read from the altimeter) to differ from the GSL altitude. This variation results in the aircraft's true altitude differing from the baro-corrected altitude.

11.3.5 Using TAWS

During unit power-up, the terrain/obstacle database versions are displayed. At the same time, TAWS self-test begins. One of the following aural messages is generated:

- *"TAWS System Test OK" (not given if the aircraft is on the ground)*
- *"TAWS System Failure"*

TAWS information can be displayed on the Map page. Terrain and obstacles with heights greater than 200 feet Above Ground Level (AGL) are displayed in yellow and red. The GTN 7XX adjusts colors automatically as the aircraft altitude changes.

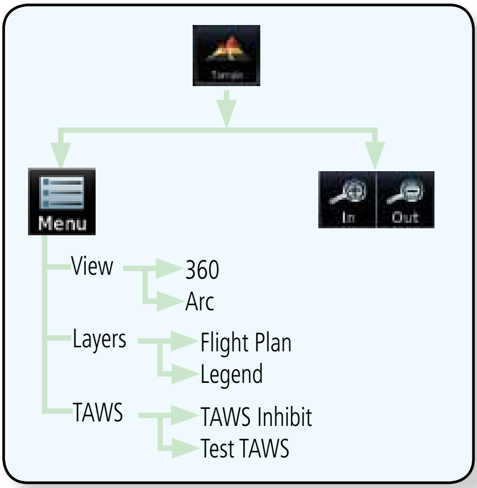


Figure 11-5 TAWS Page Functional Diagram

11.3.6 Displaying TAWS Data

TAWS uses yellow (caution) and red (warning) to depict terrain and obstacles alerts relative to aircraft altitude. Colors are adjusted automatically as the aircraft altitude changes. The colors and symbols shown below are used to represent terrain, obstacles, and potential impact points.

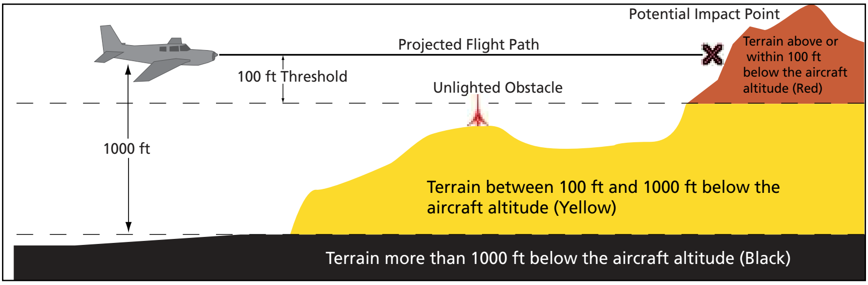

Potential Impact Point
Projected Flight Path
100 ft Threshold
Unlighted Obstacle
Terrain above or within 100 ft below the aircraft altitude (Red)
1000 ft
Terrain between 100 ft and 1000 ft below the aircraft altitude (Yellow)
Terrain more than 1000 ft below the aircraft altitude (Black)

Figure 11-6 Terrain Altitude/Color Correlation for Terrain Proximity

Obstacle Symbol	Unlighted Obstacle		Lighted Obstacle		Potential Impact Points	Terrain Color	Terrain/ Obstacle Location	Alert Level
	< 1000 ft AGL	> 1000 ft AGL	< 1000 ft AGL	> 1000 ft AGL				
	▲	⊥	✱	✱	✖	Red	Terrain/ Obstacle at or within 100 ft below current aircraft altitude	WARNING (Red)
	▲	⊥	✱	✱	✖	Yellow	Terrain/ Obstacle between 100 ft and 1000 ft below current aircraft altitude	CAUTION (Yellow)

Table 11-1 TAWS Terrain/Obstacle Colors and Symbology

11.3.7 TAWS Page

TAWS information is displayed on the Map and Terrain pages. The TAWS Page is specialized to show terrain, obstacle, and potential impact point data in relation to the aircraft's current altitude, without clutter from the basemap. Flight plan information (airports, VORs, and other NAVAIDs) included in the flight plan are displayed for reference. If an obstacle and the projected flight path of the aircraft intersect, the display automatically zooms in to the closest potential point of impact on the TAWS Page.

Aircraft orientation on this map is always heading up unless there is no valid heading. If orientation is not heading up, it will be track up. Two views are available relative to the position of the aircraft: the 360° default display and the radar-like ARC (120°) display. Map range is adjustable with the **In** and **Out** keys from 1 to 200 NM, as indicated by the map range rings (or arcs).

11.3.7.1 Terrain Page Layers

1. While viewing the Terrain page, touch the **Menu** key.

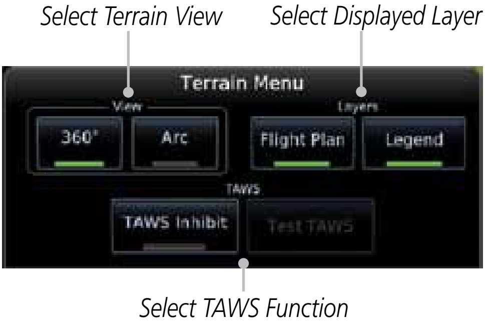

Select Terrain View
Select Displayed Layer
Terrain Menu
View
360°
Arc
Layers
Flight Plan
Legend
TAWS
TAWS Inhibit
Test TAWS
Select TAWS Function

Figure 11-7 Terrain Page Menu

2. Touch the **Flight Plan** key to toggle the display of the active flight plan.

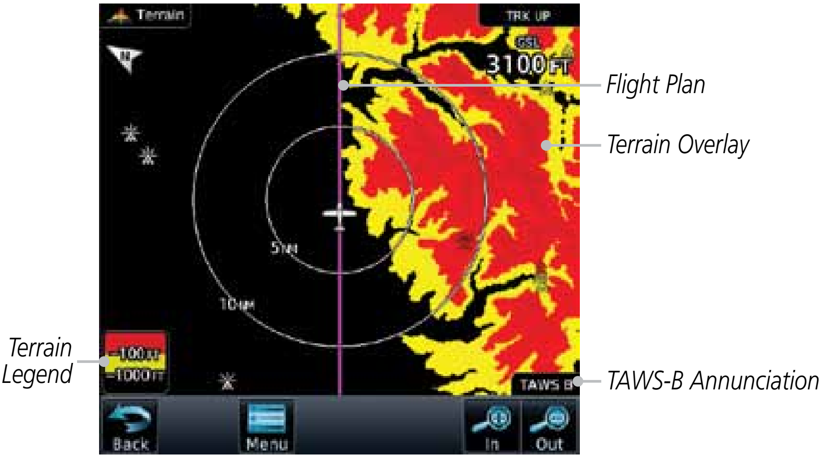

Terrain
TRK UP
GSL
3100FT
Flight Plan
Terrain Overlay
5NM
10NM
Terrain Legend
-100FT
-1000FT
TAWS B
TAWS-B Annunciation
Back
Menu
In
Out

Figure 11-8 Flight Plan and Legend Shown On Terrain Page

3. Touch the **Legend** key to toggle the display of the terrain legend.

11.3.7.2 Terrain Page View

Select the 120° Arc or 360° rings overlay for the Terrain page with either the **360** or **Arc** keys from the Menu.

1. While viewing the Terrain page, touch the **Menu** key.

2. Touch the **360°** or **Arc** key.

11.3.7.3 Terrain Page TAWS Selections

The TAWS selections allow you to inhibit aural TAWS alerts and to send a request to the TAWS equipment to run its internal tests.

1. While viewing the Terrain page, touch the **Menu** key.

TAWS Inhibit

2. Touch the **TAWS Inhibit** key to toggle the inhibiting of TAWS alerts.

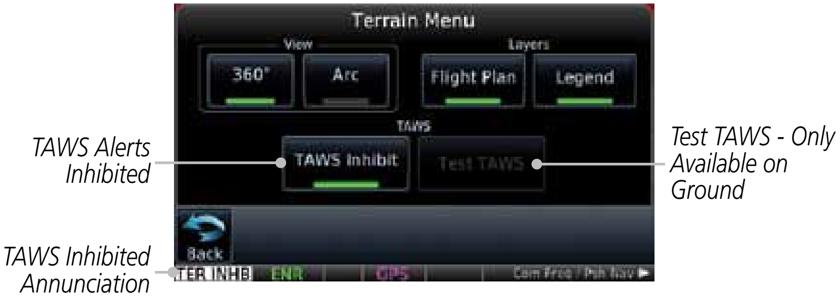

Terrain Menu
View
360°
Arc
Layers
Flight Plan
Legend
TAWS
TAWS Inhibit
Test TAWS
Back
TER INHB
ENR
GPS
Com Freq / Psh Nav
TAWS Alerts Inhibited
TAWS Inhibited Annunciation
Test TAWS - Only Available on Ground

Figure 11-9 TAWS Alerts Inhibited Selected

Test TAWS

3. Touch the **Test TAWS** key to test the TAWS system. This function is not available when the aircraft is in the air.

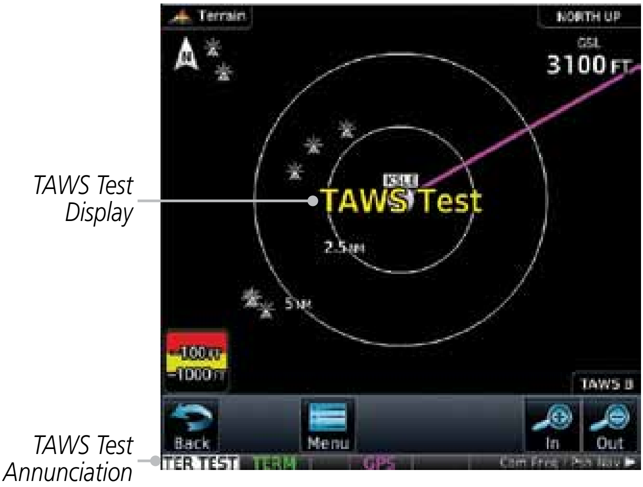
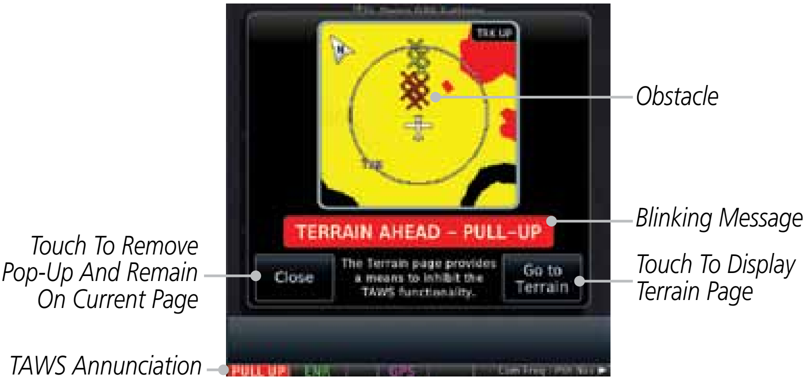

Terrain
NORTH UP
GSL
3100 FT
TAWS Test
2.5 NM
5 NM
100 FT
-1000 FT
TAWS B
Back
Menu
In
Out
TER TEST
TERM
GPS
Com Freq / Pilot Nav
TAWS Test Display
TAWS Test Annunciation

Figure 11-10 TAWS Test Selected

11.3.8 TAWS Alerts

Alerts are issued when flight conditions meet parameters that are set within TAWS software algorithms. When an alert is issued, visual annunciations are displayed and aural alerts are simultaneously issued. TAWS alert types are shown in the TAWS Alerts Summary with corresponding annunciations and aural messages.

When an alert is issued, annunciations appear on the TAWS page. If the TAWS page is not displayed at the time, a pop-up alert appears on the page being viewed.



TERRAIN AHEAD - PULL-UP

The Terrain page provides a means to inhibit the TAWS functionality.

TRK UP
Close
Go to Terrain
PULL UP
GPS
Obstacle
Blinking Message
Touch To Display Terrain Page
Touch To Remove Pop-Up And Remain On Current Page
TAWS Annunciation

Figure 11-11 Terrain Alert Pop-Up

To acknowledge the pop-up alert:

Go to
Terrain

Touch the **Go to Terrain** key (accesses the TAWS Page)

OR

Touch the **Close** key to remove the pop-up alert

If the pilot takes no action, the pop-up will be removed when the alert is no longer active.

11.3.8.1 TAWS-B Alerting Colors and Symbology

Color and symbols are also associated with TAWS alerts. The alert annunciations show in the bottom left corner of the display. The three TAWS alert levels and their associated text coloring as well as any associated symbology are shown in the following table.

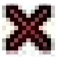
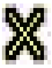
Alert Level	Annunciator Text	Potential Impact Point Symbol	Example Visual Annunciation
Warning	White text on red background		PULL UP
Caution	Black text on yellow background		TERRAIN
Informational	Black text on white background	Not Applicable	TER INHB

Table 11-2 TAWS Alert Colors and Symbology

Alert Type	Alert Annunciation	Aural Message
Excessive Descent Rate Warning (EDR-W)	PULL UP	"Pull Up"
FLTA Terrain Warning (RTC-W, ITI-W)	PULL UP	"Terrain Ahead, Pull Up; Terrain Ahead, Pull Up"* or "Terrain, Terrain; Pull Up, Pull Up"
FLTA Obstacle Warning (ROC-W, IOI-W)	PULL UP	"Obstacle Ahead, Pull Up; Obstacle Ahead, Pull Up"* or "Obstacle, Obstacle; Pull Up, Pull Up"
FLTA Terrain Caution (RTC-C, ITI-C)	TERRAIN	"Terrain Ahead; Terrain Ahead"* or "Caution, Terrain; Caution, Terrain"
FLTA Obstacle Caution (ROC-C, IOI-C)	OBSTCL	"Obstacle Ahead; Obstacle Ahead"* or "Caution, Obstacle; Caution, Obstacle"
Premature Descent Alert Caution (PDA)	TERRAIN	"Too Low, Terrain"
Voice Callout (VCO-500)	None	"Five-Hundred"
Excessive Descent Rate Caution (EDR-C)	TERRAIN	"Sink Rate"
Negative Climb Rate Caution (NCR-C)	TERRAIN	"Don't Sink"* or "Too Low, Terrain"

* *Alerts with multiple messages are configurable at installation and are installation-dependent. Alerts for the default configuration are indicated with asterisks.*

Table 11-3 TAWS-B Alerts Summary

11.3.8.2 Excessive Descent Rate Alert

The purpose of the **Excessive Descent Rate (EDR)** alert is to provide notification when the aircraft is determined to be descending upon terrain at an excessive rate. The parameters for the alert as defined by TSO-C151b are shown below.

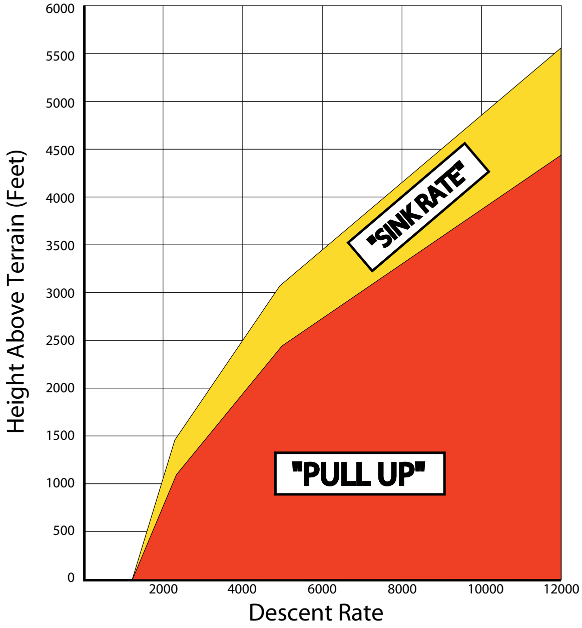


Figure 11-12 Excessive Descent Rate Alert Criteria

11.3.8.3 Forward Looking Terrain Avoidance

Reduced Required Terrain Clearance (RTC) and **Reduced Required Obstacle Clearance (ROC)** alerts are issued when the aircraft flight path is above terrain, yet is projected to come within the minimum clearance values in the FLTA Alert Minimum Terrain and Obstacle Clearance Values table. When an RTC alert and/or a ROC is issued, a potential impact point is displayed on the TAWS Page.

Imminent Terrain Impact (ITI) and **Imminent Obstacle Impact (IOI)** alerts are issued when the aircraft is below the elevation of a terrain or obstacle cell in the aircraft's projected path. ITI and IOI alerts are accompanied by a potential impact point displayed on the TAWS Page. The alert is annunciated when the projected vertical flight path is calculated to come within minimum clearance altitudes in the following table.

Flight Phase	Minimum Clearance Altitude (feet)	
	Level Flight	Descending
En Route	700	500
Terminal	350	300
Approach	150	100
Departure	100	100

Table 11-4 FLTA Alert Minimum Terrain and Obstacle Clearance Values

During final approach, FLTA alerts are automatically inhibited when the aircraft is below 200 feet AGL while within 0.5 NM of the approach runway or below 125 feet AGL while within 1.0 NM of the runway threshold.

11.3.8.4 Premature Descent Alerting

A Premature Descent Alert (PDA) is issued when the system detects that the aircraft is significantly below the normal approach path to a runway.

PDA alerting begins when the aircraft is within 15 NM of the destination airport and ends when the aircraft is either 0.5 NM from the runway threshold or is at an altitude of 125 feet AGL while within 1.0 NM of the threshold. During the final descent, algorithms set a threshold for alerting based on speed, distance, and other parameters.

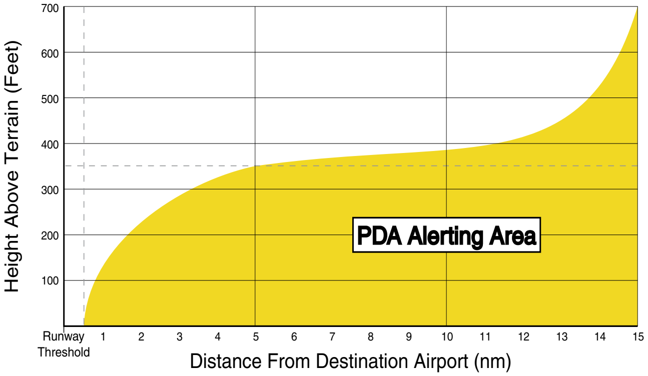
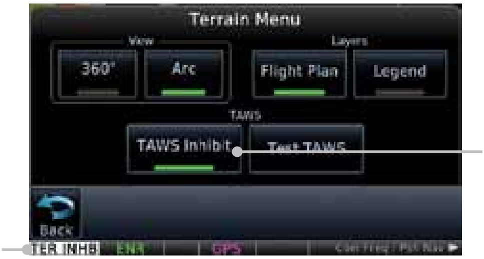


Figure 11-13 PDA Alerting Threshold

PDA and FLTA aural and visual alerts can be manually inhibited. Discretion should be used when inhibiting TAWS and the system should be enabled when appropriate. When TAWS is inhibited, the alert annunciation “TER INHB” is shown.

11.3.8.5 Inhibiting/Enabling TAWS Alerting

TAWS also has an inhibit mode that deactivates the PDA/FLTA aural and visual alerts. Pilots should use discretion when inhibiting TAWS and always remember to enable the system when appropriate. Only the PDA and FLTA alerts are disabled in the inhibit mode. After cycling power, TAWS will no longer be inhibited.



Touch To Toggle TAWS Inhibit. TAWS Inhibited shown.

Terrain (TAWS) Inhibited Annunciation

Figure 11-14 TAWS Alerting Disabled (TAWS Inhibited) Annunciation

1. While viewing the Terrain page, touch the **Menu** key.
2. Touch the **TAWS Inhibit** key to inhibit or enable TAWS (choice dependent on current state). A green bar in the key indicates the TAWS is inhibited.

11.3.8.6 Negative Climb Rate After Take-Off Alert (NCR)

The **Negative Climb Rate (NCR) After Take-Off** alert (also referred to as "Altitude Loss After Take-Off") provides alerts when the system determines the aircraft is losing altitude (closing upon terrain) after takeoff. The aural message "Don't Sink" is given for NCR alerts, accompanied by an annunciation and a pop-up terrain alert on the display. NCR alerting is only active when departing from an airport and when the following conditions are met:

- Height above the terrain is less than 700 feet
- Distance from the departure airport is 2 NM or less
- Heading change from the departure heading is less than 110°

The NCR alerting parameters as defined by TSO-C151b are shown below.

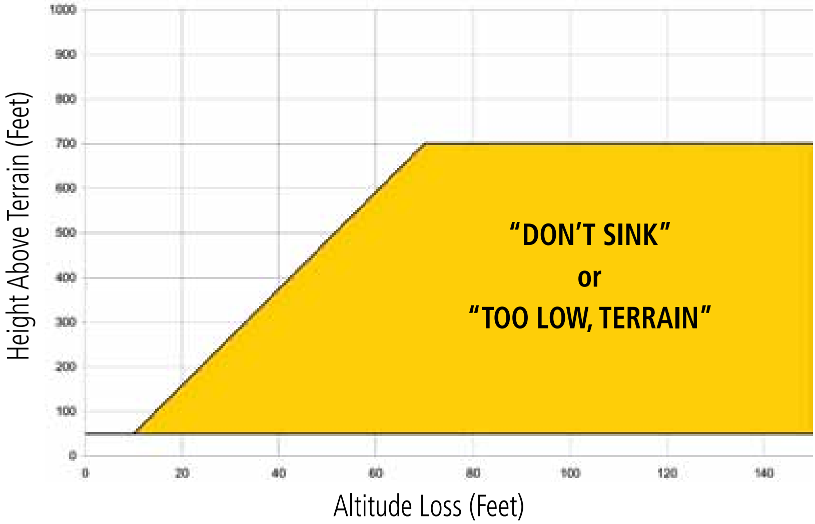


Figure 11-15 Negative Climb Rate (NCR) Altitude Loss

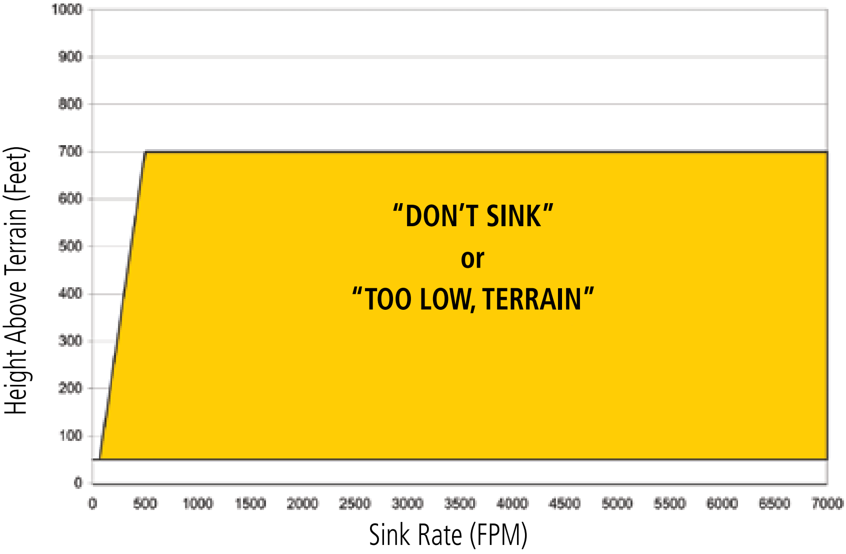


Figure 11-16 Negative Climb Rate (NCR) Sink Rate

11.3.8.7 TAWS Not Available Alert

TAWS requires a 3-D GPS position solution along with specific vertical accuracy minimums. Should the position solution become degraded or if the aircraft is out of the database coverage area, the annunciation "TAWS N/A" is generated in the annunciation window and on the TAWS page. The aural message "TAWS Not Available" is generated. When the GPS signal is re-established and the aircraft is within the database coverage area, the aural message "TAWS Available" is generated (when the aircraft is airborne).

11.3.8.8 TAWS Failure Alert

TAWS continually monitors several system-critical items such as database validity, hardware status, and GPS status. If the terrain/obstacle database is not available, the aural message "TAWS System Failure" is generated along with a "TAWS FAIL" annunciation.

11.3.9 TAWS System Status

During power-up, TAWS conducts a self-test of its aural and visual annunciations. The system test can also be manually initiated. An aural alert is issued at test completion. TAWS System Testing is disabled when ground speed exceeds 30 knots.

Alert Type	Alert Annunciation	Aural Message
TAWS Available	None	"TAWS Available"
TAWS System Test in Progress	TER TEST	None
TAWS System Test Pass	None	"TAWS System Test OK"
TAWS N/A	TER N/A	TAWS Not Available
TAWS Alerting is Disabled	TER INHB	None
TAWS System Test Fail	TER FAIL	"TAWS System Failure"

Table 11-5 TAWS-B System Test Status Annunciations

This page intentionally left blank

12 WEATHER

Weather data are displayed by the Weather function when an optional weather source is installed. The Wx Weather pages may be oriented to Track Up, Heading Up, or North Up.

When more weather products are installed, a key for each product will be shown. Touch the key for the desired weather product. When a single weather product is installed, touching the **Weather** key will go directly to the Weather page.

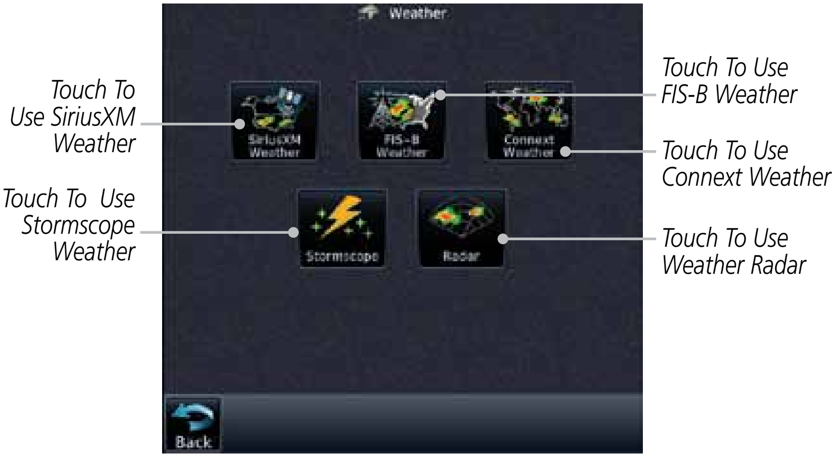

Weather
Touch To Use SiriusXM Weather
Touch To Use Stormscope Weather
Touch To Use FIS-B Weather
Touch To Use Connext Weather
Touch To Use Weather Radar
SiriusXM Weather
FIS-B Weather
Connext Weather
Stormscope
Radar
Back

Figure 12-1 Weather Product Selection

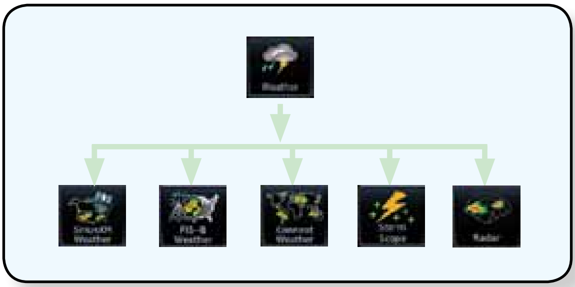


Figure 12-2 Weather Page Functional Diagram

***NOTE:** In data link weather, Temporary Flight Restrictions (TFRs) and Notices to Airmen (NOTAMs) that do not have geographical locations cannot be viewed on the GTN.*

***WARNING:** Do not use data link weather information for maneuvering in, near, or around areas of hazardous weather. Information contained within data link weather products may not accurately depict current weather conditions.*

***NOTE**: Do not rely solely upon data link services to provide Temporary Flight Restriction (TFR) information. Always confirm TFR information through official sources such as Flight Service Stations or Air Traffic Control.*

12.1 SiriusXM Weather Products (Optional)

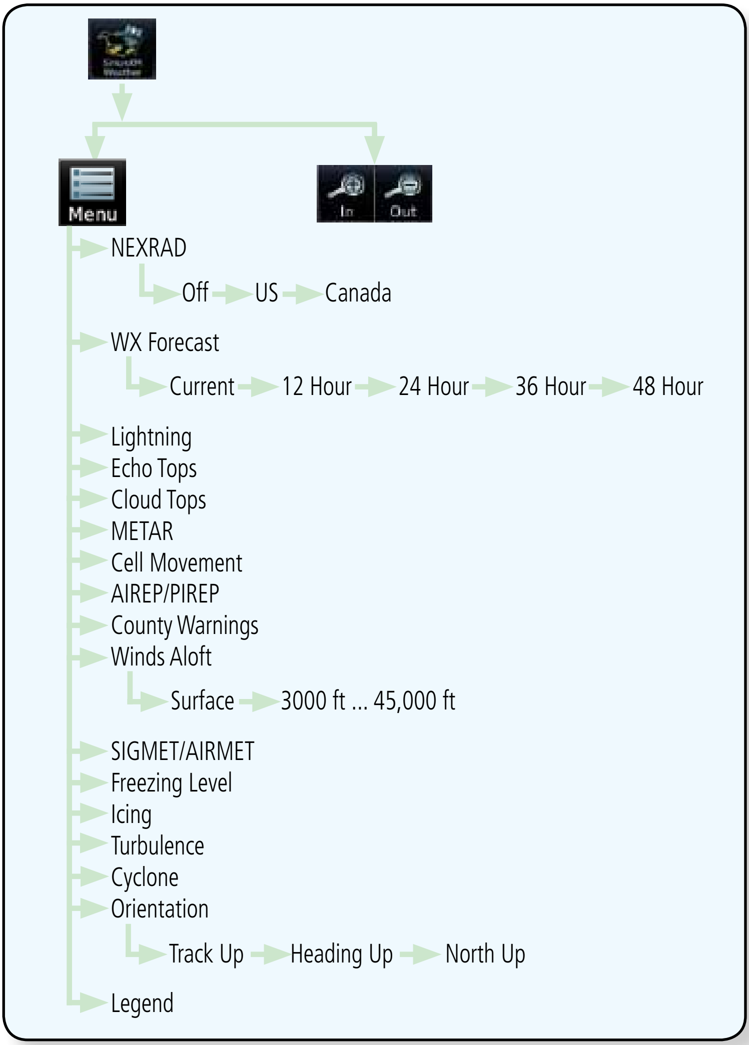
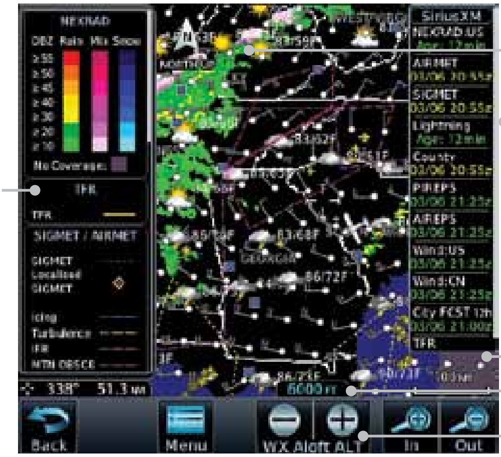

SiriusXM Weather
Menu
In
Out
NEXRAD
Off
US
Canada
WX Forecast
Current
12 Hour
24 Hour
36 Hour
48 Hour
Lightning
Echo Tops
Cloud Tops
METAR
Cell Movement
AIREP/PIREP
County Warnings
Winds Aloft
Surface
3000 ft ... 45,000 ft
SIGMET/AIRMET
Freezing Level
Icing
Turbulence
Cyclone
Orientation
Track Up
Heading Up
North Up
Legend

Figure 12-3 SiriusXM Weather Functional Diagram

12.1.1 Displaying SiriusXM Weather

To display SiriusXM Weather touch the **Weather** key on the Home page.

1. Touch the **Weather** key on the Home page and then touch the **SiriusXM** key.


NEXRAD
DBZ Rain Mix Snow
>55
>50
>45
>40
>30
>20
>10
No Coverage
TFR
SIGMET / AIRMET
SIGMET
Localized SIGMET
Icing
Turbulence
IFR
MTN OBSCR
SiriusXM
NEXRAD US
AIRMET
SIGMET
Lightning
County
PIREPS
AIREPS
Wind:US
Wind:CN
City FCST 12h
TFR
338° 51.3 NM
5000 FT
Back
Menu
WX Aloft ALT
In
Out

NEXRAD Weather

Age Of Selected Weather Products

Weather Product Legends

Out Of Coverage Area

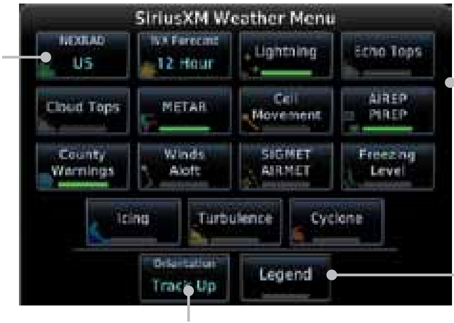
Selected Altitude

Touch + or - To Select Altitude

Figure 12-4 SiriusXM Weather Page

2. While viewing the Data Link weather page, touch the **Menu** key to configure the Data Link Weather page.

Touch NEXRAD Key To Select Off, US, or Canada NEXRAD


SiriusXM Weather Menu
NEXRAD US
WX Forecast 12 Hour
Lightning
Echo Tops
Cloud Tops
METAR
Cell Movement
AIREP PIREP
County Warnings
Winds Aloft
SIGMET AIRMET
Freezing Level
Icing
Turbulence
Cyclone
Orientation Track Up
Legend

Touch Keys To Select Weather Product. Green Bar Indicates Selected Product.

Touch Legend Key To Display Legend

Weather Overlay Map Orientation

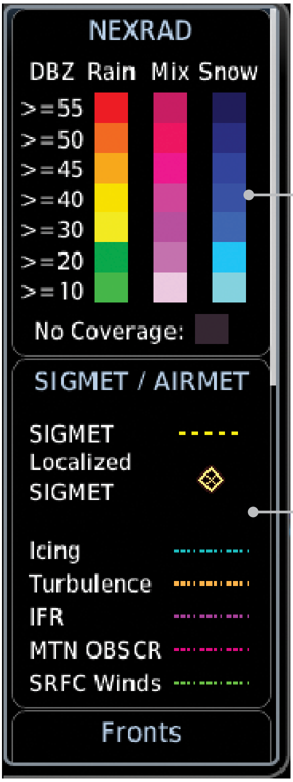
Figure 12-5 SiriusXM Weather Menu

3. Once you selected what items you want to display, touch **BACK** to return to the Data Link Weather page.

12.1.2 Weather Legend

The **Legend** key displays a pop-up legend of the currently displayed weather products.

1. While viewing the Data Link Weather menu, touch the **Legend** key.


NEXRAD
DBZ Rain Mix Snow
>=55
>=50
>=45
>=40
>=30
>=20
>=10
No Coverage:
SIGMET / AIRMET
SIGMET
Localized SIGMET
Icing
Turbulence
IFR
MTN OBSCR
SRFC Winds
Fronts

Legend Of Selected Weather Products

Touch Legend And Slide Finger Up And Down To Scroll Legend

Figure 12-6 Weather Legend Display

2. Touch the Legend area of the display and while maintaining light pressure against the display, drag your finger up or down to scroll through the legend display for the selected weather products, or use the **Up/Down** keys.

3. Touch the **Legend** key again to remove the Legend.

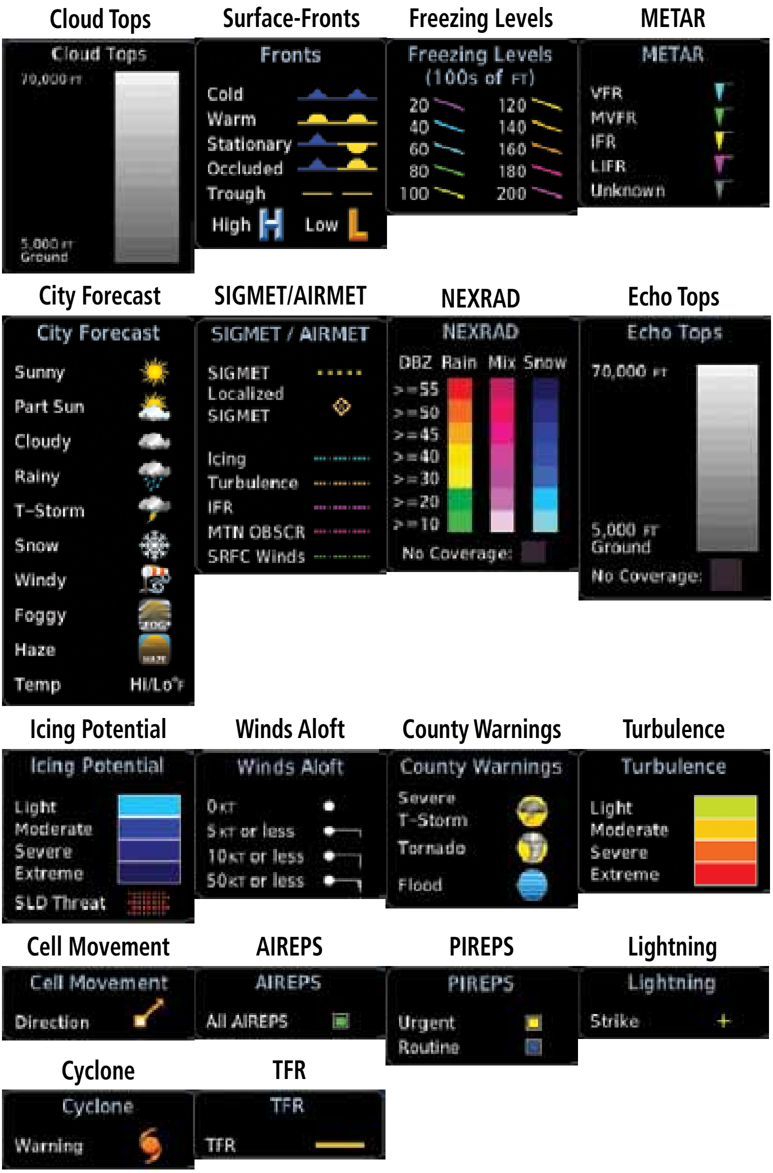

Cloud Tops
Surface-Fronts
Freezing Levels
METAR
City Forecast
SIGMET/AIRMET
NEXRAD
Echo Tops
Icing Potential
Winds Aloft
County Warnings
Turbulence
Cell Movement
AIREPS
PIREPS
Lightning
Cyclone
TFR
Cloud Tops
70,000 FT
5,000 FT
Ground
Fronts
Cold
Warm
Stationary
Occluded
Trough
High
Low
Freezing Levels (100s of FT)
20
40
60
80
100
120
140
160
180
200
METAR
VFR
MVFR
IFR
LIFR
Unknown
City Forecast
Sunny
Part Sun
Cloudy
Rainy
T-Storm
Snow
Windy
Foggy
Haze
Temp
Hi/Lo°F
SIGMET / AIRMET
SIGMET
Localized SIGMET
Icing
Turbulence
IFR
MTN OBSCR
SRFC Winds
NEXRAD
DBZ
Rain
Mix
Snow
>=55
>=50
>=45
>=40
>=30
>=20
>=10
No Coverage:
Echo Tops
70,000 FT
5,000 FT
Ground
No Coverage:
Icing Potential
Light
Moderate
Severe
Extreme
SLD Threat
Winds Aloft
0 KT
5 KT or less
10 KT or less
50 KT or less
County Warnings
Severe T-Storm
Tornado
Flood
Turbulence
Light
Moderate
Severe
Extreme
Cell Movement
Direction
AIREPS
All AIREPS
PIREPS
Urgent
Routine
Lightning
Strike
Cyclone
Warning
TFR
TFR

Figure 12-7 Available Weather Legends

12.1.3 Weather Map Orientation

Menu

Orientation
Heading Up

1. While viewing the Weather Data Link function, touch the **Menu** key.
2. Touch the **Orientation** key to toggle the map view orientation choices of North Up, Track Up, and Heading Up.

12.1.4 SiriusXM Weather Symbols and Product Age

When a weather product is active on the Map function or the Weather Data Link function is selected, the age of the data is displayed on the screen. The age of the data may not indicate the time between the current GPS time and the time when the data is assembled, but rather a general indication of the time elapsed from when the data is received by the GTN.

Updated weather data may or may not contain new weather data. Weather data is refreshed at intervals that are defined and controlled by SiriusXM Satellite Radio and its data vendors.

If for any reason, a weather product is not refreshed within the designated intervals, the data is considered expired and is removed from the display. This ensures that the displayed data is consistent with what is currently being broadcast by SiriusXM Satellite Radio services. If more than half of the designated time has elapsed from the time the data is received, the color of the product age displayed changes to yellow.

WARNING: *Do not use the indicated data link weather product age to determine the age of the weather information shown by the data link weather product. Due to time delays inherent in gathering and processing weather data for data link transmission, the weather information shown by the data link weather product may be significantly older than the indicated weather product age.*

The following table contains the expiration time and XM broadcast interval.

The expiration time is an elapsed time after which the data is considered expired and is removed from the display. This ensures that the displayed data is consistent with what is currently being broadcast by SiriusXM Satellite Radio services. If more than half of the expiration time has elapsed from the time the data is received, the color of the product age displayed changes to yellow.

The SiriusXM Weather broadcast interval is the time interval when SiriusXM Satellite Radio broadcasts new signals that may or may not contain new weather data. Weather data is broadcast at intervals that are defined and controlled by SiriusXM Satellite Radio.

NOTE: *SiriusXM Weather does not provide a timestamp for AIRMETs, SIGMETs, City Forecasts, County Warnings, Cell Movement and TFR products. Therefore, the unit does not display a product age indication for these products.*

NOTE: *The unit displays valid times on the weather map in lieu of product age indications for SiriusXM Weather Icing Potential, Winds Aloft, and Turbulence weather products.*

NOTE: *The unit displays product age for SiriusXM Weather Freezing Level and Canada Winds Aloft weather products. The product age indication represents the number of minutes that have elapsed since the weather product was created by SiriusXM Weather. The unit does not display the valid times assigned to the information within these products.*

Weather Product	Expiration Time (Minutes)	Broadcast Rate (Minutes)
NEXRAD (NEXRAD and Echo Top are Mutually Exclusive)	30	5 (U.S.) 10 (Canada)
Echo Top (Cloud Top and Echo Top Mutually Exclusive) (NEXRAD and Echo Top Mutually Exclusive)	30	7.5
Cloud Top (Cloud Top and Echo Top Mutually Exclusive)	60	15
SiriusXM Lightning	30	5
Cell Movement	30	1.25
SIGMETs / AIRMETs	60	12
METARs	90	12
WX Forecast	60	12
Freezing Levels	60	12
Winds Aloft	60	12
County Warnings	60	5
Cyclone Warnings	60	12
Icing Potential (Icing) (SLD)	90	22
Pilot Weather Report (PIREP) (Blue - Regular, Yellow - Urgent)	90	12
Air Report (AIREP)	90	12

Weather Product	Expiration Time (Minutes)	Broadcast Rate (Minutes)
Turbulence	180	12
Radar Coverage	30	5
Temporary Flight Restriction (TFR)	60	12
Terminal Aerodrome Forecast (TAF)	60	12

Table 12-1 SiriusXM Weather Products and Data Timing

Symbol	Description
🌊	Flood
⛈	Severe Thunderstorm
🌪	Tornado
☀	Sunny
⛅	Part Sun
☁	Cloudy
🌧	Rainy
⛈	T-Storm
❄	Snow
🌬	Windy
FOG	Foggy
🌫	Haze
__/__F	High/Low Temp

Table 12-2 Weather Symbols

12.1.5 NEXRAD

WSR-88D, or NEXRAD (NEXt-generation RADar), is a network of 158 high-resolution Doppler radar systems that are operated by the National Weather Service (NWS). NEXRAD data provides centralized meteorological information for the continental United States and selected overseas locations. The maximum range of a single NEXRAD radar site is 250 NM. The NEXRAD network provides important information about severe weather for air traffic safety.

NEXRAD data is not real-time. The lapsed time between collection, processing, and dissemination of NEXRAD images can be significant and may not reflect the current radar synopsis. Due to the inherent delays and the relative age of the data, it should be used for long-range planning purposes only. Never use NEXRAD data for maneuvering in, near, or around areas of hazardous weather. Instead, use it in an early-warning capacity of pre-departure and en route evaluation.

Composite data from all the NEXRAD radar sites in the United States is shown. This data is composed of the maximum reflectivity from the individual radar sweeps. The display of the information is color-coded to indicate the weather severity level.

***NOTE:** Due to similarities in color schemes, the display of Echo Tops cannot be shown with Cloud Tops and NEXRAD.*

1. While viewing the SiriusXM Weather menu, touch the **NEXRAD** key to step through the NEXRAD selections.

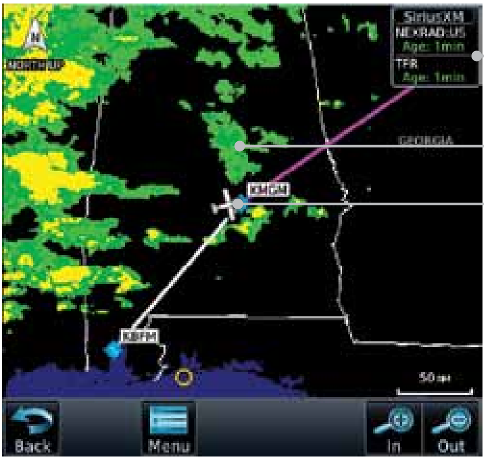
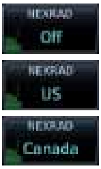
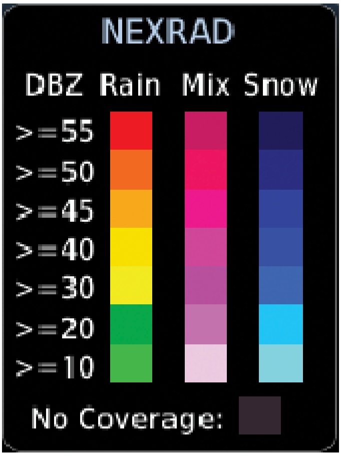


Figure 12-8 SiriusXM NEXRAD Weather



2. Repeated touches to the **NEXRAD** key will toggle between the Off, US, and Canada selections.



NEXRAD

DBZ	Rain	Mix	Snow
>=55	🟥	🟪	🟦
>=50	🟧	🟪	🟦
>=45	🟧	🟪	🟦
>=40	🟨	🟪	🟦
>=30	🟨	🟪	🟦
>=20	🟩	🟪	🟦
>=10	🟩	🟪	🟦

No Coverage: ⬛

Figure 12-9 NEXRAD Weather Legend

12.1.5.1 Reflectivity

Reflectivity is the amount of transmitted power returned to the radar receiver. Colors on the NEXRAD display directly correlate to the level of detected reflectivity. Reflectivity as it relates to hazardous weather can be very complex.

The role of radar is essentially to detect moisture in the atmosphere. Simply put, certain types of weather reflect radar better than others. The intensity of a radar reflection is not necessarily an indication of the weather hazard level. For instance, wet hail returns a strong radar reflection, while dry hail does not. Both wet and dry hail can be extremely hazardous.

The different NEXRAD echo intensities are measured in decibels (dB) relative to reflectivity (Z). NEXRAD measures the radar reflectivity ratio, or the energy reflected back to the radar receiver (designated by the letter Z). The value of Z increases as the returned signal strength increases.

12.1.5.2 NEXRAD Limitations

NEXRAD radar images may have certain limitations:

- NEXRAD base reflectivity does not provide sufficient information to determine cloud layers or precipitation characteristics. For example, it is not possible to distinguish between wet snow, wet hail, and rain.
- NEXRAD base reflectivity is sampled at the minimum antenna elevation angle. An individual NEXRAD site cannot depict high altitude storms at close ranges. It has no information about storms directly over the site.
- Each square block on the display represents an area of four square kilometers (2.15 NM). The intensity level reflected by each square represents the highest level of NEXRAD data sampled within the area.

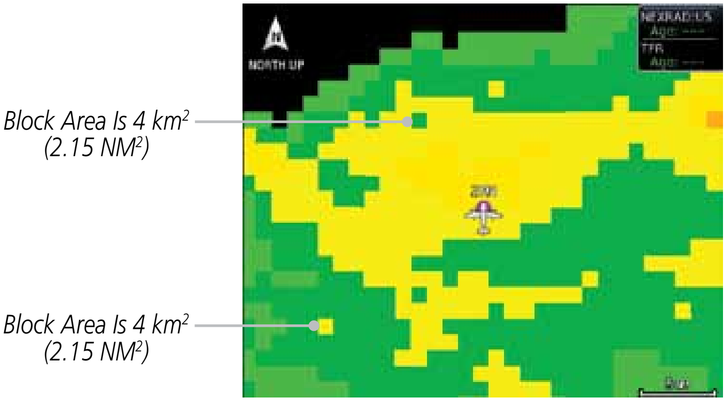

Block Area Is 4 km^2 (2.15 NM^2)
Block Area Is 4 km^2 (2.15 NM^2)
NORTH UP
NEXRAD-US
TFR

Figure 12-10 NEXRAD Data Blocks

The following may cause abnormalities in displayed NEXRAD radar images:

- Ground clutter
- Strobes and spurious radar data
- Sun strobes (when the radar antenna points directly at the sun)
- Interference from buildings or mountains, which may cause shadows
- Metallic dust from military aircraft, which can cause alterations in radar scans

NEXRAD Limitations (Canada)

- Radar coverage extends to 55°N.
- Any precipitation displayed between 52°N and 55°N is displayed as mixed because it is unknown.

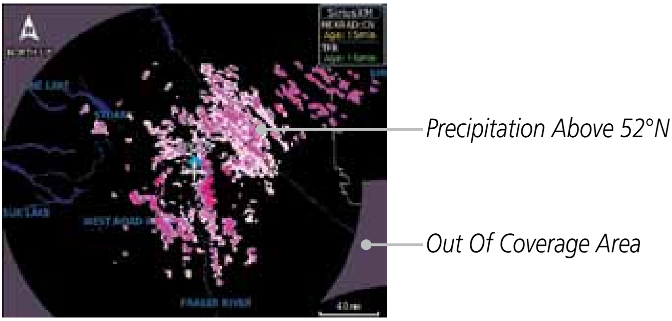


Figure 12-11 NEXRAD Data - Canada

12.1.6 Echo Tops

Echo Tops data shows the location, elevation, and direction of the highest radar echo. The highest radar echo does not indicate the top of a storm or clouds; rather it indicates the highest altitude at which precipitation is detected. This information is determined from NEXRAD data.

***NOTE:** Due to similarities in color schemes, the display of Echo Tops cannot be shown with Cloud Tops and NEXRAD.*

1. While viewing the Data Link Weather menu, touch the **Echo Tops** key.

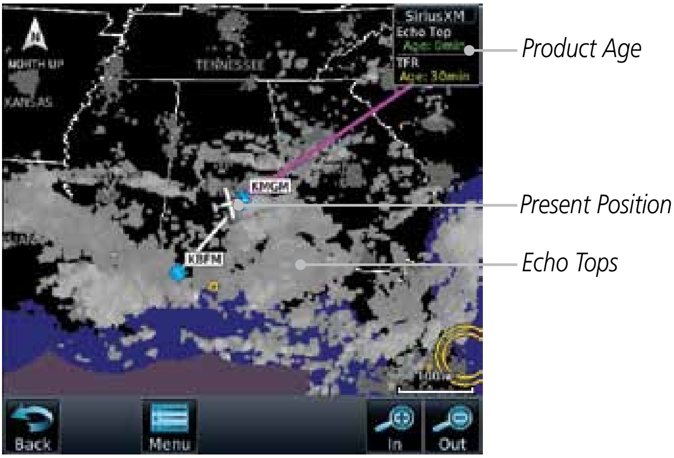

SiriusXM
Echo Top
Age: 0min
TFR
Age: 30min
NORTH UP
TENNESSEE
KANSAS
KMGM
KBFM
Back
Menu
In
Out
Product Age
Present Position
Echo Tops

Figure 12-12 Echo Tops

2. Touch the **Echo Tops** key again to turn it off.

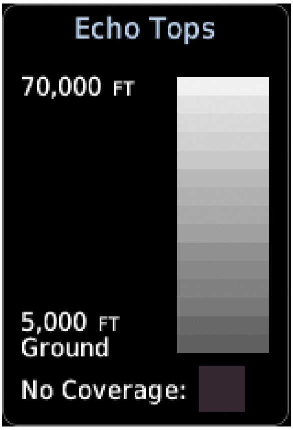

Echo Tops
70,000 FT
5,000 FT
Ground
No Coverage:

Figure 12-13 Echo Tops Legend

12.1.7 Cloud Tops

***NOTE:** Due to similarities in color schemes, it is not possible to display Echo Tops and Cloud Tops at the same time.*

Cloud tops data depicts cloud top altitudes as determined from satellite imagery.

1. While viewing the Data Link Weather menu, touch the **Cloud Tops** key.

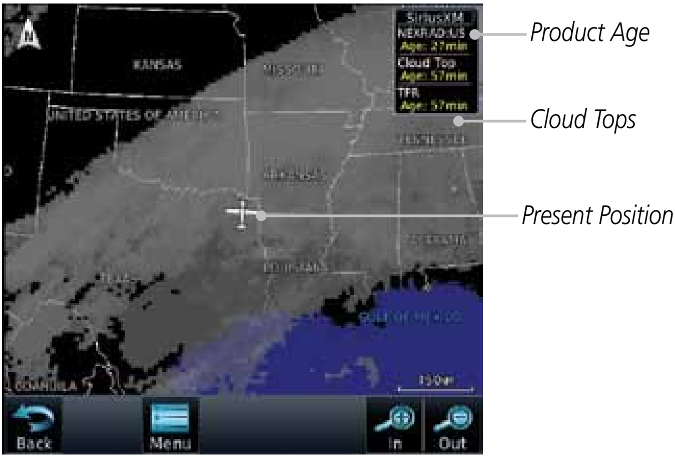

SiriusXM
NEXRAD-US
Age: 27min
Cloud Top
Age: 57min
TFR
Age: 57min
KANSAS
MISSOURI
UNITED STATES OF AMERICA
COAHUILA
Back
Menu
In
Out
Product Age
Cloud Tops
Present Position

Figure 12-14 Cloud Tops

2. Touch the **Cloud Tops** key again to turn it off.

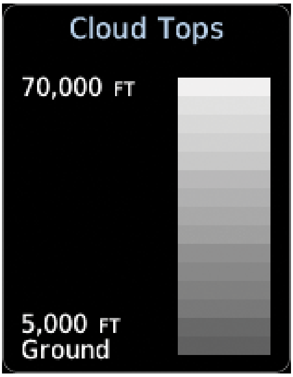

Cloud Tops
70,000 FT
5,000 FT
Ground

Figure 12-15 Cloud Tops Legend

12.1.8 Cell Movement

Cell Movement data shows the location and movement of storm cells as identified by a ground-based system. Cells are represented by yellow squares, with direction of movement indicated with short, orange arrows.

1. While viewing the Data Link Weather menu, touch the **Cell Movement** key.

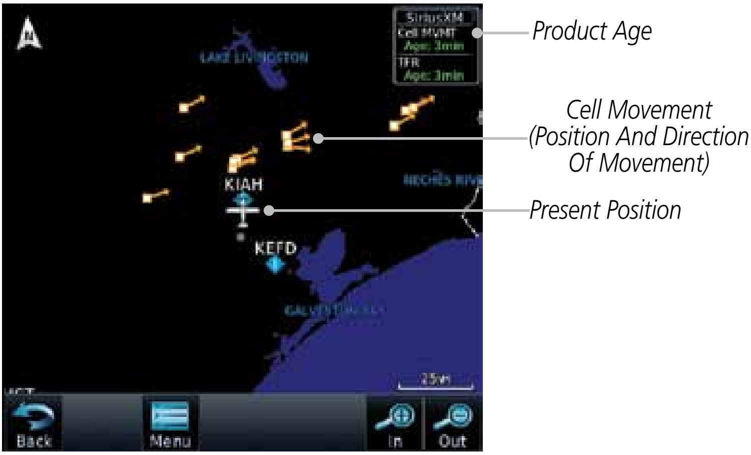

SiriusXM
Cell MVMT
Age: 3min
TFR
Age: 3min
LAKE LIVINGSTON
KIAH
NECHES RIV
KEFD
GALVESTON
25nm
Back
Menu
In
Out
Product Age
Cell Movement (Position And Direction Of Movement)
Present Position

Figure 12-16 Cell Movement

2. Touch the **Cell Movement** key again to turn it off.

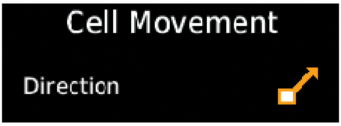

Cell Movement
Direction

Figure 12-17 Cell Movement Legend

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

12.1.9 SIGMETs and AIRMETs

SIGMETs (SIGnificant METerological Information) and AIRMETs (AIRmen's METerological Information) are broadcast for potentially hazardous weather considered of importance to aircraft.

1. While viewing the Data Link Weather menu, touch the **SIGMET/AIRMET** key.

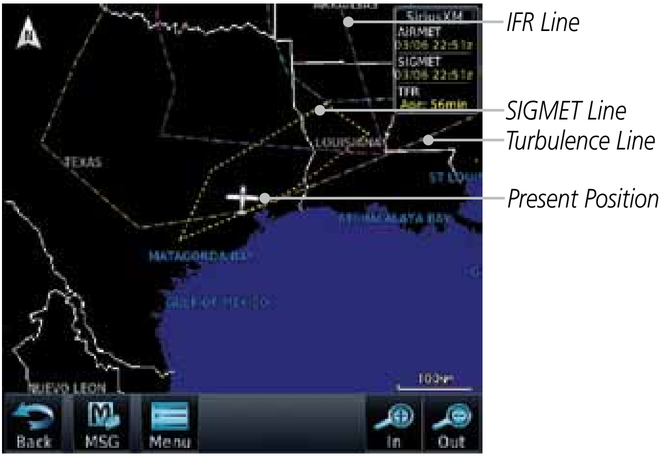
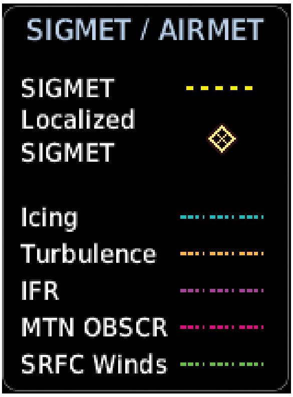

SiriusXM
AIRMET
03/06 22:51z
SIGMET
03/06 22:51z
TFR
Age: 56min
TEXAS
LOUISIANA
MATAGORDA B
GULF OF MEXICO
NUEVO LEON
103nm
Back
MSG
Menu
In
Out
IFR Line
SIGMET Line
Turbulence Line
Present Position

Figure 12-18 SIGMETs and AIRMETs

2. Touch the **SIGMET/AIRMET** key again to turn it off.



SIGMET / AIRMET

SIGMET - - - - -
Localized SIGMET ◇
Icing ---:---:---
Turbulence ---:---:---
IFR ---:---:---
MTN OBSCR ---:---:---
SRFC Winds ---:---:---

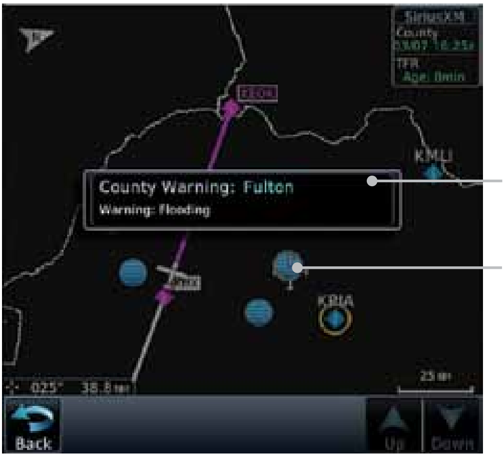
Figure 12-19 SIGMET/AIRMET Legend

12.1.10 County Warnings

County Warnings data provides specific public awareness and protection weather warnings from the National Weather Service. This can include information on fires, tornadoes, severe thunderstorms, flood conditions, and other natural disasters.

County Warnings

1. While viewing the Data Link Weather menu, touch the **County Warnings** key. Touch the County Warnings symbol for detailed information.


SiriusXM
County
03/07 16:25z
TFR
Age: 0min
KMLJ
KRIA
025° 38.8nm
25nm
Back
Up
Down

County Warning: Fulton
Warning: Flooding

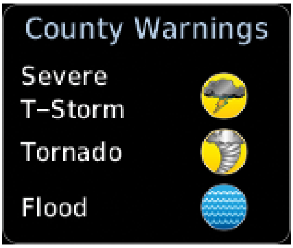
County Warning Detail

County Warning Symbol - Touch To Display Detail

Figure 12-20 County Warnings Data

County Warnings

2. Touch the **County Warnings** key again to turn it off.



County Warnings

Severe T-Storm	⛈
Tornado	🌪
Flood	●

Figure 12-21 County Warnings Legend

12.1.11 Freezing Level

Freezing Level data shows the color-coded contour lines for the altitude and location at which the Freezing Level is found. When no data is displayed for a given altitude, the data for that altitude has not been received, or is out of date and has been removed from the display. New data appears on the next update.

