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G3X™ Pilot's Guide

This manual reflects the operation of System Software version 8.00 or later. Some differences in operation may be observed when comparing the information in this manual to earlier or later software versions.

⚠ *WARNING:* Navigation and terrain separation must NOT be predicated upon the use of the terrain function. The G3X 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:* To reduce the risk of unsafe operation, carefully review and understand all aspects of the G3X Pilot's Guide documentation and the Pilot's Operating Handbook of the aircraft. Thoroughly practice basic operation prior to actual use. During flight operations, carefully compare indications from the G3X 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.

⚠ *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 altitude calculated by G3X internal GPS receivers is geometric height above Mean Sea Level and could vary significantly from the altitude displayed by pressure altimeters. Always use pressure altitude displayed by the G3X PFD when determining or selecting aircraft altitude.

⚠ *WARNING:* Do not use outdated database information. Databases used in the G3X system must be updated regularly in order to ensure that the information remains current. Pilots using any outdated database do so entirely at their own risk.

⚠ *WARNING:* Do not use data link weather information for maneuvering in, near, or around areas of hazardous weather. Information contained with in 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: 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.*

⚠ *WARNING: The illustrations in this guide are only examples. Never use the G3X to attempt to penetrate a thunderstorm. Both the FAA Advisory Circular, Subject: Thunderstorms, and the Aeronautical Information Manual (AIM) recommend avoiding "by at least 20 miles any thunderstorm identified as severe or giving an intense radar echo."*

⚠ *WARNING: Because of variation in the earth's magnetic field, operating the G3X within the following areas could result in loss of reliable attitude and heading indications. North of 72° North latitude at all longitudes; South of 70° South latitude at all longitudes; North of 65° North latitude between longitude 75° W and 120° W. (Northern Canada); North of 70° North latitude between longitude 70° W and 128° W. (Northern Canada); North of 70° North latitude between longitude 85° E and 114° E. (Northern Russia); South of 55° South latitude between longitude 120° E and 165° E. (Region south of Australia and New Zealand)*

⚠ *WARNING: 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 G3X utilize GPS as a precision electronic NAVigation AID (NAVAID). Therefore, as with all NAVAIDs, information presented by the G3X can be misused or misinterpreted and, therefore, become unsafe.*

⚠ *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: Do not use the approach information provided by the VFR navigation database residing within the G3X as a means of navigating any instrument approach. The G3X VFR navigation database is limited to present only the waypoints for the final approach leg of a published procedure. These waypoints and associated course line are made available for monitoring purposes only.*

⚠ *WARNING: Do not rely solely upon the display of traffic information for collision avoidance maneuvering. The traffic display does not provide collision avoidance resolution advisories and does not under any circumstances or conditions relieve the pilot's responsibility to see and avoid other aircraft.*

⚠ *WARNING: Do not rely solely upon the display of traffic information to accurately depict all of the traffic within range of the aircraft. Due to lack of equipment, poor signal reception, and/or inaccurate information from aircraft or ground stations, traffic may be present that is not represented on the display.*

⚠ *WARNING: For safety reasons, G3X operational procedures must be learned on the ground.*

⚠ *CAUTION: The display uses 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.*

⚠ *CAUTION: The Garmin G3X 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.*

NOTE: The Garmin G3X 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 G3X. 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.

NOTE: All visual depictions contained within this document, including screen images of the G3X panel and displays, are subject to change and may not reflect the most current G3X system and aviation databases. Depictions of equipment may differ slightly from the actual equipment.

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: Interference from GPS repeaters operating inside nearby hangars can cause an intermittent loss of attitude and heading displays while the aircraft is on the ground. Moving the aircraft more than 100 yards away from the source of the interference should alleviate the condition.

NOTE: Use of polarized eyewear may cause the flight displays to appear dim or blank.

NOTE: Temporary Flight Restriction (TFR) data is provided by the FAA and may not be updated outside of normal business hours. Confirm data currency through alternate sources and contact your local FSS for interpretation of TFR data.

NOTE: The Garmin G3X system includes products like the GDU 37X and the GSU 73 that are not TSO-certified products and have not received FAA approval or endorsement. Consequently the G3X system is not suitable for installation in type-certificated aircraft.

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Part Number	Change Summary
190-01115-00	Initial release

Rev	Date	Description
A	August, 2009	Production Release
B	January, 2010	Added System Software Version 2.50 parameters
C	March, 2010	**System Software Version 2.50 to 2.60:** • Added message to indicate if config module is missing • Added warning text to Weight & Balance Page
D	June, 2010	**System Software Version 2.60 to 2.70**: • Added support for Integrated Autopilot control and display via the PFD Page • Added PFD Setup Menu • Added second Bearing Pointer to PFD HSI • Added fuel range ring to map • Added menu option to XM Page to allow selection of a specific channel number **System Software Version 2.70 to 3.00:** • Added Synthetic Vision • Added mach number to configurable Data Fields
E	April, 2011	**System Software Version 3.00 to 3.10:** • Added ability to import/export flight plans using the SD card • Added Softkeys to Nearest Airports Page to quickly show/hide private airports and heliports • Removed ability to adjust Roll Mode reference using the FMS Joystick **System Software Version 3.10 to 3.20:** • Added ability to display checklist files from SD Card • Added ability to log data to SD Card • Added ability to export Track Log and User Waypoints to SD Card • Added ability to display fuel calculator values in data bar **System Software Version 3.20 to 4.00:** • Added support for Jeppesen ChartView and geo-referenced FliteCharts • Added ability to use VNAV when using an external GPS navigation Source • Added Softkey to Terrain Page to quickly enabled/disable terrain alerts • Added display of Navaid frequency to PFD bearing pointer data fields

Rev	Date	Description
E	April, 2011	**System Software Version 4.00 to 4.10:** • Added support for displaying flight time in databar **System Software Version 4.10 to 5.00:** • Added support for VOR, localizer, and glideslope modes for integrated autopilot • Added option to display trim and flap position on PFD • Added persistent sky/ground display to PFD • Added ability to configure and display Vse (blue line) and Vmc (red line) on PFD airspeed tape for multiengine aircraft • Added 'User Selected' configuration option to allow the position of the EIS strip to be changed via the Display Setup Page • Added ability to view EGT/CHT cylinder temperature bar graph on a single-display system • Added automatic sync of altimeter setting to local terrain elevation when FMS Joystick is pressed and held while BARO Softkey is selected and aircraft is stationary on the ground • Added display of displaced runway threshold distance to Airport Review Page • Added menu options to the Waypoint Page to quickly view the departure and destination airports • Added menu option and softkey to the FPL VNAV Page to force a capture of a VNAV profile • Added Sirius/XM warning text • Improved HSI localizer course auto-slew and localizer backcourse presentation **System Software Version 5.0 to 5.10:** • Added Fuel Flow to list of configurable data fields **System Software Version 5.10 to 6.00:** • Added pathways • Note about VPX Page
F	October, 2011	**System Software Version 6.00 to 6.10:** • Added baro minimums altitude reference bug and audio alert to PFD • Changed CRS Softkey on PFD Page to indicate which course it controls (LOC, VOR, or OBS).

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Rev	Date	Description
F	October, 2011	**System Software Version 6.10 to 6.20:** • Added remote transponder interface information • Added ability to switch between internal and external GPS flight plan sources • Added optional dedicated Traffic Page • Added softkey to Map Page to enable/disable traffic display • Added ability to enable/disable 'Traffic Not Available' audio alert • Added ability to enable/diable traffic data on Synthetic Vision display • Added ability to change the layout of PFD1 between full-screen and split-screen in normal mode via the Display Setup Page • Added arrows to PFD traffic and terrain messages to indicate traffic and terrain alerts which are outside the Synthetic Vision field of view • Added display of peak EGT temperature to bar graph display on Engine Page when Lean Mode is active • Added softkey to Terrain page • Changed EGT gauge in EIS strip to display the cylinder with the temperature closest to its own peak value when Lean Mode is active • Changed AP NAV Softkey on PFD Page to cancel armed GS Mode on the first press if GPS Mode is active and LOC and GS Modes are both armed

Rev	Date	Description
G	May, 2012	**System Software Version 6.20 to 6.30:** • Added ability to adjust PFD pitch attitude offset, using the PFD Setup page. • Added ability to configure the initial MFD page that is displayed after powerup, using the Display Setup page. • Added ability to display synthetic vision field of view on the map. • Added configurable data fields to display current climb gradient in percent or altitude gain per nautical mile. • Added runway number labels to runway extension lines on map. • Added items to Map Setup page to adjust visibility of water labels, park and land cover areas, runway numbers, and runway extension lines. • Simplified requirements for availability of autopilot VNAV mode, and reduced the need for pilot acknowledgement before VNAV mode can be activated. • Changed screenshot utility to be activated when Menu key is pressed and held. • Changed selected altitude data field on PFD to flash in conjunction with armed autopilot VNAV indicator if an altitude has not been selected prior to VNAV descent. • Changed Fuel Calculator display on Engine page to show fuel quantity and pressure gauges if space is available. • Changed wind direction display on PFD to use system units settings for heading offset. • Changed display of XTK data fields to more closely resemble G1000 presentation. • Improved flight log to more closely match airframe timer, and to account for time spent with the engine running while on the ground before or after a flight. **System Software Version 6.30 to 6.40:** • Added option to display G-meter on PFD. • Added option to display track-up orientation on PFD HSI. • Added support for GTS 8xx active traffic system. • Added support for GNS 480.
H	July, 2012	**System Software Version 6.40 to 7.00:** • Added GDL39 Support
J	August, 2012	**System Software Version 7.00 to 7.20:** • Added TargetTrend™

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Rev	Date	Description
K	May, 2013	**System Software Version 7.20 to 7.30:** • Includes GDL 39 system software 2.51 **System Software Version 7.30 to 7.40:** • Added support for Rotax 966385 sensor for CHT and oil temperature • Improved lean assist detection of false peaks due to small temperature fluctuations **System Software Version 7.40 to 8.00:** • Added GMC 305 AFCS Controller support • Added GSU 25 AHRS support • Added GAP 26 Pitot-AOA Mast support • Added GSA 28 Auto Pilot Servo support • Added GEA 24 Engine/Airframe support

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SECTION 1 SYSTEM OVERVIEW

The G3X System presents flight instrumentation, position, navigation, communication, and identification information to the pilot using Wide VGA (800x480) flat-panel color display(s). The seven-inch diagonally measured display(s) provides 22 square-inches (each) of viewing area.

1.1 LINE REPLACEABLE UNITS

The system consists of the following Line Replaceable Units (LRUs):

- **Garmin Display Unit (GDU) 375 (with XM)**
    - Single Display: Split Primary Flight Display (PFD) & Multi Function Display (MFD)
    - Multiple Displays: MFD (recommended)

- **GDU 370 (without XM)**
    - Single Display: Split Primary Flight Display (PFD) & Multi Function Display (MFD)
    - Multiple Displays: MFD, PFD, or split-screen

GDU 37X

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- **GSU 73**
  - Garmin Sensor Unit sub-system for the G3X (Air Data Computer (ADC), Engine/Airframe Unit, and the Attitude and Heading Reference System (AHRS))
    - ADC: Processes data from the pitot-static system and outside air temperature (OAT) sensor.
    - Engine/Airframe Unit: Receives and processes signals from the engine and airframe sensors.
    - AHRS: Provides aircraft attitude and heading information to the PFD. The AHRS contains advanced sensors (including accelerometers and rate sensors) and interfaces with the Magnetometer to obtain magnetic field information, with the ADC to obtain air data, and with the GDU to obtain GPS information. AHRS operation is discussed later in this section.
    - ARINC 429 interface: Transmits and receives ARINC 429 signals for interface to panel-mount IFR GPS navigators.

GSU 73

- **GSU 25**
    - Garmin Sensor Unit sub-system for the G3X (Air Data Computer (ADC), and the Attitude and Heading Reference System (AHRS))
        - ADC: Processes data from the pitot-static system and outside air temperature (OAT) sensor.
        - AHRS: Provides aircraft attitude and heading information to the PFD. The AHRS contains advanced sensors (including accelerometers and rate sensors) and interfaces with the Magnetometer to obtain magnetic field information, with the ADC to obtain air data, and with the GDU to obtain GPS information. AHRS operation is discussed later in this section.

GSU 25

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- **GMU 44/GMU 22**
  - Magnetometer: Measures the local magnetic field and sends data to the AHRS for processing to determine aircraft magnetic heading. This unit receives power directly from the AHRS and communicates with it via an RS-485 digital interface.

GMU 44/GMU 22

- **GTP 59**
  - Temperature Probe: Provides raw air temperature data.

GTP 59

- **GAP 26**
  - Pitot Probe: Sends dynamic air pressure for airspeed, altitude, and angle of attack (AOA), when paired with a GSU 25.

GAP 26

- **GSA 28**
  - Auto Pilot Servo: Used for automatic control of pitch, roll, and yaw.

GSA 28

- **GEA 24**
  - Engine and Airframe Unit: Receives and processes signals from the engine and airframe sensors.

GEA 24
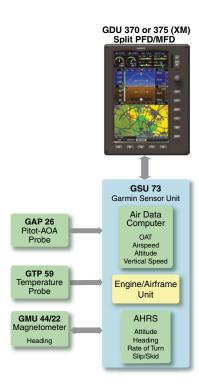
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- **GAD 29**
  - ARINC 429 interface: Transmits and receives ARINC 429 signals for interface to panel-mount IFR GPS navigators.
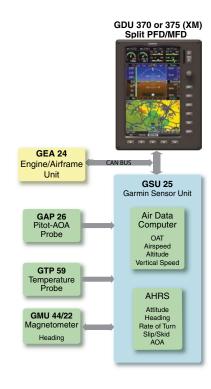
G3X SINGLE DISPLAY (EXAMPLES)

In the single display, split-screen configuration, the Primary Flight Display (PFD) and the Multi Function Display (MFD) are displayed in split-screen mode on a single GDU.

GDU 370 or 375 (XM)
Split PFD/MFD

GSU 73
Garmin Sensor Unit

GAP 26
Pitot-AOA
Probe

GTP 59
Temperature
Probe

GMU 44/22
Magnetometer

Heading

Air Data Computer
OAT
Airspeed
Altitude
Vertical Speed

Engine/Airframe Unit

AHRS
Attitude
Heading
Rate of Turn
Slip/Skid

G3X Standard Panel
(Split-Screen) (GSU 73)

GDU 370 or 375 (XM)
Split PFD/MFD

GEA 24
Engine/Airframe Unit

CAN BUS

GSU 25
Garmin Sensor Unit

GAP 26
Pitot-AOA
Probe

GTP 59
Temperature
Probe

GMU 44/22
Magnetometer

Heading

Air Data Computer
OAT
Airspeed
Altitude
Vertical Speed

AHRS
Attitude
Heading
Rate of Turn
Slip/Skid
AOA

G3X Standard Panel
(Split-Screen) (GSU 25)

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GDU 370 or 375 (XM)
Split PFD/MFD

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Air Data Computer

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Airspeed
Altitude
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Engine/Airframe Unit

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Attitude
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Rate of Turn
Slip/Skid

GAP 26
Pitot-AOA Probe

GTP 59
Temperature Probe

GMU 44/22
Magnetometer

Heading

GSU 25
Garmin Sensor Unit

Air Data Computer

OAT
Airspeed
Altitude
Vertical Speed

AHRS

Attitude
Heading
Rate of Turn
Slip/Skid
AOA

G3X Dual ADAHRS Example Install

> **NOTE:** The G3X can support as many as three ADAHRS units.
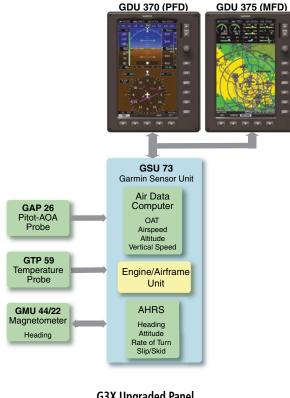
G3X DUAL DISPLAY (EXAMPLES)

NOTE: *The G3X System can be configured with more than two displays.*

A typical dual display panel would have the left GDU configured as a full-screen PFD and the right GDU configured as a full-screen MFD. The following is an example of an upgraded G3X panel using a GDU 370 and a GDU 375; however, two GDU 370s can be used if SiriusXM is not needed.

**G3X Upgraded Panel
(Full-Screen) (GSU 73)**

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GDU 370 (PFD)   **GDU 375 (MFD)**

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Garmin Sensor Unit

CAN BUS

GAP 26
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Probe

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Altitude
Vertical Speed

GEA 24
Engine/Airframe
Unit

GTP 59
Temperature
Probe

AHRS

Attitude
Heading
Rate of Turn
Slip/Skid
AOA

GMU 44/22
Magnetometer

Heading

**G3X Upgraded Panel
(Full-Screen) (GSU 25)**

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GDU 370 (PFD)   **GDU 375 (MFD)**

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Garmin Sensor Unit

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Probe

GTP 59
Temperature
Probe

GMU 44/22
Magnetometer

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GSU 25
Garmin Sensor Unit

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AOA

G3X Upgraded Panel Dual ADAHRS

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GDU 370 (PFD)　　　**GDU 375 (MFD)**

| GSU 25 Garmin Sensor Unit | GEA 24 Engine/Airframe Unit | GAD 29 ARINC 429 interface | GSU 25 Garmin Sensor Unit |

GSU 25
Garmin Sensor Unit

Air Data Computer

OAT
Airspeed
Altitude
Vertical Speed

GEA 24
Engine/Airframe Unit

GAD 29
ARINC 429 interface

GSU 25
Garmin Sensor Unit

Air Data Computer

OAT
Airspeed
Altitude
Vertical Speed

GAP 26
Pitot-AOA Probe

AHRS

Attitude
Heading
Rate of Turn
Slip/Skid
AOA

GTP 59
Temperature Probe

GMU 44/22
Magnetometer

Heading

AHRS

Attitude
Heading
Rate of Turn
Slip/Skid
AOA
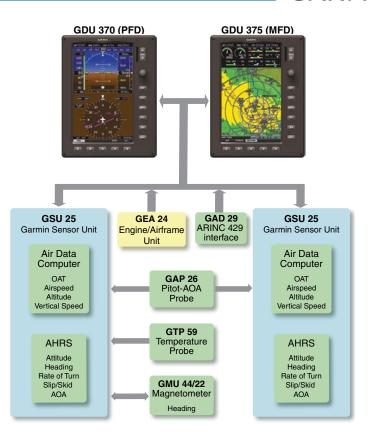
G3X Dual GSU 25 ADAHRS

SPLIT-SCREEN VS. FULL-SCREEN CONFIGURATIONS

Various combinations of split and full-screen configurations are available in systems with 2 or more GDUs. For example, a system with 2 GDUs (MFD and PFD1) can be configured to have a split-screen layout on PFD1, and a system with 3 GDUs (PFD1, MFD, PFD2) can be configured to have full-screen MFD pages displayed on PFD2 if desired.

EXTERNAL NAVIGATORS (OPTIONAL)

The G3X can also communicate with the following optional external navigators:

- SL30 Nav/Comm Transceiver

- SL40 Comm Transceiver

- GTR series Comm Transceiver

- GNC series Nav/Comm Transceiver

- GTN or GNS Series Units

USING THE G3X WITH AN EXTERNAL GPS NAVIGATOR

⚠️ **WARNING:** *Do not use the approach information provided by the VFR navigation database residing within the G3X as a means of navigating any instrument approach. The G3X VFR navigation database is limited to present only the waypoints for the final approach leg of a published procedure. These waypoints and associated course line are made available for monitoring purposes only.*

In a configuration which includes one or more external GPS navigators (i.e., GTN or GNS Series), the G3X displays the selected external GPS Navigator's flight plan and guidance information. When using an external GPS navigator with the G3X, press the **INTERNAL** Softkey on the Active Flight Plan Page or Direct-To Page to make changes to the active flight plan from the G3X. Press the **EXTERNAL** Softkey to return to the external GPS navigator's flight plan. When an external navigator is configured the internal GPS can still be used for VFR navigation.

✓ **NOTE:** *The G3X internal GPS flight plan is only for VFR use.*

CHANGING THE NAVIGATION SOURCE

When an external navigator that supports both GPS and VOR/ILS capabilities (i.e., GTN or GNS Series) is selected, the external navigator's **CDI** Key is used to switch the G3X HSI between GPS and VOR/ILS navigation.

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SELECTION BETWEEN MULTIPLE NAVIGATORS

The G3X **CDI SRC** Softkey (refer to Section 1.7) becomes available when more than one source of navigation data is configured. The **CDI SRC** Softkey toggles between the available navigation sources (e.g., between the internal G3X GPS and external SL30 VLOC sources, between an SL30 and a GNS 430, or between two GNS 430s, etc). Refer to the Flight Instruments section for more information.

USING MAPMX SERIAL DATA INPUT FORMAT

When using a WAAS enabled external GPS navigator (i.e., GNS 430W/530W, GNS 480 or any GTN Series navigator), and configuring an RS-232 input for 'MapMX' instead of 'Aviation In', a more accurate depiction of the flight plan legs are displayed on the moving map (i.e., holds, procedure turns, etc). Non-WAAS external navigators do not support MapMX. Refer to the G3X Installation Manual for more information.

EXTERNAL GPS NAVIGATOR FAILURE

In the event that all configured external GPS navigators fail, the G3X reverts to its internal VFR GPS for navigation and flight plan modifications.

AUTOMATIC FLIGHT CONTROL SYSTEM (OPTIONAL)

The G3X can also communicate with Garmin GSA 28, Garmin GMC 305 and various third-party autopilot units. With the AFCS configured, the G3X issues pitch and roll steering commands to the autopilot unit. Refer to Section 9 (AFCS) for more information.

1.2 DISPLAY OVERVIEW

7" WVGA (800x480) Color Display

SD Card Slot

Range (RNG) Key

FMS Joystick

Display Bezel

Hardkeys

Softkeys

Display Overview (Split-Screen)

1.3 SECURE DIGITAL (SD) CARDS

> **NOTE:** Refer to Appendix C for more information on SD Card use and databases.

The G3X data card slot uses Secure Digital (SD) cards and is located on the upper right side of the display bezel(s). The SD card can be used for software updates, checklist files, flight data logging, exporting Track Logs/User Waypoints, and Importing/Exporting Flight Plans.

GARMIN.
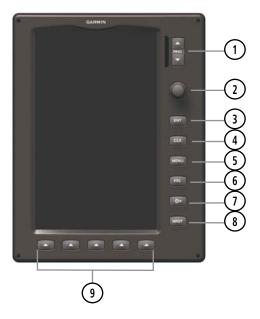
Installing an SD Card:

1) Insert the SD card in the SD card slot with the card contacts facing the display (the card should be flush with the face of the bezel).

2) To eject the card, gently press on the SD card to release the spring latch.

SD Card Slot

Display Bezel SD Card Slot

1.4 G3X CONTROLS

① RNG Key Press to increase or decrease the viewing range of the map
Press to increase or decrease the HSI Scale on the PFD or PFD Page

② FMS Joystick Press the **FMS** Joystick to toggle input focus between user interaction with the current page and the page navigation bar

Turn the **FMS** Joystick clockwise to access a drop down menu within the highlighted field

Turn the **FMS** Joystick to change the selected value within the highlighted field

Move the **FMS** Joystick (up, down, left, or right) to highlight a field

Move the **FMS** Joystick (up, down, left, right, or diagonally) to move the map pointer

With the **HDG** or **HDG/ROLL** Softkey selected, press and hold the **FMS** Joystick to sync to the current heading

With the appropriate autopilot mode selected, move the **FMS** Joystick (up/down) to adjust the mode reference for Vertical Speed, Altitude Hold, Target Airspeed for IAS mode (GMC 305 only), and Pitch Hold modes, or move the **FMS** Joystick (left/right) to decrease the mode reference for Roll Hold mode.

③ ENT Key Press to confirm menu selection or data entry
Press to acknowledge messages
Press and hold to mark a waypoint

④ CLR Key Press to cancel an entry, revert to the previous value in a data entry field or remove menus
Press and hold to return to the default page

⑤ MENU Key Press once to view the Page Menu
Press twice to view the Main Menu
Press a third time to clear the Main Menu
Press and hold to capture screen shot

⑥ FPL Key Press to display the Flight Plan Page

⑦ Direct-To Key Press to activate the Direct-To function, enter a destination waypoint and establish a direct course to the selected destination

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(8)	**NRST Key**	Press to display the Nearest Page for viewing the nearest airports, intersections, NDBs, VORs, waypoints, frequencies, and airspaces
(9)	**Softkey Selection Keys**	Press to select softkey shown above the bezel key on the display

1.5 SYSTEM POWER-UP

During system initialization, the AHRS displays the message 'AHRS ALIGN, KEEP WINGS LEVEL' over the attitude indicator. The AHRS should display valid attitude and heading fields typically within the first minute of power-up. The AHRS can align itself both while taxiing and during level flight.

System Initialization

Current database information is displayed during power-up including 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.

Database Information

Pressing the **ENT** Key acknowledges this information.

After acknowledgement of the database information, the pilot is prompted to acknowledge a data link weather advisory.

Data link Weather Advisory

Pressing the **ENT** Key acknowledges this information.

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1.6 SYSTEM OPERATION

✅ *NOTE: The G3X display operation can be configured from the DSPL Page in Config Mode (refer to the G3X Installation Manual for more information).*

DISPLAY OPERATION

✅ *NOTE: In a reversionary situation where failure occurs with all the GDUs configured to use their own internal GPS receivers, any remaining GDUs will attempt to approximate their position using GPS data from an external GPS navigator (if configured).*

In normal operating mode, the PFD presents graphical flight instrumentation (attitude, heading, airspeed, altitude, vertical speed), replacing the traditional flight instrument cluster.

- **Split-Screen Only**
  - The PFD occupies the top portion of the display at all times, and a full display PFD can be accessed by navigating to the PFD Page (see Section 1.7, Accessing System Functionality).
  - The MFD occupies the bottom portion of the display.

G3X Split-Screen Only (Normal Mode)

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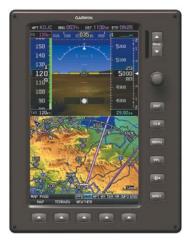
- **Full-Screen PFD/MFD Configuration (Normal Mode)**
  - In normal mode the displays can be configured to have a dedicated PFD and MFD or have an optional split-screen PFD.

G3X Full-Screen (Normal Mode)

G3X Normal Mode (Optional Split-Screen PFD)

- **Full-Screen PFD/MFD Configuration (Reversionary Mode)**

In the event of a display failure, the G3X System automatically switches to reversionary (backup) mode. In reversionary mode, all flight information is presented on the remaining display in the split-screen configuration.

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If a display failure occurs with the GDU 375, the **WX** and **XM** Pages will no longer be available since the XM receiver resides in the GDU 375.

G3X Full-Screen Reversionary Mode (Failed PFD)

- **Multi-Display (Normal Mode)**
    – In normal mode an example Multi-Display system includes a pilot-side PFD (PFD1), MFD, and co-pilot side PFD (PFD2). PFD1 can also be configured as a split-screen. PFD2 can be configured as a split-screen or PFD/MFD (full-screen PFD page and full-screen MFD pages without split-screen)

PFD1   MFD   PFD2

G3X Multi-display Normal Mode (example)

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• **Multi-Display (Reversionary Mode)**

If the system detects a failure in PFD1, the MFD enters reversionary mode. If the MFD fails, PFD1 and PFD2 enter reversionary mode. A failure of PFD2 is not considered an emergency and will not cause either of the remaining displays to enter reversionary mode.

PFD DISPLAY CONFIGURATION

If the system is configured for multiple GDUs, the pilot has the ability to change the layout of PFD1 between full-screen and split-screen in normal mode.

Changing the PFD1 Display Layout:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Display', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the PFD Display Layout field.

5) Turn the **FMS** Joystick to highlight 'Auto' or 'Split'.

6) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.

Changing the PFD2 Display Layout:

If the system is configured for multiple GDUs, the pilot has the ability to change the layout of PFD2 between full-screen PFD, split-screen, or full-screen PFD/MFD.

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Display', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the PFD2 Display Layout field.

5) Turn the **FMS** Joystick to highlight 'Auto', 'Split', or 'PFD/MFD'.

6) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.

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G3X SYSTEM ANNUNCIATIONS

When an LRU or an LRU function fails, a large red 'X' is typically displayed over the instrument(s) or data experiencing the failure (Refer to Appendix F, Abnormal Operation). Upon G3X power-up, certain instruments remain invalid as equipment begins to initialize. All instruments should be operational within one minute of power-up. If any instrument remains flagged, and it is not likely an installation related problem, the G3X should be serviced by a Garmin-authorized repair facility .
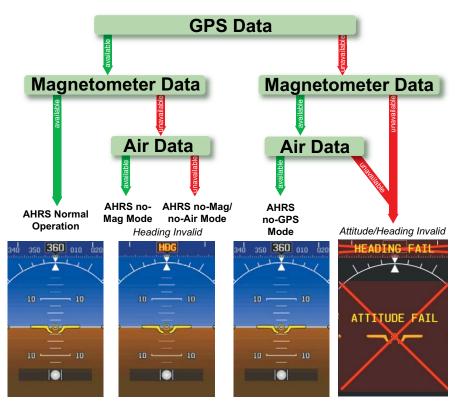
PFD Initialization

AHRS OPERATION

The Attitude and Heading Reference System (AHRS) performs attitude, heading, and vertical acceleration calculations for the G3X System, utilizing GPS, magnetometer, and air data in addition to information from its internal sensors. Attitude and heading information are updated on the PFD while the AHRS receives appropriate combinations of information from the external sensor inputs.

The AHRS (GSU 73 or GSU 25) corrects for shifts and variations in the Earth's magnetic field by applying the Magnetic Field Variation Database. The Magnetic Field Variation Database is derived from the International Geomagnetic Reference Field (IGRF). The IGRF is a mathematical model that describes the Earth's main magnetic field and its annual rate of change. The database is updated approximately every 5 years. Failure to update this database could lead to erroneous heading information being displayed to the pilot.

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Loss of GPS, magnetometer, or air data inputs is communicated to the pilot by message advisory alerts. Any failure of the internal AHRS inertial sensors results in loss of attitude and heading information (indicated by red 'X' flags over the corresponding flight instruments). If the G3X senses that the magnetic heading measurement is valid, but possibly outside of the internal accuracy limits, the numeric heading value on the PFD is displayed in yellow.

Uncertain Heading

If GPS input fails, the AHRS can continue to provide attitude and heading information to the PFD as long as magnetometer and airspeed data are available and valid.

If the magnetometer input fails, the AHRS continues to output valid attitude information; however, the heading output on the PFD Page is flagged as invalid with a red 'X'.

Failure of the air data input has no effect on the AHRS output while AHRS is receiving valid GPS information. Invalid/unavailable airspeed data in addition to GPS failure results in loss of all attitude and heading information. Likewise, loss of magnetometer (heading) data, in combination with loss of GPS data results in a loss of all attitude and heading information.

In installations that include multiple AHRS units (G3X supports up to three AHRS sources) if data from an AHRS source is lost the G3X will automatically switch sources, when a failure is detected. Reversionary sensor selection is annunciated in a window on the right side of the PFD. These annunciations reflect reversionary sensors selected on the PFD. Pressing the **Menu** Key while on the PFD page accesses the PFD Setup page, select the Sensors Softkey, turn the FMS Joystick to select the desired ADAHRS source (**AUTO**, **ADAHRS1**, **ADAHRS2, or ADAHRS3)** softkeys. This allows for manual switching of the ADAHRS sensors being viewed on the PFD. The GPS sensor cannot be switched manually.

In the example below a GSU 73 is configured as ADAHRS1 and a GSU 25 is configured as ADAHRS2. ADAHRS1 has failed, the system has auto filled the AHRS information from AHRS2 as annunciated in the Reversionary Sensor Window to the right of the HSI. Since the GSU 73 also processes the engine and airframe data, engine and airframe data is lost as indicated by the red 'Xs'.

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Reversionary Sensor Window

Dual AHRS

1.7 ACCESSING SYSTEM FUNCTIONALITY

MENUS

![note icon] *NOTE: Flight Log and Track Log must be accessed from the MFD in a Multiple Display system.*

The G3X has a dedicated **MENU** Key. Press once to display a context-sensitive list of options for the page or the dedicated PFD. Press twice to display the Main Menu.

The Page Menu allows the user to access additional features or make setting changes which specifically relate to the currently displayed page. The menu will display 'No Options' when there are no options for the page selected.

Navigating the page menu:

1) Press the **MENU** Key once to display the Page Menu.

2) Turn or move the **FMS** Joystick to scroll through a list of available options (a scroll bar always appears to the right of the window/box when the option list is longer than the window/box).

3) Press the **ENT** Key to select the desired option.

4) Press the **FMS** Joystick, **CLR** Key, or press the **MENU** Key twice to remove the menu and cancel the operation.

Page Menu (No Options)

TER Page Menu

Navigating the main menu:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to scroll through a list of available options (a scroll bar always appears to the right of the window/box when the option list is longer than the window/box).

3) Press the **ENT** Key to select the desired option.

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4) Press the **FMS** Joystick, **CLR** Key, **EXIT** Softkey, or press the **MENU** Key to remove the menu and cancel the operation.

Main Menu (Split-Screen)

Main Menu (Split-Screen PFD)

Main Menu (Full-Screen MFD)

DATA ENTRY

The **FMS** Joystick can be used for directly entering alphanumeric data into the G3X. In some instances, such as when entering an identifier, the G3X tries to predict the desired identifier based on the characters being entered. In this case, if the desired identifier appears, use the **ENT** Key to confirm the entry without entering the rest of the identifier manually. This can save the pilot from having to enter all the characters of the identifier.

Besides character-by-character data entry, the system also provides a shortcut for entering waypoint identifiers. When the cursor is on a field awaiting entry of a waypoint identifier, turning the **FMS** Joystick counter-clockwise accesses a menu with three different lists of identifiers for quick selections: recent waypoints (RECENT WPTS), nearest airports (NRST APTS), and flight plan waypoints (FPL WPTS). The G3X automatically fills in the identifier, facility, and city fields with the information for the selected waypoint.

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Using the FMS Joystick to enter data:

1) Press the **FMS** Joystick to activate the cursor.

2) Move the **FMS** Joystick to highlight the desired field.

3) Begin entering data.

   a) To quickly enter a waypoint identifier, turn the **FMS** Joystick counter-clockwise to display a list of recent waypoints (RECENT WPTS), nearest airports (NRST APTS) or flight plan waypoints (FPL WPTS).

   b) Move the **FMS** Joystick to highlight the desired waypoint from the list and press the **ENT** Key.

Waypoint Entry on Waypoint Page (Split-Screen)

Or:

   a) Turn the **FMS** Joystick clockwise to select a character for the first placeholder.

Data Entry

Turning the **FMS** Joystick clockwise scrolls through the alphabet (where appropriate) toward the letter Z, starting in the middle at K (US only), and the digits zero through nine. Turning the **FMS** Joystick counter-clockwise scrolls in the opposite direction.

   b) Use the **FMS** Joystick to move the cursor to the next placeholder in the field.

c) Repeat, turning the **FMS** Joystick to select a character and then moving the **FMS** Joystick to move the cursor, until the fields are complete.

d) Press the **ENT** Key to confirm entry.

Or:

Press the **FMS** Joystick or the **CLR** Key to cancel data entry (the field reverts back to its previous information).

PAGES

The Main Pages, Flight Plan Pages, and Nearest Pages are linked together in a series that you can cycle through using the **FMS** Joystick. A page navigation bar is displayed on the lower portion of the display, directly above the softkey bar. The right side of the page navigation bar shows a list of abbreviated names for each of the pages, and the left side shows the name of the current page.

Press the **FMS** Joystick to toggle input focus between the Page Navigation Bar and interaction with the current page (i.e., turning the page cursor on/off). When the Page Navigation Bar is highlighted blue, the user can cycle through the pages using the **FMS** Joystick. If the Page Navigation Bar is not highlighted blue, the user can interact with the current page (if available).

On the split-screen example below, the PFD occupies the top portion of the display while the selected page occupies the bottom portion of the display.

Selected Page

**Input Focus on Page Navigation Bar
(Page Cursor Off)**

**Input Focus on Current Page
(Page Cursor On)**

Active Page Title

Page Navigation (Split-Screen)

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MAIN PAGES

✓ *NOTE: Contact Vertical Power for more information regarding the VPX Page.*

There are up to nine Main Pages that can be navigated using the **FMS** Joystick. The Traffic (TRF) Page can be displayed or removed from the Display Setup menu.

Selecting a main page using the FMS Joystick:

1) If necessary, press the **FMS** Joystick to begin interaction with the Page Navigation Bar.

2) Turn the **FMS** Joystick until the desired page is selected (**PFD** (split-screen only), **MAP**, **WPT**, **WX**, **TER**, **TRF** (optional) **XM**, **INFO**, **ENG**).

- **Main Pages**

PFD Page (PFD) (split-screen)   Traffic Page (TRF)

Map Page (MAP)   XM Audio Page (XM) (optional)

Waypoint Page (WPT)   Vertical Power (VP-X) (optional)

Weather Page (WX) (optional)   Info Page (INFO)

Terrain Page (TER)   Engine Page (ENG)

Main Pages (Split-Screen)

Displaying/Removing the Traffic Page:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Display', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the Traffic Page field.

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5) Turn the **FMS** Joystick to highlight 'Show' or 'Hide'.

6) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.

FLIGHT PLAN AND NEAREST PAGES

The Flight Plan and Nearest Pages are selected by pressing the **FPL** Key or **NRST** Key.

Selecting the FPL or NRST pages:

1) Press the **FPL** or **NRST** Key.

2) Turn the **FMS** Joystick until the desired page is selected.

3) To return to the Main Pages, press the **EXIT** Softkey.

The Nearest Pages contain the following information.

• APT (Airport)—identifier, bearing, distance, length of the longest runway, and common traffic advisory (CTAF) or tower frequency.

• WX (Airport Weather) (GDU 375 Only)—identifier, bearing, distance, METAR text, and ATIS, AWOS, or ASOS frequency.

• VOR (VHF Omnidirectional Radio Beacon)—identifier, facility type (symbol), bearing, distance, and frequency.

• NDB (Non Directional Beacons)—identifier, facility, type (symbol), bearing, distance, and frequency.

• INT (Intersection)—identifier, bearing, and distance.

• VRP (Visual Reporting Point) (Atlantic)—identifier, bearing, and distance.

• USR (User Waypoints)—name, bearing, and distance.

• CTY (City)—name, bearing, and distance.

• ATC (Air Route Traffic Control Center)—bearing, distance, and frequency.

• FSS (Flight Service Station)—name, bearing, distance, frequency, and VOR (if applicable).

• ASPC (Airspace)—name, time to entry (when applicable), and status.

• **Nearest Pages (NRST)**

Nearest Airports (APT)   Nearest User Waypoints (USR)

Nearest Airport Weather (WX) (GDU 375)   Nearest Cities (CTY)

Nearest VORs (VOR)   Nearest ARTCC (ATC)

Nearest NDBs (NDB)   Nearest FSS (FSS)

Nearest Intersections (INT)   Nearest Airspace (ASPC)

Visual Reporting Point (VRP) (Atlantic)

Nearest Pages (Split-Screen)

- **Flight Planning Pages (FPL)**

Active Flight Plan (ACTV)   Vertical Navigation (VNAV)

Flight Plan List (LIST) (only available from the MFD in two display system)

Flight Planning Pages (Split-Screen)

MAIN PAGE SOFTKEYS
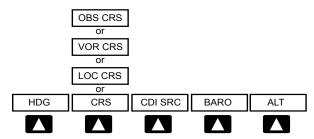
The softkeys are located along the bottom of the display(s). The softkeys shown depend on the softkey level or page being displayed. The bezel keys below the softkeys can be used to select the appropriate softkey. When a softkey is selected, its color undergoes a momentary change to black text on blue background then automatically switches to black text on gray background and remains this way until it is turned off, at which time it reverts to white text on black background. When a softkey function is disabled, the softkey label is subdued (dimmed).

Softkey On

Softkey Names (Displayed)

Bezel Mounted Softkeys (Press)

Softkeys (WPT Page)

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OBS CRS
or
VOR CRS
or
LOC CRS
or

HDG	CRS	CDI SRC	BARO	ALT
▲	▲	▲	▲	▲

HDG   Allows the pilot to adjust the heading bug

CRS (subdued)   A navigation source is not selected

or

OBS CRS   Allows the pilot to adjust the OBS course

or

VOR CRS   Allows the pilot to adjust the VOR course

or

LOC CRS   Allows the pilot to adjust the localizer course
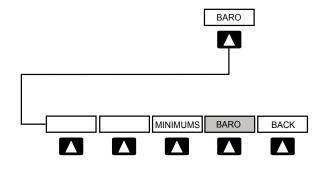
CDI SRC   Toggles between available NAV sources (when configured)

BARO   Allows the pilot to change the barometric setting and enables the second-level BARO Softkeys

ALT   Allows the pilot to adjust the selected altitude

BARO
▲

		MINIMUMS	BARO	BACK
▲	▲	▲	▲	▲

MINIMUMS   Allows the pilot to set or clear the barometric minimums altitude reminder
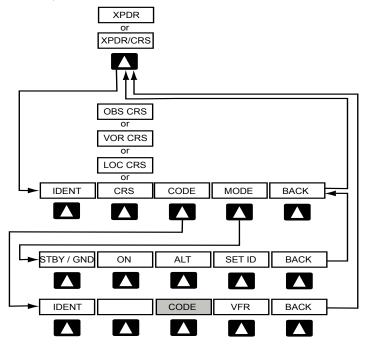
BARO   Allows the pilot to change the barometric setting

BACK   Returns to top-level softkeys

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OPTIONAL TRANSPONDER SOFTKEY

With a remote transponder configured, the #2 PFD Softkey becomes **XPDR** (if a navigation source is not selected) or **XPDR/CRS** (when the pilot can control the navigation course).

IDENT		Sends a distinct identity indication to Air Traffic Control (ATC).		

IDENT   Sends a distinct identity indication to Air Traffic Control (ATC).

CRS (subdued)   A navigation source is not selected
or

OBS CRS   Allows the pilot to adjust the OBS course
or

VOR CRS   Allows the pilot to adjust the VOR course
or

LOC CRS   Allows the pilot to adjust the localizer course

CODE   Allows the pilot to enter the transponder code and displays the second-level **CODE** softkeys

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MODE	Displays second-level **MODE** softkeys
BACK	Returns to top-level softkeys

CODE Softkey selected

IDENT	Sends a distinct identity indication to Air Traffic Control (ATC).
CODE	Returns to top-level softkeys
VFR	The pre-programmed VFR code is automatically displayed in the code field of the Transponder Data Box. Pressing the **VFR** softkey again restores the previous identification code.
BACK or DONE	Returns to top-level softkeys

MODE Softkey selected

STBY	Selects the standby mode. When in standby mode, the remote transponder will not reply to any interrogations. Press and hold to put the transponder in Ground (GND) Mode. Ground Mode is normally selected automatically when the aircraft is on the ground.
ON	Generates Mode A and Mode S replies, but Mode C altitude reporting is inhibited.
ALT	Selects ALT Mode. All transponder replies requesting altitude information are provided with pressure altitude information.
SET ID	Allows the pilot to set the Flight ID. (The Flight ID must be configured to 'Set By Pilot' for the **SET ID** softkey to be displayed).
BACK	Returns to previous level softkeys

OPTIONAL INTEGRATED AUTOPILOT INTERFACE SOFTKEYS

With an autopilot configured, the #1 PFD Softkey becomes **HDG/ROLL** and the #5 PFD Softkey becomes **ALT/PTCH**.

> **NOTE:** *Optional Integrated Autopilot Interface Softkeys are not available when a GMC 305 is operating as part of the AFCS system.*

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HDG/ROLL Softkey selected

HDG/ROLL	Initial press allows the pilot to adjust the heading bug and displays lateral mode softkeys; subsequent press returns to top-level softkeys
AP HDG	Selects/deselects heading mode
AP NAV	Selects/deselects navigation mode. Cancels GS Mode if LOC Mode is either active or armed. Cancels GP Mode if GPS Mode is either active or armed. Cancels LOC Mode if GPS Mode is active and LOC Mode is armed.
ALT/PTCH	Initial press allows the pilot to adjust the selected altitude and displays the vertical mode softkeys; subsequent press returns to top-level softkeys

ALT/PTCH Softkey selected

HDG/ROLL	Initial press allows the pilot to adjust the heading bug and displays lateral mode softkeys; subsequent press returns to top-level softkeys
AP VNAV	Selects/deselects altitude hold mode
or	
AP APPR	Selects/deselects approach mode
AP VS	Selects/deselects vertical speed mode
AP ALT	Selects/deselects altitude hold mode

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ALT/PTCH   Initial press allows the pilot to adjust the selected altitude and displays the vertical mode softkeys; subsequent press returns to top-level softkeys

MAP PAGE SOFTKEYS

| MAP | TERRAIN | WEATHER | TRAFFIC | |
| ▲ | ▲ | ▲ | ▲ | ▲ |
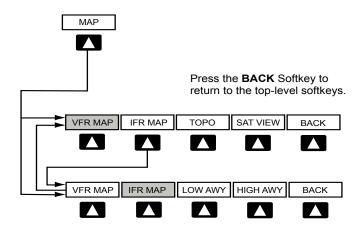
MAP   Enables second-level Map Page softkeys
TERRAIN   Displays/removes terrain awareness information
WEATHER   Displays/removes weather information
TRAFFIC   Displays/removes traffic information

| MAP |
| ▲ |

Press the **BACK** Softkey to return to the top-level softkeys.

| VFR MAP | IFR MAP | TOPO | SAT VIEW | BACK |
| ▲ | ▲ | ▲ | ▲ | ▲ |

| VFR MAP | IFR MAP | LOW AWY | HIGH AWY | BACK |
| ▲ | ▲ | ▲ | ▲ | ▲ |

VFR MAP Softkey selected

IFR MAP   Displays IFR map information and softkeys
TOPO   Displays/removes topographical terrain shading
SAT VIEW   Displays/removes satellite imagery (above 20nm scale)
BACK   Returns to top-level softkeys

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IFR MAP Softkey selected
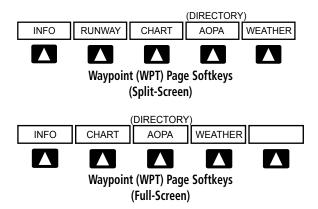
VFR MAP	Displays VFR map information and softkeys
LOW AWY	Low Altitude (Victor) Airways displayed
HIGH AWY	High Altitude Airways (Jet Routes) displayed
BACK	Returns to top-level softkeys

WAYPOINT PAGE SOFTKEYS

(DIRECTORY)

INFO	RUNWAY	CHART	AOPA	WEATHER

**Waypoint (WPT) Page Softkeys
(Split-Screen)**

(DIRECTORY)

INFO	CHART	AOPA	WEATHER	

**Waypoint (WPT) Page Softkeys
(Full-Screen)**
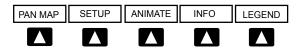
INFO	Displays waypoint information
RUNWAY	Displays runway information (split-screen only)
CHART	Displays optional FliteCharts
AOPA or DIRECTORY	Displays airport directory information
WEATHER	Displays METAR and TAF text (optional)

WEATHER PAGE SOFTKEYS (OPTIONAL)

PAN MAP	SETUP	ANIMATE	INFO	LEGEND

PAN MAP	Activates the map pointer for panning the map
SETUP	Select the weather source (XM or FIS-B).
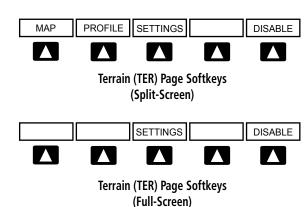
ANIMATE	Animates NEXRAD Radar and Satellite Mosaic weather
INFO	Displays XM Information
LEGEND	Displays weather legends

TERRAIN PAGE SOFTKEYS

| MAP | PROFILE | SETTINGS | | DISABLE |

Terrain (TER) Page Softkeys (Split-Screen)

| | | SETTINGS | | DISABLE |

Terrain (TER) Page Softkeys (Full-Screen)
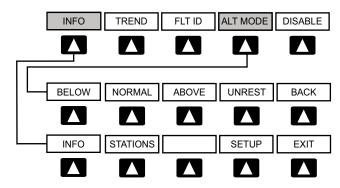
MAP	Displays the Terrain Page Map View
PROFILE	Displays the Terrain Page Profile View.
SETTINGS	Displays the Terrain Setup Page
DISABLE	Toggles terrain alerts on/off.

TRAFFIC PAGE SOFTKEYS (OPTIONAL GDL 39 OR GTS 800)

| INFO | TREND | FLT ID | ALT MODE | DISABLE |

| BELOW | NORMAL | ABOVE | UNREST | BACK |

| INFO | STATIONS | | SETUP | EXIT |

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INFO	Select to view Data Link and Weather info
TREND	Displays TargetTrend™ traffic vectors (GDL 39 only).
FLT ID	Displays FLT ID information.
ALT MODE	Select to set altitude mode.
DISABLE	Temporarly disables traffic alerts

ALT MODE Softkey selected

BELOW	Displays non-threat and proximity traffic from 2700 feet above the aircraft to 9000 feet below the aircraft. Typically used during descent phase of flight.
NORMAL	Displays non-threat and proximity traffic from 2700 feet above the aircraft to 2700 feet below the aircraft. Typically used during enroute phase of flight.
ABOVE	Displays non-threat and proximity traffic from 9000 feet above the aircraft to 2700 feet above the aircraft. Typically used during enroute phase of flight.
UNREST	(Unrestricted): All traffic is displayed.

INFO Softkey selected

INFO	Displays Device, status, GPS position, pressure altitude, ground uplink signal, TIS-B uplink signal, and air-to-air traffic information.
WEATHER	Displays weather product status.

XM AUDIO PAGE SOFTKEYS (OPTIONAL)

INFO	CATEGORY	CHANNEL	FAVORITE	VOLUME
▲	▲	▲	▲	▲

INFO	Displays XM Information
CATEGORY	Highlights the Category field
CHANNEL	Highlights the Channels field
FAVORITE	Displays a list of favorite channels

VOLUME   Enables second-level VOLUME softkeys

Press and hold to toggle Mute on/off.

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VOLUME

Press the **BACK** Softkey to
return to the top-level softkeys.

| | VOL - | VOL + | MUTE | BACK |

VOL -   Decreases XM audio volume

VOL +   Increases XM audio volume

MUTE   Toggles XM audio on/off

BACK   Returns to top-level softkeys

INFO PAGE SOFTKEY

| | | | | MESSAGES |

MESSAGES   Displays system status messages
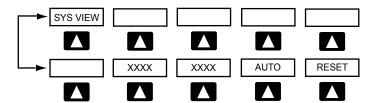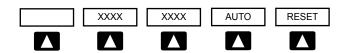
VP-X PAGE SOFTKEYS (OPTIONAL)

**Vertical Power (VPX) Softkeys
(Split-Screen)**

**Vertical Power (VPX) Softkeys
(Full-Screen)**

SYS VIEW	SYS VIEW is only available on a Split-Screen installation and toggles between a list of configured devices and the schematic showing the connected devices.
XXXX	Device Sensitive Softkey (e.g., 'ON', 'TRIM UP', 'TRIM L', or 'FLAPS UP')
XXXX	Device Sensitive Softkey (e.g., 'OFF', 'TRIM DN', 'TRIM R', or 'FLAPS DN')
AUTO	Only appears when the landing light is selected and it has been configured for 'wig-wag'.
RESET	Only available when the selected device is in a fault condition. Select RESET to reset the device, similar to resetting a circuit breaker.
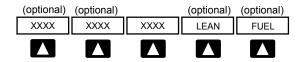
ENG PAGE SOFTKEYS (EXAMPLE CONFIGURATION)

NOTE: The Engine (ENG) Page softkeys displayed are dependant on the configuration. Refer to the G3X Installation Manual for information on configuring the Engine Page.

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If the Engine Page information configured exceeds one page, additional engine gauges may be distributed among the 1st, 2nd, and 3rd softkeys as required.

(optional)	(optional)		(optional)	(optional)
XXXX	XXXX	XXXX	LEAN	FUEL
▲	▲	▲	▲	▲
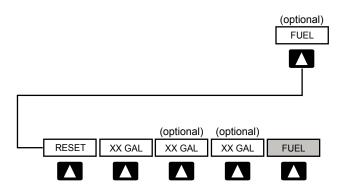
MAIN, TEMPS — Displays main engine gauges (optional)

AUX, AUX1, AUX2, ELEC, TRIM, TEMPS — Displays additional engine gauges as required (optional)

LEAN — Activates/deactivates Lean Assist (optional)

FUEL — Displays Fuel Calculator (optional)

| (optional) |
| FUEL |
| ▲ |

		(optional)	(optional)	
RESET	XX GAL	XX GAL	XX GAL	FUEL
▲	▲	▲	▲	▲

RESET — Resets fuel used to zero and fuel remaining to full tanks

XX GAL — Sets fuel remaining to the full tank quantity where XX is the airframe specific full fuel quantity

XX GAL — Sets fuel remaining to a partial tank quantity (i.e., filler neck tab) where XX is an airframe specific partial fuel quantity (optional)

XX GAL — Sets fuel remaining to a partial tank quantity (i.e., filler neck tab) where XX is an airframe specific partial fuel quantity (optional)

FUEL — Returns to top-level softkeys

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FLIGHT PLANNING SOFTKEYS

ACTIVE FLIGHT PLAN PAGE SOFTKEYS

USE MAP	SEL APPR	INTERNAL	EXTERNAL	EXIT

USE MAP	Activates the Map Pointer
SEL APPR	Displays the Select Approach Window
INTERNAL	(Optional) Allows the pilot to select the internal GPS flight plan source.
EXTERNAL	(Optional) Allows the pilot to select the external GPS flight plan source.
EXIT	Exits the Flight Plan Pages

FLIGHT PLAN LIST PAGE SOFTKEYS

ACTIVATE	NEW	IMPORT	EXPORT	EXIT

ACTIVATE	Displays the 'Activate Flight Plan?' Window
NEW	Displays the 'New Flight Plan' Window
IMPORT	Displays the available flight plans to import from the SD Card
EXPORT	Exports the selected flight plan
EXIT	Exits the Flight Plan Pages
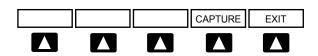
VERTICAL NAVIGATION (VNAV) PAGE SOFTKEYS

			CAPTURE	EXIT

| CAPTURE | Captures/cancels VNAV profile |
| EXIT | Exits the Flight Plan Pages |

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NEAREST PAGE SOFTKEYS

NEAREST AIRPORT PAGE SOFTKEYS

	PRIVATE	HELIPORT		EXIT
▲	▲	▲	▲	▲

PRIVATE   Displays/removes the nearest private airports

HELIPORT   Displays/removes the nearest heliports

EXIT   Exits the Nearest Pages

Various softkeys revert to the previous level after 45 seconds of inactivity (e.g., PAN MAP, VOLUME, etc), other softkeys require manual de-selection (e.g., TERRAIN, WEATHER, PANEL, etc.).

1.8 ACCESSING THE INFORMATION (INFO) PAGE

✓ **NOTE:** *Refer to Section 10.2 for the INFO Page System Status Messages.*

✓ **NOTE:** *A System Status Message and the word 'External' appearing next to the GPS Status indicates that the display connected to the GPS antenna is unavailable and the remaining display(s) are using the external GPS navigator for 2D GPS position data. In this case, the data collected from the external navigator is not considered a sufficient source of GPS data by the GSU 73 AHRS.*

VIEWING GPS RECEIVER STATUS

Internal system checking is performed to ensure the GPS receiver is providing accurate data to the GDU(s).

The G3X GDUs can be configured to share GPS information (refer to the G3X Installation Manual for configuration information). For example, a GDU can be configured to share its GPS position, velocity, and time data with another GDU. If a GDU is not using its own GPS receiver, the name of the GDU providing the data (i.e.,

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'3D GPS Location (PFD)' or '3D GPS Location (MFD)') is displayed following the GPS Status text on the INFO Page.

The GPS Status will display one of the following conditions:

• Autolocate—Receiver is looking for any satellite whose almanac has been collected, which can take up to 5 minutes

• Searching the Sky—Receiver is looking for satellites

• Acquiring Satellites—Receiver is looking for and collecting data from satellites visible at its last known or initialized location, but has not acquired a fix

• 2D GPS Location—At least three satellites have been acquired and a two-dimensional location fix has been calculated. "2D Differential" appears when you are receiving DGPS corrections in 2D mode

• 3D GPS Location—At least four satellites have been acquired and a three-dimensional fix has been calculated. "3D Differential" appears when you are receiving DGPS corrections in 3D mode

• Lost Satellite Reception—the receiver is no longer tracking enough satellites for a 2D or 3D fix

GPS Status, Position, and Data Fields (full-screen only) can be accessed from the Information Page.

INFO Page (Split-Screen)

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NEXT WPT	DIST NEXT	ETE NEXT	VNAV TIME
GARMN	6.2ɴᴍ	__:__	__:__
FLT TIMER	**FUEL TIMER**	**ETA NEXT**	**DTK**
00:00	__:__	__:__ᴀᴍ	023°ᴛ
GPS ALT	**SUNRISE**	**SUNSET**	**EXT VOLTS**
1075ꜰᴛ	5:54ᴀᴍ	8:48ᴘᴍ	13.8ᴠ

Data Fields

Constellation Diagram

PRN Number

45° Above Horizon

Horizon

Reference Waypoint

Receiver Status

Signal Strength Bars

GPS STATUS — 3D GPS LOCATION (PFD)

11 14 16 20 23 29 30 31 32 33 -- --
DATE 23-JUN-09   TIME 1:08:24PM
18:08ᴜᴛᴄ

POSITION
N 38°51.343' W094°47.928'   ACCURACY 10ꜰᴛ
FROM JOHNSON CO EXECUTIVE (KOJC):
2.9ɴᴍ W 280°ᴛ

INFO PAGE   MAP WPT WX TER XM **INFO** ENG
MESSAGES

INFO Page (Full Screen)

Viewing GPS receiver status information:

1) If necessary press the **FMS** Joystick to begin interaction with the Navigation Bar.

2) Turn the **FMS** Joystick until the Info Page is selected.

NEW LOCATION

The 'New Location' menu option on the **INFO** Page is used when the GPS Receiver is having trouble finding the satellites it expects to be there.

Entering a new location:

1) From the **INFO** Page, while the unit is searching for satellites, press the **MENU** Key.

2) With 'New Location' menu option highlighted, press the **INFO** Key.

3) Move the **FMS** Joystick to highlight 'Use Map' or 'Use Identifier', and press the **ENT** Key.

4) After selecting your approximate position using the map pointer or entering an identifier, press the **ENT** Key.

5) The GPS Receiver will begin a new search based on the location entered.

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ACQUIRING SATELLITES

When the receiver is in the process of acquiring enough satellite signals for navigation, the receiver uses satellite orbital data (collected continuously from the satellites) and last known position to determine the satellites that should be in view. "Acquiring Satellites" is indicated as the solution until a sufficient number of satellites have been acquired for computing a solution.

When the receiver is in the process of acquiring a 3D differential GPS solution, "3D GPS Location" is indicated as the solution until the 3D differential fix has finished acquisition.

SATELLITE INFORMATION

Satellites currently in view are shown at their respective positions on a satellite constellation diagram. The outer circle of the constellation diagram represents the horizon, the inner circle represents 45° above the horizon, and the center point shows the position directly overhead. Each satellite is represented by a square containing the Pseudo-Random Noise (PRN) number (i.e., satellite identification number).

The **INFO** Page can be helpful in troubleshooting weak (or missing) signal levels due to poor satellite coverage or installation problems. As the GPS receiver locks onto satellites, a signal strength bar is displayed for each satellite in view, with the appropriate satellite PRN number (01-32 or 33-64 for WAAS) below each bar. The progress of satellite acquisition is shown in three stages, as indicated by signal bar appearance:

- No bar—Receiver is looking for the indicated satellite
- Gray bar—Receiver has collected the necessary data and the satellite signal can be used
- Green bar—Satellite is being used for the GPS solution

POSITION

The Position box on the **INFO** Page displays latitude, longitude, accuracy (in feet), reference waypoint, type, distance, direction, and bearing. The reference waypoint is designed to display the current position in relation to a prominent landmark. The pilot can change the reference waypoint 'Nearest Type' using the 'Change Nearest Type' page menu option. By default the Nearest Type is set to 'Automatic', which will display the nearest large airport, enroute VOR, or city (in that order).

Position Information on INFO Page (Split-Screen)

Changing the Nearest Type:

1) From the Info Page press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Change Nearest Type' and press the **ENT** Key.

3) Move the **FMS** Joystick to highlight the desired nearest type option (Automatic, Airport, VOR, NDB, Intersection, City, Waypoint), and press the **ENT** Key.

INFO Page Menu

Nearest Type Menu

SHOW/HIDE LAT/LON ON THE INFO PAGE

If the Location Format selected on the Position Setup Page (refer to Appendix D, Map Datum and Location Formats) is not set to a Lat/Lon format, a new menu option 'Show/Hide Lat/Lon' will appear on the **INFO** Page. Selecting 'Show Lat/Lon' allows simultaneous display of the current position in both the selected location format as well as Lat/Lon format.
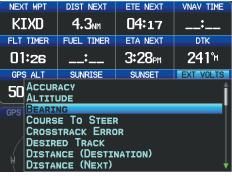
DATA FIELDS AND LAYOUT (FULL-SCREEN MFD)

The page layout and Data Fields of the full-screen Info Page can be independently configured by the user. Refer to the Annunciations and Alerts Section for a list of available Info Page Data Field options.

Changing the Info Page Data Fields (Full-Screen):

1) From the Info Page press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Change Data Fields' and press the **ENT** Key. The cursor is displayed on the first Data Field.

3) Move the **FMS** Joystick to highlight the desired Data Field.

4) Turn the **FMS** Joystick to access a list of available Data Field options.

5) Turn or move the **FMS** Joystick to highlight the desired Data Field, and press the **ENT** Key.

INFO Page Menu   **Data Field Options**

Changing the Info Page layout:

1) From the Info Page press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Select Page Layout' and press the **ENT** Key.

3) Move the **FMS** Joystick to highlight the desired page layout option (1 Row, 2 Rows, 3 Rows), and press the **ENT** Key.

1.9 SYSTEM SETTINGS

The System Setup option in the Main Menu allows management of the following system parameters:

- Transponder (optional)
- Data Bar Fields
- Display
- Sound
- Units
- Date & Time
- Position
- Alarms