1. While viewing the Data Link Weather menu, touch the **Freezing Level** key.

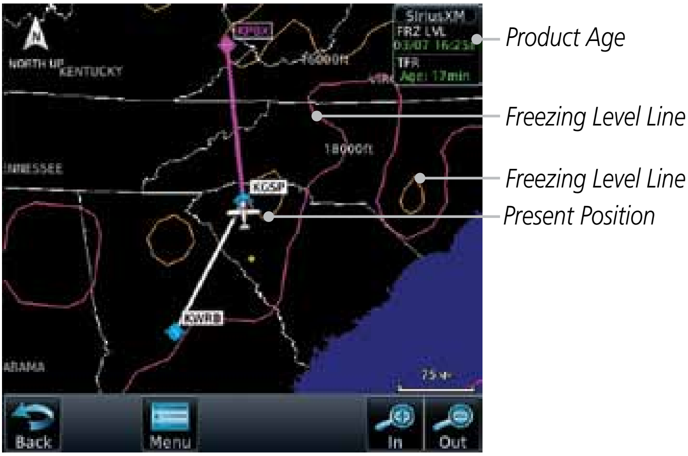
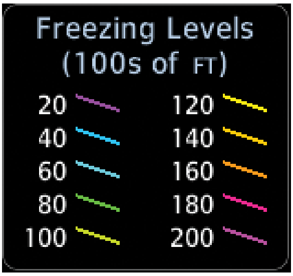

SiriusXM
FRZ LVL
03/07 16:25
TFR
Age: 17min
NORTH UP
KENTUCKY
16000ft
18000ft
NNESSEE
KPSK
KGSP
KWRB
ABAMA
75 nm
Back
Menu
In
Out
Product Age
Freezing Level Line
Freezing Level Line
Present Position

Figure 12-22 Freezing Level

2. Touch the **Freezing Level** key again to turn it off.



Freezing Levels
(100s of FT)

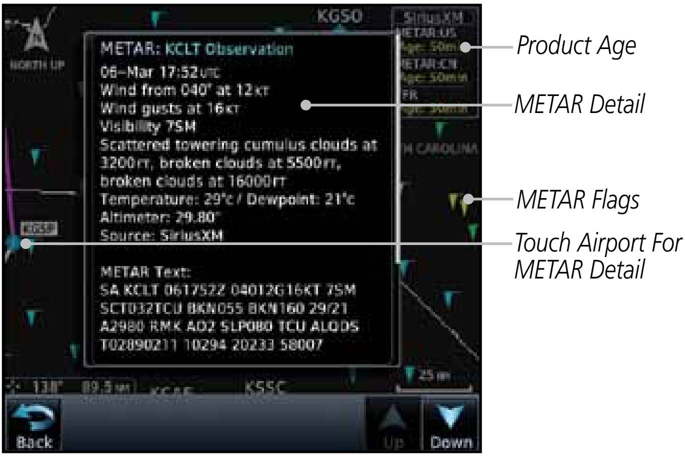
20	120
40	140
60	160
80	180
100	200

Figure 12-23 Freezing Level Legend

12.1.12 METARs

METAR (METeorological Aerodrome Report), known as an Aviation Routine Weather Report, is the standard format for current weather observations. METARs are updated hourly and are considered current. METARs typically contain information about the temperature, dew point, wind, precipitation, cloud cover, cloud heights, visibility, and barometric pressure. They can also contain information on precipitation amounts, lightning, and other critical data. METARs are shown as colored flags at airports that provide them.

1. While viewing the Data Link Weather menu, touch the **METAR** key. Touch an airport symbol for more METAR detail.



METAR: KCLT Observation
06-Mar 17:52UTC
Wind from 040° at 12KT
Wind gusts at 16KT
Visibility 7SM
Scattered towering cumulus clouds at 3200FT, broken clouds at 5500FT, broken clouds at 16000FT
Temperature: 29°C / Dewpoint: 21°C
Altimeter: 29.80"
Source: SiriusXM

METAR Text:
SA KCLT 061752Z 04012G16KT 7SM SCT032TCU BKN055 BKN160 29/21 A2980 RMK AO2 SLP080 TCU ALQDS T02890211 10294 20233 58007

Product Age

METAR Detail

METAR Flags

Touch Airport For METAR Detail

Figure 12-24 METARs

2. Touch the **METAR** key in the Menu again to turn it off.

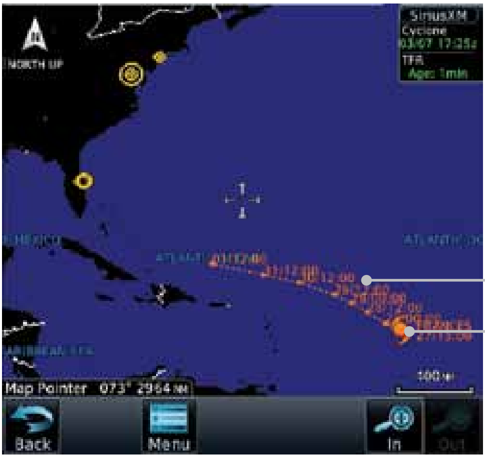
METAR Symbol	Description
🟦	VFR (ceiling greater than 3000 ft. AGL and visibility greater than five miles)
🟩	Marginal VFR (ceiling 1000–3000 ft. AGL and/or visibility three to five miles)
🟨	IFR (ceiling 500 to below 1000 ft. AGL and/or visibility one mile to less than three miles)
🟪	Low IFR (ceiling below 500 ft. AGL or visibility less than one mile)
⬛	Unknown

Table 12-3 METAR Symbols

12.1.13 Cyclone

The current location of the cyclone is shown along with its projected path with the date and time.

1. While viewing the Data Link Weather menu, touch the **Cyclone** key.


SiriusXM
Cyclone
03/07 17:25z
TFR
Age: 1min
NORTH UP
Map Pointer 073° 2954nm
100nm
Back
Menu
In
Out

Projected Path With Date And Time

Current Position Of Cyclone

Figure 12-25 Cyclone

2. Touch the **Cyclone** key again to turn it off.

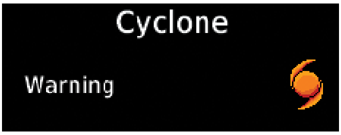

Cyclone
Warning

Figure 12-26 Cyclone Legend

12.1.14 Lightning

Lightning data shows the approximate location of cloud-to-ground lightning strikes. A yellow cross icon represents a strike that has occurred within a 2 kilometer (approx. 1 NM) region. The exact location of the lightning is not displayed.

1. While viewing the Data Link Weather menu, touch the **Lightning** key.

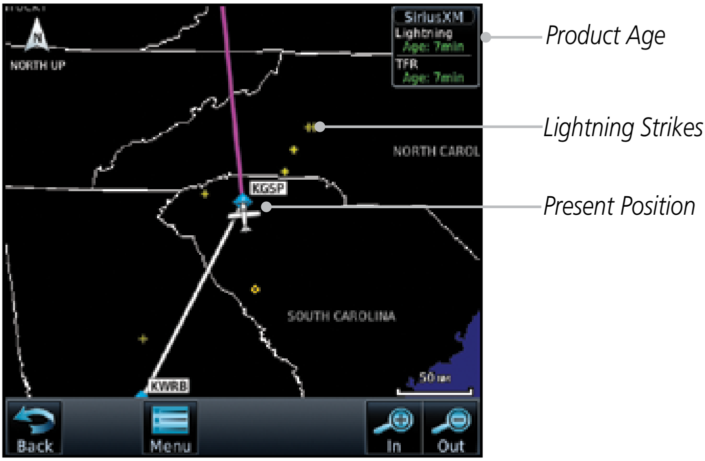
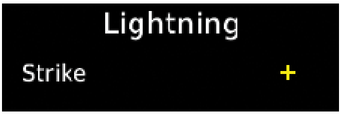

NORTH UP
SiriusXM
Lightning
Age: 7min
TFR
Age: 7min
NORTH CAROL
KGSP
SOUTH CAROLINA
KWRB
50nm
Back
Menu
In
Out
Product Age
Lightning Strikes
Present Position

Figure 12-27 Lightning

2. Touch the **Lightning** key again to turn it off.



Lightning

Strike +

Figure 12-28 Lightning Legend

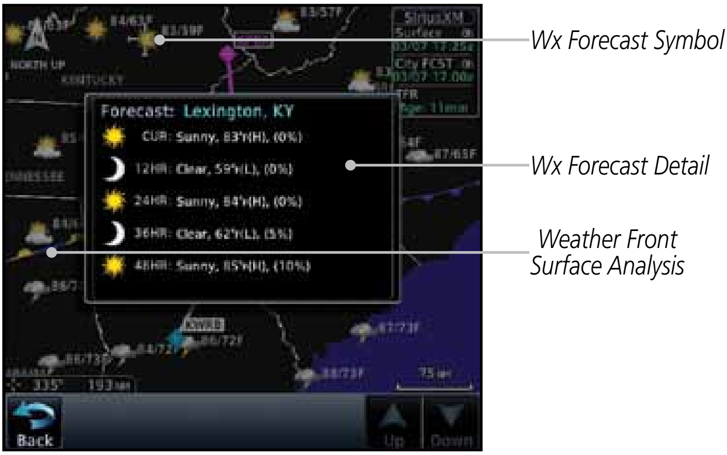
Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

12.1.15 Weather Forecast

The Weather Forecast data provides Surface Analysis and City Forecast information for current and forecast weather conditions. The Surface Analysis forecast shows frontal lines indicating weather fronts and the direction they are moving. High and Low pressure centers are noted with a large H or L. A Cold Front is a front where cold air replaces warm air. A blue line with blue triangles will point in the direction of cold air flow. A Warm Front is where warm air replaces cold air. A red line with red half moons will point in the direction of the warm air flow.

Wx Forecast
Current

1. While viewing the Data Link Weather menu, touch the **WX Forecast** key. Touch a Wx Forecast symbol for more detail.


Wx Forecast Symbol
Wx Forecast Detail
Weather Front
Surface Analysis
NORTH UP
SiriusXM
Surface
City FCST
Back
Up
Down

Forecast: Lexington, KY
CUR: Sunny, 83°F(H), (0%)
12HR: Clear, 59°F(L), (0%)
24HR: Sunny, 84°F(H), (0%)
36HR: Clear, 62°F(L), (5%)
48HR: Sunny, 85°F(H), (10%)

Figure 12-29 Surface

2. Touch the desired time increment for the forecast period.

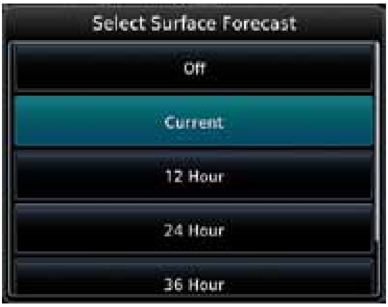
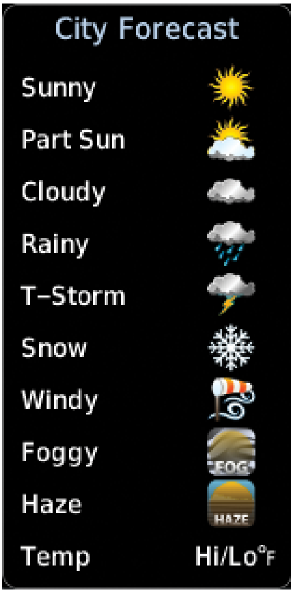
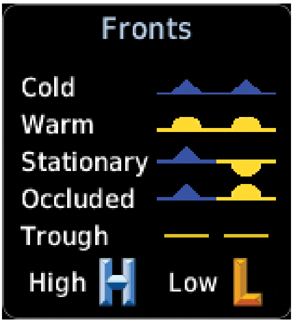

Select Surface Forecast
Off
Current
12 Hour
24 Hour
36 Hour

Figure 12-30 Select Surface Forecast Time Period


City Forecast
Sunny
Part Sun
Cloudy
Rainy
T-Storm
Snow
Windy
Foggy
FOG
Haze
HAZE
Temp
Hi/Lo°F


Fronts
Cold
Warm
Stationary
Occluded
Trough
High
H
Low
L

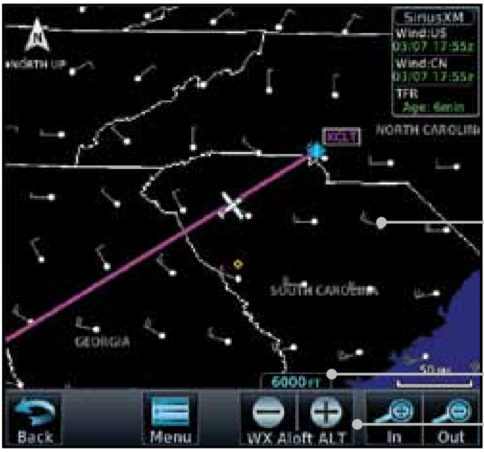
City Forecast **Fronts**

Figure 12-31 Surface Legends

12.1.16 Winds Aloft

Winds Aloft data shows the forecast wind speed and direction at the surface and at selected altitudes. Altitudes can be selected in 3000 foot increments from the surface up to 45,000 feet.

1. While viewing the Data Link Weather menu, touch the **Winds Aloft** key.


SiriusXM
Wind:US
03/07 17:55z
Wind:CN
03/07 17:55z
TFR
Age: 6min
NORTH UP
KCLT
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
6000FT
50nm
Back
Menu
WX Aloft ALT
In
Out

Wind Symbols

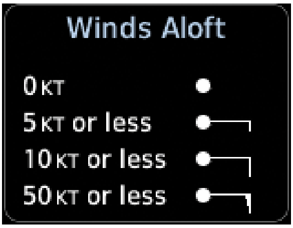
Selected Wind Altitude

Touch To Select Wind Altitude

Figure 12-32 Winds Aloft

2. Touch the **WX Aloft ALT** **–** or **+** keys to increase or decrease the reporting altitude of the winds aloft in 3,000 foot increments. The selected altitude is shown in a window above the altitude keys.

3. Touch the **Winds Aloft** key again to turn it off.



Winds Aloft

0 KT	●
5 KT or less	●─┐
10 KT or less	●──┐
50 KT or less	●──┐

Figure 12-33 Winds Aloft Legend

12.1.17 Icing

The Icing product shows a graphic view of the current icing environment in four categories: light, moderate, severe, and extreme (not specific to aircraft type). The Icing product is not a forecast, but a presentation of the current conditions at the time of the analysis. Supercooled Large Droplet (SLD) icing conditions are characterized by the presence of relatively large, super cooled water droplets indicative of freezing drizzle and freezing rain aloft. SLD threat areas are depicted as black and red blocks over the Icing colors. Icing and SLD data are shown between 1,000 feet and 30,000 feet in 3,000 foot increments.

1. While viewing the Data Link Weather menu, touch the **Icing** key.

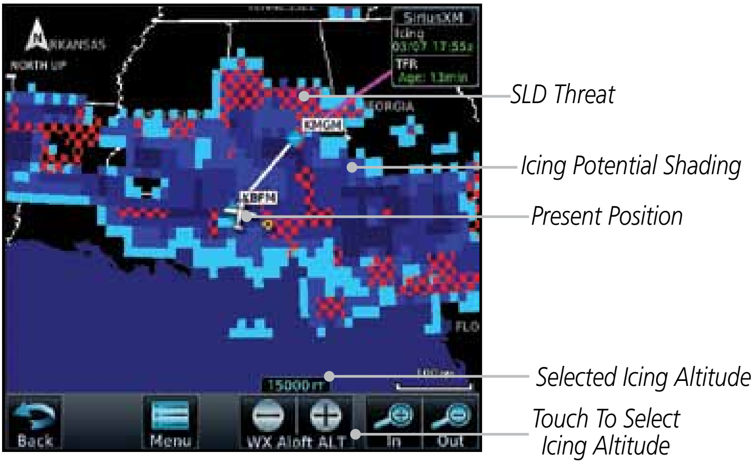
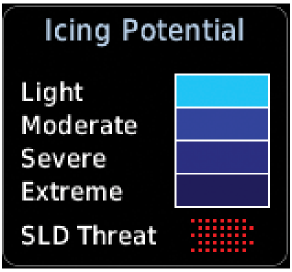

SiriusXM
Icing
03/07 17:55z
TFR
Age: 13min
ARKANSAS
NORTH UP
GEORGIA
KMGM
KBFN
FLO
15000 FT
Back
Menu
WX Aloft ALT
In
Out
SLD Threat
Icing Potential Shading
Present Position
Selected Icing Altitude
Touch To Select Icing Altitude

Figure 12-34 Icing and SLD

2. Touch the **WX Aloft ALT** **–** or **+** keys to increase or decrease the reporting altitude of icing in 3,000 foot increments. The selected altitude is shown in a window above the altitude keys.
3. Touch the **Icing** key again to turn it off.



Icing Potential

Light	🟦
Moderate	🟦
Severe	🟦
Extreme	🟦
SLD Threat	▦

Figure 12-35 Icing Legend

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

12.1.18 Turbulence

Turbulence data identifies the potential for erratic movement of high-altitude air mass associated winds. Turbulence is classified as light, moderate, severe or extreme, at altitudes between 21,000 and 45,000 feet. Turbulence data is intended to supplement AIRMETs and SIGMETs.

1. While viewing the Weather Data Link menu, touch the **Turbulence** key.

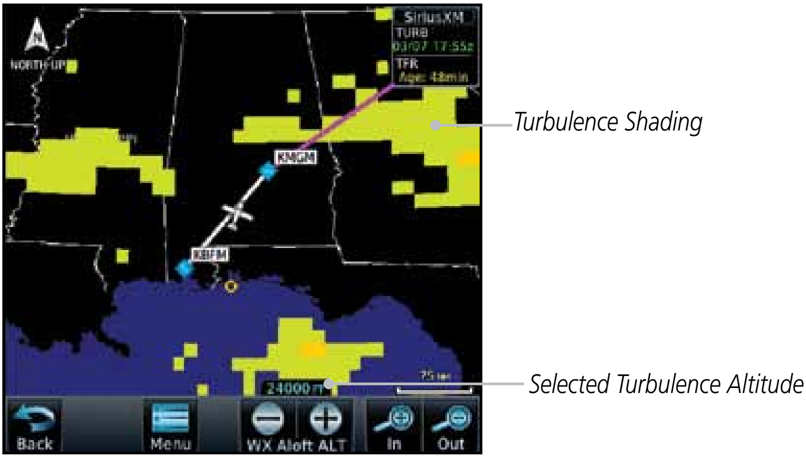
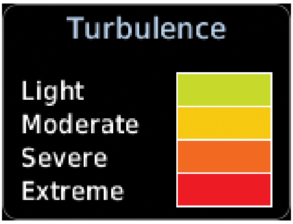

SiriusXM
TURB
03/07 17:55z
TFR
Age: 48min
NORTH UP
KMGM
KBFM
24000 ft
75 nm
Back
Menu
WX Aloft ALT
In
Out
Turbulence Shading
Selected Turbulence Altitude

Figure 12-36 Turbulence

2. Touch the **WX Aloft ALT** − or + keys to increase or decrease the reporting altitude for turbulence in 3,000 foot increments. The selected altitude is shown in a window above the altitude keys.
3. Touch the **Turbulence** key again to turn it off.



Turbulence

Light	🟩
Moderate	🟨
Severe	🟧
Extreme	🟥

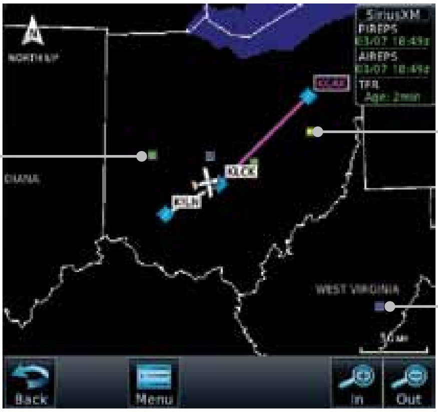
Figure 12-37 Turbulence Legend

12.1.19 AIREP/PIREP

Pilot Weather Reports (PIREPs) provide timely weather information for a particular route of flight. When significant weather conditions are reported or forecast, Air Traffic Control (ATC) facilities are required to solicit PIREPs. A PIREP may contain non-forecast adverse weather conditions, such as low in-flight visibility, icing conditions, wind shear, and turbulence. PIREPs are issued as either Routine (UA) or Urgent (UUA).

AIREP
PIREP

1. While viewing the Data Link Weather menu, touch the **AIREP/PREP** key.


SiriusXM
PIREPS
03/07 18:49z
AIREPS
03/07 18:49z
TFR
Age: 2min
NORTH UP
DIANA
WEST VIRGINIA
Back
Menu
In
Out

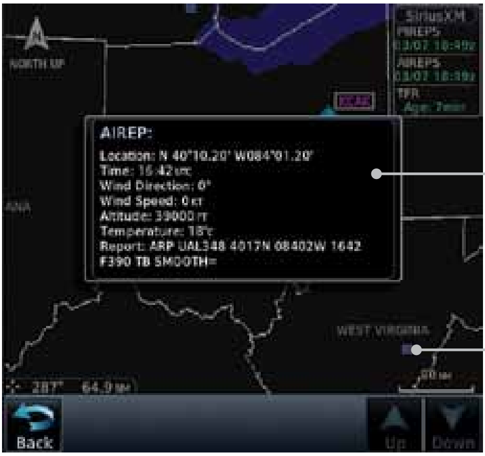
AIREP Symbol (Green). Touch For Details.

Urgent PIREP Symbol (Yellow). Touch For Details.

Routine PIREP Symbol (Blue). Touch For Details.

Figure 12-38 Weather Display With AIREP/PIREP Information Active

2. Touch a weather information symbol to view details for that item.


SiriusXM
PIREPS
03/07 18:49z
AIREPS
03/07 18:49z
TFR
Age: 7min
NORTH UP
WEST VIRGINIA
287° 64.9 NM
Back
Up
Down

AIREP:
Location: N 40°10.20' W084°01.20'
Time: 16:42 UTC
Wind Direction: 0°
Wind Speed: 0 KT
Altitude: 39000 FT
Temperature: 18°C
Report: ARP UAL348 4017N 08402W 1642 F390 TB SMOOTH=

AIREP Details

Touch An AIREP/PIREP Symbol For Detail

Figure 12-39 AIREP/PIREP Information Detail

3. Touch the **Back** key to remove the detailed information.

AIREP PIREP

4. Touch the **AIREP/PREP** key again to turn it off.

12.2 StormScope® Weather

12.2.1 StormScope® (Optional)

> ***NOTE**: Refer to the WX-500 Pilot's Guide for a detailed description of the WX-500 StormScope.*

The WX-500 StormScope Weather Mapping Sensor is a passive weather avoidance system that detects electrical discharges associated with thunderstorms within a 200 NM radius of the aircraft. The StormScope measures relative bearing and distance of thunderstorm-related electrical activity and reports the information to the display. ***Interfaces are currently only available for the WX-500 StormScope System***.

For lightning display interpretation, study the examples in the WX-500 Pilot's Guide that are designed to help you relate the cell or strike patterns shown on the display to the size and location of thunderstorms that may be near your aircraft.

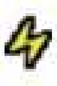
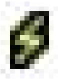
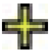
Symbol	Time Since Strike (Seconds)
	6
	60
	120
	180

Table 12-4 Stormscope Symbols

1. From the Home page, touch the **Weather** key (and then the **StormScope** key if present) to reach the StormScope function.

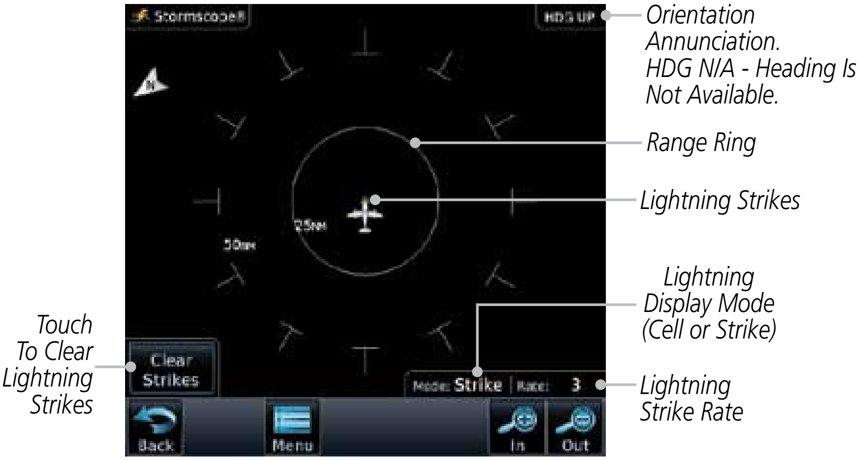

Stormscope®
HDG UP
Orientation Annunciation. HDG N/A - Heading Is Not Available.
Range Ring
Lightning Strikes
25NM
50NM
Lightning Display Mode (Cell or Strike)
Touch To Clear Lightning Strikes
Clear Strikes
Mode: Strike
Rate: 3
Lightning Strike Rate
Back
Menu
In
Out

Figure 12-40 StormScope Display (360º Display View Shown)

2. Touch the **Menu** key to setup the StormScope display.

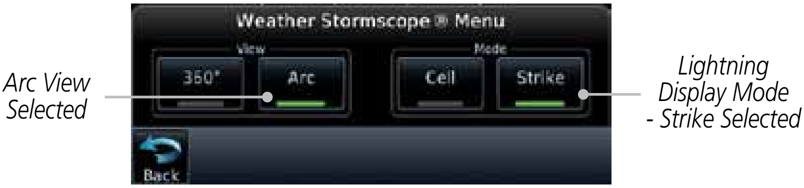

Weather Stormscope® Menu
View
Mode
360°
Arc
Cell
Strike
Arc View Selected
Lightning Display Mode - Strike Selected
Back

Figure 12-41 StormScope Menu

3. Touch the **360°** or **Arc** to select the display view.

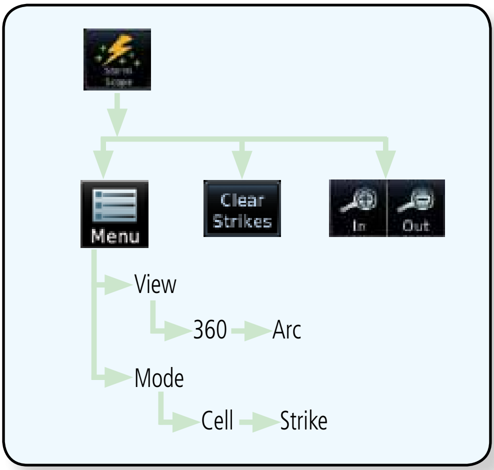

Storm Scope
Menu
Clear Strikes
In
Out
View
360
Arc
Mode
Cell
Strike

Figure 12-42 StormScope Functional Diagram

12.2.2 Clearing the StormScope® Page

Routinely clearing the StormScope Page of all discharge points is a good way to determine if a storm is building or dissipating. In a building storm discharge points reappear faster and in larger numbers. In a dissipating storm discharge points appear slower and in smaller numbers.

Clear Strikes

1. While viewing the Weather StormScope page, touch the **Clear Strikes** key to clear lightning strikes.
2. Lightning strikes will be cleared from the display and the Rate value will be reset.

NOTE: *When Heading is not available (N/A), the pilot must clear the strikes after each turn.*

12.2.3 Changing the StormScope® Display View

The Lightning Page displays either a 360° or a 120° viewing angle.

Menu

1. While viewing the Weather StormScope page, touch **MENU.**

360°

Arc

2. Touch the **360°** or **Arc** to select the display view.

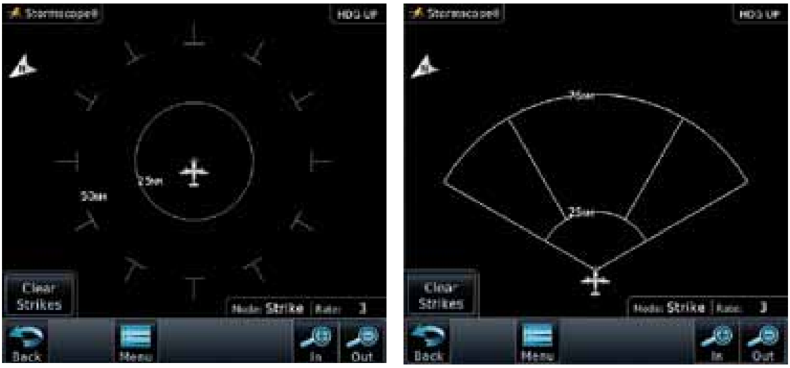

Stormscope®
HDG UP
50nm
25nm
Clear Strikes
Mode: Strike
Rate: 3
Back
Menu
In
Out
Stormscope®
HDG UP
25nm
25nm
Clear Strikes
Mode: Strike
Rate: 3
Back
Menu
In
Out

Figure 12-43 StormScope 360° and Arc Display Views

12.2.4 Changing the Storm Data Display Range

Storm data can be displayed on the Map page 2000 NM zoom scale, but the data only goes out as far as the StormScope can report (200 NM). The

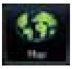
500 NM zoom scale will display all lightning data. Scales greater than 500 NM do not display any additional StormScope data.

While viewing the StormScope page touch the **In** and **Out** keys to display a larger or smaller area.

***NOTE:** Cell mode uses a clustering program to identify clusters of electrical activity that indicate cells. Cell mode is most useful during periods of heavy storm activity. Displaying cell data during these periods frees the user from sifting through a screen full of discharge points and helps to better determine where the storm cells are located.*

12.2.5 Displaying StormScope® Data on the Map Page

The Map Page displays cell or strike information using yellow lightning strike symbology overlaid on a moving map. This added capability improves situational awareness, which in turn makes it much easier for the pilot to relate storm activity to airports, NAVAIDs, obstacles and other ground references.



1. On the Home page, touch the **Map** key.

2. Touch the **Menu** key.

Stormscope
Off
Stormscope
Cell
Stormscope
Strike

3. Touch the **StormScope** key to enable StormScope lightning display on the Map page. Repeated touches toggle between Off, Cell, and Strike.

***NOTE:** The selected lightning display type, cell or strike, will be shown the same on both the StormScope and the Map pages.*

***NOTE:** StormScope data is displayed on the Map Page only if aircraft heading is available.*

***NOTE:** The GTN will display StormScope data with or without a heading source. If no heading source is available, the display will indicate this by placing "HDG N/A" in the upper right portion of the display. If no heading is available, the pilot must clear the strikes after each heading change.*

12.3 Weather Radar

The GTN 7xx can display weather radar from a Garmin GWX system or from selected 3rd party radars. Only one weather radar system may be interfaced to the system. For detailed information on the operation of 3rd party radars, refer to their specific documentation.

12.3.1 Garmin GWX Radar Description

The Garmin GWX 68 and GWX 70 Airborne Color Weather Radars combine excellent range and adjustable scanning profiles with a high-definition target display.

To focus radar scanning on specific areas, Sector Scanning offers pilot-adjustable horizontal scan angles of 20°, 40°, 60°, or 90° (up to 120° with the GWX 70). A vertical scanning function helps to analyze storm tops, gradients, and cell buildup activity at various altitudes.

See the documentation of each radar for specific features.

12.3.1.1 Principles of Pulsed Airborne Weather Radar

The term RADAR is an acronym for RAdio Detecting and Ranging. Pulsed radar locates targets by transmitting a microwave pulse beam that, upon encountering a target, is then reflected back to the radar receiver as a return "echo." The microwave pulses are focused and radiated by the antenna, with the most intense energy in the center of the beam and decreasing intensity near the edge. The same antenna is used for both transmitting and receiving. The returned signal is then processed and displayed on the GTN 7xx.

Radar detection is a two-way process that requires 12.36 micro-seconds for the transmitted microwave pulses to travel out and back for each nautical mile of target range. It takes 123.6 micro-seconds for a transmitted pulse to make the round trip if a target is 10 NM away.

The GWX weather radar should be used to avoid severe weather, not for penetrating severe weather. The decision to fly into an area of radar targets depends on target intensity, spacing between the targets, aircraft capabilities and pilot experience. Pulse type weather radar detects only precipitation, not clouds or turbulence. The display may indicate clear areas between intense returns, but this does not necessarily mean it is safe to fly between them. Only Doppler radar can detect turbulence.

Airborne weather radar has other capabilities beyond weather detection. It also has the ability to detect and provide distance to objects on the ground, such as, cities, mountains, coastlines, rivers, lakes, and oceans.

12.3.1.2 Antenna Beam Illumination

It is important to understand the concept of the antenna beam illumination. The radar beam is much like the beam of a spotlight. The farther the beam travels, the wider it gets. The radar is only capable of "seeing" what is inside the boundaries of the beam.

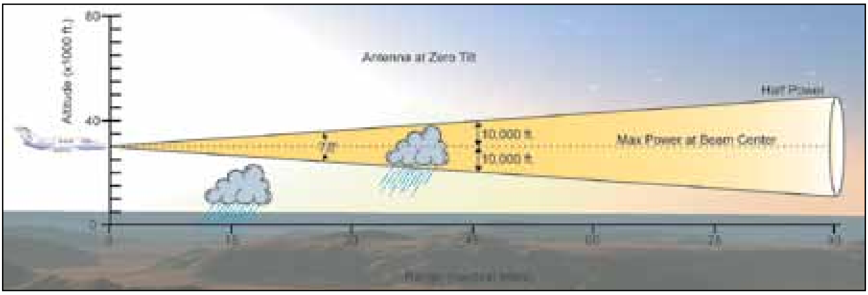


Figure 12-44 Radar Beam from 12 inch Antenna

The vertical dimensions of the radar beam are shown in the figure above and the same holds true for the horizontal dimensions. In other words, the beam will be as wide as it is tall. Note that it is possible not to see areas of precipitation on the radar display because of the antenna tilt setting. With the antenna tilt set to zero in this illustration, the beam overshoots the precipitation at 15 NM. The curvature of the earth can also be a factor, especially at range settings of 150 NM or more.

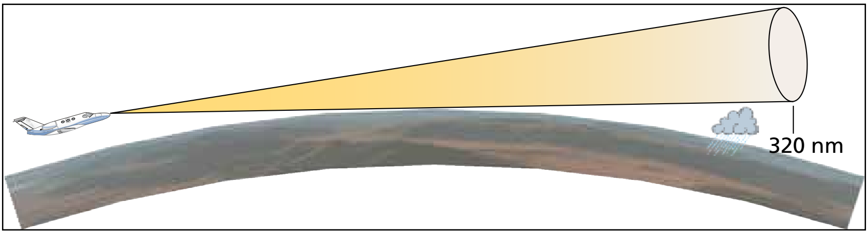


Figure 12-45 Radar Beam in Relation to the Curvature of the Earth

12.3.1.3 Radar Signal Attenuation

The phenomena of weather attenuation needs to be kept in mind whenever operating the weather radar. When the radar signal is transmitted, it is progressively absorbed and scattered, making the signal weaker. This weakening, or attenuation, is caused by two primary sources, distance and precipitation.

Attenuation because of distance is due to the fact that the amount of radar energy at a distance from the antenna is inversely proportional to the square of the distance. The reflected radar energy from a target 40 miles away that fills the radar beam will be one fourth the energy reflected from an equivalent target 20 miles away. This would appear to the operator that the storm is gaining intensity as the aircraft gets closer. Internal circuitry within the GWX system compensates for much of this distance attenuation.

Attenuation due to precipitation is not as predictable as distance attenuation. It is also more intense. As the radar signal passes through moisture, a portion of the radar energy is reflected back to the antenna. However, much of the energy is absorbed. If precipitation is very heavy, or covers a large area, the signal may not reach completely through the area of precipitation. The weather radar system cannot distinguish between an attenuated signal and area of no precipitation. If the signal has been fully attenuated, the radar will display a “radar shadow.” This appears as an end to the precipitation when, in fact, the heavy rain may extend much further. A cell containing heavy precipitation may block another cell located behind the first, preventing it from being displayed on the radar. Never fly into these shadowed areas and never assume that all of the heavy precipitation is being displayed unless another cell or a ground target can be seen beyond the heavy cell. The WATCH™ feature of the GWX Weather Radar system can help in identifying these shadowed areas. Areas in question will appear as “shadowed” or gray area on the radar display. Proper use of the antenna tilt control can also help detect radar shadows.

Attenuation can also be due to poor maintenance or degradation of the radome. Even the smallest amount of wear and tear, pitting, and pinholes on the radome surface can cause damage and system inefficiency.

12.3.2 Radar Signal Reflectivity

12.3.2.1 Precipitation

Precipitation or objects more dense than water, such as earth or solid structures, will be detected by the weather radar. The weather radar will not detect clouds, thunderstorms or turbulence directly. It detects precipitation associated with clouds, thunderstorms, and turbulence. The best radar signal reflectors are raindrops, wet snow or wet hail. The larger the raindrop the better it reflects. The size of the precipitation droplet is the most important factor in radar reflectivity. Because large drops in a small concentrated area are characteristic of a severe thunderstorm, the radar displays the storm as a strong return. Ice, dry snow, and dry hail have low reflective levels and often will not be displayed by the radar. A cloud that contains only small raindrops, such as fog or drizzle, will not reflect enough radar energy to produce a measurable target return.

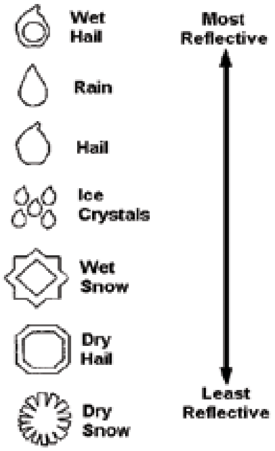


Figure 12-46 Precipitation Type and Reflectivity

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

12.3.2.2 Ground Returns

The intensity of ground target returns depends upon the angle at which the radar beam strikes the ground target (Angle of Incidence) and the reflective properties of that target. The gain can be adjusted so shorelines, rivers, lakes, and cities are well defined. Increasing gain too much causes the display to fill in between targets, thus obscuring some landmarks.

Cities normally provide a strong return signal. While large buildings and structures provide good returns, small buildings can be shadowed from the radar beam by the taller buildings. As the aircraft approaches, and shorter ranges are selected, details become more noticeable as the highly reflective regular lines and edges of the city become more defined.

Bodies of water such as lakes, rivers, and oceans are not good reflectors, and normally do not provide good returns. The energy is reflected in a forward scatter angle with inadequate energy being returned. They can appear as dark areas on the display. However, rough or choppy water is a better reflector and will provide stronger returns from the downwind sides of the waves.

Mountains also provide strong return signals to the antenna, but also block the areas behind. However, over mountainous terrain, the radar beam can be reflected back and forth in the mountain passes or off canyon walls using up all or most of the radar energy. **In this case, no return signal is received from this area causing the display to show a dark spot which could indicate a pass where no pass exists.**

12.3.2.3 Angle of Incidence

The angle at which the radar beam strikes the target is called the Angle of Incidence. Incident angle (“A”) is illustrated below. This directly affects the detectable range, the area of illumination, and the intensity of the displayed target returns. A large incident angle gives the radar system a smaller detectable range and lower display intensity due to minimized reflection of the radar energy.

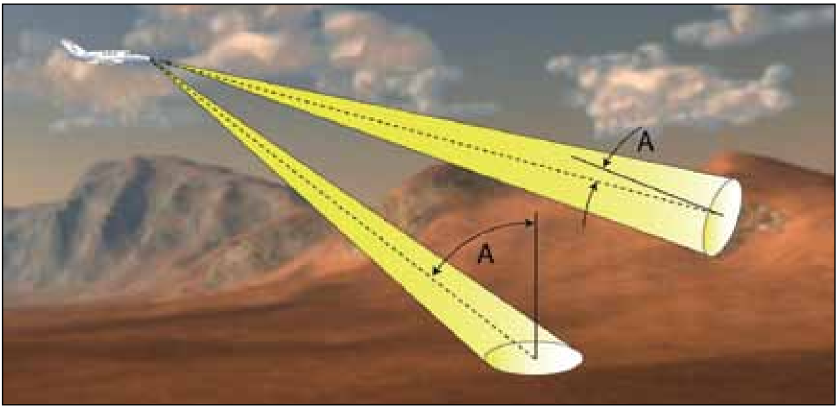


Figure 12-47 Angle of Incidence

A smaller incident angle gives the radar a larger detectable range of operation and the target display will show a higher intensity. Since more radar energy is reflected back to the antenna with a low incident angle, the resulting detectable range is increased for mountainous terrain.

12.3.3 Operating Distance

The following information establishes a minimum safe distance from the antenna for personnel near an operating airborne weather radar. The minimum safe distance is based upon the FCC's exposure limit at 9.3 to 9.5 GHz for general population/uncontrolled environments which is 1 mW/cm^2. See Advisory Circular 20-68B for more information on safe distance determination.

12.3.3.1 Maximum Permissible Exposure Level (MPEL) (GWX 68)

The zone in which the radiation level exceeds the US Government standard of 1 mW/cm^2, is the semicircular area of at least 11 feet from the 12 inch antenna as indicated in the illustration below. All personnel must remain outside of this zone. With a scanning or rotating beam, the averaged power density at the MPEL boundary is significantly reduced.

12.3.3.2 Maximum Permissible Exposure Level (MPEL) (Other Radars)

See the appropriate documentation for MPEL.

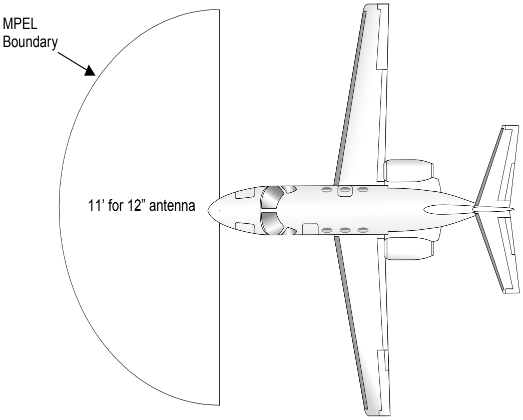


Figure 12-48 MPEL Boundary

12.3.4 Basic Antenna Tilt Setup

The following discussion is a simple method for setting up the weather radar antenna tilt for most situations. It is not to be considered an all encompassing setup that will work in all situations, but this method does provide good overall parameters for the monitoring of threats. Ultimately, it is desired to have the antenna tilted so that the bottom of the radar beam is four degrees below parallel with the ground. The following discussion explains one way of achieving this.

With the aircraft flying level, adjust the antenna tilt so ground returns are displayed at a distance that equals the aircraft's current altitude (AGL) divided by 1,000. For example, if the aircraft is at 14,000 feet, adjust the tilt so the front edge of ground returns are displayed at 14 NM. Note this antenna tilt angle setting. Now, raise the antenna tilt 6° above this setting. The bottom of the radar beam is now angled down 4° from parallel with the ground.

Practical Application Using the Basic Tilt Setup

At this point, when flying at altitudes between 2,000 and 30,000 feet AGL, any displayed target return should scrutinized. If the displayed target advances on the screen to 5 NM of the aircraft, avoid it. This may be either weather or ground returns that are 2,000 feet or less below the aircraft. Raising the antenna tilt 4° can help separate ground returns from weather returns in relatively flat terrain. This will place the bottom of the radar beam level with the ground. Return the antenna tilt to the previous setting after a few sweeps.

If the aircraft is above 29,000 feet, be cautious of any target return that gets to 30 NM or closer. This is likely a thunderstorm that has a top high enough that the aircraft cannot fly over it safely.

If the aircraft altitude is 15,000 feet or lower, set the displayed range to 60 NM. Closely monitor anything that enters the display.

Also, after setting up the antenna tilt angle as described previously, ground returns can be monitored for possible threats. The relationship between antenna tilt angle, altitude, and distance is one degree of tilt equals 100 feet of altitude for every one nautical mile.

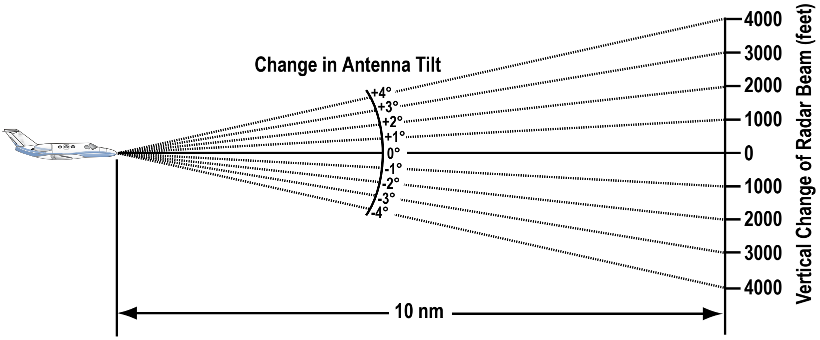


Figure 12-49 Vertical Change in Radar Beam per Nautical Mile

Therefore, with the antenna tilt set so that the bottom of the beam is four degrees below parallel with the ground, a target return at 10 NM is approximately 4,000 feet below the aircraft; at 20 NM, 8,000 feet; at 50 NM, 20,000 feet. In other words, at this tilt setting, a ground return (such as a mountain peak) being displayed at 10 NM would have a maximum distance below the aircraft of 4,000 feet. If that ground target return moves to 5 NM, maximum distance below the aircraft will be 2,000 feet.

This setup will provide a good starting point for practical use of the GWX radar. There are many other factors to consider in order to become proficient at using weather radar in all situations.

12.3.5 Weather Mapping and Interpretation

12.3.5.1 Weather display Interpretation

When evaluating various target returns on the weather radar display, the colors denote approximate rainfall intensity and rates as shown in the table below.

Weather Mode Color	GWX 68 Radars		GWX 70 Radars	3rd Party Radars
	Approximate Intensity	Approximate Rainfall Rate (in/hr)	Approximate Intensity	Radar Return Level (see radar documentation for details)
BLACK	< 23 dBZ	< .01	< 23 dBZ	0
GREEN	23 dBZ to < 33 dBZ	.01 - 0.1	23 dBZ to < 33 dBZ	1
YELLOW	33 dBZ to < 41 dBZ	0.1 - 0.5	33 dBZ to < 41 dBZ	2
RED	41 dBZ to < 50 dBZ	0.5 - 2	> 41 dBZ	3
MAGENTA	50 dBZ and greater	> 2		4

Table 12-5 Precipitation Intensity Levels

12.3.5.2 Thunderstorms

Updrafts and downdrafts in thunderstorms carry water through the cloud. The more severe the drafts, the greater the number and size of the precipitation droplets. With this in mind, the following interpretations can be made from what is displayed on the weather radar. Avoid these areas by an extra wide margin.

- In areas where the displayed target intensity is red or magenta (indicating large amounts of precipitation), the turbulence is considered severe.
- Areas that show steep color gradients (intense color changes) over thin bands or short distances suggest irregular rainfall rate and strong turbulence.
- Areas that show red or magenta are associated with hail or turbulence, as well as heavy precipitation. Vertical scanning and antenna tilt management may be necessary to identify areas of maximum intensity.

Along squall lines (multiple cells or clusters of cells in a line), individual cells may be in different stages of development. Areas between closely spaced, intense targets may contain developing clouds not having enough moisture to produce a return. However, these areas could have strong updrafts or downdrafts. Targets showing wide areas of green are generally precipitation without severe turbulence.

Irregularities in the target return may also indicate turbulence, appearing as “hooks,” “fingers,” or “scalloped” edges. These irregularities may be present in green areas with no yellow, red, or magenta areas and should be treated as highly dangerous areas. Avoid these areas as if they were red or magenta areas.

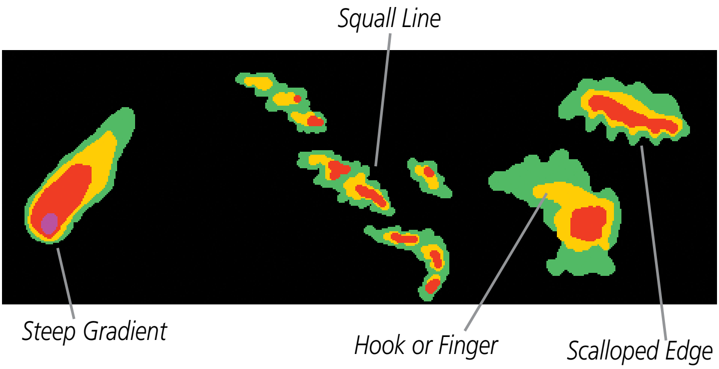


Figure 12-50 Cell Irregularities

Thunderstorm development is rapid. A course may become blocked within a short time. When displaying shorter ranges, periodically select a longer range to see if problems are developing further out. That can help prevent getting trapped in a "blind alley" or an area that is closed at one end by convective weather.

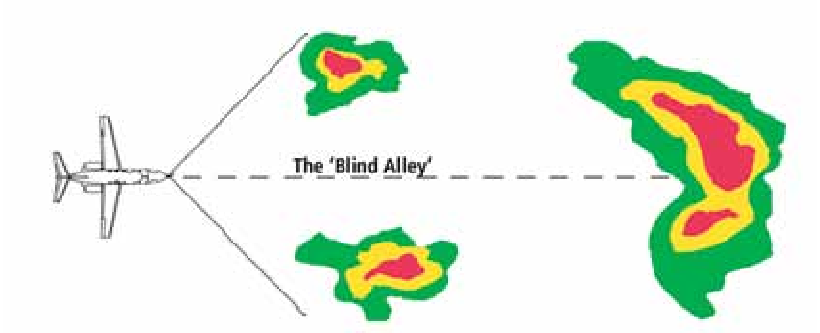


Figure 12-51 The "Blind Alley" Overhead View

In areas of multiple heavy cells, use the Vertical Scan feature along with antenna tilt management to examine the areas. Remember to avoid shadowed areas behind targets.

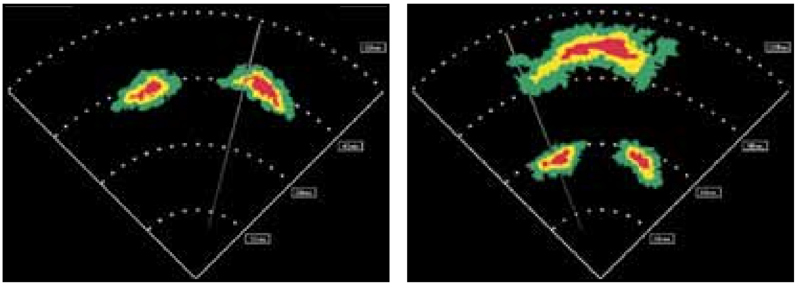


Figure 12-52 The "Blind Alley" Vertical Scan

12.3.5.3 Tornadoes

There is no conclusive radar target return characteristics which will identify a tornado, however, tornadoes may be present if the following characteristics are observed:

- A narrow, finger-like portion, as shown on the previous page, extends and, in a short time, curls into a hook and closes on itself.
- A “hook” which may be in the general shape of the numeral “6,” especially if bright and projecting from the southwest quadrant (northeast quadrant in the southern hemisphere) of a major thunderstorm.
- V- shaped notches.
- Doughnut shapes.

These shapes do not always indicate tornadoes, nor are tornado returns limited to these characteristics. Confirmed radar observations of tornadoes most often have not shown shapes different from those of a normal thunderstorm display.

12.3.5.4 Hail

Hail results from updrafts carrying water high enough to freeze. Therefore, the higher the top of a thunderstorm, the greater the probability that it contains hail. Vertically scanning the target return can give the radar top of a thunderstorm that contains hail. Radar top is the top of a storm cell *as detected by radar*. It is not the actual top, or true top of the storm. The actual top of a storm cell is seen with the eyes in clear air and may be much higher than the radar top. The actual top does not indicate the top of the hazardous area.

Hail can fall below the minimum reflectivity threshold for radar detection. It can have a film of water on its surface, making its reflective characteristics similar to a very large water droplet. Because of this film of water, and because hail stones usually are larger than water droplets, thunderstorms with large amounts of wet hail return stronger signals than those with rain. Some hail shafts are extremely narrow (100 yards or less) and make poor radar targets. In the upper regions of a cell where ice particles are “dry” (no liquid coating), target returns are less intense.

Hail shafts are associated with the same radar target return characteristics as tornados. U-shaped cloud edges 3 to 7 miles across can also indicate hail. These target returns appear quite suddenly along any edge of the cell outline. They also change in intensity and shape in a matter of seconds, making vigilant monitoring essential.

12.4 GWX Radar Operation in Weather Mode

WARNING: *Begin transmitting only when it is safe to do so. When transmitting while the aircraft is on the ground, no personnel or objects should be within 11 feet of the antenna.*

CAUTION: *In Standby mode, the antenna is parked at the center line. It is always a good idea to put the radar in Standby mode before taxiing the aircraft to prevent the antenna from bouncing on the bottom stop and possibly causing damage to the radar assembly.*

When the weather radar system is in the Weather or Ground Map mode, the system automatically switches to Standby mode on landing.

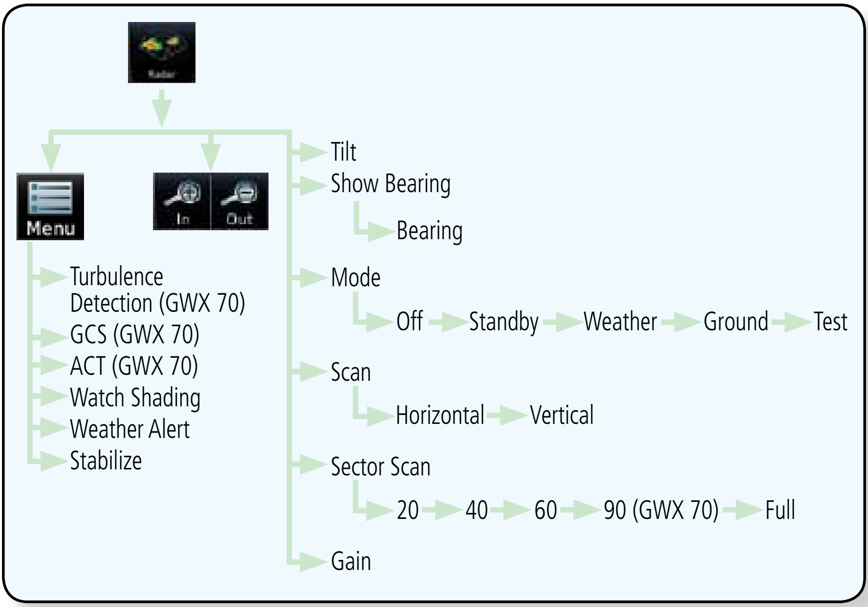
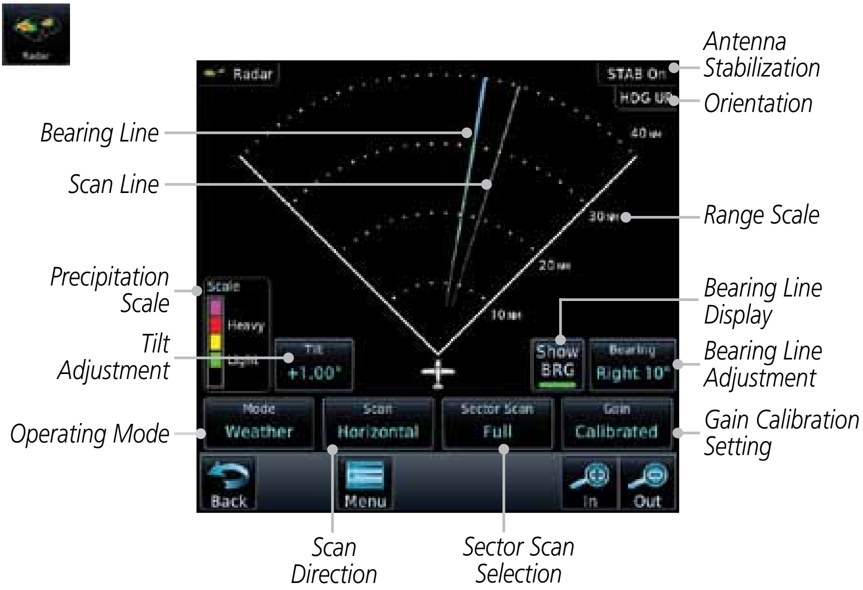

Radar
Menu
In
Out
Turbulence Detection (GWX 70)
GCS (GWX 70)
ACT (GWX 70)
Watch Shading
Weather Alert
Stabilize
Tilt
Show Bearing
Bearing
Mode
Off
Standby
Weather
Ground
Test
Scan
Horizontal
Vertical
Sector Scan
20
40
60
90 (GWX 70)
Full
Gain

Figure 12-53 Weather Radar Functional Diagram

12.4.1 Viewing Weather on the Weather Radar Page

1. From the Home page, touch the **Weather** key on the Home page and then touch the **Radar** key (if necessary).

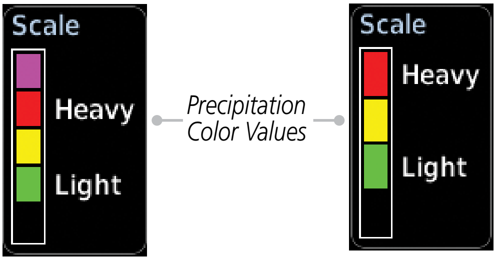

Antenna Stabilization
Orientation
Bearing Line
Scan Line
Range Scale
Precipitation Scale
Bearing Line Display
Tilt Adjustment
Bearing Line Adjustment
Operating Mode
Gain Calibration Setting
Scan Direction
Sector Scan Selection
Radar
40 nm
30 nm
20 nm
10 nm
Scale
Heavy
Light
Show BRG
Back
Menu
In
Out

STAB On
HDG UP
Tilt +1.00°
Bearing Right 10°
Mode Weather
Scan Horizontal
Sector Scan Full
Gain Calibrated

Figure 12-54 Weather Radar Page (Horizontal Scan)

2. Touch the **MODE** key and then touch the function desired.

3. The color-coded precipitation scale is shown on the left side of the display. A table describing the precipitation intensity levels is in section 12.3.5.1.


Scale
Heavy
Light
Precipitation Color Values
Scale
Heavy
Light

GWX 68 GWX 70

Figure 12-55 Weather Radar Precipitation Scale

4. Touch the **IN** and **OUT** keys to select the desired range. Touch the desired keys to set any required values as described below.

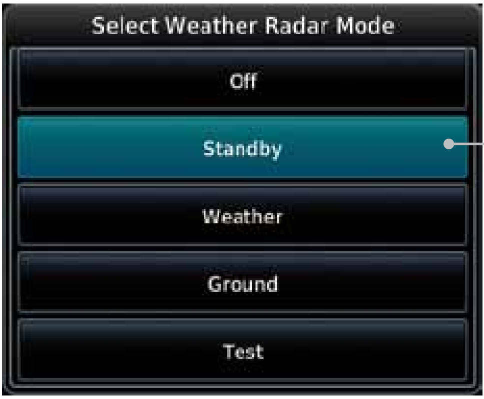
12.4.2 Configuring Weather Radar Page

To configure the WX Radar page, the Radar Mode must be in Ground, Weather, or Test mode. When one of these modes is selected, a warm-up period is initiated (countdown is displayed on the screen). After the warm-up is complete, the selected mode will be available.

1. While on the ground, touch **MODE**.

Mode
Standby

2. In the Weather Radar Mode window, touch **STANDBY**.

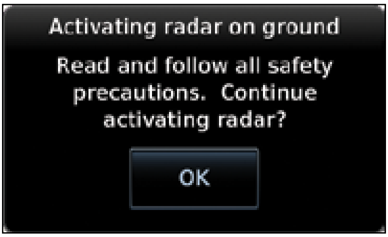


Touch the Desired Mode

Figure 12-56 Weather Radar Mode Selection

Mode
Weather

3. Touch **MODE** and select Weather, Ground, or Test. A caution window is displayed.



Activating radar on ground

Read and follow all safety precautions. Continue activating radar?

Figure 12-57 Caution for Radar Activation Confirmation

4. Touch **OK** to acknowledge the selected mode will be activated.

   If Weather or Ground is selected, a warm-up period is initiated (countdown is displayed on the screen). After the warm-up is complete, the radar begins transmitting.

12.4.3 Vertically Scanning a Storm Cell

When vertically scanning with stabilization ON, the actual physical area that the radar is sweeping may not match the vertical scan display. This occurs whenever the aircraft pitch is not at 0 degrees. To compensate for this, the vertical display will "erase" the portion of the vertical display that is no longer being scanned. It will appear that the vertical sweep "wraps around" when reaching the end of the GTN vertical display. The radar is simply "erasing" the portion of the vertical display that is not currently being scanned.

***NOTE:** Vertical scanning of a storm cell should be done with the aircraft wings level to avoid constant adjustment of the Bearing Line.*

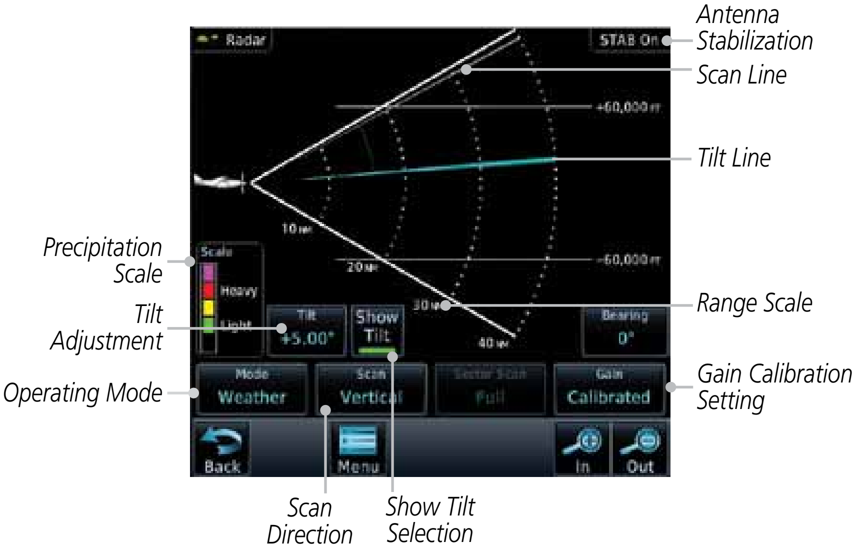

Antenna Stabilization
Scan Line
Tilt Line
Precipitation Scale
Tilt Adjustment
Range Scale
Operating Mode
Gain Calibration Setting
Scan Direction
Show Tilt Selection
Radar
STAB On
+60,000 FT
10 NM
20 NM
30 NM
40 NM
-60,000 FT
Scale
Heavy
Light
Tilt +5.00°
Show Tilt
Bearing 0°
Mode Weather
Scan Vertical
Sector Scan Full
Gain Calibrated
Back
Menu
In
Out

Figure 12-58 Weather Radar Page (Vertical Scan)

12.4.4 Adjusting the Antenna Tilt Angle

In order to make an accurate interpretation of a storm cell, the radar beam should be pointed at the wet part of the weather cell to record the proper rainfall intensity (color level). The ideal aiming point is just below the freezing level of the storm. The best way to find this point is to use the Vertical Scan feature. The antenna tilt angle can be centered on the strongest return area in the vertical scan to get a more accurate view of the coverage and intensity of the target in the horizontal scan.

1. While viewing the WX Radar page touch the **TILT** key. An adjustment window will be displayed.

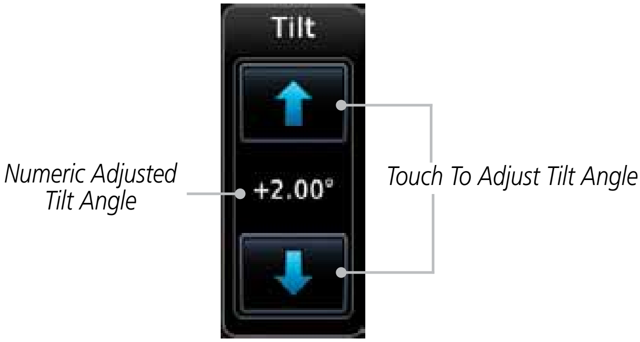


Figure 12-59 Adjusting Tilt

2. Touch the **Up and Down Arrow** keys to adjust the Tilt. The range is DN 15° to UP 15°.

3. Touch **Back** to save the values and return to the Radar display.

12.4.5 Adjusting the Bearing Line

1. Touch the **SHOW BRG** key. This displays the Bearing Line in Horizontal Scanning mode.
2. To adjust the Bearing Line, touch the **BEARING** key. An adjustment window will be displayed.