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```
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  DATA BAR FIELDS
  DISPLAY
  SOUND
  UNITS
  DATE & TIME
  POSITION
```

System Setup Menu (Split-Screen)

Restoring system setting defaults:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight the desired menu option (Data Bar Fields, Display, Date & Time, Position, or Alarms), and press the **ENT** Key.

4) Press the **MENU** Key.

5) With 'Restore Default' highlighted press the **ENT** Key.

TRANSPONDER

If configured to 'Set By Pilot' in configuration mode, (refer to the Installation Manual for configuration information) the pilot can change the Flight ID and enable/disable ADS-B Transmit from the Transponder Setup Page.

Setting the Flight ID:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Transponder', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the 'Flight ID' Field.

5) Use the **FMS** Joystick to enter the desired Flight ID and press the **ENT** Key.

Enabling/disabling ADS-B Transmit:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Transponder', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the 'ADS-B Transmit' Field.

5) Turn the **FMS** Joystick to highlight 'Enabled' or 'Disabled'.

6) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.
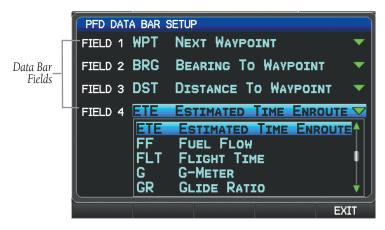
DATA BAR FIELDS

The content of the four data bar fields are independently configured by the user. The full-screen MFD and PFD Data Bar Fields are independently configured from each display.

Data Bar (Split-Screen)

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Data Bar Fields

Data Bar Setup Page (Split-Screen)

By default, the split-screen PFD Page data bar fields and the full-screen PFD data bar fields are set to display Next Waypoint (WPT), Bearing to Waypoint (BRG), Distance to Waypoint (DIS), and Estimated Time Enroute (ETE). The full-screen MFD data bar fields default to Ground Speed (GS), Ground Track (TRK), Minimum Safe Altitude (MSA), and Vertical Speed Required (VSR). These four data fields can be changed to display any of the Data Bar Field Options. Refer to the Annunciations and Alerts Section for a list of available Data Bar Field options.

Changing the information shown in the data bar fields:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) With 'Data Bar Fields' highlighted, press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the desired 'Field'.

5) Turn the **FMS** Joystick to access the list of options, then turn or move the **FMS** Joystick to highlight the desired option and press the **ENT** Key.

6) To restore defaults, press the **MENU** Key. With 'Restore Default' highlighted, press the **ENT** Key.

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ADDITIONAL DATA BAR INFORMATION

If more than one GPS Navigator is configured, the active GPS Navigator is displayed in magenta in the upper left corner of the Data Bar.

Data Fields Using External Navigator 1 (GPS1)

Data Bar (GPS1)

'INT' is displayed in cyan and 'GPS' is displayed in magenta in the upper left corner of the Data Bar when one or more GPS Navigators are configured and the pilot elects to use the internal GPS navigation source.

Using Internal GPS Flight Plan

Internal Flight Plan Indication

'REV' is displayed in yellow and 'GPS' is displayed in magenta in the upper left corner of the Data Bar when all external GPS navigation sources fail.

External GPS Failure. Reverted to Internal GPS

External GPS Navigation Failure

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![Garmin logo]

DISPLAY

The Backlight Intensity (display brightness) can be set to 'Auto' or 'Manual'. 'Auto' sets the Backlight Intensity based on the aircraft's instrument lighting bus voltage. With 'Manual' selected, the pilot can manually adjust the desired backlight intensity (1-10). After each power cycle the Backlight Intensity is set to the default, which is configurable. Refer to the G3X Installation Manual for more information.

'EIS Display Location' Menu Option ————

DISPLAY SETUP		
BACKLIGHT INTENSITY	◄ AUTO ►	100%
COLOR MODE	◄ AUTO ►	
PFD DISPLAY LAYOUT	◄ AUTO ►	
EIS DISPLAY LOCATION	◄ AUTO ►	
TRAFFIC PAGE	◄ SHOW ►	
SCREENSHOT	◄ DISABLED ►	

Display Setup Page

Adjusting backlight intensity:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Display', and press the **ENT** Key.

4) Turn the **FMS** Joystick to highlight 'Auto'.

   Or:

   a) Turn the **FMS** Joystick to highlight 'Manual'.

   b) Move the **FMS** Joystick to highlight the desired Backlight Intensity (1-10).

5) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.

COLOR MODE

The Color Mode setting is used to adjust the color brightness used on the map and synthetic vision display for day or night use.

Adjusting the color mode:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Display', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the Color Mode field.

5) Turn the **FMS** Joystick to highlight 'Day', 'Night', or 'Auto'.

6) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.

Setting the Startup Page

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Display', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the Startup Page field.

5) Turn the **FMS** Joystick to highlight the desired Startup Page.

EIS DISPLAY LOCATION (OPTIONAL)

In Configuration Mode the 'EIS Display Location' setting can be set to one of the following:

- AUTO—Displays the EIS Strip on the MFD, or on the PFD1 (and PFD2 if applicable) if the MFD is not displayed.

- PFD—Always displays the EIS Strip on PFD1 (and PFD2 if applicable).

- User Selected—Enables the user to choose between 'AUTO' and 'PFD' via the Display Setup menu.

For more information on how to enable the 'EIS Display Location' setting in Configuration Mode refer to the G3X Installation Manual.

'EIS Display Location' Menu Option

Display Setup Page

Changing the EIS display location:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Display', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the EIS Display Location field.

5) Turn the **FMS** Joystick to highlight 'Auto' or 'PFD'.

6) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.

SCREENSHOT

Enabling/disabling screenshots:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Display', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the Screenshot field.

5) Turn the **FMS** Joystick to highlight 'Enabled' or 'Disabled'.

Saving a Screenshot:

1) With screenshots enabled (see above), navigate to the desired screen.

2) Press and hold the **MENU** Key until the screen flashes indicating the screenshot was saved to the SD Card.

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SOUND

The pilot can manually adjust the desired XM Volume (0-10), Message Volume (Off or 1-10), Altitude Alert (On/Off), and Minimums Alert (On/Off). Message Volume controls the banner message tones (e.g., "Approaching Airspace" or "Arriving at Waypoint"). Alert Volume (e.g., terrain, traffic, autopilot, etc.) is set in configuration mode (refer to the G3X Installation Manual for more information).

SOUND SETUP		
XM VOLUME	◄5	►
MESSAGE VOLUME	◄5	►
ALTITUDE ALERT	◄On	►
MINIMUMS ALERT	◄On	►
TRAFFIC N/A ALERT	◄On	►

Sound Setup Page (Split-Screen)

Adjusting XM and/or Message Volume:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Sound', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the desired field (XM Volume or Message Volume), and select the desired volume by turning the **FMS** Joystick.

5) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.

Turning the altitude alert tone on/off:

NOTE: Refer to the Flight Instruments section for more information regarding the Altitude Alert Tone.

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Sound', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the Altitude Alert field, and select 'On/Off' by turning the **FMS** Joystick.

Turning the minimums alert tone on/off:

> *NOTE: Refer to the Flight Instruments section for more information regarding the Minimums Alert Tone.*

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Sound', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the Minimums Alert field, and select 'On/Off' by turning the **FMS** Joystick.

Enable/disable the 'Traffic Not Available' audio alert:

> *NOTE: Refer to the Hazard Avoidance section for more information regarding the 'Traffic Not Available' audio alert.*

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Sound', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the Traffic N/A Alert field.

5) Turn the **FMS** Joystick to highlight 'On' or 'Off'.

6) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.

UNITS

Changing unit settings:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Units' and press the **ENT** Key.

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4) Move the **FMS** Joystick to highlight the desired field, and select the desired unit by turning the **FMS** Joystick.

5) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.

UNITS SETUP	
AIR TEMPERATURE	◄ FAHRENHEIT (°F) ►
BARO PRESSURE	◄ INCHES (HG) ►
WEIGHT	◄ POUNDS (LBS) ►
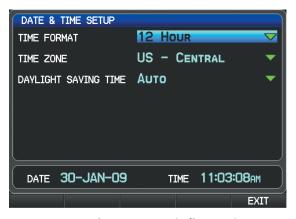
Units Setup Page (Split-Screen)

DATE & TIME

Changing date & time settings:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Date & Time' and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the desired field, and select the desired option by turning the **FMS** Joystick.

5) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.

DATE & TIME SETUP	
TIME FORMAT	12 HOUR ▽
TIME ZONE	US – CENTRAL ▼
DAYLIGHT SAVING TIME	AUTO ▼
DATE 30-JAN-09	TIME 11:03:08AM
	EXIT

Date & Time Setup Page (Split-Screen)

POSITION

NOTE: Refer to Appendix D for more information on Map Datums and Location Formats.

NOTE: 'Heading' and 'Mag. Variation' settings always display magnetic heading and have no effect on the HSI or Heading Tape since they are driven by the magnetometer data.

Changing position settings:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Position' and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the desired field, and select the desired option by turning the **FMS** Joystick.

5) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to remove the menu.

POSITION SETUP	
LOCATION FORMAT	HDDD°MM.MMM'
MAP DATUM	WGS 84
HEADING	Auto Mag. Variation
MAG. VARIATION	003°E

Position Setup Page (Split-Screen)

ALARMS

The Alarms Page allows the pilot to turn airspace alarms On/Off, set an Altitude Buffer, Arrival Alarm, Next Waypoint Alarm, Proximity Alarm, and Fuel Tank Reminder Alarm.

Changing alarm settings:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...', and press the **ENT** Key.

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3) Turn or move the **FMS** Joystick to highlight 'Alarms' and press the **ENT** Key. Pressing the **AIRSPACE** Softkey displays the Airspace Alarms Page. Pressing the **NAV** Softkey displays the Arrival Alarm, Next Waypoint Alarm, Proximity Alarm, and Fuel Tank Reminder (Split-Screen Only).

4) Move the **FMS** Joystick to highlight the desired field, and select the desired option by turning the **FMS** Joystick.

5) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to remove the menu.

FUEL TANK REMINDER ALARM AND FUEL TANK TIMER
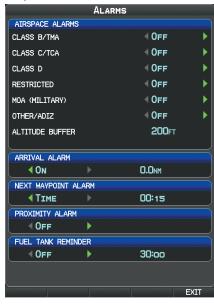
The 'Fuel Tank' Reminder alarm is used a a reminder to switch fuel tanks. The reminder message repeats at the specified interval after the beginning of each trip. The Fuel Tank Timer (FUEL TIMER) data field option is the elapsed time since the 'Fuel Tank' Reminder alarm was last issued (HH:MM).

Airspace Alarms (Split-Screen)

Nav Alarms (Split-Screen)

Alarms (Full-Screen MFD)

AIRPORT CRITERIA

The Page Menu on the Nearest Airports Page allows the pilot to filter out airports that do not meet a defined criteria. Specific surface types and runway lengths can be defined, as well as the option to include private airports and/or heliports.

- **Runway Surface**: Allows the pilot to set criteria for the type of surface on the runway.

  - Any: Shows any runway, regardless of surface type, including water landing facilities.

  - Hard Only: Shows only runways with a concrete, asphalt, or similar sealed surface.

  - Hard or Soft: Shows all runways except water landing facilities.

  - Water Only: Shows only water landing facilities.

- **Minimum Runway Length**: Allows the pilot to enter a specific length for the shortest runway allowed.

- **Include Private Airports**: Allows the pilot include Private Airports in the search criteria.

Entering airport criteria:

1) Press the **NRST** Key.

2) Turn the **FMS** Joystick to select the Nearest Airports Page.

3) Press the **MENU** Key to display the Page Menu.

4) Turn or move the **FMS** Joystick to select 'Set Airport Criteria', and then press the **ENT** Key. The Airport Criteria Window appears with the current settings.

Nearest Airports Page Menu

5) Move the **FMS** Joystick to highlight the desired field and turn the **FMS** Joystick to select the desired option from the menu. Press the **ENT** Key if necessary to highlight the next field.

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Airport Criteria Window

6) With 'Done' highlighted press the **ENT** Key.

Restoring airport criteria defaults:

1) Press the **NRST** Key.

2) Turn the **FMS** Joystick to select the Nearest Airports Page.

3) Press the **MENU** Key to display the Page Menu.

4) Turn or move the **FMS** Joystick to select 'Set Airport Criteria', and then press the **ENT** Key. A window appears with the current settings.

5) Press the **MENU** Key.

6) With 'Restore Default' highlighted press the **ENT** Key.

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SECTION 2 FLIGHT INSTRUMENTS

2.1 FLIGHT INSTRUMENTS
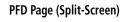
✓ **NOTE:** *Refer to Section 9 for Autopilot information.*

Increased situational awareness is provided by replacing the traditional instruments on the panel with an easy-to-scan Primary Flight Display (PFD) that features a horizon, airspeed, attitude, altitude, vertical speed, heading, and course deviation information.

The split-screen display has a PFD that occupies the top portion of the display at all times. Select the PFD Page in order to view the Horizontal Situation Indicator (HSI), Outside Air Temperature (OAT), System Time, selected course, and selected heading.

PFD Page (Split-Screen)   **PFD (Full Screen)**

Selecting the PFD Page (split-screen):

1) Press the **FMS** Joystick if necessary to begin interaction with the Page Navigation Bar.

2) Turn the **FMS** Joystick to select the **PFD** Page.

The following flight instruments and supplemental flight data are displayed on the PFD and/or PFD Page (split-screen).

GS 105ᴋᴛ
AP | ROL | ALTS ALT
357
310 320 330 340 35 010 020 030 040
120
110
100
10   10
87
80 6
70
60
TAS 105ᴋᴛ
KIXD

2700ꜰᴛ
G 2700
2600
20 00 25
2400
2300
30.06ɪɴ

HDG 357°
CRS 356°

0ᴋᴛ
358°ᴍ

LOC1

33
30
W
24
21
N
3
6
E
12
15
S

O DN
E
F
30 UP

DUSTT
GPS1

K34
6.2ɴᴍ

OAT 85°F
XPDR 1200 ALT
LCL 4:17:37ᴘᴍ

① Heading Strip

② Ground Speed (GS)

③ Airspeed Indicator

④ Attitude Indicator

⑤ Pathways

⑥ Flight Path Marker

⑦ Angle of Attack (AOA)

⑧ Pitch Scale

⑨ Vspeed Reference

⑩ Slip/Skid Indicator

⑪ True Airspeed (TAS)

⑫ Lateral Deviation Scale & Course Deviation

⑬ Selected Heading

⑭ Current Track Indicator

⑮ Wind Data (Speed & Direction)

⑯ Course Deviation Indicator (CDI)

⑰ Trim Indicator

⑱ Flap Indicator

⑲ Navigation Source

⑳ Bearing 1 Information Window

㉑ Outside Air Temperature (OAT)

㉒ Transponder Code

㉓ Transponder Mode

㉔ System Time

㉕ Bearing 2 Information Window

㉖ Bearing Pointer

㉗ Selected Heading Bug (HSI)

㉘ Selected Course

㉙ Altimeter Barometric Setting

㉚ Current Vertical Speed

㉛ Aircraft Symbol

㉜ Flight Director

㉝ Glideslope Indicator

㉞ Current Vertical Speed

㉟ Vertical Speed Indicator (VSI)

㊱ Reference Altitude

㊲ Selected Altitude Bug

㊳ Turn Rate Indicator

㊴ Zero Pitch Line

㊵ Current Track Indicator (Heading Strip)

㊶ Current Heading

㊷ Selected Heading Bug

㊸ Turn Rate Indicator

㊹ Autopilot Status Box

AIRSPEED INDICATOR
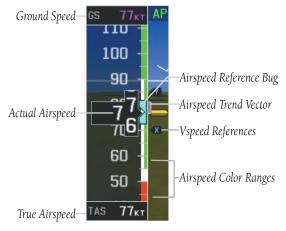
✓ *NOTE: The G3X Vspeed Reference values and Flaps Tick Mark values depend upon the aircraft's specific system configuration and may vary from the examples discussed in this section.*

The Airspeed Indicator displays airspeed on a rolling number gauge using a moving tape. The true airspeed (TAS) is displayed in knots below the Airspeed Indicator. The numeric labels and major tick marks on the moving tape are marked at intervals of 10 knots. Speed indication starts at 30 knots, with 60 knots of airspeed viewable at any time. The actual airspeed is displayed inside the black pointer. The pointer remains black until reaching never-exceed speed (V_{NE}), at which point it turns red.

A color-coded (red, white, green, yellow, and red/white "barber pole") speed range strip is located on the moving tape. The colors denote flaps operating range, normal operating range, caution range, and never-exceed speed (V_{NE}). A red range is also present for low speed awareness.

The Airspeed Trend Vector is a vertical, magenta line, extending up or down on the airspeed scale, shown to the right of the color-coded speed range strip. The end of the trend vector corresponds to the predicted airspeed in 6 seconds if the current rate of acceleration is maintained. If the trend vector crosses V_{NE}, the text of the actual airspeed readout changes to yellow. The trend vector is absent if the speed remains constant or if any data needed to calculate airspeed is not available due to a system failure.
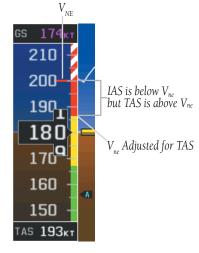
Airspeed Indicator

V~NE~ ADJUSTED FOR TRUE AIRSPEED (OPTIONAL)

The airspeed indicator can optionally be configured to display V_{NE} adjusted for true airspeed. This is useful in aircraft where true airspeed (instead of indicated airspeed) must be kept below V_{NE}. Using TAS instead of IAS causes V_{NE} to be reduced at high altitudes. If configured, the G3X can calculate and display this reduction in V_{NE}. A solid red band is used between the TAS adjusted V_{NE} and the actual indicated value for V_{NE}.

V~ne~ Adjusted for True Airspeed

VSPEED REFERENCE
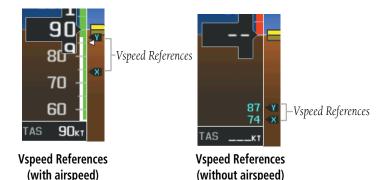
Vspeed references including V_{NE}, V_{no}, V_{so}, V_{s1}, V_{fe}, V_{a}, V_{x}, V_{y}, V_{Yse}, V_{g}, V_{r}, as well as several custom Vspeeds can be configured from the Aircraft Configuration Page, refer to the G3X Installation Manual for more information.

When airspeed is present, the Vspeeds configured are also displayed at their respective locations to the right of the airspeed scale, otherwise the Vspeeds are displayed at the bottom of the airspeed indicator.

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Vspeed References

Vspeed References

**Vspeed References
(with airspeed)**

**Vspeed References
(without airspeed)**
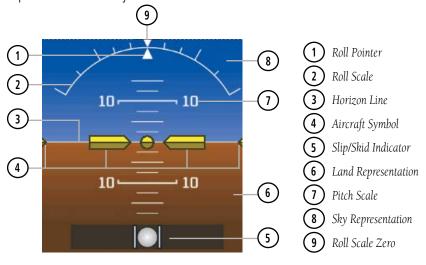
ATTITUDE INDICATOR

Attitude information is displayed over a virtual blue sky and brown ground with a white horizon line. The Attitude Indicator displays the pitch (indicated by the yellow symbolic aircraft on the pitch scale), roll, and slip/skid information.

The horizon line is part of the pitch scale. Pitch markings occur at 2.5˚ intervals through all pitch ranges.

The inverted white triangle indicates zero on the roll scale. Major tick marks at 30˚ and 60˚ and minor tick marks at 10˚, 20˚, and 45˚ are shown to the left and right of the zero. Angle of bank is indicated by the position of the pointer on the roll scale.

Slip/skid is indicated by the location of the ball.

1	Roll Pointer
2	Roll Scale
3	Horizon Line
4	Aircraft Symbol
5	Slip/Skid Indicator
6	Land Representation
7	Pitch Scale
8	Sky Representation
9	Roll Scale Zero

Attitude Indicator

Attitude Indicator W/AFCS and SVX

1	Roll Pointer
2	Roll Scale
3	Horizon Line
4	Aircraft Symbol
5	Slip/Skid Indicator
6	Land Representation
7	Pitch Scale
8	Sky Representation
9	Roll Scale Zero
10	Flight Director Command Bars

ALTIMETER

The Altimeter displays 400 feet of barometric altitude values at a time on a rolling number gauge using a moving tape. Numeric labels and major tick marks are shown at intervals of 100 feet. Minor tick marks are at intervals of 20 feet. The current altitude is displayed in the black pointer.

The Selected Altitude is displayed above the Altimeter in the box indicated by a selection bug symbol. A bug corresponding to this altitude is shown on the tape; if the Selected Altitude exceeds the range shown on the tape, the bug appears at the corresponding edge of the tape.
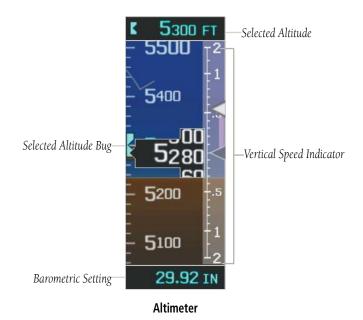
Setting the selected altitude:

1) From the PFD Page (one display) or PFD (two display), press the **ALT** (or **ALT/PTCH** if the Integrated Autopilot Interface is configured) Softkey.

2) Turn the **FMS** Joystick to set the Selected Altitude in 100-ft increments.

Syncing to the current altitude:

1) From the PFD Page (one display) or PFD (two display), press the **ALT** (or **ALT/PTCH** if the Integrated Autopilot Interface is configured) Softkey.

2) Press and hold the **FMS** Joystick. The current altitude is now displayed as the Selected Altitude.

Selected Altitude

Selected Altitude Bug

Vertical Speed Indicator

Barometric Setting

Altimeter

BAROMETRIC PRESSURE

The barometric pressure setting is displayed below the Altimeter in inches of mercury (in Hg) or hectopascals (hPa) when metric units are selected.

Selecting the altimeter barometric pressure setting:

1) From the PFD Page (one display) or PFD (two display), press the **BARO** Softkey to highlight the barometric pressure setting.

2) Turn the **FMS** Joystick to display the desired barometric pressure setting and press the **ENT** Key.
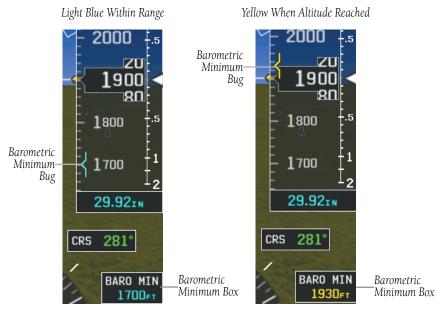
Syncing to the local barometric pressure setting:

1) From the PFD Page (one display) or PFD (two display), press the **BARO** Softkey.

2) While stationary on the ground, press and hold the **FMS** Joystick.

3) Verify indicated altitude matches local field elevation.

BAROMETRIC MINIMUM ALERT

For altitude awareness, a barometric Minimum Descent Altitude (MDA) or Decision Height (DH) can be set by the user and is reset when the power is cycled. Once the user-defined altitude is within the range of the tape, a cyan bug appears at the reference altitude on the Altimeter. Once the aircraft reaches the user-defined MDA/DH, the bug and text turn yellow and the aural alert, "Minimums Minimums", is heard.

Light Blue Within Range   *Yellow When Altitude Reached*

Barometric Minimum Visual Annunciations

Setting the barometric minimum alert bug:

1) From the PFD Page (one display) or PFD (two display), press the **BARO** Softkey.

2) Press the **MINIMUMS** Softkey.

3) Turn the **FMS** Joystick to display the desired alert altitude and press the **ENT** Key.

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Canceling the barometric minimum alert bug:

1) From the PFD Page (one display) or PFD (two display), press the **BARO** Softkey.

2) Press the **MINIMUMS** Softkey.

3) Press the **CLR** Key.

Turning the minimums alert tone on/off:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup…' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Sound', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the Minimums Alert field, and select 'On/Off' by turning the **FMS** Joystick.

ALTITUDE ALERTING

The Altitude Alerting function provides the pilot with visual and aural alerts when approaching the Selected Altitude. Whenever the Selected Altitude is changed, the Altitude Alerter is reset. The following will occur when approaching the Selected Altitude:

- Passing within 1000 feet of the Selected Altitude, the Selected Altitude (shown above the Altimeter) flashes for 5 seconds and an aural tone is generated.

- When the aircraft passes within 200 ft of the Selected Altitude, the Selected Altitude flashes for 5 seconds and an aural tone is generated to indicate that the aircraft is approaching the selected altitude.

- After reaching the Selected Altitude, if the pilot flies outside the deviation band (±200 Feet of the Selected Altitude), the Selected Altitude changes to yellow text on a black background, flashes for 5 seconds, and an aural tone is generated.

Deviation of ±200 ft

Altitude Alerting Visual Annunciation

Turning the altitude alert tone on/off:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Sound', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the Altitude Alert field, and select 'On/Off' by turning the **FMS** Joystick.

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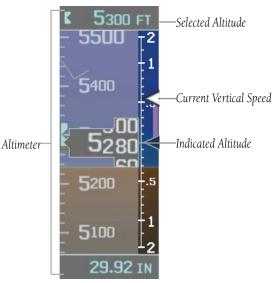
VERTICAL SPEED INDICATOR (VSI)

The Vertical Speed Indicator displays the aircraft vertical speed using a non-moving tape labeled at 500, 1000 and 2000 fpm with minor tick marks every 100 feet up to 1000 fpm. The current vertical speed is displayed using a white arrow along the tape.

Vertical Speed Indicator

VERTICAL DEVIATION INDICATOR AND VNAV INDICATOR
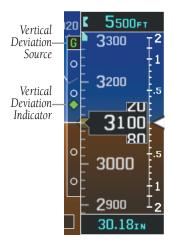
NOTE: An external navigator (i.e., SL30 Nav/Comm Transceiver and/or the GTN or GNS Series Units) must be configured to receive glideslope and/or glidepath vertical deviation indications.

GLIDESLOPE - ILS SOURCE

The Vertical Deviation (Glideslope) Indicator (VDI) appears to the left of the altimeter whenever an ILS frequency is tuned in the active NAV field of an external navigator. A green diamond acts as the VDI Indicator, like a glideslope needle on a conventional indicator. If a localizer frequency is tuned and there is no glideslope signal, "NO GS" is annunciated.

Vertical Deviation Source

Vertical Deviation Indicator
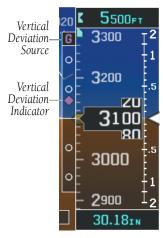
Vertical Deviation Indicator
(Glideslope-ILS Source)

GLIDEPATH - GPS SOURCE

The Vertical Deviation (Glidepath) Indicator (VDI) also appears to the left of the altimeter during a GPS approach. The glidepath is analogous to the glideslope for GPS approaches supporting WAAS vertical guidance (LNAV+V, L/VNAV, LPV). The Glidepath Indicator appears on the G3X as a magenta diamond. If the approach type downgrades past the final approach fix (FAF), "NO GP" is annunciated.

Vertical Deviation Source

Vertical Deviation Indicator

Vertical Deviation Indicator
(Glidepath-GPS Source)

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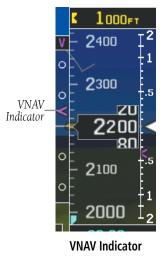
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VNAV INDICATOR

An external navigation source is not required to receive VNAV indications. When the VNAV profile is defined, the pilot is informed of the progress by message alerts. A magenta chevron (VNAV Indicator) to the left of the altimeter on the Vertical Deviation Scale shows the VNAV profile, and a magenta chevron (Required Vertical Speed Indicator (RVSI)) on the Vertical Speed Indicator indicates the required vertical speed to reach the target altitude. Refer to section 2.3 for more information.

VNAV Indicator

HORIZONTAL SITUATION INDICATOR (HSI)

The Horizontal Situation Indicator (HSI) displays a rotating compass card in a heading-up orientation at the bottom of the page. Letters indicate the cardinal points and numeric labels occur every 30°. Major tick marks are at 10° intervals and minor tick marks at 5° intervals. The current track is represented on the HSI by a magenta triangle and dashed line. The HSI also presents course deviation, bearing, and navigation source information.

The Selected Heading is shown to the left of the HSI The light blue bug on the compass rose corresponds to the Selected Heading.

Adjusting the selected heading:

1) From the PFD Page (one display) or PFD (two display), press the **HDG** (or **HDG/ROLL** if the Integrated Autopilot Interface is configured) Softkey (if necessary). The Heading Box is highlighted.

2) Turn the **FMS** Joystick to select the desired heading, and press the **FMS** Joystick. The Selected Course is shown to the right of the HSI.

Syncing to the current heading:

1) From the PFD Page (one display) or PFD (two display), press the **HDG** (or **HDG/ROLL** if the Integrated Autopilot Interface is configured) Softkey (if necessary).

2) Press and hold the **FMS** Joystick. The current heading is now displayed as the Selected Heading.

1	Lubber Line	**7**	To/From Indicator
2	Current Track Indicator	**8**	Aircraft Symbol
3	Course Pointer	**9**	Lateral Deviation Scales
4	Navigation Source	**10**	Selected Heading Bug
5	Course Deviation Indicator (CDI)	**11**	Course Deviation & To/From Indicator
6	Rotating Compass Rose		

Horizontal Situation Indicator (HSI)

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HSI ANNUNCIATIONS
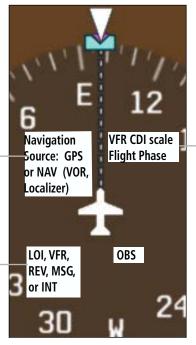
✓ *NOTE: Some or all HSI annunciations may appear in the four quadrants of the G3X HSI depending on the external navigator(s) configured (i.e., SL30 Nav/Comm Transceiver and/or the GTN or GNS Series Units).*

'1' or '2' will appear after the Navigation Source if more than one external navigation source is configured.

Navigation Source: GPS or NAV (VOR, Localizer)

VFR CDI scale Flight Phase

VFR CDI Scales: 0.25nm, 1.25nm, 5.00nm

Flight Phase (IFR): APR, TERM, ENR, OCN, LNAV, L/VNAV, LNAV+V, or LPV

LOI: Loss of GPS integrity.
VFR: An external GPS source is configured but there is not enough guidance data for IFR use.
REV: External Navigation Source failed. Reverted to internal VFR GPS for navigation.
MSG: External navigation source has a pending message
INT: The pilot has elected to use the internal GPS navigation source instead of the external GPS navigation source.

LOI, VFR, REV, MSG, or INT

OBS

HSI Annunciations

BEARING POINTERS AND INFORMATION WINDOWS

Two bearing pointers and associated information can be displayed on the HSI for NAV (VOR, Localizer) and GPS sources as well as nearest airports. The bearing pointers are light blue and are single-line (Bearing Pointer 1) or double-line (Bearing Pointer 2). A pointer symbol is shown in the information windows to indicate the navigation source. The bearing pointers never override the CDI and are visually separated from the CDI by a white ring (shown when the bearing pointers are selected but not necessarily visible due to data unavailability).

When a bearing pointer is displayed, its associated information window is also displayed. The Bearing Information Windows are displayed at the lower sides of the HSI. The following information may be displayed in the Bearing Information Windows:
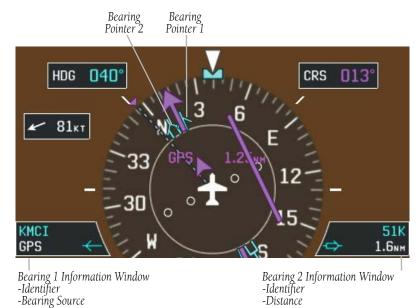
- Bearing source (NAV, GPS)
- Pointer icon (single lined or double lined)
- Frequency (NAV)
- Station/waypoint identifier (NAV, GPS)
- GPS-derived great circle distance to bearing source

If an external NAV radio is the bearing source and it is tuned to an ILS frequency, the bearing source and the bearing pointer are removed from the HSI and the frequency is replaced with "ILS". If VLOC1 or VLOC2 is the bearing source and it is tuned to a VOR frequency, the frequency is replaced with the station identifier. If GPS is the bearing source, the active waypoint identifier is displayed in lieu of a frequency.

The bearing pointer is removed from the HSI and "NO DATA" is displayed in the information window if:

- The NAV radio is not receiving the tuned VOR station
- GPS is the bearing source and an active waypoint is not selected

Bearing Pointer 2   *Bearing Pointer 1*

Bearing 1 Information Window
-Identifier
-Bearing Source

Bearing 2 Information Window
-Identifier
-Distance

HSI with Bearing Pointers

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Enabling/disabling the bearing pointer and changing sources:

1) From the full screen PFD and/or split screen PFD Page, press the **MENU** Key.

2) Move the **FMS** Joystick to highlight the desired Bearing Pointer.

3) Turn the **FMS** Joystick to highlight the desired source (dependant on the external navigators configured), or to remove the bearing pointer and information window, highlight 'Off'.

COURSE DEVIATION INDICATOR (CDI)

The HSI contains a Course Deviation Indicator (CDI), with a Course Pointer, To/From Indicator, and a sliding deviation bar and scale. The course pointer is a single line arrow (GPS1, VOR1, and LOC1) or a double line arrow (GPS2, VOR2, and LOC2) which points in the direction of the set course. The To/From arrow rotates with the course pointer and is displayed when the active NAVAID is received.

The Course Deviation Indicator (CDI) moves left or right from the course pointer along a lateral deviation scale to display aircraft position relative to the course. If the course deviation data is not valid, the CDI is not displayed.

Another Lateral Deviation Scale and combination Course Deviation and To/From Indicator is located below the slip/skid indicator.

Course Deviation & To/From Indicator   **Lateral Deviation Scale**   *Lateral Deviation Scale*

The CDI is capable of displaying two sources of navigation: GPS or NAV (VOR, localizer) depending on the external navigator(s) configured (refer to the G3X Installation Manual for more information). Color indicates the current navigation source: magenta (for GPS) or green (for VOR and LOC). The full-scale limits for the CDI are defined by a GPS-derived distance when coupled to GPS. When coupled to a VOR or localizer (LOC), the CDI has the same angular limits as a mechanical CDI. If the CDI exceeds the maximum deviation on the scale (two dots) while coupled to GPS, the crosstrack error (XTK) is displayed below the white aircraft symbol.

Changing the External Navigator

Changing the external navigator:

1) If more than one navigator is configured, press the **CDI SRC** Softkey to toggle between available navigation sources.

2) Verify the external navigation source by the indication in the upper left quadrant of the HSI and on the external navigator.

Changing the Navigation Source

Changing the navigation source (GPS, VOR, LOC, or VLOC):

Use the associated external navigator to toggle between GPS and VOR/LOC source types. Refer to the appropriate external navigator Pilot's Guide (e.g., SL30 Nav/Comm Transceiver Pilot's Guide, or the GTN or GNS Series Pilot's Guides) for more information. When an external navigator is configured the internal GPS can still be used for VFR navigation.

> **NOTE:** *The G3X internal GPS flight plan is only for VFR use.*

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| GPS Navigator 1 | ← Toggle the External Navigator → | LOC Navigator 1 |

CDI SRC

| GPS Navigator 2 | ← Toggle the External Navigator → | LOC Navigator 2 |

CDI SRC

(e.g., if the external navigator is a GNS 430, press the CDI Key on the GNS 430 to toggle between GPS1 and LOC1 or GPS2 and LOC2)

CDI Source

G-METER

Whenever the G load on the airplane goes above +2.1G or below -0.5G, the HSI is temporally replaced with a large graphical G-meter. To remove the G-meter, press the **CLR** Key. Regardless of the current G load, the HSI can be replaced with a G-meter by changing the 'G METER' setting on the PFD setup page. The G-meter will be displayed until the setting is changed to auto or the power is cycled. Small white triangles are used to indicate the minimum and maximum recorded G loads. When in the auto display mode, the G-meter will automatically be displayed when an unusual attitude is sensed (i.e., greater than +/- 65° roll or +30°/-20° pitch). Refer to the G3X installation manual for more information on configuring the G-meter.
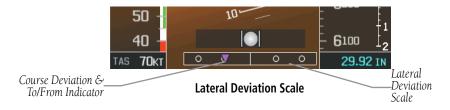
Manually displaying the G-meter:

1) From the full screen PFD and/or split screen PFD Page, press the **MENU** Key.
2) Move the **FMS** Joystick to highlight G METER.
3) Turn the **FMS** Joystick to select 'ON (NO HSI)'.

Resetting the G-meter minimum and maximum markers:

1) From the full screen PFD and/or split screen PFD Page, press the **MENU** Key.
2) Press the **RESET G** Softkey to reset the minimum and maximum recorded G loads.

G-meter

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HSI ORIENTATION

The HSI may be configured to provide directional information in either 'Heading' or 'Auto Trk/Hdg' "Track-up" modes. Selecting Heading Mode orients the HSI to display aircraft heading in a conventional manner with heading shown at the top of the compass card as indicated by the lubber line. In 'Auto Trk/Hdg' "Track-up" mode, the aircraft symbol and lubber line move to indicate heading and wind correction while ground track in shown at the top of the compass card. While in 'Auto Trk/Hdg' the HSI will remain heading-based when the aircraft is on the ground or when the autopilot is in HDG mode. Refer to the G3X installation manual for more information on configuring the HSI Orientation.

Changing HSI orientation:

1) From the full screen PFD and/or split screen PFD Page, press the **MENU** Key.

2) Press the **MORE** Softkey.

3) Move the **FMS** Joystick to highlight HSI ORIENTATION.

4) Turn the **FMS** Joystick to highlight 'Heading' or 'Auto Trk/Hdg'.

Current Ground Track

Heading Pointer

Aircraft Symbol showing wind correction

Track up HSI

PFD PITCH ATTITUDE OFFSET

The Pitch attitude offset function allows the yellow aircraft symbol on the attitude indicator to be adjusted up or down much like the aircraft on a mechanical attitude indicator. The pitch attitude can be adjusted as much as +/- 2.5°.

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Changing the PFD Pitch Attitude Offset:

1) From the full screen PFD and/or split screen PFD Page, press the **MENU** Key.

2) Press the **MORE** Softkey.

3) Move the **FMS** Joystick to highlight PITCH OFFSET.

4) Turn the **FMS** Joystick to select the desired setting.

Aircraft Symbol showing pitch offset.

Pitch Attitude offset angle

Pitch Attitude Offset

MANUALLY SWITCHING BETWEEN INTERNAL AND EXTERNAL FLIGHT PLAN SOURCES

Press the **INTERNAL** Softkey on the Active Flight Plan Page or the Direct-to Page, to temporarily allow flight planning through the G3X using the internal GPS flight plan when an external GPS Navigator is configured. Press the **EXTERNAL** Softkey to return to the external GPS navigator's flight plan.

When manually selecting the internal GPS flight plan, 'INT' is displayed in light blue in the upper left corner of the Data Bar as well as the lower left quadrant of the HSI.

Using Internal GPS Flight Plan

INT: *The pilot has elected to use the internal GPS navigation source instead of the external GPS navigation source.*

Internal Flight Plan Indication

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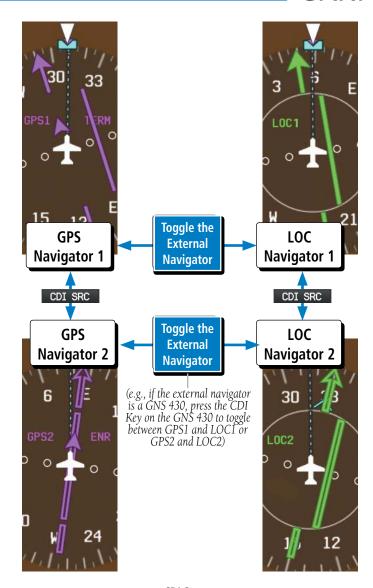
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Switching between internal and external flight plan sources:

From the Active Flight Plan Page or the Direct-to Page, touch the **INTERNAL** or **EXTERNAL** Softkey to switch between the internal and external flight plan sources when an external GPS Navigator is configured.

FAILURE OF THE EXTERNAL GPS NAVIGATION SOURCE

If the external GPS navigation source fails, the system reverts to the internal GPS navigation source and 'REV' is shown in yellow in the upper left corner of the Data Bar as well as the lower left quadrant of the HSI.

External GPS Failure. Reverted to Internal GPS

REV: External Navigation Source failed. Reverted to internal VFR GPS for navigation.

External GPS Navigation Failure

GARMIN

Aᴜᴛᴏᴍᴀᴛɪᴄ CDI Sᴄᴀʟᴇ Sᴇʟᴇᴄᴛɪᴏɴ (Iɴᴛᴇʀɴᴀʟ GPS Oɴʟʏ)

> **NOTE:** When an external GPS navigator is in use, the pilot cannot change the CDI scale.

Three factors determine the default distance from the center of the CDI to full left or right limits:

- CDI scale = 1.25 nm - within 30 nm of any airport in the active route.

- CDI scale = 0.25 nm - on an approach leg or within 2 nm of the FAF or MAP.

- CDI scale = 5.0 nm - if the previous two conditions do not exist.

Mᴀɴᴜᴀʟ CDI Sᴄᴀʟᴇ Sᴇʟᴇᴄᴛɪᴏɴ (Iɴᴛᴇʀɴᴀʟ GPS Oɴʟʏ)

Adjusting the CDI scale:

From the full-screen PFD and/or split-screen PFD Page, press the **RNG** Key down arrow to zoom in (decrease CDI scale), or the up arrow to zoom out (increase CDI scale).

The current CDI scale appears in the upper right corner of the HSI.

Current CDI Scale

Horizontal Situation Indicator (HSI)

The Automatic CDI Scale Selection will resume once the default determining factor for the current phase of flight matches the user-selected CDI scale.

Aᴜᴛᴏ-Sʟᴇᴡɪɴɢ

The G3X will automatically slew the LOC course pointer to the correct final approach course when an ILS, LOC, BC, LDA, or SDF approach is active in the external navigator and the appropriate CDI and navigation source are selected on the G3X.

Setting up Auto-Slew:

1) With the desired approach activated in the external navigator, verify the appropriate CDI Source is selected (i.e., GPS1 or GPS2).

2) Once inside the FAF (Final Approach Fix), the course pointer will change from magenta to green and the course pointer will move, or slew, to the final approach course as received from the external GPS navigator.

When flying a localizer backcourse approach, verify that the selected course matches the published front course. The course selected can be manually changed by pressing the **LOC CRS** Softkey from the PFD or PFD Page (or press **XPDR/CRS** > **LOC CRS** (from the PFD or PFD Page) if a transponder is configured). A 'Set APPR CRS' message will appear if the course selection is not within 5° of either the front or back course for the selected approach.

'SET APPR CRS' Message

Auto-Slewing Message

TRIM AND FLAP POSITION INDICATORS (OPTIONAL)

> **NOTE:** *If the aircraft is configured with a remote transponder rudder and aileron trim indicators are not available on the PFD. All trim gauges are available from the ENG page.*

Elevator Trim, Aileron Trim, Rudder Trim, and Flap Position indicators can be configured from the Engine/Airframe Input Configuration Page in Configuration Mode. Refer to the G3X Installation Manual for more information.

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Elevator Trim Indicator

Flap Position Indicator

Aileron Trim Indicator

Rudder Trim Indicator

Trim and Flap Position Indicators

HEADING STRIP AND TURN RATE INDICATOR

The Heading Strip displays the Current Heading, Selected Heading Bug, Current Heading, and Current Track Indicator. Numeric labels occur every 10°. Major tick marks are at 5° intervals and minor tick marks at 1° intervals. A digital reading of the current heading appears in the center of the Heading Strip.

The Turn Rate Indicator is located above the Heading Strip. Tick marks to the left and right of the displayed heading denote standard turn rates (3 deg/sec). A magenta Turn Rate Trend Vector shows the current turn rate. The end of the trend vector gives the heading predicted in 6 seconds, based on the present turn rate. A standard-rate turn is shown on the indicator by the trend vector stopping at the standard turn rate tick mark, corresponding to a predicted heading of 18° from the current heading. At rates greater than 4 deg/sec, an arrowhead appears at the end of the magenta trend vector and the prediction is no longer valid.

Turn Rate Indicator (Standard Rate Tick Marks)

Turn Rate Trend Vector

Current Heading

Selected Heading Bug

Heading Strip

Current Track Indicator

Heading Strip/Turn Rate Indicator

OBS MODE

![NOTE icon] *NOTE: If configured, the selected external GPS navigator (i.e., GTN or GNS Series Units) is used to set the OBS Mode.*

Enabling Omni-bearing Selector (OBS) Mode suspends the automatic sequencing of waypoints in a GPS flight plan, but retains the current "active-to" waypoint as the navigation reference even after passing the waypoint. 'OBS' is annunciated to the left of the aircraft symbol when OBS Mode is selected.

While OBS Mode is enabled, a course line is drawn through the "active-to" waypoint on the moving map. If desired, the course to/from the waypoint can now be adjusted. When OBS Mode is disabled, the GPS flight plan returns to normal operation with automatic sequencing of waypoints, following the course set in OBS Mode. The flight path on the moving map retains the modified course line.

Extended Course Line   *OBS Mode Annunciation*   *OBS Mode Box*

OBS Course Softkey

Omni-bearing Selector (OBS) Mode (Split-Screen)

Enabling/disabling OBS Mode (without external GPS navigator):

1) From the Active Flight Plan Page press the **MENU** Key while navigating a flight plan or Direct-to.

2) With 'Set OBS and Hold' highlighted, press the **ENT** Key. The OBS Mode Box is highlighted.

3) Turn the **FMS** Joystick to select the desired course to/from the waypoint.

4) To cancel OBS Mode and return to automatic waypoint sequencing, press the **MENU** Key, with 'Release Hold' highlighted, press the **ENT** Key.

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Enabling/disabling OBS Mode (with external GPS navigator configured):

1) Press the **OBS** Key on the external navigator. The 'Set OBS and Hold' Active Flight Plan Page menu option is now available.

2) Turn the **FMS** Joystick on the G3X to select the desired course to/from the waypoint.

Syncing to the current aircraft location (without external GPS navigator):

1) With OBS Mode enabled, press the **OBS CRS** Softkey or press **XPDR/CRS** > **OBS CRS** (if necessary).

2) Press and hold the **FMS** Joystick.

2.2 SUPPLEMENTAL FLIGHT DATA

In addition to the flight instruments, the PFD or PFD Page also displays various supplemental information, including the Outside Air Temperature (OAT), wind data, and Vertical Navigation (VNAV) indications.

OUTSIDE AIR TEMPERATURE

The Outside Air Temperature (OAT) is displayed in degrees Fahrenheit (°F) or degrees Celsius (°C) in the lower left of the PFD or PFD Page.

Outside Air Temperature

Outside Air Temperature on PFD Page (Split-Screen)

Changing the outside air temperature setting:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Units' and press the **ENT** Key.

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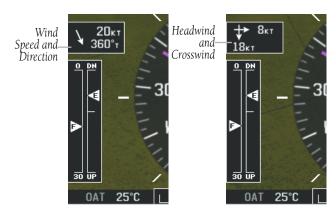
4) Turn the **FMS** Joystick to select the desired unit (**Fahrenheit (°F)** or **Celsius (°C)**).

5) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.

WIND DATA

Wind direction/speed or headwind/Crosswind information can be displayed in a window to the upper left of the HSI. When the window is selected for display, but wind information is invalid or unavailable, the window displays "No Wind Data".

Showing/hiding wind data:

1) From the full-screen PFD and/or split-screen PFD Page, press the **MENU** Key.

2) Move the **FMS** Joystick to highlight the Wind Vector field.

3) Turn the **FMS** Joystick to highlight 'Speed/Dir' or 'Head/X-wind'.

Wind Data

ANGLE OF ATTACK (AOA)

G3X installations that include a GAP 26 and a GSU 25, Angle of Attack information can be displayed on the PFD. Refer to the G3X Installation Manual for the Angle of Attack Calibration procedure. During Angle of Attack Calibration Stall Warning AOA, Caution Alert AOA, Minimum Visible AOA, and Approach Target AOA are defined.

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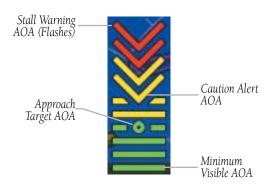
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When AOA exceeds the calibrated Caution Alert threshold (AOA gauge , an intermittent audible tone will be heard. The tone will increase in frequency until the Stall Warning AOA, when it will play continuously.

When AOA is below the calibrated Minimum Visible AOA threshold, the angle of attack gauge is not displayed.

Angle of Attack

Angle of Attack (AOA)

Stall Warning AOA (Flashes)

Approach Target AOA

Caution Alert AOA

Minimum Visible AOA

Angle of Attack Display (AOA)

2.3 VERTICAL NAVIGATION (VNAV)

⚠️ **CAUTION:** *VNAV is only a VFR navigation aid and is not intended for instrument approaches.*

The Vertical Navigation Page provides settings for the vertical navigation feature. These settings create a three-dimensional profile from the present location and altitude to a final (target) altitude at a specified location.

When the VNAV profile is defined, the pilot is informed of the progress by message alerts. A magenta chevron (VNAV Indicator) to the left of the altimeter on the Vertical Deviation Scale shows the VNAV profile, and a magenta chevron (Required Vertical Speed Indicator (RVSI)) on the Vertical Speed Indicator indicates the required vertical speed to reach the target altitude.

The Vertical Navigation feature is only available when navigating a Direct-to or flight plan, and the ground speed is greater than 35 knots.

One minute prior to the initial descent point the "Approaching VNAV Profile" message appears and the 'Estimated Time to VNAV' (on Active Flight Plan Page) goes blank. The descent angle locks to prevent changes in speed from altering the profile. The VNAV feature does not take into account any changes in ground speed that occur during the transition from level flight to descent or climb.
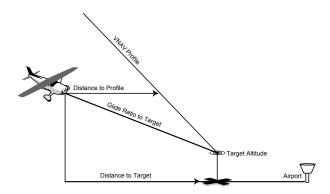
APPROACHING VNAV PROFILE

At 200 ft above the target altitude, the "Approaching Target Altitude" message appears, and the VNAV indicator disappears from the PFD.

APPROACHING TARGET ALTITUDE

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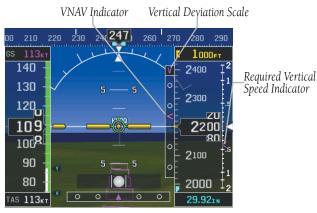
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Visual Representation of VNAV

USING THE VNAV FEATURE

Use the VNAV (Vertical Navigation) feature to ensure the aircraft is at the proper altitude. The magenta VNAV Indicator appears on the PFD. A message appears when approaching the VNAV Profile. When the VNAV Indicator is in the vertical center of the Vertical Deviation Scale, the aircraft is at the proper altitude for the VNAV Profile.
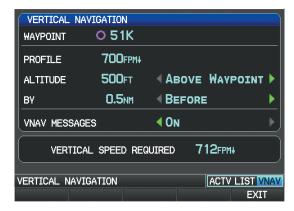
VNAV Indications (PFD)

Configuring a VNAV profile:

1) Press the **FPL** Key.

2) Turn the **FMS** Joystick to select the Vertical Navigation Page.

3) Press the **FMS** Joystick to activate the cursor.

4) Enter the desired profile into the fields, and press the **EXIT** Softkey.

Vertical Navigation Page (Split-Screen)

- Waypoint—Enter any waypoint along the currently active route as the reference waypoint. The reference waypoint defines the target location.

- Profile—Enter the descent rate.

- Altitude—Enter the desired reference waypoint altitude. Select 'Above Waypoint' to use field elevation for airports in the Jeppesen database or 'MSL' to specify an exact MSL altitude target.

- By—Enter the target location with settings of distance 'Before' or 'After' a reference waypoint. To set a target location at a reference waypoint, enter a distance of zero.

- VNAV Messages—Select 'On' or 'Off' to enable/disable VNAV alert messages.

Enabling/disabling the VNAV indicator:

1) From the full-screen PFD and/or the split-screen PFD Page, press the **MENU** Key.

2) Move the **FMS** Joystick to highlight the VNAV Indicator field.

3) Turn the **FMS** Joystick to highlight 'On' or 'Off'.

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Forcing capture of the VNAV profile:

1) Enter a valid VNAV profile and begin navigation.

2) Press the **FPL** Key.

3) Turn the **FMS** Joystick to highlight the Vertical Navigation Page.

4) Press the **MENU** Key.

5) Turn or move the **FMS** Joystick to highlight 'Capture VNAV Profile' and press the **ENT** Key. Selecting 'Capture VNAV Profile' centers the VNAV indicator (must be navigating a Flight Plan or Direct-to).

Or:

1) Enter a valid VNAV profile and begin navigation.

2) From the VNAV Page, press (select) the **CAPTURE** Softkey.

Canceling the VNAV profile:

1) Press the **FPL** Key.

2) Turn the **FMS** Joystick to highlight the Vertical Navigation Page.

3) Press the **MENU** Key.

4) Turn or move the **FMS** Joystick to highlight 'Cancel VNAV Capture' and press the **ENT** Key.

Or:

1) Enter a valid VNAV profile and begin navigation.

2) From the VNAV Page, press (deselect) the **CAPTURE** Softkey.

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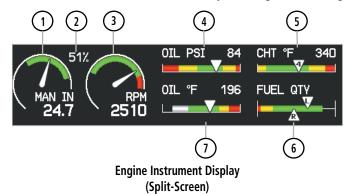
SECTION 3 ENGINE INDICATION SYSTEM
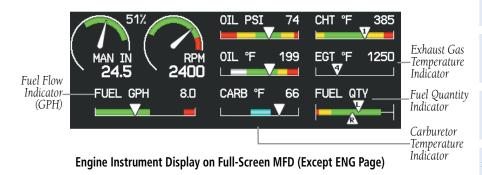
3.1 EIS DISPLAY & ENG PAGE

> **NOTE:** *The display of the G3X Engine Indication System depends upon the current configuration and may vary from the examples discussed in this section.*

The G3X Engine Indication System (EIS) displays critical engine, electrical, and other system parameters on the top portion of the display (split-screen and/or full-screen MFD). Additional EIS information can be viewed by selecting the **ENG** Page.

**Engine Instrument Display
(Split-Screen)**

Fuel Flow Indicator (GPH)

Exhaust Gas Temperature Indicator

Fuel Quantity Indicator

Carburetor Temperature Indicator

Engine Instrument Display on Full-Screen MFD (Except ENG Page)

If the Engine Page information configured exceeds one page, additional engine gauges may be distributed among the 1st, 2nd, and 3rd softkeys as required.

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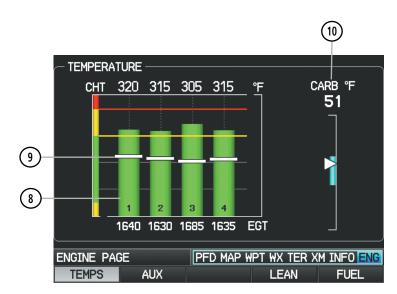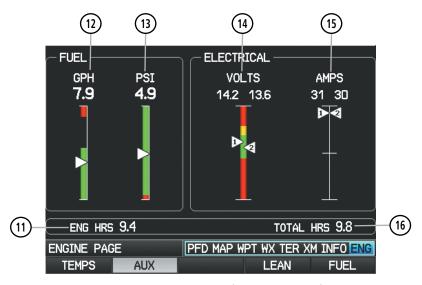
Example Engine (ENG) Page Configuration - TEMPS Softkey Selected (Split-Screen)

Example Engine (ENG) Page Configuration- AUX Softkey Selected (Split-Screen)
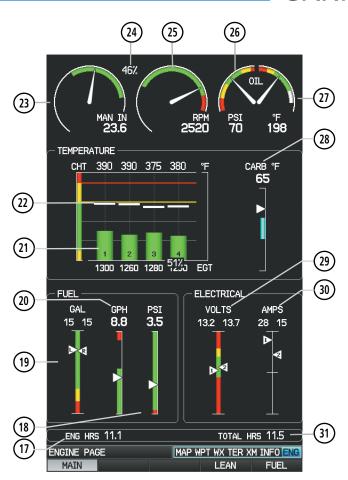
①	㉓	**Engine Manifold Pressure**	Displays manifold pressure to indicate engine power	
②	㉔	**Percent Power**	Displays engine power as a percentage	
③	㉕	**Tachometer (RPM)**	Displays propeller speed in revolutions per minute (rpm)	
④	㉖	**Oil Pressure Indicator**	Displays oil pressure	
⑤ ⑨	㉒	**Cylinder Head Temperature Indicator**	Displays the head temperature of the hottest cylinder	
⑥	⑲	**Fuel Quantity Indicator**	Displays the fuel quantity	
⑦	㉗	**Oil Temperature Indicator**	Displays oil temperature	
⑧	㉑	**Exhaust Gas Temperature Indicator**	Displays the Exhaust Gas Temperature	
⑩	㉘	**Carburetor Temperature Indicator**	Displays carburetor temperature; the yellow range indicates where carburetor icing is most likely to occur	
⑪	⑰	**Engine Hours (Tach) (ENG HOURS)**	Counted whenever a valid RPM is detected. Refer to G3X Installation Manual for more information.	
⑫	⑳	**Fuel Flow Indicator**	Displays fuel flow.	
⑬	⑱	**Fuel Pressure Indicator**	Displays fuel pressure	
⑭	㉙	**Voltmeter**	Displays the main bus voltage	
⑮	㉚	**Ammeter**	Displays the battery load in amperes	
⑯	㉛	**Total Hours (HOURS)**	Refer to G3X Installation Manual for more information.	

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Example Engine (ENG) Page Configuration
(Full-Screen MFD)

Green bands on the instruments indicate normal ranges of operation; yellow and red bands indicate caution and warning, respectively. When unsafe operating conditions occur, the corresponding caution readout will display solid yellow and the warning readout will flash red. If sensory data to an instrument becomes invalid or unavailable, a red "X" is displayed across the instrument.
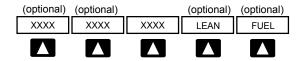
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ENG PAGE SOFTKEYS (EXAMPLE CONFIGURATION)

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✓ **NOTE:** *The Engine (ENG) Page softkeys displayed are dependant on the configuration. Refer to the G3X Installation Manual for information on configuring the Engine Page.*

If the Engine Page information configured exceeds one page, additional engine gauges may be distributed among the 1st, 2nd, and 3rd softkeys as required.

(optional)	(optional)		(optional)	(optional)
XXXX	XXXX	XXXX	LEAN	FUEL
▲	▲	▲	▲	▲

MAIN, TEMPS — Displays engine gauges as required (optional)

AUX, AUX1, AUX2, ELEC, TRIM, TEMPS — Displays additional engine gauges as required (optional)

LEAN — Activates/deactivates Lean Assist (optional)

FUEL — Displays Fuel Calculator (optional)

3.2 LEAN ASSIST MODE (OPTIONAL)

✓ **NOTE:** *The pilot should follow the engine manufacturer's recommended leaning procedures as described in the Pilot's Operating Handbook (POH).*

A **LEAN** Softkey is displayed on the ENG Page if Lean Assist Mode is enabled and at least one Exhaust Gas Temperature (EGT) or Turbine Inlet Temperature (TIT) input is configured (refer to the G3X Installation Manual for more information).

Using Lean Assist Mode:

From the ENG Page, press the **LEAN** Softkey. As the mixture is leaned, one of the cylinders' exhaust temperature will peak. Continuing to lean the mixture will cause each additional cylinder to peak (if applicable) until the last of the cylinders peaks. To cancel Lean Assist Mode, press the **LEAN** Softkey again.
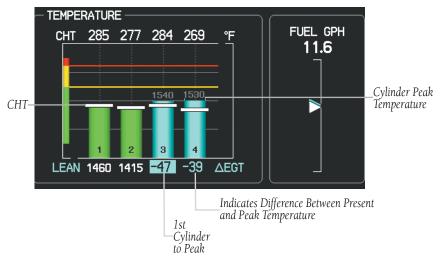
When the **LEAN** Softkey is selected, the Lean Assist Mode waits for a cylinder's EGT to reach a peak temperature and decrease by at least 7°F. The peak EGT for each cylinder is displayed as a small grey number above each bar on the graph. To prevent detection of false peaks, the system waits for a cylinder's EGT to increase by at least 15°F before detecting a peak. In addition, if the cylinder temperature rises above a previously detected peak by more than 100°F, the previous peak is considered false.

A cylinder temperature bar graph appears if CHT/EGT data is configured on 4 or more cylinders. A readout showing the temperature deviation from peak (ΔEGT) is displayed in place of the normal EGT temperature number. The temperature deviation of the first cylinder to peak is highlighted light blue. A light blue outline appears around the temperature deviation of the last cylinder to peak. A light blue hollow box appears above the cylinder's bar to represent the peak EGT for that cylinder.

Leaning to First Peak (ENG Page - Full-Screen MFD)

✓ **NOTE:** A '+' (ΔEGT) value indicates that the current temperature is greater than the previously detected peak.

Fuel Flow Corresponding to Peak EGT

Last Cylinder to Peak
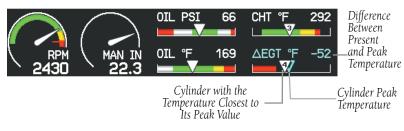
Leaning to Last Peak (ENG Page - Full-Screen MFD)

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If a fuel flow sensor is configured, the fuel flow value detected as the first cylinder peaks is saved (see above). The fuel flow corresponding to peak EGT is drawn on the fuel flow gauge as a hollow blue pointer. This can be used to determine if you are on the rich side of peak (ROP) or the lean side of peak (LOP). Rich of Peak (ROP) if the fuel flow pointer is above the blue triangle, or Lean of Peak (LOP) if the fuel flow pointer is below the blue triangle.

The EIS Display (See Section 3.1) and the split-screen ENG Page will display the cylinder whose temperature is currently closest to its own peak value (when Lean Assist Mode is active) as a white pointer with the cylinder number. The peak temperature is depicted by a hollow blue pointer, and the temperature deviation from peak (ΔEGT or ΔTIT) is displayed in place of the normal temperature number in light blue text.

Difference Between Present and Peak Temperature

Cylinder with the Temperature Closest to Its Peak Value

Cylinder Peak Temperature

Engine Instrument Display (Split-Screen)

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Difference Between Present and Peak Temperature

Cylinder Peak Temperature

1st Cylinder to Peak
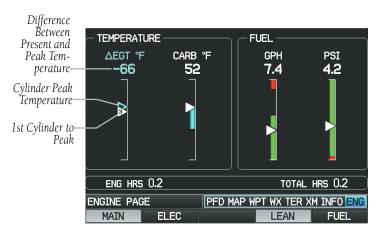
Lean Assist Mode - ENG Page
(Split-Screen)

If Turbine Inlet Temperature (TIT) inputs are configured, the first and last TIT to peak are not identified.

Lean Assist Mode - Turbine Inlet Temperature (ENG Page)

GARMIN.

3.3 FUEL CALCULATOR (OPTIONAL)

⚠️ **WARNING:** *The G3X Fuel Calculator and/or Fuel Range Rings are NOT intended to be relied upon as the primary fuel indicator(s), and does not relieve the pilot from the responsibility of proper flight planning. G3X fuel calculations do not use the aircraft fuel quantity indicators and are calculated from the last time the fuel was reset.*

✓ **NOTE:** *An optional Fuel Flow Sensor must be configured for the FUEL Softkey to appear on the ENG Page. Refer to the Installation Manual for more information.*

Refer to the Section 5.2, Using Map Displays, for information on displaying fuel range rings on the Navigation Map.

Adjusting the Fuel Remaining or Fuel Used quantity:

1) From the ENG Page, press the **FUEL** Softkey.

2) Press the **FMS** Joystick to activate the cursor.

3) Move the **FMS** Joystick to the Fuel Remaining or Fuel Used Field (if necessary).

4) Turn the **FMS** Joystick to adjust the desired quantity.

Resetting the Fuel Used to zero and Fuel Remaining to full tanks:

1) From the ENG Page, press the **FUEL** Softkey.

2) Press the **RESET** Softkey; this resets Fuel Used to zero and Fuel Remaining to the maximum fuel capacity for the aircraft.

Resetting Fuel Remaining only:

1) From the ENG Page, press the **FUEL** Softkey.

2) Press Softkey #2 (**XX GAL**); this resets only Fuel Remaining to the maximum fuel capacity for the aircraft. XX is the airframe specific full fuel quantity.

Resetting Fuel Remaining to partial fuel quantities (optional):

1) From the ENG Page, press the **FUEL** Softkey.

2) Press Softkey #3 or #4 (**XX GAL**); this resets fuel remaining to a partial tank quantity (i.e., filler neck tab). XX is the airframe specific partial fuel quantity (if configured).

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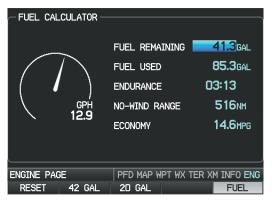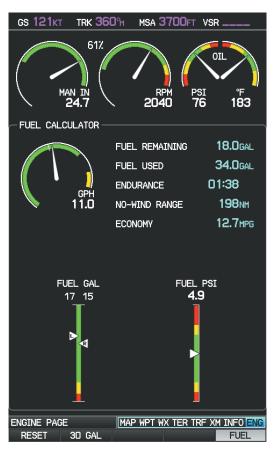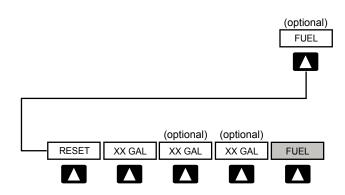
Fuel Calculator (Split-Screen)

Fuel Calculator (Full-Screen MFD)

FUEL CALCULATOR SOFTKEYS

(optional)

| FUEL |

▲

(optional) (optional)

| RESET | XX GAL | XX GAL | XX GAL | FUEL |

▲   ▲   ▲   ▲   ▲

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RESET   Resets fuel used to zero and fuel remaining to full tanks

XX GAL   Sets fuel remaining to the full tank quantity where XX is the airframe specific full fuel quantity

XX GAL   Sets fuel remaining to a partial tank quantity (i.e., filler neck tab) where XX is an airframe specific partial fuel quantity (optional)

XX GAL   Sets fuel remaining to a partial tank quantity (i.e., filler neck tab) where XX is an airframe specific partial fuel quantity (optional)

FUEL   Returns to top-level softkeys

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CONFIRMING FUEL QUANTITY

When the system detects that fuel has been added, a 'Confirm Fuel Quantity' Reminder Page appears when the system is powered on.

CONFIRM FUEL QUANTITY SOFTKEYS

RESET	XX GAL	XX GAL		DONE

RESET	Resets fuel used to zero and fuel remaining to full tanks
XX GAL	Sets fuel remaining to the full tank quantity where XX is the airframe specific full fuel quantity
XX GAL	Sets fuel remaining to a partial tank quantity (i.e., filler neck tab) where XX is an airframe specific partial fuel quantity (optional)
DONE	Returns to top-level softkeys

'Confirm Fuel Quantity' Reminder Page

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Adjusting the Fuel Remaining or Fuel Used quantity:

1) Move the **FMS** Joystick to the Fuel Remaining or Fuel Used Field (if necessary).

2) Turn the **FMS** Joystick to adjust the desired quantity.

Resetting the Fuel Used to zero and Fuel Remaining to full tanks:

Press the **RESET** Softkey; this resets Fuel Used to zero and Fuel Remaining to the maximum fuel capacity for the aircraft

Resetting Fuel Remaining only:

Press Softkey #2 (**XX GAL**); this resets only Fuel Remaining to the maximum fuel capacity for the aircraft. XX is the airframe specific full fuel quantity.

Resetting Fuel Remaining to partial fuel quantities (optional):

Press Softkey #3 or #4 (**XX GAL**); this resets fuel remaining to a partial tank quantity (i.e., filler neck tab). XX is the airframe specific partial fuel quantity (if configured).

3.4 CAS MESSAGES (OPTIONAL)

The CAS messages displayed depend upon the current configuration, and will vary from the examples listed below. Refer to the G3X Installation Manual for more information on configuring CAS messages (if applicable).

CAS Messages are grouped by criticality (warning, caution, advisory). The color of the message is based on its urgency and on required action:

- **WARNING (red):** Requires immediate attention. Warning messages will flash until acknowledged by pressing the **ENT** Key.

- **CAUTION (yellow)**: Requires pilot awareness and possible future corrective action.

- **ADVISORY (white):** Provides general information.

Warning annunciation text is shown in red in the CAS Annunciation Window on the full-screen PFD and/or the split-screen PFD Page (dependent on number of CAS messages configured). The CAS Annunciation Window is located to the right of the Horizontal Situation Indicator.

CAS Warning Example
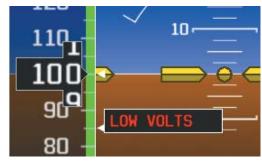
Important CAS Messages may not be visible at all times (e.g., the split-screen PFD Page is not displayed, or FPL/NRST Pages are displayed on the full-screen PFD). In that case a Check Alerts Triangle is displayed to the right of the Airspeed Indicator as a reminder to check the CAS Messages.

CAS Warning Example (Check Alerts Triangle)

If less than four CAS Messages are configured for the system, the CAS Messages are displayed to the right of the Airspeed Indicator and the Check Alerts Triangle is not displayed.

CAS Warning Example

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Blank Page

SECTION 4 CNS INTERFACE

4.1 AUTO-TUNING FREQUENCIES (OPTIONAL)

> *NOTE: Refer to the G3X Installation Manual for more information on the G3X optional communication interfaces.*

Frequencies can be automatically tuned from the following:
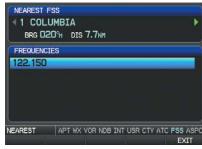
- Map Page
- Weather Page
- Waypoint Page
- Nearest Airports Page
- Nearest Airport Weather Page
- Nearest ARTCC Page
- Nearest FSS Page
- Nearest Airspace Page

Auto-tuning a frequency from the Nearest Pages:

1) Press the **NRST** Key to display the Nearest Pages.

2) Turn the **FMS** Joystick to select the Nearest (Airports, Airport Weather, ARTCC, FSS, or Airspace) Page.

3) From the Nearest ARTCC or Nearest FSS, move the **FMS** Joystick to highlight the desired frequency.

| **Nearest ARTCC (Split-Screen)** | **Nearest FSS (Split-Screen)** |

Or:

a) From the Nearest Airport Weather Page, highlight the desired airport weather, and press the **ENT** Key.

b) With the Weather Information Page displayed, press the **INFO** Softkey.

c) Move the **FMS** Joystick to highlight the desired frequency.

Or:

a) From the Nearest Airspace Page, highlight the desired airspace, and press the **ENT** Key.

b) Press the **FREQS** Softkey.

c) Move the **FMS** Joystick to highlight the desired frequency.

Or:

a) From the Nearest Airport Page, highlight the desired airport and press the **ENT** Key. The Airport Information Page is displayed.

b) Move the **FMS** Joystick to highlight the desired frequency.

Airport Information Page (Split-Screen)

4) Press the **ENT** Key to load the frequency into the standby field of the SL40. If the frequency has an * (additional information available) next to it, press the **ENT** Key a second time with 'Tune' highlighted.

**Frequency with Additional Information
(Split-Screen)**

Auto-tuning a frequency from the Map Page and Weather Page:

1) Press the **FMS** Joystick on the Map Page (or **PAN MAP** Softkey on the Weather (WX) Page) to display the Map Pointer.

2) Place the Map Pointer on a map feature (airport, METAR Flag, etc.). If multiple map features are present at the Map Pointer position (green arrow in the information box), turn the **FMS** Joystick to cycle through the list.

3) Press the **ENT** Key to display the review page for the highlighted feature.

4) If necessary, press the **INFO** Softkey to access the Airport Information Page.

5) Move the **FMS** Joystick to highlight the desired frequency.

6) Press the **ENT** Key to load the frequency into the standby field of the SL40. If the frequency has an * (additional information available) next to it, press the **ENT** Key a second time with 'Tune' highlighted.

Auto-tuning a frequency from the Waypoint Page:

1) From the Waypoint Page, enter the desired waypoint using the **FMS** Joystick.

2) Move the **FMS** Joystick to highlight the desired frequency.

3) Press the **ENT** Key to load the frequency into the standby field of the SL40. If the frequency has an * (additional information available) next to it, press the **ENT** Key a second time with 'Tune' highlighted.

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4.3 REMOTE TRANSPONDER INTERFACE (OPTIONAL)

NOTE: *If the aircraft is configured with a remote transponder rudder and aileron trim indicators are not available on the PFD. All trim gauges are available from the ENG page.*

The G3X is capable of interfacing with several remote transponders providing Mode S interrogation and reply capabilities. Selective addressing or Mode Select (Mode S) capability includes the following features:
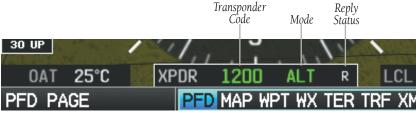
- Level-2 reply data link capability (used to exchange information between aircraft and ATC facilities)

- Surveillance identifier capability

- Flight ID (Flight Identification) reporting - The Mode S Transponder reports identification as either the aircraft registration or a unique Flight ID.

- Altitude Reporting

- Airborne status determination

- Transponder capability reporting

- Mode S Enhanced Surveillance (EHS) requirements

- Acquisition squitter - Acquisition squitter, or short squitter, is the transponder 24 bit identification address. The transmission is sent periodically, regardless of the presence of interrogations. The purpose of the acquisition squitter is to enable Mode S ground stations and aircraft equipped with a Traffic Avoidance System (TAS) to recognize the presence of Mode S-equipped aircraft for selective interrogation.

When configured the transponder interface is displayed on three levels of softkeys on the PFD: Top-level, Mode Selection, and Code Selection. When the top-level XPDR Softkey is pressed, the associated transponder softkeys appear: IDENT, CODE, and MODE.

When the CODE Softkey is pressed, the pilot can enter the desired code using the FMS Joystick.
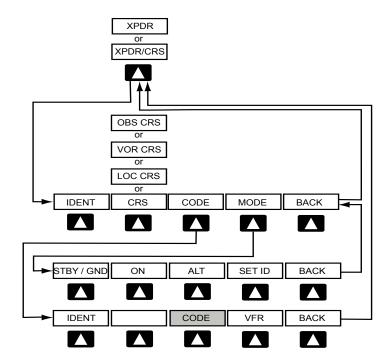
Pressing the IDENT Softkey initiates the ident function and reverts to the top-level softkeys.

Transponder Code   *Mode*   *Reply Status*

Transponder Data Box (Split-Screen)

With a remote transponder configured, the #2 PFD Softkey becomes **XPDR** (if a navigation source is not selected) or **XPDR/CRS** (when the pilot can control the navigation course).

IDENT	Sends a distinct identity indication to Air Traffic Control (ATC).
CRS (subdued)	A navigation source is not selected
or	

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OBS CRS	Allows the pilot to adjust the OBS course
or	
VOR CRS	Allows the pilot to adjust the VOR course
or	
LOC CRS	Allows the pilot to adjust the localizer course
CODE	Allows the pilot to enter the transponder code and displays the second-level **CODE** softkeys
MODE	Displays second-level **MODE** softkeys
BACK	Returns to top-level softkeys

CODE Softkey selected

IDENT	Sends a distinct identity indication to Air Traffic Control (ATC).
CODE	Returns to top-level softkeys
VFR	The pre-programmed VFR code is automatically displayed in the code field of the Transponder Data Box. Pressing the **VFR** softkey again restores the previous identification code.
BACK or DONE	Returns to top-level softkeys

MODE Softkey selected

STBY	Selects the standby mode. When in standby mode, the remote transponder will not reply to any interrogations. Press and hold to put the transponder in Ground (GND) Mode. Ground Mode is normally selected automatically when the aircraft is on the ground.
ON	Generates Mode A and Mode S replies, but Mode C altitude reporting is inhibited.
ALT	Selects ALT Mode. All transponder replies requesting altitude information are provided with pressure altitude information.
SET ID	Allows the pilot to set the Flight ID. (The Flight ID must be configured to 'Set By Pilot' for the **SET ID** softkey to be displayed).
BACK	Returns to previous level softkeys

TRANSPONDER MODE SELECTION

The transponder mode will automatically switch between GND Mode and ALT Mode. The mode can also be manually set using the softkeys.

Selecting a transponder mode:

1) From the full-screen PFD and/or the split-screen PFD Page, press the **XPDR** Softkey.

2) Press the **MODE** Softkey.

3) Press the desired mode softkey (**STBY** / **GND**, **ON**, or **ALT**). Pressing and holding the **STBY** Softkey activates Ground (GND) Mode and the **STBY** Softkey becomes the **GND** Softkey.

GROUND MODE

Ground Mode is normally selected automatically when the aircraft is on the ground. The transponder powers up in the last mode it was in when shut down. To manually select Ground Mode, press and hold the **STBY** Softkey. A green GND indication and transponder code appear in the mode field of the Transponder Data Box and the **STBY** Softkey becomes the **GND** Softkey. In Ground Mode, the transponder does not allow Mode A and Mode C replies, but it does permit acquisition squitter and replies to discretely addressed Mode S interrogations.

Deselect (press) the **GND** Softkey to return to Standby Mode.

STANDBY MODE (MANUAL)

Standby Mode can be selected at any time by pressing the **STBY** Softkey. In Standby, the transponder does not reply to interrogations, but new codes can be entered. When Standby Mode is selected, a white STBY indication and transponder code appear in the mode field of the Transponder Data Box.

MANUAL ON MODE

ON Mode can be selected at any time by pressing the **ON** Softkey. ON Mode generates Mode A and Mode S replies, but Mode C altitude reporting is inhibited. In ON Mode, a green ON indication and transponder code appear in the mode field of the Transponder Data Box.

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ALTITUDE MODE (AUTOMATIC OR MANUAL)

Altitude Mode is automatically selected when the aircraft becomes airborne. Altitude Mode may also be selected manually by pressing the **ALT** Softkey.

If Altitude Mode is selected, a green ALT indication and transponder code appear in the mode field of the Transponder Data Box, and all transponder replies requesting altitude information are provided with pressure altitude information.

REPLY STATUS

When the transponder sends replies to interrogations, a white R indication appears momentarily in the Transponder Data Box.

ENTERING A TRANSPONDER CODE

Entering a transponder code:

1) From the full-screen PFD and/or split-screen PFD Page, press the **XPDR** Softkey.

2) Press the **CODE** Softkey. A Transponder Code Box appears with the cursor on the first digit in the code.

3) Enter the desired code using the **FMS** Joystick and press the **ENT** Key.

Transponder Code Entry   *CODE Softkey*

Transponder Code Entry (Split-Screen PFD Page)

VFR CODE

The VFR code can be entered either manually or by pressing the **XPDR** Softkey, the **CODE** Softkey, then the **VFR** Softkey. When the **VFR** Softkey is pressed, the pre-programmed VFR code is automatically displayed in the code field of the Transponder Data Box. Pressing the **VFR** Softkey again restores the previous identification code.

IDENT FUNCTION

Pressing the **IDENT** Softkey sends a distinct identity indication to Air Traffic Control (ATC). The indication distinguishes the identing transponder from all the others on the air traffic controller's screen. When the **IDENT** Softkey is pressed, a white IDENT indication is displayed in the mode field of the Transponder Data Box for a duration of 18 seconds.

ADS-B OUT

When configured with an ADS-B Out capable transponder, **'NO ADSB'** is displayed in yellow, in the Transponder Data Box, if the ADS-B Out broadcast has been manually disabled or if the transponder does not have the required GPS data.

Transponder is not broadcasting ADS-B Out data

NO ADS-B (Split-Screen PFD Page)

GARMIN.
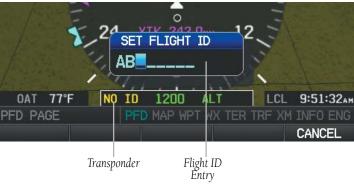
FLIGHT ID REPORTING

✓ *NOTE: The Flight ID must be configured to 'Set By Pilot' in Configuration Mode for the **SET ID** Softkey to appear. Refer to the G3X Installation Manual for more information.*

Entering a Flight ID:

1) From the full-screen PFD and/or the split-screen PFD Page, press the **XPDR** Softkey.

2) Press the **MODE** Softkey.

3) Press the **SET ID** Softkey. The 'SET FLIGHT ID' Window appears.

4) Enter the desired Flight ID using the **FMS** Joystick and press the **ENT** Key.

Transponder   *Flight ID Entry*

Flight ID Entry (Split-Screen PFD Page)

SECTION 5 GPS NAVIGATION

5.1 INTRODUCTION

The Map Page displays aviation data (e.g., airports, VORs, airways, airspaces), geographic data (e.g., cities, lakes, highways, borders), and topographic data (map shading indicating elevation) to be used for situational awareness only. The Navigation Map can be oriented three different ways: North Up (NORTH UP), Track Up (TRK UP) or Desired Track Up (DTK UP).

An aircraft icon is placed on the Navigation Map at the location corresponding to the calculated present position. The aircraft position and the flight plan legs are accurately based on GPS calculations. The basemap upon which these are placed are from a source with less resolution, therefore the relative position of the aircraft to map features is not exact. The leg of the active flight plan currently being flown is shown as a magenta line on the navigation map. The other legs are shown in white.
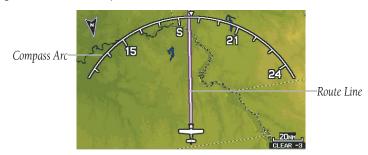
The Direct-to Window, the Flight Plan Pages, and the Nearest Airports Pages can be displayed by pressing the corresponding hardkeys.

COMPASS ARC

> ✓ **NOTE:** The compass arc is not available in 'North Up' map orientation.

A compass arc representing the aircraft's ground track, appears by default on the Map Page. The route line represents the course.

Compass Arc (Map Page)

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Removing the Compass Arc from the Map Page:

1) With the Map Page displayed, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map' and press the **ENT** Key.

3) Turn the **FMS** Joystick to highlight the 'General' Menu.

4) Move the **FMS** Joystick to highlight the 'Compass Arc' field.

5) Turn the **FMS** Joystick to access the 'On/Off' drop down list.

6) Turn or move the **FMS** Joystick to highlight 'Off', and press the **ENT** Key.

5.2 USING MAP DISPLAYS

⚠️ *WARNING: The G3X map displays are to be used for situational awareness only.*

Map displays are used extensively in the G3X to provide situational awareness in flight. Most G3X maps can display the following information:

- Airports, NAVAIDs, airspaces, airways, land data (highways, cities, lakes, rivers, borders, etc.) with names

- Map Pointer information (distance and bearing to pointer, location of pointer, name, and other pertinent information)

- Map range

- Aircraft icon (representing present position)

- Flight plan legs

- User waypoints

- Track vector

- Topography data

The information in this section applies to the following maps unless otherwise noted:

- All Map Pages (MAP)

- Waypoint Page (WPT)

- Split-Screen: The Waypoint Page when the **RUNWAY** Softkey is pressed.

- Full-Screen: The Waypoint Page when the **INFO** Softkey is pressed.

- All Nearest Pages (NRST) (Full-Screen)

- Flight Plan Pages (FPL) (Full-Screen)

- Direct-to Window (Full-Screen)

MAP PAGE SETUP

MAP ORIENTATION

Maps are shown in one of three different orientation options, allowing flexibility in determining aircraft position relative to other items on the map (North Up) or for determining where map items are relative to where the aircraft is going (Track Up), or desired track up (DTK UP).

- North Up aligns the top of the map display to north (default setting).

- Track Up aligns the top of the map display to the current ground track.

- Desired Track (DTK) Up aligns the top of the map display to the desired course.

> **NOTE:** Map orientation can only be changed on the Map Page. Any other pages that show navigation data reflect the orientation selected for the Map Page.

Changing the Navigation Map orientation:

1) With the Map Page displayed, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map' and press the **ENT** Key.

3) Turn the **FMS** Joystick to highlight the 'General' Menu.

   a) Move the **FMS** Joystick to highlight the 'Orientation' field.

   b) Turn the **FMS** Joystick to access a list of available options.

   c) Turn or move the **FMS** Joystick to highlight 'North Up', 'Track Up', or 'DTK Up', and press the **ENT** Key.

   Or:

   a) Move the **FMS** Joystick to highlight the 'North Up Above' field.

   b) Turn the **FMS** Joystick to access a list of available range options.

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c) Turn or move the **FMS** Joystick to highlight the desired range above which to display North Up orientation.

Or:

a) Move the **FMS** Joystick to highlight the 'North Up On GRND' field.

b) Using the **FMS** Joystick highlight 'On' or 'Off', and press the **ENT** Key. When 'North Up On GRND' is 'ON' (default), the map orientation will change to North Up when the aircraft is on the ground.

Map Page Menu	General Menu (Map Setup Page)

AIRPORTS & NAVAIDS

Airport and NAVAID information can be customized to display a variety of information including: runway extension lines, runway numbers and visual reporting points (VRP). Runway extension lines show runway orientation relative to other landmarks and terrain features and are intended to aid in planning traffic pattern entry and/or departure routing.

Runway Extension line

Runway Number

Runway Extensions and Numbers (Map Page)

Setting up and customizing airports and NAVAIDs for the map page:

1) From the Map Page press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map' and press the **ENT** Key.

3) Turn the **FMS** Joystick to select the 'Airport' or 'NAVAID' Category from the horizontal list.

4) Move the **FMS** Joystick to highlight the desired feature.

5) Turn the **FMS** Joystick to access a list of options for each feature (On/Off, Auto, range settings, text size, etc).

6) Using the **FMS** Joystick select the desired option and press the **ENT** Key.

7) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the Map Page with the changed settings.

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MAP SETUP		
◀ AIRPORT		▶
LARGE AIRPORT	AUTO ▼	LRG TEXT ▼
MEDIUM AIRPORT	AUTO ▼	LRG TEXT ▼
SMALL AIRPORT	AUTO ▼	MED TEXT ▼
PRIVATE AIRPORT	AUTO ▼	SML TEXT ▼
HELIPORT	AUTO ▼	SML TEXT ▼
RUNWAY NUMBERS	AUTO ▼	
RUNWAY EXTENSION	AUTO ▼	
SAFETAXI	ON ▼	

Map Setup Page (Airport Category)

MAP SETUP		
◀ NAVAID		▶
AIRWAYS	OFF ▼	
VOR	AUTO ▼	MED TEXT ▼
NDB	AUTO ▼	MED TEXT ▼
INTERSECTION	AUTO ▼	SML TEXT ▼
VRP	AUTO ▼	SML TEXT ▼
AIR SPORTS SITE	AUTO ▼	NO TEXT ▼

Map Setup Page (NAVAID Category)

CITIES & ROADS

Setting up and customizing cities and roads for the map page:

1) From the Map Page press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map' and press the **ENT** Key.

3) Turn the **FMS** Joystick to select the 'City' or 'Road' Category from the horizontal list.

4) Move the **FMS** Joystick to highlight the desired feature.

5) Turn the **FMS** Joystick to access a list of options for each feature (On/Off, Auto, range settings, or text size).

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6) Using the **FMS** Joystick select the desired option and press the **ENT** Key.

7) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the Map Page with the changed settings.

```
MAP SETUP
◄ CITY                                          ►
LARGE CITY     AUTO      ▼    MED TEXT ▼
MEDIUM CITY    AUTO      ▼    MED TEXT ▼
SMALL CITY     AUTO      ▼    MED TEXT ▼
SMALL TOWN     AUTO      ▼    MED TEXT ▼
```

```
MAP SETUP
◄ ROAD                                          ►
INTERSTATE      AUTO      ▼
HIGHWAY         AUTO      ▼
LOCAL HIGHWAY   AUTO      ▼
LOCAL ROAD      AUTO      ▼    SML TEXT ▼
RAILROAD        AUTO      ▼    NO TEXT ▼
```
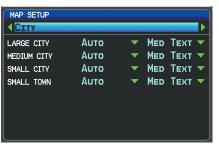
Map Setup Page (City Category)   **Map Setup Page (Road Category)**
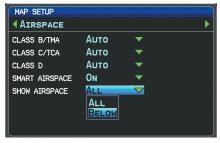
AIRSPACE

Setting up and customizing airspace for the map page:

1) From the Map Page press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map' and press the **ENT** Key.

3) Turn the **FMS** Joystick to select the 'Airspace' or 'SUA' (Special Use Airspace) Category from the horizontal list.

4) Move the **FMS** Joystick to highlight the desired feature.

5) Turn the **FMS** Joystick to access a list of options for each feature (On/Off, Auto, range settings, All (Atlantic), or Below (Atlantic)).

6) Using the **FMS** Joystick select the desired option and press the **ENT** Key.

7) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the Map Page with the changed settings.