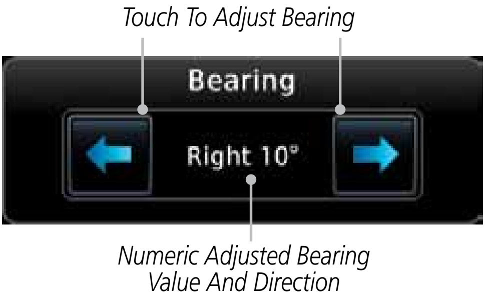

Touch To Adjust Bearing
Bearing
Right 10°
Numeric Adjusted Bearing Value And Direction

Figure 12-60 Bearing Line Adjustment

3. Touch the Gain Adjustment arrow keys to change the gain.
4. Touch **Back** to save the values and return to the Radar display.

12.4.6 Adjusting Gain

Gain is used to adjust the sensitivity of the radar receiver. It can be used to adjust the characteristics of the returns from the surface.

***WARNING**: Changing the gain in weather mode will cause precipitation intensity to be displayed as a color not representative of the true intensity. Remember to return the gain setting to : "Calibrated" for viewing the actual intensity of precipitation.*

Set to Calibrated

1. While viewing the WX Radar page touch the **GAIN** key. The Gain Adjustment Bar will be displayed.

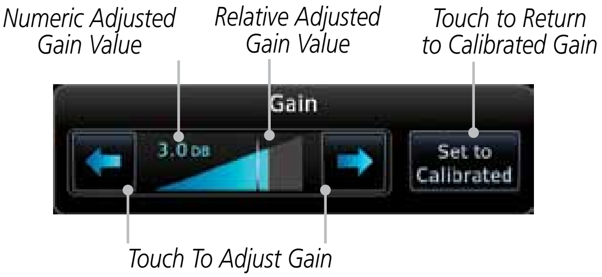

Numeric Adjusted Gain Value
Relative Adjusted Gain Value
Touch to Return to Calibrated Gain
Gain
3.0 DB
Set to Calibrated
Touch To Adjust Gain

Figure 12-61 Gain Adjustment

2. Touch the Gain Adjustment arrow keys to change the gain.

Back

3. Touch **Back** to save the values and return to the Radar display.

Restore Calibrated Gain

Gain
3.0 DB

1. While viewing the WX Radar page touch **GAIN** to display the Gain adjustment window.

Set to Calibrated

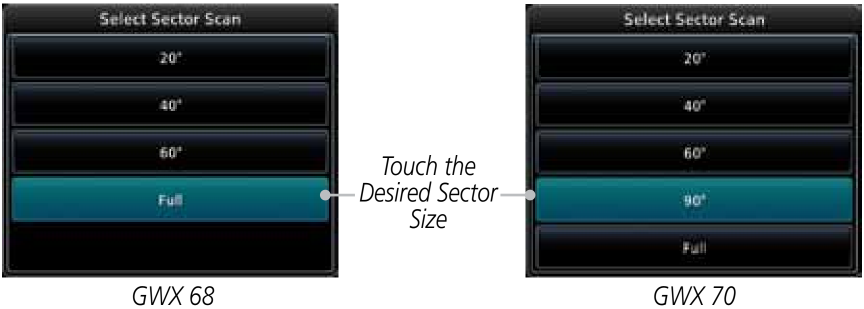
2. Touch the **SET TO CALIBRATED** key. This will restore the calibrated gain.

12.4.7 Sector Scan

Adjusting the Sector Scan reduces the scan angle from Full in increments of ±20°, ±40°, and ±60° in horizontal or vertical scanning.

Sector Scan
Full

1. While viewing the WX Radar page, touch **Sector Scan** to display the Sector Scan Mode window.


Select Sector Scan
20°
40°
60°
Full
Select Sector Scan
20°
40°
60°
90°
Full

Touch the Desired Sector Size

GWX 68

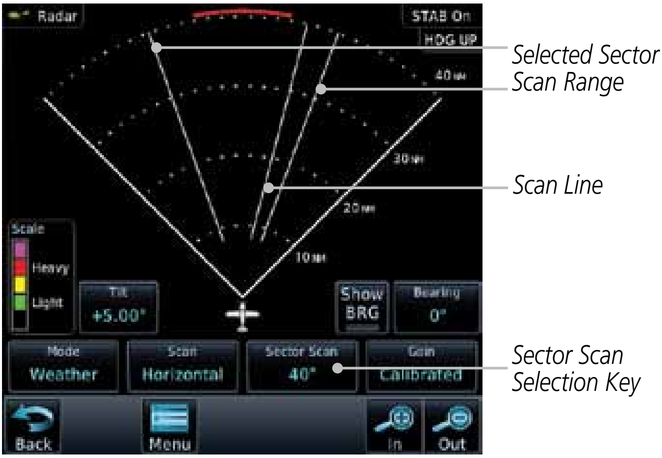
GWX 70

Figure 12-62 Sector Scan Mode

Sector Scan
40°

2. Touch the desired mode. After selection, you are returned to the Weather Radar Menu screen.

3. Touch **Back** again to return to the Weather Radar screen.


Radar
STAB On
HDG UP
40 NM
30 NM
20 NM
10 NM
Scale
Heavy
Light
Tilt
+5.00°
Show BRG
Bearing
0°
Mode
Weather
Scan
Horizontal
Sector Scan
40°
Gain
Calibrated
Back
Menu
In
Out

Selected Sector Scan Range

Scan Line

Sector Scan Selection Key

Figure 12-63 Selected Sector Scan Range

12.4.8 Weather Radar Menu

Touch **Menu** to view the Weather Radar Menu.

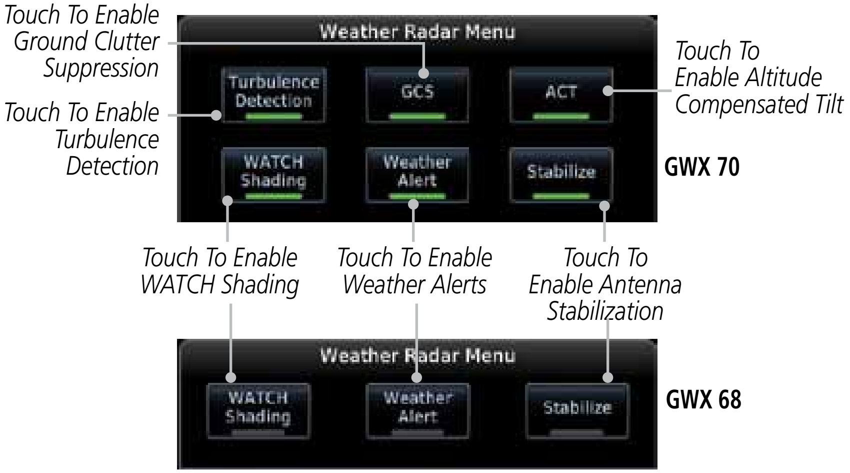

Touch To Enable Ground Clutter Suppression
Touch To Enable Turbulence Detection
Weather Radar Menu
Turbulence Detection
GCS
ACT
WATCH Shading
Weather Alert
Stabilize
Touch To Enable Altitude Compensated Tilt
GWX 70
Touch To Enable WATCH Shading
Touch To Enable Weather Alerts
Touch To Enable Antenna Stabilization
Weather Radar Menu
WATCH Shading
Weather Alert
Stabilize
GWX 68

Figure 12-64 Weather Radar Menu Selections

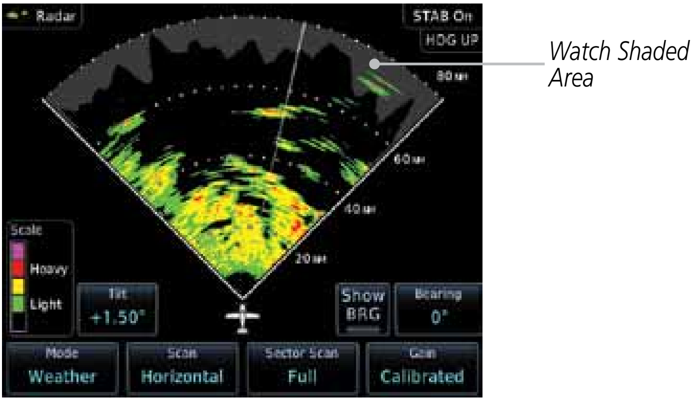
> ***NOTE:*** *Ground Clutter Suppression (GCS) and Turbulence Detection is only supported for 12" or larger RADAR antennas. Turbulence Detection is only supported out to a range of 40 NM and is disabled at display ranges greater than 160 NM.*

12.4.8.1 Weather Attenuated Color Highlight (WATCH™)

While in horizontal scan mode, this feature can be used as a tool to determine areas of possible inaccuracies in displayed intensity due to weakening of the radar energy. This weakening is known as "attenuation." The radar energy weakens as it passes through areas of intense precipitation, large areas of lesser precipitation, and distance. Issues with the radome will also attenuate the radar energy. All these factors have an effect on the return intensity. The more energy that dissipates, the lesser the displayed intensity of the return. Accuracy of the displayed intensity of returns located in the shaded areas are suspect. Make maneuvering decisions with this information in mind. Proper antenna tilt management should still be employed to determine the extent of attenuation in a shaded area.

1. While viewing the Weather Radar Menu, touch **WATCH Shading** to toggle WATCH Shading.

2. To deactivate Watch Mode, repeat sequence.


Radar
STAB On
HDG UP
80 NM
60 NM
40 NM
20 NM
Scale
Heavy
Light
Show BRG
Watch Shaded Area

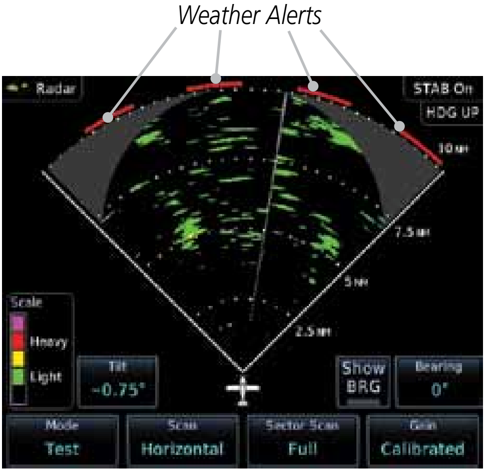
Tilt +1.50°
Bearing 0°
Mode Weather
Scan Horizontal
Sector Scan Full
Gain Calibrated

Figure 12-65 Horizontal Scan with WATCH

12.4.8.2 Weather Alert

The Weather Alert feature may be used to indicate the presence of heavy precipitation beyond the currently displayed range and 80 to 320 NM from the aircraft's present position. Weather Alert targets appear as red bands along the outer range ring at the approximate azimuth of the detected returns.

If a Weather Alert is detected within ±10° of the aircraft heading, a message will be displayed in the Messages page. Touch the **MSG** key to view messages.


Weather Alerts
Radar
STAB On
HDG UP
10 NM
7.5 NM
5 NM
2.5 NM
Scale
Heavy
Light
Show BRG

Tilt -0.75°
Bearing 0°
Mode Test
Scan Horizontal
Sector Scan Full
Gain Calibrated

Figure 12-66 Weather Alert Display

If the antenna tilt is adjusted too low, a weather alert can be generated by ground returns. To avoid this issue, set the display range to less than 80 NM in the terminal area. Weather alerts can also be deactivated in the terminal area.

Weather Alert

1. While viewing the Weather Radar Menu, touch **Weather Alert** to toggle Weather Alerts.
2. To deactivate Weather Alerts, repeat sequence.

12.4.8.3 Antenna Stabilization

1. While viewing the Weather Radar Menu, touch **Stabilize** to toggle Antenna Stabilization.
2. To deactivate Antenna Stabilization, repeat sequence. The current stabilization condition is shown in the top right of the weather radar display.

12.4.8.4 Altitude Compensated Tilt (ACT) - GWX 70 only

Altitude Compensated Tilt (ACT) automatically adjusts the tilt to compensate for altitude changes as you climb or descend.

1. While viewing the Weather Radar Menu, touch **ACT** to toggle ACT.
2. To deactivate ACT, repeat sequence.

12.4.8.5 Turbulence Detection - GWX 70 only

Turbulence Detection activates a feature that detects and displays severe turbulence. Turbulence Detection is inactive at ranges greater that 160 NM. If Turbulence Detection is enabled and available, Turbulence Detection will be reported as Inactive in any of the following conditions:

- Scan orientation is not Horizontal
- Scan range is greater than 160 NM
- Radar mode is not Weather

Turbulence Detection

1. While viewing the Weather Radar Menu, touch **Turbulence Detection** to toggle Turbulence Detection.
2. To deactivate Turbulence Detection, repeat sequence.

12.4.8.6 Ground Clutter Suppression (GCS) - GWX 70 only

Ground Clutter Suppression reduces the amount of returns as a result of highly reflective objects on the ground, such as buildings or cities, while maintaining the intensity and size of weather returns.

1. While viewing the Weather Radar Menu, touch **GCS** to toggle Ground Clutter Suppression.
2. To deactivate Ground Clutter Suppression, repeat sequence.

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

12.5 Connext Weather

Connext Weather is an optional feature available with the Iridium® satellite system that is interfaced through the optional Garmin GSR 56. Connext Weather may be viewed in the Weather and Map functions. The Weather pages may be oriented to either Track Up, Heading, or North Up. Both Connext and XM Weather may be installed and selected individually. Connext Weather coverage is available throughout most of Europe, Canada and the U.S. Additional radar coverage areas are being added continuously.

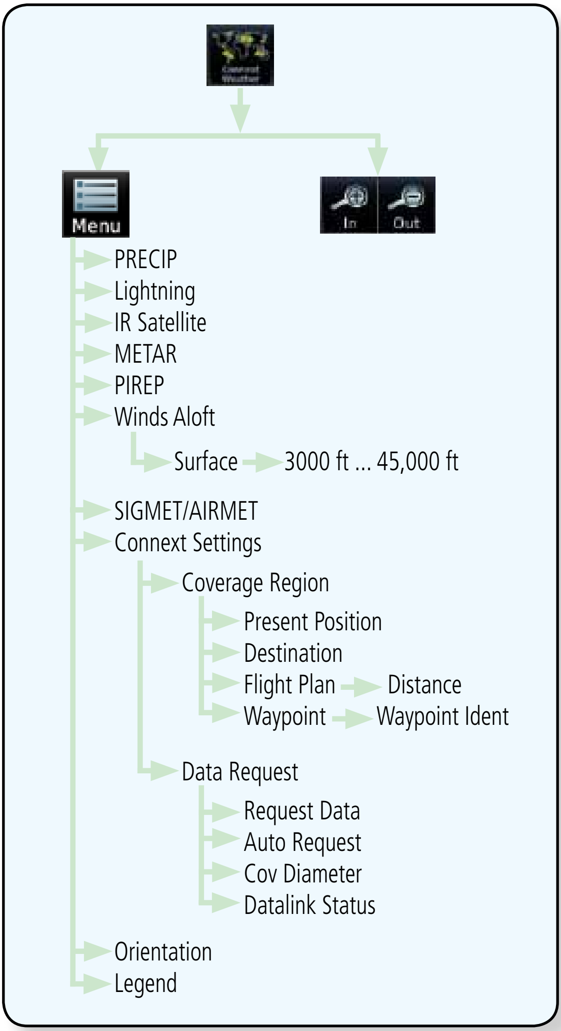

Connext Weather
Menu
In
Out
PRECIP
Lightning
IR Satellite
METAR
PIREP
Winds Aloft
Surface
3000 ft ... 45,000 ft
SIGMET/AIRMET
Connext Settings
Coverage Region
Present Position
Destination
Flight Plan
Distance
Waypoint
Waypoint Ident
Data Request
Request Data
Auto Request
Cov Diameter
Datalink Status
Orientation
Legend

Figure 12-67 Connext Weather Functional Diagram

More detail on Connext weather products and coverage can be found at: http://fly.garmin.com/fly-garmin/gfds-weather/

***NOTE:** A system can be configured for multiple weather products, but only one may be selected for viewing in the Weather or map pages at a given time.*

1. While viewing the Connext Weather page, press the **MENU** key to display the Connext Weather Menu.

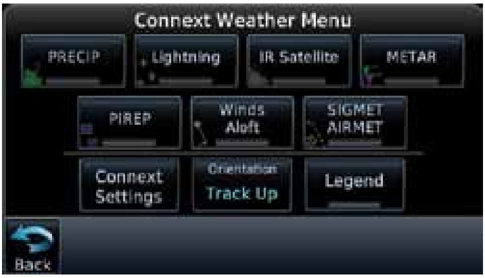

Connext Weather Menu
PRECIP
Lightning
IR Satellite
METAR
PIREP
Winds Aloft
SIGMET AIRMET
Connext Settings
Orientation
Track Up
Legend
Back

Figure 12-68 Select Connext Weather

2. Touch the desired key to access the settings. The settings will affect the display on both the Weather and Map pages.

12.5.1 Using Connext Satellite Weather Products

When a weather product is active on the Weather Data Link Page or the Navigation Map Page, the age of the data is displayed on the screen. The age of the product is based on the time difference between when the data was assembled on the ground and the current GPS time. Weather products are refreshed at selectable intervals.

Weather products expire at intervals based on each product. When the data expires, it is removed from the display. This ensures that the displayed data is consistent with what is currently being broadcast by Connext Satellite Radio services. If more than half of the expiration time has elapsed from the time the data is received, the color of the product age displayed changes to yellow.

12.5.2 Connext Weather Menu

The Connext Weather page is customized by selecting options from the Connext Weather and the Connext Settings Menus. The Connext Weather Menu options include choices for Weather Setup and displaying selected weather products. The Connext Settings Menu makes settings for the Coverage Region and Data Request frequency.

Menu

1. While viewing the Connext Weather page, touch the **MENU** key to display the Connext Weather Menu. Touch the desired keys to toggle the weather product.

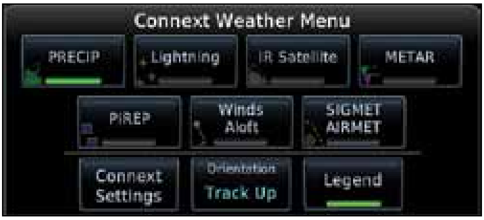


Figure 12-69 Connext Weather Menu

Connext Settings

2. Touch the **Connext Settings** key to make detailed settings for the Connext Weather display.

12.5.3 Connext Settings

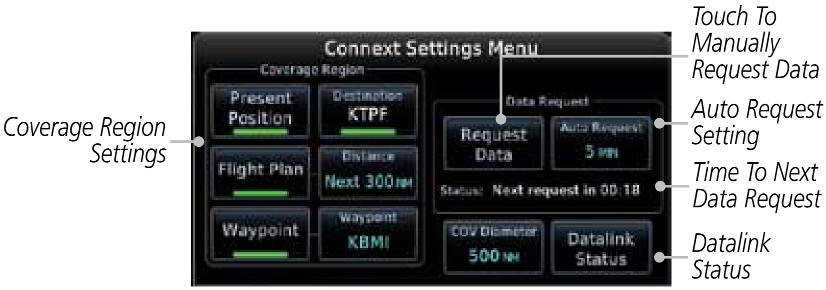

Connext Settings Menu
Coverage Region
Present Position
Destination
KTPF
Flight Plan
Distance
Next 300 NM
Waypoint
Waypoint
KBMI
Data Request
Request Data
Auto Request
5 MIN
Status: Next request in 00:18
COV Diameter
500 NM
Datalink Status
Coverage Region Settings
Touch To Manually Request Data
Auto Request Setting
Time To Next Data Request
Datalink Status

Figure 12-70 Connext Settings Menu

12.5.3.1 Connext Data Request

It is necessary to request the downloading of weather products. Requests can be sent manually or set to automatically update at a selected rate. The Connext weather data may be updated at any time regardless of the automatic update timing by selecting a Manual Request. When multiple requests are made, some products are merged with the old data (SIGMETs/AIRMETs, TAFs, TFRs, and METARs), but the old data of other products is discarded.

Request Data

1. While viewing the Connext Settings Menu, touch the **Request Data** key to manually request data.

Auto Request
Off

2. Touch the **Auto Request** key to set the Auto Request Period.

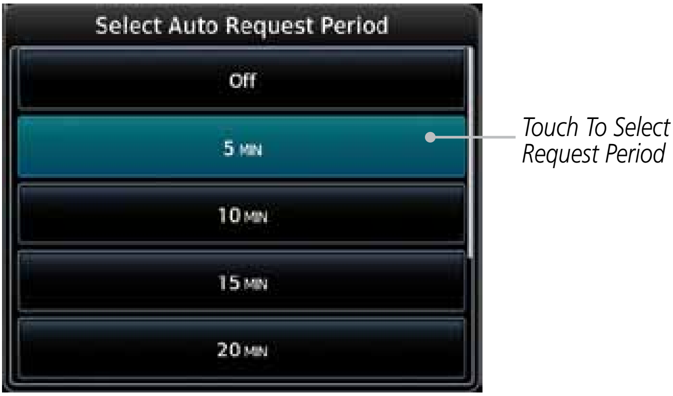

Select Auto Request Period
Off
5 MIN
10 MIN
15 MIN
20 MIN
Touch To Select Request Period

Figure 12-71 Select Auto Request Period

Cancel Request

3. Touch the **Cancel Request** key to cancel a request in progress.

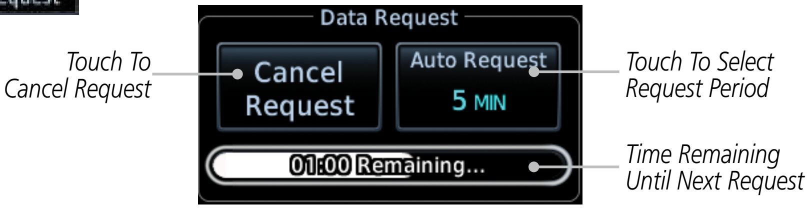

Data Request
Cancel Request
Auto Request
5 MIN
01:00 Remaining...
Touch To Cancel Request
Touch To Select Request Period
Time Remaining Until Next Request

Figure 12-72 Cancelling A Request

12.5.3.2 Connext Data Request Coverage Region

Present Position Data Request

Present Position

Touch the **Present Position** key to request that weather information will be shown around your present position.

Destination Connext Data Request

Destination
KTPF

Touch the **Destination** key to request that weather information will be shown around the destination waypoint in the flight plan.

Flight Plan Data Request

Flight Plan

Touch the **Flight Plan** key to request that weather information will be shown around the active flight plan.

Flight Plan Distance Data Request

Distance
Next 300 NM

Touch the **Distance** key to request that weather information will be shown for the selected distance along the active flight plan.

Waypoint Connext Data Request

1. Touch the **Waypoint** key to request that weather information will be shown around the selected waypoint.

Waypoint
KLEX

2. Select the waypoint and then press **ENT.**

Diameter/Route Width Connext Data Request

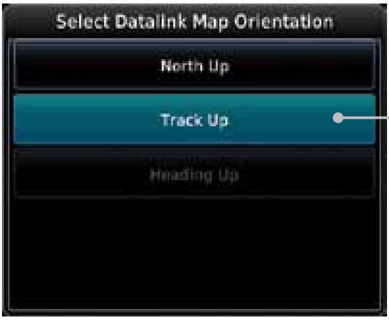
COV Diameter
10 NM

After selecting a coverage option in the previous section, select the desired **Diameter** and then press **ENT.**

12.5.3.3 Connext Weather Map Orientation

Orientation
Heading Up

1. While viewing the Connext Weather Menu, touch the **Orientation** key.
2. Touch the orientation choices of North Up, Track Up, and Heading Up and to accept the displayed value and return to the Connext Weather Menu.


Select Datalink Map Orientation
North Up
Track Up
Heading Up

Touch To Select Map Orientation

Figure 12-73 Connext Weather Map Orientation

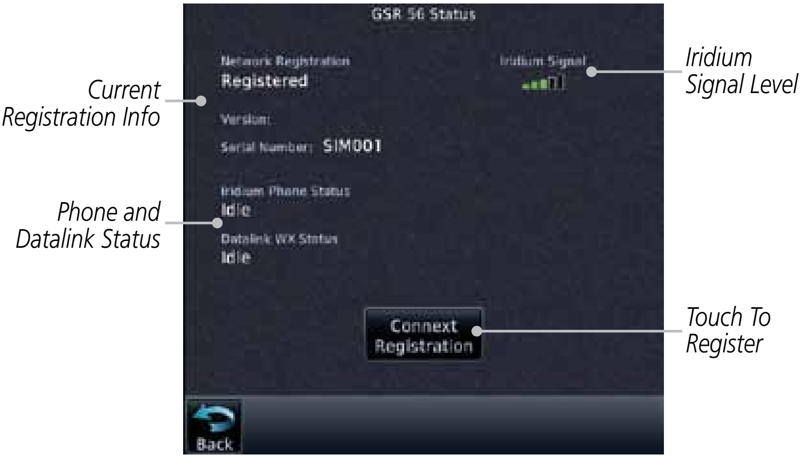
12.5.4 Register With Connext

It is necessary to register the GTN with Connext to utilize the weather products.

1. Call Garmin Customer Service to create a Connext account. Provide the GTN System ID and airframe info (model, tail number, etc).
2. Customer Service will issue an access code to enter on the Connext Registration page.

Datalink Status

3. While viewing Connext Settings Menu, touch the **Datalink Status** key.


GSR 56 Status

Network Registration
Registered

Iridium Signal

Version:

Serial Number: SIM001

Iridium Phone Status
Idle

Datalink WX Status
Idle

Current Registration Info

Phone and Datalink Status

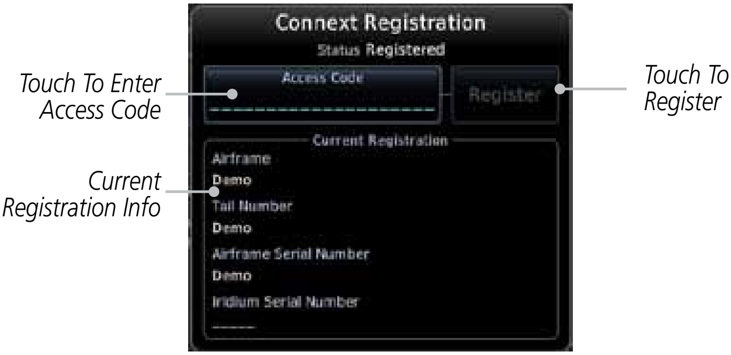
Iridium Signal Level

Touch To Register

Figure 12-74 GSR 56 Status

Connext Registration

4. Touch the **Connext Registration** key to display the Connext Registration display.


Connext Registration

Status Registered

Access Code

Current Registration

Airframe
Demo

Tail Number
Demo

Airframe Serial Number
Demo

Iridium Serial Number

Touch To Enter Access Code

Current Registration Info

Touch To Register

Figure 12-75 Connext Registration Page

5. Touch the Access Code key to enter the appropriate code and then touch the **Enter** key.

6. Touch the **Register** key to complete the process. The GTN will contact the Connext servers using the GSR 56 transceiver. If the access code and system ID are correct, it will download and display the airframe info.

Deactivate Unit Registration With Connext

Registration of the GTN unit with Connext can be deactivated so that the unit can no longer make requests to Connext. This does not cancel the subscription.

1. While viewing the Connext Registration display, touch the Access Code field and enter an invalid access code to deactivate the Connext registration.
2. Any weather requests will now fail and the system will no longer be linked to the Connext account.

12.5.5 Connext Weather Product Age

The weather product expiration time and the refresh rate are shown in the following table. The refresh rate represents the interval at which Connext Satellites broadcast new signals that may or may not contain new weather data. It does not represent the rate at which weather data is updated or new content is received by the Data Link Receiver. Weather data is refreshed at intervals that are defined and controlled by Connext and its data vendors.

Weather Product	Expiration Time (Minutes)
PRECIP	30
Lightning	30
IR Satellite	60
SIGMETs / AIRMETs	60
METARs	90
Winds Aloft	90
Pilot Weather Report (PIREP) (Blue - Regular, Yellow - Urgent)	90
Temporary Flight Restriction (TFR)	60

Table 12-6 Connext Weather Products and Aging Times

***WARNING:** Do not use the indicated data link weather product age to determine the age of the weather information shown by the data link weather product. Due to time delays inherent in gathering and processing weather data for data link transmission, the weather information shown by the data link weather product may be significantly older than the indicated weather product age.*

12.5.6 TFRs

Temporary Flight Restrictions (TFRs) provide detailed information for local short term restrictions.

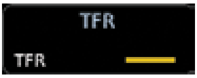
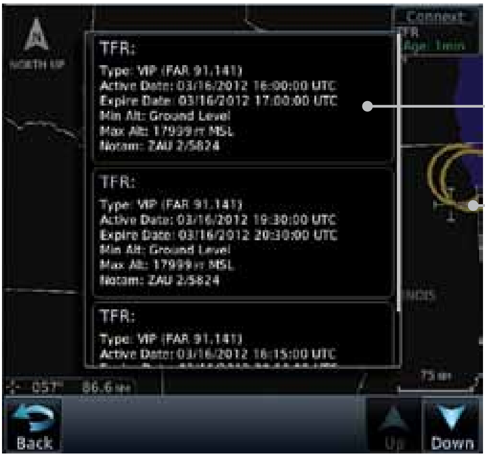


Figure 12-76 Connext TFR Legend

1. Touch a TFR symbol on the Weather page to view details.



TFR:
Type: VIP (FAR 91.141)
Active Date: 03/16/2012 16:00:00 UTC
Expire Date: 03/16/2012 17:00:00 UTC
Min Alt: Ground Level
Max Alt: 17999 FT MSL
Notam: ZAU 2/5824

TFR:
Type: VIP (FAR 91.141)
Active Date: 03/16/2012 19:30:00 UTC
Expire Date: 03/16/2012 20:30:00 UTC
Min Alt: Ground Level
Max Alt: 17999 FT MSL
Notam: ZAU 2/5824

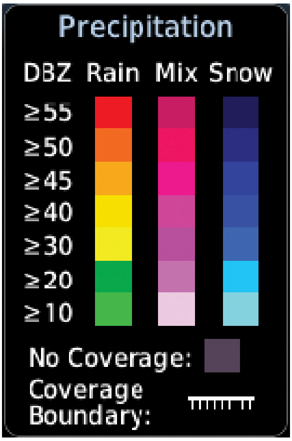
TFR:
Type: VIP (FAR 91.141)
Active Date: 03/16/2012 16:15:00 UTC

Figure 12-77 Connext TFR Detail

2. Touch the **Back** key to return to the Weather display.

12.5.7 Precipitation (PRECIP) Data

Graphical data is overlaid on the map indicating the rainfall detected by ground based radar for a specific area. The colors indicating increasing levels of rainfall progresses from light green for light rainfall to red for heavy rainfall. Review the Limitations section in the front of this guide for the limitations that apply to the Connext data. Rainfall data is color coded as follows:



Precipitation

DBZ	Rain	Mix	Snow
≥55	🟥	🟪	🟦
≥50	🟧	🟪	🟦
≥45	🟧	🟪	🟦
≥40	🟨	🟪	🟦
≥30	🟨	🟪	🟦
≥20	🟩	🟪	🟦
≥10	🟩	🟪	🟦

No Coverage: ■

Coverage Boundary:

Figure 12-78 Connext PRECIP Weather Map Display and Legend

The "No Coverage" color indicates that no data is available for that area, and rainfall in that area is unknown.

When weather data is received, the airborne system will display that data for 20 minutes. If no new data has been received for a given area, the rainfall will be removed after 20 minutes and the area will revert back to the "No Coverage" color.

The Connext Weather Function is based on a ground-to-air data link and requires that the appropriate ground systems are broadcasting weather data and the aircraft is within reception range of the Ground Broadcast Transceiver (GBT).

12.5.8 Lightning

Lightning data shows the approximate location of cloud-to-ground lightning strikes. A strike icon represents a strike that has occurred within a two kilometer (1.08 NM) region. The exact location of the lightning strike is not displayed. Only cloud to ground strikes are reported in the US and extreme southern Canada (cloud to cloud strikes are not reported).

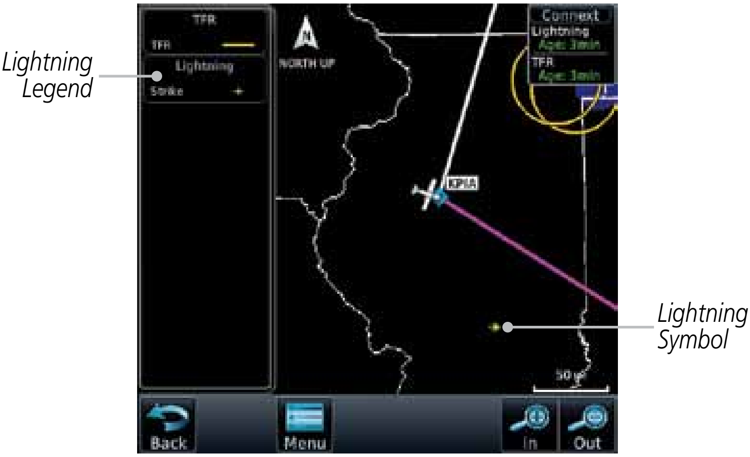

Lightning Legend
TFR
TFR
Lightning
Strike
NORTH UP
Connext
Lightning
Age: 3min
TFR
Age: 3min
KPIA
Lightning Symbol
50 nm
Back
Menu
In
Out

Figure 12-79 Connext Data Link Lightning and Legend

12.5.9 Infrared Satellite Data

Infrared Satellite data is available over North America and Europe and depicts cloud top temperatures from satellite imagery. Brighter cloud top colors indicate cooler temperatures occurring at higher altitudes. Information is updated every half hour.

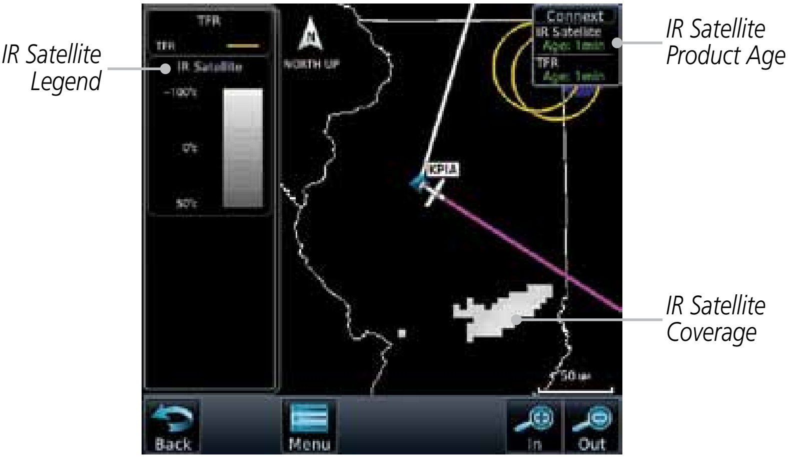

IR Satellite Legend
TFR
TFR
IR Satellite
NORTH UP
Connext
IR Satellite
Age: 1min
TFR
Age: 1min
IR Satellite Product Age
KPIA
IR Satellite Coverage
50 nm
Back
Menu
In
Out

Figure 12-80 Connext Infrared Satellite Data Map Display and Legend

12.5.10 METARs

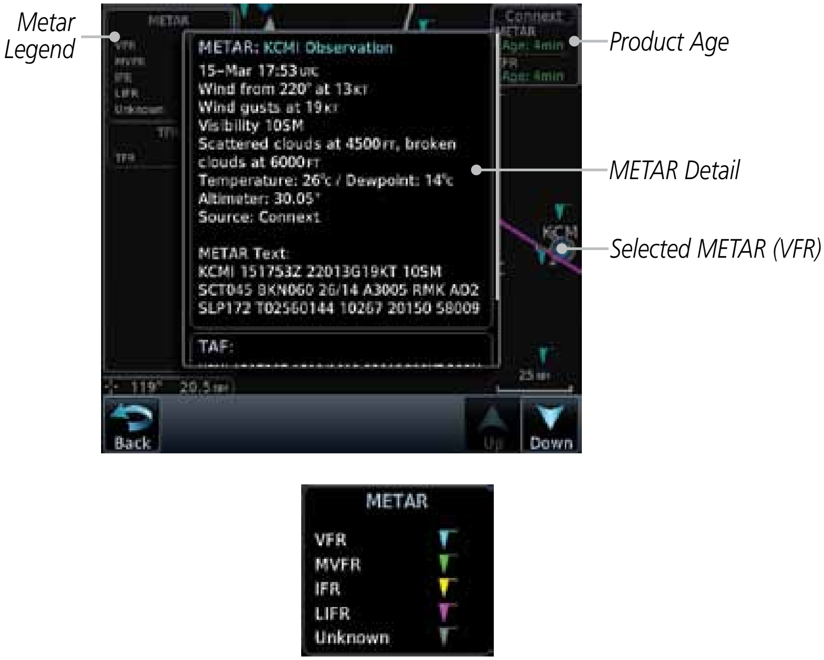
NOTE: *Atmospheric pressure reported for METARs is given in hectopascals (hPa), except in the United States, where it is reported in inches of mercury (in Hg). Temperatures are reported in Celsius.*

NOTE: *METAR information is only displayed within the installed aviation database service area.*

METAR (METeorological Aerodrome Report), known as an Aviation Routine Weather Report, is the standard format for current weather observations. METARs are generally updated hourly, but some site are more frequent. Special updates are done as conditions warrant. METARs typically contain information about the temperature, dew point, wind, precipitation, cloud cover, cloud heights, visibility, and barometric pressure. They can also contain information on precipitation amounts, lightning, and other critical data. METARs are shown as colored flags at airports that provide them.

METAR Symbol	Description
	VFR (ceiling greater than 3000 ft. AGL and visibility greater than five miles)
	Marginal VFR (ceiling 1000–3000 ft. AGL and/or visibility three to five miles)
	IFR (ceiling 500 to below 1000 ft. AGL and/or visibility one mile to less than three miles)
	Low IFR (ceiling below 500 ft. AGL or visibility less than one mile)
	Unknown

Table 12-7 METAR Symbols


Metar Legend
Product Age
METAR Detail
Selected METAR (VFR)
METAR
VFR
MVFR
IFR
LIFR
Unknown
TFR
Connext
METAR
Age: 4min
TFR
Age: 4min
KCM
119°
20.5 NM
25 NM
Back
Up
Down

METAR: KCMI Observation
15-Mar 17:53 UTC
Wind from 220° at 13 KT
Wind gusts at 19 KT
Visibility 10SM
Scattered clouds at 4500 FT, broken clouds at 6000 FT
Temperature: 26°C / Dewpoint: 14°C
Altimeter: 30.05"
Source: Connext

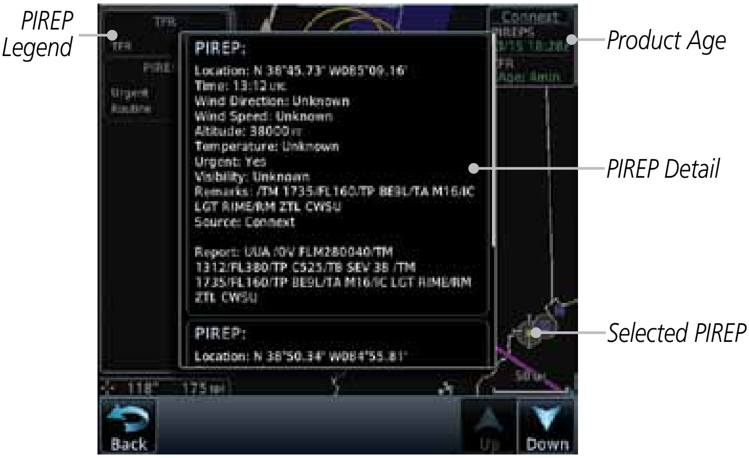
METAR Text:
KCMI 151753Z 22013G19KT 10SM
SCT045 BKN060 26/14 A3005 RMK AO2
SLP172 T02560144 10267 20150 58009

TAF:

Figure 12-81 Connext Weather - Graphic METARs and Legend

12.5.11 PIREPs

Pilot Weather Reports (PIREPs) provide timely weather information for a particular route of flight. When significant weather conditions are reported or forecast, Air Traffic Control (ATC) facilities are required to solicit PIREPs. A PIREP may contain non-forecast adverse weather conditions, such as low in-flight visibility, icing conditions, wind shear, and turbulence. PIREPs are issued as either Routine (UA) or Urgent (UUA).

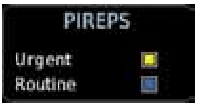


PIREP:
Location: N 38°45.73' W085°09.16'
Time: 13:12 utc
Wind Direction: Unknown
Wind Speed: Unknown
Altitude: 38000 FT
Temperature: Unknown
Urgent: Yes
Visibility: Unknown
Remarks: /TM 1735/FL160/TP BE9L/TA M16/IC LGT RIME/RM ZTL CWSU
Source: Connext

Report: UUA /OV FLM280040/TM 1312/FL380/TP C525/TB SEV 38 /TM 1735/FL160/TP BE9L/TA M16/IC LGT RIME/RM ZTL CWSU

PIREP:
Location: N 38°50.34' W084°55.81'

Figure 12-82 Connext Weather - PIREPs



PIREPS
Urgent 🟨
Routine 🟦

Figure 12-83 Connext Weather - PIREPs Legend

12.5.12 Winds Aloft

Winds Aloft data shows the forecast wind speed and direction at the surface and at selected altitudes. Altitudes can be selected in 3000 foot increments from the surface up to 42,000 feet MSL. Pressing the **WX Aloft ALT + or –** soft keys steps down or up in 3,000 foot increments.

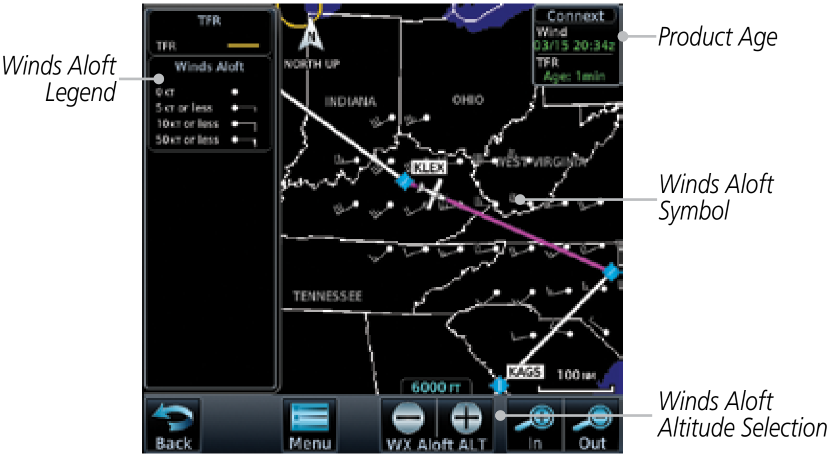

Winds Aloft Legend
Product Age
Winds Aloft Symbol
Winds Aloft Altitude Selection
TFR
TFR
Winds Aloft
0KT
5KT or less
10KT or less
50KT or less
NORTH UP
Connext
Wind
03/15 20:34z
TFR
Age: 1min
INDIANA
OHIO
WEST VIRGINIA
KLEX
TENNESSEE
KAGS
100nm
6000FT
Back
Menu
WX Aloft ALT
In
Out

Figure 12-84 Connext Weather - Winds Aloft

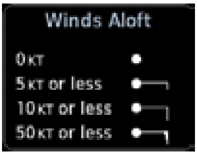

Winds Aloft
0KT ●
5KT or less ●
10KT or less ●
50KT or less ●

Figure 12-85 Connext Weather - Winds Aloft Legend

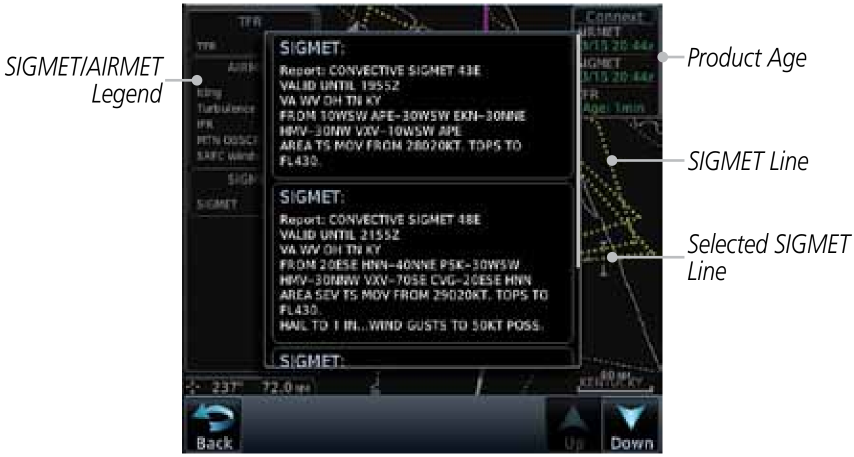
Winds Aloft Altitude

The Winds Aloft Altitude option allows you to select the altitude for the Winds Aloft weather product. Altitude can be selected in 3,000 foot increments from the surface up to 42,000 feet MSL.

Pressing the **WX Aloft ALT + or –** soft keys steps down or up in 3,000 foot increments. In the figure shown above, 6,000 feet is selected and Winds Aloft data is shown for winds reported at an altitude of 6,000 feet.

12.5.13 SIGMETs and AIRMETs

SIGMETs (SIGnificant METeorological Information) and AIRMETs (AIRmen's METeorological Information) are broadcast for potentially hazardous weather considered of importance to aircraft. A Convective SIGMET is issued for hazardous convective weather. A localized SIGMET is a significant weather condition occurring at a localized geographical position.


SIGMET/AIRMET Legend
Product Age
SIGMET Line
Selected SIGMET Line
TFR
AIRMET
Icing
Turbulence
IFR
MTN OBSCR
SRFC Winds
SIGMET
Connext
237°
72.0 NM
80 NM
Back
Up
Down

SIGMET:
Report: CONVECTIVE SIGMET 43E
VALID UNTIL 1955Z
VA WV OH TN KY
FROM 10WSW APE-30WSW EKN-30NNE
HMV-30NW VXV-10WSW APE
AREA TS MOV FROM 28020KT. TOPS TO
FL430.

SIGMET:
Report: CONVECTIVE SIGMET 48E
VALID UNTIL 2155Z
VA WV OH TN KY
FROM 20ESE HNN-40NNE PSK-30WSW
HMV-30NNW VXV-70SE CVG-20ESE HNN
AREA SEV TS MOV FROM 29020KT. TOPS TO
FL430.
HAIL TO 1 IN...WIND GUSTS TO 50KT POSS.

SIGMET:

Figure 12-86 Connext Weather Page - AIRMETs/SIGMETs

When enabled, SIGMET/AIRMETs advise the pilot of potentially hazardous weather. SIGMETs are directed to all aircraft. AIRMETs are intended for light aircraft. SIGMET/AIRMET data covers icing, turbulence, dust, and volcanic ash as issued by the National Weather Service. The update rate is selected in the Connext Settings Menu.

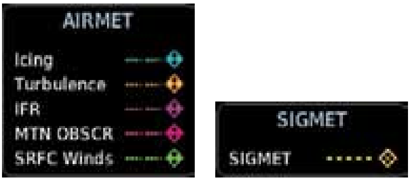

AIRMET
Icing
Turbulence
IFR
MTN OBSCR
SRFC Winds
SIGMET
SIGMET

Figure 12-87 Connext Weather - AIRMETs/SIGMETs Detail and Legend

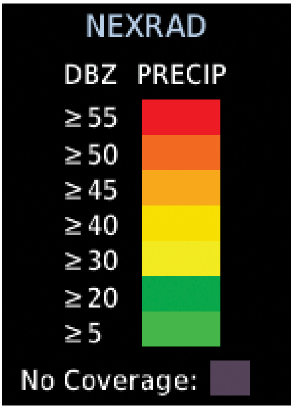
When enabled, the following AIRMETs are available for display:

- Icing
- Turbulence
- IFR conditions
- Mountain obscuration
- Surface winds

12.6 FIS-B Weather

The Flight Information Services (FIS-B) function is capable of displaying text and graphic weather information with GDL 88 installations. No subscription for FIS-B services is required with the GDL 88.

The FIS-B Function is a graphic weather display capable of displaying graphical weather information on UAT equipped installations. Graphical data is overlaid on the map indicating the rainfall detected by ground based radar for a specific area. Colors are used to identify the different NEXRAD echo intensities (reflectivity) measured in dBZ (decibels of Z). "Reflectivity" (designated by the letter Z) is the amount of transmitted power returned to the radar receiver. The dBZ values increase as returned signal strength increases. Precipitation intensity is displayed using colors corresponding to the dBZ values. Review the Limitations section in the front of this guide for the limitations that apply to the FIS-B data. An example of how rainfall data is color coded follows:



NEXRAD

DBZ	PRECIP
≥55	🟥
≥50	🟧
≥45	🟧
≥40	🟨
≥30	🟨
≥20	🟩
≥5	🟩

No Coverage: ⬛

Figure 12-88 FIS-B Weather Precipitation Legend

The FIS-B Function is based on a ground-to-air data link and requires that the appropriate ground systems are broadcasting weather data and the aircraft is within reception range of the Ground Broadcast Transceiver (GBT).

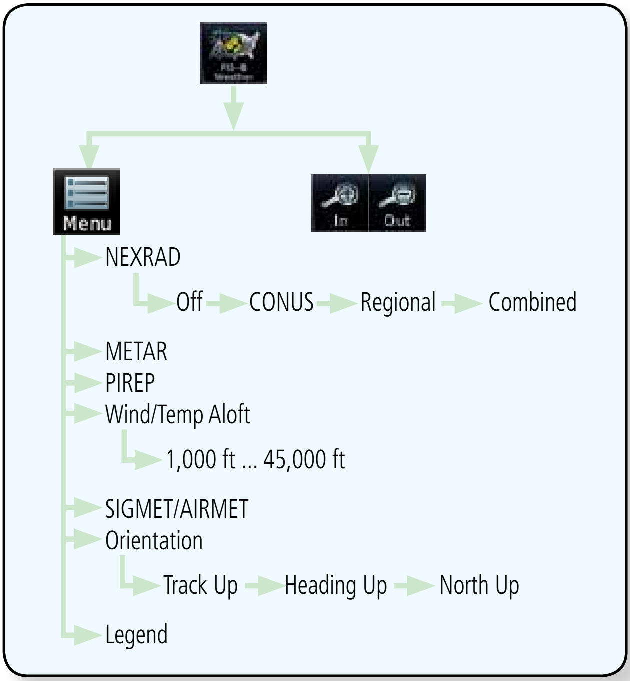

FIS-B Weather
Menu
In
Out
NEXRAD
Off
CONUS
Regional
Combined
METAR
PIREP
Wind/Temp Aloft
1,000 ft ... 45,000 ft
SIGMET/AIRMET
Orientation
Track Up
Heading Up
North Up
Legend

Figure 12-89 FIS-B Weather Functional Diagram

Weather Product	Expiration Time (Minutes)	Transmission Interval (Minutes)	Update Interval (Minutes)
CONUS NEXRAD	60	15	15
Regional NEXRAD	30	2.5	5
AIRMETs	60	5	As Available (Typically 20 minutes)
SIGMETs	60	5	As Available (Typically 20 minutes), then at 15 minute intervals for 1 hour
METARs	90	5	1 minute (where available), As Available otherwise (Typically ≤ 20 minutes)
Winds and Temperatures Aloft	90 or at the end of the valid period	10	12 hours
Pilot Weather Report (PIREP) (Blue - Regular, Yellow - Urgent)	90	10	As available |(Typically 20 minutes)
TAFs	60	10	8 hours
TFRs	60	10	20
NOTAMs	60	10	As available (Typically 20 minutes)

Table 12-8 FIS-B Weather Products and Aging

WARNING: *Do not use the indicated data link weather product age to determine the age of the weather information shown by the data link weather product. Due to time delays inherent in gathering and processing weather data for data link transmission, the weather information shown by the data link weather product may be significantly older than the indicated weather product age.*

12.6.1 FIS-B Operation

Weather data reception time is shown in the upper right corner of the screen. An indicated time shows if the aircraft is currently within reception coverage of a ground station with weather broadcast capabilities. The ground system determines the weather coverage area and extent of data that is transmitted by each ground station. The GDL 88 can display weather from multiple ground stations.

1. From the Home page, touch the **Weather** key on the Home page and then touch the **FIS-B Weather** key (if necessary).

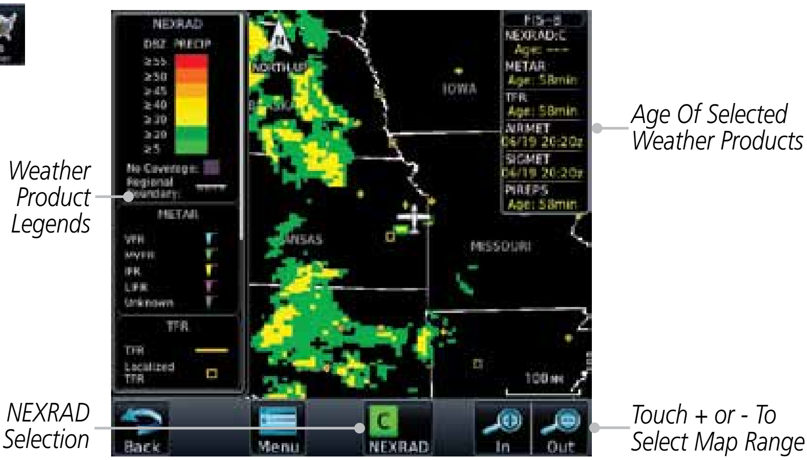

NEXRAD
DBZ PRECIP
≥55
≥50
≥45
≥40
≥30
≥20
≥5
No Coverage
Regional Boundary
METAR
VFR
MVFR
IFR
LIFR
Unknown
TFR
TFR
Localized TFR
NORTH UP
IOWA
KANSAS
MISSOURI
100 NM
FIS-B
NEXRAD:C
Age: ---
METAR
Age: 58min
TFR
Age: 58min
AIRMET
06/19 20:20z
SIGMET
06/19 20:20z
PIREPS
Age: 58min
Back
Menu
NEXRAD
In
Out
Weather Product Legends
NEXRAD Selection
Age Of Selected Weather Products
Touch + or - To Select Map Range

Figure 12-90 FIS-B Weather Page (NEXRAD Key Shown)

2. While viewing the FIS-B weather page, touch the **Menu** key to configure the Data Link Weather page.

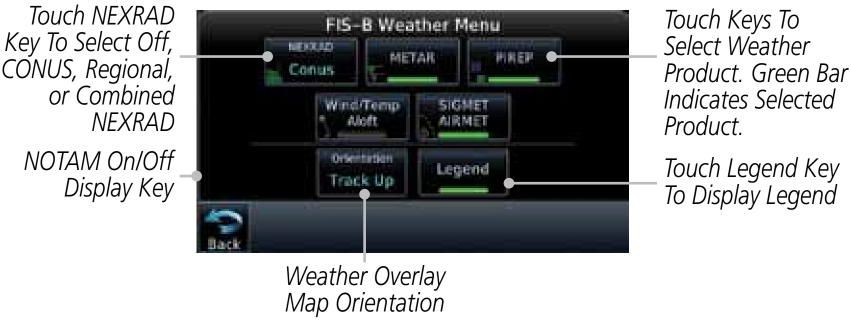

FIS-B Weather Menu
NEXRAD
Conus
METAR
PIREP
Wind/Temp Aloft
SIGMET AIRMET
Orientation
Track Up
Legend
Back
Touch NEXRAD Key To Select Off, CONUS, Regional, or Combined NEXRAD
NOTAM On/Off Display Key
Touch Keys To Select Weather Product. Green Bar Indicates Selected Product.
Touch Legend Key To Display Legend
Weather Overlay Map Orientation

Figure 12-91 FIS-B Weather Data Link Menu

3. Once you selected what items you want to display, touch **BACK** to return to the FIS-B Weather page.

12.6.2 FIS-B NEXRAD

WSR-88D weather surveillance radar or NEXRAD (NEXt generation RADar) is a Doppler radar system that has greatly improved the detection of meteorological events such as thunderstorms, tornadoes, and hurricanes. An extensive network of NEXRAD stations provides almost complete radar coverage of the continental United States, Alaska, and Hawaii. The unobstructed range of each NEXRAD is 124 nautical miles.

12.6.2.1 NEXRAD Abnormalities

There are possible abnormalities regarding displayed NEXRAD images. Some, but not all, causes of abnormal displayed information include:

- Ground Clutter
- Strobes and spurious radar data
- Sun strobes, when the radar antenna points directly at the sun
- Military aircraft deploy metallic dust which can cause alterations in radar scans
- Interference from buildings or mountains, which may cause shadows
- Scheduled maintenance may put a radar off-line

12.6.2.2 NEXRAD Limitations

Certain limitations exist regarding the NEXRAD radar displays. Some, but not all, are listed for the user's awareness:

- NEXRAD base reflectivity does not provide sufficient information to determine cloud layers or precipitation characteristics (hail vs. rain, etc).
- NEXRAD base reflectivity is sampled at the minimum antenna elevation angle. An individual NEXRAD site cannot depict high altitude storms at close ranges, and has no information about storms directly over the site.
- The resolution of displayed Regional NEXRAD data is approximately two kilometers and the resolution of displayed CONUS NEXRAD data is approximately 10 kilometers. Therefore, when zoomed in on the display, each square block is two kilometers (1.08 NM) or 10 kilometers (5.4 NM) on a side. The intensity level reflected by the square will be the highest level sampled within the area covered by each block.

12.6.2.3 NEXRAD Intensity

Colors are used to identify the different NEXRAD echo intensities (reflectivity) measured in dBZ (decibels of Z). "Reflectivity" is the amount of transmitted power returned to the radar receiver. Reflectivity (designated by the letter Z) covers a wide range of signals (from very weak to very strong). So, a more convenient number for calculations and comparison, a decibel (or logarithmic) scale (dBZ), is used. The dBZ values increase as the strength of the signal returned to the radar increases.

12.6.2.4 NEXRAD

When enabled, NEXRAD weather information is shown. Composite data from all of the NEXRAD radar sites in the United States is shown. This data is composed of the maximum reflectivity from the individual radar sweeps. The display of the information is color-coded to indicate the weather level severity. Refer to the legend for a description of the color code.

The NEXRAD option has selections of Regional, CONUS, or Combined NEXRAD. CONUS NEXRAD includes a composite of available NEXRAD radar imagery across the 48 states. Regional NEXRAD is a composite of available NEXRAD radar imagery in a local area, showing a more detailed image than CONUS NEXRAD.

Continental US NEXRAD (CONUS)

The Display CONUS NEXRAD selection shows NEXRAD radar information for the entire continental United States. CONUS NEXRAD data is updated every 15 minutes.

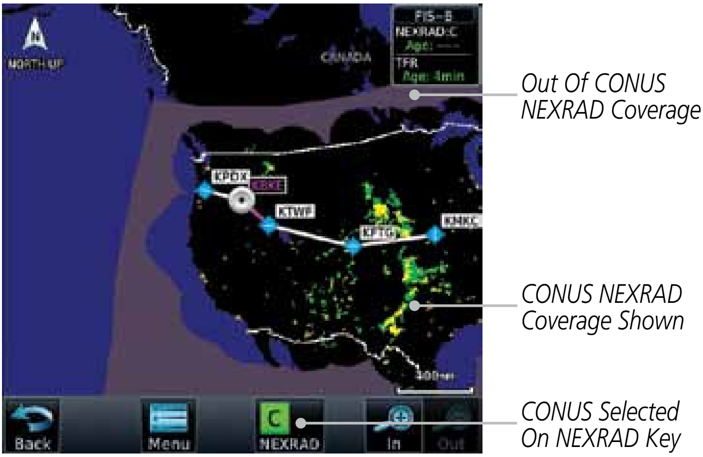

NORTH UP
CANADA
FIS-B
NEXRAD-C
Age:
TFR
Age: 4min
KPDX
KTWF
Back
Menu
C
NEXRAD
In
Out
Out Of CONUS NEXRAD Coverage
CONUS NEXRAD Coverage Shown
CONUS Selected On NEXRAD Key

Figure 12-92 Weather Page With CONUS Displayed

Regional NEXRAD

The Regional NEXRAD selection shows regional NEXRAD radar information within 500 miles of the aircraft location.

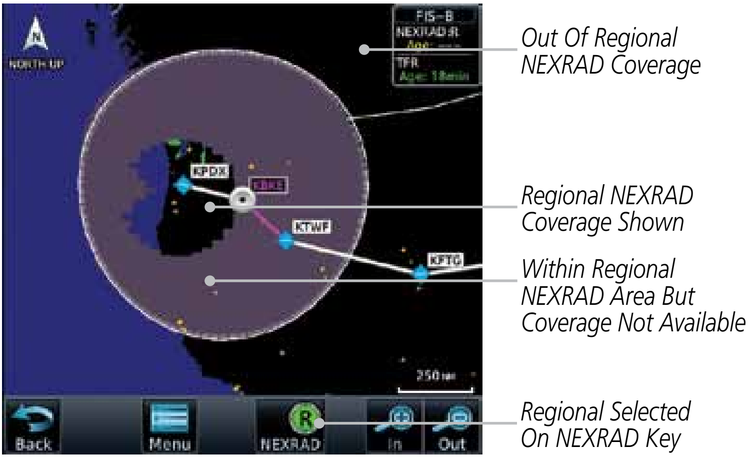

NORTH UP
FIS-B
NEXRAD R
Age: ---
TFR
Age: 18min
KPDX
KBKE
KTWF
KFTG
250nm
Back
Menu
NEXRAD
In
Out
Out Of Regional NEXRAD Coverage
Regional NEXRAD Coverage Shown
Within Regional NEXRAD Area But Coverage Not Available
Regional Selected On NEXRAD Key

Figure 12-93 Weather Page With Regional NEXRAD Displayed

Combined NEXRAD

Regional NEXRAD data within 150 NM of the aircraft location and CONUS NEXRAD data everywhere else. The two types of NEXRAD are separated by a white stippled border. This boundary is updated whenever new Regional or CONUS NEXRAD data is received.