```
MAP SETUP
◄ AIRSPACE                                      ►
CLASS B/TMA     AUTO      ▼
CLASS C/TCA     AUTO      ▼
CLASS D         AUTO      ▼
SMART AIRSPACE  ON        ▼
```

```
MAP SETUP
◄ AIRSPACE                                      ►
CLASS B/TMA     AUTO      ▼
CLASS C/TCA     AUTO      ▼
CLASS D         AUTO      ▼
SMART AIRSPACE  ON        ▼
SHOW AIRSPACE   ALL       ▽
                ALL
                BELOW
```

Map Setup Page (Airspace Category)   **Map Setup Page (Airspace Category - Atlantic)**

MAP RANGE

There are 23 different map ranges available, from 200 feet to 800 nm. The current range is indicated in the lower right corner of the map. **The scale bar represents the map scale.** To change the map range on any map, use the down arrow on the **RNG** Key to zoom in (decreasing), or the up arrow to zoom out (increasing).

When the selected range exceeds the resolution of the map data, 'overzoom' appears below the map range scale.

Scale Bar Representing a Map Scale of 3 nm Per Scale Width.

Map Range/Overzoom (Split-Screen)

AUTO ZOOM

Auto Zoom allows the G3X to change the map display range to the smallest range clearly showing the active waypoint. Auto Zoom can be overridden by adjusting the range and remains that way until the active waypoint changes, a terrain or traffic alert occurs, or the aircraft takes off.

Enabling/disabling Auto Zoom:

1) With the Map Page displayed, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map' and press the **ENT** Key.

3) Turn the **FMS** Joystick to highlight the 'General' Menu.

4) Move the **FMS** Joystick to highlight the 'Autozoom' field.

5) Turn the **FMS** Joystick to access the 'On/Off' drop down list.

6) Turn or move the **FMS** Joystick to highlight the desired option, and press the **ENT** Key.

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MAP PANNING
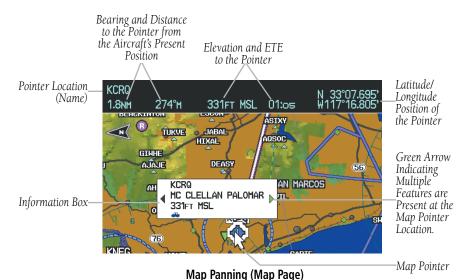
Map panning allows the pilot to:

- View parts of the map outside the displayed range without adjusting the map range

- Highlight and select locations on the map

- Review information for a selected airport, NAVAID or user waypoint

- Designate locations for use in flight planning

- View airspace and airway information

When the panning function is selected by pressing the **FMS** Joystick (**PAN MAP** Softkey on the Weather Page) the Map Pointer flashes on the map display. A window also appears at the top of the map display showing the latitude/longitude position of the pointer, the bearing and distance to the pointer from the aircraft's present position, the elevation of the land at the position of the pointer, or the object's (airports, obstacles, etc) elevation, if known.

When the Map Pointer is placed on a map feature, the map feature is highlighted and an information box appears (even if the name was not originally displayed on the map).

Pressing the **ENT** Key displays a review page for the highlighted map feature. If multiple features are present at the Map Pointer position, a green arrow will appear in the information box. Turning the **FMS** Joystick will cycle through the list of map features present at that position.

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Bearing and Distance to the Pointer from the Aircraft's Present Position

Elevation and ETE to the Pointer

Pointer Location (Name)

Latitude/ Longitude Position of the Pointer

Green Arrow Indicating Multiple Features are Present at the Map Pointer Location.

Information Box

KCRQ
MC CLELLAN PALOMAR
331FT MSL

Map Pointer

Map Panning (Map Page)

Panning the map:

1) Press the **FMS** Joystick (or **PAN MAP** Softkey on the Weather (WX) Page) to display the Map Pointer.

2) Move the **FMS** Joystick to move the Map Pointer around the map.

3) Press the **FMS** Joystick to remove the Map Pointer and re-center the map on the aircraft's current position.

Reviewing information for a map feature:

1) Place the Map Pointer on a map feature. If multiple map features are present at the Map Pointer position (green arrow in the information box), turn the **FMS** Joystick to cycle through the list.

2) Press the **ENT** Key to display the review page for the highlighted feature.

3) Press the **FMS** Joystick, the **CLR** Key, or the **ENT** Key to exit the review page and return to the Map Page showing the selected waypoint.

FUEL RANGE RING
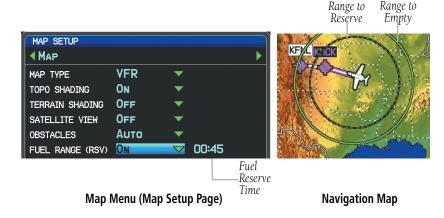
⚠️ **WARNING:** *The G3X Fuel Calculator and/or Fuel Range Rings are NOT intended to be relied upon as the primary fuel indicator(s), and does not relieve the pilot from the responsibility of proper flight planning. G3X fuel calculations do not use the aircraft fuel quantity indicators and are calculated from the last time the fuel was reset.*

The Navigation Map can display fuel range rings which show the remaining flight distance. If current fuel endurance is greater than reserve, range-to-empty is shown as a solid green circle and range-to-reserve is a dashed green circle. If current endurance is less than reserve, range-to-empty is shown as a solid yellow circle. Fuel range rings are offset to show the effects of the wind at the current location (e.g., does not account for wind variations throughout the range).

Displaying/removing the fuel range rings and selecting a fuel reserve time:

1) From the Map Page, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map', and press the **ENT** Key.

3) Turn the **FMS** Joystick to highlight the 'Map' Category from the horizontal list.

4) Move the **FMS** Joystick to highlight the 'Fuel Range (RSV)' field.

5) Using the **FMS** Joystick select (On/Off) or set the fuel reserve time and press the **ENT** Key.

6) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the Map Page with the changed settings.

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Range to Reserve *Range to Empty*

Fuel Reserve Time

Map Menu (Map Setup Page)   **Navigation Map**
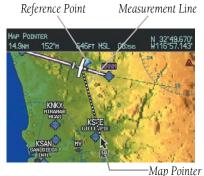
MEASURING BEARING AND DISTANCE

Distance and bearing from the aircraft's present position to any point on the viewable navigation map may be calculated using the 'Measure Distance' selection from Map Page menu. The distance tool displays a dashed Measurement Line and a Map Pointer to aid in graphically identifying points to measure. Lat/Long, bearing, distance, and elevation data for the Map Pointer is provided in a window at the top of the Map Page.

Measuring bearing and distance between any two points:

1) From the Map Page, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Measure Distance' and press the **ENT** Key. A Measure Pointer is displayed on the map at the aircraft's present position.

3) Move the **FMS** Joystick to place the reference pointer at the desired location. The bearing and distance are displayed at the top of the map. Elevation at the current pointer position is also displayed. Pressing the **ENT** Key changes the starting point for measuring.

4) To exit the Measure Bearing/Distance option, press the **FMS** Joystick; or select 'Stop Measuring' from the Page Menu and press the **ENT** Key.

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Reference Point   *Measurement Line*

Map Page Menu   **Map Page (Measure Distance)**

Map Pointer

TOPOGRAPHY

Topographic data can be displayed or removed as described in the following procedures.

Displaying/removing topographic data:

1) Press the **MAP** Softkey on the Map Page. Press the **VFR MAP** Softkey (if necessary).

2) Press the **TOPO** Softkey. Topographic data is displayed.

3) Press the **TOPO** Softkey again to remove topographic data from the Navigation Map.

Or:

1) From the Map Page, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map', and press the **ENT** Key.

3) Turn the **FMS** Joystick to highlight the 'Map' Category from the horizontal list.

4) Move the **FMS** Joystick to highlight the 'Topo Shading' field.

5) Turn the **FMS** Joystick to select 'On' or 'Off', and press the **ENT** Key.

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VFR MAP Softkey *TOPO Softkey*

Topographic Data (Map Page)
(Split-Screen)

SATELLITE VIEW

The Satellite View displays satellite imagery above 20nm.

Displaying/removing satellite imagery on the map page:

1) Press the **MAP** Softkey on the Map Page. Press the **VFR MAP** Softkey (if necessary).

2) Press the **SAT VIEW** Softkey. Satellite imagery is displayed on the map.

3) Press the **SAT VIEW** Softkey again to remove satellite imagery from the Navigation Map.

 Or:

1) From the Map Page, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map', and press the **ENT** Key.

3) Turn the **FMS** Joystick to highlight the 'Map' Category from the horizontal list.

4) Move the **FMS** Joystick to highlight the 'Satellite View' field.

5) Turn the **FMS** Joystick to select 'On' or 'Off', and press the **ENT** Key.

VFR MAP Softkey   *SAT VIEW Softkey*

Satellite View (Map Page)
(Split-Screen)

MAP PAGE TRAFFIC

Enabling/disabling traffic on the Map Page:

1) From the Map Page, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map', and press the **ENT** Key.

3) If necessary, turn the **FMS** Joystick to highlight the 'Map' Category from the horizontal list.

4) Move the **FMS** Joystick to highlight the 'Traffic Data' field.

5) Turn the **FMS** Joystick to select 'On' or 'Off', and press the **ENT** Key.

MAP SYMBOLS

Refer to Appendix G for a list of map symbols.

MAP DECLUTTER

The pilot can remove (declutter) unwanted items, such as highways from the map.

Decluttering the Map Page:

1) From any Map Page, press the **CLR** Key. 'CLEAR-1' appears below the map range. The background symbols (such as highways, cities, rivers, and smaller lakes) are removed from the map.

2) Press the **CLR** Key again. 'CLEAR-2' appears below the map range and airspace boundary detail is removed from the map.

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3) Press the **CLR** Key again. 'CLEAR-3' appears below the map range. Only the waypoints and navaids that are part of the current flight plan appear on the map.

4) Press the **CLR** Key again to return 'ALL' detail to the map.

Map Declutter (Split-Screen)

MAP DETAIL

The map detail can also be adjusted. Map detail changes the amount of detail with respect to the zoom scale.

Adjusting the map detail:

1) From the Map Page, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map', and press the **ENT** Key.

3) Turn the **FMS** Joystick to highlight the 'General' Category from the horizontal list.

4) Move the **FMS** Joystick to highlight the 'Detail Level' field.

5) Turn the **FMS** Joystick to select the desired detail level ('Most', 'More', 'Normal', 'Less', or 'Least'), and press the **ENT** Key.
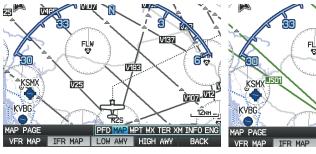
5.3 AIRWAYS

⚠️ *WARNING: Do not use the approach information provided by the VFR navigation database residing within the G3X as a means of navigating any instrument approach. The G3X VFR navigation database is limited to present only the waypoints for the final approach leg of a published procedure. These waypoints and associated course line are made available for monitoring purposes only.*
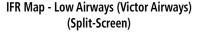
Low Altitude Airways (or Victor Airways) primarily serve smaller piston-engine, propeller-driven airplanes on shorter routes and at lower altitudes. Airways are eight nautical miles wide and start 1,200 feet above ground level (AGL) and extend up to but not including 18,000 feet mean sea level (MSL). Low Altitude Airways are designated with a "V" before the airway number (hence the name "Victor Airways") since they run primarily between VORs.

High Altitude Airways (or Jet Routes) primarily serve airliners, jets, turboprops, and turbocharged piston aircraft operating above 18,000 feet MSL. Jet Routes start at 18,000 feet MSL and extend upward to 45,000 feet MSL (altitudes above 18,000 feet are called "flight levels" and are described as FL450 for 45,000 feet MSL). Jet Routes are designated with a "J" before the route number.

Low Altitude Airways are drawn in gray. High Altitude Airways are drawn in green. When both types of airways are displayed, high altitude airways are drawn on top of Low Altitude Airways.

When airways are selected for display on the map, the airway waypoints (VORs, NDBs, and Intersections) are also displayed.

IFR Map - Low Airways (Victor Airways)
(Split-Screen)

IFR Map - High Airways (Jet Routes)
(Split-Screen)

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Airways may be displayed on the map at the pilot's discretion using the **MAP** Softkey on the Map Page.

Displaying/removing airways:

1) Press the **MAP** Softkey on the Map Page.

2) Press the **IFR MAP** Softkey to display the IFR Map and related softkeys.

3) Press the **LOW AWY** Softkey to display/remove the Low Altitude Airways.

4) Press the **HIGH AWY** Softkey to display/remove the High Altitude Airways.

5) Press the **BACK** Softkey to return to the top-level softkeys.

Reviewing information for an airway:

1) From the Map Page, press the **MAP** Softkey.

2) Press the **IFR MAP** Softkey (if necessary).

3) With the **LOW AWY** and/or **HIGH AWY** Softkeys selected, press the **FMS** Joystick to display the Map Pointer.

4) Place the Map Pointer on an airway. The MEA, name of airway, endpoints, distance, and calculated radials are displayed.

Reviewing Airway Information (Map Page)
(Split-Screen)

5) Press the **ENT** Key to display the review page for the airway.

```
LOW ALTITUDE AIRWAY
V71

MEA      3000FT
DISTANCE 77.6NM

  ⬦ SGF    311°M   116.90MHZ
  ⬦ BUM    128°M   115.90MHZ

              DONE
```

Low Altitude Airway Review Page
(Split-Screen)

6) Press the **FMS** Joystick, the **CLR** Key, or the **ENT** Key to exit the review page and return to the Map Page.

5.4 WAYPOINTS

The Waypoint (WPT) Page provides airport and waypoint information.

Waypoints are predetermined geographical positions (internal database) or pilot-entered positions, and are used for all phases of flight planning and navigation.
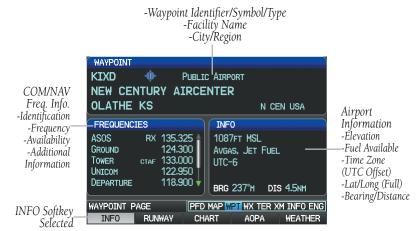
Waypoints can be changed by entering the ICAO identifier, entering the name of the facility, or by entering the city name. As a waypoint identifier, facility name, or location is entered, the G3X's Spell'N'Find™ feature scrolls through the database, displaying those waypoints matching the characters which have been entered up to that point. A direct-to navigation leg to the selected waypoint can be initiated by pressing the Direct-to Key from the Waypoint Page.

The Waypoint Page allows the pilot to review airport information, runway information, frequencies, instrument procedures, airport directory information, and weather information. The pilot can manually enter the identifier or the G3X will choose the most appropriate identifier based on the current position and phase of flight.

The following descriptions and abbreviations are used:

• Usage type: Public, Military, or Private

• Runway surface type: Hard, Turf, Sealed, Gravel, Dirt, Soft, Unknown, or Water

• Runway lighting type: No Lights, Part Time, Full Time, Unknown, or PCL Freq (for pilot-controlled lighting)

• COM Availability: TX (transmit only), RX (receive only), PT (part time), * (additional information available)

-Waypoint Identifier/Symbol/Type
-Facility Name
-City/Region

COM/NAV
Freq. Info.
-Identification
-Frequency
-Availability
-Additional
Information

Airport
Information
-Elevation
-Fuel Available
-Time Zone
(UTC Offset)
-Lat/Long (Full)
-Bearing/Distance

INFO Softkey
Selected

Waypoint Page (INFO Softkey Selected)
(Split-Screen)

Runway
Information
-Designation
-Length/Width
-Surface
-Lighting
-Traffic Pattern
-Wind (Full)

Map
Showing
Selected
Waypoint

RUNWAY
Softkey
Selected

Waypoint Page (RUNWAY Softkey Selected)
(Split-Screen)

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Waypoint Page (INFO Softkey Selected)
(Full-Screen MFD)

Selecting an airport for review by identifier, facility name, or location:

1) From the Waypoint (WPT) Page, press the **INFO** Softkey.

2) Press the **FMS** Joystick to activate the cursor.

3) Turn the **FMS** Joystick clockwise to begin entering a waypoint identifier (turning it counter-clockwise brings up the waypoint selection submenu - press the **CLR** Key or the **FMS** Joystick to remove it), or move the **FMS** Joystick to select the facility name, or city field.

4) Press the **ENT** Key.

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If duplicate entries exist for the entered facility name or location, additional entries may be viewed by continuing to turn the **FMS** Joystick during the selection process. If duplicate entries exist for an identifier, a Duplicate Waypoints Window is displayed. Press the **ENT** Key to move the cursor to the Duplicate Waypoints Window.

Duplicate Waypoints Window

SELECT WAYPOINT

IA_____   ⊛   NDB

● NDB GR LKS US
◇ NDB NE USA
◇ NDB BRAZIL

SELECT WAYPOINT

IA   ⊛   NDB

● NDB GR LKS US
◇ NDB NE USA
◇ NDB BRAZIL

Waypoint Information Window-Duplicate Identifier

Selecting a runway:

1) With the Waypoint (WPT) Page displayed, press the **INFO** Softkey.

2) Press the **FMS** Joystick to activate the cursor.

3) Turn the **FMS** Joystick clockwise to begin entering a waypoint identifier for the desired runway (turning it counter-clockwise brings up the waypoint selection submenu - press the **CLR** Key or the **FMS** Joystick to remove it), or move the **FMS** Joystick to select the facility name, or city field.

4) Press the **ENT** Key. Full-Screen: continue to **Step 7**.

5) Press the **RUNWAY** Softkey (split-screen only).

6) Press the **FMS** Joystick to activate the cursor (split-screen only).

7) Move the **FMS** Joystick to place the cursor in the 'Runway' Box, on the runway designator.

RUNWAYS

◄ 15L-33R ►

4180 x 75FT

HARD SURFACE

NO LIGHTS

LEFT TRAFFIC   15L

RIGHT TRAFFIC   33R

Runways Box (Waypoint Page)

8) Turn the **FMS** Joystick to display the desired runway (if more than one) for the selected airport.

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Viewing additional information for a frequency:

The Frequencies Box uses the descriptions and abbreviations listed in the following table:

Communication Frequencies			Navigation Frequencies
Approach *	Control	Pre-Taxi	ILS
Arrival *	CTA *	Radar	LOC
ASOS	Departure *	Ramp	
ATIS	Gate	Terminal*	
AWOS	Ground	TMA *	
Center	Helicopter	Tower	
Class B *	Multicom	TRSA *	
Class C *	Other	Unicom	
Clearance			
* May include Additional Information			

Frequency Abbreviations

1) With the Waypoint (WPT) Page displayed, press the **INFO** Softkey.

2) Press the **FMS** Joystick to activate the cursor.

3) Move the **FMS** Joystick to place the cursor in the 'Frequencies' Box, on the frequency denoted with an *.

Additional Frequency Information (Waypoint Page)

4) Press the **ENT** Key to view the Additional Information Window.

5) To remove the window, press the **FMS** Joystick, **ENT** Key, or **CLR** Key.

To quickly view the departure or destination airport information:

1) From the Waypoint (WPT) Page, press the **INFO**, **RUNWAY**, **CHART**, **AOPA** / **DIRECTORY**, or **WEATHER** Softkey.

2) Press the **MENU** Key.

3) Turn or move the **FMS** Joystick to highlight 'View Destination Airport' or 'View Departure Airport', and press the **ENT** Key.

NEAREST INFORMATION

The G3X provides a **NRST** Key which gives the pilot quick access to nearest airport, weather, VOR, NDB, intersection, user waypoint, city, ARTCC, FSS, and airspace information. If none are available, "None Within 200 NM" is displayed.

Pressing the **ENT** Key displays the associated 'Information Page' for the highlighted selection (except for the Nearest ARTCC, and Nearest FSS pages), similar to the Waypoint Page. Pressing the **ENT** Key again returns to the Nearest Page.

Viewing nearest information:

1) Press the **NRST** Key.

2) Turn the **FMS** Joystick to select the desired Nearest Page (APT, WX, VOR, NDB, INT, USR, CTY, ATC, FSS, or ASPC). If none are available, "None Within 200 NM" is displayed.

3) Press the **FMS** Joystick to highlight the first selection in the list. Turn or move the **FMS** Joystick to highlight the desired nearest option.

4) Press the **ENT** Key to display the associated 'Information Page' (except for the Nearest ARTCC and Nearest FSS pages). From the Airport Information Page, press the **INFO**, **CHART**, **AOPA** / **DIRECTORY**, or **WEATHER** Softkeys for additional information. From the User Waypoint Information Page, press the **DELETE**, or **EDIT** softkeys to make changes to the selected user waypoint.

5) To return to the Nearest Page, press the **FMS** Joystick, the **ENT** Key, or the **CLR** Key.

**Nearest Airports Page
(Split-Screen)**

**Airport Information Page
(Split-Screen)**

NEAREST AIRPORT CRITERIA

From the Menu on the Nearest Airports Page the pilot can define the minimum runway length and surface type used when determining the 15 nearest airports to display on the Nearest Airports Page. A minimum runway length and/or surface type can be entered to prevent airports with small runways or runways that are not appropriately surfaced from being displayed. Default settings are 0 feet (or meters) for runway length and "Any" for runway surface type. Private airports and Heliports can also be included.

The Page Menu also allows the pilot to choose between displaying the facility names, city names, bearing, or direction arrows.

To quickly show/hide private airport and heliports from the Nearest Airports Page, press the **PRIVATE** or **HELIPORT** Softkeys.

Setting nearest airport criteria:

1) With the Nearest Airports Page displayed, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to select 'Set Airport Criteria' from the Page Menu.

3) Press the **ENT** Key. The Airport Criteria Window is displayed.

4) Move the **FMS** Joystick to select the desired criteria to be defined.

5) Turn the **FMS** Joystick to select the desired option.

6) Press the **ENT** Key.

![Nearest Airports Page Menu and Airport Criteria Window screens]

SHOW FACILITY NAMES
SHOW ARROWS
SET AIRPORT CRITERIA

MENU FOR MAIN MENU

AIRPORT CRITERIA
RUNWAY SURFACE ◀ ANY ▶
MINIMUM RUNWAY LENGTH 0FT
INCLUDE PRIVATE AIRPORTS ◀ No ▶
INCLUDE HELIPORTS ◀ No ▶
DONE

Nearest Airports Page Menu   **Airport Criteria Window**

Restoring nearest airport criteria defaults:

1) With the Nearest Airports Page displayed, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to select 'Set Airport Criteria' from the Page Menu.

3) Press the **ENT** Key. The Airport Criteria Window is displayed.

4) Move the **FMS** Joystick to select the desired criteria to be restored.

5) Press the **MENU** Key.

6) With 'Restore Default' highlighted, press the **ENT** Key.

WEATHER INFORMATION

Textual weather information can be viewed from the Waypoint Page or the Nearest WX Page. Refer to the Hazard Avoidance section for information on SiriusXM Weather. and FIS-B

Selecting airport weather information:

1) From the Waypoint Page, press the **WEATHER** Softkey.

2) Press the **FMS** Joystick to activate the cursor.

3) Turn the **FMS** Joystick clockwise to begin entering an airport identifier (turning it counter-clockwise brings up the waypoint selection submenu - press the **CLR** Key or the **FMS** Joystick to remove it).

4) Press the **ENT** Key.

    Or:

1) Press the **NRST** Key.

2) Turn the **FMS** Joystick to select the Nearest Airport WX Page. If Nearest Airport Weather is not available, "None Within 200 NM" is displayed.

3) Press the **FMS** Joystick to highlight the first airport in the nearest airport weather list. Turn or move the **FMS** Joystick to highlight the desired airport weather.

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4) Press the **ENT** Key to display the Weather Information Page.

5) Turn the **FMS** Joystick to scroll up or down on the page.

6) To return to the Nearest Airport Weather Page, press the **FMS** Joystick, the **ENT** Key, or the **CLR** Key.

Nearest Airport Weather Page
(Split-Screen)

Weather Information Page
(Split-Screen)

INTERSECTIONS

Intersections can be viewed from the Waypoint Page or the Nearest Intersections Page. In addition to displaying a map of the currently selected intersection and surrounding area, the Intersection Information Page displays the region, bearing, distance, latitude, and longitude.

Selecting an intersection:

1) From the Waypoint Page, press the **INFO** Softkey.

2) Press the **FMS** Joystick to activate the cursor.

3) Turn the **FMS** Joystick clockwise to begin entering an intersection identifier (turning it counter-clockwise brings up the waypoint selection submenu - press the **CLR** Key or the **FMS** Joystick to remove it), or move the **FMS** Joystick to select the facility name, or city field.

4) Press the **ENT** Key.

Or:

1) Press the **NRST** Key.

2) Turn the **FMS** Joystick to select the Nearest Intersections Page.

3) Press the **FMS** Joystick to activate the cursor.

4) Turn or move the **FMS** Joystick to highlight the desired intersection.

5) Press the **ENT** Key to display the Intersection Information Page.

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NDBs

NDBs can be viewed from the Waypoint Page or the Nearest NDBs Page. In addition to displaying a map of the currently selected NDB and surrounding area, the page displays the region, bearing, distance, latitude, longitude, and frequency.

The Nearest NDB Page can be used to quickly find a NDB close to the flight path. The list only includes NDBs that are within 200nm. If there are no NDBs in the list, text indicating that there are no nearest NDBs is displayed. If there are no nearest NDBs in the list, the information and frequency fields are dashed.

Selecting a NDB:

1) From the Waypoint Page, press the **INFO** Softkey if necessary.

2) Press the **FMS** Joystick to activate the cursor.

3) Turn the **FMS** Joystick clockwise to begin entering the identifier (turning it counter-clockwise brings up the waypoint selection submenu - press the **CLR** Key or the **FMS** Joystick to remove it), or move the **FMS** Joystick to select the facility name, or city field.

4) Press the **ENT** Key.

   Or:

1) Press the **NRST** Key.

2) Turn the **FMS** Joystick to select the Nearest NDBs Page.

3) Press the **FMS** Joystick to activate the cursor.

4) Turn the **FMS** Joystick to highlight the desired NDB.

5) Press the **ENT** Key to display the NDB Information Page.

VORs

VORs can be viewed from the Waypoint Page or the Nearest VORs Page. In addition to displaying a map of the currently selected VOR and surrounding area, the page displays the region, city, state, bearing, distance, latitude, longitude, frequency, and class (High, Low, or Terminal VOR).

The Nearest VOR Page can be used to quickly find a VOR close to the flight path. The list only includes VORs that are within 200nm. If there are no VORs in the list, text indicating that there are no nearest VORs is displayed. If there are no nearest VORs in the list, the information and frequency fields are dashed.

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Localizer information cannot be viewed on the VOR Information Page. If a VOR station is combined with a TACAN station it is listed as a VORTAC on the VOR Information Page and if it includes only DME, it's displayed as VOR-DME.

Selecting a VOR:

1) From the Waypoint Page, press the **INFO** Softkey.

2) Press the **FMS** Joystick to activate the cursor.

3) Turn the **FMS** Joystick clockwise to begin entering identifier (turning it counter-clockwise brings up the waypoint selection submenu - press the **CLR** Key or the **FMS** Joystick to remove it), or move the FMS Joystick to select the facility name, or city field.

4) Press the **ENT** Key.

Or:

1) Press the **NRST** Key.

2) Turn the **FMS** Joystick to select the Nearest VOR Page.

3) Press the **FMS** Joystick to activate the cursor.

4) Turn the **FMS** Joystick to highlight the desired VOR.

5) Press the **ENT** Key to display the VOR Information Page.

USER WAYPOINTS

The G3X can create and store up to 3,000 user-defined waypoints. Once a waypoint has been created, it can be renamed, deleted, or moved.

Creating user waypoints:

1) To create a user waypoint at the current location, using the Map Pointer, or from the Main Menu:

    a) To create a user waypoint at the current location, press and hold the **ENT** Key from any page.

    b) The 'Mark a New User Waypoint?' Window appears.

    Or:

    a) Press the **MENU** Key twice to access the Main Menu.

    b) Move the **FMS** Joystick to highlight 'User Waypoints' and press the **ENT** Key.

```
MAIN MENU
  FLIGHT LOG
  TRACK LOG
  USER WAYPOINTS
  WEIGHT & BALANCE
  DATABASE INFORMATION
  SYSTEM SETUP...
```

**Main Menu (User Waypoints Selected)
(Split-Screen)**

c) Press the **NEW** Softkey. The message "Create a New User Waypoint?" is displayed.

d) Enter a user waypoint name (up to 10 characters). The current aircraft position is the default location of the new waypoint.

Or:

a) From a map page, press the **FMS** Joystick to activate the Map Pointer (on the WX Page, press the **PAN MAP** Softkey).

b) Find an empty area without any map features and press the **ENT** Key. The message "Create a New User Waypoint?" is displayed.

Or:

a) From a map page, press the **FMS** Joystick to activate the Map Pointer (on the WX Page, press the **PAN MAP** Softkey).

b) Select a map feature using the Map Pointer and press the **MENU** Key.

c) With 'Create User Waypoint' highlighted, press the **ENT** Key. The message "Create a New User Waypoint?" is displayed.

2) With 'Yes' highlighted, press the **ENT** Key. The New Waypoint Window is displayed.

3) Move the **FMS** Joystick to the User Waypoint Name Field and enter the waypoint name, if desired.

4) If desired, select the waypoint symbol:

a) Move the **FMS** Joystick to highlight the Symbol.

b) Turn the **FMS** Joystick to access the 'Select Symbol' Menu.

c) Turn or move the **FMS** Joystick to highlight the desired symbol from the menu, and press the **ENT** Key.

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Symbol Field (Selected)   User Waypoint Name Field

New Waypoint Window (Symbol Selected)

5) If desired, press the **POSITION** Softkey and enter the latitude, longitude, name, or altitude for the waypoint **or** press the **REF WPTS** Softkey to enter a bearing and distance from another waypoint or the bearing from two other waypoints to define the new waypoint location.

**New Waypoint Window
(POSITION Softkey Selected)
(Split-Screen)**

**New Waypoint Window
(REF WPTS Softkey Selected)
(Split-Screen)**

6) With 'Done' highlighted, press the **ENT** Key.

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Selecting and viewing nearest user waypoints:

1) Press the **NRST** Key.

2) Turn the **FMS** Joystick to select the Nearest USR Page.

3) Press the **FMS** Joystick to activate the cursor.

4) Turn the **FMS** Joystick to highlight the desired user waypoint.

5) Press the **ENT** Key to display the User Waypoint Information Window.

Editing or renaming a user waypoint:

1) Press the **MENU** Key twice to access the Main Menu.

2) Move the **FMS** Joystick to highlight 'User Waypoints' and press the **ENT** Key.

3) Move the **FMS** Joystick to highlight the appropriate waypoint and press the **EDIT** Softkey. The Edit Waypoint Window is displayed.

4) Move the cursor to the desired field(s) and make any necessary changes (to edit the Reference Waypoints, press the **REF WPTS** Softkey).

5) With 'Done' highlighted, press the **ENT** Key.

Deleting user waypoints:

1) Press the **MENU** Key twice to access the Main Menu.

2) Turn or Move the **FMS** Joystick to highlight 'User Waypoints' and press the **ENT** Key. If deleting all user waypoints, go to Step 4.

3) Highlight a User Waypoint in the User Waypoint List, or enter a waypoint in the User Waypoint field.

4) Press the **MENU** Key.

User Waypoints Page Menu

5) Select 'Delete Waypoint' or 'Delete All'.

6) Press the **ENT** Key. 'No' is highlighted in the confirmation window.

7) With 'Yes' highlighted in the confirmation window, press the **ENT** Key.

> **Or**:

1) Press the **MENU** Key twice to access the Main Menu.

2) Turn or Move the **FMS** Joystick to highlight 'User Waypoints' and press the **ENT** Key.

3) Highlight a User Waypoint in the User Waypoint List, or enter a waypoint in the User Waypoint field.

4) Press the **ENT** Key.

5) Press the **DELETE** Softkey. 'No' is highlighted in the confirmation window.

6) Highlight 'Yes' and press the **ENT** Key.

User Waypoints can also be deleted by 'Symbol' or 'Distance' from the User Waypoints Page Menu.

AUTOMATIC WAYPOINT SELECTION

Automatic waypoint selection is the system's attempt to deduce what Waypoint to display based on the aircraft's location in relation to the departure airport and/or the waypoints in the Flight Plan.

The pilot can override Automatic Waypoint Selection by manually entering a waypoint. The automatic selection will not resume until such time that the manually entered waypoint and the automatically selected waypoint coincide (does not apply if the **CHART** Softkey is selected). To manually return to Automatic Waypoint Selection, highlight the identifier and press the **CLR** Key.

5.5 AIRSPACE

The Nearest Airspace Page and Airspace Alerts provide information about airspaces and the location of the aircraft in relationship to them. The Nearest Airspace Page can be used to quickly find airspaces close to the flight path.
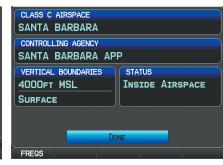
The Nearest Airspace Page displays the class of airspace, controlling agency, vertical boundaries, and status.

Selecting and viewing nearest airspaces:

1)   Press the **NRST** Key.

2)   Turn the **FMS** Joystick to select the Nearest Airspace Page.

3)   Press the **FMS** Joystick to highlight the nearest airspace. Turn or move the **FMS** Joystick to highlight the desired airspace.

4)   Press the **ENT** Key to display the Airspace Information Page.

5)   Press the **FREQS** Softkey (if available) to display frequency and additional airport information similar to the Waypoint Information Page.

**Nearest Airspace Page
(Split-Screen)**

**Airspace Information Page
(Split-Screen)**

The Full-Screen Display will also show a map with the nearest airspace highlighted.

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Nearest Airspace Page Map

AIRSPACE ALERT MESSAGES

When an airspace alert appears, press the **NRST** Key to automatically show nearby airspace information on the Nearest Airspace Page. This information includes name, time to entry (if applicable), and status.

There are four types of status information:

• Ahead—Projected to enter the airspace within the next 10 minutes or less

• Near—Within two nautical miles of an airspace but not projected to enter it

• Near & Ahead—Projected to enter the airspace within two nautical miles

• Inside Airspace—Within the boundaries of the airspace

SMART AIRSPACE™

Smart Airspace™ shows airspace at and immediately surrounding the aircraft's current altitude in bold. Airspaces at all other altitudes are de-emphasized.

De-emphasized Airspace   *Bold Airspace*

Smart Airspace™

5.6 DIRECT-TO NAVIGATION USING THE G3X

> **NOTE:** *The G3X **Direct-to** Key is disabled while using an external GPS navigator. Press the **INTERNAL** Softkey on the Direct-to Page to make changes to the active flight plan from the G3X. Press the **EXTERNAL** Softkey to return to the external GPS navigator's flight plan.*

The Direct-to method of navigation, initiated by pressing the **Direct-to** Key is quicker to use than a flight plan when the desire is to navigate to a single point such as a nearby airport.

Once a direct-to is activated, the G3X establishes a point-to-point course line from the present position to the selected direct-to destination. Course guidance is provided until the direct-to is replaced with a new direct-to or flight plan, or cancelled.

Entering a waypoint identifier, facility name, or city as a direct-to destination:

1) Press the **Direct-to** Key. The Direct-to Window is displayed (with the active flight plan waypoint as the default selection or a blank waypoint field if no flight plan is active).

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) Turn the **FMS** Joystick clockwise to begin entering a waypoint identifier (turning it counter-clockwise brings up the waypoint selection submenu - press the **CLR** Key or the **FMS** Joystick to remove it), press the **RECENT** Softkey to display a list of recent waypoints, or move the **FMS** Joystick to select the facility name, or city field.

4) Press the **ENT** Key.

5) With 'Activate' highlighted, press the **ENT** Key.

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```
DIRECT TO WAYPOINT
KSBA              ⬦   PUBLIC AIRPORT
SANTA BARBARA MUN
SANTA BARBARA CA

 LOCATION
SW USA                BRG 180°M
N 34°25.571'          DIS 23.6NM
W119°50.489'

  RESUME NAVIGATION         ACTIVATE
```

Direct-to Window (Split-Screen)

Selecting RECENT WPTS, NRST APTS, or FPL WPTS as a direct-to destination:

1) Press the **Direct-to** Key. The Direct-to Window is displayed (with the active flight plan destination as the default selection or a blank destination if no flight plan is active).