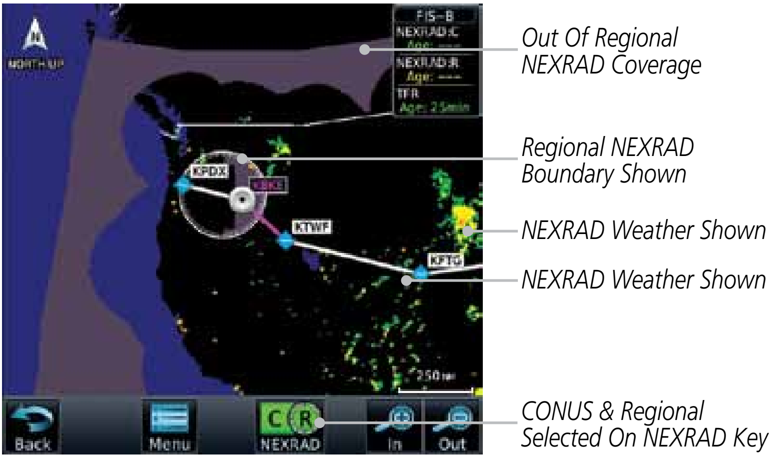
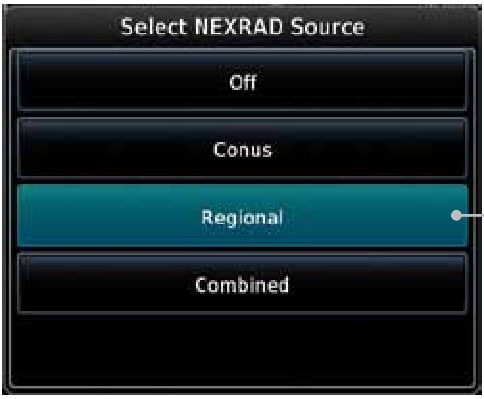

NORTH UP
FIS-B
NEXRAD C
Age: ---
NEXRAD R
Age: ---
TFR
Age: 25min
KPDX
KBKE
KTWF
KFTG
250nm
Back
Menu
C R
NEXRAD
In
Out
Out Of Regional NEXRAD Coverage
Regional NEXRAD Boundary Shown
NEXRAD Weather Shown
NEXRAD Weather Shown
CONUS & Regional Selected On NEXRAD Key

Figure 12-94 Weather Page With Combined NEXRAD Displayed

Selecting NEXRAD in the FIS-B Weather Menu

Menu

1. While viewing the FIS-B weather page, touch the **Menu** key to select the NEXRAD choice.
2. Touch the **NEXRAD** key to select Off, Regional, CONUS, or Combined NEXRAD.



Touch the Desired NEXRAD Source

Figure 12-95 NEXRAD Source Selection

Back

3. Touch the **Back** key to return to the FIS-B Weather Menu.

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

12.6.3 FIS-B TFRs

Temporary Flight Restrictions (TFRs) provide detailed information for local short term restrictions. The update rate is approximately every 20 minutes.

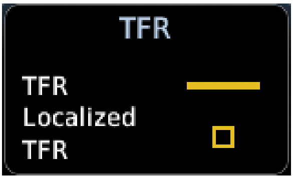
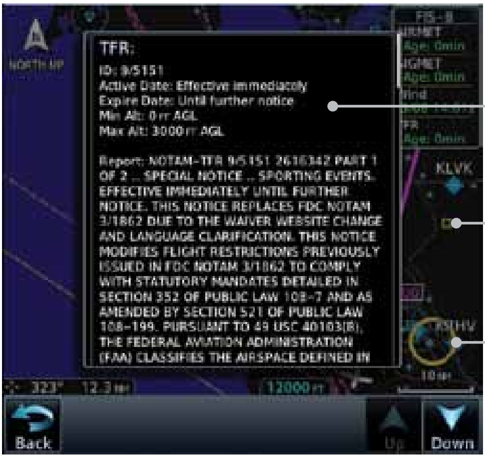

TFR
TFR
Localized TFR

Figure 12-96 FIS-B TFR Legend

1. Touch a TFR symbol on the Weather page to view details.


TFR:
ID: 9/5151
Active Date: Effective immediately
Expire Date: Until further notice
Min Alt: 0 FT AGL
Max Alt: 3000 FT AGL

Report: NOTAM-TFR 9/5151 261634Z PART 1 OF 2 ... SPECIAL NOTICE ... SPORTING EVENTS. EFFECTIVE IMMEDIATELY UNTIL FURTHER NOTICE. THIS NOTICE REPLACES FDC NOTAM 3/1862 DUE TO THE WAIVER WEBSITE CHANGE AND LANGUAGE CLARIFICATION. THIS NOTICE MODIFIES FLIGHT RESTRICTIONS PREVIOUSLY ISSUED IN FDC NOTAM 3/1862 TO COMPLY WITH STATUTORY MANDATES DETAILED IN SECTION 352 OF PUBLIC LAW 108-7 AND AS AMENDED BY SECTION 521 OF PUBLIC LAW 108-199. PURSUANT TO 49 USC 40103(B), THE FEDERAL AVIATION ADMINISTRATION (FAA) CLASSIFIES THE AIRSPACE DEFINED IN

NORTH UP
FIS-B
AIRMET
Age: 0min
SIGMET
Age: 0min
Wind
TFR
Age: 0min
KLVK
323°
12.3 nm
12000 FT
10 nm
Back
Up
Down
TFR Detail
Touch TFR Symbol To View Details
Touch TFR Symbol To View Details

Figure 12-97 FIS-B TFR Detail

2. Touch the **Back** key to return to the Weather display.

12.6.4 FIS-B METARs

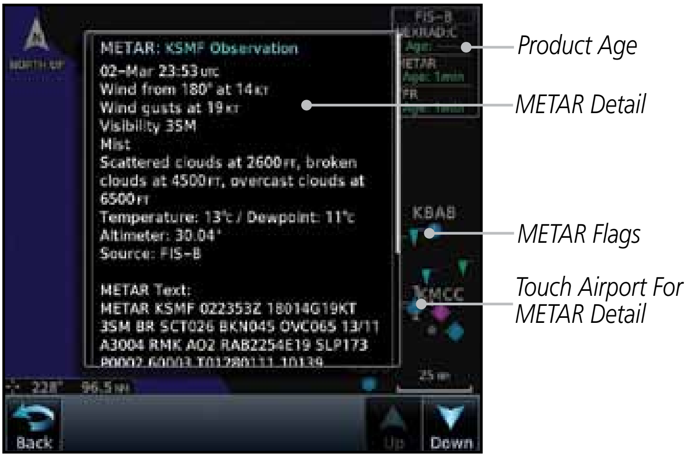
When enabled, graphic METARs (METeorological Aviation Reports) are shown as colored flags at airports that provide METAR reports. Press the **METARs** key to enable or disable METARs. Refer to the Legend for a description of the color code. The update rate is every five minutes.

METAR Symbol	Description
🟦	VFR (ceiling greater than 3000 ft. AGL and visibility greater than five miles)
🟩	Marginal VFR (ceiling 1000–3000 ft. AGL and/or visibility three to five miles)
🟨	IFR (ceiling 500 to below 1000 ft. AGL and/or visibility one mile to less than three miles)
🟪	Low IFR (ceiling below 500 ft. AGL or visibility less than one mile)
⬛	Unknown

Table 12-9 METAR Symbols

Menu

1. While viewing the FIS-B weather page, touch the **Menu** key to select the METAR choice. Touch an airport symbol for more METAR detail.



METAR: KSMF Observation
02-Mar 23:53 UTC
Wind from 180° at 14 KT
Wind gusts at 19 KT
Visibility 3SM
Mist
Scattered clouds at 2600 FT, broken clouds at 4500 FT, overcast clouds at 6500 FT
Temperature: 13°C / Dewpoint: 11°C
Altimeter: 30.04"
Source: FIS-B

METAR Text:
METAR KSMF 022353Z 18014G19KT 3SM BR SCT026 BKN045 OVC065 13/11 A3004 RMK AO2 RAB2254E19 SLP173 P0002 60003 T01280111 10139

Figure 12-98 METARS

METAR

2. Touch the **METAR** key to toggle METARS on or off.

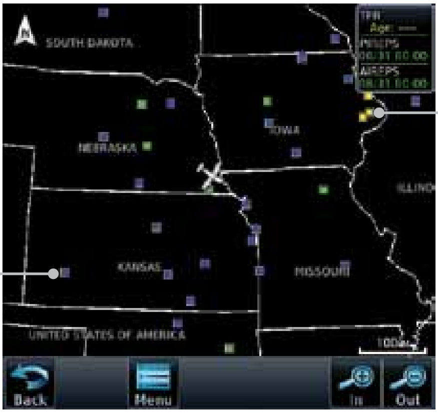
Back

3. Touch the **Back** key to return to the FIS-B Weather page.

12.6.5 FIS-B PIREPs

Pilot Weather Reports (PIREPs) provide timely weather information. When significant weather conditions are reported or forecast, Air Traffic Control (ATC) facilities are required to solicit PIREPs. A PIREP may contain non-forecast adverse weather conditions, such as low in-flight visibility, icing conditions, wind shear, and turbulence. PIREPs are issued as either Routine (UA) or Urgent (UUA). The update rate is approximately every 20 minutes.

1. While viewing the FIS-B weather page, touch the **Menu** key to select the PIREP choice.
2. Touch the **PIREP** key to toggle PIREPs on or off.

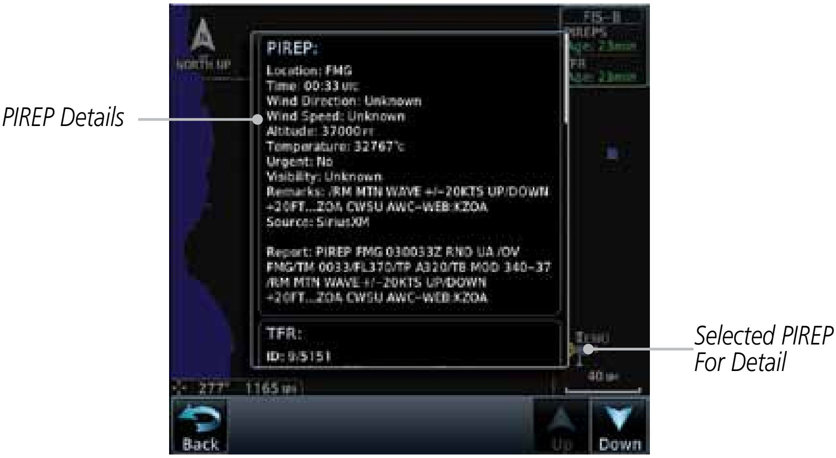

SOUTH DAKOTA
NEBRASKA
IOWA
KANSAS
MISSOURI
ILLINO
UNITED STATES OF AMERICA
TFR
Age: ---
PIREPS
AIREPS
100nm
Back
Menu
In
Out

Urgent PIREP Symbol (Yellow). Touch For Details.

Routine PIREP Symbol (Blue). Touch For Details.

Figure 12-99 Weather Display With PIREP Information Active

3. Touch a weather information symbol to view details for that item.


PIREP Details
Selected PIREP For Detail
NORTH UP
FIS-B
PIREPS
Age: 23min
TFR
Age: 23min
277° 1165 nm
40 nm
Back
Up
Down

PIREP:
Location: FMG
Time: 00:33 UTC
Wind Direction: Unknown
Wind Speed: Unknown
Altitude: 37000 FT
Temperature: 32767°C
Urgent: No
Visibility: Unknown
Remarks: /RM MTN WAVE +/-20KTS UP/DOWN +20FT...ZOA CWSU AWC-WEB:KZOA
Source: SiriusXM

Report: PIREP FMG 030033Z RNO UA /OV FMG/TM 0033/FL370/TP A320/TB MOD 340-37 /RM MTN WAVE +/-20KTS UP/DOWN +20FT...ZOA CWSU AWC-WEB:KZOA

TFR:
ID: 9/5151

Figure 12-100 PIREP Information Detail

4. Touch the **Back** key to remove the detailed information.

5. Touch the **PIREP** key again to turn it off.

12.6.6 FIS-B Winds and Temperatures Aloft

Winds and Temperatures Aloft data shows the forecast wind speed, direction, and Temperature at selected altitudes. Altitudes can be selected in increments from the 1,000 feet up to 53,000 feet. The update rate is every 12 hours.

Wind/Temp Alo't

1. While viewing the Data Link Weather menu, touch the **Wind/ Temp Aloft** key.

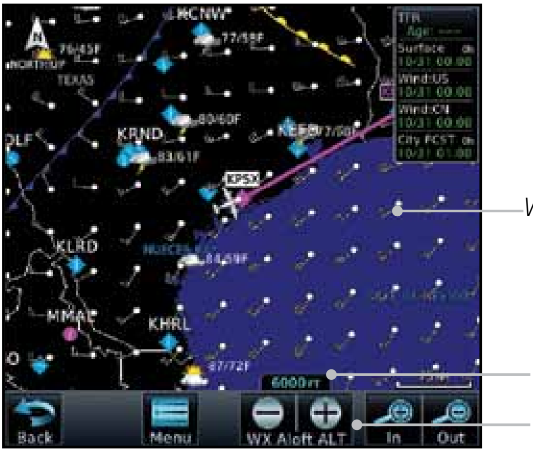

KCNW
77/58F
76/45F
NORTH UP
TEXAS
KRND
80/60F
83/61F
KPSX
KLRD
MMAE
KHRL
84/69F
87/72F
6000FT
Back
Menu
WX Aloft ALT
In
Out
Wind Symbols
Selected Wind Altitude
Touch To Select Wind Altitude

Figure 12-101 Winds Aloft

WX Aloft ALT

2. Touch the **WX Aloft ALT** **—** or **+** keys to increase or decrease the reporting altitude of the winds aloft in increments. The selected altitude is shown in a window above the altitude keys.

Wind/Temp Alo't

3. Touch the **Wind/Temp Aloft** key again to turn it off.

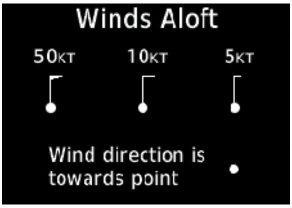
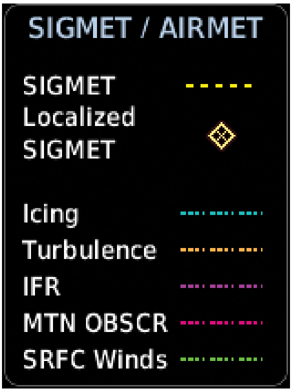

Winds Aloft
50KT
10KT
5KT
Wind direction is towards point

Figure 12-102 FIS-B Winds Aloft Legend

12.6.7 FIS-B SIGMETs and AIRMETs

SIGMETs (SIGnificant METerological Information) and AIRMETs (AIRmen's METerological Information) are broadcast for potentially hazardous weather considered of importance to aircraft. The update rate is approximately every 20 minutes.



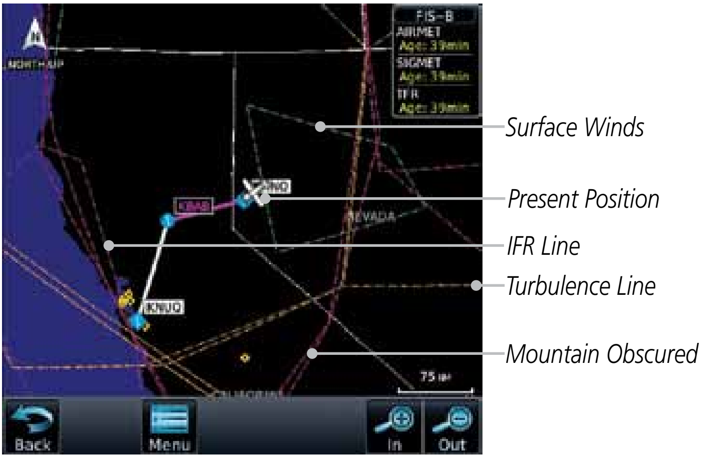
SIGMET / AIRMET

SIGMET - - - - -
Localized SIGMET ◈
Icing ---- ---- ----
Turbulence ---- ---- ----
IFR ---- ---- ----
MTN OBSCR ---- ---- ----
SRFC Winds ---- ---- ----

Figure 12-103 FIS-B SIGMET/AIRMET Legend

SIGMET AIRMET

1. While viewing the FIS-B Weather menu, touch the **SIGMET/ AIRMET** key.



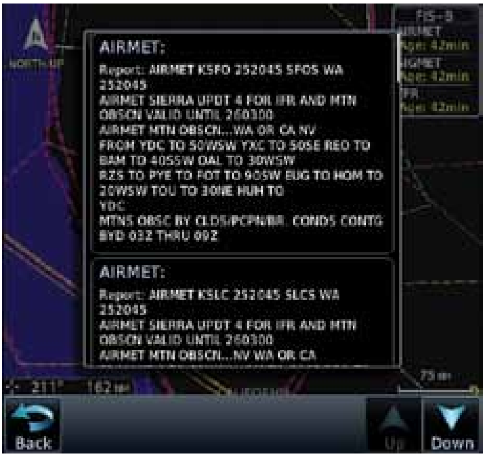
FIS-B
AIRMET
Age: 39min
SIGMET
Age: 19min
IFR
Age: 39min

NORTH UP
KBAB
KNUQ
NEVADA
CALIFORNIA
75 NM
Back
Menu
In
Out
Surface Winds
Present Position
IFR Line
Turbulence Line
Mountain Obscured

Figure 12-104 FIS-B SIGMETs and AIRMETs

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

2. Touch a SIGMET/AIRMET line to view details. Touch the **Back** key to return to the Weather display.



AIRMET:
Report: AIRMET KSFO 252045 SFOS WA 252045
AIRMET SIERRA UPDT 4 FOR IFR AND MTN OBSCN VALID UNTIL 260300
AIRMET MTN OBSCN...WA OR CA NV
FROM YDC TO 50WSW YXC TO 50SE REO TO BAM TO 40SSW OAL TO 30WSW
RZS TO PYE TO FOT TO 90SW EUG TO HQM TO 20WSW TOU TO 30NE HUH TO
YDC
MTNS OBSC BY CLDS/PCPN/BR. CONDS CONTG BYD 03Z THRU 09Z

AIRMET:
Report: AIRMET KSLC 252045 SLCS WA 252045
AIRMET SIERRA UPDT 4 FOR IFR AND MTN OBSCN VALID UNTIL 260300
AIRMET MTN OBSCN...NV WA OR CA

Figure 12-105 SIGMET and AIRMET Details

3. Touch the **SIGMET/AIRMET** key again to turn it off.

13 NEAREST

The Nearest function provides detailed information for the 25 nearest airports, VORs, NDBs, Intersections and User waypoints within 200 NM of your current position. In addition, the Nearest pages include the five nearest Flight Service Station (FSS) and center (ARTCC/FIR) points of communication and alert you to any Special Use (SUA) or Controlled Airspace you may be in or near.

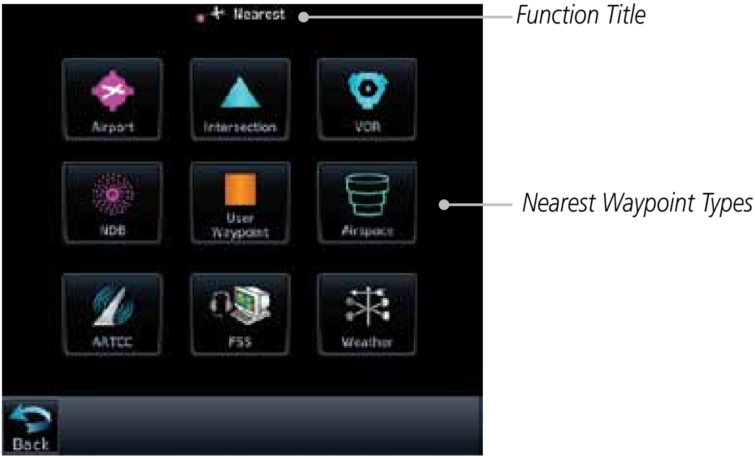

Nearest
Function Title
Airport
Intersection
VOR
NDB
User Waypoint
Airspace
Nearest Waypoint Types
ARTCC
FSS
Weather
Back

Figure 13-1 Nearest Page

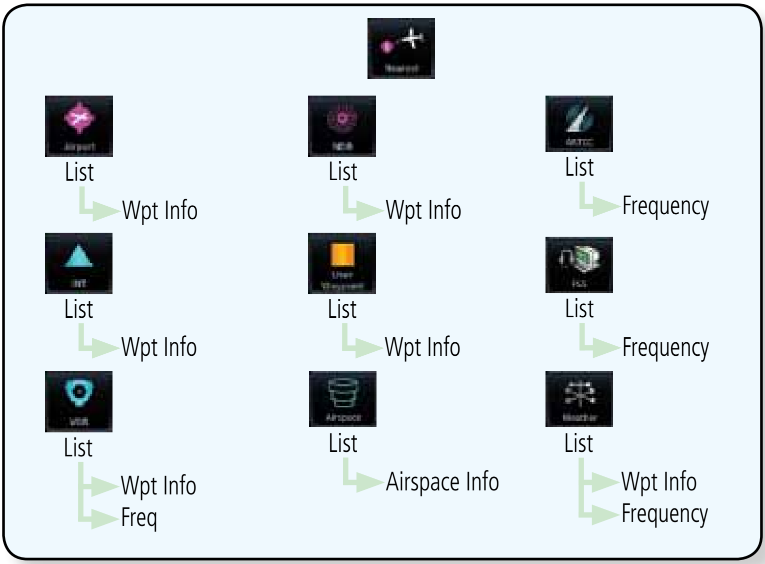

Nearest
Airport
List
Wpt Info
INT
List
Wpt Info
VOR
List
Wpt Info
Freq
NDB
List
Wpt Info
User Waypoint
List
Wpt Info
Airspace
List
Airspace Info
ARTCC
List
Frequency
FSS
List
Frequency
Weather
List
Wpt Info
Frequency

Figure 13-2 Nearest Page Functional Map

13.1 Select a Nearest Page

The available waypoint types are shown on the Nearest page. Touch the key to display the nearest 25 waypoint types (FSS and ARTCC will display up to five items). Not all 25 nearest waypoints can be displayed on the corresponding Nearest page at one time. The Nearest page displays detailed information for five nearest items.

1. On the Home page, touch the **Nearest** key.

2. Touch the desired waypoint type (Airport, VOR, etc.) and then touch the **Up** and **Down** keys on the lower right of the display to navigate through the list of available items. You can also touch an item on the list and drag your finger to scroll the list.
3. Touch the highlighted item to view more detailed information.

4. To navigate Direct-To the waypoint you're viewing, press the **Direct-To** key. The waypoint will be loaded into the Waypoint window of the Direct-To function.

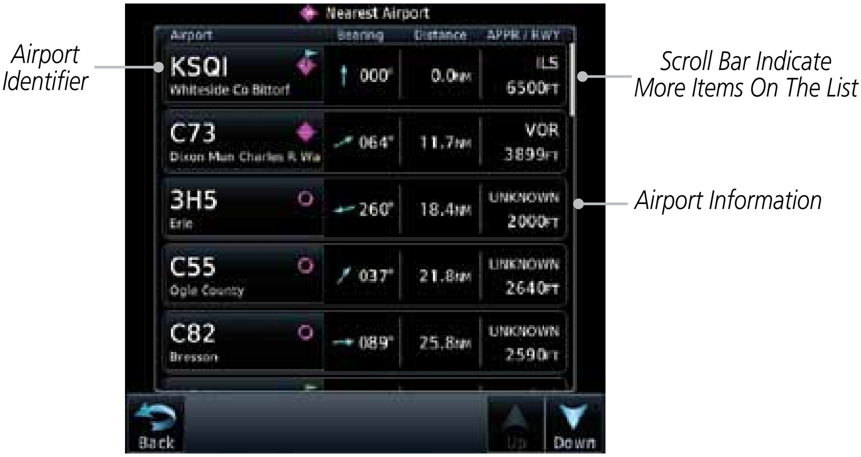
5. Touch the **Activate** key to navigate directly to that waypoint.

13.2 Nearest Airport

The Nearest Airport Page displays the identifier, symbol, bearing and distance, and the length of the longest runway for the 25 nearest airports (within 200 NM of your present position).

The Nearest Airport Page can be configured to exclude shorter runways or undesirable runway surface types, so that the corresponding airports do not appear on the list. You may wish to use this feature to exclude seaplane bases, heliports, or runway lengths which would be difficult or impossible to land upon. See *System - Setup - Nearest Airport Criteria* for information about configuring the Nearest Airport display criteria.

1. While viewing the Nearest function, touch the **Airport** key. A list of the nearest 25 airports within 200 NM will be listed.



Nearest Airport

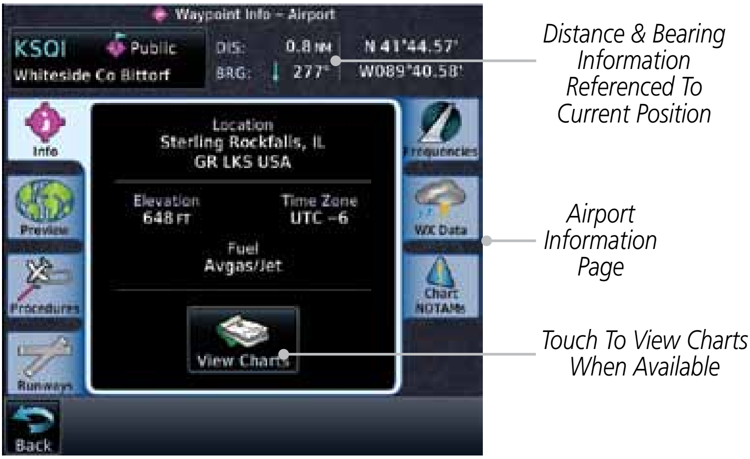
Airport	Bearing	Distance	APPR / RWY
KSQI Whiteside Co Bittorf	000°	0.0NM	ILS 6500FT
C73 Dixon Mun Charles R Wa	064°	11.7NM	VOR 3899FT
3H5 Erie	260°	18.4NM	UNKNOWN 2000FT
C55 Ogle County	037°	21.8NM	UNKNOWN 2640FT
C82 Bresson	089°	25.8NM	UNKNOWN 2590FT

Back
Up
Down
Airport Identifier
Scroll Bar Indicate More Items On The List
Airport Information

Figure 13-3 Nearest Airport

2. Touch the **Up** and **Down** keys to scroll through the list.

3. Touch the **Airport Identifier** key to show the Waypoint Info page for the selected airport.



Waypoint Info – Airport

KSQI Public
Whiteside Co Bittorf
DIS: 0.8NM N 41°44.57'
BRG: 277° W089°40.58'

Location
Sterling Rockfalls, IL
GR LKS USA

Elevation
648FT

Time Zone
UTC −6

Fuel
Avgas/Jet

Info
Preview
Procedures
Runways
Back
Frequencies
WX Data
Chart NOTAMs
View Charts
Distance & Bearing Information Referenced To Current Position
Airport Information Page
Touch To View Charts When Available

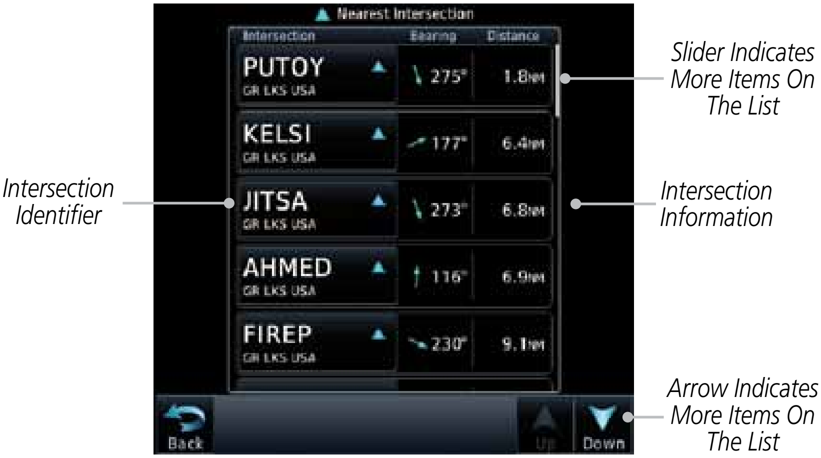
Figure 13-4 Nearest Airport Waypoint Info

4. Touch one of the tabs (Map, Procedures, Runways, etc.) on the sides of the display for more information about the selected airport.

13.3 Nearest Intersection (INT)

The Nearest Intersection Page displays the identifier, symbol, bearing and distance to the 25 nearest intersections (within 200 NM of your present position).

1. While viewing the Nearest function, touch the **INT** key. A list of the nearest 25 Intersections within 200 NM will be listed.



Intersection	Bearing	Distance
PUTOY GR LKS USA	275°	1.8NM
KELSI GR LKS USA	177°	6.4NM
JITSA GR LKS USA	273°	6.8NM
AHMED GR LKS USA	116°	6.9NM
FIREP GR LKS USA	230°	9.1NM

Slider Indicates More Items On The List

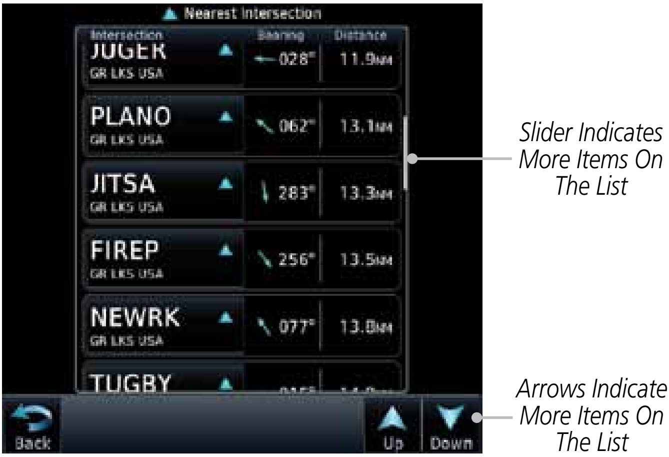
Intersection Identifier

Intersection Information

Arrow Indicates More Items On The List

Figure 13-5 Nearest Intersection List

2. Touch the **Up** and **Down** keys to scroll through the list.



Intersection	Bearing	Distance
JUGER GR LKS USA	028°	11.9NM
PLANO GR LKS USA	062°	13.1NM
JITSA GR LKS USA	283°	13.3NM
FIREP GR LKS USA	256°	13.5NM
NEWRK GR LKS USA	077°	13.8NM
TUGBY		

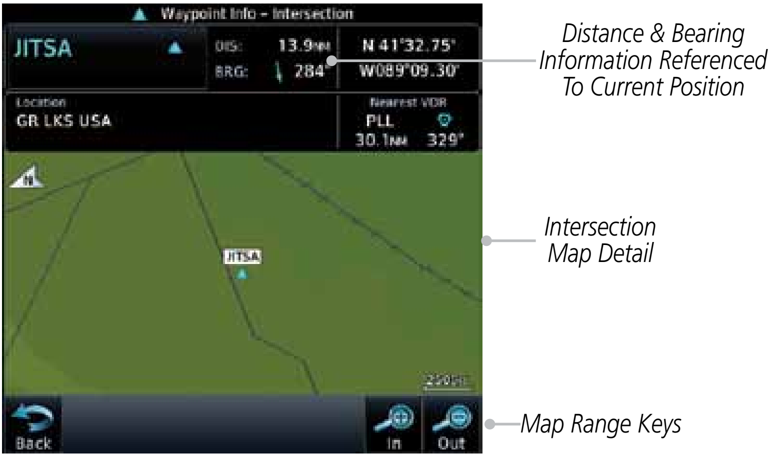
Slider Indicates More Items On The List

Arrows Indicate More Items On The List

Figure 13-6 Scrolling Down the Nearest Intersection List

JITSA
GR LKS USA

3. Touch the **Intersection Identifier** key to show the Waypoint Info page for the selected Intersection.



Waypoint Info - Intersection

JITSA

DIS: 13.9NM

BRG: 284°

N 41°32.75'

W089°09.30'

Location

GR LKS USA

Nearest VOR

PLL

30.1NM 329°

JITSA
Back
In
Out
Distance & Bearing Information Referenced To Current Position
Intersection Map Detail
Map Range Keys

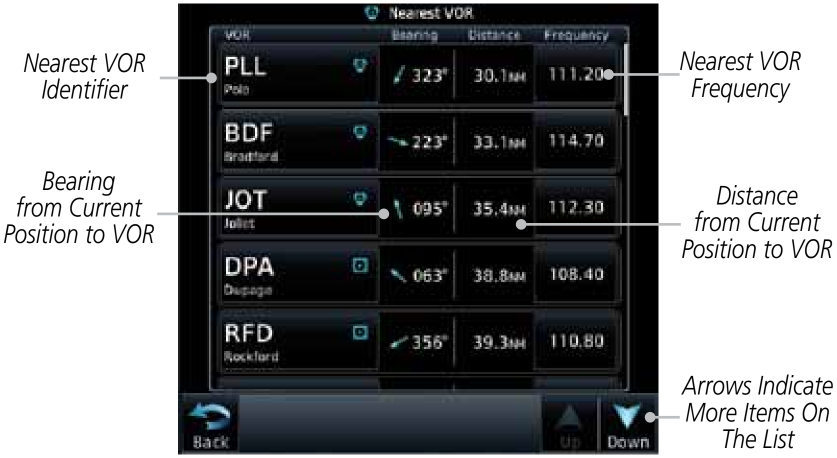
Figure 13-7 Nearest Intersection Waypoint Detail

13.4 Nearest VOR

The Nearest VOR Page displays the identifier, symbol, bearing and distance to the 25 nearest VORs (within 200 NM of your present position). For each VOR listed, the Nearest VOR Page also indicates the frequency and may be used to quickly tune the Nav radio to the nearby VOR (GTN 750 only).

Touch the VOR Frequency key to place the frequency in the standby field of the Nav window. Touch the **Nav** Active window to flip/flop the Nav frequencies.

1. While viewing the Nearest function, touch the **VOR** key. A list of the nearest 25 VORs within 200 NM will be listed.


Nearest VOR Identifier
Bearing from Current Position to VOR
Nearest VOR Frequency
Distance from Current Position to VOR
Arrows Indicate More Items On The List
Back
Up
Down

Nearest VOR

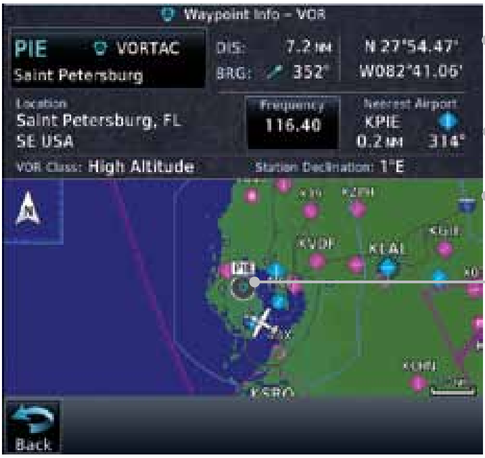
VOR	Bearing	Distance	Frequency
PLL Polo	323°	30.1NM	111.20
BDF Bradford	223°	33.1NM	114.70
JOT Joliet	095°	35.4NM	112.30
DPA Dupage	063°	38.8NM	108.40
RFD Rockford	356°	39.3NM	110.80

Figure 13-8 Nearest VOR List and Information

2. Touch the **Up** and **Down** keys to scroll through the list.

MCI
Kansas City

3. Touch the **VOR Identifier** key to show the Waypoint Info page for the selected VOR.


Waypoint Info - VOR

PIE VORTAC
Saint Petersburg

DIS: 7.2 NM
BRG: 352°

N 27°54.47'
W082°41.06'

Location: Saint Petersburg, FL SE USA

Frequency: 116.40

Nearest Airport: KPIE 0.2 NM 314°

VOR Class: High Altitude

Station Declination: 1°E

PIE
K2PH
KVDF
KLAL
KGIF
KSRQ
Back

VOR Information Referenced To Current Position

Additional VOR Information

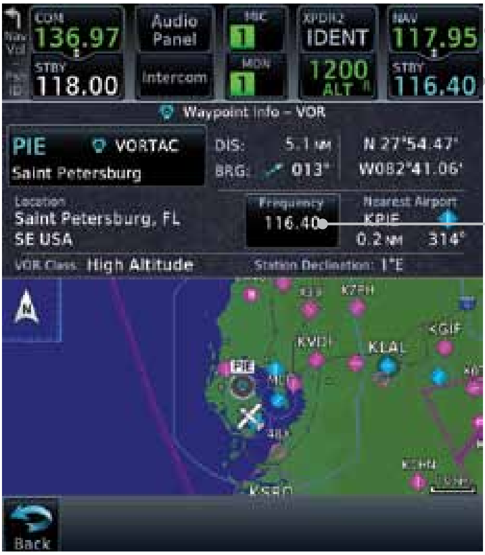
VOR Map Detail

VOR Location

Figure 13-9 Nearest VOR Waypoint Information

Frequency
113.25

4. Touch the **Frequency** key on this page or from the Nearest VOR List page to place the selected frequency into the Nav Standby window.


COM 136.97
STBY 118.00

XPDR2 IDENT
1200 ALT

NAV 117.95
STBY 116.40

Waypoint Info - VOR

PIE VORTAC
Saint Petersburg

DIS: 5.1 NM
BRG: 013°

N 27°54.47'
W082°41.06'

Location: Saint Petersburg, FL SE USA

Frequency: 116.40

Nearest Airport: KPIE 0.2 NM 314°

VOR Class: High Altitude

Station Declination: 1°E

Nav Vol
Audio Panel
Intercom
MIC 1
MON 1
PIE
K2PH
KVDF
KLAL
KGIF
KSRQ
Back

Touch to Flip/Flop

VOR Frequency Inserted Into Standby Window.

VOR Frequency

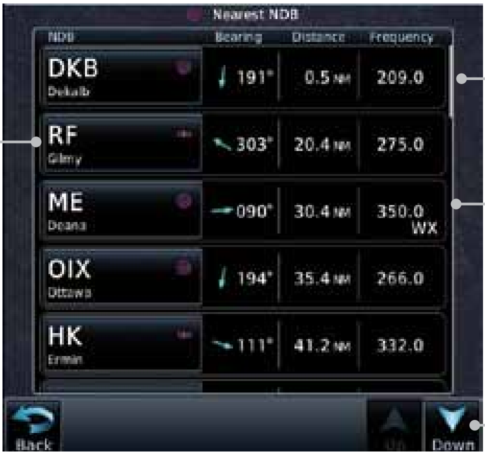
Figure 13-10 Nearest VOR Frequency Entry

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

13.5 Nearest NDB

The Nearest NDB Page displays the identifier, symbol, bearing, distance and frequency to the 25 nearest NDBs (within 200 NM of your present position).

1. While viewing the Nearest function, touch the **NDB** key. A list of the nearest 25 NDBs within 200 NM will be listed.



Nearest NDB

NDB	Bearing	Distance	Frequency
DKB Dekalb	191°	0.5 NM	209.0
RF Gilmy	303°	20.4 NM	275.0
ME Deana	090°	30.4 NM	350.0 WX
OIX Ottawa	194°	35.4 NM	266.0
HK Ermin	111°	41.2 NM	332.0

NDB Identifier

Scroll Bar Indicates More Items On The List. Touch And Drag Finger To Scroll.

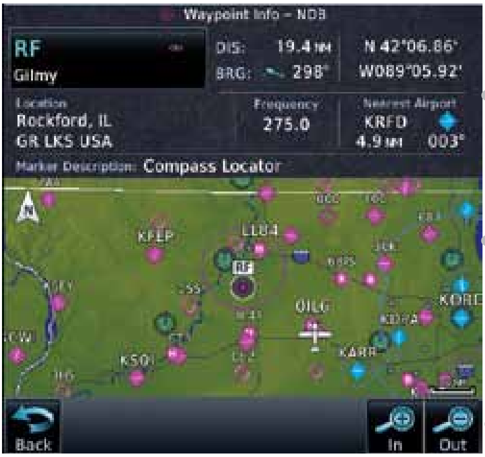
NDB Information

Arrows Indicate More Items On The List

Figure 13-11 Nearest NDB

2. Touch the **Up** and **Down** keys to scroll through the list.

3. Touch the **NDB Identifier** key to show the Waypoint Info page for the selected NDB.



Waypoint Info – NDB

RF
Gilmy

DIS: 19.4 NM
BRG: 298°
N 42°06.86'
W089°05.92'

Location: Rockford, IL GR LKS USA
Frequency: 275.0
Nearest Airport: KRFD 4.9 NM 003°
Marker Description: Compass Locator

Distance and Bearing Referenced To Current Position

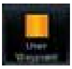
NDB Map Detail

Map Range Keys

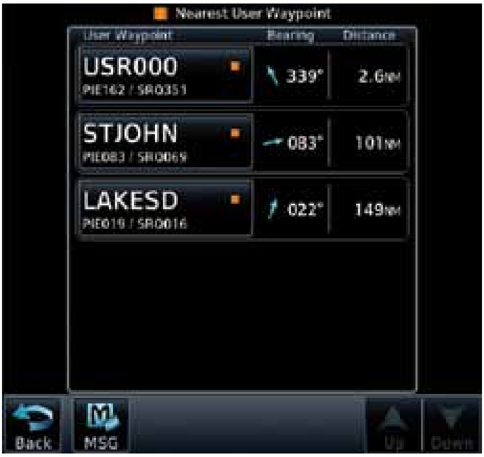
Figure 13-12 Nearest NDB Waypoint Information

13.6 Nearest User Waypoint

The Nearest User Waypoint Page displays the name, bearing and distance to the 25 nearest user waypoints (within 200 NM of your present position).



1. While viewing the Nearest function, touch the **User Waypoint** key. A list of the nearest 25 User waypoints within 200 NM will be listed.



Nearest User Waypoint

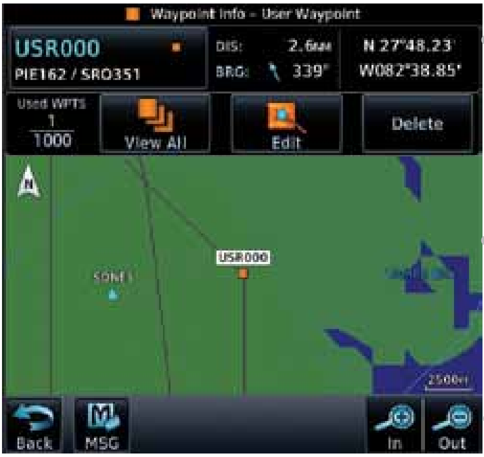
User Waypoint	Bearing	Distance
USR000 PIE162 / SRQ351	339°	2.6NM
STJOHN PIE083 / SRQ069	083°	101NM
LAKESD PIE019 / SRQ016	022°	149NM

Figure 13-13 Nearest User Waypoint

2. Touch the **Up** and **Down** keys to scroll through the list.

USR000
PIE162 / SRQ351

3. Touch the **User Identifier** key to show the Waypoint Info page for the selected User waypoint.



Waypoint Info - User Waypoint

USR000
PIE162 / SRQ351

DIS: 2.6NM
BRG: 339°
N 27°48.23'
W082°38.85'

Used WPTS
1
1000

User Wpt Distance & Bearing Referenced To Current Position

User Wpt Map Detail

Map Range Keys

Figure 13-14 Nearest User Waypoint Information

13.7 Nearest Airspace

The Nearest Airspace Page, alerts you to as many as 25 controlled or special use airspaces near or in your flight path. Alerts are provided according to the following conditions:

- If your projected course will take you inside an airspace within the next ten minutes, the alert message "*AIRSPACE ALERT - Airspace entry in less than 10 minutes*" appears. The Nearest Airspace Page shows the airspace as "Airspace Ahead."
- If you are within two nautical miles of an airspace and your current course will take you inside, the message "*AIRSPACE ALERT - Within 2nm of airspace*" appears. The Nearest Airspace Page shows the airspace as "Airspace Within 2 NM."
- If you are within two nautical miles of an airspace and your current course will take you inside in less than 10 minutes, the message "*AIRSPACE ALERT - Airspace within 2nm and entry in less than 10 minutes*" appears. The Nearest Airspace Page shows the airspace as "Ahead < 2 NM."
- If you have entered an airspace, the message "*AIRSPACE ALERT - Inside Airspace*" appears. The Nearest Airspace Page shows "Inside of airspace."

Note that the airspace alerts are based on three-dimensional data (latitude, longitude and altitude) to avoid nuisance alerts. The alert boundaries for controlled airspace are also sectorized to provide complete information on any nearby airspace. Once one of the described conditions exists, the message annunciator flashes, alerting you of an airspace message (if airspace alert messages are enabled). See *System-Alerts* to set the Arrival Alert Proximity, Airspace Type, and Altitude Buffer values.

***NOTE:** The Airspace Alert setting does not alter the depiction of airspace, or change the Smart Airspace setting for the main map page.*

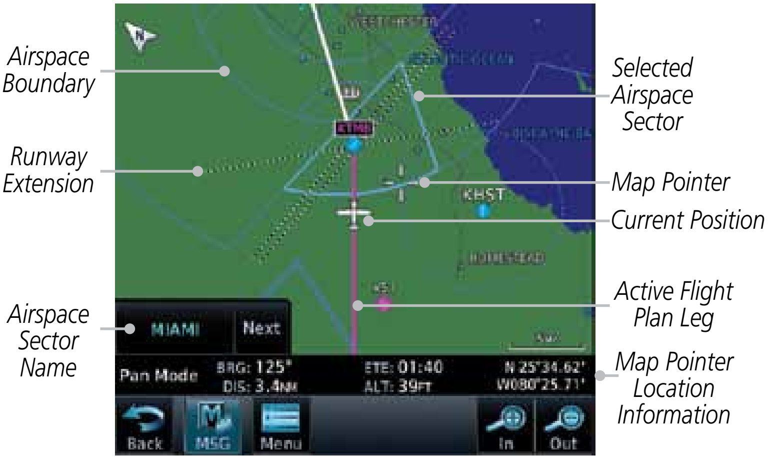
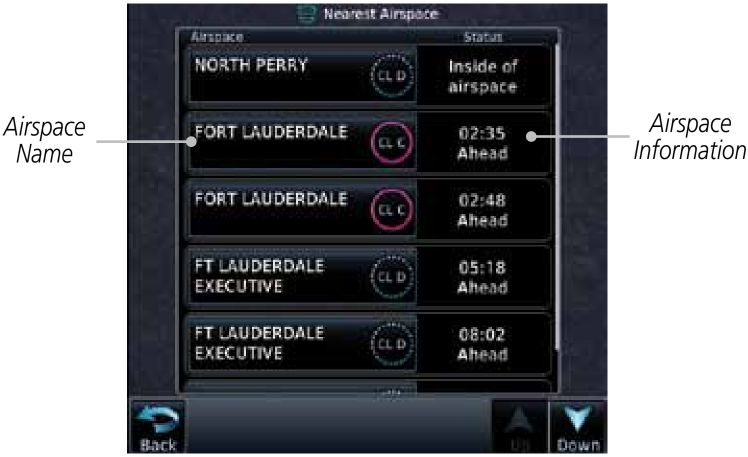

Airspace Boundary
Runway Extension
Airspace Sector Name
Selected Airspace Sector
Map Pointer
Current Position
Active Flight Plan Leg
Map Pointer Location Information
KTMB
KHST
MIAMI
Next
Pan Mode
BRG: 125°
DIS: 3.4NM
ETE: 01:40
ALT: 39FT
N 25°34.62'
W080°25.71'
Back
MSG
Menu
In
Out

Figure 13-15 Airspace Sectors

1. While viewing the Nearest function, touch the **Airspace** key. A list of the nearest 25 Airspaces within 200 NM along the aircraft flight path will be listed, depending on the airspace types and values set by the user.

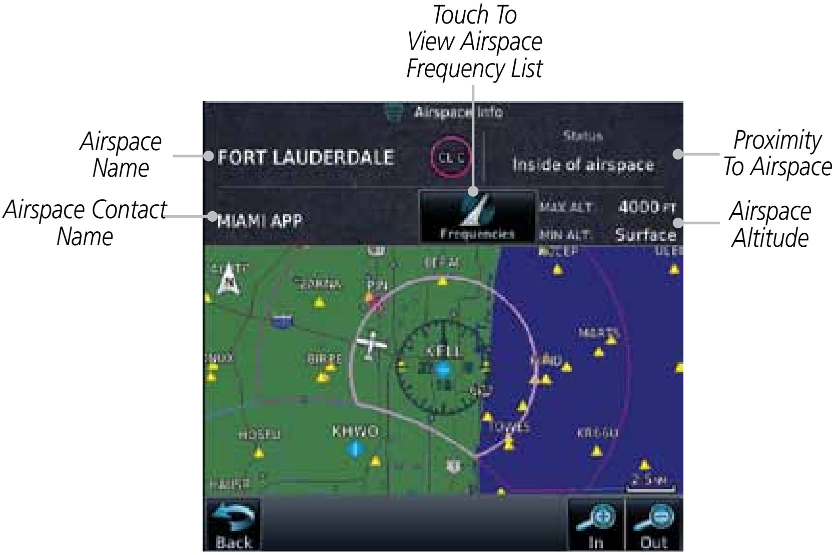

Airspace Name
Airspace Information
Nearest Airspace
Back
Up
Down

Airspace		Status
NORTH PERRY	CL D	Inside of airspace
FORT LAUDERDALE	CL C	02:35 Ahead
FORT LAUDERDALE	CL C	02:48 Ahead
FT LAUDERDALE EXECUTIVE	CL D	05:18 Ahead
FT LAUDERDALE EXECUTIVE	CL D	08:02 Ahead

Figure 13-16 Nearest Airspace List

2. Touch the **Up** and **Down** keys to scroll through the list.

3. Touch the **Airspace Identifier** key to show the Waypoint Info page for the selected Airspace.



Airspace Info

FORT LAUDERDALE

MIAMI APP

Status: Inside of airspace

MAX ALT: 4000 FT

MIN ALT: Surface

Touch To View Airspace Frequency List
Airspace Name
Airspace Contact Name
Proximity To Airspace
Airspace Altitude
CLC
Frequencies
KFLL
KHWO
Back
In
Out

Figure 13-17 Nearest Airspace Waypoint Information

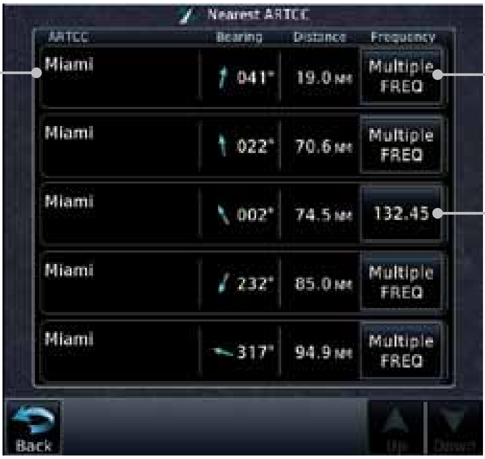
Once you have been provided an airspace alert message, detailed information concerning the specific airspace is provided on the Nearest Airspace Page. The Nearest Airspace Page displays the airspace name, status ("AIRSPACE ALERT - inside Airspace", "AIRSPACE ALERT - Airspace entry in less than 10 minutes", etc.), and a time to entry (if applicable). By selecting any airspace name listed on the Nearest Airspace Page, additional details are provided — including controlling agency, communication frequencies and floor/ceiling limits.

13.8 Nearest ARTCC

The Nearest ARTCC page displays the facility name, bearing to, distance, and frequency to the five nearest Air Route Traffic Control Center (ARTCC) points of communication (within 200 NM of your present position). For each ARTCC listed, the Nearest ARTCC page also indicates the frequency(s) and may be used to quickly tune the COM transceiver to the center's frequency.

Touch the ARTCC Frequency key to place the frequency in the standby field of the COM window. Touch the **COM** Active window to flip/flop the Com frequencies (GTN 750 only).

1. While viewing the Nearest function, touch the **ARTCC** key. A list of the nearest five ARTCCs within 200 NM will be listed.



Nearest ARTCC

ARTCC	Bearing	Distance	Frequency
Miami	041°	19.0 NM	Multiple FREQ
Miami	022°	70.6 NM	Multiple FREQ
Miami	002°	74.5 NM	132.45
Miami	232°	85.0 NM	Multiple FREQ
Miami	317°	94.9 NM	Multiple FREQ

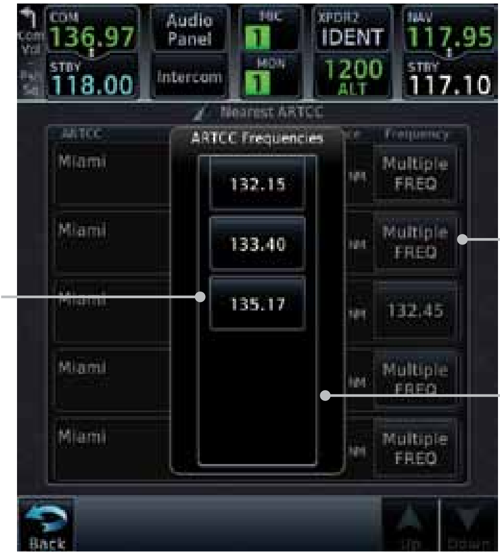
Back
Up
Down
ARTCC Name and Information
ARTCC Frequency Key With Multiple Frequencies Available
ARTCC Frequency Key

Figure 13-18 Nearest ARTCC

2. Touch the **Up** and **Down** keys to scroll through the list as needed.

Multiple FREQ

3. The Frequency category will show "Multiple" keys if multiple frequencies are available. Touch the **Multiple FREQ** key to display the frequencies.


COM
136.97
STBY
118.00
Audio Panel
Intercom
MIC
1
MON
1
XPDR2
IDENT
1200
ALT
NAV
117.95
STBY
117.10
Nearest ARTCC
ARTCC
Frequency
Miami
ARTCC Frequencies
132.15
133.40
135.17
Multiple FREQ
132.45
Back
Up
Down

Selected ARTCC Frequency Key

ARTCC Multiple Frequency Key

ARTCC Multiple Frequency List

Figure 13-19 Nearest ARTCC Multiple Frequency List

135.17

4. Touch the key for the desired frequency to place the selected frequency into the Com Standby window.

Touch To Flip/Flop Active And Standby Frequencies

Selected ARTCC Frequency Inserted Into Standby Window

Selected ARTCC Multiple Frequency List Key

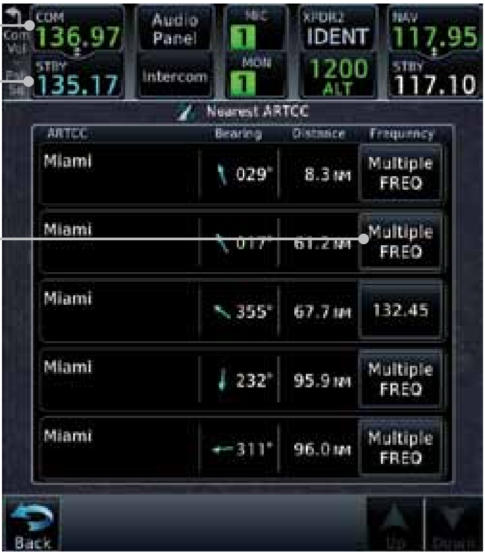

COM
136.97
STBY
135.17
Audio Panel
Intercom
MIC
1
MON
1
XPDR2
IDENT
1200
ALT
NAV
117.95
STBY
117.10
Nearest ARTCC
ARTCC
Bearing
Distance
Frequency
Miami 029° 8.3 NM Multiple FREQ
Miami 017° 61.2 NM Multiple FREQ
Miami 355° 67.7 NM 132.45
Miami 232° 95.9 NM Multiple FREQ
Miami 311° 96.0 NM Multiple FREQ
Back
Up
Down

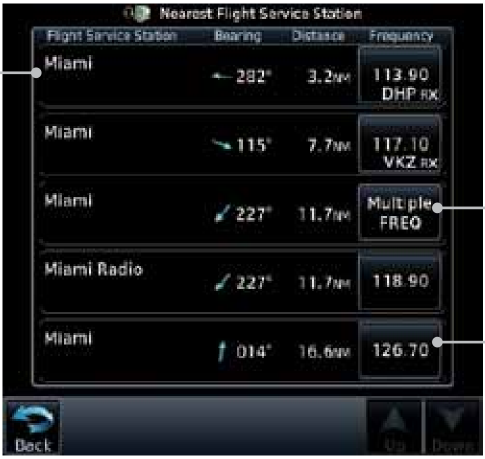
Figure 13-20 Selected ARTCC Frequency From List

13.9 Nearest Flight Service Station (FSS)

The Nearest Flight Service Station (FSS) Page displays the facility name, bearing to, distance, and frequency to the five nearest FSS points of communication (within 200 NM of your present position). For each FSS listed, the Nearest FSS Page also indicates the frequency(s) and may be used to quickly tune the COM transceiver to the FSS's frequency.

Touch the FSS Frequency key to place the frequency in the standby field of the COM window. Touch the **COM** Active window to flip/flop the Com frequencies (GTN 750 only). Receive-only frequencies are noted with a white "RX."

1. While viewing the Nearest function, touch the **FSS** key. A list of the nearest five FSSs within 200 NM will be listed.



Nearest Flight Service Station

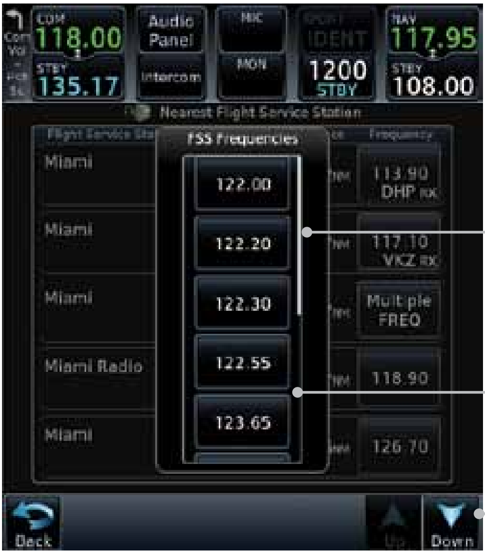
Flight Service Station	Bearing	Distance	Frequency
Miami	282°	3.2NM	113.90 DHP RX
Miami	115°	7.7NM	117.10 VKZ RX
Miami	227°	11.7NM	Multiple FREQ
Miami Radio	227°	11.7NM	118.90
Miami	014°	16.6NM	126.70

Figure 13-21 Nearest FSS

2. Touch the **Up** and **Down** keys to scroll through the list, if necessary.

Multiple FREQ

3. The **Frequency** key will show "Multiple FREQ" if multiple frequencies are available. Touch the **Multiple FREQ** key to display the frequencies.


COM
118.00
STBY
135.17
Com Vol
Audio Panel
Intercom
MIC
MON
IDENT
1200
STBY
NAV
117.95
STBY
108.00
Nearest Flight Service Station
Flight Service Sta
FSS Frequencies
Frequency
Miami
Miami
Miami
Miami Radio
Miami
122.00
122.20
122.30
122.55
123.65
113.90 DHP RX
117.10 VKZ RX
Multiple FREQ
118.90
126.70
Back
Up
Down

Slider Indicates More Frequencies. Touch And Drag Finger To View More.

FSS Multiple Frequency List

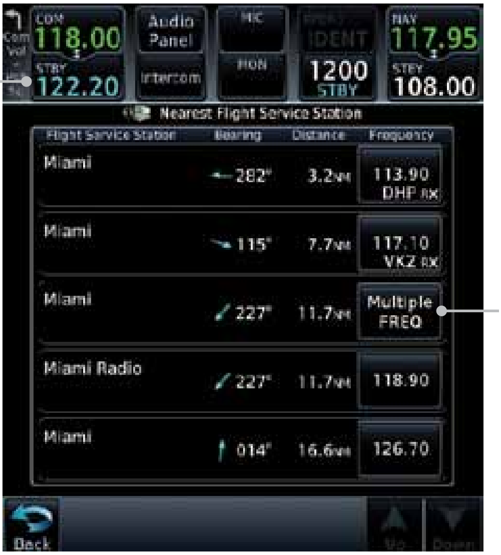
Touch The Up And Down Keys To View More Frequencies

Figure 13-22 Nearest FSS Multiple Frequency List

122.20

4. Touch the key for the desired frequency to place the selected frequency into the Com Standby window.

Selected FSS Frequency Inserted Into Standby Window


COM
118.00
STBY
122.20
Com Vol
Audio Panel
Intercom
MIC
MON
IDENT
1200
STBY
NAV
117.95
STBY
108.00
Nearest Flight Service Station
Back
Up
Down

Flight Service Station	Bearing	Distance	Frequency
Miami	282°	3.2NM	113.90 DHP RX
Miami	115°	7.7NM	117.10 VKZ RX
Miami	227°	11.7NM	Multiple FREQ
Miami Radio	227°	11.7NM	118.90
Miami	014°	16.6NM	126.70

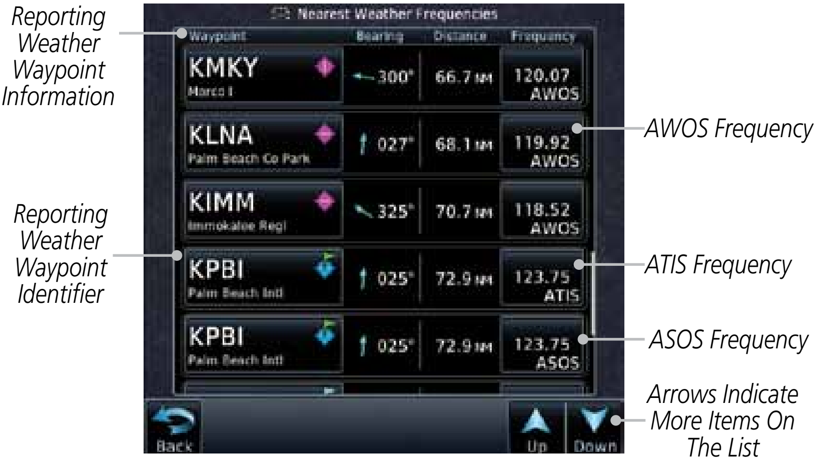
FSS Multiple Frequency Key

Figure 13-23 Selected FSS Frequency From List

13.10 Nearest Weather Frequency (WX Freq)

The Nearest WX FREQ function displays facility name, bearing to, distance, and frequency for the nearest 25 Automatic Terminal Information Service (ATIS), Automated Service Observing System (ASOS), and Automated Weather Observing Station (AWOS) weather reporting stations within 200 NM.

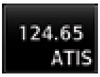
1. While viewing the Nearest function, touch the **WX FREQ** key. A list of the nearest 25 Weather stations within 200 NM will be listed.


Reporting Weather Waypoint Information
Reporting Weather Waypoint Identifier
AWOS Frequency
ATIS Frequency
ASOS Frequency
Arrows Indicate More Items On The List
Nearest Weather Frequencies
Back
Up
Down

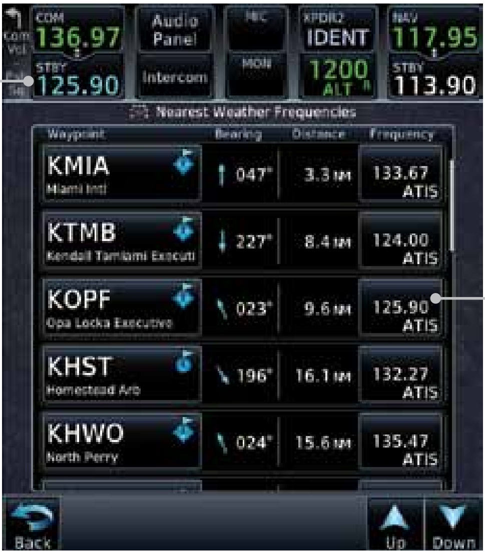
Waypoint	Bearing	Distance	Frequency
KMKY Marco I	300°	66.7 NM	120.07 AWOS
KLNA Palm Beach Co Park	027°	68.1 NM	119.92 AWOS
KIMM Immokalee Regl	325°	70.7 NM	118.52 AWOS
KPBI Palm Beach Intl	025°	72.9 NM	123.75 ATIS
KPBI Palm Beach Intl	025°	72.9 NM	123.75 ASOS

Figure 13-24 Nearest Weather Station

2. Touch the **Up** and **Down** keys to scroll through the list, as needed.



3. Touch the key for the desired frequency to place the selected frequency into the Com Standby window.


Com Vol
Push Sq
COM
STBY
Audio Panel
Intercom
MIC
MON
XPDR2
IDENT
ALT
NAV
STBY
Nearest Weather Frequencies
Back
Up
Down

COM 136.97 STBY 125.90 | XPDR2 IDENT 1200 ALT | NAV 117.95 STBY 113.90

Waypoint	Bearing	Distance	Frequency
KMIA Miami Intl	047°	3.3 NM	133.67 ATIS
KTMB Kendall Tamiami Executi	227°	8.4 NM	124.00 ATIS
KOPF Opa Locka Executive	023°	9.6 NM	125.90 ATIS
KHST Homestead Arb	196°	16.1 NM	132.27 ATIS
KHWO North Perry	024°	15.6 NM	135.47 ATIS

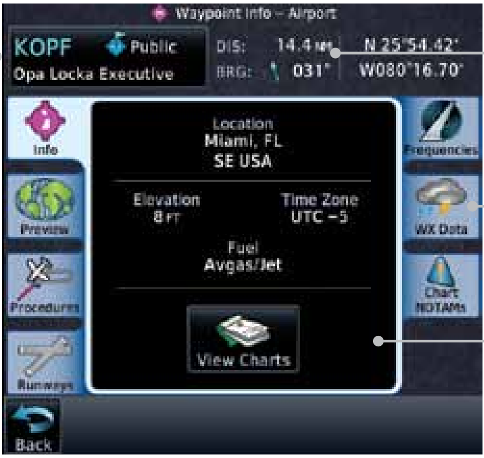
Selected Weather Frequency Inserted Into Standby Window

Selected Weather Frequency Key

Figure 13-25 Nearest Weather Station Selected Frequency

KOPF
Opa Locka Executive

4. Touch the **Weather Station Identifier** key to show the Waypoint Info page for the selected Weather station.


Waypoint Info - Airport
Info
Preview
Procedures
Runways
Frequencies
WX Data
Chart NOTAMs
View Charts
Back

KOPF Public
Opa Locka Executive
DIS: 14.4 NM N 25°54.42'
BRG: 031° W080°16.70'

Location
Miami, FL
SE USA

Elevation
8 FT

Time Zone
UTC -5

Fuel
Avgas/Jet

Wpt Identifier, Type, and Name

Dis & Brg Information Referenced To Current Position

Weather Tab Selected

Wpt Information Detail

Figure 13-26 Nearest Weather Station Waypoint Information

14 SERVICES/MUSIC

The Services function is available when certain optional features are installed and enabled. The key will be labeled as Music when only the Music feature is enabled. Music is provided through SiriusXM Satellite Radio. The GSR 56 is an Iridium® satellite transceiver that supports voice telephone calls, aircraft position reporting, and world wide weather products.

While viewing the Home page, touch the **Services** key to view the Services page.

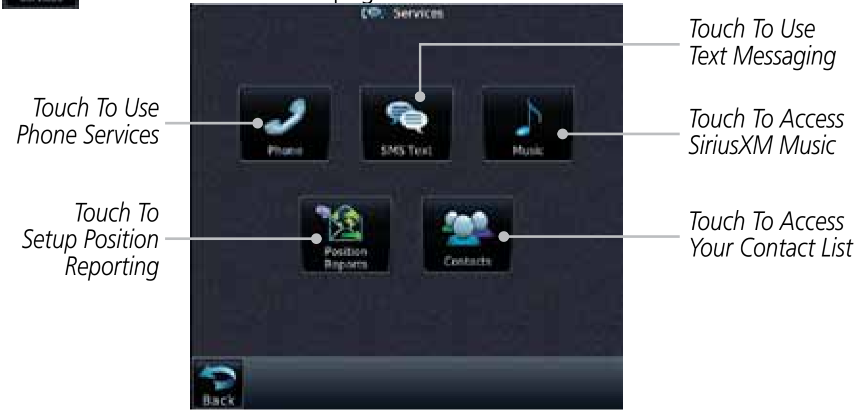

Services
Phone
SMS Text
Music
Position Reports
Contacts
Back
Touch To Use Text Messaging
Touch To Use Phone Services
Touch To Access SiriusXM Music
Touch To Setup Position Reporting
Touch To Access Your Contact List

Figure 14-1 Services Page

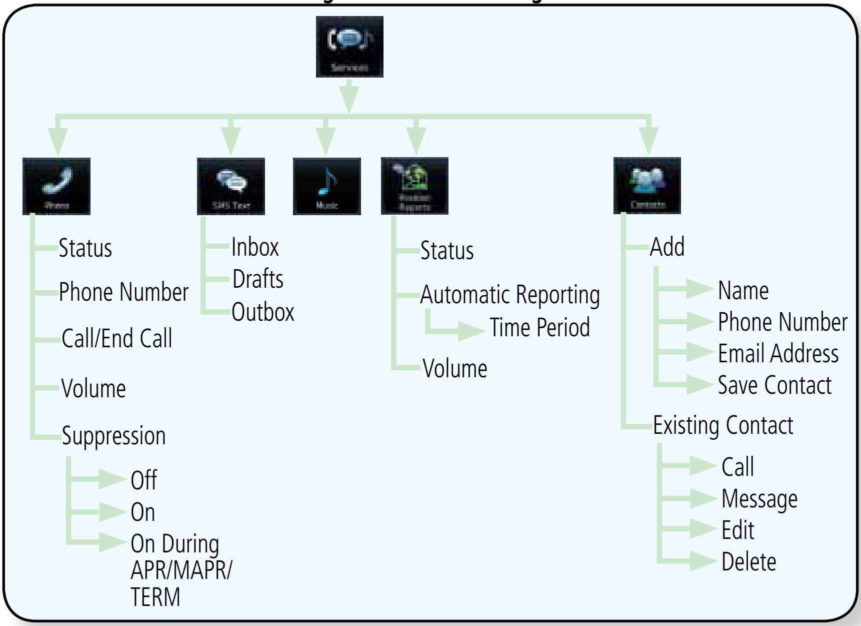

Services
Phone
Status
Phone Number
Call/End Call
Volume
Suppression
Off
On
On During APR/MAPR/TERM
SMS Text
Inbox
Drafts
Outbox
Music
Position Reports
Status
Automatic Reporting
Time Period
Volume
Contacts
Add
Name
Phone Number
Email Address
Save Contact
Existing Contact
Call
Message
Edit
Delete

Figure 14-2 Services Functional Diagram

14.1 Music

***NOTE:** Refer to the Weather Section for information about SiriusXM Weather products.*

The optional SiriusXM Satellite Radio entertainment feature of the GDL 69A Data Link Receiver is available for the pilot's and passengers' enjoyment. The GDL 69A can receive SiriusXM Satellite Radio entertainment services at any altitude throughout the Continental U.S. Entertainment audio is not available on the GDL 69 Data Link Receiver.

SiriusXM Satellite Radio offers a variety of radio programming over long distances without having to constantly search for new stations. Based on signals from satellites, coverage far exceeds land-based transmissions. SiriusXM Satellite Radio services are subscription-based. For more information on specific service packages, visit http://www.garmin.com/xm/.

Audio entertainment is available through the SiriusXM Satellite Radio Service when activated in the optional installation of the GDL 69A. The GTN unit serves as the display and control head for your remotely mounted GDL 69A. When enabled, the SiriusXM Satellite Radio audio entertainment is accessible in the Music function.

The information on the SiriusXM Satellite Radio display is composed of four areas: the Active Channel, Available Channels, Category of the highlighted channel, and the Volume setting. The Active Channel window shows the Channel Name and Number, Artist, Song Title, and Category.

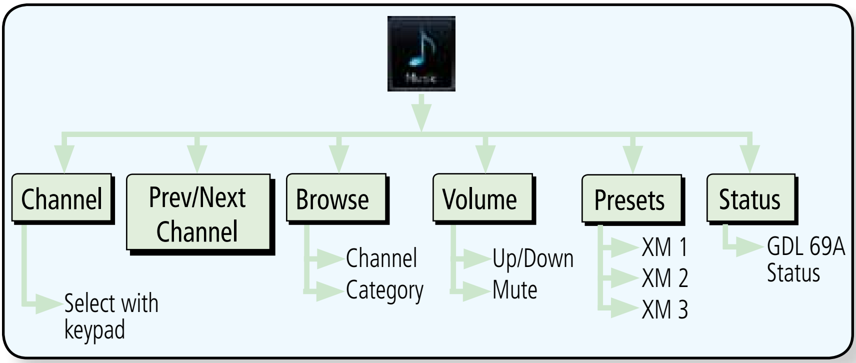


Figure 14-3 Music Functional Diagram

14.2 Activating SiriusXM Satellite Radio Services

The service is activated by providing SiriusXM Satellite Radio with either one or two coded IDs, depending on the equipment. Either the Audio Radio ID or the Data Radio ID, or both, must be provided to SiriusXM Satellite Radio to activate the entertainment subscription. The SiriusXM Satellite Radio Activation Instructions are included with the GDL 69A (also available at www.garmin.com, P/N 190-00355-04).

It is not required to activate both the entertainment and weather service subscriptions with the GDL 69A. Either or both services can be activated. SiriusXM Satellite Radio uses one or both of the coded IDs to send an activation signal that, when received by the GDL 69A, allows it to play entertainment programming.

These IDs are located:

- On the label on the back of the Data Link Receiver
- On the Music Menu

Contact the installer if the Data Radio ID and the Audio Radio ID cannot be located.

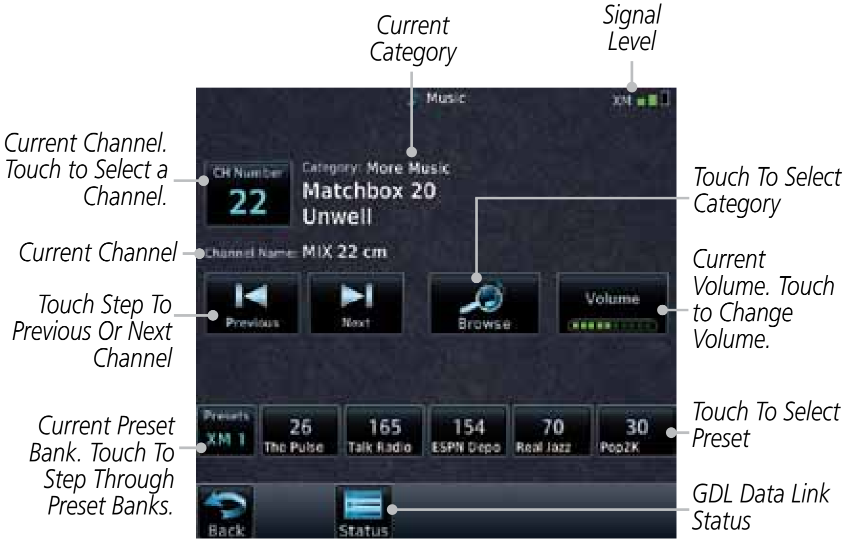
***NOTE:** Refer to the GDL 69/69A SiriusXM Satellite Radio Activation Instructions (190-00355-04) for further information.*

1. Contact SiriusXM Satellite Radio through the e-mail address listed on their web site (www.xmradio.com) or by the customer service phone number listed on the web site (1-800-985-9200).
2. Follow the instructions provided.

If SiriusXM weather services have not been activated, all the weather product boxes are cleared on the XM Information Page and a yellow Activation Required message is displayed in the center of the Weather Data Link Page (Map Page Group). The Service Class refers to the groupings of weather products available for subscription.

14.3 Music Operation

The GTN 7xx provides control for enjoying SiriusXM Satellite Radio audio entertainment in the aircraft. The Music function allows selecting music categories and specific channels, as well as saving category and channel selections as presets for quick recall. The music volume level may also be managed.


Music
XM
CH Number
22
Category: More Music
Matchbox 20
Unwell
Channel Name: MIX 22 cm
Previous
Next
Browse
Volume
Presets
XM 1
26
The Pulse
165
Talk Radio
154
ESPN Depo
70
Real Jazz
30
Pop2K
Back
Status

Current Category

Signal Level

Current Channel. Touch to Select a Channel.

Touch To Select Category

Current Channel

Current Volume. Touch to Change Volume.

Touch Step To Previous Or Next Channel

Touch To Select Preset

Current Preset Bank. Touch To Step Through Preset Banks.

GDL Data Link Status

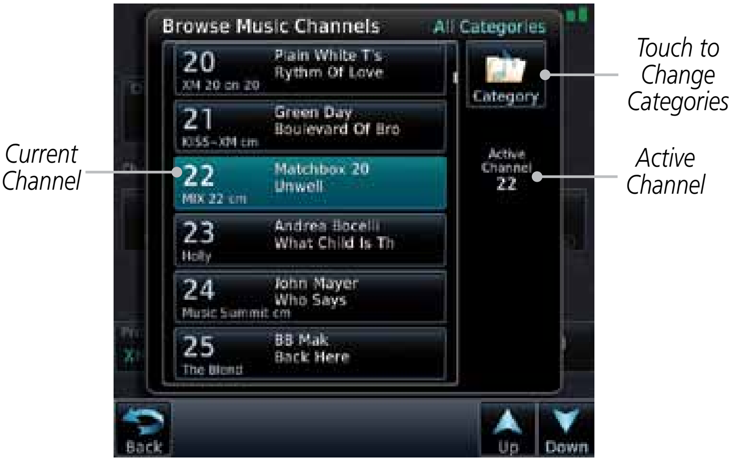
Figure 14-4 Main Music Display

NOTE: *The Music Configuration function can be set so that when there is radio reception or intercom conversation, the music level is dropped to a low, or background level. When the radio or intercom traffic ceases, the level gradually returns to normal.*

14.3.1 Browsing Channels and Categories

The Category window displays the currently selected category of audio. Categories of channels, such as Jazz, Rock, or News, can be selected to list the available channels for a type of music or other contents.

1. While viewing the Music page, touch the **Browse** key and then touch the desired channel to select it.


Browse Music Channels
All Categories
20
XM 20 on 20
Plain White T's
Rythm Of Love
21
KISS-XM cm
Green Day
Boulevard Of Bro
22
MIX 22 cm
Matchbox 20
Unwell
23
Holly
Andrea Bocelli
What Child Is Th
24
Music Summit cm
John Mayer
Who Says
25
The Blond
BB Mak
Back Here
Category
Active Channel 22
Back
Up
Down

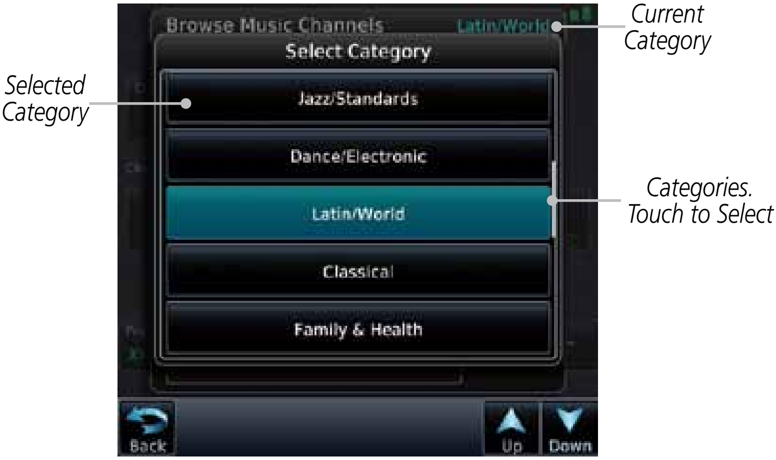
Touch to Change Categories

Current Channel

Active Channel

Figure 14-5 Music Channels

2. Touch the **Category** key to activate Category selection and then touch the desired **Category** to select it.


Browse Music Channels
Latin/World
Select Category
Jazz/Standards
Dance/Electronic
Latin/World
Classical
Family & Health
Back
Up
Down

Current Category

Selected Category

Categories. Touch to Select

Figure 14-6 Music Categories

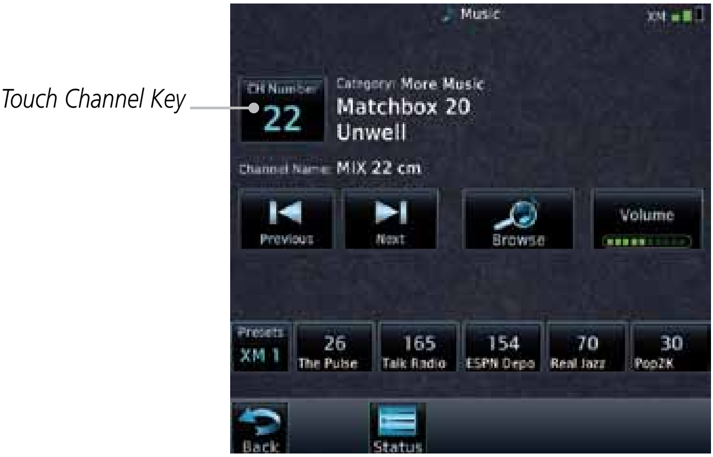
3. The current category will be shown at the top of the display.

14.3.2 Selecting an SiriusXM Satellite Radio Channel by Number

Channels may be selected directly in the selected category using the numeric keypad.

CH Number
22

1. While viewing the main Music page, touch the **Channel** key. The Channel Number selection page will appear.


Touch Channel Key
Music
XM
CH Number
22
Previous
Next
Browse
Volume
Presets
XM 1
26
The Pulse
165
Talk Radio
154
ESPN Depo
70
Real Jazz
30
Pop2K
Back
Status

Category: More Music
Matchbox 20
Unwell
Channel Name: MIX 22 cm

Figure 14-7 Selecting Music Channels

2. Use the numeric keys to enter the number for the desired channel and then touch the **Enter** key.

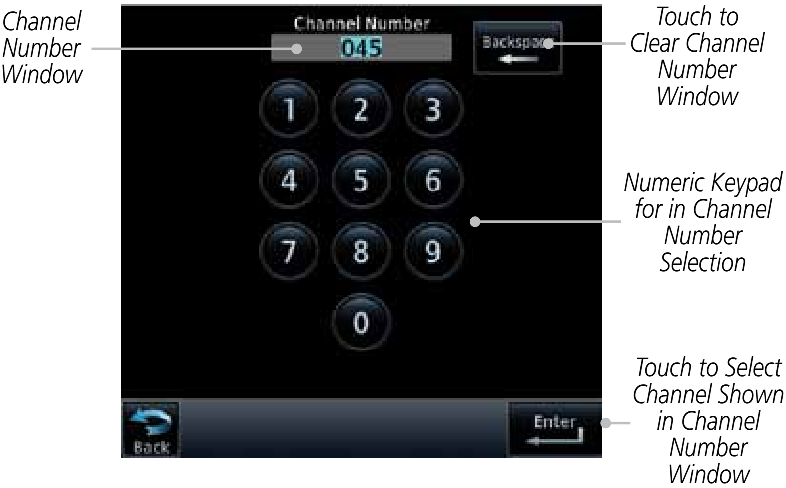

Channel Number Window
Channel Number
045
Backspace
Touch to Clear Channel Number Window
1
2
3
4
5
6
7
8
9
0
Numeric Keypad for in Channel Number Selection
Back
Enter
Touch to Select Channel Shown in Channel Number Window

Figure 14-8 Selecting Music Channels with the Numeric Keypad

14.3.3 SiriusXM Satellite Radio Volume

The Volume control allows you to set the audio volume level, as well as mute the audio.

1. While viewing the Music page, touch the **Volume** key.

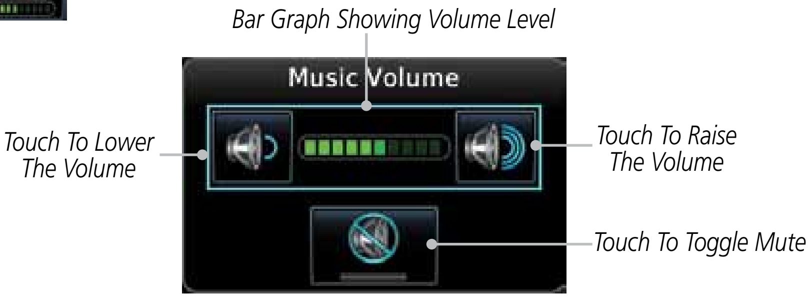

Bar Graph Showing Volume Level
Music Volume
Touch To Lower The Volume
Touch To Raise The Volume
Touch To Toggle Mute

Figure 14-9 Music Volume Control

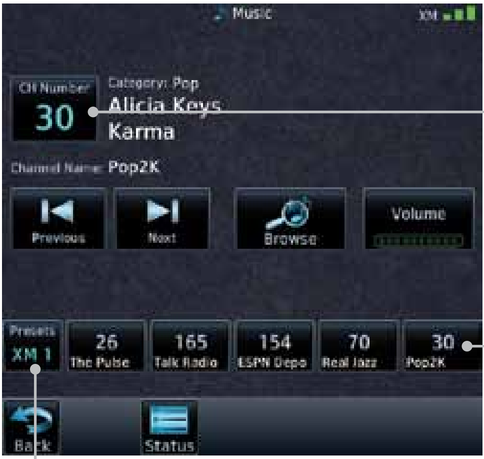
2. Touch the **Up** or **Down** Volume keys to adjust the radio volume.

3. Touch **MUTE** to toggle muting of the radio volume.

4. Touch **MUTE** again or the **Volume** key to unmute the radio volume.

14.3.4 SiriusXM Satellite Radio Channel Presets

The Music Menu allows you to store the Active Channel into a selected preset position for easy later recall. A delay of several seconds can occur when setting or recalling a preset.


Music
XM
CH Number
30
Category: Pop
Alicia Keys
Karma
Channel Name: Pop2K
Previous
Next
Browse
Volume
Presets
XM 1
26
The Pulse
165
Talk Radio
154
ESPN Deps
70
Real Jazz
30
Pop2K
Back
Status

Selected Preset Channel

Touch To Recall Selected Preset

Touch To Select Bank of Presets (XM 1, XM 2, or XM 3)

Figure 14-10 Music Presets

14.3.4.1 Saving a Preset

Presets
XM 2

1. While viewing the desired channel, select the preset bank for saving the preset (XM 1, XM 2, or XM 3) by touching the **Presets** key until the desire bank is shown.

2. Touch the desired Preset key and hold it for three seconds.

14.3.4.2 Recalling a Preset

Presets
XM 2

1. Touch the **Presets** key to select the preset bank (XM 1, XM 2, or XM 3).

2. Touch the desired Preset key.

14.3.5 GDL 69/69A Data Link Receiver Troubleshooting

Some quick troubleshooting steps listed below can be performed to find the possible cause of a failure.

- Ensure the owner/operator of the aircraft in which the Data Link Receiver is installed has subscribed to SiriusXM Satellite Radio
- Ensure the SiriusXM Satellite Radio subscription has been activated
- Perform a quick check of the circuit breakers to ensure that power is applied to the Data Link Receiver

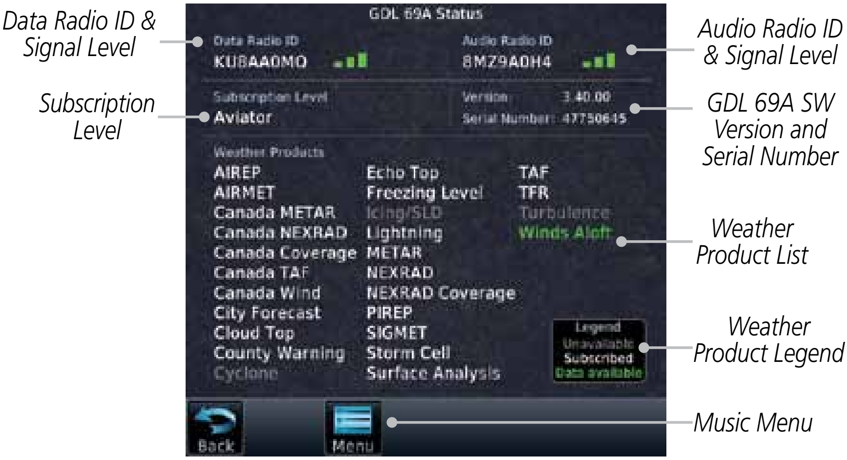
For troubleshooting purposes, check the Menu on the Music Page or the GDL 69 Box on the System - External LRUs Page for Data Link Receiver (GDL 69/69A) status, serial number, and software version number.

It may take several minutes for all subscribed data to become available after power-up.

Text Color	Description
White	Subscribed
Grey	Not Subscribed
Green	Available

Table 14-1 Product Status

1. Touch the **Status** key on the Music page to display the GDL 69/69A Status.


Data Radio ID & Signal Level
Subscription Level
Audio Radio ID & Signal Level
GDL 69A SW Version and Serial Number
Weather Product List
Weather Product Legend
Music Menu
Back
Menu

GDL 69A Status

Data Radio ID: KUBAA0MO

Audio Radio ID: 8MZ9A0H4

Subscription Level: Aviator

Version: 3.40.00

Serial Number: 47730645

Weather Products

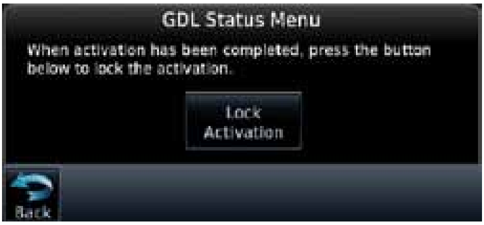
AIREP
AIRMET
Canada METAR
Canada NEXRAD
Canada Coverage
Canada TAF
Canada Wind
City Forecast
Cloud Top
County Warning
Cyclone
Echo Top
Freezing Level
Icing/SLD
Lightning
METAR
NEXRAD
NEXRAD Coverage
PIREP
SIGMET
Storm Cell
Surface Analysis
TAF
TFR
Turbulence
Winds Aloft

Legend
Unavailable
Subscribed
Data available

Figure 14-11 GDL 69 Status Page

2. The GDL status information is provided on this page.

3. Touch the **Menu** key to display the GDL Status Menu.

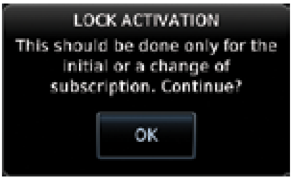


GDL Status Menu

When activation has been completed, press the button below to lock the activation.

Figure 14-12 GDL Status Menu

4. Touch the **Lock Activation** key if this is for the initial subscription or a change in the subscription. Touch the **OK** key to continue the operation.



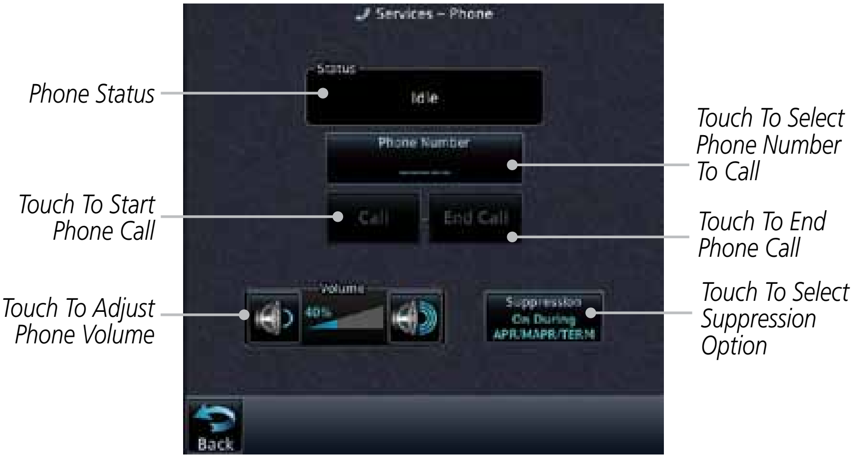
LOCK ACTIVATION

This should be done only for the initial or a change of subscription. Continue?

Figure 14-13 Lock Activation

14.4 Iridium Phone Operation (Optional)

Optional satellite telephone operation is available through the Iridium® satellite system that is interfaced through the Garmin GSR 56.



Status: Idle

Suppression: On During APR/MAPR/TERM

Services - Phone
Phone Number
Call
End Call
Volume
40%
Back
Phone Status
Touch To Start Phone Call
Touch To Adjust Phone Volume
Touch To Select Phone Number To Call
Touch To End Phone Call
Touch To Select Suppression Option

Figure 14-14 Services Phone Page

14.4.1 Status

The Status section shows the Call Time, Phone Status, and Call Suppression selected. The Call Time value shows the length of the call time for the current call using the Iridium phone. Phone Status shows the current operating status of the Iridium phone.

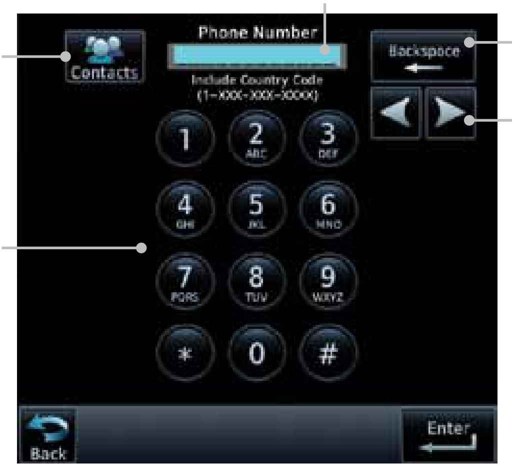
Status	Description
Idle	The Iridium phone is not using the GSR 56 for communicating at this time.
Initializing	The GSR 56 and its driver are currently initializing.
Connected	The GSR 56 is connected to the called number.
Connecting Call	The GSR 56 is in the process of connecting to the called number.
Changing Volume	The volume level on the GSR 56 is changing.
Busy	The phone is in use by another service and the call may not be made.
Dialing	The GSR 56 is dialing the called number.
Incoming Call	A call is being made to the GSR 56.
Hanging Up	The GSR 56 is disconnecting from the current call.
Unavailable	The GSR 56 is currently not usable by the Iridium phone system.

Table 14-2 Iridium Phone Status

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

14.4.2 Making a Phone Call

1. While viewing the Iridium Phone page, touch **Phone**, select a phone number, or select one from Contacts.


Phone Number
Include Country Code
(1-XXX-XXX-XXXX)
Contacts
Backspace
1
2 ABC
3 DEF
4 GHI
5 JKL
6 MNO
7 PQRS
8 TUV
9 WXYZ
*
0
#
Back
Enter

Entered Phone Number

Touch To Select Number From Existing Contacts

Touch To Delete Previous Character

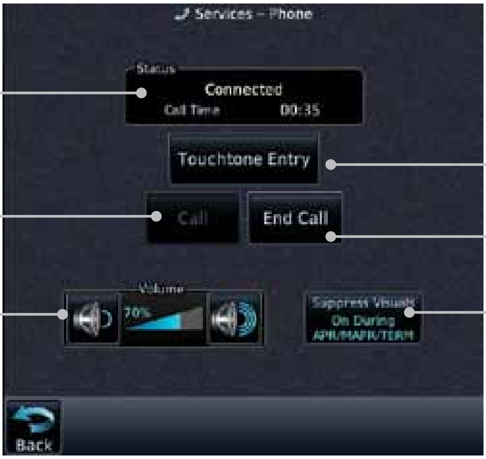
Touch To Move Cursor

Touch To Select Phone Number

Figure 14-15 Making a Phone Call

2. Touch **Enter** to accept the selected number.

3. Touch the **Call** key.


Services - Phone
Status
Touchtone Entry
Call
End Call
Volume
70%
Suppress Visuals On During APR/MAPR/TERM
Back

Status: Connected
Call Time 00:35

Phone Status

Touch To Select Phone Number To Call

Touch To Start Phone Call

Touch To End Phone Call

Touch To Adjust Phone Volume

Touch To Select Suppression Option

Figure 14-16 Phone Call In Progress

Touchtone Entry

4. To make a direct call with a keypad, touch the **Touchtone Entry** key.

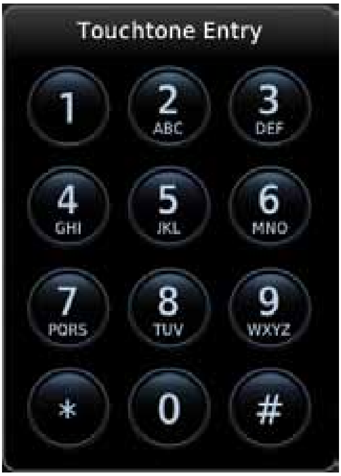

Touchtone Entry
1
2 ABC
3 DEF
4 GHI
5 JKL
6 MNO
7 PQRS
8 TUV
9 WXYZ
*
0
#

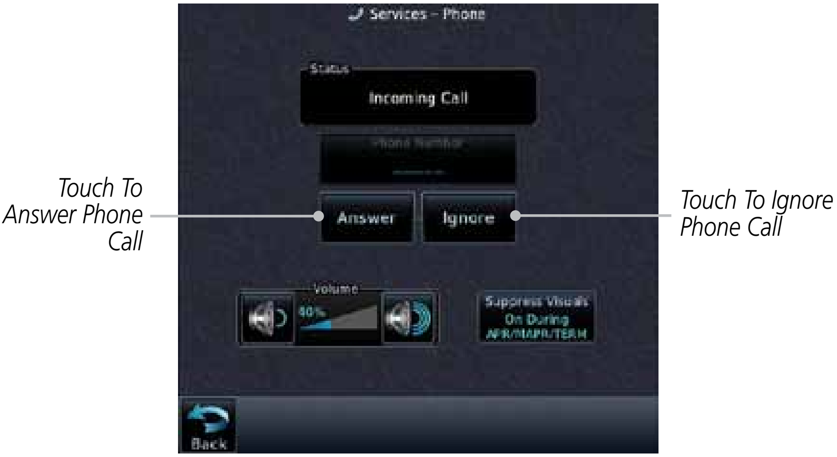
Figure 14-17 Touchtone Entry Pad

5. After completing the call, touch the **End Call** key.

14.4.3 Answering a Phone Call

An incoming phone call will generate a pop-up announcing the call. When a call is accepted, the pop-up will show that the call is connected and the cumulative call time will be shown.

1. When an incoming call is available, touch the **Enter** key or the **ANSWER** key to answer the call. Or, press the **Ignore** key to not answer the call and hang up.


Services - Phone
Touch To Answer Phone Call
Answer
Ignore
Touch To Ignore Phone Call
Volume
90%
Suppress Visuals On During APR/MAPR/TERM
Back

Status: Incoming Call

Figure 14-18 Incoming Call Pop-Up

2. After a called is accepted and connected, the connection time will be shown on the pop-up. Touch the **ATT** soft key to attenuate the call volume; touching it again will return to normal volume. Touch the **HANG UP** soft key to end the call.

14.4.4 Suppress Visuals

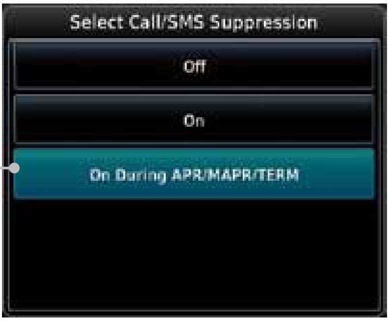
Call Suppression controls calling when use of the Iridium phone system is allowed.

***NOTE:** The "Suppress Visuals" setting only affects the visual indication of an incoming call/text. It does not inhibit the phone ringer or incoming SMS chime. Garmin recommends that you inhibit the audio from the GSR 56 unless a phone call is active.*

Status	Description
Off	Call Suppression is turned off. Calls may be transmitted and received through the Iridium phone.
On	Call Suppression is turned on. The incoming call pop-up will not be shown. The call may still be answered on the phone page. Outgoing calls are not affected.
On During APR/ MAPR/TERM	Call Suppression is turned on during Approach, Missed Approach, and Terminal operations. The incoming call pop-up will not be shown. The call may still be answered on the phone page. Outgoing calls are not affected.

Table 14-3 Call Suppression

1. While viewing the Iridium Phone page, touch the **Suppression** key.
2. Touch the desired Call Suppression type.



Select Call/SMS Suppression
Off
On
On During APR/MAPR/TERM
Touch To Select The Desired Suppression

Figure 14-19 Select Call/SMS Suppression

3. Or, press **Back** to return to the Phone page without making a selection.

14.4.5 Phone Volume

Use the Phone Volume controls to adjust the loudness of the phone calls you hear. Volume controls will only be available when the Idle, Connected, or Changing Volume states are displayed.

Adjusting the Phone Volume with the Soft Keys

1. While viewing the Iridium Phone page, touch the **VOL** keys to adjust the phone volume.

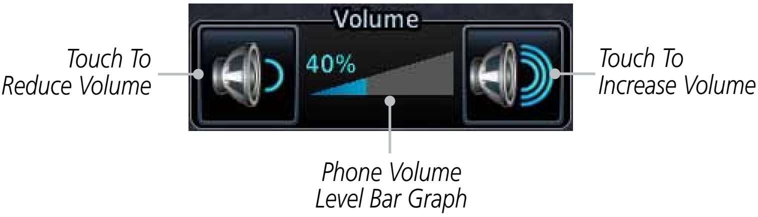

Volume
40%
Touch To Reduce Volume
Touch To Increase Volume
Phone Volume Level Bar Graph

Figure 14-20 Select Soft Keys for Phone Volume Adjustment

2. The phone volume level is shown as a bar graph.

14.4.6 SMS Text Operation

Send and receive text messages through the GSR 56 phone connection.

1. While viewing the Services page, touch the **SMS Text** key.

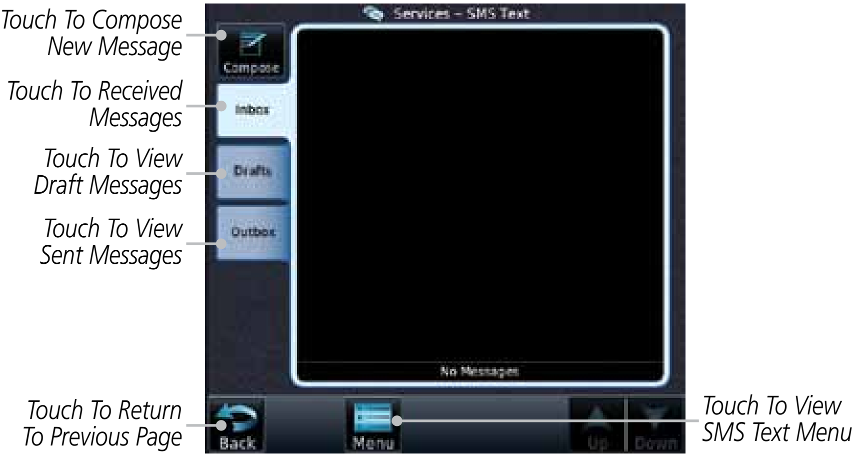

Services - SMS Text
Touch To Compose New Message
Compose
Touch To Received Messages
Inbox
Touch To View Draft Messages
Drafts
Touch To View Sent Messages
Outbox
No Messages
Touch To Return To Previous Page
Back
Menu
Up
Down
Touch To View SMS Text Menu

Figure 14-21 SMS Text Page

2. Select Compose, Inbox, Drafts, or Outbox.

14.4.6.1 SMS Text Messaging Menu

The SMS Text Messaging Menu allows you to sort, mark, or delete messages and select call suppression.

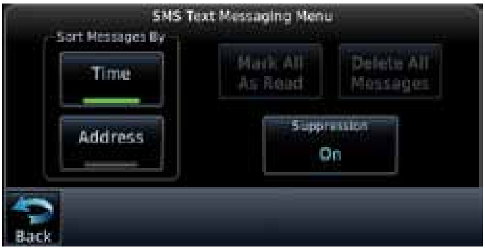

SMS Text Messaging Menu
Sort Messages By
Time
Address
Mark All As Read
Delete All Messages
Suppression
On
Back

Figure 14-22 SMS Text Messaging Menu

1. Touch the **Time** key to sort messages by Time or the **Address** key to sort by Address.

Suppression
On

2. Touch the **Suppression** key and then touch the call suppression choice. The current choice will be shown on the **Suppression** key.

Mark All
As Read

3. While viewing the Inbox, Drafts, or Outbox, touch the **Mark All As Read** to tag the messages as having been read.

Delete All
Messages

4. Touch the **Delete All Messages** to delete the messages in the viewed category.

14.4.6.2 Composing a SMS Text Message

1. While viewing the SMS Text page, touch the **Compose** key.

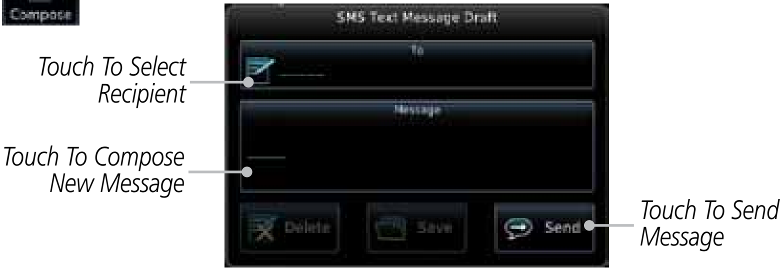

SMS Text Message Draft
To
Message
Delete
Save
Send
Touch To Select Recipient
Touch To Compose New Message
Touch To Send Message

Figure 14-23 Compose a New SMS Text Message

2. Touch the **To** window to select the recipient. Select either a Phone Number or E-mail Address.

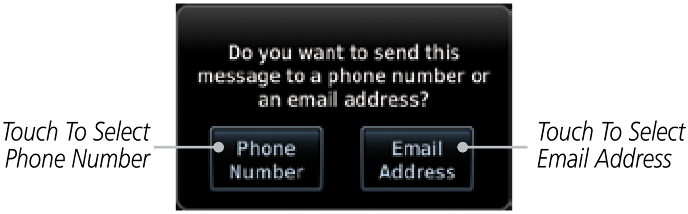
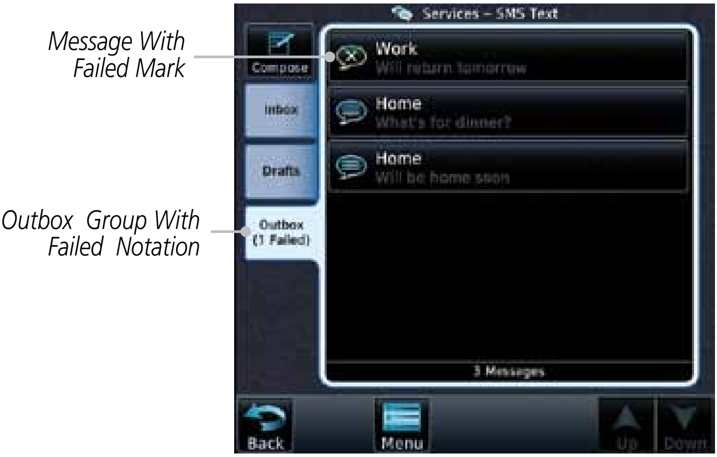

Do you want to send this message to a phone number or an email address?
Touch To Select Phone Number
Phone Number
Email Address
Touch To Select Email Address

Figure 14-24 Select Destination for the SMS Text Message

3. Use either the keypad or select from the Contacts.
4. Touch the **Message** window to enter the text for the message. Use the keypad to create the message.
5. Touch **Send** to send the message. Touch **Save** to save the message as a draft. Touch **Delete** to delete this message.

14.4.6.3 A Failed SMS Text Message

1. While viewing the Services page, touch the **SMS Text key** and touch the Outbox tab. A failed message is noted with an "x."


Services - SMS Text

Work
Will return tomorrow

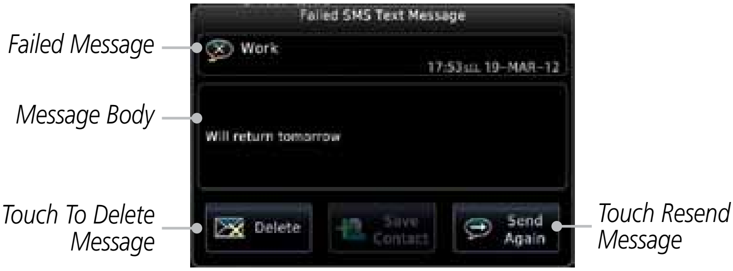
Home
What's for dinner?

Home
Will be home soon

3 Messages
Message With Failed Mark
Outbox Group With Failed Notation
Compose
Inbox
Drafts
Outbox (1 Failed)
Back
Menu
Up
Down

Figure 14-25 SMS Text Message List Showing a Failed Message

2. Touch the failed message. Touch the **Send Again** key to resend the message. Touch the **Delete** key to delete the message.


Failed Message
Message Body
Touch To Delete Message
Touch Resend Message
Failed SMS Text Message
Delete
Save Contact
Send Again

Work 17:53LCL 19-MAR-12

Will return tomorrow

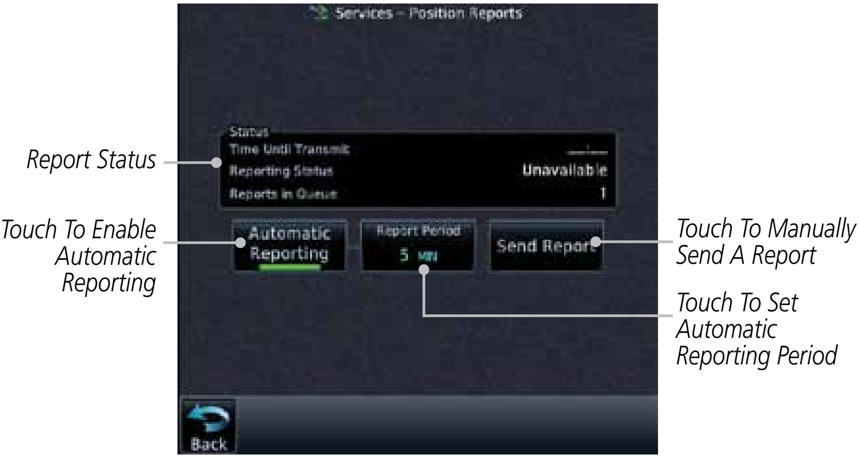
Figure 14-26 Resend a Failed SMS Text Message

14.4.7 Position Reporting

Position Reporting is a system which collects system variables and transmits them over the Iridium® satellite at a given interval through the GSR 56.

Position Reports

1. While viewing the Services page, touch the **Position Reports** key.


Services - Position Reports
Report Status
Touch To Enable Automatic Reporting
Touch To Manually Send A Report
Touch To Set Automatic Reporting Period
Automatic Reporting
Report Period
Send Report
Back

Status
Time Until Transmit ---
Reporting Status Unavailable
Reports in Queue 1
Report Period 5 MIN

Figure 14-27 Services Position Reporting

Automatic Reporting

2. Touch the **Automatic Reporting** key to enable Automatic Reporting.

Send Report

3. After Automatic Reporting is enabled, touch the **Report Period** key to set the Reporting Period.

4. Select the Report Period with the keypad and press **Enter**.

Send Report

5. When Automatic Reporting is disabled, touch the **Send Report** key to manually send a report.

14.4.7.1 Status

The Status window shows the time until the next data transmission and the status of the reporting system.

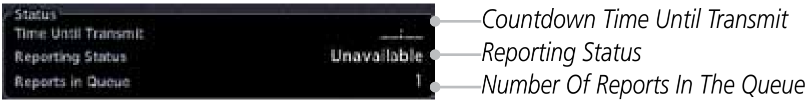
***NOTE:** The GSR 56 does not report its serial number until 90 seconds after power up of the GTN. As a result, for that period, the product info for the GSR 56 will show "Waiting."*

14.4.7.2 Position Reporting Status

The Time Until Transmit field is a countdown timer that shows the time until the next data transmission. This field is blank when the aircraft is on the ground. Position Reporting will be enabled when the aircraft is in the air.

Status	Description
Idle	The reporting system is not using the GSR 56 for reporting at this time.
Initializing	The GSR 56 and its driver are currently initializing.
Transferring	A position report is currently being transmitted.
Unavailable	The GSR 56 is currently not usable by the reporting system.

Table 14-4 Position Reporting Status



Status
Time Until Transmit
Reporting Status Unavailable
Reports in Queue 1

Figure 14-28 Position Reporting Status

14.4.8 Contacts

The Phone Book may hold up to 128 entries. A phone number may be entered and dialed without saving it to the Phone Book. Note that it is necessary to dial a "1," the area code, and then the number.

14.4.8.1 Creating a Contact

1. While viewing the Services page, touch the **Contacts** key.

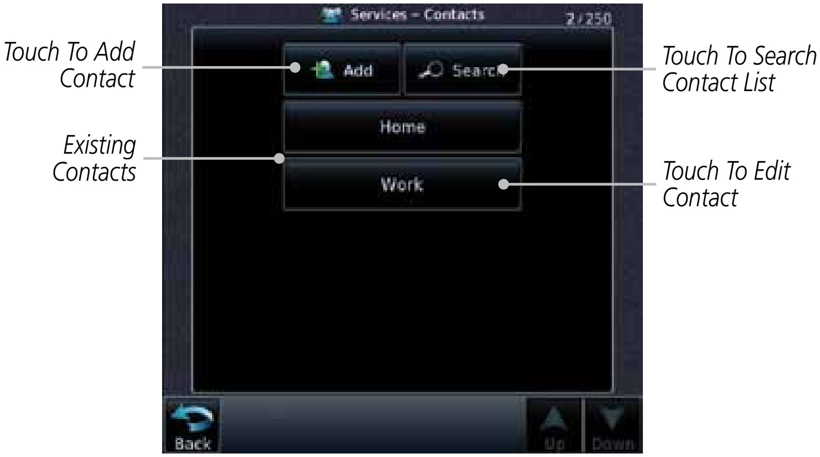

Services - Contacts
2/250
Add
Search
Home
Work
Back
Up
Down
Touch To Add Contact
Existing Contacts
Touch To Search Contact List
Touch To Edit Contact

Figure 14-29 Contact List

2. Touch the **Add** key to add a new contact.

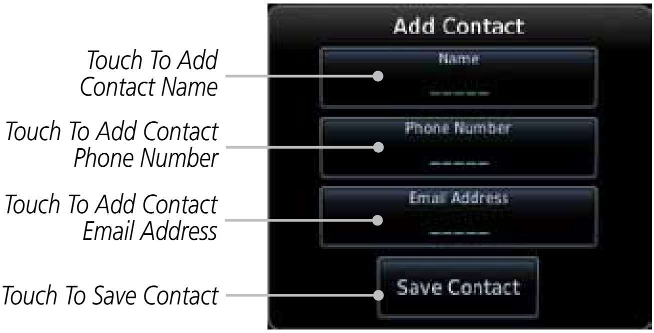

Add Contact
Name
Phone Number
Email Address
Save Contact
Touch To Add Contact Name
Touch To Add Contact Phone Number
Touch To Add Contact Email Address
Touch To Save Contact

Figure 14-30 Add a New Contact

Save Contact

3. Use the keypad to enter the information for each item and then touch the **Save Contact** key.

14.4.8.2 Using a Contact

1. While viewing the Contacts page, touch an existing contact.

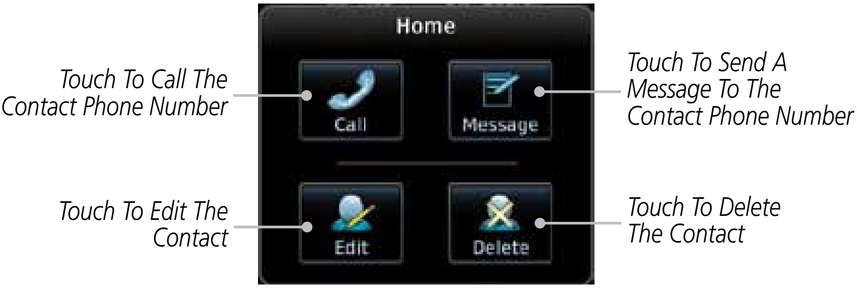

Home
Call
Message
Edit
Delete
Touch To Call The Contact Phone Number
Touch To Send A Message To The Contact Phone Number
Touch To Edit The Contact
Touch To Delete The Contact

Figure 14-31 Using the Contact List

2. Touch the desired function for the selected Contact.

15 UTILITIES

The Utilities page provides a group of features that will support your flight planning to make them easier and more efficient. The Vertical Calculator (VCALC) calculates the time to begin descent and vertical speed required to reach a desired altitude at the chosen location. The Flight Timers feature provides a number of timer types to assist in monitoring your time in flight. RAIM Prediction predicts if GPS coverage is available for your current location or at a specified waypoint at any time and date. RAIM performs checks to ensure that the GTN unit has adequate satellite geometry during your flight. The Trip Planning feature allows the pilot to view desired track (DTK), distance (DIS), estimated time en route (ETE), en route safe altitude (ESA) and estimated time of arrival (ETA) information for a direct-to, point-to-point between two specified waypoints or for any programmed flight plan. The Fuel Planning feature will display fuel conditions along the active direct-to or flight plan when equipped with fuel flow (FF) and/or fuel on board (FOB) sensors. The DALT/TAS/Winds feature performs calculations about Altitude, Airspeed, and Winds. The Clean Screen function will lock the touchscreen so the display can be cleaned without activating any functions.

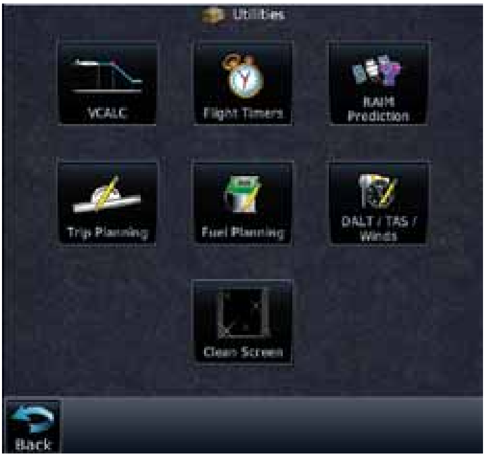


Figure 15-1 Utilities Home Page

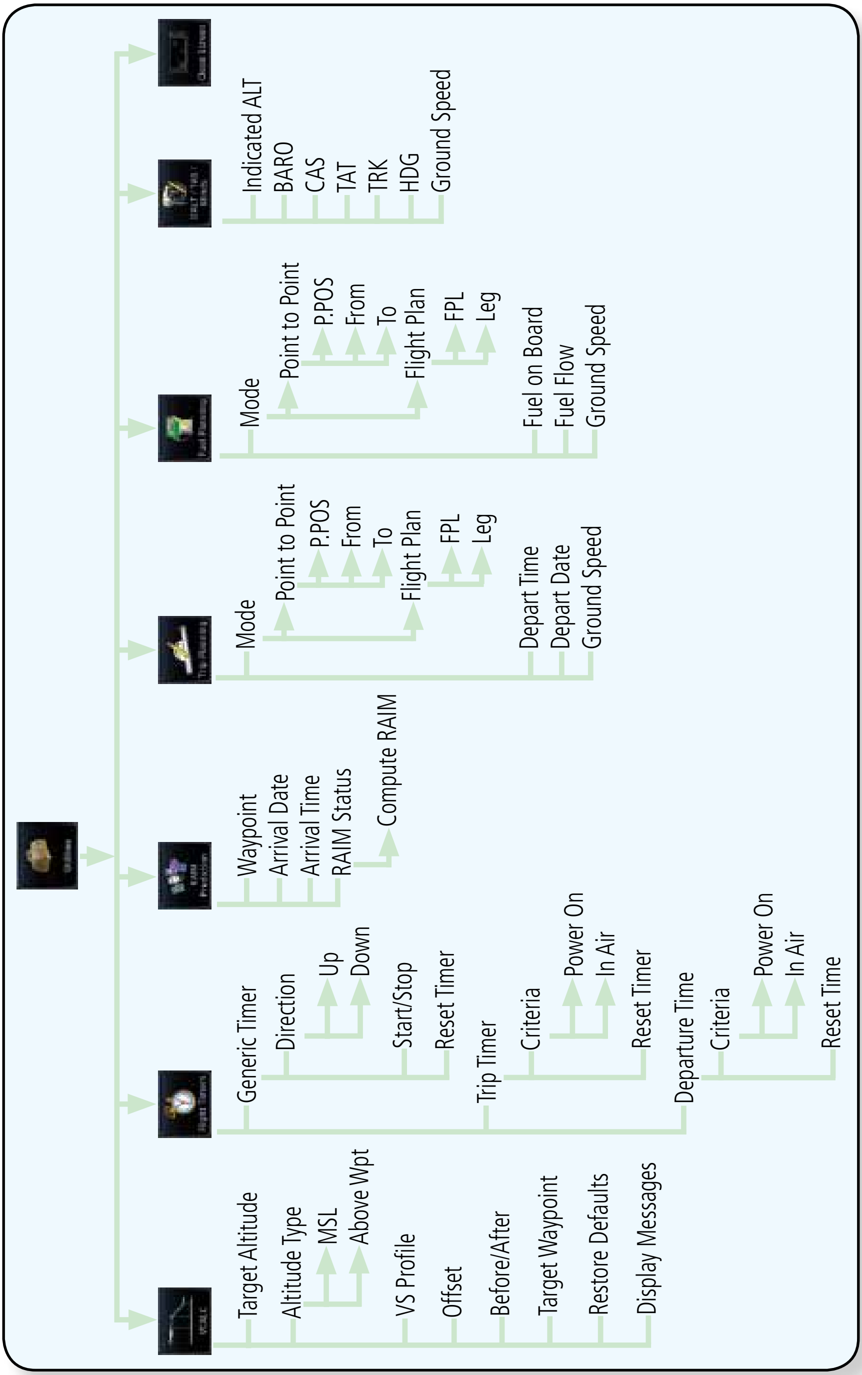

Indicated ALT
BARO
CAS
TAT
TRK
HDG
Ground Speed
Mode
Point to Point
P.POS
From
To
Flight Plan
FPL
Leg
Fuel on Board
Fuel Flow
Ground Speed
Mode
Point to Point
P.POS
From
To
Flight Plan
FPL
Leg
Depart Time
Depart Date
Ground Speed
Waypoint
Arrival Date
Arrival Time
RAIM Status
Compute RAIM
Generic Timer
Direction
Up
Down
Start/Stop
Reset Timer
Trip Timer
Criteria
Power On
In Air
Reset Timer
Departure Time
Criteria
Power On
In Air
Reset Time
Target Altitude
Altitude Type
MSL
Above Wpt
VS Profile
Offset
Before/After
Target Waypoint
Restore Defaults
Display Messages

Figure 15-2 Utilities Functional Diagram

15.1 Vertical Calculator (VCALC)

The Vertical Calculator (VCALC) function allows you to create a three-dimensional profile which guides you from your present position and altitude to a final (target) altitude at a specified location. This is helpful when you'd like to descend to a certain altitude near an airport. Once the profile is defined, message alerts and additional data can be configured on the Default NAV and Map Pages to keep you informed of your progress.

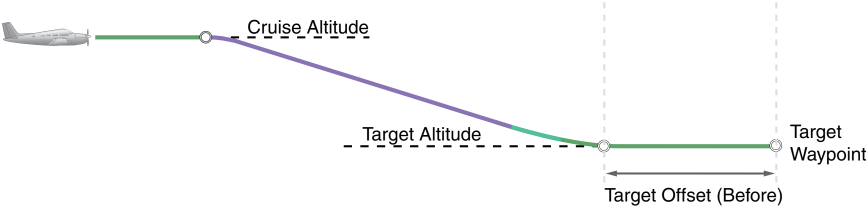


Figure 15-3 VCALC Target

VCALC is inhibited in the following conditions:

- Groundspeed is less than 35 knots
- No active flight plan or direct-to destination
- SUSP mode
- Vectors-to-Final mode
- VLOC mode
- After the FAF on an approach

***WARNING:** Do not use VCALC messages as the only means of either avoiding terrain/obstacles or following ATC guidance. VCALC provides advisory information only and must be used in concert with all other available navigation data sources.*

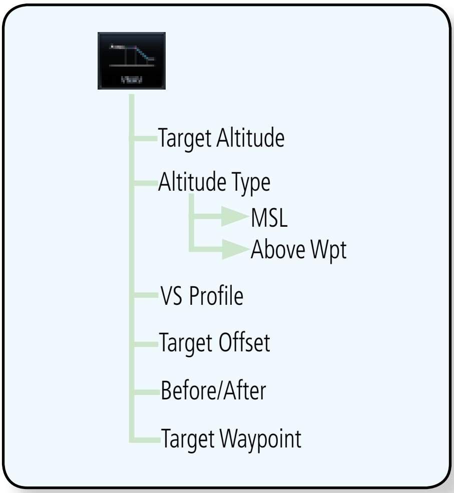
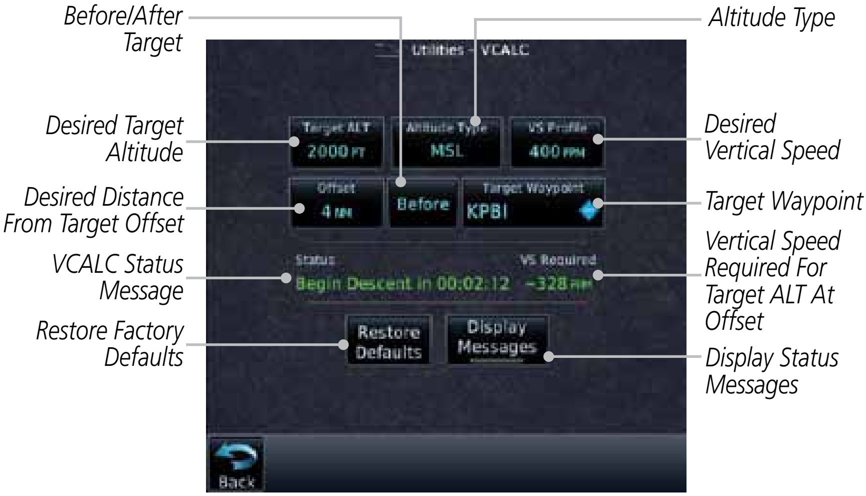

VNAV
Target Altitude
Altitude Type
MSL
Above Wpt
VS Profile
Target Offset
Before/After
Target Waypoint

Figure 15-4 VCALC Page Functional Diagram

1. From the Utilities page, touch **VCALC.**


Before/After Target
Altitude Type
Desired Target Altitude
Desired Vertical Speed
Desired Distance From Target Offset
Target Waypoint
Vertical Speed Required For Target ALT At Offset
VCALC Status Message
Restore Factory Defaults
Display Status Messages
Utilities - VCALC
Restore Defaults
Display Messages
Back

Target ALT: 2000 FT
Altitude Type: MSL
VS Profile: 400 FPM
Offset: 4 NM
Before
Target Waypoint: KPBI
Status: Begin Descent in 00:02:12
VS Required: -328 FPM

Figure 15-5 VCALC Page

2. Select the VCALC items as necessary to set up parameters for the next waypoint. Touch the **Back** key when finished.

15.1.1 Target Altitude

This sets the desired ending altitude for the VCALC setup.