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) Press the **RECENT** Softkey to display a list of recent waypoints (RECENT WPTS) only or turn the **FMS** Joystick counter-clockwise to display a list of recent waypoints (RECENT WPTS), nearest airports (NRST APTS), and flight plan waypoints (FPL WPTS).

4) Move the **FMS** Joystick to select the desired waypoint.

5) Press the **ENT** Key.

6) With 'Activate' highlighted, press the **ENT** Key.

Direct-to Window (Flight Plan Waypoints Selected)
(Split-Screen)

Selecting a nearby airport as a direct-to destination:

1) Press the **NRST** Key.

2) Select the desired airport (the nearest one is already selected).

3) Press the **Direct-to** Key.

4) If an external navigator is configured, press the **INTERNAL** Softkey.

5) Press the **ENT** Key.

6) With 'Activate' highlighted, press the **ENT** Key.

Direct-to destinations may also be selected by using the pointer on the navigation map pages. If no airport, NAVAID, or user waypoint exists at the desired location, a temporary waypoint named 'MAP POINTER' is automatically created at the location of the map arrow.

Selecting a waypoint as a direct-to destination using the pointer:

1) From a navigation map page, press the **FMS** Joystick to display the pointer.

2) Move the **FMS** Joystick to place the pointer at the desired destination location.

3) If the pointer is placed on an existing airport, NAVAID, or user waypoint, the waypoint name is highlighted.

4) Press the **Direct-to** Key to display the Direct-to Window with the selected point entered as the direct-to destination.

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5) If an external navigator is configured, press the **INTERNAL** Softkey.

6) Press the **ENT** Key.

7) With 'Activate' highlighted, press the **ENT** Key.

Cancelling or resuming a direct-to:

1) Press the **Direct-to** Key to display the Direct-to Window.

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) Move the **FMS** Joystick to highlight 'Stop Navigation' or 'Resume Flight Plan' if a flight plan was active.

4) Press the **ENT** Key. If a flight plan is still active, the G3X resumes navigating the flight plan.

Or:

1) Press the **FPL** Key.

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) Press the **Menu** Key.

4) Turn or move the **FMS** Joystick to highlight 'Stop Navigation' or 'Resume Flight Plan' if a flight plan was active.

5) Press the **ENT** Key. If a flight plan is still active, the system resumes navigating the flight plan.

SECTION 6 FLIGHT PLANNING

6.1 INTRODUCTION

> ✓ **NOTE:** *In order to add, delete, or change flight plan waypoints from the G3X when an external GPS navigator is configured, press the* **INTERNAL** *Softkey from the Active Flight Plan Page or Direct-to Page. Press the* **EXTERNAL** *Softkey to return to the external GPS navigator's flight plan.*

> ✓ **NOTE:** *While navigating using an external GPS navigation source, the ability to edit/invert/delete the Active Flight Plan or activate a Saved Flight Plan is disabled.*

> ✓ **NOTE:** *The Saved Flight Plan Page is not available from the full-screen PFD.*

Flight planning on the G3X consists of building a flight plan by entering waypoints one at a time and inserting approaches as needed. The flight plan is displayed on maps using different line widths, colors, and types, based on the type of leg and the segment of the flight plan currently being flown.

Up to 50 flight plans with up to 300 waypoints each can be created and stored in memory. One flight plan can be activated at a time and becomes the active flight plan. The active flight plan is erased when the destination is reached and the system is turned off. When storing flight plans with an approach, the G3X uses the waypoint information from the current database to define the waypoints. If the database is changed or updated, the G3X automatically updates the information if the procedure has not been modified. If an approach is no longer available, the procedure is deleted from the affected stored flight plan(s), and an alert is displayed.

Whenever an approach is loaded into the active flight plan it replaces the destination airport with a sequence of waypoints for the selected approach. The airport must have a published instrument approach and only the final course segment (usually from final approach fix to missed approach point) of the published approach is available if an external navigator (i.e., GTN or GNS Series) is not configured.

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FLIGHT PLAN DATA FIELDS

By default, the Data Fields on the Active and Saved Flight Plan Pages are set to display Leg Desired Track (DTK), Leg Distance (DIST), and Leg Estimated Time En Route (ETE). The first two Data Fields can be changed using the Page Menu. The last Data Field can be changed using the **FMS** Joystick.
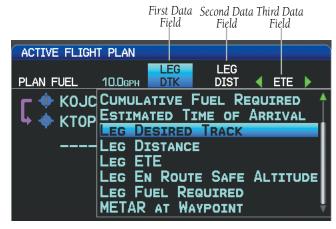
Changing the information shown in the flight plan data fields:

> From the Active Flight Plan Page or the Saved Flight Plan Page, move the **FMS** Joystick (right or left) to quickly change the third data field.
>
> **Or**:

1) From the Active Flight Plan Page or the Saved Flight Plan Page, press the **MENU** Key.

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) Turn or move the **FMS** Joystick to highlight 'Change Data Fields' and press the **ENT** Key. The cursor is displayed on the first Data Field.

4) If desired, move the **FMS** Joystick to highlight the second Data Field.

5) Turn the **FMS** Joystick to access the list of available Data Fields.

6) Turn or Move the **FMS** Joystick to highlight the desired option from the list and press the **ENT** Key.

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First Data Field   *Second Data Field*   *Third Data Field*

Data Field Selection (Active Flight Plan Page)

Viewing fuel remaining at each waypoint:

From the Active Flight Plan Page, move the **FMS** Joystick (right or left) to quickly change the third data field to Fuel Remaining (FUEL REM).

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MANUALLY SWITCHING BETWEEN INTERNAL AND EXTERNAL FLIGHT PLAN SOURCES

> ✓ *NOTE: The selection of the internal GPS navigation source to persist through power cycles or reset to the external GPS navigation source is dependant on the configuration. Refer to the G3X Installation Manual for more information.*

Press the **INTERNAL** Softkey on the Active Flight Plan Page or the Direct-to Page, to temporarily allow flight planning through the G3X using the internal GPS flight plan when an external GPS Navigator is configured. Press the **EXTERNAL** Softkey to return to the external GPS navigator's flight plan.

When manually selecting the internal GPS flight plan, 'INT' is displayed in light blue in the upper left corner of the Data Bar as well as the lower left quadrant of the HSI.

Using Internal GPS Flight Plan

INT: The pilot has elected to use the internal GPS navigation source instead of the external GPS navigation source.

Internal Flight Plan Indication

Switching between internal and external flight plan sources:

From the Active Flight Plan Page or the Direct-to Page, touch the **INTERNAL** or **EXTERNAL** Softkey to switch between the internal and external flight plan sources when an external GPS Navigator is configured.

FAILURE OF THE EXTERNAL GPS NAVIGATION SOURCE

If the external GPS navigation source fails, the system reverts to the internal GPS navigation source and 'REV' is shown in yellow in the upper left corner of the Data Bar as well as the lower left quadrant of the HSI.

External GPS Failure. Reverted to Internal GPS

REV: External Navigation Source failed. Reverted to internal VFR GPS for navigation.

External GPS Navigation Failure

6.2 FLIGHT PLAN CREATION USING THE G3X

The active flight plan is listed on the Active Flight Plan Page. It is the flight plan to which the G3X is currently providing guidance, and is shown on the navigation maps. Stored flight plans are listed on the Flight Plan List Page, and are available for activation (becomes the active flight plan).

Active Flight Plan Page (Split-Screen)   **Map Page (Split-Screen)**

Creating an active flight plan using the G3X:

1) Press the **FPL** Key.

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) Press the **FMS** Joystick to activate the cursor.

4) Turn the **FMS** Joystick to display the Insert Waypoint Window. (Turning it clockwise displays a blank Insert Waypoint Window, turning it counter-clockwise displays a list of recent waypoints (RECENT WPTS), nearest airports (NRST APTS), or flight plan waypoints (FPL WPTS)).

Insert Waypoint Window (Split-Screen)

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5) Enter the identifier, facility, or city name of the departure waypoint or select a waypoint from the submenu of waypoints and press the **ENT** Key. The active flight plan is modified as each waypoint is entered.

6) Repeat step numbers 3 and 4 to enter each additional flight plan waypoint.

7) When all waypoints have been entered, press the **FMS** Joystick to remove the cursor.

Creating a stored flight plan using the G3X:

1) Press the **FPL** Key.

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) Turn the **FMS** Joystick to display the Flight Plan List Page.

4) Press the **NEW** Softkey; or press the **MENU** Key, highlight 'New Flight Plan', and press the **ENT** Key to display a blank flight plan for the first empty storage location.

5) Turn the **FMS** Joystick to display the Insert Waypoint Window (Turning it clockwise displays a blank Insert Waypoint Window, turning it counter-clockwise displays the a list of recent waypoints (RECENT WPTS), nearest airports (NRST APTS), or flight plan waypoints (FPL WPTS)).

6) Enter the identifier, facility, or city name of the departure waypoint or select a waypoint from the submenu of waypoints and press the **ENT** Key.

7) Repeat steps 4 and 5 to enter each additional flight plan waypoint.

8) When all waypoints have been entered, press the **FMS** Joystick to return to the Flight Plan List Page. The new flight plan is now in the list.

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6.3 FLIGHT PLAN STORAGE USING THE G3X

The G3X can store up to 50 flight plans. The active flight plan is erased when another flight plan is activated. Details about each stored flight plan can be viewed on the Flight Plan List Page

Viewing information about a stored flight plan:

1) Press the **FPL** Key.

2) Turn the **FMS** Joystick to display the Flight Plan List Page.

3) Press the **FMS** Joystick to activate the cursor and turn or move the **FMS** Joystick to highlight the desired flight plan.

4) Press the **ENT** Key. The Saved Flight Plan Page is displayed showing departure, destination, total distance, and enroute safe altitude information for the selected Flight Plan.

5) Press the **FMS** Joystick or **DONE** Softkey to exit the Saved Flight Plan Page.

FLIGHT PLAN LIST		
	DISTANCE	ESA
KMKC–KLNK	148NM	3900FT
KOJC–KMKC	33NM	3200FT
IN USE 2	AVAILABLE 48	
FLIGHT PLAN LIST		ACTV LIST VNAV
ACTIVATE	NEW	EXIT

SAVED FLIGHT PLAN			
KMKC–KLNK			
PLAN SPEED 120KT	LEG DTK	LEG DIST	LEG ESA
PLAN FUEL 8.0/hr			
KMKC	___°M	_____NM	_____FT
KSTJ	336°M	41.6NM	3700FT
KLNK	305°M	107NM	3900FT
————————			
TOTAL		148NM	3900FT
USE MAP	SEL APPR	ACTIVATE	DONE

Flight Plan List Page (Split-Screen)   **Saved Flight Plan Page (Split-Screen)**

Storing an active flight plan from the Active Flight Plan Page:

1) Press the **FPL** Key.

2) Turn the **FMS** Joystick to select the Active Flight Plan Page.

3) Press the **MENU** Key. The Active Flight Plan Page Menu is displayed.

4) Turn or move the **FMS** Joystick to Highlight 'Save Flight Plan'.

5) Press the **ENT** Key.

6) With 'Yes' highlighted, press the **ENT** Key. A copy of the flight plan is stored in the next available position in the flight plan list on the Flight Plan List Page.

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6.4 FLIGHT PLAN ACTIVATION USING THE G3X

Activating a stored flight plan erases the active flight plan and replaces it with a copy of the flight plan being activated. Inverting a stored flight plan reverses the waypoint order, erases the active flight plan, and replaces it with the flight plan being activated (the stored flight plan is not changed).

Activating a stored flight plan:

1) Press the **FPL** Key and turn the **FMS** Joystick to display the Flight Plan List Page.

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) Press the **FMS** Joystick to activate the cursor, and turn or move the **FMS** Joystick to highlight the desired flight plan.

4) Press the **ACTIVATE** Softkey; or press the **MENU** Key, highlight 'Activate Flight Plan', and press the **ENT** Key. The 'Activate XXXXX-XXXXX' confirmation window appears (only if already navigating a flight plan).

5) With 'Yes' highlighted, press the **ENT** Key. To cancel the request, press the **CLR** Key, the **FMS** Joystick, or highlight 'No' and press the **ENT** Key.

Activating a Flight Plan Leg:

1) Press the **FPL** Key.

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) Turn the **FMS** Joystick to display the Active Flight Plan Page.

4) Press the **FMS** Joystick to activate the cursor and move the **FMS** Joystick to highlight the waypoint leg to be activated.

5) Press the **Direct-to** Key twice. The "Activate Leg XXXXX - XXXXX?" window is displayed.

Activate Leg Window

6) With 'Yes' highlighted, press the **ENT** Key. To cancel the request, press the **CLR** Key, the **FMS** Joystick, or highlight 'No' and press the **ENT** Key.

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6.5 FLIGHT PLAN EDITING

ADDING WAYPOINTS TO AN EXISTING FLIGHT PLAN

Waypoints can be added to the active flight plan or any stored flight plan. Choose the flight plan, select the desired point of insertion, enter the waypoint, and it is added in front of the selected waypoint. Flight plans are limited to 300 waypoints (including approach waypoints).

Adding a waypoint to a stored flight plan:

1) On the Flight Plan List Page, press the **FMS** Joystick to activate the cursor.

2) Turn or move the **FMS** Joystick to highlight the desired flight plan.

3) Press the **ENT** Key.

4) Move the **FMS** Joystick select the point in the flight plan to add the new waypoint. The new waypoint is placed directly in front of the highlighted waypoint.

5) Turn the **FMS** Joystick to display the Insert Waypoint Window. Turning it clockwise displays a blank Insert Waypoint Window, turning it counter-clockwise displays the a list of recent waypoints (RECENT WPTS), nearest airports (NRST APTS), or flight plan waypoints (FPL WPTS).
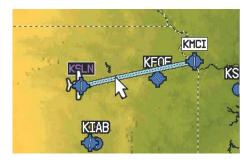
   Or:

   Press the **MENU** Key, highlight 'Insert Waypoint', and press the **ENT** Key.

6) Enter the identifier, facility, or city name of the departure waypoint or select a waypoint from the submenu of waypoints.

7) Press the **ENT** Key.

Adding a waypoint to the active flight plan:

1) Press the **FPL** Key.

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) Press the **FMS** Joystick to activate the cursor.

4) Using the **FMS** Joystick select the point in the flight plan before which to add the new waypoint. The new waypoint is placed directly in front of the highlighted waypoint.

5) Turn the **FMS** Joystick to display the Insert Waypoint Window. Turning it clockwise displays a blank Insert Waypoint Window, turning it counterclockwise displays the a list of recent waypoints (RECENT WPTS), nearest airports (NRST APTS), or flight plan waypoints (FPL WPTS).

> **Or**:
>
> Press the **MENU** Key, highlight 'Insert Waypoint', and press the **ENT** Key.

6) Enter the identifier, facility, or city name of the departure waypoint or select a waypoint from the submenu of waypoints and press the **ENT** Key. The active flight plan is modified as each waypoint is entered.

Adding a waypoint to the active or saved flight plan using the map:

1) Press the **FPL** Key.

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) From the Active Flight Plan Page or from the Saved Flight Plan Page, press the **USE MAP** Softkey to activate the map pointer.

4) Move the **FMS** Joystick to highlight the desired flight plan leg to be modified.

Active Flight Plan Page (Flight Plan Leg Highlighted with Map Pointer)

5) With the desired flight plan leg highlighted (blue), press the **ENT** Key (the flight plan leg turns magenta). This will split the flight plan leg.

6) Using the **FMS** Joystick, drag the flight plan leg to highlight the desired waypoint to be added.

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Selected Waypoint

Active Flight Plan Page (Waypoint Selected with Map Pointer)

7) With the desired waypoint highlighted, press the **ENT** Key. The flight plan is now modified to include the added waypoint.

8) Press the **DONE** Softkey (from the Flight Plan List Page only).

EDITING FLIGHT PLAN SPEED, FUEL, AND/OR NAME

NOTE: If a fuel flow sensor is configured, the user-entered 'Plan Fuel' value is used while on the ground. In the air, the 'Plan Fuel' field is hidden and the fuel calculations are based on the actual measured fuel flow.

Adjusting the Active Flight Plan fuel:

1) Press the **FPL** Key and turn the **FMS** Joystick to display the Active Flight Plan Page.

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) Press the **FMS** Joystick to activate the cursor, and move the **FMS** Joystick to highlight the 'Plan Fuel' field.

4) Using the **FMS** Joystick, enter the desired plan flow, and press the **ENT** Key.

Plan Fuel Field

Plan Fuel (Active Flight Plan Page)

Adjusting the Saved Flight Plan speed and fuel:

1) Press the **FPL** Key and turn the **FMS** Joystick to display the Flight Plan List Page.

2) Press the **FMS** Joystick to activate the cursor, and turn or move the **FMS** Joystick to highlight the desired flight plan, and press the **ENT** Key. The Saved Flight Plan Page is displayed.

3) Move the **FMS** Joystick to the 'Plan Speed' field.

4) Using the **FMS** Joystick, enter the desired speed, and press the **ENT** Key.

5) Repeat steps 3 and 4 for 'Plan Fuel', and press the **DONE** Softkey.

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Plan Fuel Field ——————————— Plan Speed Field

Plan Speed and Plan Fuel (Saved Flight Plan Page)

Editing the Saved Flight Plan name:

1) Press the **FPL** Key and turn the **FMS** Joystick to display the Flight Plan List Page.

2) Press the **FMS** Joystick to activate the cursor, and turn or move the **FMS** Joystick to highlight the desired flight plan, and press the **ENT** Key. The Saved Flight Plan Page is displayed.

3) Move the **FMS** Joystick to highlight the Flight Plan Name field.

4) Using the **FMS** Joystick, enter the flight plan name, and press the **ENT** Key.

Editing the Saved Flight Plan Name

COPYING FLIGHT PLANS

The G3X allows copying a flight plan into a new flight plan memory slot, allowing editing, etc., without affecting the original flight plan. This can be used to duplicate an existing stored flight plan for use in creating a modified version of the original stored flight plan.

Copying a stored flight plan:

1) Press the **FPL** Key and turn the **FMS** Joystick to display the Flight Plan List Page.

2) Press the **FMS** Joystick to activate the cursor, and turn or move the **FMS** Joystick to highlight the desired flight plan.

3) Press the **MENU** Key, using the **FMS** Joystick highlight 'Copy Flight Plan', and press the **ENT** Key.

DELETING FLIGHT PLANS

Individual or all stored flight plans can be deleted from the G3X memory.

Deleting a stored flight plan:

1) Press the **FPL** Key and turn the **FMS** Joystick to display the Flight Plan List Page.

2) Press the **FMS** Joystick to activate the cursor, and turn or move the **FMS** Joystick to highlight the desired flight plan.

3) Press the **CLR** Key; or press the **MENU** Key, highlight 'Delete Flight Plan', and press the **ENT** Key.

4) With 'Yes' highlighted, press the **ENT** Key to delete the flight plan. To cancel the request, press the **CLR** Key, the **FMS** Joystick, or highlight 'No' and press the **ENT** Key.

Deleting all stored flight plans:

1) Press the **FPL** Key and turn the **FMS** Joystick to display the Flight Plan List Page.

2) Press the **MENU** Key, highlight 'Delete All', and press the **ENT** Key.

3) With 'Yes' highlighted, press the **ENT** Key to delete all saved flight plans. To cancel the request, press the **CLR** Key, the **FMS** Joystick, or highlight 'No' and press the **ENT** Key.

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⚠️ *NOTE: The changes made to the active flight plan affect navigation as soon as they are entered. Editing the active flight plan does not affect any saved flight plans. Waypoints in the final approach segment (such as the FAF or MAP) can not be deleted individually.*

Deleting the Active Flight Plan:

1) Press the **FPL** Key to display the Active Flight Plan Page.

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) Press the **MENU** Key.

4) With 'Stop Navigation' highlighted, press the **ENT** Key.

> STOP NAVIGATION
> EDIT ON MAP
> ADD WAYPOINT
> INVERT FLIGHT PLAN
> SELECT APPROACH
> SAVE FLIGHT PLAN
> CHANGE DATA FIELDS
>
> MENU FOR MAIN MENU

Active Flight Plan Page Menu

Deleting an individual waypoint from the active flight plan:

1) Press the **FPL** Key to display the Active Flight Plan Page.

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) Press the **FMS** Joystick to activate the cursor and turn or move the **FMS** Joystick to highlight the waypoint to be deleted.

4) Press the **CLR** Key or press the **MENU** Key and highlight 'Remove Waypoint'. The 'Remove XXXXX From Flight Plan?' window is displayed.

> REMOVE KSTJ FROM
> FLIGHT PLAN?
>
> No   YES

Remove Waypoint Window

5) With 'Yes' highlighted, press the **ENT** Key. To cancel the request, press the **CLR** Key, the **FMS** Joystick, or highlight 'No' and press the **ENT** Key.

Deleting an individual waypoint from a saved flight plan:

1) Press the **FPL** Key.

2) Turn the **FMS** Joystick to display the Flight Plan List Page if necessary.

3) Press the **FMS** Joystick to activate the cursor and turn or move the **FMS** Joystick to highlight the flight plan to be edited and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the waypoint to be deleted.

5) Press the **CLR** Key or press the **MENU** Key and highlight 'Remove Waypoint'. The 'Remove XXXXX From Flight Plan?' window is displayed.

6) With 'Yes' highlighted, press the **ENT** Key. To cancel the request, press the **CLR** Key, the **FMS** Joystick, or highlight 'No' and press the **ENT** Key.

INVERTING A FLIGHT PLAN

Any flight plan may be inverted (reversed) for navigation back to the original departure point.

Inverting the active flight plan:

1) Press the **FPL** Key to display the Active Flight Plan Page.

2) If an external navigator is configured, press the **INTERNAL** Softkey.

3) Press the **MENU** Key, turn or move the **FMS** Joystick to highlight 'Invert Flight Plan', and press the **ENT** Key. An "Invert the Active Flight Plan?" confirmation window is displayed.

4) With 'Yes' highlighted, press the **ENT** Key to invert the active flight plan. To cancel, press the **CLR** Key, the **FMS** Joystick, or highlight 'No' and press the **ENT** Key.

Inverting a saved flight plan:

1) Press the **FPL** Key and turn the **FMS** Joystick to display the Flight Plan List Page.

2) Press the **FMS** Joystick to activate the cursor.

3) Move the **FMS** Joystick to highlight the desired flight plan, and press the **ENT** Key. The Saved Flight Plan Page is displayed.

4) Press the **MENU** Key, highlight 'Invert Flight Plan?', and press the **ENT** Key.

5) With 'Yes' highlighted, press the **ENT** Key. To cancel the request, press the **CLR** Key, the **FMS** Joystick, or highlight 'No' and press the **ENT** Key.

IMPORTING/EXPORTING FLIGHT PLANS

Importing flight plans:

1) With a flight plan saved to the SD Card, press the **FPL** Key and turn the **FMS** Joystick to display the Flight Plan List Page.

2) Press the **IMPORT** Softkey.

3) Using the **FMS** Joystick highlight the desired flight plan to import.

4) Press the **IMPORT** Softkey again and press the **ENT** Key.

Exporting flight plans:

1) Press the **FPL** Key and turn the **FMS** Joystick to display the Flight Plan List Page.

2) Press the **FMS** Joystick to activate the cursor, and turn or move the **FMS** Joystick to highlight the desired flight plan.

3) Press the **EXPORT** Softkey and press the **ENT** Key.

6.6 APPROACHES (WITHOUT EXTERNAL NAVIGATOR CONFIGURED)

⚠️ **WARNING:** Do not use the approach information provided by the VFR navigation database residing within the G3X as a means of navigating any instrument approach. The G3X VFR navigation database is limited to present only the waypoints for the final approach leg of a published procedure. These waypoints and associated course line are made available for monitoring purposes only.

✓ **NOTE:** This section is not applicable if an external GPS navigator is configured. Approach configuration is handled via the external GPS navigator's controls only. Refer to the external GPS navigator's Pilot's Guide for more information.

An approach can be loaded at any airport that has one available, and provides situational awareness for non-precision and precision approaches to airports with published instrument approach procedures. 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.

Whenever an approach is selected, the choice to either "Load Approach" or "Activate Approach" is given. "Load Approach" adds the approach to the end of the flight plan without immediately using it for navigation guidance. This allows continued navigation via the intermediate waypoints in the original flight plan, but keeps the procedure available on the Active Flight Plan Page for quick activation when needed. "Activate Approach" also adds the procedure to the end of the flight plan but immediately begins to navigate to the first waypoint in the approach.

Select Approach Window (Split-Screen)

SELECTING AN APPROACH

When selecting an approach, it replaces the destination airport with the sequence of waypoints for the selected approach. Keep in mind that the airport must have a published approach (GPS, RNAV, VOR, NDB, localizer, or ILS) and only the final course segment (final approach fix to missed approach point) of the published approach is available (unless an external navigator is configured).

An approach can be selected from the Direct-to Window, Waypoint (WPT) Page, Active Flight Plan Page, and the Saved Flight Plan Page.

Loading an approach from the active or saved flight plan page:

1) Press the **FPL** Key.

2) Turn the **FMS** Joystick to display the Active Flight Plan Page or Saved Flight Plan Page.

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3) Press the **SEL APPR** Softkey; or press the **MENU** Key, highlight 'Select Approach' by turning or moving the **FMS** Joystick, and press the **ENT** Key. The Select Approach Window is displayed.

4) Turn the **FMS** Joystick to access a list of available approaches. Turn or move **FMS** Joystick to highlight the desired approach and press the **ENT** Key.

5) With 'Load Approach' highlighted, press the **ENT** Key. To cancel the request, press the **CLR** Key or the **FMS** Joystick.

Viewing a chart for the selected approach:

1) With an approach selected in the Select Approach Window, press the **MENU** Key. The Show Chart Menu is displayed.

SHOW CHART

MENU FOR MAIN MENU

Select Approach Menu

2) Press the **ENT** Key. A chart displaying the selected approach is displayed.

3) Press the **EXIT** Softkey to return to the Select Approach Window.

Activating an approach on the Active Flight Plan Page:

1) Press the **FPL** Key.

2) Turn the **FMS** Joystick to display the Active Flight Plan Page (if necessary).

3) Press the **SEL APPR** Softkey; or press the **MENU** Key, highlight 'Select Approach' by turning or moving the **FMS** Joystick, and press the **ENT** Key. The Select Approach Window is displayed.

4) Turn the **FMS** Joystick to access a list of available approaches. Turn or move the **FMS** Joystick to highlight the desired approach and press the **ENT** Key.

5) With 'Activate Approach' highlighted, press the **ENT** Key. To cancel the request, press the **CLR** Key or the **FMS** Joystick.

   Or:

1) With an approach loaded on the Active Flight Plan Page, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Activate Approach', and press the **ENT** Key.

```
STOP NAVIGATION
EDIT ON MAP
ADD WAYPOINT
INVERT FLIGHT PLAN
ACTIVATE APPROACH
SELECT APPROACH
REMOVE APPROACH
SAVE FLIGHT PLAN

  MENU  FOR MAIN MENU
```

Active Flight Plan Page Menu

Or:

1) With an approach loaded on the Active Flight Plan Page, press the **FMS** Joystick to activate the cursor.

2) Move the **FMS** Joystick to highlight the approach, and press the **ENT** Key. "Activate XXXXX Approach?" window is displayed.

3) With 'Yes' highlighted, press the **ENT** Key.

Loading/Activating an approach from the Direct-to Window or Waypoint Page:

1) Press the **Direct-to** Key or select the Waypoint Page.

2) Press the **MENU** Key.

3) Turn or move the **FMS** Joystick to highlight 'Select Approach', and press the **ENT** Key. If an approach is not already loaded or activated, the cursor is displayed in the Approach Field. If an approach is already loaded or activated, 'Activate' is highlighted.

4) With 'Activate' highlighted press the **ENT** Key, or select an approach, highlight 'Load Approach' or 'Activate Approach', and press the **ENT** Key.

Removing an approach:

1) Press the **FPL** Key.

2) Turn the **FMS** Joystick to display the Active Flight Plan Page or Saved Flight Plan Page.

3) Press the **RMV APPR** Softkey; or press the **MENU** Key, highlight 'Remove Approach' by turning or moving the **FMS** Joystick, and press the **ENT** Key.

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After an approach has been activated, the **VECTORS** Softkey is used when being vectored to the final approach course by Air Traffic Control (ATC).

If the **VECTORS** Softkey is pressed, the G3X creates an extension of the final course, beyond the final approach waypoint in the database (final approach fix [FAF]). On the Active Flight Plan Page, a Vector to Final symbol appears beside the first approach waypoint.

Vectors-to-Final Symbol →

VECTORS Softkey

**Vectors-to-Final (Active Flight Plan Page)
(Split-Screen)**

Final Course Extension

**Vectors-to-Final (Map Page)
(Split-Screen)**

The G3X does not provide guidance to the inbound course. The course deviation needle on the graphic HSI remains off-center until established on the final approach course. The map shows an extension of the final approach course using a bold magenta line.

If the **VECTORS** Softkey is not pressed, the G3X creates a straight-line course directly to the first waypoint in the approach.

Loading the approach cancels the Direct-to and initiates a route to the FAF.

Cancelling Vectors-to-Final:

From the Active Flight Plan Page (with an approach activated), press the **VECTORS** Softkey.

Or:

1) From the Active Flight Plan Page, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Cancel Vectors-to-Final' and press the **ENT** Key.

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SECTION 7 HAZARD AVOIDANCE

7.1 WEATHER INFORMATION

WEATHER SOURCE

On installations that include the capability to receive both SiriusXM and FIS-B (through GDL® 39) weather information, there are three options available for selection through the Main Menu or Weather Page; AUTO, XM (SiriusXM), and GDL FIS-B. The default selection is 'AUTO.' With AUTO selected, and a SiriusXM subscription, SiriusXM weather information is displayed. If SiriusXM service is unavailable with AUTO selected, FIS-B weather information is displayed, if available. If either SiriusXM or GDL FIS-B source is selected, only the selected source is used to display weather information and no automatic source-switching will occur. When more than one source is available, the name of the current weather source will be displayed in the title bar of the Weather Page (WX) and on the Waypoint Page when the Weather Softkey is selected. Data from the selected weather source will apply to all weather shown on the Map Page, Waypoint Page, Weather Page, Nearest Page, and configurable data fields. The weather source can also be changed manually through the Main Menu or on the Weather Page (WX).

Switching Weather Sources:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'WEATHER.'

4) Press the **ENT** Key.

5) Turn or move the **FMS** Joystick to select the desired weather source (AUTO, XM, or GDL FIS-B). The default is 'AUTO' which will use XM over GDL FIS-B if both are available.

6) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the previous page.

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1) From the Weather Page press **SETUP** Softkey.

2) Turn or move the **FMS** Joystick to select the desired weather source (AUTO, XM, or GDL FIS-B). The default is 'AUTO' which will use XM over GDL FIS-B if both are available.

3) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the previous page.

Weather Product	SiriusXM Weather (products vary by subscription)	GDL 39 FIS-B Weather (subscription-free)
NEXRAD Radar (CONUS high resolution)	+	
NEXRAD Radar (CONUS low resolution)		+
NEXRAD Radar (Regional high resolution)		+
NEXRAD Radar (Canada)	+	
Satellite Mosaic	+	
Surface Precipitation	+	
Surface Analysis	+	
Sea Surface Temperatures	+	
Echo Tops	+	
Surface Pressure	+	
Lightning	+	
Storm Cells	+	
METAR (US)	+	+
METAR (Canada)	+	
TAF (US)	+	+
TAF (Canada)	+	
AIRMET	+	+
SIGMET	+	+
PIREP	+	+
Winds Aloft	+	+
Temperatures Aloft		+

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Weather Product	SiriusXM Weather (products vary by subscription)	GDL 39 FIS-B Weather (subscription-free)
NOTAMs		+
Temporary Flight Restrictions	+	+
Freezing Level	+	
Turbulence Forecast	+	
Icing Forecast	+	
City Forecast	+	

Supported Weather Products by Source

SiriusXM WEATHER (OPTIONAL)

> **NOTE:** See the G3X Installation Manual for SiriusXM activation instructions.

> **NOTE:** SiriusXM Weather is only available with the optional GDU 375.

SiriusXM DATA LINK WEATHER ADVISORY

Each time the system powers-up, the pilot is prompted to acknowledge a SiriusXM data link weather advisory.


```
CAUTION - ADVISORY ONLY

    DATALINK WEATHER INFORMATION IS SUBJECT TO SERVICE
    INTERRUPTIONS, MAY CONTAIN ERRORS OR INACCURACIES, AND
    SHOULD NOT BE RELIED UPON EXCLUSIVELY. YOU ARE URGED TO
     CHECK ALTERNATE WEATHER INFORMATION SOURCES PRIOR TO
                MAKING SAFETY RELATED DECISIONS.

     YOU ACKNOWLEDGE AND AGREE THAT YOU SHALL BE SOLELY
      RESPONSIBLE FOR USE OF WEATHER INFORMATION AND ALL
   DECISIONS TAKEN WITH RESPECT THERETO. BY USING THIS WEATHER
    SERVICE, YOU RELEASE AND WAIVE ANY CLAIMS AGAINST SIRIUS
     XM RADIO INC. AND BARON SERVICES AND AFFILIATES WITH
               REGARD TO WEATHER INFORMATION.

                 PRESS ENTER TO ACCEPT
```

Data link Weather Advisory

Press the **ENT** Key to acknowledge this information.

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ACTIVATING SERVICES

Before SiriusXM Weather can be used, the service must be activated. Service is activated by providing SiriusXM Satellite Radio with a Radio ID.

SiriusXM Satellite Radio uses the Radio ID to send an activation signal that allows the G3X to display weather data and/or entertainment programming.

XM WEATHER INFORMATION

• Radio ID—Eight-digit ID number used for activation.

• Service Level—SiriusXM Weather subscription plan purchased.

• Weather Products—List of weather features and age of weather data in minutes.

Accessing SiriusXM Weather information:

From the Weather (WX) Page press the **INFO** Softkey.

Or:

From the (XM) Audio Page press the **INFO** Softkey.

SIRIUSXM WEATHER PRODUCTS

NEXRAD

NEXRAD (NEXt-generation RADar), is a network of multiple high-resolution Doppler radar sites 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. In addition to a wide array of services, the NEXRAD network provides important information about severe weather and 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 or any radar data to penetrate hazardous weather. Rather, use it in an early-warning capacity of pre-departure and enroute 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.

The display of radar coverage is always active when NEXRAD is selected. Areas where NEXRAD radar coverage is not currently available or is not being collected are indicated in grayish-purple (Weather (WX) Page Only). Radar capability exists in these areas, but it is not active or is off-line.

NEXRAD Abnormalities

There are possible abnormalities regarding displayed NEXRAD images. Some, but not all, of those include:

- Ground clutter

- Strobes and spurious radar data

- Sun strobes, when the radar antenna points directly at the sun

- Military aircraft deploy metallic dust (chaff) which can cause alterations in radar scans

- Interference from buildings or mountains, which may cause shadows

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). 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, and has no information about storms directly over the site.

- Radar coverage only extends to 55°N.

- Any precipitation displayed between 52°N and 55°N is unknown.

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NEXRAD INTENSITY

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.
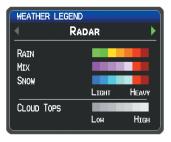
RADAR Legend   **NEXRAD Data**

SATELLITE MOSAIC

Satellite Mosaic displays infrared composite images of cloud cover taken by geostationary weather satellites. The Satellite Mosaic provides up to seven levels of cloud cover.

RADAR Legend   **Satellite Mosaic/Cloud Tops Data**

Echo Tops

Echo Tops are derived from NEXRAD radar and indicate the highest altitude at which precipitation is falling. Echo Tops at or above the altitude you select are displayed, in 5,000 foot increments up to 70,000 ft. Echo Tops can be helpful in determining the severity of thunderstorms.

Echo Tops Data (Split-Screen)

Winds Aloft

Winds Aloft data shows the forecasted wind speed and direction at the surface and at selected altitudes. Altitudes can be displayed in 3,000-foot increments up to 42,000 feet MSL.

Winds Aloft are displayed using wind barbs or a wind streamline depending on the selected range. The wind barbs indicate wind speed and direction. The wind streamline indicates wind direction with arrows.

The wind barbs always point in the direction that the wind is coming from. The wind speed is depicted using flags at the end of the wind barb. A short wind flag is 5 knots, a long wind flag is 10 knots, and a triangle flag is 50 knots.

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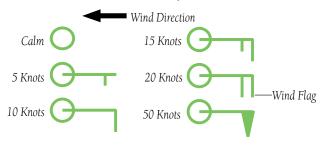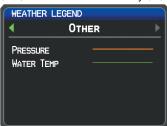
Winds Aloft Data (Split-Screen)

Winds Barbs

SURFACE PRESSURE

This feature displays pressure isobars and pressure centers. The isobars connect points of equal pressure. Pressure readings can help determine weather and wind conditions. High pressure areas are generally associated with fair weather. Low pressure areas are generally associated with clouds and the chance of precipitation. Isobars that are packed closely together show a strong pressure gradient. Strong gradients are associated with areas of stronger winds. Pressure units can be displayed in Millibars (mb) and Inches of Mercury (in).

Other Legend

Surface Pressure Data

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XM 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 region and within the last seven minutes. The exact location of the lightning strike is not displayed.

Lightning Data (Split-Screen)

STORM CELLS

The Storm Cells feature displays storms as well as the storm's projected path in the immediate future.

The direction of the storm is displays by an arrow (at a range of 20 nm or less). The tip of the arrow indicates where the storm should be in 15 minutes. Critical information about the storm cell (tops and intensity) can be viewed by selecting the storm cell with the map pointer. Pressing the **ENT** Key will display additional information.

Storm Cell Data (Split-Screen)

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METARs AND TAFs

✓ **NOTE:** *METAR information is only displayed within the installed aviation database service area.*

METAR (METeorological Aerodrome Report) is an international code used for reporting weather observations. METARs are updated hourly or as needed. METARs typically contain information about the temperature, dewpoint, wind, precipitation, cloud cover, cloud heights, visibility, and barometric pressure. They can also contain information on precipitation amounts, lightning, and other critical data. If METAR data is available for an airport, a color-coded flag is shown next to the airport.

TAF (Terminal Area Forecast) is the standard format for 24-hour weather forecasts. TAFs may contain some of the same code as METAR data. It typically forecasts significant weather changes, temporary changes, probable changes, and expected changes in weather conditions.

METAR and TAF text data is displayed on the Map Page and the Weather (WX) Page. An abbreviated version can be viewed by panning over the METAR flag. Pressing the **ENT** Key will display additional information. METAR and TAF data can be displayed as raw or decoded text.

Changing METAR and TAF text:

1) Using the Map Pointer, select the desired METAR and press the **ENT** Key; or from the Waypoint (WPT) Page press the **WEATHER** Softkey. The Weather Information Page is displayed.

2) Press the **MENU** Key.

   a) Select 'Show Decoded Text' or 'Show Raw Text'.

   b) Press the **ENT** Key.

   Or:

   a) Select 'Change Text Size' and press the **ENT** Key.

   b) Select 'Small', 'Medium', or 'Large' and press the **ENT** Key.

The METAR flag color is determined by the information in the METAR text.

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VFR (ceiling greater than 3000 feet AGL and visibility greater than 5 miles)

Marginal VFR (ceiling 1000-3000 feet AGL and/or visibility 3-5 miles)

IFR (ceiling 500 to below 1000 feet AGL and/or visibility 1 mile to less than 3 miles)

Low IFR (ceiling below 500 feet AGL or visibility less than 1 mile)

METAR text does not contain adequate information to determine flight conditions

METAR Legend

METAR Selected With Map Pointer

AIRMETS

An AIRMET (AIRmen's METeorological Information) can be especially helpful for pilots of light aircraft that have limited flight capability or instrumentation. An AIRMET must affect or be forecast to affect an area of at least 3,000 square miles at any one time. AIRMETs are routinely issued for six-hour periods and are amended as necessary due to changing weather conditions. AIRMETs are displayed as colored, dashed lines.

SIGMETs

A SIGMET (SIGnificant METeorological Information) advises of weather that is potentially hazardous to all aircraft. In the contiguous United States, the following items are covered: severe icing, severe or extreme turbulence, volcanic ash, dust storms, and sandstorms that lower visibility to less than three statute miles.

A Convective SIGMET is issued for the following conditions: thunderstorms, isolated severe thunderstorms, embedded thunderstorms, hail at the surface, and tornadoes.

A SIGMET is widespread and must affect or be forecast to affect an area of at least 3,000 square miles. SIGMETs are displayed as a yellow-dashed line.

AIRMET/SIGMET Legend

AIRMET Selected With Map Pointer

TEMPORARY FLIGHT RESTRICTIONS (TFR)

> *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.*

Temporary Flight Restrictions, or TFRs, temporarily restrict all aircraft from entering the selected airspace unless a waiver has been issued. TFRs are routinely issued for activities such as sporting events, dignitary visits, military depots, and forest fires. TFRs are represented as an area highlighted by red (active) or yellow (not yet active).

TFR Data

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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 unforecast adverse weather conditions, such as low in-flight visibility, icing conditions, wind shear, and turbulence. PIREPs are issued as either Routine (UA) (blue) or Urgent (UUA) (yellow).

Urgent (UUA) PIREP

LFK UA /OV SGR-LFK /TM 1338
/FL 230 /TP PA46 /SK OVC-
TOP170 /TA -05C /IC TRACE /
RM DURGC

Routine (UA) PIREP Selected

PIREP Data

FREEZING LEVELS

Freezing Level shows contours for the lowest forecast altitude where icing conditions are likely to occur.

Freezing Level Data

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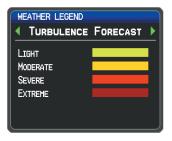
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TURBULENCE FORECAST

Turbulence data identifies the potential for erratic movement of high-altitude air mass associated winds. Turbulence is classified as light, moderate, severe, or extreme. Turbulence data is intended to supplement AIRMETs and SIGMETs.

Turbulence Forecast Legend   **Severe Turbulence Selected With Map Pointer (Split-Screen)**

ICING FORECAST (CIP & SLD)

Current Icing Product (CIP) data shows a graphical view of the current icing environment. Icing severity is displayed in four categories: light, moderate, severe, and extreme (not specific to aircraft type). The CIP product is not a forecast, but a representation 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 magenta dots over the CIP colors.

Icing Forecast Legend   **Moderate Icing Selected With Map Pointer (Split-Screen)**

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FORECAST

Forecast information is available for current and forecast weather conditions. Forecasts are available for intervals of 12, 24, 36, and 48 hours.

Forecast Data (Split-Screen)

Sunny	Thunderstorms	Windy	Very Hot
Partly Cloudy	Rain	Haze	
Mostly Cloudy	Freezing Rain	Foggy	
Cloudy	Snow	Very Cold	
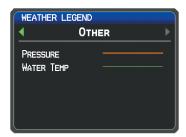
Fronts Legend   **Forecast Legend**

WATER TEMPERATURE

The surface temperatures of coastal and large inland bodies of water are displayed.

Other Legend   **Water Temperature Data (Split-Screen)**

USING SɪʀɪᴜsXM WEATHER PRODUCTS

USING SɪʀɪᴜsXM WEATHER PRODUCTS

⚠️ **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.*

SiriusXM Weather Products can be displayed on the Map Page and individually on the Weather (WX) Page.

The setup menu for the Map Page controls the map range settings above which weather products are decluttered from the display. If a map range larger than the weather product map range setting is selected, the weather product data is removed from the map. For weather products such as Lightning, and Storm Cells, the weather product is displayed when a map range "smaller" than the weather product map range setting is selected (Satellite Mosaic works inversely). The menu also provides a means for enabling/disabling display of 'Airmets', 'Sigmets', 'Weather Data', 'NEXRAD', and/or 'Fronts' on the Map Page.

Additional information about the following can be displayed by panning over the display on the Weather Page or the Map Page:

- Storm Cells
- SIGMETs
- AIRMETs
- METARs
- TFRs

Additional information is also available for the following weather products on the Weather Page (not displayed on the Map Page):

- Forecast
- PIREPs

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Viewing SiriusXM Weather products on the Map Page:

1) Select the Map Page.

2) Select the **WEATHER** Softkey to display the XM weather products.

   Or:

   a) Press the **MENU** Key.

   b) Select 'Show Weather' and press the **ENT** Key.

3) Press the **FMS** Joystick to activate the Map Pointer.

4) Use the **FMS** Joystick to highlight the desired weather product with the Map Pointer.

5) With the desired weather product highlighted, press the **ENT** Key to get detailed information (if available).

Viewing SiriusXM Weather products on the Weather (WX) Page:

1) From the WX Page press the **FMS** Joystick to highlight the weather product field.

2) Turn the **FMS** Joystick to select and automatically display the desired weather product.

3) If necessary, move the **FMS** Joystick to highlight the type field and turn the **FMS** Joystick to scroll through a list of available options.

4) Press the **PAN MAP** Softkey to get abbreviated information about the selected weather product or map feature (if available).

5) With the desired weather product selected press the **ENT** Key to get detailed information (if available).

Abbreviated Weather Product Information (Split-Screen)

Detailed Weather Product Information (Split-Screen)

> *NOTE: The Map Setup Menu may display the weather category as: 'Weather' and 'WX Reports' or 'XM Weather' and 'XM WX Reports' or 'FIS-B Weather' depending on the currently configured weather source(s).*

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Setting up and customizing weather data for the Map Page:

1) From the Map Page press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map' and press the **ENT** Key.

3) Turn the **FMS** Joystick to select the 'Weather' or 'WX Reports' Category from the horizontal list.

4) Move the **FMS** Joystick to select the desired weather product.

5) Turn the **FMS** Joystick to access a list of options for each product (On/Off, Auto, range settings).

6) Press the **ENT** Key to select an option.

7) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the Map Page with the changed settings.

MAP SETUP		
◀ WEATHER		▶
WEATHER DATA	OFF	▼
NEXRAD	ON	▼
SATELLITE MOSAIC	AUTO	▼
LIGHTNING	AUTO	▼
STORM CELLS	AUTO	▼
FRONTS	ON	▼

MAP SETUP		
◀ WX REPORT		▶
METAR	AUTO	▼
AIRMET	OFF	▼
SIGMET	ON	▼

Map Setup Page (Weather Category)   **Map Setup Page (WX Report Category)**

Restoring default weather data for the Map Page:

1) From the Map Page press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map' and press the **ENT** Key.

3) Turn the **FMS** Joystick to select 'Weather' or 'WX Reports' '.

4) Move the **FMS** Joystick to select the desired weather product.

5) Press the **MENU** Key.

6) With 'Restore Default' or 'Restore All Map Defaults' selected, press the **ENT** Key.

7) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the Map Page with the restored settings.

Viewing legends for displayed weather products:

1) From the Map Page press the **MENU** Key to access the Map Page Menu.

2) Turn or move the **FMS** Joystick to select 'Weather Legend' and press the **ENT** Key to display the Weather Legend Window.

3) Turn the **FMS** Joystick to view the desired weather legend (Radar, Fronts, METAR, AIRMET, Turbulence Forecast, Icing Forecast, or Other).

4) With '**DONE**' highlighted, press the **ENT** Key to return to the Map Page.

Or:

1) From the Weather (WX) Page press the **LEGEND** Softkey to display the Weather Legend Window.

2) Turn the **FMS** Joystick to view the desired weather legend (Radar, Fronts, METAR, AIRMET, Turbulence Forecast, Icing Forecast, or Other).

3) Press the **FMS** Joystick, **CLR** Key, or **LEGEND** Softkey to return to the Weather (WX) Page.

Animating SiriusXM weather:

1) From the Map Page press the **MENU** Key to access the Map Page Menu.

2) Turn or move the **FMS** Joystick to select 'Animate Weather' and press the **ENT** Key.

3) To stop animation, press the **MENU** Key again, turn or move the **FMS** Joystick to select 'Stop Animation', and press the **ENT** Key.

Or:

1) Select the Weather (WX) Page.

2) Using the **FMS** Joystick select either the 'NEXRAD Radar' or 'Satellite Mosaic' weather product.

3) Select the **ANIMATE** Softkey to begin animation.

Or:

a) Press the **MENU** Key.

b) Select 'Animate Weather' and press the **ENT** Key to begin animation.

4) To stop animation, deselect the **ANIMATE** Softkey.

Or:

Press the **MENU** Key, turn or move the **FMS** Joystick to select 'Stop Animation', and press the **ENT** Key.

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DATA LINK WEATHER (FIS-B)

The GDL 39 is a receive-only data link radio with on-board GPS, 978 MHz (the Universal Access Transceiver frequency band), and 1090 MHz Extended Squitter (1090 ES) receivers. It is designed to receive, process, and output traffic (ADS-B air-to-air, and TIS-B traffic information), and weather (Flight Information Service-Broadcast (FIS-B)) information to the G3X system through an RS-232 serial connection. As a UAT receiver, the GDL 39 can receive and, when connected to the G3X, display Flight Information Service-Broadcast (FIS-B) weather products as well as traffic.

FIS-B is a subscription-free weather service that is broadcast by Ground Based Transceivers (GBTs) over the 978 MHz UAT frequency band as part of the FAA's Next Generation Air Transportation System (NextGen). To receive FIS-B weather information, the GDL 39 must be within range and line-of-sight of an operating GBT. Reception may be affected by altitude, terrain, and other factors. GDL 39-supported FIS-B weather products include METARs, TAFs, NEXRAD (Regional and CONUS (Combined)), AIRMETs, SIGMETs, PIREPs, and Winds and Temperatures Aloft. Other products include NOTAMs and TFRs. Only one display in a multiply-display installation may be configured to show FIS-B weather information. It is recommended that the GDL 39 be connected to the MFD in a multiple-display system.

Switching Weather Sources:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'WEATHER'.

4) Press the **ENT** Key.

5) Turn or move the **FMS** Joystick to select the desired weather source (AUTO, XM, or GDL FIS-B). The default is 'AUTO' which will use XM over GDL FIS-B if both are available.

6) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the previous page.

Or

1) From the Weather Page press **SETUP** Softkey.

2) Turn or move the **FMS** Joystick to select the desired weather source (AUTO, XM, or GDL FIS-B). The default is 'AUTO' which will use XM over GDL FIS-B if both are available.

3) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the previous page

Viewing FIS-B Weather product Status:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'Data Link Information' and press the **ENT** Key.

3) Press the **WEATHER** Softkey, to view the age in hours:minutes of each weather product.

Or:

1) From the Weather Page, press the **INFO** Softkey.

Viewing Ground Station Status:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'Data Link Information' and press the **ENT** Key.

3) Press the **STATIONS** Softkey, to view ground station(s) status (Active/Inactive), bearing, and distance.

Or:

1) From the Weather Page, press the **INFO** Softkey.

2) Press the **STATIONS** Softkey, to view ground station(s) status bearing and distance.

FIS-B WEATHER PRODUCTS

FIS-B weather broadcasts are updated regularly and may take approximately ten minutes to transmit all available weather data. Therefore, weather data is not immediately available. No pilot action is required to receive FIS-B weather information. Weather product status can be viewed on the dedicated Weather Page, or the Data Link Page from the Tools menu.

When a FIS-B weather product is active on a map, the age of the data is displayed on the screen in the lower left corner. 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 broadcast at specific intervals (see broadcast interval in the table below).

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If, for any reason, a weather product is not refreshed within the Expiration Time intervals (see table), the data is considered expired and is removed from the display. This ensures that only data that is consistent with FIS-B broadcast data is displayed. If more than half of the expiration time has elapsed, the color of the product age displayed changes to yellow. The system displays dashes instead of a product age when a product has expired. If a weather product is not available or has not been received, the system displays 'N/A' instead of a product age.

The table below shows the FIS-B weather expiration time and the broadcast interval. The broadcast interval represents the interval at which FIS-B GBTs 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 GDL 39.

FIS-B Products	Expiration Time	Update Interval (Minutes)	Broadcast Interval (Minutes)
NEXRAD Composite Reflectivity (CONUS)	60 minutes	~5 minutes precipitation mode 10 minutes for clear air	15
NEXRAD Composite Reflectivity (Regional)	60 minutes	As Available	2.5
METAR	8 hours	1 minute (where available), As Available otherwise	5
TAF	12 hours	8 hours	10
AIRMET	12 hours	As Available	5
SIGMET	12 hours	As Available, then at 15 minute intervals for 1 hour	5
PIREP	8 hours	As Available	10
Winds and Temperatures Aloft	12 hours	12 hours	10
NOTAM (D)/FDC (Including TFRs)	12 hours	As Available	10

Weather Product Timing

NEXRAD

NEXRAD (NEXt-generation RADar), is a network of multiple high-resolution Doppler radar sites 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. In addition to a wide array of services, the NEXRAD network provides important information about severe weather and 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 or any radar data to maneuver in or near areas of hazardous weather. Rather, use it in an early-warning capacity of pre-departure and enroute 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.

The display of radar coverage is always active when NEXRAD is selected. Areas where NEXRAD radar coverage is not currently available or is not being collected are indicated in grayish-purple (Weather (WX) Page Only). Radar capability may exists in these areas, but it is not active or is off-line. When Regional Radar is selected, areas outside the current region are also shown in grayish-purple shading.

NEXRAD Abnormalities

There are possible abnormalities regarding displayed NEXRAD images. Some, but not all, of those include:

- Ground clutter

- Strobes and spurious radar data

- Sun strobes, when the radar antenna points directly at the sun

- Military aircraft deploy metallic dust (chaff) which can cause alterations in radar scans

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- Interference from buildings or mountains, which may cause shadows
- Poor reception from Ground Based Transceivers (GBTs) can cause portions of the received radar imagery to not be displayed
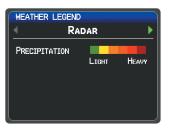
NEXRAD Limitations

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). 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, and has no information about storms directly over the site.

NEXRAD INTENSITY

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.

RADAR Legend   NEXRAD Data

FIS-B RADAR PRODUCTS

FIS-B weather provides two different Radar products, CONUS and Regional. The system can display each individually or a composite (COMBINED). When Regional Radar is displayed, only precipitation for your current region is displayed. The subdued (grayish-purple colored) area represents the area not covered by the regional radar product. When Combined radar data is viewed, Regional Radar data is displayed on top of CONUS data and the time shown in the lower left corner is associated with Regional Radar data only.

FIS-B Radar (CONUS) (Split-Screen)

FIS-B Radar (Regional) (Split-Screen)

FIS-B Radar (Combined) (Split-Screen)

WINDS ALOFT

Winds Aloft data shows the forecasted wind speed and direction in 3,000-foot increments up to 39,000 feet MSL.

Winds Aloft are displayed using wind barbs or a wind streamline depending on the selected range. The wind barbs indicate wind speed and direction. The wind streamline indicates wind direction with arrows.

The wind barbs always point in the direction that the wind is coming from. The wind speed is depicted using flags at the end of the wind barb. A short wind flag is 5 knots, a long wind flag is 10 knots, and a triangle flag is 50 knots.

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Winds Aloft Data (Split-Screen)

Winds Barbs

TEMPERATURES ALOFT

Temperature Aloft data shows the forecasted temperatures aloft in 3,000-foot increments up to 39,000 feet MSL. For altitudes 18,000 feet and above the relative ISA temperature is also shown. Temperatures are color coded with temperatures near and below freezing are shown as shades of blue, green for temperatures just above freezing and shades of orange are used for warmer temperatures.

Temperatures Aloft

METARs AND TAFs

✓ **NOTE:** *METAR information is only displayed within the installed aviation database service area.*

METAR (METeorological Aerodrome Report) is an international code used for reporting weather observations. METARs are updated hourly or as needed. 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. If METAR data is available for an airport, a color-coded flag is shown next to the airport.

TAF (Terminal Area Forecast) is the standard format for 24-hour weather forecasts. TAFs may contain some of the same code as METAR data. It typically forecasts significant weather changes, temporary changes, probable changes, and expected changes in weather conditions.

METAR and TAF text data is displayed on the Map Page and the Weather (WX) Page. An abbreviated version can be viewed by panning over the METAR flag. Pressing the **ENT** Key will display additional information. METAR and TAF data can be displayed as raw or decoded text.

Changing METAR and TAF text:

1) Using the Map Pointer, select the desired METAR and press the **ENT** Key; or from the Waypoint (WPT) Page press the **WEATHER** Softkey. The Weather Information Page is displayed.

2) Press the **MENU** Key.

    a) Select 'Show Decoded Text' or 'Show Raw Text'.

    b) Press the **ENT** Key.

    Or:

    a) Select 'Change Text Size' and press the **ENT** Key.

    b) Select 'Small', 'Medium', or 'Large' and press the **ENT** Key.

The METAR flag color is determined by the information in the METAR text.

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VFR (ceiling greater than 3000 feet AGL and visibility greater than 5 miles)

Marginal VFR (ceiling 1000-3000 feet AGL and/or visibility 3-5 miles)

IFR (ceiling 500 to below 1000 feet AGL and/or visibility 1 mile to less than 3 miles)

Low IFR (ceiling below 500 feet AGL or visibility less than 1 mile)

METAR text does not contain adequate information to determine flight conditions

METAR Legend

METAR Selected With Map Pointer

AIRMETS

An AIRMET (AIRmen's METeorological Information) can be especially helpful for pilots of light aircraft that have limited flight capability or instrumentation. An AIRMET must affect or be forecast to affect an area of at least 3,000 square miles at any one time. AIRMETs are routinely issued for six-hour periods and are amended as necessary due to changing weather conditions. AIRMETs are displayed as colored, dashed lines.

SIGMETs

A SIGMET (SIGnificant METeorological Information) advises of weather that is potentially hazardous to all aircraft. In the contiguous United States, the following items are covered: severe icing, severe or extreme turbulence, volcanic ash, dust storms, and sandstorms that lower visibility to less than three statute miles.

A Convective SIGMET is issued for the following conditions: thunderstorms, isolated severe thunderstorms, embedded thunderstorms, hail at the surface, and tornadoes.

A SIGMET is widespread and must affect or be forecast to affect an area of at least 3,000 square miles. SIGMETs are displayed as a yellow-dashed line.

AIRMET/SIGMET Legend

AIRMET Selected With Map Pointer

TEMPORARY FLIGHT RESTRICTIONS (TFR)

⚠ **CAUTION:** *The Graphical Depiction of TFR data is approximated.*

✓ **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 of Air Traffic Control.*

Temporary Flight Restrictions, or TFRs, temporarily restrict all aircraft from entering the selected airspace unless a waiver has been issued. TFRs are routinely issued for activities such as sporting events, dignitary visits, military depots, and forest fires. TFRs are represented as an area highlighted by red (active) or yellow (not yet active).

TFR Data

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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 unforecast adverse weather conditions, such as low in-flight visibility, icing conditions, wind shear, and turbulence. PIREPs are issued as either Routine (UA) (blue) or Urgent (UUA) (yellow).

Urgent (UUA) PIREP

Routine (UA) PIREP Selected

PIREP Data

USING FIS-B WEATHER PRODUCTS

⚠️ **WARNING:** *Do not use data link weather information for maneuvering in, near, or around areas of hazardous weather. Information contained with in 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.*

FIS-B Weather Products can be displayed on the Map Page and individually on the Weather (WX) Page.

Switching Weather Sources:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'WEATHER'.

4) Press the **ENT** Key.

5) Turn or move the **FMS** Joystick to select the desired weather source (AUTO, XM, or GDL FIS-B). The default is 'AUTO' which will use XM over GDL FIS-B if both are available.

6) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the previous page.

Or

1) From the Weather Page press **SETUP** Softkey.

2) Turn or move the **FMS** Joystick to select the desired weather source (AUTO, XM, or GDL FIS-B). The default is 'AUTO' which will use XM over GDL FIS-B if both are available.

3) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the previous page

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The setup menu for the Map Page controls the map range settings above which weather products are decluttered from the display. If a map range larger than the weather product map range setting is selected, the weather product data is removed from the map. The menu also provides a means for enabling/disabling display of 'Airmets', 'Sigmets', 'Weather Data', and/or 'NEXRAD' on the Map Page.

Additional information about the following can be displayed by panning over the display on the Weather Page or the Map Page:

- SIGMETs
- AIRMETs
- METARs
- TFRs

Additional information is also available for PIREPs on the Weather Page (not displayed on the Map Page):

Viewing FIS-B Weather products on the Map Page:

1) Select the Map Page.

2) Select the **WEATHER** Softkey to display the FIS-B weather products.

   Or:

   a) Press the **MENU** Key.

   b) Select 'Show Weather' and press the **ENT** Key.

3) Press the **FMS** Joystick to activate the Map Pointer.

4) Use the **FMS** Joystick to highlight the desired weather product with the Map Pointer.

5) With the desired weather product highlighted, press the **ENT** Key to get detailed information (if available).

Viewing FIS-B Weather products on the Weather (WX) Page:

1) From the WX Page press the **FMS** Joystick to highlight the weather product field.

2) Turn the **FMS** Joystick to select and automatically display the desired weather product.

3) If necessary, move the **FMS** Joystick to highlight the type field and turn the **FMS** Joystick to scroll through a list of available options.

4) Press the **PAN MAP** Softkey to get abbreviated information about the selected weather product or map feature (if available).

5) With the desired weather product selected press the **ENT** Key to get detailed information (if available).

Abbreviated Weather Product Information (Split-Screen)

Detailed Weather Product Information (Split-Screen)

> *NOTE: The Map Setup Menu may display the weather category as: 'Weather' and 'WX Reports' or 'XM Weather' and 'XM WX Reports' or 'FIS-B Weather' depending on the currently configured weather source(s).*

Setting up and customizing FIS-B weather data for the Map Page:

1) From the Map Page press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map' and press the **ENT** Key.

3) Turn the **FMS** Joystick to select the 'Weather' from the horizontal list.

4) Move the **FMS** Joystick to select the desired weather product.

5) Turn the **FMS** Joystick to access a list of options for each product (On/Off, Auto, range settings).

6) Press the **ENT** Key to select an option.

7) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the Map Page with the changed settings.

Map Setup Page (FIS-B Weather)

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Restoring default weather data for the Map Page:

1) From the Map Page press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map' and press the **ENT** Key.

3) Turn the **FMS** Joystick to select 'Weather'.

4) Move the **FMS** Joystick to select the desired weather product.

5) Press the **MENU** Key.

6) With 'Restore Default' or 'Restore All Map Defaults' selected, press the **ENT** Key.

7) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the Map Page with the restored settings.

Viewing legends for displayed weather products:

1) From the Map Page press the **MENU** Key to access the Map Page Menu.

2) Turn or move the **FMS** Joystick to select 'Weather Legend' and press the **ENT** Key to display the Weather Legend Window.

3) Turn the **FMS** Joystick to view the desired weather legend (Radar, METAR, or AIRMET).

4) With '**DONE**' highlighted, press the **ENT** Key to return to the Map Page.

Or:

1) From the Weather (WX) Page press the **LEGEND** Softkey to display the Weather Legend Window.

2) Turn the **FMS** Joystick to view the desired weather legend (Radar, METAR, or AIRMET).

3) Press the **FMS** Joystick, **CLR** Key, or **LEGEND** Softkey to return to the Weather (WX) Page.

Animating FIS-B weather:

1) From the Map Page press the **MENU** Key to access the Map Page Menu.

2) Turn or move the **FMS** Joystick to select 'Animate Weather' and press the **ENT** Key.

3) To stop animation, press the **MENU** Key again, turn or move the **FMS** Joystick to select 'Stop Animation', and press the **ENT** Key.

Or:

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1) Select the Weather (WX) Page.

2) Using the **FMS** Joystick select either the 'NEXRAD Radar Combined' or 'NEXRAD Radar Regional Only' weather product.

3) Select the **ANIMATE** Softkey to begin animation.
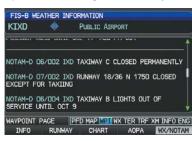
    Or:

    a) Press the **MENU** Key.

    b) Select 'Animate Weather' and press the **ENT** Key to begin animation.

4) To stop animation, deselect the **ANIMATE** Softkey.

    Or:

    Press the **MENU** Key, turn or move the **FMS** Joystick to select 'Stop Animation', and press the **ENT** Key.

Viewing FIS-B NOTAMs:

1) From the Waypoints Page press NOTAMS Softkey.

2) If needed, scroll up or down using the FMS Joystick.

FIS-B WX/NOTAM

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7.2 TERRAIN

⚠️ *WARNING: Do not use Terrain information for primary terrain avoidance. Terrain information is intended only to enhance situational awareness.*

✓ *NOTE: Terrain data is not displayed when the aircraft is outside the installed terrain database coverage area.*

✓ *NOTE: Terrain depicted in the Profile View is always "ahead" of the aircraft, and will change as ground track changes.*

The Terrain Page displays altitudes of terrain and obstructions relative to the aircraft position and altitude with reference to a database that may contain inaccuracies. Terrain and obstructions are shown only if they are in the database. Terrain and obstacle information should be used as an aid to situational awareness. They should never be used to navigate or maneuver around terrain.

Note that all obstructions may not be available in the terrain and obstacle database. No terrain and obstacle information is shown without a valid 3-D GPS position.

The G3X GPS receiver provides the horizontal position and altitude of the aircraft. Aircraft GPS altitude is derived from satellite position. GPS altitude is then converted to a mean sea level (MSL)-based altitude (GPS-MSL altitude) and is used to determine terrain and obstacle proximity. GPS-MSL altitude accuracy is affected by satellite geometry, but is not subject to variations in pressure and temperature that normally affect pressure altitude sensors. GPS-MSL altitude does not require local altimeter settings to determine MSL altitude. It is a widely-used MSL altitude source.

Terrain and obstacle databases are referenced to MSL. Using the GPS position and altitude, the Terrain feature portrays a 2-D picture of the surrounding terrain and obstacles relative to the position and altitude of the aircraft. GPS position and GPS-MSL altitude are used to calculate and predict the aircraft's flight path in relation to the surrounding terrain and obstacles. In this way, the pilot can view predicted dangerous terrain and obstacle conditions.

Alert windows appear on all pages (except the Terrain (TER) Page) to inform the pilot of proximity to the terrain and obstacles, as well as an unsafe descent rate. These alerts depend on user-defined parameters in the Terrain Page setup.

SYNTHETIC VISION

Terrain is integrated within Synthetic Vision (when active) to provide land contours (colors are consistent with those of the topographical map display), large water features, towers, obstacles over 200' AGL, as well as visual and auditory alerts to indicate the presence of terrain and obstacle threats relevant to the projected flight path. Synthetic Vision terrain information is displayed in red and yellow shading on the PFD. Refer to section 8.1 (Synthetic Vision) for more information.

TERRAIN INFORMATION

The areas of the terrain shaded red are predicted to be within 100 feet below or above the aircraft. The yellow terrain areas are between the user-defined Caution Elevation and 100 feet below the aircraft. By default, the Caution Elevation is 1,000 feet; therefore, the areas in yellow are between 1,000 feet and 100 feet below the aircraft. The black areas are further than the Caution Elevation. A projected point of impact is marked with an "X" symbol.

Enabling/Disabling Terrain Shading on the Map Page:

From the Map Page with the VFR Map displayed, press the **TERRAIN** Softkey.

Or:

1) From the Map Page, press the **MENU** Key.
2) Turn or move the **FMS** Joystick to highlight 'Set Up Map', and press the **ENT** Key.
3) Turn the **FMS** Joystick to highlight the 'Map' Category from the horizontal list.
4) Move the **FMS** Joystick to highlight the 'Terrain Shading' field.
5) Turn the **FMS** Joystick to select 'On' or 'Off', and press the **ENT** Key.

TERRAIN VIEWS

Two views are displayed on the Terrain (TER) Page: the Map View, and the Profile View.

Press the **MAP** or **PROFILE** Softkeys to toggle between views (split-screen only).

Yellow Terrain is Between the User-defined Caution Elevation and 100 ft Below the Aircraft

Red Terrain is above the aircraft, or within 100 ft below the aircraft.

Potential Impact Point

Terrain Legend

Obstacle

Terrain (TER) Page (Map View) (Split-Screen)

Terrain (TER) Page (Profile View) (Split-Screen)

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OBSTACLE INFORMATION

Obstacles are shown on the Terrain Page at or below the map range of 12 nm. Obstacles are also shown on the Map Page when the map range is set to 3 nm or below.

Standard aeronautical chart symbols are used for lighted or unlighted obstacles taller than 200 feet Above Ground Level (AGL). Refer to the Obstacle Icons legend below.

Each obstacle is labeled with the altitude of the top of the obstacle, or Mean Sea Level (MSL). Each obstacle also lists, in parentheses, the actual height of the obstacle, or Above Ground Level (AGL).

Unlighted Obstacle		Lighted Obstacle		Potential Impact Points	Obstacle Location
< 1000' AGL	> 1000' AGL	< 1000' AGL	> 1000' AGL		
					WARNING: Red obstacle is above or within 100' below current aircraft altitude
					CAUTION: Yellow obstacle is between 100' and 1000' (default) below current aircraft altitude

Terrain Obstacle Colors and Symbology

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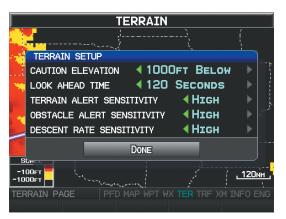
TERRAIN SETTINGS

Use the terrain settings to set levels for terrain alerts as well as obstacles in or near your flight path.

- Caution Elevation—The G3X will provide an alert if the terrain or obstacle is within the default Caution Elevation or user-defined Caution Elevation.

- Look Ahead Time—Determines the maximum time when an alert annunciation occurs. For example, if 120 seconds is selected, the G3X provides an alert up to 120 seconds before you reach the terrain or obstacle.

- Alert Sensitivity—The three Alert Sensitivity settings (Terrain, Obstacle, and Descent Rate) determine what level of alerts are annunciated. The G3X defaults to 'High' sensitivity, which annunciates all red and yellow alerts at the time set in Look Ahead Time. 'Medium' sensitivity annunciates all of the red and the highest priority of yellow alerts. 'Low' only annunciates red alerts. 'Off' disables the alert.