Target ALT
7300 FT

1. While viewing the VCALC page, touch **Target ALT**.

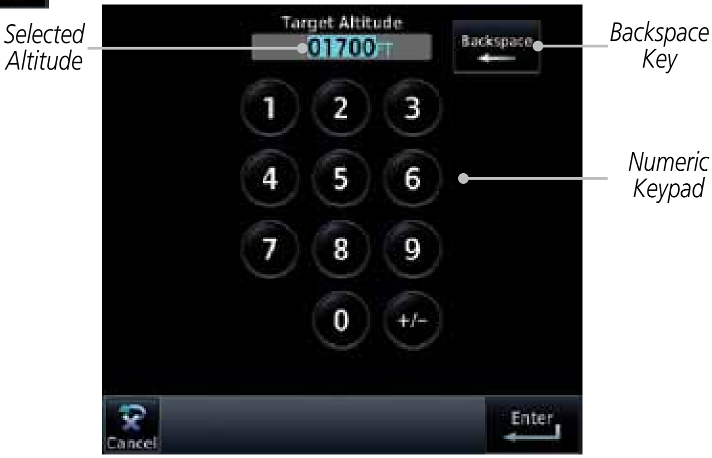

Selected Altitude
Target Altitude
01700FT
Backspace
Backspace Key
1
2
3
4
5
6
Numeric Keypad
7
8
9
0
+/-
Cancel
Enter

Figure 15-6 Select VCALC Target Altitude

2. Use the numeric keypad to select the desired Target Altitude and then touch the **Enter** key.

15.1.2 Altitude Type

This value selects the altitude reference that will be used for VCALC calculations.

1. While viewing the VCALC page, touch **Altitude Type**.

Altitude Type
MSL
Altitude Type
Above WPT

2. Touching the **Altitude Type** key will toggle between MSL and Above WPT. "Above WPT" is only available for waypoints that are airports.

15.1.3 Vertical Speed (VS) Profile

This value sets the desired vertical speed.

VS Profile
200FPM

1. While viewing the VCALC page, touch **VS Profile**.

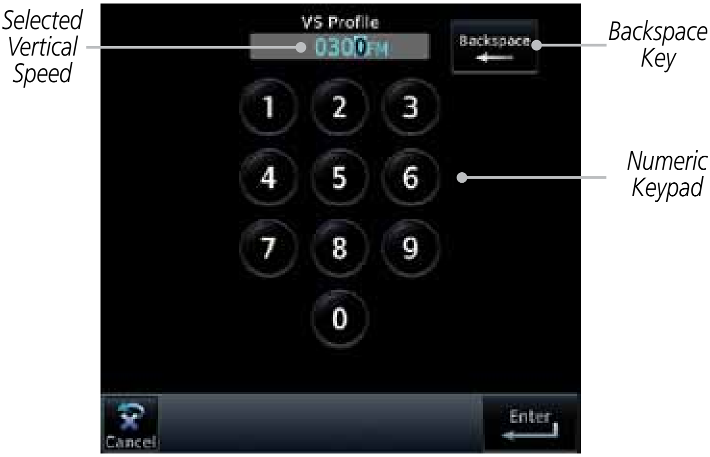

Selected Vertical Speed
VS Profile
0300FPM
Backspace
Backspace Key
1
2
3
4
5
6
7
8
9
0
Numeric Keypad
Cancel
Enter

Figure 15-7 Select VCALC Vertical Speed

2. Use the numeric keypad to select the desired Vertical Speed and then touch the **Enter** key.

15.1.4 Target Offset

The Target Offset is a pilot-selected distance value that represents the geographical location where you wish to arrive at the target altitude. This distance is measured from the Target Waypoint and, in a separate data field on the VCALC page, designated as either before or after the Target Waypoint.

Offset
0.0NM

1. While viewing the VCALC page, touch the **Offset** key.

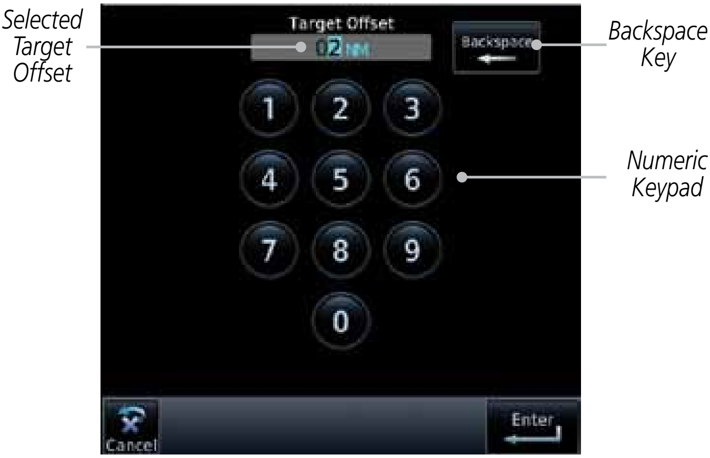

Selected Target Offset
Target Offset
02NM
Backspace
Backspace Key
1
2
3
4
5
6
7
8
9
0
Numeric Keypad
Cancel
Enter

Figure 15-8 Select VCALC Target Offset

2. Use the numeric keypad to select the desired Target Offset and then touch the **Enter** key.

15.1.5 Before/After Target Waypoint

This setting designates whether the offset distance defines a point before you reach the target reference waypoint or after you reach the waypoint. The "After" selection is not available for the last waypoint in a flight plan.

1. While viewing the VCALC page, touch the **Before/After** key.

2. Touching the **Before/After** key will toggle between Before and After the Target Waypoint.

15.1.6 Target Waypoint

Select the waypoint in the flight plan that will be used for planning a descent. When using a flight plan, the target waypoint is a reference that can be specified from the waypoints contained in the flight plan. By default, the last waypoint in the flight plan is selected.

Target Waypoint
KBFM

1. While viewing the VCALC page, touch **Target Waypoint**.

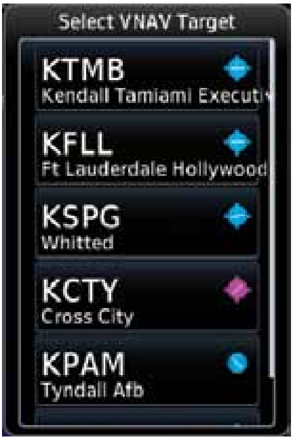

Select VNAV Target
KTMB
Kendall Tamiami Executi
KFLL
Ft Lauderdale Hollywood
KSPG
Whitted
KCTY
Cross City
KPAM
Tyndall Afb

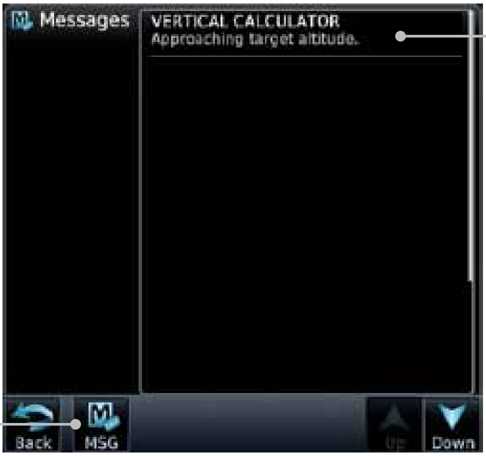
Figure 15-9 Select VCALC Target Waypoint List

2. A list of the remaining waypoints in the flight plan will be shown. Touch the desired waypoint to select it as the Target Waypoint.

15.1.7 Display VCALC Messages

Selecting **Display Messages** will allow the display of messages about the VCALC function when they occur. With **Display Messages** not selected, VCALC messages will not be displayed.

1. While viewing the VCALC page, touch **Display Messages** to toggle the display of VCALC messages in the Message function.



VERTICAL CALCULATOR
Approaching target altitude.

VCALC Message

Touch To Toggle Messages

Figure 15-10 VCALC Approaching Target Altitude Message

2. Touch the **MSG** key to toggle the display of available messages.

15.1.8 Restore VCALC Defaults

While viewing the VCALC page menu, touching the **Restore Defaults** key will reset all of the VCALC values back to their default values. The Target Waypoint will not be changed.

15.2 Flight Timers

The Flight Timers function provides count up/down timers, plus automatic recording of departure time, and total trip time. Departure and total trip time recording can be configured to run either any time unit power is on, or only when your ground speed exceeds the in-air threshold set by the installer (for example, 30 knots). A flexible Generic Timer is available for general timing needs.

***NOTE:** When a count up timer is used, the preset value has no function.*

1. While viewing the Utilities page, touch the **Flight Timers** key.

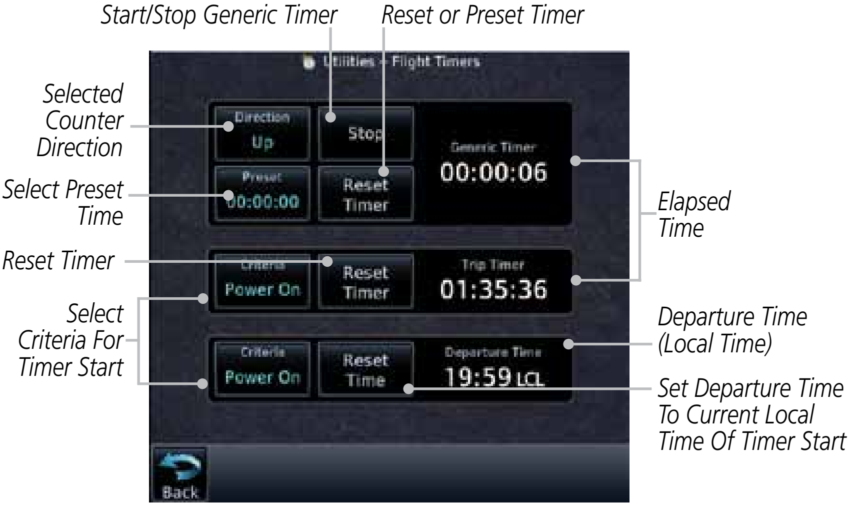

Start/Stop Generic Timer
Reset or Preset Timer
Selected Counter Direction
Select Preset Time
Reset Timer
Select Criteria For Timer Start
Elapsed Time
Departure Time (Local Time)
Set Departure Time To Current Local Time Of Timer Start
Utilities - Flight Timers
Direction
Up
Stop
Generic Timer
00:00:06
Preset
00:00:00
Reset Timer
Criteria
Power On
Reset Timer
Trip Timer
01:35:36
Criteria
Power On
Reset Time
Departure Time
19:59 LCL
Back

Figure 15-11 Utility Flight Timers Page

2. If the Generic Timer Direction counter is set to "Up," the Reset Timer key will be shown and when touched will return the timer to 00:00:00. If the Direction counter is set to "Down," the Preset Timer key will be shown and the key will return the timer to the Preset time value.
3. Touch each key as desired to set up timer operation.

15.3 RAIM Prediction

RAIM Prediction predicts if GPS coverage is available for your current location or at a specified waypoint at any time and date. RAIM performs checks to ensure that the GTN unit has adequate satellite geometry during your flight. RAIM availability is near 100% in Oceanic, En Route and Terminal phases of flight. Because the FAA's TSO requirements for non-precision approaches specify significantly better satellite coverage than other flight phases, RAIM may not be available when flying some approaches. The GTN unit automatically monitors RAIM during approach operations and warns you if RAIM is not available. In such cases, use a non-GPS based approach. RAIM prediction helps you plan for a pending flight to confirm GPS operation during an approach.

RAIM prediction only predicts the availability of Fault Detection (FD) integrity in the absence of SBAS corrections. It cannot predict the availability of LPV or L/VNAV approaches. The FAA provides a NOTAM service for LPV approach availability.

1. While viewing the Utilities page, touch the **RAIM Prediction** key.

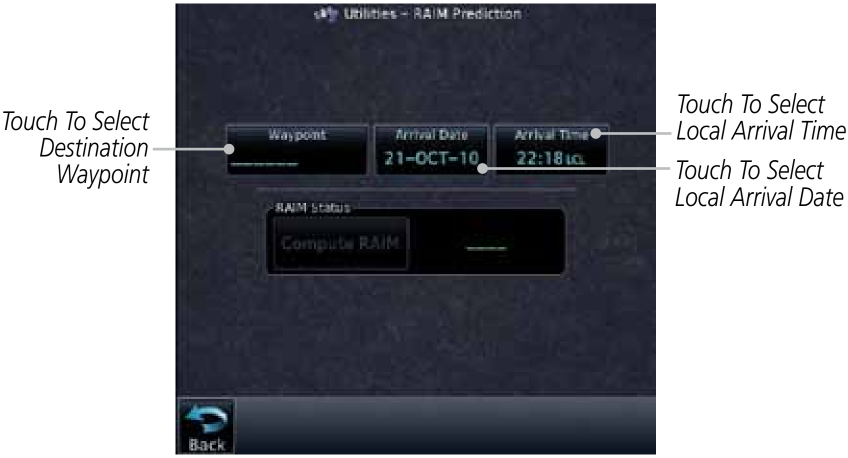

Utilities - RAIM Prediction
Touch To Select Destination Waypoint
Waypoint
____
Arrival Date
21-OCT-10
Arrival Time
22:18LCL
Touch To Select Local Arrival Time
Touch To Select Local Arrival Date
RAIM Status
Compute RAIM
____
Back

Figure 15-12 Utility RAIM Prediction Page

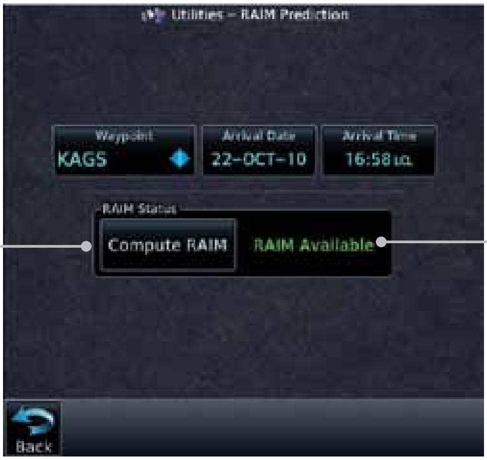
2. Touch the **Waypoint** key and select the waypoint for RAIM Prediction.
3. Touch the **Arrival Date** key and select the date of arrival at the selected waypoint.

Arrival Time
22:18LCL

4. Touch the **Arrival Time** key and select the local time of expected arrival at the selected waypoint.

Compute RAIM

5. When the Waypoint, Arrival Date, and Arrival Time values have been entered, touch the **Compute RAIM** key to determine if RAIM is available.



Utilities - RAIM Prediction

Waypoint: KAGS

Arrival Date: 22-OCT-10

Arrival Time: 16:58LCL

RAIM Status: RAIM Available

Touch To Compute RAIM

RAIM Prediction Result

Figure 15-13 RAIM Prediction Completed

15.4 Trip Planning

The GTN 7XX allows the pilot to view desired track (DTK), distance (DIS), estimated time en route (ETE), en route safe altitude (ESA) and estimated time of arrival (ETA) information for a direct-to, point-to-point between two specified waypoints or for any programmed flight plan. This item also displays the sunrise/sunset times for your destination waypoint (for the selected departure date). All times are based on the time set in System-Setup. The trip planning inputs are manually entered by the pilot.

The trip statistics are calculated based on the selected starting and ending waypoints and the trip planning inputs.

In Flight Plan mode with a stored flight plan selected, and the entire flight plan (CUM) selected, the waypoints are the starting and ending waypoints of the selected flight plan.

In Flight Plan mode with a stored flight plan selected, and a specific leg selected, the waypoints are the endpoints of the selected leg.

In Point-To-Point mode these are manually selected waypoints (if there is an active flight plan, these default to the endpoints of the active leg).

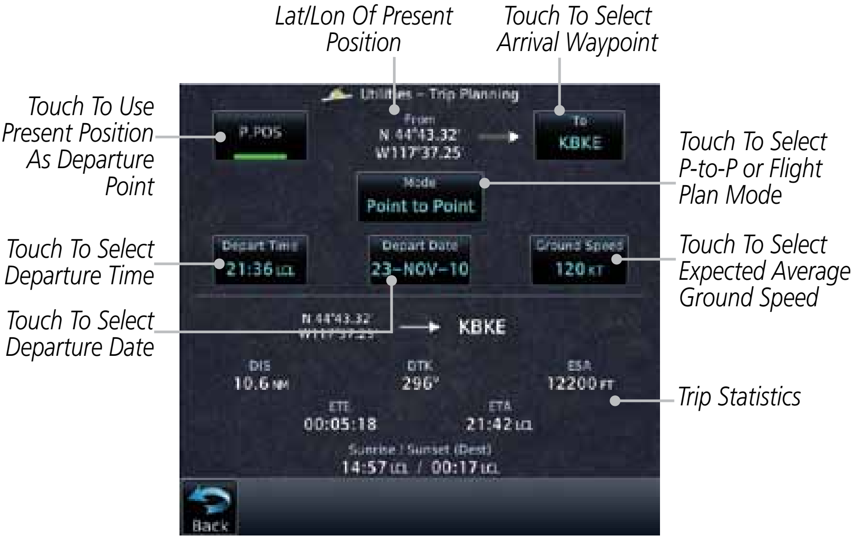
Some of the calculated trip statistics are dashed when the selected leg of the active flight plan has already been flown.

- Desired Track (DTK) - DTK is shown as nnn° and is the desired track between the selected waypoints. It is dashed unless only a single leg is selected.
- Distance (DIS) - The distance is shown in tenths of units up to 99.9, and in whole units up to 9999.
- Estimated time en route (ETE) - ETE is shown as hours:minutes until less than an hour, then it is shown as minutes:seconds.
- Estimated time of arrival (ETA) - ETA is shown as hours:minutes and is the local time at the destination.
    - If in Point-To-Point mode then the ETA is the ETE added to the departure time.
    - If a flight plan other than the active flight plan is selected it shows the ETA by adding to the departure time all of the ETEs of the legs up to and including the selected leg. If the entire flight plan is selected, then the ETA is calculated as if the last leg of the flight plan was selected.
    - If the active flight plan is selected the ETA reflects the current position of the aircraft and the current leg being flown. The ETA is calculated by adding to the current time the ETEs of the current leg up to and including the selected leg. If the entire flight plan is selected, then the ETA is calculated as if the last leg of the flight plan was selected.
- En Route safe altitude (ESA) - The ESA is shown as nnnnnFT
- Destination sunrise and sunset times - These times are shown as hours:minutes and are the local time at the destination.

15.4.1 Point-To-Point Mode

The Trip Planning Point-to-Point mode shows trip calculations between two selected points: either two waypoints from the database or from your present position to a selected waypoint.

1. While viewing the Utilities page, touch the **Trip Planning** key.
2. Touch the **Mode** key to toggle to Point-to-Point.
3. Touch the **P.POS** key to toggle between using your present position as the From waypoint when selected or a waypoint selected from the database when **P.POS** is deselected. If **P.POS** is selected, the Lat/Lon of the present position will be shown in the From position.


Lat/Lon Of Present Position
Touch To Select Arrival Waypoint
Touch To Use Present Position As Departure Point
Touch To Select P-to-P or Flight Plan Mode
Touch To Select Departure Time
Touch To Select Expected Average Ground Speed
Touch To Select Departure Date
Trip Statistics

Utilities - Trip Planning
P.POS
From N 44°43.32' W117°37.25' → To KBKE
Mode Point to Point
Depart Time 21:36 LCL
Depart Date 23-NOV-10
Ground Speed 120 KT
N 44°43.32 W117°37.25 → KBKE
DIS 10.6 NM
DTK 296°
ESA 12200 FT
ETE 00:05:18
ETA 21:42 LCL
Sunrise / Sunset (Dest) 14:57 LCL / 00:17 LCL
Back

Figure 15-14 Utility Trip Planning Page (Point-To-Point Mode)

4. If **P.POS** is not selected for the From point, touch the **From** key and then use the keypad to select a waypoint from the database and touch **Enter**.

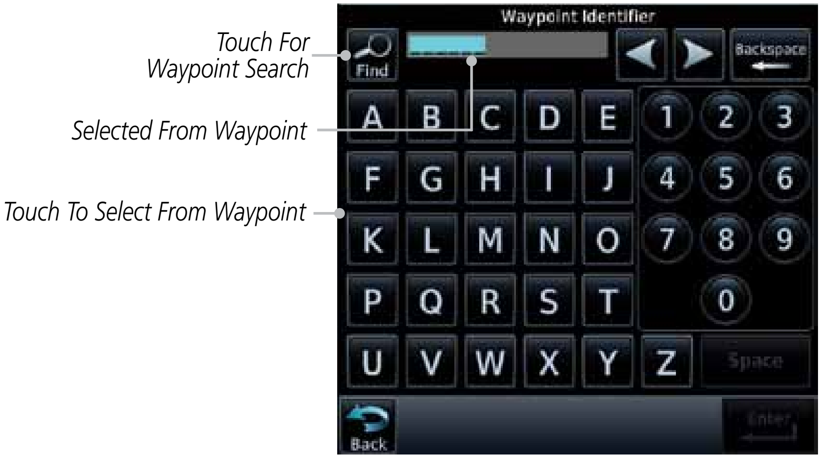

Touch For Waypoint Search
Selected From Waypoint
Touch To Select From Waypoint
Waypoint Identifier
Find
Backspace
A B C D E 1 2 3
F G H I J 4 5 6
K L M N O 7 8 9
P Q R S T 0
U V W X Y Z
Space
Back
Enter

Figure 15-15 Selecting a From Waypoint

5. Touch the **To** key and then use the keypad to select a waypoint from the database for the destination waypoint and touch **Enter**.

Depart Time
21:36LCL

6. Touch the **Depart Time** key and then use the keypad to select the departure time (local time at From waypoint) and touch **Enter**.

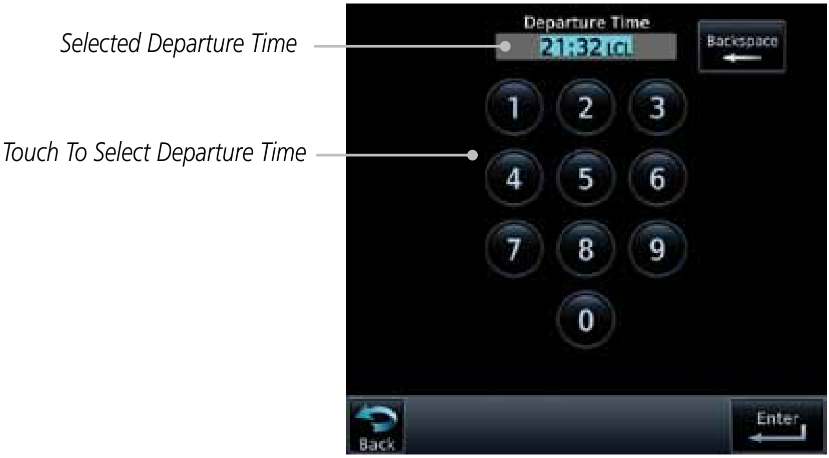
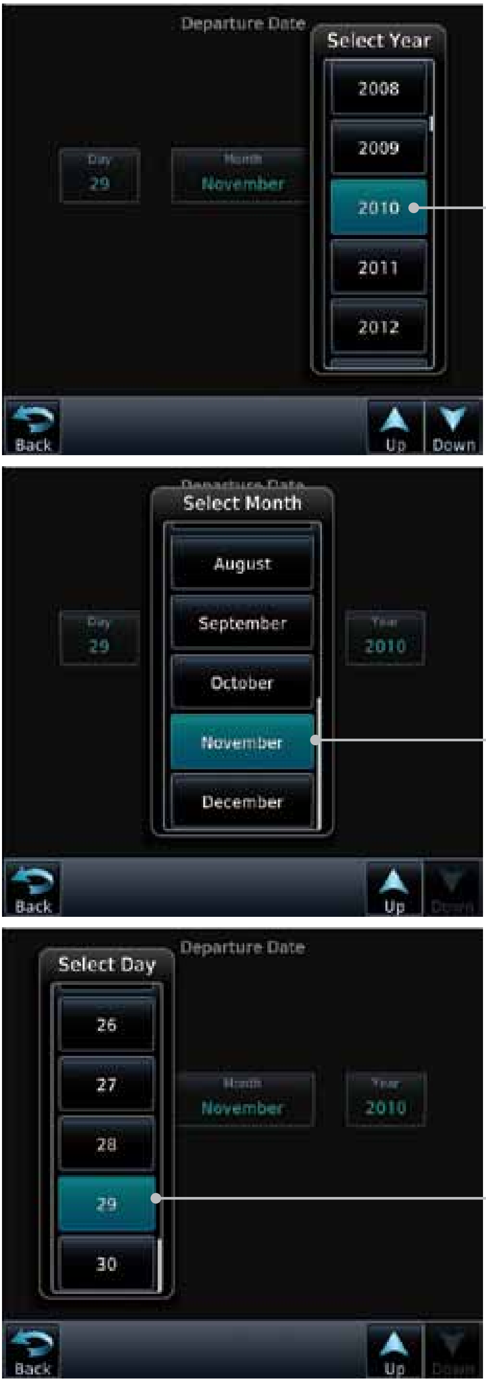

Selected Departure Time
Touch To Select Departure Time
Departure Time
21:32LCL
Backspace
1 2 3
4 5 6
7 8 9
0
Back
Enter

Figure 15-16 Selecting Departure Time

Depart Date
23-NOV-10

7. Touch the **Depart Date** key and then the Departure Date page to select the departure year, month, and day and then touch **Enter**.


Departure Date
Select Year
2008
2009
2010
2011
2012
Day
29
Month
November
Back
Up
Down
Select Month
August
September
October
November
December
Year
2010
Select Day
26
27
28
29
30

Touch To Select Departure Year

Touch To Select Departure Month

Touch To Select Departure Day

Figure 15-17 Selecting Departure Date

Ground Speed
120 KT

8. Touch the **Ground Speed** key and then the keypad to select the average ground speed for the trip and touch **Enter**.

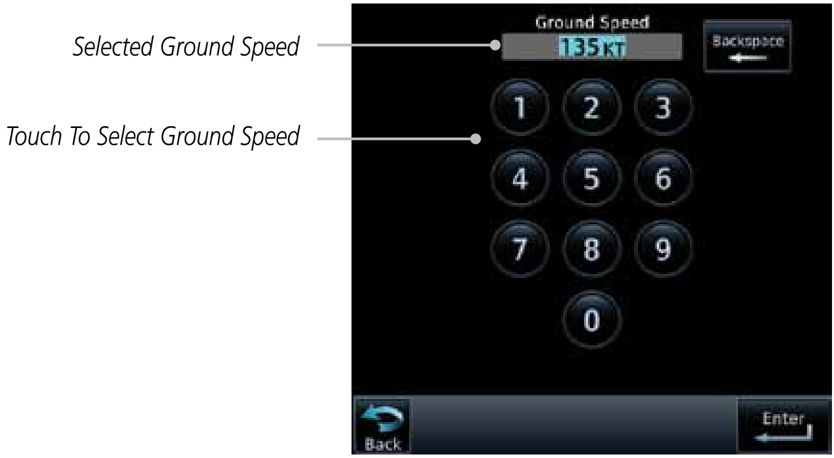
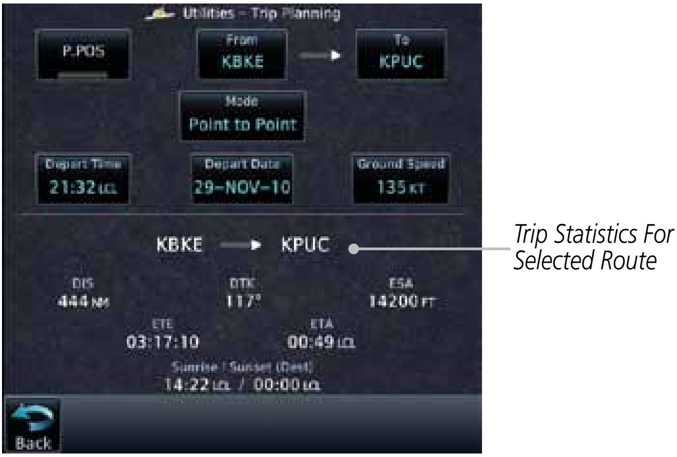

Selected Ground Speed
Touch To Select Ground Speed
Ground Speed
135 KT
Backspace
1
2
3
4
5
6
7
8
9
0
Back
Enter

Figure 15-18 Selecting Expected Average Ground Speed

Compute Data

9. After completing the Trip Planning selections, the trip statistics will be shown in the lower half of the display.


Utilities - Trip Planning
P.POS
Mode
Back
Trip Statistics For Selected Route

From KBKE → To KPUC

Mode: Point to Point

Depart Time 21:32 LCL

Depart Date 29-NOV-10

Ground Speed 135 KT

KBKE → KPUC

DIS 444 NM

DTK 117°

ESA 14200 FT

ETE 03:17:10

ETA 00:49 LCL

Sunrise / Sunset (Dest) 14:22 LCL / 00:00 LCL

Figure 15-19 Utility Trip Planning Page With Computed Data (Point-To-Point Mode)

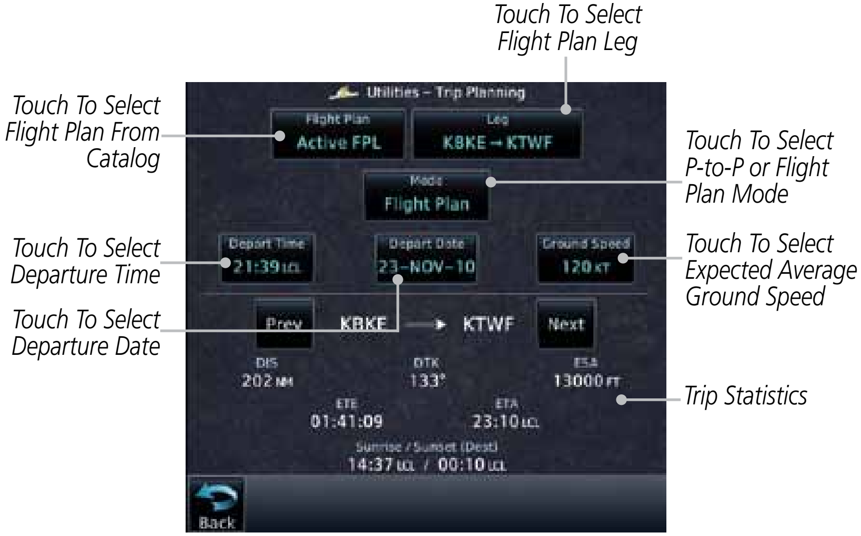
***NOTE:** When Local Time is selected in the Setup-Date/Time feature, Sunrise/Sunset calculations in the Trip Planning feature are based on the From waypoint time zone. For instance, a flight plan originating in the Pacific time zone and ending in the Central time zone would show Sunset/Sunrise times at the destination in Pacific time. This potential offset does not occur when UTC time is used.*

15.4.2 Flight Plan Mode

The Trip Planning Flight Plan mode shows trip calculations between two legs of the flight plan or the cumulative flight plan.

Mode
Point to Point

1. Touch the **Mode** key to select Flight Plan mode, if required.


Utilities - Trip Planning
Flight Plan
Active FPL
Leg
KBKE → KTWF
Mode
Flight Plan
Prev
Next
Back

Depart Time 21:39LCL
Depart Date 23-NOV-10
Ground Speed 120KT
KBKE ► KTWF
DIS 202NM
DTK 133°
ESA 13000FT
ETE 01:41:09
ETA 23:10LCL
Sunrise / Sunset (Dest) 14:37LCL / 00:10LCL

Touch To Select Flight Plan Leg

Touch To Select Flight Plan From Catalog

Touch To Select P-to-P or Flight Plan Mode

Touch To Select Departure Time

Touch To Select Expected Average Ground Speed

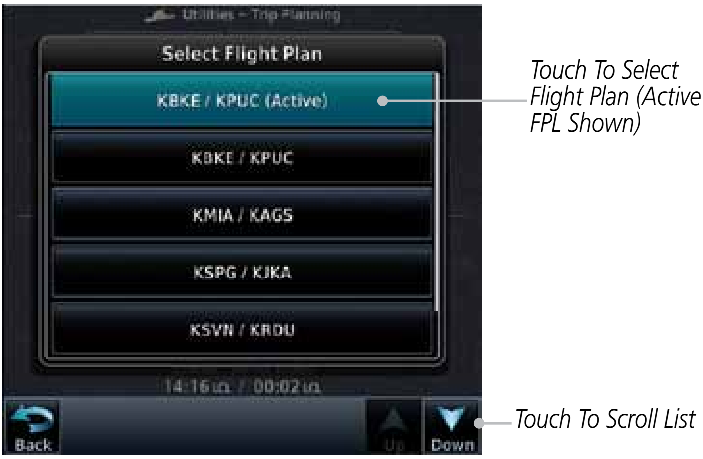
Touch To Select Departure Date

Trip Statistics

15-20 Utility Trip Planning Page (Flight Plan Mode)

Flight Plan
Active FPL

2. Touch the **Flight Plan** key to select the flight plan.


Utilities - Trip Planning
Select Flight Plan
KBKE / KPUC (Active)
KBKE / KPUC
KMIA / KAGS
KSPG / KJKA
KSVN / KRDU
14:16LCL / 00:02LCL
Back
Up
Down

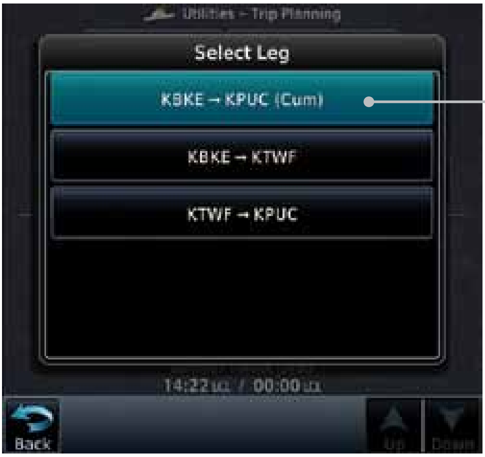
Touch To Select Flight Plan (Active FPL Shown)

Touch To Scroll List

Figure 15-21 Select Flight Plan

Leg
KBKE → KTWF

3. Touch the **Leg** key to select the flight plan leg. If the "Cumulative" selection is chosen, statistics will relate to the entire flight plan.


Utilities - Trip Planning
Select Leg
KBKE → KPUC (Cum)
KBKE → KTWF
KTWF → KPUC
14:22LCL / 00:00LCL
Back
Up
Down

Touch To Select Flight Plan Leg (Cumulative FPL Shown)

Figure 15-22 Select Flight Plan Leg

Depart Time
21:36LCL

4. Touch the **Depart Time** key and then use the keypad to select the departure time (local time at From waypoint) and touch **Enter**.

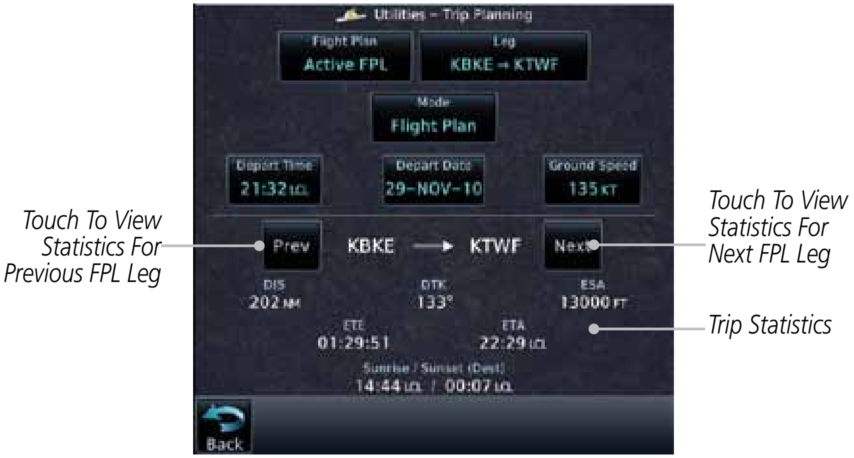
Depart Date
23-NOV-10

5. Touch the **Depart Date** key and then the Departure Date page to select the departure year, month, and day and then touch **Enter**.

Ground Speed
120KT

6. Touch the **Ground Speed** key and then the keypad to select the average ground speed for the trip and touch **Enter**.

7. Statistics for the current flight plan leg are displayed in the lower half of the display. The Cumulative flight plan is shown.


Utilities - Trip Planning
Flight Plan
Active FPL
Leg
KBKE → KTWF
Mode
Flight Plan
Prev
Next
Back

Depart Time 21:32LCL

Depart Date 29-NOV-10

Ground Speed 135KT

KBKE → KTWF

DIS 202NM

DTK 133°

ESA 13000FT

ETE 01:29:51

ETA 22:29LCL

Sunrise / Sunset (Dest) 14:44LCL / 00:07LCL

Touch To View Statistics For Previous FPL Leg

Touch To View Statistics For Next FPL Leg

Trip Statistics

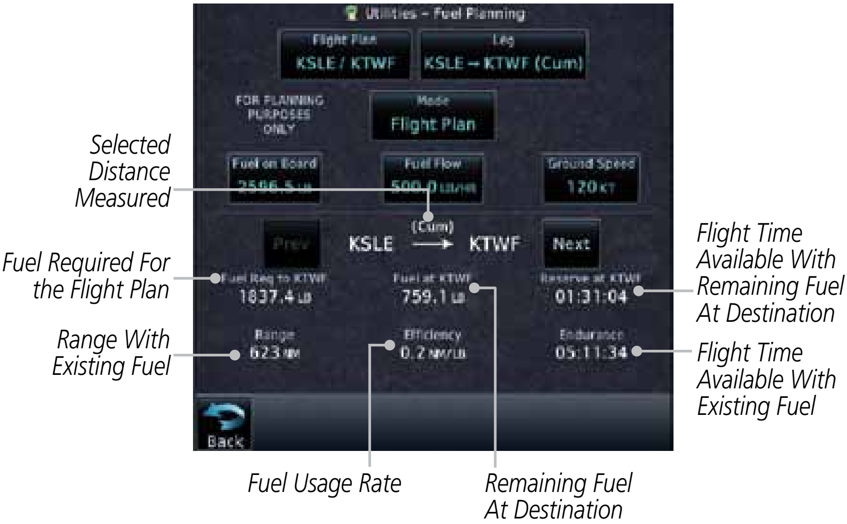
15-23 Utility Trip Planning Page Computed Data View (Flight Plan Mode)

8. Touch the **Next** key to view statistics for the next leg in the flight plan.

15.5 Fuel Planning

Fuel Planning — This item displays fuel conditions along the active direct-to or flight plan. You may manually enter fuel flow, ground speed (GS) and fuel on board figures for planning purposes. Fuel planning figures can be displayed not only for the currently active flight plan or direct-to, but also point-to-point between two specified waypoints and for any programmed flight plan.

Fuel on board and fuel flow are manually entered in the unit start-up sequence and used to recalculate fuel on board as it is consumed. When fuel flow or fuel on board is manually entered, the figures are retained the next time you view the page (with fuel on board continuously recalculated).


Utilities - Fuel Planning

Flight Plan: KSLE / KTWF

Leg: KSLE → KTWF (Cum)

FOR PLANNING PURPOSES ONLY

Mode: Flight Plan

Fuel on Board: 2596.5 LB

Fuel Flow: 500.0 LB/HR

Ground Speed: 120 KT

(Cum) KSLE → KTWF

Fuel Req to KTWF: 1837.4 LB

Fuel at KTWF: 759.1 LB

Reserve at KTWF: 01:31:04

Range: 623 NM

Efficiency: 0.2 NM/LB

Endurance: 05:11:34

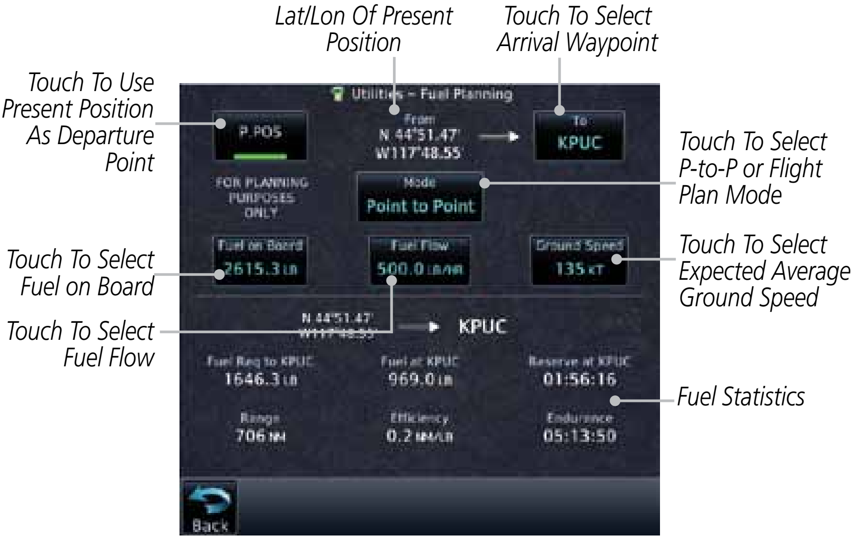
Prev
Next
Back
Selected Distance Measured
Fuel Required For the Flight Plan
Range With Existing Fuel
Flight Time Available With Remaining Fuel At Destination
Flight Time Available With Existing Fuel
Fuel Usage Rate
Remaining Fuel At Destination

Figure 15-24 Utility Fuel Planning Page (Flight Plan Mode)

15.5.1 Point-To-Point Mode

The Fuel Planning Point-to-Point mode shows fuel calculations between two selected points: either two waypoints from the database or from your present position to a selected waypoint.

1. While viewing the Utilities page, touch the **Fuel Planning** key.
2. Touch the **Mode** key to toggle to Point-to-Point.
3. Touch the **P.POS** key to toggle between using your present position as the From waypoint when selected or a waypoint selected from the database when **P.POS** is deselected. If **P.POS** is selected, the Lat/Lon of the present position will be shown in the From position.


Lat/Lon Of Present Position
Touch To Select Arrival Waypoint
Touch To Use Present Position As Departure Point
Touch To Select P-to-P or Flight Plan Mode
Touch To Select Fuel on Board
Touch To Select Expected Average Ground Speed
Touch To Select Fuel Flow
Fuel Statistics
Utilities - Fuel Planning
P.POS
Back

From N 44°51.47' W117°48.55 → To KPUC

FOR PLANNING PURPOSES ONLY

Mode Point to Point

Fuel on Board 2615.3 LB
Fuel Flow 500.0 LB/HR
Ground Speed 135 KT

N 44°51.47' W117°48.55 → KPUC

Fuel Req to KPUC 1646.3 LB
Fuel at KPUC 969.0 LB
Reserve at KPUC 01:56:16
Range 706 NM
Efficiency 0.2 NM/LB
Endurance 05:13:50

Figure 15-25 Utility Trip Planning Page (Point-To-Point Mode)

4. If **P.POS** is not selected for the From point, touch the **From** key and then use the keypad to select a waypoint from the database and touch **Enter**.

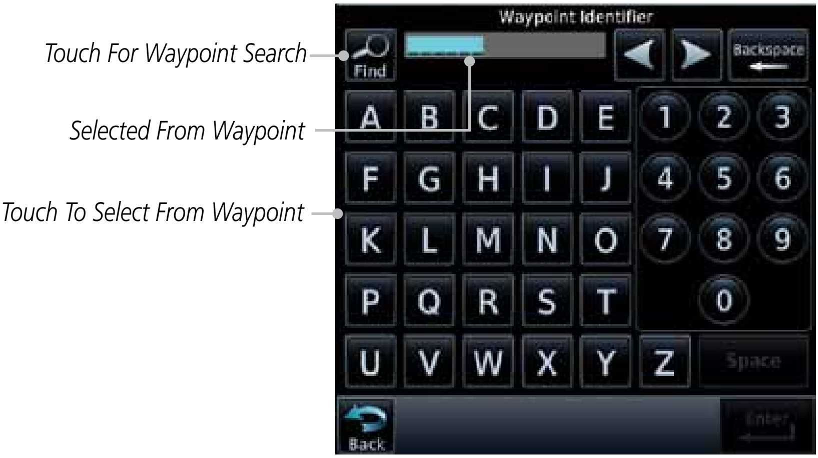

Touch For Waypoint Search
Selected From Waypoint
Touch To Select From Waypoint
Waypoint Identifier
Find
Backspace
A B C D E 1 2 3
F G H I J 4 5 6
K L M N O 7 8 9
P Q R S T 0
U V W X Y Z Space
Back
Enter

Figure 15-26 Selecting the From Waypoint

5. Touch the **To** key and then use the keypad to select a waypoint from the database for the destination waypoint and touch **Enter**.

6. Touch the **Fuel on Board** key and then use the keypad to select the current amount of fuel on board and touch **Enter**.

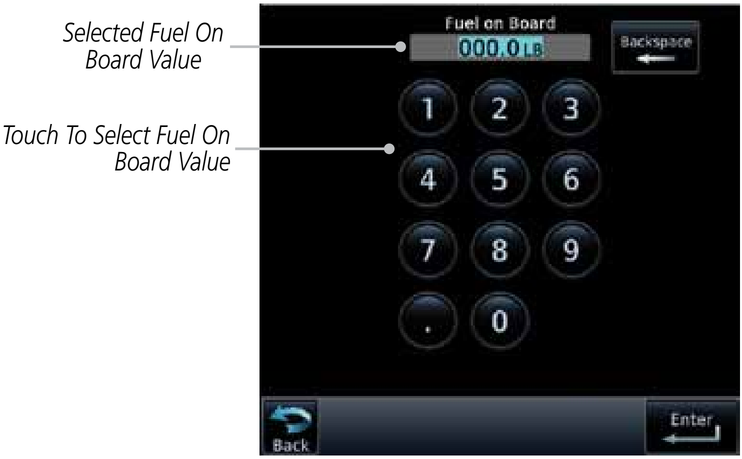

Selected Fuel On Board Value
Touch To Select Fuel On Board Value
Fuel on Board
000.0 LB
Backspace
1 2 3
4 5 6
7 8 9
. 0
Back
Enter

Figure 15-27 Selecting Current Fuel On Board

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

Fuel Flow
500.0 LB/HR

7. Touch the **Fuel Flow** key and then use the keypad to select the average fuel flow and touch **Enter**.

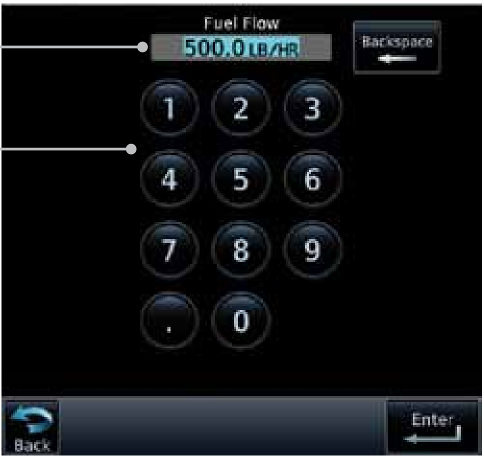

Selected Fuel Flow Value
Touch To Select Fuel Value
Fuel Flow
500.0 LB/HR
Backspace
1
2
3
4
5
6
7
8
9
.
0
Back
Enter

Figure 15-28 Selecting Fuel Flow

Ground Speed
120 KT

8. Touch the **Ground Speed** key and then the keypad to select the average ground speed for the trip and touch **Enter**.

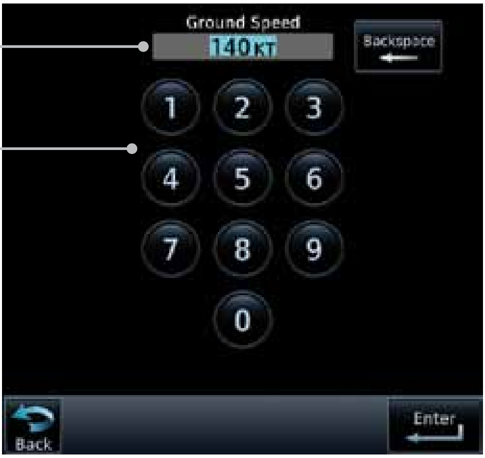

Selected Ground Speed Value
Touch To Select Ground Speed Value
Ground Speed
140 KT
Backspace
1
2
3
4
5
6
7
8
9
0
Back
Enter

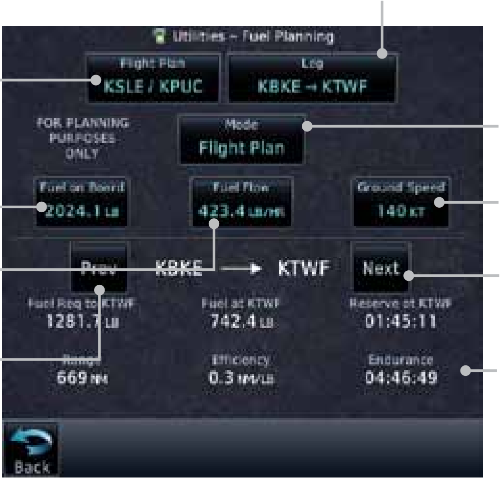
Figure 15-29 Selecting Ground Speed

15.5.2 Flight Plan Mode

The Fuel Planning Flight Plan mode shows fuel calculations between two legs of the flight plan or the cumulative flight plan.

Mode
Point to Point

1. Touch the **Mode** key to select Flight Plan mode, if required.



Flight Plan: KSLE / KPUC
Leg: KBKE → KTWF
FOR PLANNING PURPOSES ONLY
Mode: Flight Plan
Fuel on Board: 2024.1 LB
Fuel Flow: 423.4 LB/HR
Ground Speed: 140 KT
Prev KBKE → KTWF Next
Fuel Req to KTWF: 1281.7 LB
Fuel at KTWF: 742.4 LB
Reserve at KTWF: 01:45:11
Range: 669 NM
Efficiency: 0.3 NM/LB
Endurance: 04:46:49

Touch To Select Flight Plan Leg

Touch To Select Flight Plan From Catalog

Touch To Select P-to-P or Flight Plan Mode

Touch To Select Fuel on Board

Touch To Select Expected Average Ground Speed

Touch To Select Fuel Flow

Touch To Select Next FPL Leg

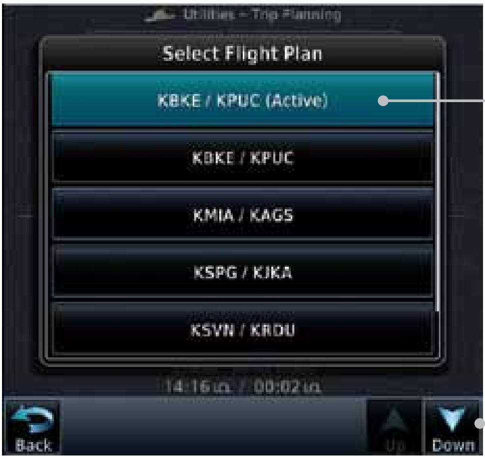
Touch To Select Previous FPL Leg

Fuel Statistics

15-30 Utility Fuel Planning Page (Flight Plan Mode)

Flight Plan
Active FPL

2. Touch the **Flight Plan** key to select the flight plan.



Select Flight Plan
KBKE / KPUC (Active)
KBKE / KPUC
KMIA / KAGS
KSPG / KJKA
KSVN / KRDU
14:16 LCL / 00:02 LCL

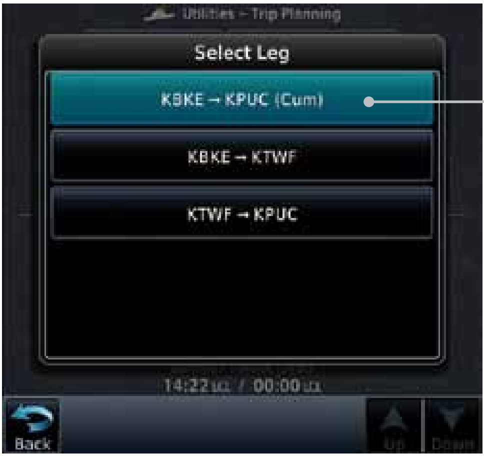
Touch To Select Flight Plan (Active FPL Shown)

Touch To Scroll List

Figure 15-31 Select Flight Plan

Leg
KBKE → KTWF

3. Touch the **Leg** key to select the flight plan leg. If the "Cumulative" selection is chosen, statistics will relate to the entire flight plan.


Utilities - Trip Planning
Select Leg
KBKE → KPUC (Cum)
KBKE → KTWF
KTWF → KPUC
14:22 LCL / 00:00 LCL
Back
Up
Down

Touch To Select Flight Plan Leg (Cumulative FPL Shown)

Figure 15-32 Select Flight Plan Leg

Fuel on Board
2615.3 LB

4. If desired, touch the **Fuel on Board** key and then use the keypad to select the Fuel on Board value and touch **Enter**.

Fuel Flow
500.0 LB/HR

5. If desired, touch the **Fuel Flow** key and then use the keypad to select the Fuel Flow value and touch **Enter**.

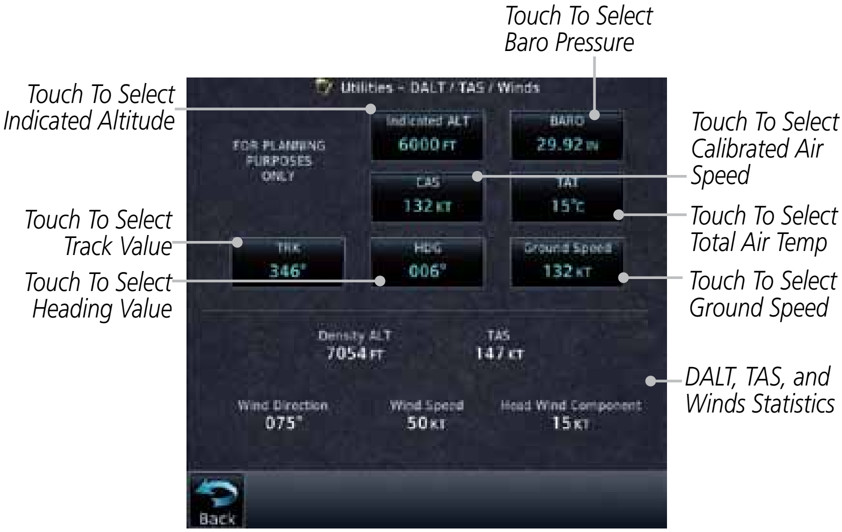
Ground Speed
120 KT

6. Touch the **Ground Speed** key and then the keypad to select the average ground speed for the trip and touch **Enter**.
7. Statistics for the current flight plan leg are displayed in the lower half of the display. The Cumulative flight plan is shown.

8. Touch the **Previous** and **Next** keys to view statistics for the previous and next legs in the flight plan.

15.6 DALT/TAS/Winds

Density Alt / TAS / Winds — indicates the theoretical altitude at which your aircraft performs depending upon several variables, including indicated altitude (Indicated ALT), barometric pressure (BARO) and total air temperature (TAT; the temperature, including the heating effect of speed, read on a standard outside temperature gauge). This item computes true airspeed (TAS) and density altitude, based upon the factors above. Also, this feature determines winds aloft — the wind direction and speed — and a head wind/tail wind component, based on true airspeed, aircraft heading (HDG) and ground speed.


Touch To Select Baro Pressure
Touch To Select Indicated Altitude
Touch To Select Calibrated Air Speed
Touch To Select Total Air Temp
Touch To Select Track Value
Touch To Select Heading Value
Touch To Select Ground Speed
DALT, TAS, and Winds Statistics
Back

Utilities - DALT / TAS / Winds

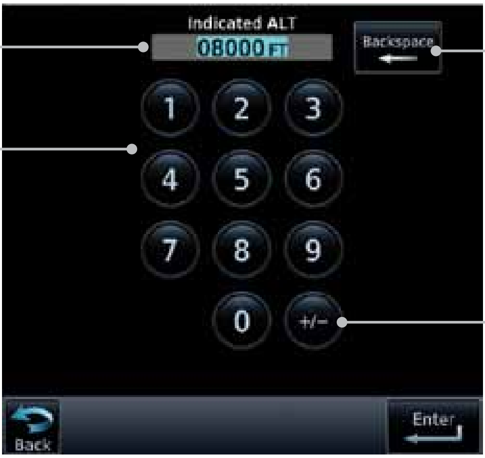
FOR PLANNING PURPOSES ONLY

Indicated ALT 6000 FT
BARO 29.92 IN
CAS 132 KT
TAT 15°C
TRK 346°
HDG 006°
Ground Speed 132 KT
Density ALT 7054 FT
TAS 147 KT
Wind Direction 075°
Wind Speed 50 KT
Head Wind Component 15 KT

Figure 15-33 Utility DALT/TAS/Winds Page

Indicated ALT
8000 FT

1. Touch the **Indicated ALT** key and then the keypad to select the Indicated Altitude and then touch **Enter**.


Indicated ALT
08000 FT
Backspace
1
2
3
4
5
6
7
8
9
0
+/-
Back
Enter

Selected Indicated Altitude Value

Touch To Select Indicated Altitude Value

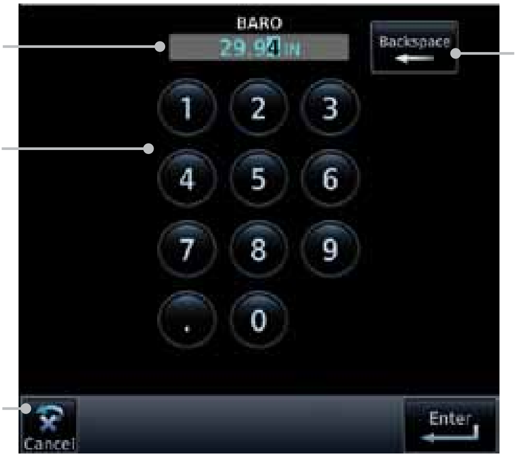
Touch To Clear Values

Touch To Select Above Or Below Sea Level

Figure 15-34 Select Indicated Altitude Value

BARO
29.92 IN

2. Touch the **BARO** key and then the keypad to select the Barometric Pressure and then touch **Enter**.


BARO
29.94 IN
Backspace
1
2
3
4
5
6
7
8
9
.
0
Cancel
Enter

Selected Barometric Pressure Value

Touch To Select Barometric Pressure Value

Touch To Clear Values

Touch To Cancel Selection

Figure 15-35 Select Barometric Pressure Value

3. Touch the **CAS** key and then the keypad to select the Calibrated Air Speed and then touch **Enter**.

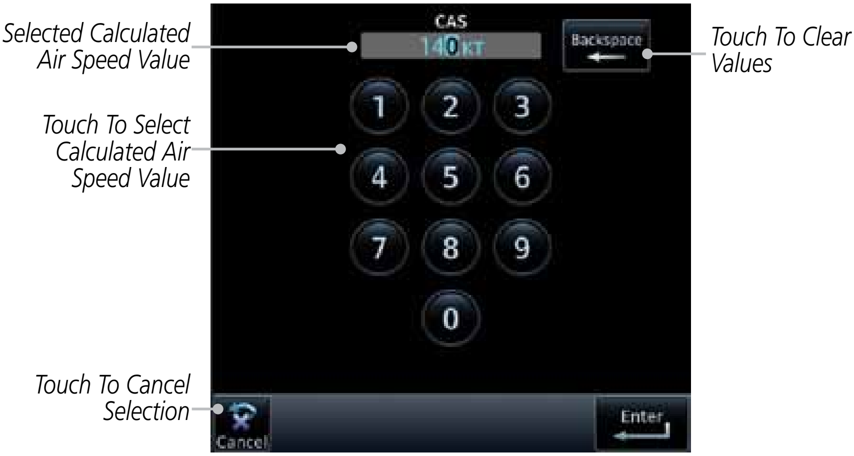

Selected Calculated Air Speed Value
Touch To Select Calculated Air Speed Value
Touch To Cancel Selection
Touch To Clear Values
CAS
140KT
Backspace
1
2
3
4
5
6
7
8
9
0
Cancel
Enter

Figure 15-36 Select Calculated Air Speed Value

4. Touch the **TAT** key and then the keypad to select the Total Air Temperature and touch **Enter**.

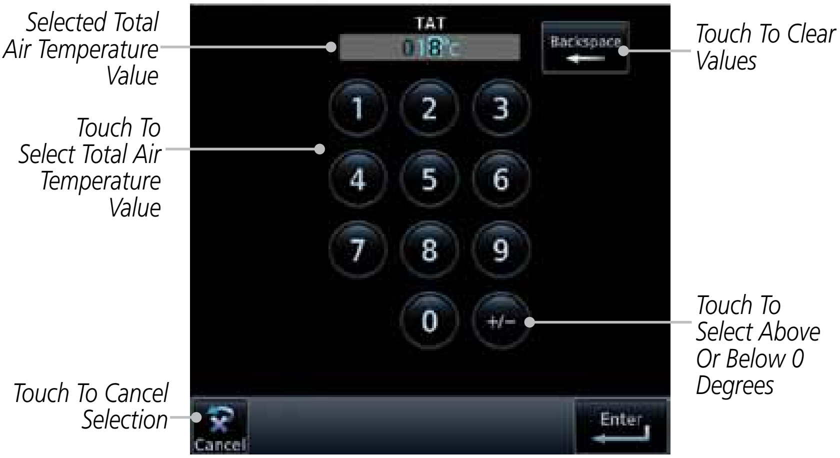

Selected Total Air Temperature Value
Touch To Select Total Air Temperature Value
Touch To Cancel Selection
Touch To Clear Values
Touch To Select Above Or Below 0 Degrees
TAT
018°C
Backspace
1
2
3
4
5
6
7
8
9
0
+/-
Cancel
Enter

Figure 15-37 Select Total Air Temperature Value

5. Touch the **TRK** key and then the keypad to select the Track Angle and then touch **Enter**.

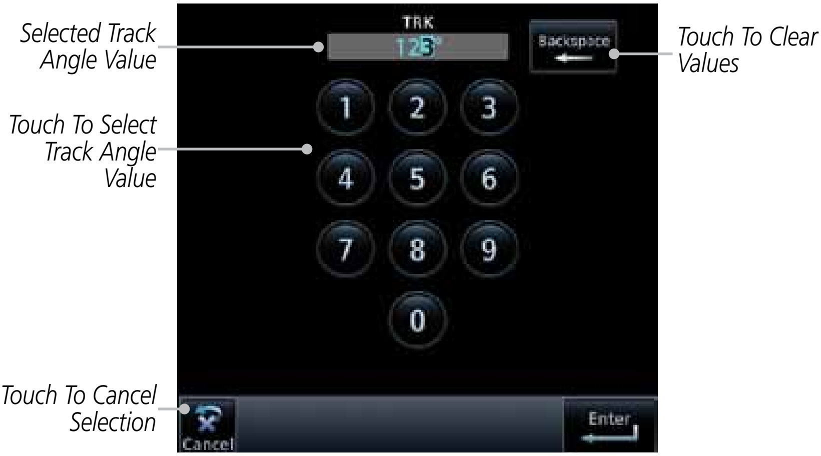

Selected Track Angle Value
Touch To Select Track Angle Value
Touch To Cancel Selection
Touch To Clear Values
TRK
123°
Backspace
1
2
3
4
5
6
7
8
9
0
Cancel
Enter

Figure 15-38 Select Track Angle Value

6. Touch the **HDG** key and then the keypad to select the Heading value and then touch **Enter**.

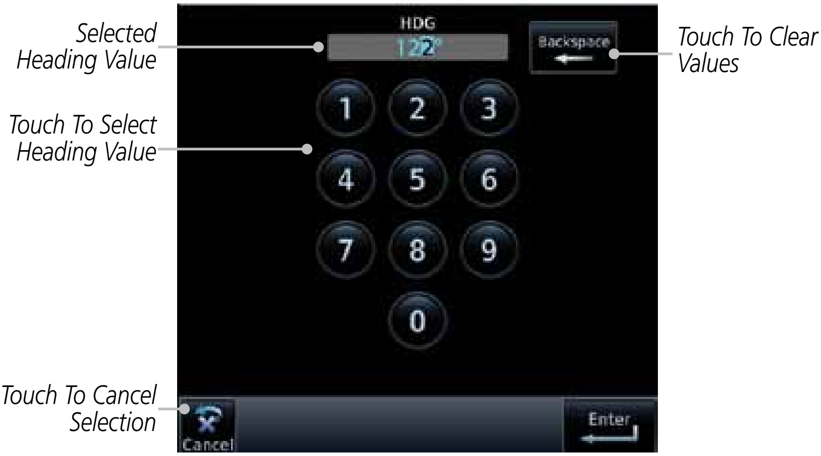

Selected Heading Value
Touch To Select Heading Value
Touch To Cancel Selection
Touch To Clear Values
HDG
122°
Backspace
1
2
3
4
5
6
7
8
9
0
Cancel
Enter

Figure 15-39 Select Heading Value

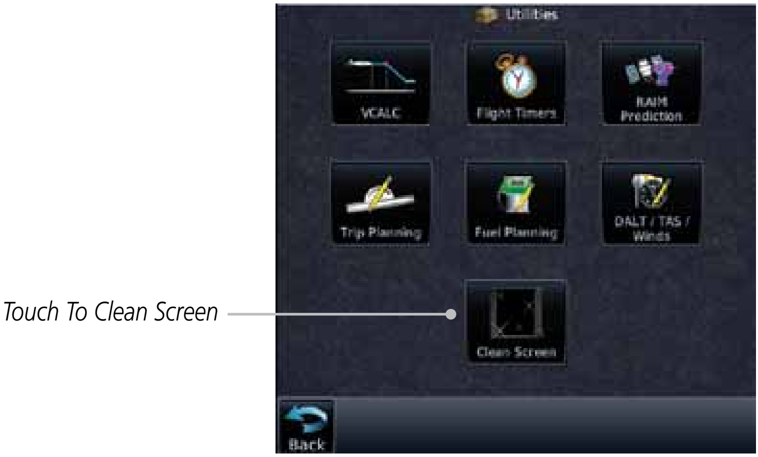
Ground Speed
120KT

7. Touch the **Ground Speed** key and then the keypad to select the average ground speed for the trip and then touch **Enter**.

15.7 Clean Screen Mode

The Clean Screen mode makes the touchscreen inactive so the display can be manually cleaned. The front bezel, keypad, and display can be cleaned with a microfiber cloth or with a soft cotton cloth dampened with clean water. DO NOT use any chemical cleaning agents. Care should be taken to avoid scratching the surface of the display.

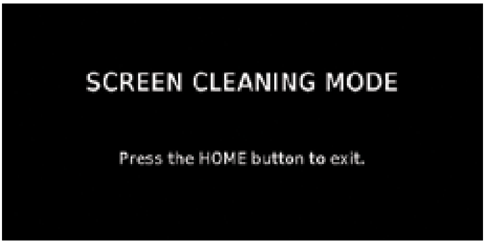
1. While viewing the Utilities page group, touch the **Clean Screen** key to start Screen Cleaning Mode.


Utilities
VCALC
Flight Timers
RAIM Prediction
Trip Planning
Fuel Planning
DALT / TAS / Winds
Clean Screen
Back

Touch To Clean Screen

Figure 15-40 Utilities Page

2. Touch the **HOME** key to exit Screen Cleaning Mode.



SCREEN CLEANING MODE

Press the HOME button to exit.

Figure 15-41 Screen Cleaning Mode

This page intentionally left blank

16 SYSTEM

The System function allows you to change unit settings, customize operation to your preferences, and check on the operation of your unit. The System pages cover System Status, GPS Status, External LRUs, Setup, Alerts, Units, Audio, Ownship, and the Backlight control function.

1. From the Home page, touch the **System** key.

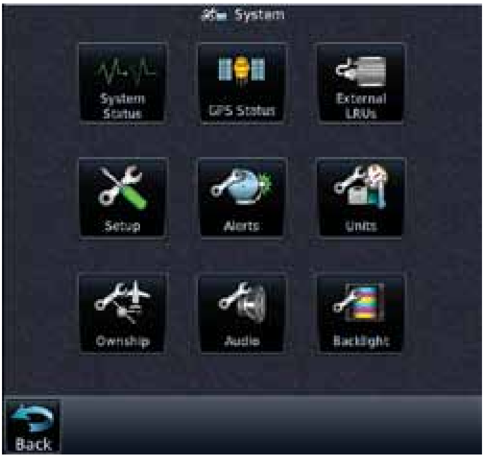

System
System Status
GPS Status
External LRUs
Setup
Alerts
Units
Ownship
Audio
Backlight
Back

Figure 16-1 System Home Page

2. Touch the desired key to reach that function. To return to the System page, touch the **Back** key.

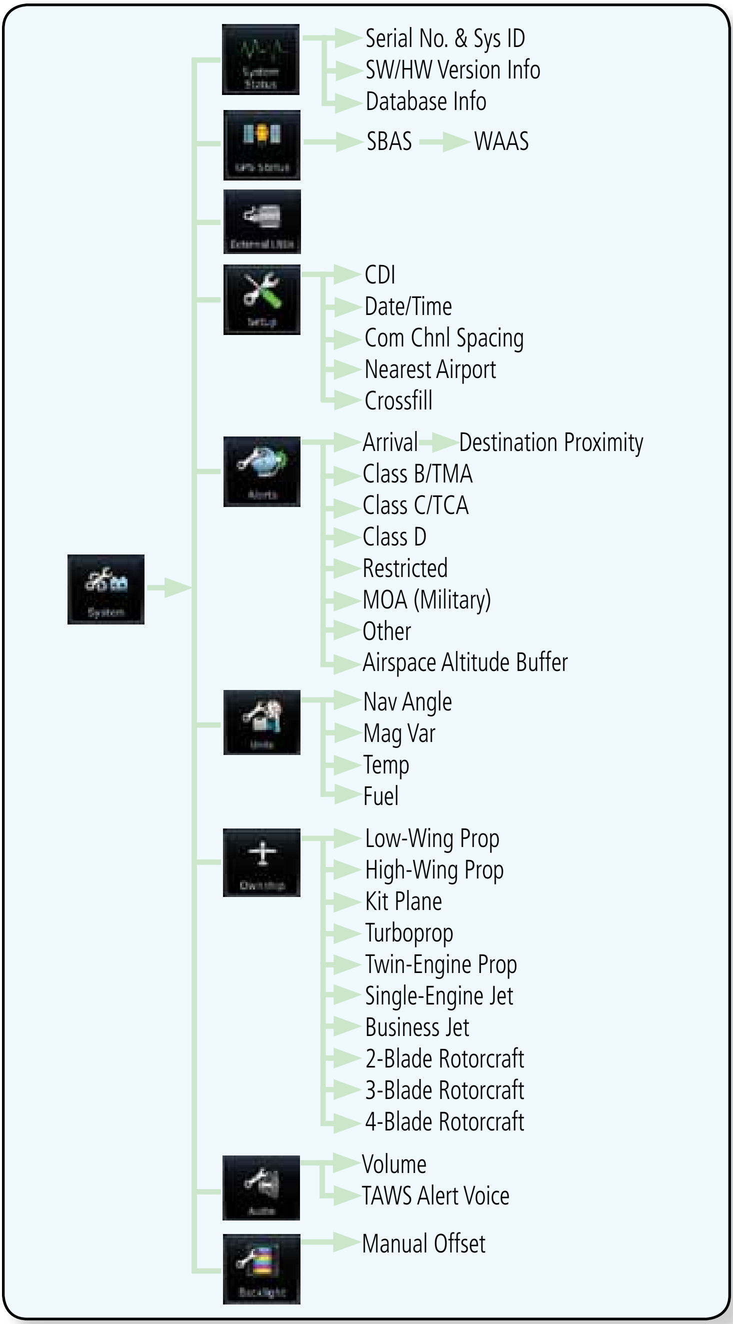
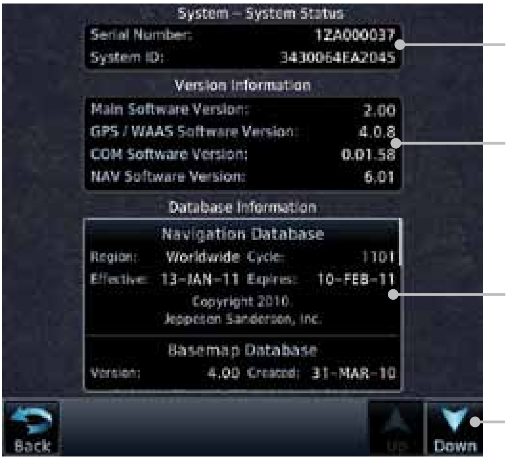

System
System Status
Serial No. & Sys ID
SW/HW Version Info
Database Info
GPS Status
SBAS
WAAS
External LRUs
Setup
CDI
Date/Time
Com Chnl Spacing
Nearest Airport
Crossfill
Alerts
Arrival
Destination Proximity
Class B/TMA
Class C/TCA
Class D
Restricted
MOA (Military)
Other
Airspace Altitude Buffer
Units
Nav Angle
Mag Var
Temp
Fuel
Ownship
Low-Wing Prop
High-Wing Prop
Kit Plane
Turboprop
Twin-Engine Prop
Single-Engine Jet
Business Jet
2-Blade Rotorcraft
3-Blade Rotorcraft
4-Blade Rotorcraft
Audio
Volume
TAWS Alert Voice
Backlight
Manual Offset

Figure 16-2 System Function Summary

16.1 System Status

The System status page of the System function provides information about the GTN unit and the equipment attached to it. This information is useful if it is necessary to contact Customer Service. The System Status page shows the System ID and serial number for the GTN unit, hardware and software versions, as well as a list of the installed databases.


System – System Status

Serial Number: 1ZA000037
System ID: 3430064EA2045

Version Information

Main Software Version: 2.00
GPS / WAAS Software Version: 4.0.8
COM Software Version: 0.01.58
NAV Software Version: 6.01

Database Information

Navigation Database
Region: Worldwide Cycle: 1101
Effective: 13-JAN-11 Expires: 10-FEB-11
Copyright 2010
Jeppeson Sanderson, Inc.

Basemap Database
Version: 4.00 Created: 31-MAR-10

Serial No. And System ID

Internal SW Versions

List of Databases with Version and Expiration Date

Touch To Scroll List

Figure 16-3 System Function System Status Page Description

System Status
Serial # & System ID
Software Versions
Databases

Figure 16-4 System Status Functional Diagram

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
Charts
Wpt Info
Map
Traffic
Terrain
Weather
Nearest
Services/ Music
Utilities
System
Messages
Symbols
Appendix
Index

System Status

1. While viewing the System page, touch **System Status**.
2. Use the **Up** and **Down** arrow keys as needed to view the Database Information.

3. Touch the **Back** key to return to the System page.

16.1.1 Serial Number and System ID

The System Status section shows the unit Serial Number and the System ID.

16.1.2 Version Information

The software versions of the GTN unit are displayed. This information is useful when contacting Customer Support.

16.1.3 Database Information

The System Status page lists the name of the database, its version, and expiration date.

***NOTE:** The data contained in the terrain and obstacle databases comes from government agencies. Garmin accurately processes and cross-validates the data, but cannot guarantee the accuracy and completeness of the data.*

The following databases are stored on Supplemental Data Cards provided by Garmin:

- **Terrain** – The terrain database contains terrain mapping data. It is updated periodically and has no expiration date.
- **Obstacles** – The obstacles database contains data for obstacles, such as towers, that pose a potential hazard to aircraft. Obstacles 200 feet and higher are included in the obstacle database. It is very important to note that not all obstacles are necessarily charted and therefore may not be contained in the obstacle database. This database is updated on a 56-day cycle. Obstacles will still be shown after the database has expired.
- **SafeTaxi** – The SafeTaxi database contains detailed airport diagrams for selected airports. These diagrams aid in following ground control instructions by accurately displaying the aircraft position on the map in relation to taxiways, ramps, runways, terminals, and services. This database is updated on a 56-day cycle. SafeTaxi will still be shown after it has expired.

- **FliteCharts –** The FliteCharts database contains procedure charts for the United States only. This database is updated on a 28-day cycle. If not updated within 180 days of the expiration date, FliteCharts no longer functions.
- **Basemap** - The Basemap database contains land and water data, such as roads, boundaries, rivers, and lakes.
- **Aviation –** The Navigation database is updated on a 28 day cycle. Navigation database updates are provided by Garmin and may be downloaded from the Garmin web site “http://fly.garmin.com” or from Jeppesen at "http://www.jeppdirect.com/Garmin" onto a Garmin provided Supplemental Datacard. Contact Garmin at http://fly.garmin.com for navigation database updates and update kits.
- **Charts –** The optional ChartView database is updated on a 14 day cycle. The ChartView database is provided directly from Jeppesen. Contact Jeppesen (www.jeppesen.com) for ChartView subscription and update information.

Database Name	Function	Where Stored	Update Cycle	Provider	Notes
Aviation	Airport, NAVAID, Waypoint, and Airspace information	Internal memory	28 days	fly.garmin.com	Updates installed via SD card and copied into internal memory
SafeTaxi	Airport surface diagrams	Internal memory	56 days	fly.garmin.com	Updates installed via SD card and copied into internal memory
Terrain	Topographic map, Terrain/TAWS	SD card	As required	fly.garmin.com	
Obstacle	Obstacle information for map, and TAWS	Internal memory	56 days	fly.garmin.com	Updates installed via SD card and copied into internal memory
Basemap	Boundary and road information	Internal Memory	As required	fly.garmin.com	Updates installed via SD card and copied into internal memory
FliteCharts	FAA-published terminal procedures	SD card	28 days	fly.garmin.com	Disables 180 days after expiration date.
ChartView	Jeppesen terminal procedures	SD card	14 days	Contact Jeppesen	Optional feature that requires Garmin dealer enablement. Disables 70 days after expiration date.

Table 16-1 Database List

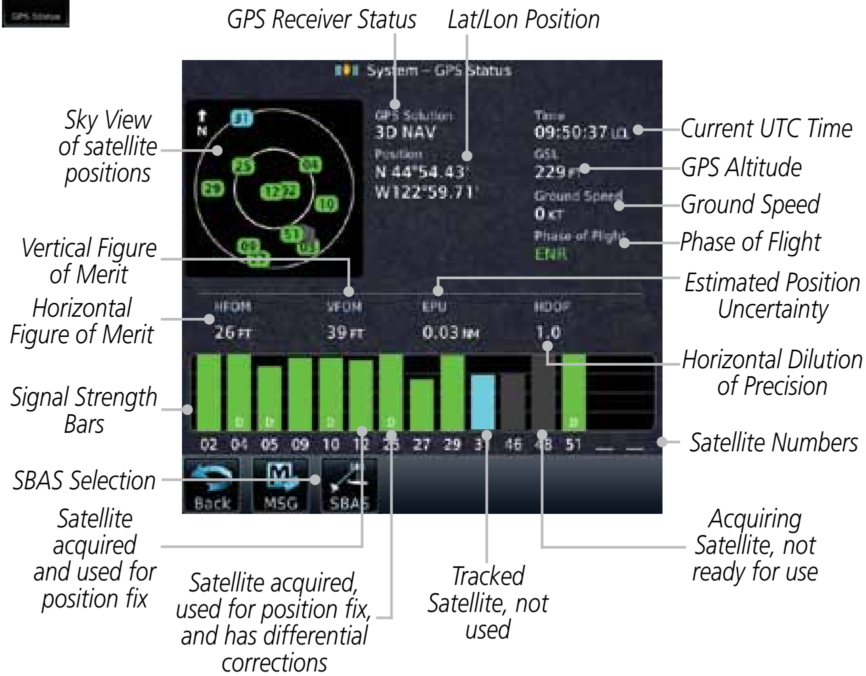
16.2 GPS Status

16.2.1 GPS Status Page

The GPS Status Page provides a visual reference of GPS receiver functions, including current satellite coverage, GPS receiver status, position accuracy, and displays your present position (in latitude and longitude) and altitude. The GPS Status Page also displays the current UTC time at the top right of the page.

The Satellite Status Page is helpful in troubleshooting weak (or missing) signal levels due to poor satellite coverage or installation problems. You may wish to refer to this page occasionally to monitor GPS receiver performance and establish a normal pattern for system operation. Should problems occur at a later date, you may find it helpful to have an established baseline from which to compare.

1. While viewing the System page, touch **GPS Status**.


GPS Receiver Status
Lat/Lon Position
System - GPS Status
Sky View of satellite positions
Vertical Figure of Merit
Horizontal Figure of Merit
Signal Strength Bars
SBAS Selection
Satellite acquired and used for position fix
Satellite acquired, used for position fix, and has differential corrections
Tracked Satellite, not used
Acquiring Satellite, not ready for use
Current UTC Time
GPS Altitude
Ground Speed
Phase of Flight
Estimated Position Uncertainty
Horizontal Dilution of Precision
Satellite Numbers
02 04 05 09 10 12 25 27 29 31 46 48 51
Back
MSG
SBAS

GPS Solution 3D NAV
Position N 44°54.43' W122°59.71'
Time 09:50:37 UTC
GSL 229 FT
Ground Speed 0 KT
Phase of Flight ENR
HFOM 26 FT
VFOM 39 FT
EPU 0.03 NM
HDOP 1.0

Figure 16-5 GPS Status Page

2. If desired, touch the **SBAS** key to select an SBAS provider. The SBAS list is based on the Aviation database.

3. Touch the key for the desired SBAS provider.
4. Touch the **Back** key to return to the System Status page.

As the GPS receiver locks onto satellites, a signal strength bar appears for each satellite in view, with the appropriate satellite number (01-32, SBAS satellites will have higher numbers) underneath each bar. The progress of satellite acquisition is shown in three stages:

Graph Symbol	Description
No signal strength bars	The receiver is looking for the satellites indicated.
Grey signal strength bars	The receiver has found the satellite(s) and is collecting data.
Yellow signal strength bars	The receiver has collected the necessary data but the satellite is not being used in the position solution as it has been excluded.
Cross-hatch cyan signal strength bars	The receiver has found the satellite(s) but it has been excluded by the FDE program as a faulty satellite.
Solid cyan signal strength bars	The receiver has collected the necessary data, but is not using the satellite in the position solution.
Solid green signal strength bars	The receiver has collected the necessary data and the satellite is being used in the position solution.
D	The "D" character inside the bars indicates differential corrections (e.g. WAAS) are being used for that satellite.

Table 16-2 Signal Strength Bar Graph Description

The Time and other data may not be displayed until the unit has acquired enough satellites for a fix.

The sky view display at the left of the page shows the satellites currently in view as well as their respective positions. The outer circle of the sky view represents the horizon (with north at the top of the circle); the inner circle represents 45° above the horizon and the center point shows the position directly overhead.

Each satellite has a 30-second data transmission that must be collected (hollow signal strength bar) before the satellite may be used for navigation (solid signal strength bar). Once the GPS receiver has determined your position, the GTN unit indicates your position, altitude, track and ground speed. The GPS receiver status field also displays the following messages under the appropriate conditions:

GPS Signal Message	Description
Acquiring	The GPS receiver is acquiring satellites for navigation. In this mode, the receiver uses satellite orbital data (collected continuously from the satellites) and last known position to determine the satellites that should be in view.
3D Nav	The GPS receiver is in 3D navigation mode and computes altitude using satellite data.
3D Diff Nav	The GPS receiver is in 3D navigation mode and differential corrections are being used.
LOI	The "LOI" (Loss Of Integrity) annunciator (bottom left corner of the screen) indicates that satellite coverage is insufficient to pass built-in integrity monitoring tests.

Table 16-3 GPS Signal Messages

The GPS Status Page also indicates the accuracy of the position fix, using Horizontal Figure of Merit (HFOM), Vertical Figure of Merit (VFOM), and Estimated Position Uncertainty (EPU). HFOM and VFOM represent the 95% confidence levels in horizontal and vertical accuracy. The lowest numbers are the best accuracy and the highest numbers are worse. EPU is the horizontal position error estimated by the Fault Detection and Exclusion (FDE) algorithm, in feet or meters.

NOTE: *Operating outside of an SBAS service area with SBAS enabled may cause elevated EPU values to be displayed on the satellite status page. Regardless of the EPU value displayed, the LOI annunciation is the controlling indication for determining the integrity of the GPS navigation solution.*

NOTE: *The FDE Prediction program is used to predict FDE availability. This program must be used prior to all oceanic or remote area flights for all operators using the GTN as a primary means of navigation under FAR parts 91, 121, 125, and 135. The FDE program is part of the GTN trainer, available for download from the GTN product information page on Garmin's web site, www.garmin.com.*

If the GTN has not been operated for a period of six months or more, acquiring satellite data to establish almanac and satellite orbit information can take 5 to 10 minutes.

The Time and other data may not be displayed until the unit has acquired enough satellites for a fix.

16.2.2 Satellite-Based Augmentation System (SBAS)

SBAS is a system that supports wide area, or regional, augmentation through the use of additional satellite broadcast messages. WAAS, EGNOS, and MSAS are known SBAS providers.

At the time of printing, SBAS providers support the following areas:

- WAAS provides SBAS service for Alaska, Canada, the 48 contiguous states, and most of Central America.
- EGNOS provides SBAS service for most of Europe and parts of North Africa.
- MSAS provides SBAS service for Japan only.

1. While viewing the System page, touch **GPS Status**.
2. If desired, touch the **SBAS** key to select an SBAS provider. The SBAS list is based on the Aviation database.
3. Touch the key for the desired SBAS provider.

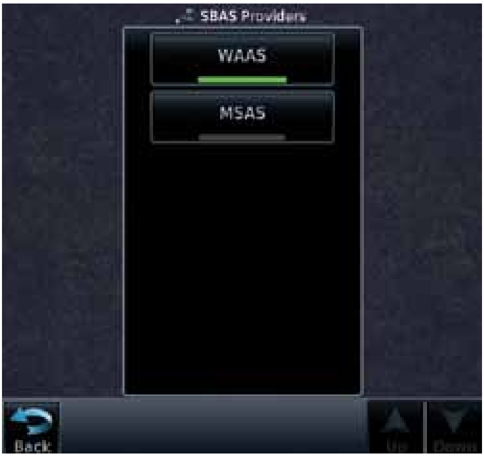


Figure 16-6 SBAS Selection Page

4. Touch the **Back** key to return to the System Status page.

16.2.3 Circle of Uncertainty

The Circle of Uncertainty depicts an area where the ownship location is guaranteed to be when the aircraft location cannot be accurately determined. The area of the Circle of Uncertainty becomes larger as GPS horizontal accuracy degrades and smaller as it improves. The Circle of Uncertainty is shown only when the aircraft is on the ground. The Circle of Uncertainty area is transparent so that features within it may still be seen.

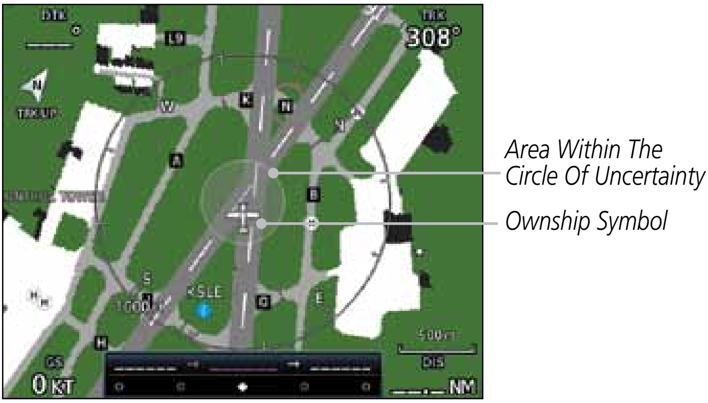
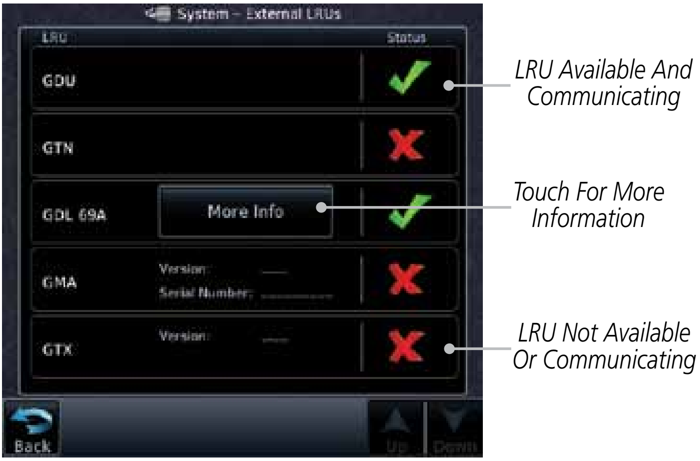

TRK
308°
TRK UP
GS
0 KT
DIS
NM
KSLC
Area Within The Circle Of Uncertainty
Ownship Symbol

Figure 16-7 Circle of Uncertainty

16.3 External LRUs

The External LRU page displays the external equipment connected to the GTN and their connection status.

1. While viewing the System page, touch the **External LRUs** key.



System – External LRUs

LRU		Status
GDU		✓
GTN		✗
GDL 69A	More Info	✓
GMA	Version: ---- Serial Number: --------	✗
GTX	Version: ----	✗

LRU Available And Communicating

Touch For More Information

LRU Not Available Or Communicating

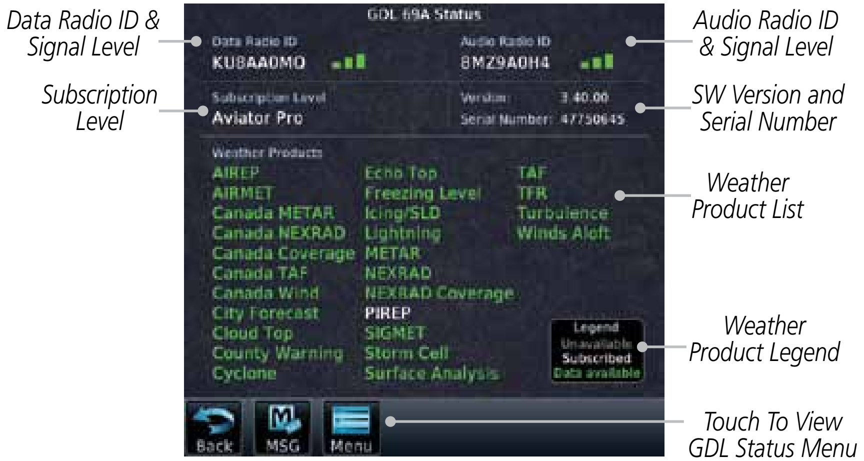
Figure 16-8 External LRU Page

2. When more information is available about the listed units, touch the **More Info** key to view the information.

16.3.1 GDL 69 (and GDL 69A) Status

The GDL 69 Status page displays the serial numbers for the Data Radio for the GDL 69/69A and the Audio Radio for the GDL 69A. Subscription status displays the level of service available for your particular subscription. The Weather Products section lists the products available for your particular subscription.

1. While viewing the External LRUs page, touch **More Info** for the GDL 69 LRU.


Data Radio ID &
Signal Level
Subscription
Level
Audio Radio ID
& Signal Level
SW Version and
Serial Number
Weather
Product List
Weather
Product Legend
Touch To View
GDL Status Menu
Back
MSG
Menu

GDL 69A Status

Data Radio ID: KUBAADMO

Audio Radio ID: 8MZ9A0H4

Subscription Level: Aviator Pro

Version: 3.40.00

Serial Number: 47750645

Weather Products

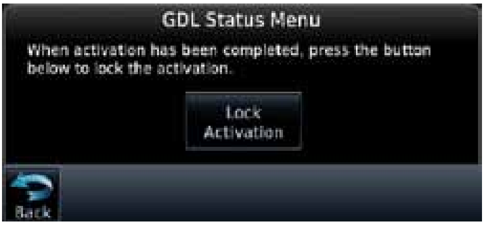
AIREP
AIRMET
Canada METAR
Canada NEXRAD
Canada Coverage
Canada TAF
Canada Wind
City Forecast
Cloud Top
County Warning
Cyclone
Echo Top
Freezing Level
Icing/SLD
Lightning
METAR
NEXRAD
NEXRAD Coverage
PIREP
SIGMET
Storm Cell
Surface Analysis
TAF
TFR
Turbulence
Winds Aloft

Legend
Unavailable
Subscribed
Data available

Figure 16-9 GDL 69/69A Status Page

Menu

2. Touch the **Menu** key to display the GDL 69 Status Menu.


Lock
Activation
Back

GDL Status Menu

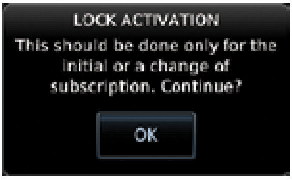
When activation has been completed, press the button below to lock the activation.

Figure 16-10 GDL Status Menu

Lock Activation

OK

3. Touch the **Lock Activation** key if this is for the initial subscription or a change in the subscription. Touch the **OK** key to continue the operation.



LOCK ACTIVATION

This should be done only for the initial or a change of subscription. Continue?

Figure 16-11 Lock Activation

Back

4. Touch the **Back** key to return to the System page.

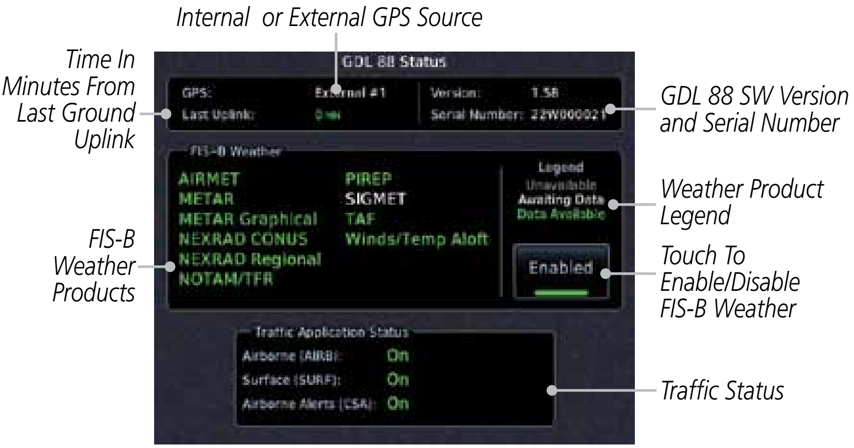
16.3.2 GDL 88 Status

The GDL 88 Status page displays information about the status of the GDL 88.

Status	Description
On	Application is on/running. Required ownship input data is available and meets the performance criteria.
Available to Run	Application is configured. Required input data is available and meets the performance criteria. This state represents that the ASA Application is manually or automatically selected off.
Unavailable – Fault	Required Input data is not available due to a failure or the ASA Application process is failed.
Unavailable to Run	Required Input data is available but does not meet the performance criteria or is not available due to Non-Computed Data (NCD) conditions.

Table 16-4 Traffic Application Status

1. While viewing the External LRUs page, touch **More Info** for the GDL 88 LRU.


Internal or External GPS Source
Time In Minutes From Last Ground Uplink
FIS-B Weather Products
GDL 88 SW Version and Serial Number
Weather Product Legend
Touch To Enable/Disable FIS-B Weather
Traffic Status
FIS-B Weather
Legend
Unavailable
Awaiting Data
Data Available
Enabled

GDL 88 Status

GPS: External #1
Last Uplink: 0 min
Version: 1.58
Serial Number: 22W000021

AIRMET
METAR
METAR Graphical
NEXRAD CONUS
NEXRAD Regional
NOTAM/TFR
PIREP
SIGMET
TAF
Winds/Temp Aloft

Traffic Application Status
Airborne (AIRB): On
Surface (SURF): On
Airborne Alerts (CSA): On

Figure 16-12 GDL 88 Status

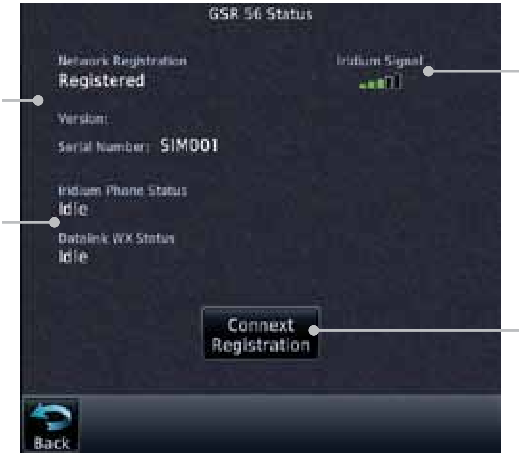
2. Touch the **Enabled** key to toggle whether FIS-B Weather is enabled/disabled for use.

16.3.3 GSR 56 Status

The GSR 56 Status page displays information about the status of the GSR 56.

More Info

1. While viewing the External LRUs page, touch **More Info** for the GSR 56 LRU.



GSR 56 Status

Network Registration
Registered

Version:

Serial Number: SIM001

Iridium Phone Status
Idle

Datalink WX Status
Idle

Iridium Signal

Current Registration Info

Phone and Datalink Status

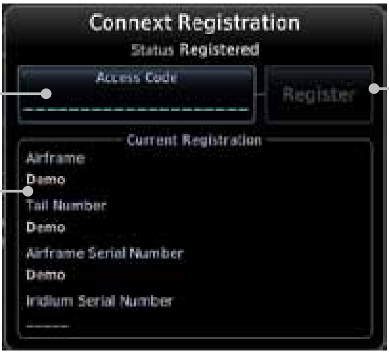
Iridium Signal Level

Touch To Register

Figure 16-13 GSR 56 Status

Connext Registration

2. Touch the **Connext Registration** key to display the Connext Registration display.



Connext Registration
Status Registered

Access Code

Current Registration
Airframe
Demo
Tail Number
Demo
Airframe Serial Number
Demo
Iridium Serial Number
_____

Touch To Enter Access Code

Current Registration Info

Touch To Register

Figure 16-14 Connext Registration Page

16.4 Setup

System Setup allows setting the time convention, Com channel spacing, crossfilling to a second GTN or GNS unit, and Nearest Airport search filtering.

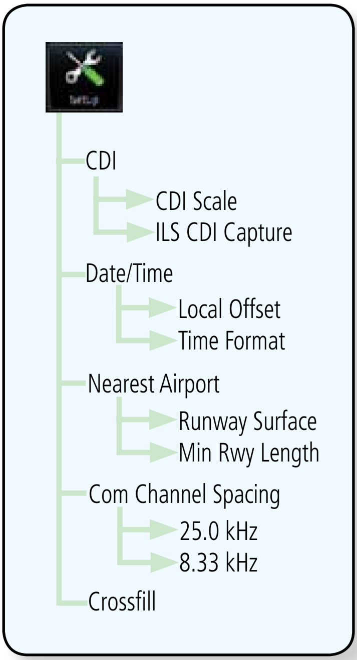
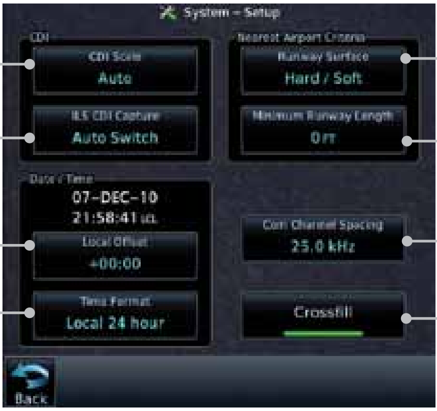

Setup
CDI
CDI Scale
ILS CDI Capture
Date/Time
Local Offset
Time Format
Nearest Airport
Runway Surface
Min Rwy Length
Com Channel Spacing
25.0 kHz
8.33 kHz
Crossfill

Figure 16-15 System Setup Functions

16.4.1 System Setup

System Setup function allows setting the time convention, Com channel spacing, crossfilling to a second GTN or GNS unit, and Nearest Airport search filtering.

1. While viewing the System page, touch the **Setup** key.



CDI Scale: Auto
ILS CDI Capture: Auto Switch
07-DEC-10
21:58:41 LCL
Local Offset: +00:00
Time Format: Local 24 hour
Runway Surface: Hard / Soft
Minimum Runway Length: Off
Com Channel Spacing: 25.0 kHz
Crossfill

Touch Key to Select CDI Scale

Touch Key to Set ILS CDI Capture

Touch Key to Set Time Offset

Touch Key to Set Time Format

Touch Key to Set Runway Surface Type

Touch Key to Set Min Runway Length

Touch Key to Set Com Channel spacing

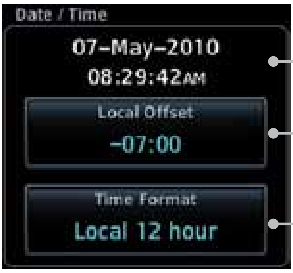
Touch Key to Enable Crossfill With Dual Units

Figure 16-16 System Setup Page

2. After making the desired selections, touch the **Back** key to return to the Setup page.

16.4.1.1 Date/Time

The Date/Time setting provides selection of time format (local or UTC; 12- or 24-hour). UTC (also called "GMT" or "Zulu") date and time are calculated directly from the GPS satellites' signals and cannot be changed.



07-May-2010
08:29:42AM
Local Offset: -07:00
Time Format: Local 12 hour

Current Selected Date and Time

Touch To Select Local Time Offset

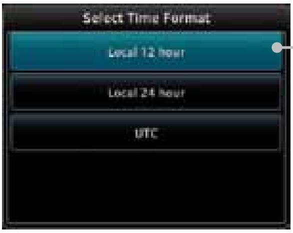
Touch To Select Time Format

Figure 16-17 System Date and Time Setup

1. While viewing the System Setup page, touch **Local Offset** to set the time offset for local time.
2. Use the keypad to select the desired local offset and then touch **Enter**.

Time Format
Local 12 hour

3. While viewing the System Setup page, touch the **Time Format** key to select local 12 hour, local 24 hour, or UTC time.



Touch Key to Select Time Format

Figure 16-18 Select System Time Format

4. Touch the key for the desired time format.

16.4.1.2 Com Channel Spacing

Com transceiver channel spacing may be selected between 8.33 kHz and 25.0 kHz.

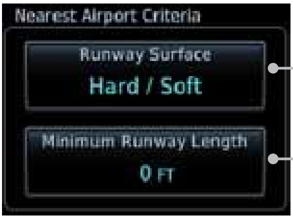
Com Channel Spacing
25.0 kHz

Com Channel Spacing
8.33 kHz

While viewing the System Setup page, touch **Channel Spacing** to toggle between 8.33 kHz and 25.0 kHz channel spacing.

16.4.1.3 Nearest Airport Criteria

Nearest Airport Criteria defines the surface type and minimum runway length used when determining the 25 nearest airports to display on the Nearest Airport Page. A minimum runway length and/or surface type may be entered to prevent airports with small runways, or runways that do not have an appropriate surface, from being displayed. The default settings are "0 feet (or meters)" for runway length and "any" for runway surface type.


Nearest Airport Criteria

Runway Surface
Hard / Soft

Minimum Runway Length
0 FT

Touch To Select Runway Surface Type

Touch To Select Minimum Runway Length

Figure 16-19 Select Nearest Airport Criteria

Runway Surface
Hard

1. While viewing the System Setup page, touch **Runway Surface** to display the options. Touch the desired surface type.

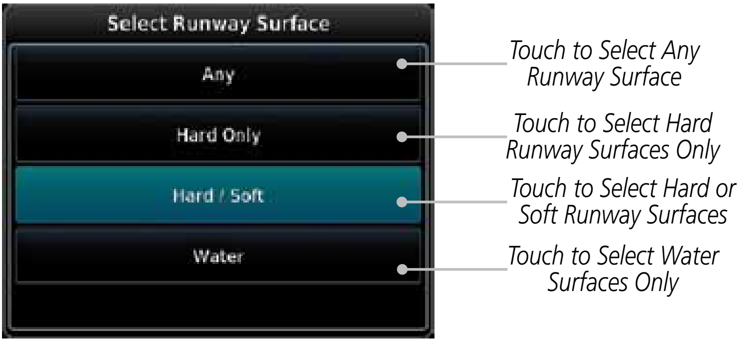

Select Runway Surface
Any
Hard Only
Hard / Soft
Water
Touch to Select Any Runway Surface
Touch to Select Hard Runway Surfaces Only
Touch to Select Hard or Soft Runway Surfaces
Touch to Select Water Surfaces Only

Figure 16-20 Nearest Airport Runway Surface Type

Minimum Runway Length
0 FT

2. Touch **Minimum Runway Length** to display the keypad for selecting the minimum runway length. Select the desired minimum runway length with the numeric keypad. A selection of "0" will allow any length.

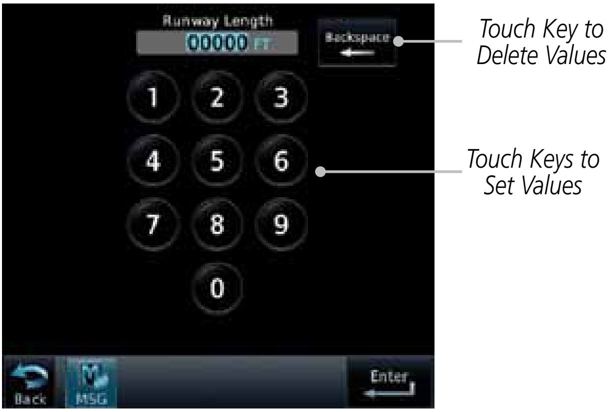

Runway Length
00000 FT
Backspace
1
2
3
4
5
6
7
8
9
0
Back
MSG
Enter
Touch Key to Delete Values
Touch Keys to Set Values

Figure 16-21 Nearest Airport Runway Length

Back

3. After selecting the runway length, touch the **Enter** key to save the entered values or touch the **Back** key to return to the System Setup page without saving a value.

16.4.1.4 Crossfill

Dual units may be interfaced to crossfill information between the two units. This option will not be available unless dual units are configured.

When Crossfill is turned on with one GTN, it is automatically turned on in the other GTN. Some items are always crossfilled regardless of the crossfill setting; others are dependent on the crossfill setting.

The GTN can be can also be interfaced with the GNS 400W/500W units. The GTN can automatically send the Active Flight Plan and active Direct-To course to the GNS unit. The GTN User Waypoints can be manually sent to the GNS unit. The GNS unit can manually send its User Waypoints to the GTN unit.

Waypoint names longer than six characters, or duplicates, sent from the GTN unit to the GNS unit will replace some characters with a "+" sign, while leaving significant characters to aid in identification (such as, USR003 becomes US+003).

NOTE: *Upon crossfill being activated, the GTNs may take up to 10 seconds to crossfill the flight plans. The pilot must verify the flight plan in each unit prior to use. The GTN and GNS units must have databases with the same cycle.*

GTN-to-GTN Crossfilling:

This data is always crossfilled:

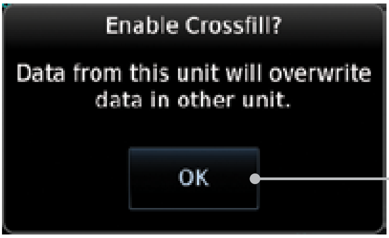
- User waypoints
- Flight plan catalog
- Alerts (traffic popup acknowledgement, missed approach waypoint popup acknowledgement, altitude leg popup acknowledgement)
- External sensors (transponder status and commands, synchro heading)
- System setup:
  - User-defined NAV frequencies to store favorites
  - Date/Time convention
  - Nearest airport criteria
  - Units (Nav angle, Distance/Speed, etc.)
  - User-defined COM frequencies to store favorites
  - Ownship icon
  - CDI Scale setting
  - ILS CDI Capture setting

This data is crossfilled only if crossfill is turned on by the pilot:

- Active navigation (flight plan)

1. While viewing the System Setup page, touch the **Crossfill** key to toggle between Enabled and Disabled Crossfill.

2. When Crossfill is about to be enabled, you will be prompted to note that data will be overwritten in the other unit. Touch **OK** to enable Crossfill or touch **Cancel** to return to the System Setup page without enabling Crossfill.



Enable Crossfill?

Data from this unit will overwrite data in other unit.

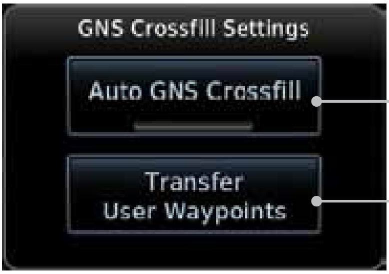
Touch OK to Enable Crossfill With Dual Units

Figure 16-22 Confirming Crossfill Selection

GTN-GNS Crossfilling:

- GTN to GNS – Active flight plans, active direct-to, User waypoints
- GNS to GTN – User waypoints

1. While viewing the System Setup page, touch the **GNS Crossfill Settings** key to reach the GNS Crossfill settings.



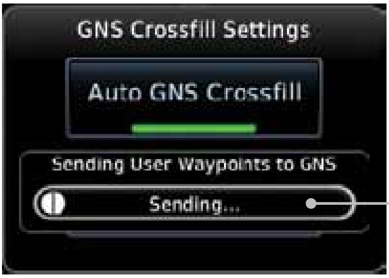
Touch OK to Enable Auto Crossfill With Dual Units

Touch OK to Manually Transfer User Waypoints

Figure 16-23 GTN-GNS Crossfill Selection

2. Touch **Auto GNS Crossfill** to enable Crossfill and send the Active Flight Plans and the active Direct-To course to the GNS unit.

3. Touch the Transfer User Waypoints key to transfer the User Waypoints from the GTN unit to the connected GNS unit.

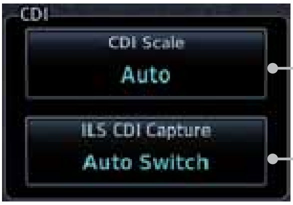

GNS Crossfill Settings
Auto GNS Crossfill
Sending User Waypoints to GNS
Sending...

Transfer Of User Waypoints In Progress

Figure 16-24 GTN-GNS Crossfill

16.4.1.5 CDI Scale Selection

The CDI source and ILS CDI Capture type may be selected manually or automatically. The selected CDI Scale will be reflected in the annunciation bar at the bottom of the display.


CDI
CDI Scale
Auto
ILS CDI Capture
Auto Switch

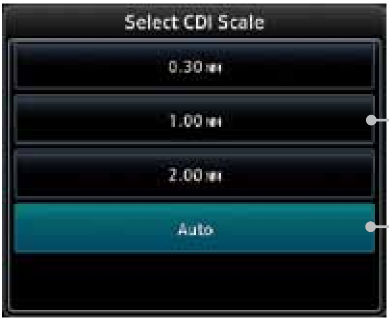
Touch To Select CDI Scale

Touch To Select ILS CDI Capture Type

Figure 16-25 CDI Selection

CDI Scale
Auto

1. While viewing the System Setup page, touch the **CDI Scale** key to allow automatic selection or to choose a CDI Scale manually.


Select CDI Scale
0.30 NM
1.00 NM
2.00 NM
Auto

Touch To Select 1 NM CDI Scaling

Touch To Select Automatic CDI Scaling

Figure 16-26 CDI Scale Selection

ILS CDI Capture
Auto

2. Touch the **ILS CDI Capture** key to select automatic or manual. This feature enables the unit to automatically switch from GPS to VLOC on an ILS approach. See *Procedures-ILS Approaches* for more detail on ILS approaches.

16.5 Alerts Settings

The Alerts Setup page controls two functions: Arrival Alerts and Airspace Alerts. Arrival Alerts, when active, will generate a message when the aircraft is within the selected proximity of the destination. Airspace Alerts generate a message and filtering of the Nearest Airspace list. The altitude component of Airspace Alerts are dependent on both aircraft and airspace altitude and the values set for the Altitude Buffer.

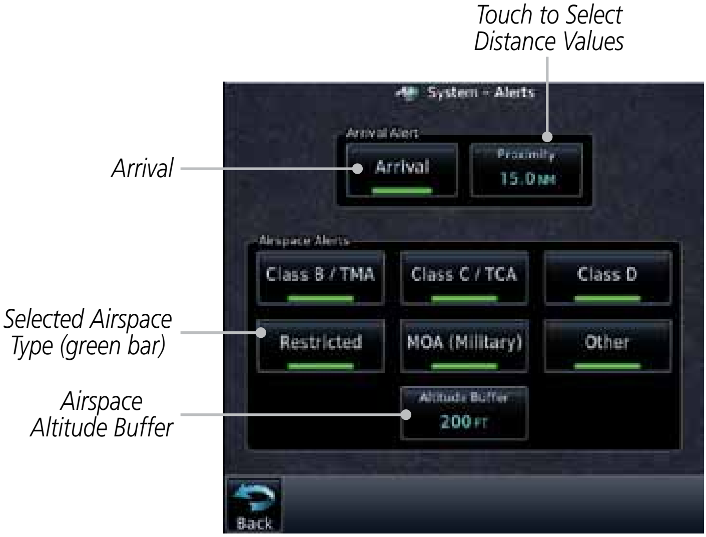

Touch to Select
Distance Values
System - Alerts
Arrival Alert
Arrival
Arrival
Proximity
15.0NM
Airspace Alerts
Class B / TMA
Class C / TCA
Class D
Selected Airspace Type (green bar)
Restricted
MOA (Military)
Other
Airspace Altitude Buffer
Altitude Buffer
200FT
Back

Figure 16-27 Alerts Setup Page

1. While viewing the System page, touch the **Alerts** key.

2. Touch the **Arrival** key to toggle activation. A green bar will appear when it is active.

Proximity
15.0NM

3. Touch the **Proximity** key to set the Proximity distance values. A numeric keypad will appear. Select the desired values and then touch **Enter**.

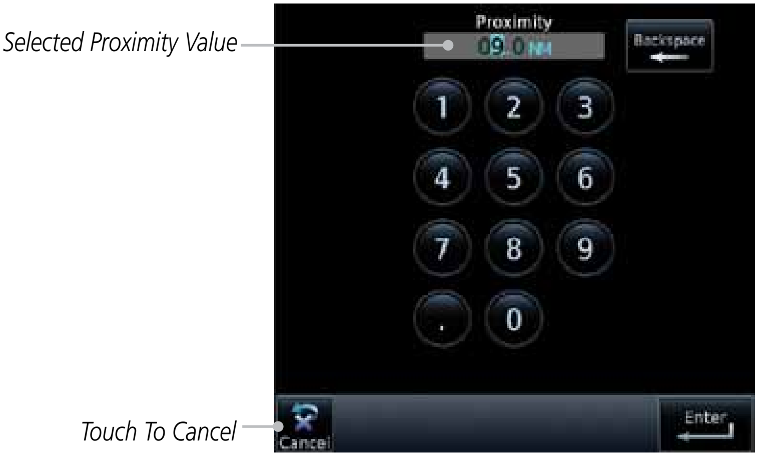

Selected Proximity Value
Proximity
09.0 NM
Backspace
1
2
3
4
5
6
7
8
9
.
0
Touch To Cancel
Cancel
Enter

Figure 16-28 Airspace Alert Proximity Selection

Altitude Buffer
200 FT

4. Touch the **Altitude Buffer** key to set the buffer altitude value. A numeric keypad will appear. Select the desired value and then touch **Enter**.

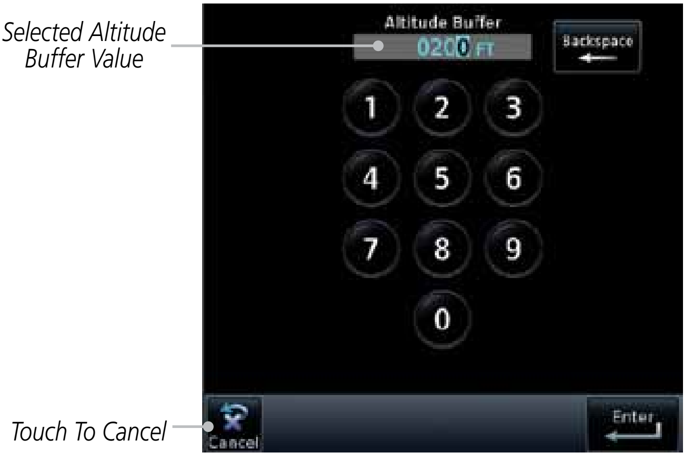

Selected Altitude Buffer Value
Altitude Buffer
0200 FT
Backspace
1
2
3
4
5
6
7
8
9
0
Touch To Cancel
Cancel
Enter

Figure 16-29 Airspace Alert Altitude Buffer Selection

5. Touch the Airspace type keys to toggle activation. A green bar will appear when it is active.

***NOTE:** The Airspace Alert setting does not alter the depiction of airspace, or change the Smart Airspace setting for the main map page.*

16.6 Units Settings

The Units Setup page allows you to select the conventions for the various units that are displayed.

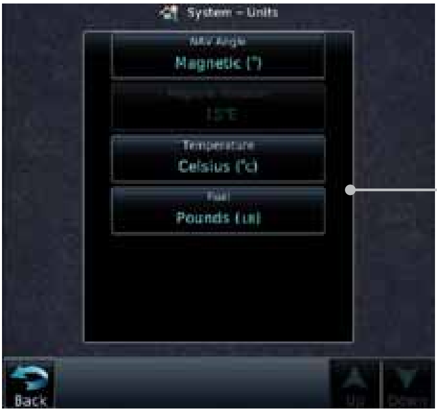
Units Type	Units Values
Nav Angle	Magnetic (°), True (°T), User (°u)
Magnetic Variation	Enter numeric value, E or W
Temperature	Celsius (°C) or Fahrenheit (°F)
Fuel	Gallons (GAL) or Pounds (LB)

Table 16-5 System Units Setup

16.6.1 Setup Units

Use these settings to set the units for values displayed in the unit operation.

1. While viewing the System page, touch the **Units** key.



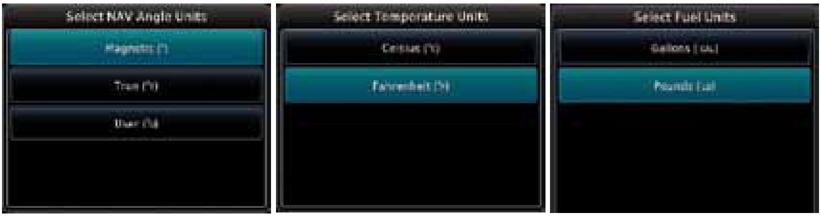
System - Units
Back
Up
Down

NAV Angle: Magnetic (°)
Magnetic Variation: 15°E
Temperature: Celsius (°C)
Fuel: Pounds (LB)

Touch Key to Set Units

Figure 16-30 System Units Page

2. Touch the key for the desired units. A window with a list of unit values will appear. Touch the desired value on the list.



Select NAV Angle Units
Magnetic (°)
True (°T)
User (°u)
Select Temperature Units
Celsius (°C)
Fahrenheit (°F)
Select Fuel Units
Gallons (GAL)
Pounds (LB)

Figure 16-31 Setup Units Selection Windows

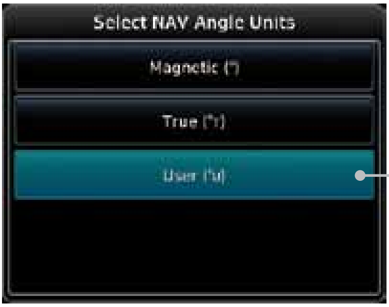
3. After making the desired selections, touch the **Back** key to return to the Setup page.

16.6.2 Setting a User-Configured (Manual) Nav Angle

There are three variation (heading) options: Magnetic, True, and User. If "Magnetic" is selected, all track, course and heading information is corrected to the magnetic variation computed by the GPS receiver. The "True" setting references all information to true north. The "User" selection allows the pilot to enter values between 0° and 179° E or W.

NOTE: *When changing the Nav angle, the DTK on the Flight Plan page for an approach does not change until that approach is reloaded.*

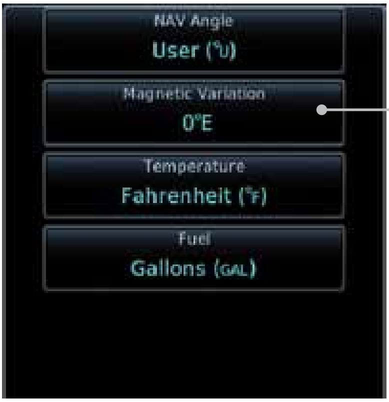
1. While viewing the System page, touch **Units** key.
2. Touch the **Nav Angle** key and then the **User** key.



Touch to select User (manual) mag var

Figure 16-32 Nav Angle Selections

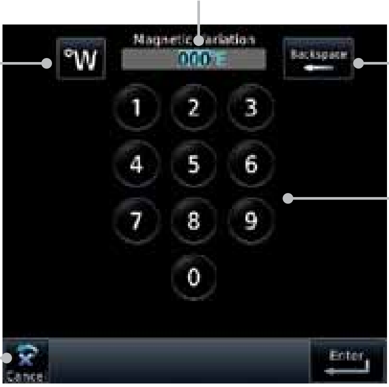
3. After User is selected, touch the **Magnetic Variation** key to set the value.


NAV Angle
User (°U)
Magnetic Variation
0°E
Temperature
Fahrenheit (°F)
Fuel
Gallons (GAL)

Touch to set manual mag var

Figure 16-33 Magnetic Variation is Available for Editing

4. Touch the keys on the numeric keypad to set the Magnetic Variation and then touch **Enter**.

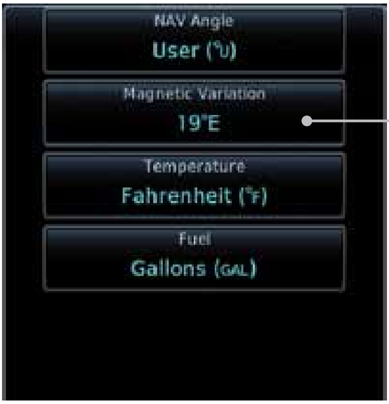


Magnetic Variation
000°E

Current User Mag Var Value
Touch Key to Toggle Hemisphere
°W
Backspace
Touch Key to Delete Values
1
2
3
4
5
6
7
8
9
0
Use the Numeric Keypad to Select User (manual) Magnetic Variation
Cancel Selection And Return To Previous Page
Cancel
Enter

Figure 16-34 Numeric Keypad for Setting Manual Magnetic Variation

5. The User Nav Angle value will be used for all angular values. Remember to change the value when traveling to an area requiring another value.



NAV Angle
User (°U)

Magnetic Variation
19°E

Temperature
Fahrenheit (°F)

Fuel
Gallons (GAL)

Selected User (manual) Magnetic Variation

Figure 16-35 User (Manual) Magnetic Variation

16.7 Ownship Settings

The Ownship setting allows the selection of an aircraft type for the ownship icon.

1. While viewing the System page, touch **Ownship** key.

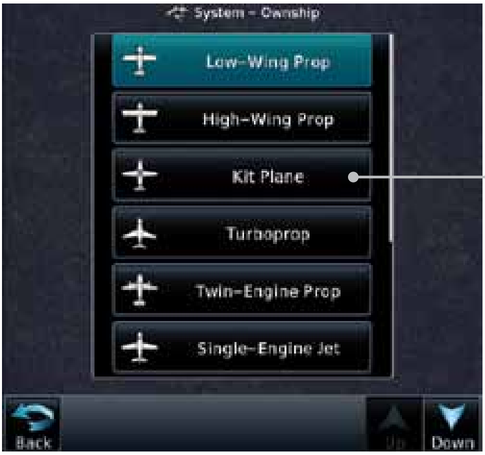

System - Ownship
Low-Wing Prop
High-Wing Prop
Kit Plane
Turboprop
Twin-Engine Prop
Single-Engine Jet
Back
Up
Down
Selected Ownship Type

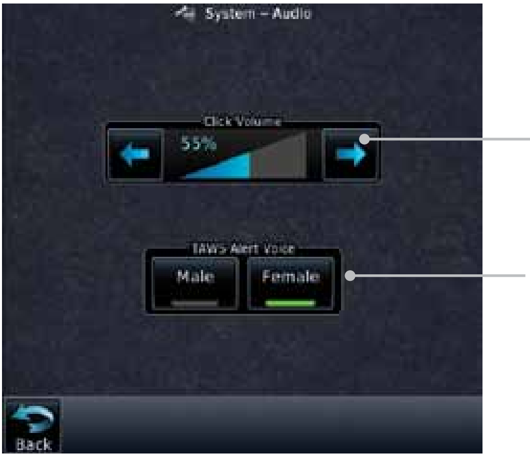
Figure 16-37 Ownship Selection

2. Touch the desired type of aircraft for the ownship symbol.

16.8 Audio

The Audio Settings allows the adjustment of the volume the click sound when controls are touched.

1. While viewing the System page, touch **Audio** key.



Click Volume 55%

Touch The Arrow Keys To Adjust Click Volume

Touch To Select Voice (TAWS Only)

Figure 16-36 System Audio Selection

2. Touch the Arrow keys to adjust the Key Click Volume.

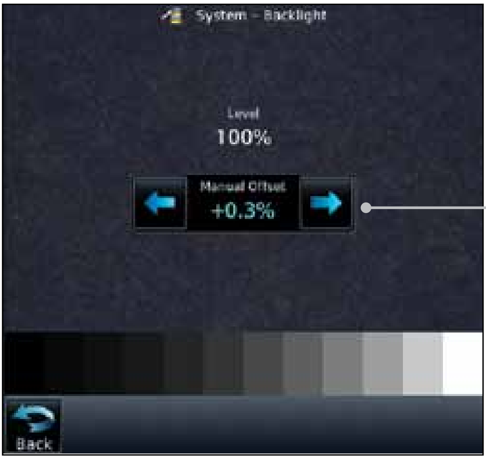
3. Touch the **Male** or **Female** key to select the audio voice type.

16.9 Backlight Settings

The backlighting of the display and bezel keys can be adjusted automatically or manually. The default setting (automatic backlighting adjustment) uses photocell technology to automatically adjust for ambient lighting conditions. Photocell calibration curves are pre-configured to optimize display appearance through a broad range of cockpit lighting conditions. A manual offset creates a deviation form the normal curve. Manual adjustments may be made from +100% to -10%. The negative adjustment is limited to prevent the backlight from being accidently decreasing the backlight to the point where the display of information could not be seen.

Manual backlighting adjustment can be accomplished using the existing instrument panel dimmer bus or the following procedures.

1. While viewing the System page, touch the **Backlight** key.
2. Touch the **Arrow** keys to adjust the Backlight level.


System - Backlight

Level
100%

Manual Offset
+0.3%

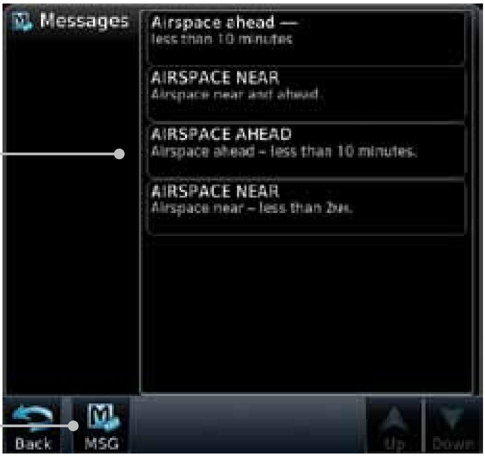
Touch The Arrow Keys For Manual Offset

Figure 16-38 Backlight Level Selection

3. After making the desired selections, touch the **Back** key to return to the System page.

17 MESSAGES

When a Message has been issued by the unit, the Message (**MSG**) key/annunciator in the lower left of the display will blink. Touch the **MSG** key to view the messages. After viewing the messages, touch the **Back** key to return to the previously viewed page. The Messages provide an aid to troubleshooting system operation.



Airspace ahead — less than 10 minutes

AIRSPACE NEAR
Airspace near and ahead

AIRSPACE AHEAD
Airspace ahead – less than 10 minutes.

AIRSPACE NEAR
Airspace near – less than 2nm.

Message List

Message Key - Touch To Toggle Message Display

Figure 17-1 Message Display

Message	Description	Action
ABORT APPROACH - GPS approach no longer available.	This message is triggered outside the MAP if the GTN system can no longer provide approach level of service. Vertical guidance will be removed from the external CDI/HSI display.	Initiate a climb to the MSA or other published safe altitude, abort the approach, and execute a non-GPS based approach.
AIRSPACE ALERT - Inside airspace.	The aircraft inside an airspace type for which alerts are configured.	No action is necessary; message is informational only.

Message	Description	Action
AIRSPACE ALERT - Airspace within 2 nm and entry in less than 10 minutes.	The aircraft is within 2 nm and predicted to enter an airspace type, within 10 minutes, for which alerts are configured.	No action is necessary; message is informational only.
AIRSPACE ALERT - Airspace entry in less than 10 minutes.	The aircraft is predicted to enter an airspace type, within 10 minutes, for which alerts are configured.	No action is necessary; message is informational only.
AIRSPACE ALERT - Within 2 nm of airspace.	The aircraft is within 2nm of an airspace type for which alerts are configured.	No action is necessary; message is informational only.
APR GUIDANCE AVAILABLE - Press "Enable APR Output" before selecting APR on autopilot.	The GTN is configured for KAP140/KFC225 autopilot, and approach guidance is now available.	Press the "Enable APR Output" key on the GTN, this will cause the autopilot to go into ROL mode. Engage the autopilot into approach mode. See section 6.14 for additional information.
APPROACH DOWNGRADE - Approach downgraded. Use LNAV minima.	Approach has been downgraded from LPV or LNAV/VNAV, to an LNAV approach. Vertical guidance will be removed from the external CDI/HSI display.	Continue to fly the approach using published LNAV minimums.

Message	Description	Action
APPROACH NOT ACTIVE - Do not continue GPS approach.	GPS approach could not transition to active (e.g., the GTN is on an approach and did not have the required HPL/VPL to get into at least LNAV, so is still in TERM).	Abort the approach, and execute a non-GPS based approach.
AUDIO PANEL - Audio panel needs service.	The GMA 35 is reporting to the GTN that it needs service. The audio panel may continue to function.	Contact dealer for service.
AUDIO PANEL - Audio panel is inoperative or connection to GTN is lost.	The GTN is configured for Garmin audio panel control (GMA 35) and the GTN cannot communicate with the GMA 35. No control of the GMA 35 will be possible.	Remove power from the GMA 35 audio panel by pulling the circuit breaker labeled "Audio." The pilot will be able to communicate with the Com 2 radio. Contact dealer for service.
CDI SOURCE - Select appropriate CDI source for approach.	Aircraft is on a GPS approach but CDI is set to VLOC, or aircraft is on VLOC approach and CDI is set to GPS *and* aircraft is less than 2 nm from the FAF.	Select the appropriate CDI source for approach.
CDI/HSI FLAG - Main lateral/ vertical flag on CDI/HSI is inoperative.	The Main Lateral Superflag or Main Vertical Superflag output has been turned off due to an over-current condition.	Verify course guidance is valid and correct by crosschecking with the GTN on-screen CDI and other navigational equipment. Contact dealer for service.

Message	Description	Action
COM RADIO - Com radio needs service.	The com radio is reporting that it needs service. The com radio may continue to function.	Cycle the power to the COM radio. Contact dealer for service.
COM RADIO - Com radio may be inoperative.	The com radio is not communicating properly with the system.	Press and hold the volume knob or the external com remote transfer (COM RMT XFR) switch, if installed – this will force the com radio to 121.5 MHz. Contact dealer for service.
COM RADIO - Com overtemp or undervoltage. Reducing transmitter power.	Com radio is in overtemp or undervoltage mode and transmitting power has been reduced to prevent damage to the com radio. Radio range will be reduced.	Decrease length of com transmissions, decrease cabin temperature and increase cabin airflow (especially near the GTN). Check aircraft voltage and reduce electrical load as necessary. Contact dealer for service if this message persists.
COM RADIO - Com locked to 121.5 MHz. Hold remote com transfer key to exit.	Com radio is locked to 121.5 MHz.	The external com remote transfer (COM RMT XFR) switch has been held and the com radio is tuned to 121.5. To exit this mode, hold the com remote transfer (COM RMT XFR) switch for two seconds.
CONFIGURATION - Terrain/TAWS configuration is invalid. GTN needs service.	TAWS is inoperative due to a configuration problem with the GTN. This message will be accompanied by a TER FAIL annunciation.	Contact dealer for service.

Message	Description	Action
CONFIGURATION MODULE - GTN configuration module needs service.	The GTN cannot communicate with its configuration module. The GTN may still have a valid configuration.	Contact dealer for service.
COOLING - GTN overtemp. Reducing backlight brightness.	Backlight brightness has been reduced due to high display temperatures. The backlight level will remain high enough to be visible in daylight conditions.	Decrease cabin temperature and increase cabin airflow (especially near the GTN). Contact dealer for service if this message persists.
COOLING FAN - The cooling fan has failed.	The GTN cooling fan is powered, but it is not turning at the desired RPM.	Decrease cabin temperature and increase cabin airflow (especially near the GTN) to prevent damage to the unit. Contact dealer for service.
CROSSFILL ERROR - Crossfill is inoperative. See CRG for crossfilled items.	Crossfill is not working due to loss of communication with other GTN or due to one GTN needing service.	See section 16.4.1.4 for a list of crossfilled items that will no longer be crossfilled. Contact dealer for service.
CROSSFILL ERROR - GTN software mismatch. See CRG for crossfilled items.	Crossfill is configured "on" but is not working due to software mismatch.	See section 16.4.1.4 for a list of crossfilled items that will no longer be crossfilled. Contact dealer to have software versions updated.

Message	Description	Action
CROSSFILL ERROR - Crossfill is inoperative. See CRG for crossfilled items.	An error was detected during unit-to-unit communication of data. This can be caused by problems with HSDB wiring or by either GTN needing service. See the Cockpit Reference Guide (CRG) for crossfilled items.	Start both GTNs in Configuration Mode and ensure that both GTNs are configured for crossfill. Contact dealer for service.
CROSSFILL ERROR - GTN Navigation DB mismatch. See CRG for crossfilled items.	The navigation databases do not match between GTNs resulting in a loss of communication between two units.	Check the specified database version of both GTNs and ensure it is up-to-date. Update the specified database if needed.
CROSSFILL STATUS - Crossfill is turned off.	Crossfill is turned off.	No action.
DATABASE - Chart function unavailable.	The GTN is configured for ChartView or FliteCharts and chart verification has failed.	Contact dealer for service.
DATABASE - Chart database valid until [DATE].	The GTN is configured for ChartView or FliteCharts and the chart database has or is about to expire.	Verify chart database expiration date on the System – System Status page. Update chart database if necessary for operations.

Message	Description	Action
DATABASE - A procedure has been modified in a cataloged flight plan.	A new database update caused a procedure to be truncated because the flight plan now has too many waypoints or removed a procedure because it no longer exists in the database.	Verify stored cataloged flight plans and procedures. Modify stored flight plans and procedures as necessary to include the current procedures by re-loading those procedures to the stored flight plan routes.
DATABASE - Verify user-modified procedures in stored flight plans are correct.	A stored flight plan contains procedures that have been manually updated, and a navigation database update has occurred.	Verify that the user-modified procedures in stored flight plans are correct.
DATABASE - Verify airways in stored flight plans are correct.	A stored flight plan contains an airway that is no longer consistent with the current navigation database.	Verify that the airways in stored flight plans are correct. Modify stored flight plans as necessary to include the current airways by re-loading those airways to the stored flight plan routes.
DATABASE - Terrain or Obstacle database not available.	The terrain or obstacle database is missing or corrupt.	Re-load these databases on the external SD card.
DATABASE - Terrain display unavailable for current location.		
DATACARD ERROR - SD card is invalid or failed.	External SD card has an error and the unit is not able to read the databases.	ChartView, FlightCharts, and Terrain databases will not be accessible by the unit. Contact dealer for service.

Message	Description	Action
DATACARD REMOVED - Reinsert SD card.	External SD card was removed.	Reinsert SD card.
DATALINK - GDL 69 is inoperative or connection to GTN is lost.	The GTN is configured for a Garmin datalink (GDL 69 or 69A) and the GTN cannot communicate with the datalink. Data from the datalink will not be available.	Contact dealer for service.
DATALINK - GDL 88 is inoperative or connection to GTN is lost.	The GTN is configured for a Garmin datalink (GDL 88) and the GTN cannot communicate with the datalink. Data from the datalink will not be available.	Contact dealer for service.
DATALINK - GDL 88 ADS-B failure. Unable to transmit ADS-B messages.	GDL 88 is not able to transmit an ADS-B message due to a failure with the GDL 88 system or antenna(s).	Contact dealer for service.
DATALINK - GDL 88 ADS-B fault.	The GDL 88 has detected a fault with one of the GDL 88 UAT/1090 antennas.	Contact dealer for service.
DATALINK - ADS-B fault: UAT receiver.	The GDL 88 has detected a UAT receiver fault.	Contact dealer for service.
DATALINK - ADS-B fault: 1090 receiver.	The GDL 88 has detected a 1090 receiver fault.	Contact dealer for service.

Message	Description	Action
DATALINK - GDL88 ADS-B is not transmitting position. Check GPS devices.	The GDL 88 has detected a position input fault.	Contact dealer for service.
DATALINK - GDL88 control input fault. Check transponder is in correct mode.	The GDL 88 has lost communication with the transponder.	Contact dealer for service.
DATALINK - GDL88 ADS-B fault. Pressure altitude input is invalid.	The GDL 88 has lost communication with the pressure altitude source.	Contact dealer for service.
DATALINK - GDL88 ADS-B traffic has failed.	GDL 88 may have lost GPS position. The GDL 88 has detected an internal failure.	Contact dealer for service.
DATALINK - GDL88 CSA failure.	The GDL 88 is reporting to the GTN that the CSA application has failed. Traffic alerting on ADS-B traffic is unavailable.	Ensure the aircraft has a clear view of the sky. If the problem persists. Contact dealer for service.
DATALINK - GDL88 external traffic system inoperative or connection lost.	The GDL 88 has detected a TAS/TCAS input fault.	Contact dealer for service.

Message	Description	Action
DATALINK - GDL88 external traffic system has a low battery.	The GDL 88 is reporting that the external traffic system has a low battery.	Contact dealer for service.
DATALINK - GDL88 configuration module needs service.	The GDL 88 has detected a configuration module fault.	Contact dealer for service.
DATALINK - GDL88 needs service.	GDL 88 has detected an internal fault.	Contact dealer for service.
DATALINK - GSR56 is inoperative or connection to GTN is lost.	The GTN is configured for a Garmin GSR 56 and the GTN cannot communicate with the GSR 56. GSR Weather, Position Reporting, and Phone Services will be unavailable.	Close the GSR 56 circuit breaker and ensure the GSR 56 is receiving power. Contact dealer for service.
DATALINK - GSR56 data services inoperative; registration required.	The GSR 56 is not registered. GSR Weather, Position Reporting, and Phone Services will be unavailable.	Contact dealer for service.
DATA LOST - Pilot stored data was lost. Recheck settings.	User settings such as map detail level, nav range ring on/off, traffic overlay on/off, and alert settings have been lost.	Recheck settings.

Message	Description	Action
DATA SOURCE - Pressure altitude source inoperative or connection to GTN lost.	The GTN is configured to receive pressure altitude but is not receiving it from any source.	If the GTN is being used to forward pressure altitude to a transponder, the transponder will not be receiving pressure altitude from the GTN while that message is present. Contact dealer for service.
DATA SOURCE - Heading source inoperative or connection to GTN lost.	The GTN is configured to receive heading information but is not receiving it from any source.	Heading up map displays will not be available. Contact dealer for service.
DEMO MODE - Demo mode is active. Do not use for navigation.	The GTN is in Demo Mode and must not be used for actual navigation.	Do not use for navigation. Power cycle the GTN to exit demo mode. Also ensure that the Direct-To key is not stuck.
FPL WAYPOINT LOCKED - Stored flight plan waypoint is not in current navigation database.	A stored flight plan waypoint is no longer in the current navigation database.	Verify stored cataloged flight plans and procedures. Modify stored flight plans as necessary to include waypoints that are in the current navigation database.
FPL WPT MOVED - Stored flight plan waypoint has changed location.	A stored flight plan waypoint has moved by more than 0.33 arc minutes from where previously positioned.	Verify stored cataloged flight plans and procedures. Modify stored flight plans as necessary to include waypoints that are in the current navigation database.
GDL 59 FAIL - GDL 59 is inoperative.	GDL 59 is reporting a system fault.	Contact dealer for service.
GDL 59 - GDL 59 needs service. Return unit for repair.	The GDL 59 is reporting that it needs service. The com radio may continue to function.	Cycle the power to the GDL 59. Contact dealer for service.

Message	Description	Action
GDL 59 ROUTER FAIL - GDL 59 router has failed.	GDL 59 router has failed.	Contact dealer for service.
GLIDESLOPE - Glideslope receiver needs service.	The glideslope board is indicating that it needs service. The glideslope board may continue to function.	Verify glideslope deviation indications with another source and crosscheck final approach fix crossing altitude. If another glideslope source is not available for verification, fly a GPS based approach. Contact dealer for service.
GLIDESLOPE - Glideslope receiver has failed.	The glideslope board is not communicating property with the system.	Fly an approach that does not use the glideslope receiver (VOR, LOC, GPS). Contact dealer for service.
GNS CROSSFILL - GTN user waypoint(s) replaced with GNS user waypoints.	A user waypoint from the GNS replaced one or more existing waypoints on the GTN.	Ensure that the waypoints on the GNS have unique names before transferring to the GTN to avoid overwriting existing waypoints.
GNS CROSSFILL - Catalog full; not all GNS waypoint(s) transferred.	A user waypoint from the GNS could not be created because the user waypoint catalog is full.	Remove some of the waypoints from the catalog to make room for the waypoints from the GNS.
GNS CROSSFILL - Waypoint transfer failed.	Waypoint transfer failed/incomplete.	The data transfer should be reattempted.
GPS NAVIGATION LOST - Insufficient satellites. Use other navigation source.	GPS position has been lost due to lack of satellites.	Wait for GPS satellite geometry to improve. Ensure the aircraft has a clear view of the sky. Use a different GPS receiver or a non-GPS based source of navigation. Contact dealer for service.

Message	Description	Action
GPS NAVIGATION LOST - Erroneous position. Use other navigation source.	GPS position has been lost due to erroneous position.	Use a different GPS receiver or a non-GPS based source of navigation. Contact dealer for service.
GPS RECEIVER - GPS receiver has failed. Check GPS coax for electrical short.	Internal communication to the SBAS board is inoperative.	Use a different GPS receiver or a non-GPS based source of navigation. Contact dealer for service.
GPS RECEIVER - Low internal clock battery.	The GPS module indicates that its clock battery is low. Almanac data may have been lost. The unit will function normally, but may take a longer than normal period to acquire a GPS position.	Contact dealer for service.
GPS RECEIVER - GPS receiver needs service.	The GPS module is reporting that it needs service. The GPS module may continue to function.	Use a different GPS receiver or a non-GPS based source of navigation. Contact dealer for service.
GPS SEARCHING SKY - Ensure GPS antenna has an unobstructed view of the sky.	The GPS module is acquiring position and may take longer than normal. This message normally occurs after initial installation or if the unit has not been powered for several weeks.	No action is necessary; message is informational only.

Message	Description	Action
GTN - GTN needs service.	The GTN has lost calibration data that was set by Garmin during manufacturing.	Contact dealer for service.
INTERFACE ADAPTER - GAD 42 configuration needs service.	GAD 42 indicates a configuration error.	Verify all input/output data from/ to the GAD 42 Interface Adapter. Contact dealer for service.
INTERFACE ADAPTER - GAD 42 needs service.	GAD 42 indicates it needs service. The GAD 42 may continue to function.	Verify all input/output data from/ to the GAD 42 Interface Adapter. Contact dealer for service.
INTERNAL SD CARD ERROR - GTN needs service.	Internal SD card has an error. This card is not accessible by the user.	Contact dealer for service.
INTERNAL SD CARD REMOVED - GTN needs service.	Internal SD card was removed or failed. This card is not accessible by the user.	Contact dealer for service.
KEY STUCK - HOME key is stuck.	The HOME key has been in pressed position for at least 30 seconds. This key will now be ignored.	Verify the HOME key is not pressed. Press the Home key again to cycle its operation. Contact dealer for service if this message persists.
KEY STUCK - Direct-To key is stuck.	The Direct-To key has been in pressed position for at least 30 seconds. This key will now be ignored.	Verify the Direct-To key is not pressed. Contact dealer for service if this message persists.

Message	Description	Action
KNOB STUCK - Volume knob is stuck in the pressed position.	The Volume knob has been in pressed position for at least 30 seconds. This knob press will now be ignored.	Verify the volume knob is not pressed. Contact dealer for service if this message persists.
KNOB STUCK - Dual concentric inner knob is stuck in the pressed position.	The dual concentric inner knob has been in pressed position for at least 30 seconds. This knob press will now be ignored.	Verify the dual concentric knob is not pressed. Contact dealer for service if this message persists.
LOCKED FLIGHT PLAN Cannot activate a flight plan containing a locked waypoint.	The user is trying to activate a flight plan that contains a locked waypoint.	Unlock the flight plan by modifying stored flight plans as necessary to include waypoints, procedures, and airways that are in the current navigation database.
LOSS OF INTEGRITY (LOI)- Verify GPS position with other navigation equipment.	Antenna may be shaded from satellites. The GPS module has reported a loss of integrity.	Make sure the aircraft is clear of hangars, buildings, trees, etc. Use a different GPS receiver or a non-GPS based source of navigation. Contact dealer for service if this message persists.
MAGNETIC VARIATION - Aircraft in area with large mag var. Verify all course angles.	MagVar is flagged as unreliable in the MagVar database. This normally occurs when operating at high latitudes that do not support a Nav Angle of Magnetic.	Verify that the geographical region supports navigation based on magnetic variation.

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Message	Description	Action
NAV ANGLE - NAV Angles are referenced to True North (T).	Nav angle is set to True.	No action is necessary; message is informational only.
NAV ANGLE - NAV Angles are referenced to a User set value (U).	Nav angle is set to User.	No action is necessary; message is informational only.
NON-WGS84 WAYPOINT - See CRG. Location may be different than where surveyed for [WPT].	The active waypoint is not referenced to the WGS84 datum. See Note 1 at the end of the table.	No action is necessary; message is informational only.
OBS - OBS is not available due to dead reckoning or no active waypoint.	OBS requires an active waypoint and is not supported in dead reckoning mode.	No action is necessary; message is informational only.
PARALLEL TRACK - Parallel track not supported past IAF.	Parallel track is not supported on approaches.	No action is necessary; message is informational only.
PARALLEL TRACK - Parallel track not supported for turns greater than 120 degrees.	Parallel track is not supported for turns greater than 120 degrees due to the acute angle.	No action is necessary; message is informational only.
PARALLEL TRACK - Parallel track not supported for leg type.	Parallel track is not supported on current leg type.	No action is necessary; message is informational only.

Message	Description	Action
REMOTE KEY STUCK - Remote OBS key is stuck.	The remote OBS (OBS MODE SEL) key/switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the OBS MODE SEL key/switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - Remote CDI key is stuck.	The remote CDI (CDI SRC SEL) key/switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the CDI SRC SEL key/switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - Com push-to-talk key is stuck.	The Push To Talk key/switch has been in pressed position for at least 30 seconds. This input will now be ignored and the com radio will no longer transmit.	Verify the Push To Talk key/switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - Com remote transfer key is stuck.	The remote com transfer (COM RMT XFR) key/switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the COM RMT XFR key/switch is not stuck. Contact dealer for service if this message persists.

Message	Description	Action
REMOTE KEY STUCK - Com remote frequency increment key is stuck.	The remote com frequency increment (COM CHAN UP) key/ switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the COM CHAN UP key/ switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - Com remote frequency decrement key is stuck.	The remote com frequency decrement (COM CHAN DN) key/ switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the COM CHAN DN key/ switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - Nav remote transfer key is stuck.	The remote nav transfer (NAV RMT XFR) key/ switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the NAV RMT XFR key/ switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - Remote go around key is stuck.		

Message	Description	Action
REMOTE KEY STUCK - TAWS inhibit key is stuck.	The TAWS INHIBIT discrete input has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the TAWS INHIBIT key/switch is not stuck. Contact dealer for service if this message persists.
SEARCHING SKY - Search-the-sky in progress.	The GTN is searching the sky for GPS satellites.	Wait 20 minutes for the unit to complete the cycle or until the current position is located.
SELECT FREQUENCY - Select appropriate NAV frequency for approach.	Correct NAV frequency is not set in the active NAV frequency for the approach procedure.	Insert the correct frequency into the active navigation frequency window.
SET COURSE - Set course on CDI/HSI to [current DTK].	The selected course on the CDI/HSI does not match the current desired track.	Set the CDI/HIS selected course to the current desired track.
STEEP TURN - Aircraft may overshoot course during turn.	Flight plan contains an acute course change ahead which will require a bank in excess of normal to follow the guidance. If coupled to the autopilot, the autopilot may not be able to execute the steep turn needed to follow the course guidance.	No action is necessary; message is informational only. If desired, slow the aircraft to shallow the turn.

Message	Description	Action
STORMSCOPE - StormScope is inoperative or connection to GTN is lost.	The GTN is configured for a WX-500 StormScope but is not receiving data from it.	Close the Stormscope circuit breaker and ensure Stormscope is receiving power. Contact dealer for service.
STORMSCOPE - Invalid heading received from StormScope.	The WX-500 StormScope reports that it has an invalid heading source.	GTN StormScope data is correct and may be used. Contact dealer for service.
TAWS AUDIO INHIBITED - TAWS audio inhibit input is stuck.	The TAWS Audio Inhibit discrete input has been active for at least 30 seconds. This input is active in all installations. TAWS audio may be heard at the same time as other audio alerts.	Contact dealer for service.
TIMER - Timer has expired.	A user-configured timer has expired.	No action is necessary; message is informational only.
TRAFFIC - Traffic device is inoperative or connection to GTN is lost.	The GTN is configured for a traffic device but is not receiving data from it. Traffic will not be displayed on the GTN.	Contact dealer for service.
TRAFFIC - Traffic device has been in standby for more than 60 seconds.	The GTN is airborne and the traffic device has been in standby for more than 60 seconds.	Set the traffic device to “operate” on the traffic page if traffic alerts are desired.

Message	Description	Action
TRAFFIC - Traffic device battery low. Traffic device user config settings not saved.		Contact dealer for service.
TRANSPONDER - Transponder 1 and 2 Mode S addresses do not match.	The GTN is configured for two transponders and their Mode S addresses do not match. This message is intended to assist installers and will not occur in a properly configured system.	Contact dealer for service.
TRANSPONDER 1 OR 2 Transponder 1 or 2 needs service.	The transponder is reporting to the GTN that it needs service. The transponder may continue to function.	Verify squawk code and altitude with ATC. Contact dealer for service.
TRANSPONDER 1 OR 2 Transponder 1 or 2 is inoperative or connection to GTN is lost.	The GTN is configured for transponder 1 or 2 but is not able to communicate with the transponder.	Verify squawk code and altitude with ATC. Contact dealer for service.
TRANSPONDER 1 OR 2 ADS-B is not transmitting position.	The transponder has insufficient data to support ADS-B.	Ensure the aircraft has a clear view of the sky. Contact dealer for service.

Message	Description	Action
TRUE NORTH APPROACH - Verify NAV Angles are referenced to True North (T).	A procedure is loaded that is referenced to true north and the active leg has a published true north reference.	Verify the Nav Angle is set to True North.
VERTICAL CALCULATOR - Approaching target altitude. Start descent.	User has configured a vertical descent calculation, and the aircraft is within 60 seconds of the calculated top of descent.	No action is necessary; message is informational only.
VERTICAL CALCULATOR - Approaching target altitude.	User has configured a vertical descent calculation, and the aircraft is approaching the target altitude.	No action is necessary; message is informational only.
VERTICAL WAYPOINT - Can't reach current vertical waypoint.		
VLOC RECEIVER - Navigation receiver needs service.	The nav radio is reporting that it needs service. The nav radio may continue to function.	Use GPS based navigation. Contact dealer for service.
VLOC RECEIVER - Navigation receiver has failed.	The nav radio is not communicating property with the system.	Use GPS based navigation. Contact dealer for service.
VNAV - Unavailable: Unsupported leg type in flight plan.		

Message	Description	Action
VNAV - Unavailable: Excessive cross-track error.		
VNAV - Unavailable: Excessive track angle error.		
VNAV - Unavailable: Parallel course selected.		
WAYPOINT - Arriving at [wpt name].	User has configured the arrival alarm and is within the specified distance.	No action is necessary; message is informational only.
WX ALERT - Possible severe weather ahead.		
WX RADAR FAIL - Weather radar is inoperative.	Weather radar is reporting a system fault.	Contact dealer for service.
WX RADAR SERVICE - Weather radar needs service. Return unit for repair.	Weather radar is reporting a system failure.	Contact dealer for service.

Table 17-1 Messages

Note 1: There are several reference datums that waypoints can be surveyed against. TSO-C146 normally requires that all waypoints be referenced to the WGS84 datum, but allows for navigation to waypoints that are not referenced to the WGS84 datum so long as the pilot is notified. Certain waypoints in the navigation database are not referenced to the WGS84 datum, or their reference datum is unknown. If this is the case, this message is displayed. Garmin cannot determine exactly how close the non-WGS84 referenced waypoint will be to the WGS84 datum that the GTN uses. Typically, the distance is within two nautical miles. The majority of non-WGS84 waypoints are located outside of the United States.

18 SYMBOLS

The following tables describe the symbols that are found on the Map display.

18.1 Map Page Symbols

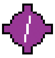
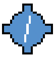
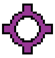
Symbol	Description
	Unknown Airport
	Non-towered, Non-serviced Airport
	Towered, Non-serviced Airport
	Non-towered, Serviced Airport
	Towered, Serviced Airport
	Soft Surface, Serviced Airport
	Soft Surface, Non-serviced Airport
	Private Airport
	Heliport
	Intersection
	LOM (compass locator at outer marker)
	NDB (Non-directional Radio Beacon)
	VOR
	VOR/DME
	ILS/DME or DME-only
	VORTAC
	TACAN

Table 18-1 Map Page Symbols

18.2 SafeTaxi™ Symbols

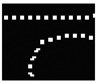
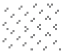
Symbol	Description
	Helipad
	Airport Beacon
	Under Construction Zones
	Unpaved Parking Areas

Table 18-2 SafeTaxi Symbols

18.3 Traffic Symbols

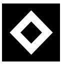
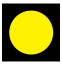
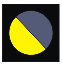
TIS Symbol	Description
	Non-Threat Traffic
	Traffic Advisory (TA)
	Traffic Advisory Off Scale

Table 18-3 TIS Symbols

TAS Symbol	Description
◇	Non-Threat Traffic (intruder is beyond 5 NM and greater than 1200 ft vertical separation)
◆	Proximity Advisory (PA) (intruder is within 5 NM and less than 1200 ft vertical separation)
●	Traffic Advisory (TA) (closing rate, distance, and vertical separation meet TA criteria)
◐	Traffic Advisory Off Scale

Table 18-4 TAS Symbols

Symbol		Description
Imminent Traffic (Traffic within ±500 feet AND 1.0 NM; OR no altitude AND within 1.0 NM)	Non-Imminent Traffic	
⧖	⧖	Traffic Closing Vertically
⟠	⟠	Traffic Diverging Vertically
□	□	Traffic not Closing or Diverging Vertically

Table 18-5 9900B TCAD Symbols

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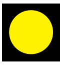
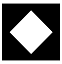
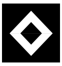
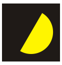
Symbol	Description
	Traffic Advisory
	Proximity Advisory (color may be configured as cyan)
	Other Traffic (color may be configured as cyan)
	Out-of-Range Traffic Advisory

Table 18-6 9900BX (TCAS) Symbols

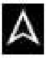
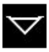
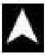
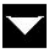
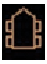
Symbol	Description
	Basic Non-Directional Traffic
	Basic Directional Traffic
	Basic Off-scale Selected Traffic
	Proximate Non-Directional Traffic
	Proximate Directional Traffic
	Proximate Off-scale Selected Traffic
	Non-Directional Alerted Traffic
	Off-Scale Non-Directional Alerted Traffic
	Directional Alerted Traffic
	Off-Scale Directional Alerted Traffic
	Non-Directional Surface Vehicle
	Directional Surface Vehicle

Table 18-7 ADS-B Traffic Symbols

__NOTE:__ Color of basic and proximate traffic is dependent on configuration (cyan or white) and airborne/on-ground status of target (target is brown when on the ground, see the surface vehicles).

18.4 Terrain Obstacle Symbols

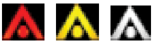
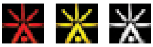
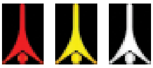
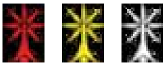
Unlighted Obstacle (Height is less than 1000 ft AGL)	Lighted Obstacle (Height is less than 1000 ft AGL)	Unlighted Obstacle (Height is greater than 1000 ft AGL)	Lighted Obstacle (Height is greater than 1000 ft AGL)
			

Figure 18-1 Obstacle Altitude/Color Correlation

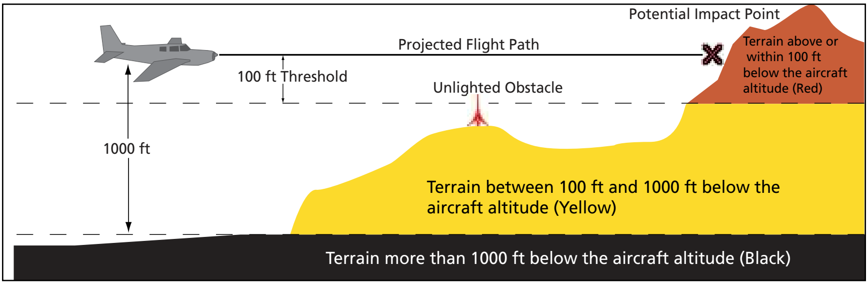

Potential Impact Point
Projected Flight Path
Terrain above or within 100 ft below the aircraft altitude (Red)
100 ft Threshold
Unlighted Obstacle
1000 ft
Terrain between 100 ft and 1000 ft below the aircraft altitude (Yellow)
Terrain more than 1000 ft below the aircraft altitude (Black)

Figure 18-2 TERRAIN Altitude/Color Correlation

18.5 Basemap Symbols

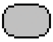
Symbol	Description
	Interstate Highway
	State Highway
	US Highway
	National Highway - 2-digit drawn inside
	Small City or Town
	Medium City
	Large City

Table 18-8 Basemap Symbols

18.6 Map Tool Bar Symbols

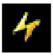
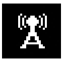
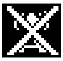
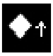
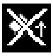
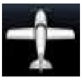
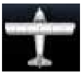
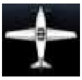
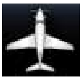
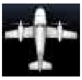
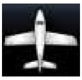
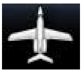
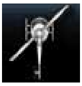
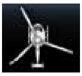
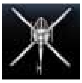
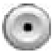
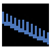
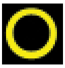
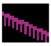
Symbol	Description
	Terrain Proximity Enabled and Available Indicator
	Terrain Proximity Enabled and Not Available Indicator
	StormScope
	Within coverage of a TIS-B ground station when connected to a GDL 88
	Not within coverage of a TIS-B ground station when connected to a GDL 88
	Traffic Enabled and Available Indicator
	Traffic Enabled and Not Available Indicator

Table 18-9 Map Tool Bar Symbols

18.7 Miscellaneous Symbols

Symbol	Description
	Low-Wing Prop (Default Ownship)
	High-Wing Prop
	Kit Plane
	Turboprop
	Twin-Engine Prop
	Single-Engine Jet
	Business Jet
	2-Blade Rotorcraft
	3-Blade Rotorcraft
	4-Blade Rotorcraft
	Non-directional ownship is shown if there is no heading or ground track. This typically only occurs during start-up.
	Parallel Track Waypoint
	Restricted/Prohibited/Warning/Alert
	TFR (Temporary Flight Restrictions)
	MOA

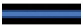
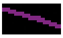
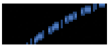
Symbol	Description
	Class B Airspace
	Class C Airspace
	Class D Airspace
	User Waypoint

Table 18-10 Miscellaneous Symbols

18.8 Stormscope Symbols

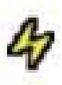
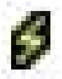
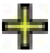
Symbol	Time Since Strike (Seconds)
	6
	60
	120
	180

Table 18-9 Stormscope Symbols

19 APPENDIX

19.1 Glossary

ACT, ACTV	active, activate
ACT	Altitude Compensated Tilt
ADC	Air Data Computer
ADF	Automatic Direction Finder
ADI	Attitude Direction Indicator
AFM	Airplane Flight Manual
AFMS	Airplane Flight Manual Supplement
AGL	Above Ground Level
AIM	Airman's Information Manual
AIRMET	Airman's Meteorological Information
ALT	altitude
AP	autopilot
APR	approach
APT	airport, aerodrome
ARINC	Aeronautical Radio Incorporated
ARSPC	airspace
ARTCC	Air Route Traffic Control Center
AS	airspeed
ASOS	Automated Surface Observing System
ATC	Air Traffic Control
ATCRBS	ATC Radar Beacon System
ATIS	Automatic Terminal Information Service
AUX	auxiliary
AWOS	Automated Weather Observing System
BARO	barometric setting
BC	backcourse
Bearing	The compass direction from the present position to a destination waypoint
BRG	bearing
C	center runway
ºC	degrees Celsius
CDI	Course Deviation Indicator
CHNL	channel

CLD	cloud
CLR	clear
CONFIG	configuration
Course	The line between two points to be followed by the aircraft
Crosstrack Error	The distance the aircraft is off a desired course in either direction, left or right
CRS	course
CRSR	cursor
CTA	Control Area
CTAF	Common Traffic Advisory Frequency
CTRL	control
CUM	The total of all legs in a flight plan

DALT	density altitude
DB, DBASE	database
DCLTR, DECLTR	declutter
deg	degree
DEP	departure
Desired Track (DTK)	The desired course between the active “from” and “to” waypoints
DEST	destination
DFLT	default
DIS	distance
Distance	The “great circle” distance from the present position to a destination waypoint
DME	Distance Measuring Equipment
DP	Departure Procedure
DPRT	departure
DSBL	disabled
DTK	Desired Track

EDR	Excessive Descent Rate
EGNOS	Provides SBAS service for most of Europe and parts of North Africa
ELEV	elevation
EMI	Electromagnetic Interference
ENR	en route

En Route Safe Altitude	The recommended minimum altitude within ten miles left or right of the desired course on an active flight plan or direct-to
ERR	error
ESA	En route Safe Altitude
ETA	Estimated Time of Arrival
ETE	Estimated Time En Route
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FCC	Federal Communication Commission
FCST	forecast
FD	flight director
FIR	Flight Information Region
FIS-B	Flight Information Services-Broadcast
FISDL	Flight Information Service Data Link
FLTA	Forward Looking Terrain Avoidance
FPL	flight plan
FREQ	frequency
FRZ	freezing
FSS	Flight Service Station
ft	foot/feet
GCS	Ground Clutter Suppression
GDC	Garmin Air Data Computer
GDL	Garmin Satellite Data Link
GEO	geographic
GLS	Global Navigation Satellite Landing System
GMA	Garmin Audio Panel System
GMT	Greenwich Mean Time
GMU	Garmin Magnetometer Unit
GPS	Global Positioning System
GPSS	GPS Roll Steering
Ground Speed	The velocity that the aircraft is travelling relative to a ground position
Ground Track	*see Track*
GRS	Garmin Reference System
GS	Ground Speed
G/S, GS	glideslope

GTX	Garmin Transponder
HDG	heading
Heading	The direction an aircraft is pointed, based upon indications from a magnetic compass or a properly set directional gyro
HFOM	Horizontal Figure of Merit
Hg	mercury
hPa	hectopascal
HPL	Horizontal Protection Level
HSDB	High-Speed Data Bus
HSI	Horizontal Situation Indicator
Hz	Hertz
IAF	Initial Approach Fix
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
IGRF	International Geomagnetic Reference Field
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
IOI	Imminent Obstacle Impact
INFO	information
in HG	inches of mercury
INT	intersection(s)
INTEG	integrity (RAIM unavailable)
ITI	Imminent Terrain Impact
L	left, left runway
LAT	latitude
LCD	Liquid Crystal Display
LCL	local
LED	Light Emitting Diode
Leg	The portion of a flight plan between two waypoints
LIFR	Low Instrument Flight Rules
LNAV	Lateral Navigation
LOC	localizer
LOI	loss of integrity (GPS)
LON	longitude
LPV	Localizer Performance with Vertical guidance
LRU	Line Replacement Unit

LT	left
LTNG	lightning
MAG	Magnetic
MAG VAR	Magnetic Variation
MapMX	A proprietary data format used to forward navigation information between Garmin units
MAX	maximum
MAXSPD	maximum speed (overspeed)
MDA	barometric minimum descent altitude
METAR	Aviation Routine Weather Report
MIN	minimum
Minimum Safe Altitude	Uses Grid MORAs to determine a safe altitude within ten miles of the aircraft present position
MKR	marker beacon
MOA	Military Operations Area
MOV	movement
mpm	meters per minute
MSA	Minimum Safe Altitude
MSAS	Provides SBAS service for Japan only
MSG	message
MSL	Mean Sea Level
MT	meter
mV	millivolt(s)
MVFR	Marginal Visual Flight Rules
NAV	navigation
NAVAID	NAVigation AID
NCR	Negative Climb Rate
NDB	Non-Directional Beacon
NEXRAD	Next Generation Radar
OAT	Outside Air Temperature
OBS	Omni Bearing Selector
PA	Proximity Advisory
PC	personal computer

PDA	Premature Descent Alert
P. POS	Present Position
PTK	parallel track

QTY	quantity

R	right, right runway
RAIM	Receiver Autonomous Integrity Monitoring
RAM	random access memory
REF	reference
REQ	required
REV	reverse, revision, revise
RMI	Radio Magnetic Indicator
RNG	range
RNWY	runway
ROC	Reduced Required Obstacle Clearance
RT	right
RTC	Reduced Required Terrain Clearance

SBAS	Satellite-Based Augmentation System
SCIT	Storm Cell Identification and Tracking
SD	Secure Digital
SFC	surface
SIAP	Standard Instrument Approach Procedures
SID	Standard Instrument Departure
SIGMET	Significant Meteorological Information
SLP/SKD	slip/skid
SMBL	symbol
SPD	speed
SRVC, SVC	service
STAR	Standard Terminal Arrival Route
STATS	statistics
STBY	standby
STD	standard
SUA	Special Use Airspace
SUSP	suspend
SW	software
SYS	system

T	true
TA	Traffic Advisory
TACAN	Tactical Air Navigation System
TAF	Terminal Aerodrome Forecast
TAS	True Airspeed
TAS	Traffic Advisory System
TAT	Total Air Temperature
TAWS	Terrain Awareness and Warning System
TCA	Terminal Control Area
TCAS	Traffic Collision Avoidance System
TEMP	temperature
TERM	terminal
TFR	Temporary Flight Restriction
T HDG	True Heading
TIS	Traffic Information System
TMA	Terminal Maneuvering Area
Topo	topographic
Track	Direction of aircraft movement relative to a ground position; also 'Ground Track'
TRK	track
TRSA	Terminal Radar Service Area
UNAVAIL	unavailable
USR	user
UTC	Coordinated Universal Time
UTM/UPS	Universal Transverse Mercator/ Universal Polar Stereographic Grid
V, Vspeed	velocity (airspeed)
VAR	variation
VFR	Visual Flight Rules
VHF	Very High Frequency
VLOC	VOR/Localizer Receiver
VMC	Visual Meteorological Conditions
VNAV, VNV	vertical navigation
VOR	VHF Omni-directional Range
VORTAC	very high frequency omnidirectional range station and tactical air navigation
VS	Vertical speed

VSI	Vertical Speed Indicator
WAAS	Wide Area Augmentation System
WGS-84	World Geodetic System - 1984
WPT	waypoint(s)
WX	weather
XPDR	transponder
XTK	cross-track

19.2 SD Card Use and Databases

The GTN 7XX System uses Secure Digital (SD) cards to load and store various types of data. For basic flight operations, SD cards are required for database storage as well as database updates.

Database Name	Function	Where Stored	Update Cycle	Provider	Notes
Navigation	Airport, NAVAID, Waypoint, and Airspace information	Internal GTN memory	28 days (on Thursdays)	fly.garmin.com	Updates installed via SD card and copied into internal memory
SafeTaxi	Airport surface diagrams	Internal GTN memory	56 days (on Thursdays)	fly.garmin.com	Updates installed via SD card and copied into internal memory
Terrain	Topographic map, Terrain/TAWS	SD card	As required	fly.garmin.com	
Obstacle	Obstacle information for map, and TAWS	Internal GTN memory	56 days (on Thursdays)	fly.garmin.com	Updates installed via SD card and copied into internal memory
Basemap	Boundary and road information	Internal GTN memory	As required	fly.garmin.com	Updates installed via SD card and copied into internal memory
FliteCharts	FAA-published terminal procedures	SD card	28 days (on Thursdays)	fly.garmin.com	Disables 180 days after expiration date.
ChartView	Jeppesen terminal procedures	SD card	14 days (on Fridays)	Contact Jeppesen	Optional feature that requires Garmin dealer enablement. Disables 70 days after expiration date.

Table 19-1 Database List

More information about databases and updates can be found at:

https://fly.garmin.com/fly-garmin/support.

19.2.1 Jeppesen Databases

The navigation database is updated on a 28-day cycle. Navigation database updates are provided by Garmin and may be downloaded from the Garmin web site "fly.garmin.com" onto a Garmin provided Supplemental Data card. Contact Garmin at fly.garmin.com for navigation database updates and update kits. The Navigation database is stored internally and the data card is only used to transfer the database into the unit.

The optional ChartView database is updated on a 14 day cycle. The ChartView database is provided directly from Jeppesen. Contact Jeppesen (www.jeppesen.com) for ChartView subscription and update information. An enablement card that is purchased from Garmin is separate from the Jeppesen database and is required to enable ChartView.

***NOTE:** Garmin requests that the flight crew report any observed discrepancies related to database information. These discrepancies could come in the form of an incorrect procedure, incorrectly identified terrain, obstacles and fixes, or any other displayed item used for navigation or communication in the air or on the ground. Go to "FlyGarmin.com" and at the bottom of the page select "Aviation Data Error Report."*

Updating the Jeppesen navigation database

1. With the GTN 7XX System OFF, insert the SD card containing the navigation database update into the card slot of the GTN 7XX to be updated (label of SD card should face to the right).
2. Turn the GTN 7XX System ON.
3. Verify the correct update cycle is loaded during power-up.

19.2.2 Garmin Databases

***NOTE:** The data contained in the terrain and obstacle databases comes from government agencies. Garmin accurately processes and cross-validates the data, but cannot guarantee the accuracy and completeness of the data.*

The Supplemental Data Card should not be removed except to update the databases stored on the card. The data cards cannot be moved between units.

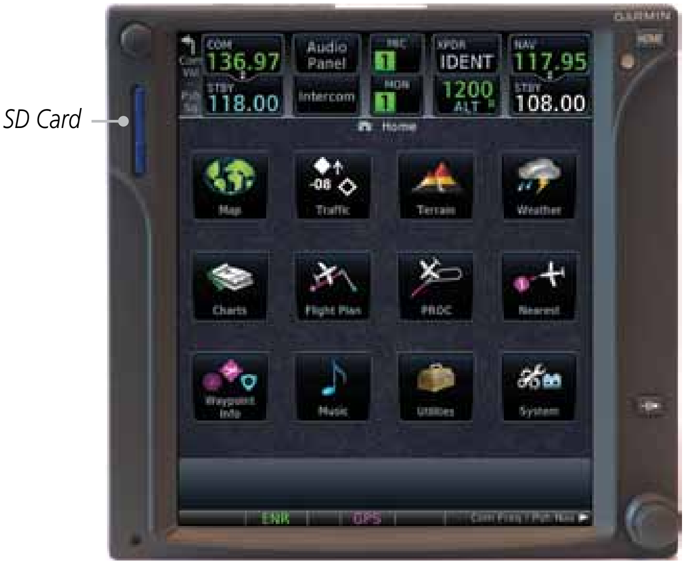

SD Card
GARMIN
COM
136.97
STBY
118.00
Audio Panel
Intercom
REC
MON
XPDR
IDENT
1200
ALT
NAV
117.95
STBY
108.00
HOME
Home
Map
Traffic
Terrain
Weather
Charts
Flight Plan
PROC
Nearest
Waypoint Info
Music
Utilities
System
ENR
GPS

Figure 19-1 SD Card Database Location

The Garmin databases can be updated by following the instructions on *fly.garmin.com*. Once the updated files have been downloaded from the web site, a PC equipped with an appropriate SD card reader is used to unpack and program the new databases onto the existing Supplemental Data Cards. The following equipment is required to perform the update:

- Windows-compatible PC computer (Windows 2000, XP, Vista, or Windows 7 recommended)
- SanDisk SD Card Reader, P/Ns SDDR-93 or SDDR-99 or equivalent card reader
- Updated database obtained from the Garmin web site
- Existing Garmin Supplemental Database SD Card

It may be necessary to have the system configured by a Garmin authorized service facility in order to use certain database features.

Common Problems/Troubleshooting Tips for Databases

- SD Cards
  - The supplied SD cards, and most commercially available SD cards, have a small sliding tab located on the top left of the card (when viewing the card label-side up).
  - When the sliding tab is in the Down position (as in farther away from the gold contacts on the back of the card), you will not be able to write data to the card, as it will be write protected.
  - The tab must be in the Up position to work correctly.
- Card Programmer
  - If a card programmer is having trouble finding or writing data to the SD cards, you may have to upgrade to a High Capacity SD card programmer.
  - SD cards with a capacity of 4GB are considered high capacity.
  - Most non-high capacity card programmers will not work with a high capacity SD card. High capacity card programmers can be easily purchased at a consumer electronics store.
  - Ensure that your card programmer is not plugged into a USB hub, your computer screen, or your keyboard.
  - Make sure it is plugged directly into your computer (the back of the computer, if using a desktop computer).
- If you accidentally place a file onto the wrong card, call Garmin's Aviation Product Support team to look at the files and delete the proper files.
  - Do not format the cards

Updating Garmin Databases

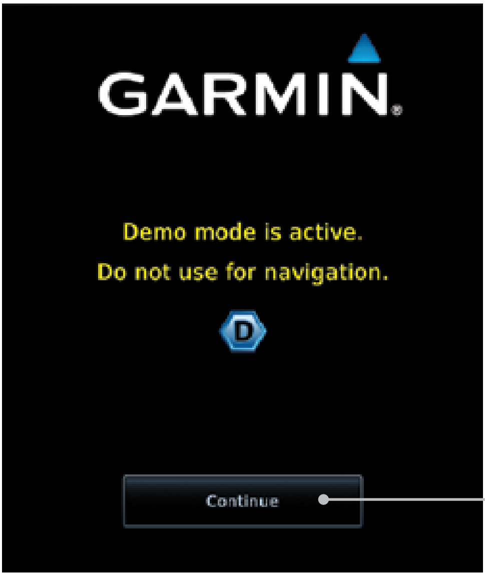
1. Download the data to the data cards from the appropriate web site.
2. Insert Navigation Database SD card in the slot of the GTN 7XX.
3. Apply power to the GTN 7XX System. View the power-up splash screen. Check that the databases are initialized and displayed on the splash screen. Some databases can take up to 15 minutes to update.
4. The database update page will prompt to either Update or Continue. Touch the **Update** key to update the database(s). Touch the **Continue** key to continue to normal operation without updating a database. This process will repeat for each database that is available on the card for updating.
5. After the database(s) have completed the update process, touch **OK** to continue the normal progression of start-up displays.
6. From the Home page, touch the **System** key. Then, touch the **System Status** key.
7. Check that all databases are current and there are no errors. If a database is highlighted in yellow, it is either expired or the GTN 7XX can not determine the date.

19.3 Demo Mode

The GTN product contains a “Demo” mode that allows simulation of all operations of the product to allow practice and familiarization while staying on the ground.

***WARNING:** Do not use the GTN to navigate while Demo mode is active. Do not use or enter Demo mode while airborne.*

1. Press in and hold the **Direct-To** key and then apply power to the unit.



Demo mode is active.

Do not use for navigation.

Touch To Continue

Figure 19-2 Demo Mode Start Up Display

2. Touch the **Continue** key and Fuel keys as normally needed to start operations.

3. Touch the **Demo** key in the lower part of the display to reach the Demo Setup functions.

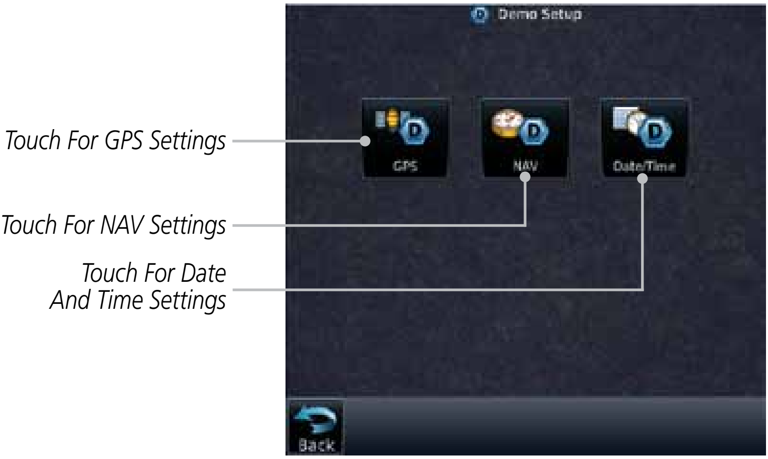
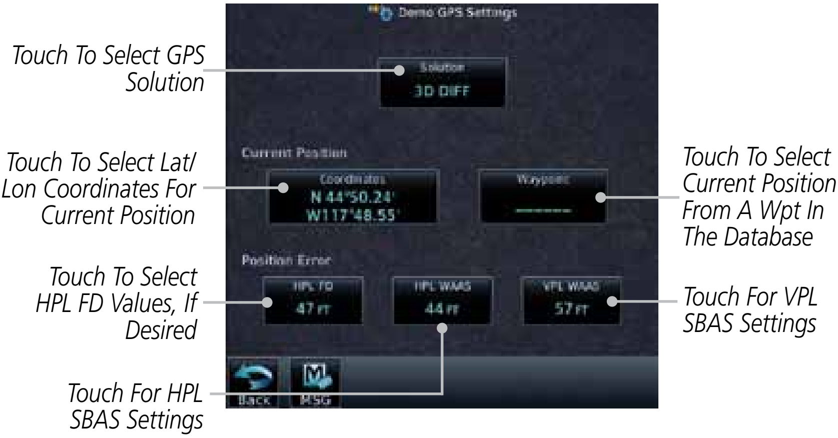

Demo Setup
GPS
NAV
Date/Time
Back
Touch For GPS Settings
Touch For NAV Settings
Touch For Date And Time Settings

Figure 19-3 Demo Mode Setup

4. Touch the **GPS** key to reach the Demo GPS Settings page. The Position Error values (Horizontal Protection Level Fault Detection [HPL FD], HPL SBAS, and Vertical Protection Level [VPL] SBAS) may be adjusted to reflect errors induced by naturally occurring conditions, but are normally not adjusted for most Demo mode operations.


Demo GPS Settings

Solution: 3D DIFF

Current Position

Coordinates: N 44°50.24' W117°48.55'

Waypoint: -----

Position Error

HPL FD: 47 FT

HPL WAAS: 44 FT

VPL WAAS: 57 FT

Back
MSG
Touch To Select GPS Solution
Touch To Select Lat/ Lon Coordinates For Current Position
Touch To Select HPL FD Values, If Desired
Touch For HPL SBAS Settings
Touch To Select Current Position From A Wpt In The Database
Touch For VPL SBAS Settings

Figure 19-4 Demo Mode GPS Settings

Foreword
Getting Started
Audio & Xpdr Ctrl
Com/Nav
FPL
Direct-To
Proc
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Map
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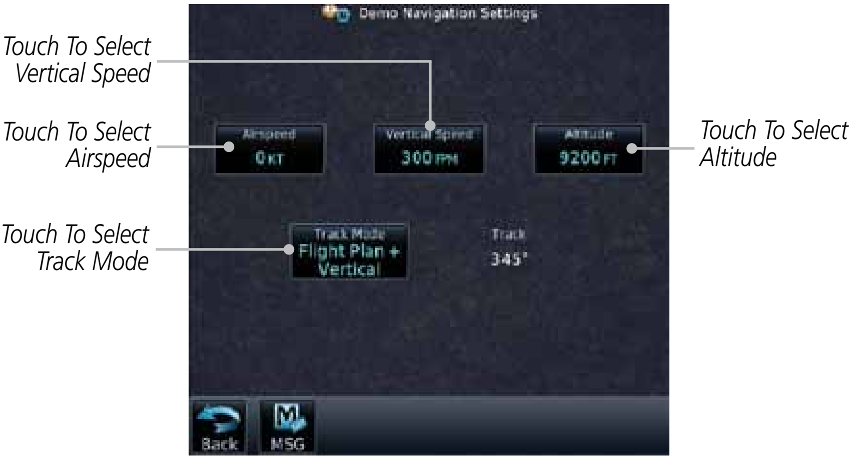
5. Touch the **Nav** key to reach the Demo Navigation Settings page.


Demo Navigation Settings

Airspeed 0 KT

Vertical Speed 300 FPM

Altitude 9200 FT

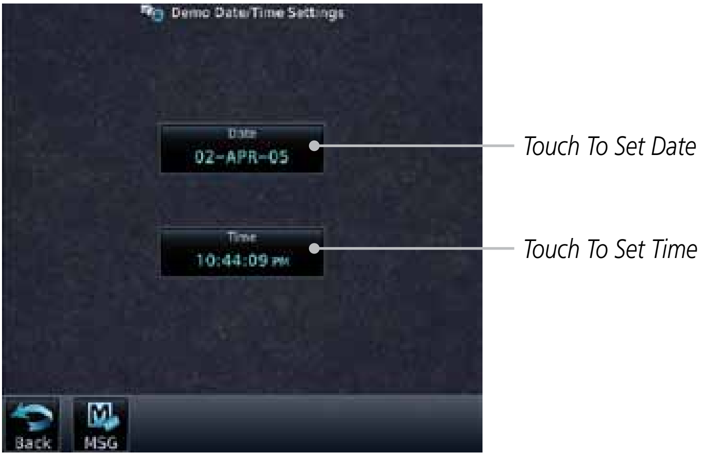
Track Mode Flight Plan + Vertical

Track 345°

Touch To Select Vertical Speed
Touch To Select Airspeed
Touch To Select Track Mode
Touch To Select Altitude
Back
MSG

Figure 19-5 Demo Mode Navigation Settings

6. Touch the **Date/Time** key to reach the Demo Date/Time Settings page.


Demo Date/Time Settings

Date 02-APR-05

Time 10:44:09 PM

Touch To Set Date
Touch To Set Time
Back
MSG

Figure 19-6 Demo Mode Date/Time Settings

7. After completing the settings for Demo mode, touch the **HOME** key or **Back** key to get started with operating the GTN.

19.4 Glove Qualification Procedure

This procedure is used to qualify a specific glove for use with the GTN system by guiding the user through a variety of tasks that use the touchscreen. Due to differences in finger size, glove size, and touchscreens between the 6XX or 7XX unit, the qualification granted by this procedure is specific to the pilot/glove and 6XX or 7XX combination. GTN 7XX and 6XX units must be evaluated separately.

The GTN touchscreen uses capacitive touch technology to sense the proximity of skin to the display. A glove increases the distance between skin and the display glass and may reduce the ability of the GTN to detect touches. Therefore, when selecting a glove for use with the GTN, thinner gloves tend to work better than thicker gloves. Leather gloves and gloves designed to work specifically with capacitive touchscreen devices are often found to be acceptable. Additionally, altering your touch technique to use the pad of your finger to touch the unit rather than the tip will increase the touchscreen sensitivity while using gloves.

This qualification must be completed on the ground. Performing this procedure in flight is not authorized. Table 19-1 contains tasks that are required to qualify a glove. Table 19-2 contains tasks that are not required to qualify a glove, but may limit the manner in which some functions are accessed while a glove is worn.

1. Sit in the pilot's seat.
2. Start the GTN in Demo mode by pressing and holding the **Direct To** key during power up.
3. Perform the tasks listed in Table 19-1 and Table 19-2 with an non-gloved hand. You do not need to record any results for this step.
4. Perform the tasks listed in Table 19-1 and Table 19-2 with a gloved hand. For each task, determine whether the operation is the same or worse as it was without the glove. Record the results in Table 19-1 and Table 19-2. Items that may cause the operation to be worse include, but are not limited to:
   a. Multiple attempts to select a key
   b. Unintentional selection of adjacent keys
   c. Excessive force on the touchscreen to select a key
5. If all applicable tasks in Table 19-1 respond in the same way with and without a glove then the glove used to complete these tasks may be used by the pilot

who performed this evaluation on the unit (6XX or 7XX) that was used during this procedure.

Pilot: ______________________________________

Glove Description: ______________________________

GTN (circle one): 6XX or 7XX

Task	Operation With Glove (circle one)	
Navigate to the Home Screen.	NA	
Touch the **Demo** key.	Same	Worse
Touch the **GPS** key.	Same	Worse
Touch the **Waypoint** key.	Same	Worse
Type "KSLE" using the touchscreen, then touch **Enter.**	Same	Worse
Navigate to the Home Screen (Press **HOME**).	NA	
Touch the **Flight Plan** key.	Same	Worse
Enter the following waypoints using the **Add Waypoint** key at the bottom of the list of flight plan waypoints: KSLE KMMV KONP BTG	Same	Worse
Select BTG, then touch the **Load Airway** key to load the following airway: V23 ALFOR.	Same	Worse
While viewing the flight plan page, touch the **Up/ Down** arrow keys to scroll up and down to view the flight plan waypoints.	Same	Worse
Touch the **Back** key to return to the Home screen.	Same	Worse
Touch the COM standby frequency to activate the com frequency entry keypad (Task applicable to 635/650/750 only).	Same	Worse
Enter a valid com frequency and touch the **Enter** key (635/650/750 only).	Same	Worse

Task	Operation With Glove (circle one)	
Touch the active com frequency to flip/flop the com frequencies. (635/650/750 only).	Same	Worse
Touch the active nav frequency to flip/flop the nav frequencies (750 only).	Same	Worse
Touch the **Menu** key (650 only).	Same	Worse

Table 19-2 Tests Required for Glove Qualification

Task	Operation With Glove (circle one)	
Navigate to the flight plan page.	NA	
While viewing the flight plan page, touch the list and drag up/down to view the flight plan waypoints.	Same	Worse
While viewing the flight plan page, touch and flick the list to view the flight plan waypoints.	Same	Worse
Navigate to the map page.	NA	
Touch the Map to enter Pan mode, then touch the **Graphically Edit FPL** key.	Same	Worse
Remove KONP from the flight plan graphically by touching KONP and dragging it to an area without any waypoints (Pan and zoom in/out as necessary to accomplish the task).	Same	Worse
Insert KSPB between KMMV and BTG by dragging the leg between KMMV and BTG to KSPB.	Same	Worse

Table 19-3 Tests Not Required for Glove Qualification

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