Accessing the terrain settings:

1) On the Terrain Page, press the **SETTINGS** Softkey.

2) Move the **FMS** Joystick to highlight the desired field.

3) Turn the **FMS** Joystick to make changes to the highlighted field.

4) With 'Done' highlighted press the **ENT** Key, or press the **CLR** Key to accept the changes and exit the Terrain Setup window.

Terrain Setup

TERRAIN ALERTS

Terrain, Obstacle, and Descent Rate Alerts are issued when flight conditions meet parameters that are set within the software algorithms. Terrain alerts typically employ a CAUTION or a WARNING alert severity level, or both. When an alert is issued, visual annunciations are displayed and aural alerts are simultaneously issued. When the aircraft descends through 500 feet above the destination airport an audible "Five Hundred" altitude reminder occurs.

If the Terrain Page is not displayed, a pop-up alert appears in the lower left corner of the page. The Range Rings on the pop-up alert are spaced every whole mile/kilometer/nautical mile. Press the **CLR** Key to acknowledge the pop-up and/or aural alert.

Terrain and obstacle annunciations appear on the PFD and PFD Page in the upper left corner of the Attitude Indicator. Arrows are depicted on the terrain and obstacle annunciations if terrain is outside the Synthetic Vision field of view.

Arrows indicate the terrain is outside the Synthetic Vision field of view.

TERRAIN →

Terrain Annunciation on PFD

Enabling/Disabling terrain alerts:

From the Terrain Page, press the **DISABLE** Softkey.

Or:

1) From the Terrain Page, press the **MENU** Key to access the Page Menu.

2) Turn or move the **FMS** Joystick to highlight 'Disable Alerts' or 'Enable Alerts' and press the **ENT** Key. Disabling terrain alerts is only temporary. Terrain alerts are automatically enabled when the unit is powered on.

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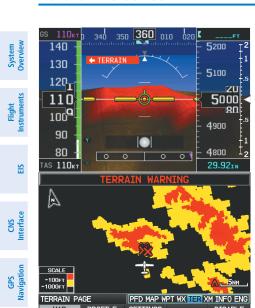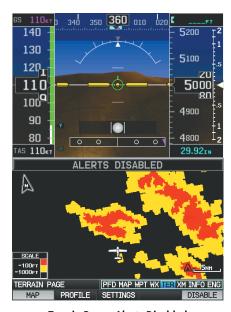
**Terrain Page - Alerts Enabled
(Split-Screen)**

**Terrain Page - Alerts Disabled
(Split-Screen)**

AURAL ALERTS

• "Five Hundred"—when the aircraft descends through 500 feet above the destination airport.

The following aural terrain alerts are issued when flight conditions meet parameters that are set within the software algorithms, and are dependent on the sensitivity level set in the Terrain Setup Menu.

Alert Severity	Terrain	Obstacle	Descent Rate
Caution	"caution, terrain" "caution, terrain ahead"	"caution, obstacle" "caution, obstacle ahead"	"caution, sink rate"
Warning	"terrain ahead! pull up!" "terrain! terrain! pull up! pull up!"	"obstacle ahead! pull up!" "obstacle! obstacle! pull up! pull up!"	"sink rate, pull up!" "pull up!"

Aural Alerts Summary

PFD Page Terrain Alerts

Pop-up Alert

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7.3 TRAFFIC SYSTEMS

TRAFFIC SOURCE

The G3X is compatible with three different traffic sources; TIS-A traffic via a Garmin Mode S Transponder (GTX 33, GTX 330 or GTX 23), TAS via a GTS 800, or ADS-B/ TIS-B traffic via a GDL 39. When the G3X system is configured with both a Mode S transponder capable of receiving TIS-A traffic and a GDL 39 capable of receiving ADS-B/TIS-B traffic the G3X will automatically switch between traffic sources. The following conditions describe the traffic display logic.

- If the GTX is not receiving TIS-A traffic data, GDL 39 ADS-B traffic will be displayed.

- If the GDL 39 is receiving both air-to-air ADS-B traffic data and ground uplink TIS-B traffic, then the GDL 39 ADS-B traffic will be displayed.

- If the GTX is receiving TIS-A traffic, and the GDL 39 is not receiving ground uplink TIS-B traffic, then GTX TIS-A traffic will be displayed.

If more than one traffic source is configured, the current traffic source is annunciated in the upper left hand corner of the Traffic Page (TRF).

Traffic Source	Description
GTX TIS-A OPERATING	Displaying TIS-A traffic from a Mode S transponder.
GDL ADS-B OPERATING NORMAL	Displaying ADS-B/TIS-B traffic from a GDL 39
GTS TAS OPERATING NORMAL	Displaying TAS traffic from a GTS 800

Traffic Source Annunciation

TRAFFIC INFORMATION SERVICE (TIS-A) (OPTIONAL)

> *NOTE: Refer to Appendix E for general information regarding Traffic Information Service (TIS-A).*

The G3X supports Traffic input from a Garmin Mode S transponder, such as the GTX 330 or GTX 23.

SYSTEM STATUS

The traffic system status is annunciated in the upper right corner of the Map Page.

System Status	Traffic Icon
Operating	
No Traffic Data Available	

If a Traffic Icon is not displayed, check the Map Page range and/or the Traffic Display Range on the Map Set Up menu.

Traffic Modes

TRAFFIC SYMBOLOGY

Traffic is shown on the G3X according to TCAS symbology, graphically shown on the Traffic Page (Optional), Map Page, and in the Traffic Warning Window.

A Proximity Advisory (PA) indicates that the intruding aircraft is within ±1200 feet and is within a 5 nm range, but is still not considered a threat.±

A Traffic Advisory (TA) symbol appears as a solid yellow circle. All other traffic within range is shown as a hollow white diamond. Altitude deviation from own aircraft altitude is shown above the target symbol if traffic is above own aircraft altitude, and below the symbol if they are below own aircraft altitude. Altitude trend is shown as an up arrow (>+500 ft/min), down arrow (<-500 ft/min), or no symbol if less than 500 ft/min rate in either direction.

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TIS-A Symbol	Description
◆	Non-Threat Traffic
◇	Proximity Advisory (PA)
●	Traffic Advisory (TA)

Traffic Symbols

TRAFFIC ANNUNCIATIONS

The G3X displays traffic symbolically on the Map Page, and the Traffic Warning Window (Inset Map) in the lower left corner of the display(s).

When a traffic advisory (TA) is detected, the following automatically occur:

• The Traffic Warning Window (Inset Map) is enabled and displays traffic.

• A flashing black-on-yellow 'TRAFFIC' annunciation will appear in the upper right corner of the Attitude Indicator for five seconds and remains displayed until no TAs are detected in the area.

• A single "Traffic" voice alert is generated

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Inset Map (Traffic Warning Window)

Traffic Alerts

Arrows are depicted on the traffic message if traffic is outside the Synthetic Vision field of view. The arrow points in the direction of the traffic.

Traffic Outside the Synthetic Vision Field of View (PFD)

TRAFFIC VOICE ALERTS

A traffic voice alert is generated whenever the number of Traffic Advisories on the G3X screen increases from one scan to the next. Limiting Traffic Advisories only reduces the "nuisance" alerting due to proximate aircraft. For example, when the first Traffic Advisories appear on the TIS-A display, the user is alerted audibly. So long as a single aircraft remains on the traffic display, no further voice alert is generated. If a second (or more) aircraft appears on the screen, a new voice alert is sounded.

If the number of Traffic Advisories on the traffic display decreases and then increases, a new voice alert is sounded. The traffic voice alert is also generated whenever traffic becomes available. The following traffic voice alerts are available:

- "Traffic"— Traffic alert received.

- "Traffic Not Available"—Traffic service is not available or out of range.

Enable/disable 'Traffic Not Available' voice alert:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Sound', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the Traffic N/A Alert field.

5) Turn the **FMS** Joystick to highlight 'On' or 'Off'.

6) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.

TRAFFIC WARNING WINDOW

When a traffic threat is imminent, the Traffic Warning Window is shown. The Traffic Warning Window shows a small pop-up map in the lower left corner. The Range Rings on the pop-up alert are spaced every whole mile/kilometer/nautical mile. Press the **CLR** Key to remove the Traffic Warning Window.

> **NOTE:** The Traffic Warning Window is disabled when the aircraft ground speed is less than 30 knots or when on the approach leg of a route.

TRAFFIC GROUND TRACK

Traffic ground track is indicated on the G3X screen by a "target track vector," a short line shown in 45-degree increments, extending in the direction of target movement.

DISPLAYING TRAFFIC DATA

Traffic is displayed by default on the Map Page and the Traffic Warning Window.

Traffic information is also displayed on the PFD when Synthetic Vision is enabled. See the 'Additional Features' Section for more information.

Displaying Traffic information using the map pointer:

1) With traffic displayed on the Map Page, press the **FMS** Joystick. The Map Pointer is activated.

2) Move the **FMS** Joystick to highlight the desired traffic.

Traffic Ground Track

Traffic Warning Window

Traffic Range and Altitude Separation using Map Pointer

Traffic (Map Page)

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Enabling/disabling traffic data on the Map Page:

1) From the Map Page, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map', and press the **ENT** Key.

3) If necessary, turn the **FMS** Joystick to highlight the 'Map' Category from the horizontal list.

4) Move the **FMS** Joystick to highlight the 'Traffic Data' field.

5) Turn the **FMS** Joystick to select 'ON' or 'OFF' from the menu, and press the **ENT** Key.

Or:

1) From the Map Page, press the **TRAFFIC** Softkey to enable or disable traffic.

Enabling/disabling traffic on the Synthetic Vision display:

1) From the full-screen PFD and/or the split-screen PFD Page, press the **MENU** Key.

2) Move the **FMS** Joystick to highlight the 'TRAFFIC' field.

3) Turn the **FMS** Joystick to highlight 'On' or 'Off'.

DEDICATED TRAFFIC PAGE (TRF)

Displaying/Removing the Traffic Page:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Display', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the Traffic Page field.

5) Turn the **FMS** Joystick to highlight 'Show' or 'Hide'.

6) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.

Disabling/Enabling the traffic alerts:

⚠ *NOTE: Traffic alerts are reset to 'enabled' on the next power cycle.*

1) Display the dedicated Traffic (TRF) Page as described in the procedure above.

2) From the Traffic (TRF) Page touch the **DISABLE** Softkey to enable/disable traffic alerts.

Traffic Page
Full-Screen MFD

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GARMIN GTS 800 TRAFFIC (OPTIONAL)

⚠️ **WARNING:** *Do not rely solely upon the display of traffic information for traffic avoidance maneuvering. The GTS 800 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.*

✓ **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.*

✓ **NOTE:** *TIS-A is disabled when TAS installed.*

The optional Garmin GTS 800 is a Traffic Advisory System (TAS). It enhances flight crew situational awareness by displaying traffic information for transponder-equipped aircraft. The system also provides visual and aural traffic alerts including voice announcements to assist in visually acquiring traffic.

The GTS 800 is capable of tracking up to 45 intruding aircraft equipped with Mode A or C transponders, and up to 30 intruding aircraft equipped with Mode S transponders. A maximum of 30 aircraft with the highest threat potential can be displayed simultaneously. No TAS surveillance is provided for aircraft without operating transponders.

THEORY OF OPERATION

When the GTS 800 is in Operating Mode, the unit interrogates the transponders of intruding aircraft while monitoring transponder replies. The system 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 GTS 800 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.

TAS SURVEILLANCE VOLUME

The GTS 800 surveillance system monitors the airspace within ±10,000 feet of own altitude. Under ideal conditions, the GTS 800 unit scans transponder traffic up to 12 nm in the forward direction.   The range is somewhat reduced to the sides and aft of own aircraft due to the directional interrogation signal patterns. In areas of greater transponder traffic density or when TCAS II (Traffic Alert and Collision Avoidance System II) systems are detected, the GTS 800 automatically reduces its interrogation transmitter power (and therefore range) in order to limit potential interference from other signals.

TAS SYMBOLOGY

The GTS 800 uses symbology to depict intruding traffic using the symbols shown below.

Symbol	Description
	Traffic Advisory.
	Traffic Advisory out of the selected display range. Displayed at outer range ring at proper bearing.
	Proximity Advisory.
	Non-Threat Traffic.

GTS 800 Traffic Symbols

A Traffic Advisory (TA), displayed as a yellow circle or triangle, alerts the crew to a potentially hazardous intruding aircraft, if the closing rate, distance, and vertical separation meet TA criteria. A Traffic Advisory that is beyond the selected display range (off scale) is indicated by a half TA symbol at the edge of the screen at the relative bearing of the intruder.

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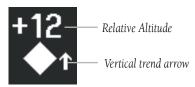
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A Proximity Advisory (PA), displayed as a solid white diamond or triangle, indicates the intruding aircraft is within ±1200 feet and is within a 6 nm range, but is still not considered a TA threat.

A Non-threat Advisory, shown as an open white diamond or triangle, is displayed for traffic beyond 6 nm that is neither a TA or PA.

Relative altitude, when available, is displayed above or below the corresponding intruder symbol in hundreds of feet. When this altitude is above own aircraft, it is preceded by a '+' symbol; a minus sign '-' indicates traffic is below own aircraft.

A vertical trend arrow to the right of the intruder symbol indicates climbing or descending traffic with an upward or downward-pointing arrow respectively.

+12 —— *Relative Altitude*

◆↑ —— *Vertical trend arrow*

Intruder Altitude and Vertical Trend Arrow

Flight IDs may also be displayed with traffic symbols; see the Flight IDs discussion in this section for more information.

TAS ALERTS

When the GTS 800 detects a new TA, the following occur:

- A single "Traffic!" voice alert is generated, followed by additional voice information about the bearing, relative altitude, and approximate distance from the intruder that triggered the TA. The announcement "Traffic! 12 o'clock, high, four miles," would indicate the traffic is in front of own aircraft, above own altitude, and approximately four nautical miles away.

- A TRAFFIC Annunciation appears at the top right of the airspeed on the PFD, flashing for five seconds and remains displayed until no TAs are detected in the area.

If the bearing of TA traffic cannot be determined, a yellow text banner will be displayed in the center of the Traffic Page and in the lower-left of the PFD inset map instead of a TA symbol. The text will indicate "TA" followed by the distance, relative altitude, and vertical trend arrow for the TA traffic, if known.

Bearing	Relative Altitude	Distance (nm)
"One o'clock" through "Twelve o'clock" or "No Bearing"	"High", "Low", "Same Altitude" (if within 200 feet of own altitude), or "Altitude not available"	"Less than one mile", "One Mile" through "Ten Miles", or "More than ten miles"

TA Descriptive Voice Announcements

TA ALERTING CONDITIONS

The GTS 800 automatically adjusts its TA sensitivity level to reduce the likelihood of nuisance TA alerting during flight phases likely to be near airports. The system uses Level A TA sensitivity when the groundspeed is less than 120 knots; Level B TA sensitivity applies in all other conditions.

Sensitivity Level	Intruder Altitude Available	TA Alerting Conditions
A	Yes	Intruder closing rate provides less than 20 seconds of vertical and horizontal separation. Or: Intruder closing rate provides less than 20 seconds of horizontal separation and vertical separation is within 600 feet. Or: Intruder range is within 0.2 nm and vertical separation is within 600 feet.
A	No	Intruder closing rate provides less than 15 seconds of separation.
B	No	Intruder range is less than 20 seconds.

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Sensitivity Level	Intruder Altitude Available	TA Alerting Conditions
B	Yes	Intruder closing rate provides less than 30 seconds of vertical and horizontal separation. Or: Intruder closing rate provides less than 30 seconds of horizontal separation and vertical separation is within 800 feet. Or: Intruder range is within 0.55 nm and vertical separation is within 800 feet.

TA Sensitivity Level and TA Alerting Criteria

SYSTEM TEST

NOTE: Traffic surveillance is not available during the system test. Use caution when performing a system test during flight.

The GTS 800 provides a system test mode to verify the TAS system is operating normally. The test takes ten seconds to complete. When the system test is initiated, a test pattern of traffic symbols is displayed on the Traffic Page. If the system test passes, the aural announcement "TAS System Test Passed" is heard, otherwise the system announces "TAS System Test Failed." When the system test is complete, the traffic system enters Standby Mode.

Testing the traffic system:

1) Turn the **FMS** Joystick to the Traffic Page.

2) Press the **RNG** Key to set the range to 2/6 nm to allow for full test pattern to be displayed during test.

3) Press the **MENU** Key to display the page menu.

4) With **SELF-TEST** highlighted press the **ENT** Key to start the self-test.

Traffic Page Menu

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OPERATION

> **NOTE:** *The GTS 800 automatically transitions from **STANDBY** to **OPERATE** mode eight seconds after takeoff. The unit also automatically transitions from **OPERATE** to **STANDBY** mode 24 seconds after landing.*

After power-up, the GTS 800 is in Standby Mode. The GTS 800 must be in Operating Mode for traffic to be displayed and for TAs to be issued.

Pressing the **OPERATE** Softkey allows the traffic unit to switch from Standby Mode to Operating Mode as necessary. Pressing the **STANDBY** Softkey forces the unit into Standby Mode.

Switching from operating mode to standby mode:

On the Traffic Page, select the **STANDBY** Softkey

Switching from standby mode to operating mode:

On the Traffic Page, press the **OPERATE** Softkey

Changing the altitude range:

1) On the Traffic Page, select the **ALT MODE** Softkey.

2) Press one of the following Softkeys:

• **ABOVE:** Displays non-threat and proximity traffic from 9000 feet above the aircraft to 2700 feet below the aircraft. Typically used during climb phase of flight.

• **NORMAL:** Displays non-threat and proximity traffic from 2700 feet above the aircraft to 2700 feet below the aircraft. Typically used during enroute phase of flight.

• **BELOW:** Displays non-threat and proximity traffic from 2700 feet above the aircraft to 9000 feet below the aircraft. Typically used during descent phase of flight.

• **UNREST** (unrestricted)**:** All traffic is displayed from 9900 feet above and 9900 feet below the aircraft.

3) To return to the Traffic Page, press the **BACK** Softkey.

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FLIGHT ID DISPLAY

The Flight IDs of other aircraft (when available) can be enabled for display on the Traffic Page. When a flight ID is received, it will appear above or below the corresponding traffic symbol on the Traffic Page when this option is enabled.
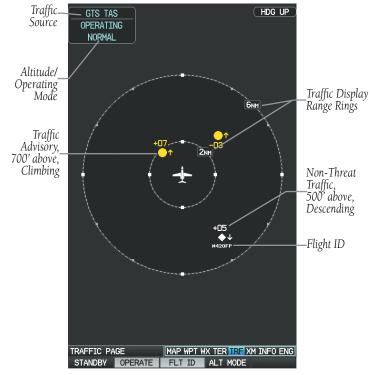
Enabling/Disabling Flight ID Display:

On the Traffic Page, press the **FLT ID** Softkey.

TRAFFIC PAGE

The Traffic Page shows surrounding TAS traffic data in relation to the aircraft's current position and altitude, without basemap clutter. It is the primary page for viewing traffic information. Aircraft orientation is always heading up unless there is no valid heading. Map range is adjustable with the **RANGE** Key, as indicated by the map range rings.

The traffic mode and altitude display mode are annunciated in the upper left corner of the page.
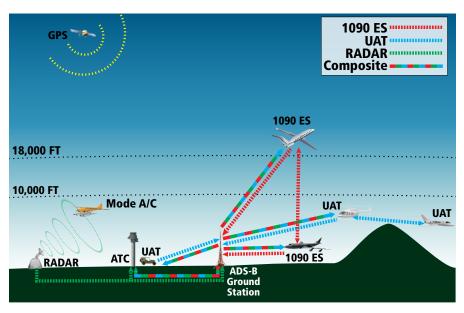
Traffic Page Full-Screen MFD (GTS 800)

DATA LINK TRAFFIC (GDL 39) (OPTIONAL)

The GDL 39 is a receive-only data link radio with on-board GPS, 978 MHz (Universal Access Transceiver frequency band), and 1090 MHz Extended Squitter (1090 ES) receivers. It is designed to receive, process, and output traffic (ADS-B air-to-air, and TIS-B traffic information), and weather (Flight Information Service-Broadcast (FIS-B)) information to the G3X system through an RS-232 serial connection.

ADS-B (Automatic Dependent Surveillance-Broadcast) is a surveillance technology deployed across the United States as the cornerstone of the FAA's Next Generation Air Transportation System (NextGen). ADS-B enables improved surveillance services, both air-to-air and air-to-ground, especially in areas where radar is ineffective due to terrain or where it is impractical or cost prohibitive. Initial applications of air-to-air ADS-B are for "advisory" use only, enhancing a pilot's visual acquisition of other nearby ADS-B equipped aircraft either when airborne or on the airport surface.

ADS-B System

For the purpose of distinguishing between levels of ADS-B service, there are three classifications of aircraft or system capability; ADS-B In, ADS-B Out, and ADS-B participating. ADS-B In refers to the capability to receive ADS-B information. ADS-B Out refers to the capability to transmit ADS-B information. ADS-B participating refers

to the capability to both send and receive ADS-B information. Aircraft lacking either ADS-In, ADS-B Out, or both ADS-B capabilities may also be referred to as ADS-B non-participating aircraft.

Currently, rule-compliant ADS-B Out capability in the United States requires a TSO'ed SBAS-enabled GPS, such as a Garmin GPS 400W or similar, and one of two possible data links: 1090 ES transponder or a 978 MHz UAT. Either data link system is capable of transmitting the aircraft's position, velocity, identification, and other information every second to compatible aircraft and ground stations called Ground Based Transceivers (GBTs).

Because 1090 ES transponders and UATs operate on different frequencies, aircraft not similarly equipped cannot transmit/receive data link information directly to/from each other. Instead, operation within range of a GBT is required to receive data link information on both frequencies. The GDL 39 is unique in its ADS-B In capability since it can receive data link information from both 1090 ES transponders and UATs.

Thus, the GDL 39 receives traffic information directly from any ADS-B Out aircraft within range as well as the rebroadcast of ADS-B information from any nearby GBT. This rebroadcast is called Automatic Dependent Surveillance-Rebroadcast (ADS-R) and is automatically triggered by the detection of an ADS-B participating aircraft within the service volume of the GBT. As a 978 MHz (UAT frequency) receiver, the GDL 39 can receive both the Traffic Information Service-Broadcast (TIS-B) and Flight Information Service-Broadcast (FIS-B) provided in conjunction with ADS-R services when in range of a GBT.

FIS-B service is provided continuously, but ADS-R including TIS-B will only be broadcast by a GBT when an ADS-B participating aircraft is within the GBT's defined service volume. In this case, a GBT will only rebroadcast TIS-B information relative to the ADS-B participating aircraft. **Only traffic that is within 15 nm lateral and 3,500' vertical of the ADS-B participating aircraft is provided in the broadcast.** Non-participating traffic aircraft located farther than 15 nm laterally and 3,500' vertically from the participating aircraft is are excluded from the information transmitted by the GBT.

TIS-B traffic information includes non-participating aircraft detected by ATC surveillance radar. As TIS-B data is derived from ATC surveillance radar data, TIS-B

traffic position updates typically occur every three to thirteen seconds. **Therefore, TIS-B traffic may be displayed with degraded positional accuracy. Aircraft without operating transponders are invisible to TIS-B. Aircraft operating outside of the ATC radar coverage area are also not displayed.**

Since the GDL 39 is a receive-only device, even when used onboard an aircraft equipped with a qualifying GPS and 1090 ES transponder, a GBT may not identify it as an ADS-B participating aircraft. The squitter of some 1090 ES transponders, including the Garmin GTX 23ES, must be configured to communicate that the aircraft has 978 MHz receive capability in order to be identified as an ADS-B participating aircraft.

> ⚠ **WARNING:** Do not rely solely upon the display of traffic information for collision avoidance maneuvering. The traffic display does not provide collision avoidance resolution advisories and does not, under any circumstances or conditions, relieve the pilot's responsibility to see and avoid other aircraft.

> ⚠ **WARNING:** Do not rely solely upon the display of traffic information to accurately depict all of the traffic within range of the aircraft. Due to lack of equipment, poor signal reception, and/or inaccurate information from aircraft or ground stations, traffic may be present that is not represented on the display.

Viewing the GDL 39 Traffic and Weather Status:

1) Press the **MENU** Key twice to display the Main Menu.
2) Turn or move the **FMS** Joystick to highlight 'Data Link' and press the **ENT** Key.
3) To view weather status select the **WEATHER** Softkey.

Or

1) From the dedicated Traffic Page (TRF) select the **INFO** Softkey.
2) To view weather status select the **WEATHER** softkey.

SYSTEM STATUS

The traffic system status is annunciated in the upper right corner of the Map Page as well as the lower left corner of the dedicated Traffic Page.

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System Status	Traffic Icon
Full traffic services available for an ADS-B participating aircraft (ground linked TIS-B, FIS-B and ADS-R, and Air-to-Air ADS-B). If you are using the GDL 39 on a non-participating aircraft you may still see this when you are within the service area of any participating aircraft. As a non-participating aircraft you are only receiving TIS-B traffic information for traffic within 15 nm and 3,500' of a participating aircraft.	
Limited traffic services available (may be limited to Air-to-Air ADS-B)	
No Traffic Data Available	

Traffic Modes

TRAFFIC DESCRIPTION

ADS-B traffic operation is similar to the TAS systems discussed previously, but ADS-B adds additional symbology. The symbols used to display ADS-B traffic are shown in the table below. The traffic identifier and altitude are displayed below the traffic symbol. A small up or down arrow next to the traffic symbol indicates that the traffic is climbing or descending at a rate of at least 500 feet per minute. The vector line that extends from the traffic symbol is an indication of the intruder aircraft track. For directional traffic symbols, the arrow head points in the direction of aircraft's ground track.

Symbol	Description
	Non-threat, non-directional airborne traffic
	Non-threat directional airborne Traffic with track vector. Points in the direction of the aircraft track.
	Non-directional airborne Proximity Advisory (PA). Proximity Advisories are issued for any traffic within 6 nautical miles and +/- 1,200'.
	Directional airborne Proximity Advisory (PA) with track vector. Points in the direction of the aircraft track. Proximity Advisories are issued for any traffic within 6 nautical miles and +/- 1,200'.
	Non-directional airborne Traffic Advisory (TA)
	Non-directional off-scale airborne Traffic Advisory (TA). Displayed at outer range ring at proper bearing.
	Directional airborne Traffic Advisory (TA) with track vector. Points in the direction of the aircraft track.
	Directional off-scale airborne Traffic Advisory (TA). Points in the direction of the aircraft track.
	*Ground traffic without directional information. Ground traffic is only displayed when own aircraft is below 1,500 feet AGL or on the ground.
	*Directional surface traffic. Ground traffic is only displayed when own aircraft is below 1,500 feet AGL or on the ground.
	*Non-directional non-aircraft ground traffic. Ground traffic is only displayed when own aircraft is below 1,500 feet AGL or on the ground.
	*Directional non-aircraft ground traffic. Ground traffic is only displayed when own aircraft is below 1,500 feet AGL or on the ground.
*Ground traffic is only displayed on the Map Page when the aircraft is on the ground or below 1,500 feet AGL. Ground traffic is always displayed on the dedicated traffic page.	

ADS-B Traffic Symbology

TRAFFIC ADVISORIES (TA)

The GDL 39 automatically adjusts its Traffic Advisory (TA) sensitivity level to reduce the likelihood of nuisance TA alerts during various phases of flight. TAs are issued for traffic when they are predicted to be within a specified volume of airspace around your aircraft in a specified amount of time. The protected volume and time interval varies based on the current geodetic altitude and groundspeed. Thus, the protected volume of airspace increases with altitude and ground speed. Refer to the following table for details.

Altitude (Geodetic)	Look Ahead Time (sec.)	Vertical Separation (ft.)	Horizontal Separation (nm.)
Below 5,000	30	+/-850	.35
5,000-10,000	40	+/-850	.55
10,000-20,000	45	+/-850	.80
20,000-42,000	48	+/-850	1.10
Above 42,000	48	+/-1,200	1.10

Traffic Advisories

The following Traffic symbols are displayed on the display when Synthetic Vision (SVX) is installed and enabled. See the Additional Features Section for more information about SVX.

ADS-B Symbol on the PFD (SVX Only)	Description
◇	Proximity Advisory (PA)
●	Traffic Advisory (TA)
◈	Non-threat traffic

PFD ADS-B Symbology (SVX Only)

TRAFFIC ALERTS (ADS-B TIS-B)

A traffic voice alert is generated whenever the number of Traffic Advisories on the G3X display increases. Limiting Traffic Advisories only reduces the "nuisance" alerting due to proximate aircraft. For example, when the first Traffic Advisories appear on the display, the user is alerted audibly. So long as a single aircraft remains on the display, no further voice alert is generated. If a second (or more) aircraft appears on the screen, a new voice alert is sounded. Traffic Advisories can only be issued when the GDL 39 knows its own altitude and the altitude of the intruder aircraft.

If the number of Traffic Advisories on the traffic display decreases and then increases, a new voice alert is sounded. The traffic voice alert is also generated whenever TIS-B service becomes available. The traffic voice alerts are as follows:

- "Traffic"—TIS-B/ADS-B traffic alert received.

- "Traffic Not Available"—TIS-B/ADS-B service is not available or out of range.

Disabling/Enabling the traffic alerts:

> *NOTE: Traffic alerts are reset to 'enabled' on the next power cycle.*

1) Display the dedicated Traffic (TRF) Page as described in the procedure above.
2) From the Traffic (TRF) Page touch the **DISABLE** Softkey to enable/disable traffic alerts.

Adjusting alert volume:

1) Press the **MENU** Key twice to access the Main Menu.
2) Turn or move the **FMS** Joystick to highlight 'System Setup', and press the **ENT** Key.
3) Turn or move the **FMS** Joystick to highlight 'Sound', and press the **ENT** Key.
4) Move the **FMS** Joystick to highlight the 'Alert Volume' field.
5) Turn the **FMS** Joystick to select the desired volume (0-10).
6) Press the **EXIT** Softkey or **FMS** Joystick to exit.

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TRAFFIC WARNING WINDOW

The Traffic Warning Window is shown, when the GDL 39 issues a traffic advisory (TA). The Traffic Warning Window shows a small pop-up map in the lower left corner. The Range Rings on the pop-up alert are spaced every whole mile/kilometer/nautical mile. Press the **CLR** Key to remove the Traffic Warning Window.

DISPLAYING TRAFFIC DATA

Traffic is displayed by default on the Map Page and in the Traffic Warning Window. Traffic Symbol and Traffic Label (i.e., relative altitude, altitude trend and absolute motion vectors) settings selects the maximum range at which traffic labels or symbols are shown. Traffic Labels can also be turned off.

Traffic information is also displayed on the PFD when Synthetic Vision is enabled. See the 'Additional Features' Section for more information.

Enabling/disabling traffic data on the Map Page:

1) Press the **TRAFFIC** Softkey.

Or:

1) From the Map Page, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map', and press the **ENT** Key.

3) If necessary, turn the **FMS** Joystick to highlight the 'Traffic' Category from the horizontal list.

4) Move the **FMS** Joystick to highlight 'Traffic Data'.

5) Turn the **FMS** Joystick to select 'ON/OFF' and press the **ENT** Key.

Customizing traffic data on the Map Page:

1) From the Map Page, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map', and press the **ENT** Key.

3) If necessary, turn the **FMS** Joystick to highlight the 'Traffic' Category from the horizontal list.

4) Move the **FMS** Joystick to highlight 'Traffic Symbol', or 'Traffic Label' field.

5) Turn the **FMS** Joystick to select 'OFF', 'AUTO' or range settings for Traffic Symbol and Traffic Label, and press the **ENT** Key.

Enabling/disabling traffic on the Synthetic Vision display:

1) From the full-screen PFD and/or the split-screen PFD Page, press the **MENU** Key.

2) Move the **FMS** Joystick to highlight the 'TRAFFIC' field.

3) Turn the **FMS** Joystick to highlight 'On' or 'Off'.

Displaying Traffic information using the map pointer:

1) With traffic displayed on the Map Page, press the **FMS** Joystick. The Map Pointer is activated.

2) Move the **FMS** Joystick to highlight the desired traffic.

Traffic (Map Page)

DEDICATED TRAFFIC PAGE (TRF)

⊘ *NOTE: Traffic alerts and altitude filters can only be changed on the dedicated Traffic Page (TRF). If the Traffic Page (TRF) is configured off voice alerts are enabled and the altitude filter is automatically set to 'Normal'*

Displaying/Removing the Traffic Page:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Display', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the Traffic Page field.

5) Turn the **FMS** Joystick to highlight 'Show' or 'Hide'.

6) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to return to the previous page.

Changing the altitude range:

1) On the Traffic Page, select the **ALT MODE** Softkey.

2) Press one of the following Softkeys:

> • **ABOVE:** Displays non-threat and proximity traffic from 9000 feet above the aircraft to 2700 feet below the aircraft. Typically used during climb phase of flight.

> • **NORMAL:** Displays non-threat and proximity traffic from 2700 feet above the aircraft to 2700 feet below the aircraft. Typically used during enroute phase of flight.

> • **BELOW:** Displays non-threat and proximity traffic from 2700 feet above the aircraft to 9000 feet below the aircraft. Typically used during descent phase of flight.

> • **UNREST** (unrestricted)**:** All traffic is displayed.

3) To return to the Traffic Page, press the **BACK** Softkey.
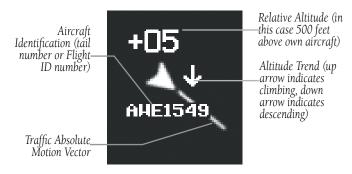
Traffic Page Half-Screen (GDL 39)

FLIGHT ID DISPLAY

The Flight IDs of other aircraft (when available) can be displayed on the Traffic Page. When a Flight ID or call sign is received, it will appear below the corresponding traffic symbol when enabled.

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Aircraft Identification (tail number or Flight ID number)

Relative Altitude (in this case 500 feet above own aircraft)

Altitude Trend (up arrow indicates climbing, down arrow indicates descending)

Traffic Absolute Motion Vector

Example ADS-B Traffic Symbol

Enabling/Disabling Flight ID Display:

On the Traffic Page, press the **FLT ID** Softkey.

MOTION VECTORS

There are two pilot-selectable and mutually exclusive types of motion vectors, Absolute and TargetTrend, which are differentiated by color and function. Absolute vectors are white and indicate ground track as reported by the traffic. TargetTrend vectors are green and indicate the flight path and position, relative to your aircraft, at which the traffic will be after the passing of one of four predetermined look-ahead intervals. The end of the TargetTrend vector indicates the traffic's predicted location relative to your predicted location at the end of the look-ahead time. For example, if traffic is ahead of you and traveling along the same track but at a slower rate, the motion vector would point opposite of its indicated direction of flight showing that you are overtaking the traffic.

Altitude/ Operating Mode

Traffic's Predicated Relative Location in 60 seconds

Traffic's Predicated Relative Location in 60 seconds

TragetTrend Look-ahead Time

Traffic Page TargetTrend (GDL 39)

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The TargetTrend look-ahead time interval is automatically adjusted from 30 seconds to five minutes and corresponds to the traffic display range setting. The greater the range setting, the longer the time interval and vise versa. Refer to the table below for more details.

Traffic Page Range Ring Settings	TargetTrend Look-ahead
.5nm to 2nm	30 seconds
2nm to 6nm	60 seconds
6nm to 12nm	2 minutes
12nm to 40nm	5 minutes

TragetTrend Look-ahead

Motion vector selection is made from the Traffic Page Menu by enabling/disabling TargetTrend. Absolute vectors are selected by default and are replaced when TargetTrend is enabled.

Enabling/Disabling TargetTrend:

On the Traffic Page, press the **TREND** Softkey.

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SECTION 8 ADDITIONAL FEATURES

> **NOTE:** *With the availability of SafeTaxi, FliteCharts, and ChartView in electronic form, it is still advisable to carry another source of charts on board the aircraft.*

Additional features of the system include the following:

- Synthetic Vision (SVX)
- SafeTaxi®
- ChartView and FliteCharts® electronic charts
- Airport Directory Data (AOPA , AC-U-KWIK, etc.)
- SiriusXM Radio entertainment (Optional)
- Electronic Checklists (Optional)
- Flight Data Logging

Synthetic Vision provides a three-dimensional forward view of terrain features on the PFD. Synthetic Vision imagery shows the pilot's view of relevant features in relation to the aircraft attitude, as well as the flight path pertaining to the active flight plan.

SafeTaxi diagrams provide detailed taxiway, runway, and ramp information at more than 1000 airports in the United States.

ChartView and FlightCharts provide on-board electronic terminal procedure charts. Electronic charts offer the convenience of rapid access to essential information. Either ChartView or FliteCharts may be used at one time, but not both. For example, if ChartView is on the SD Card and FliteCharts is on the system's internal memory, ChartView will always take precedence (FliteCharts may be used once the SD Card containing ChartView is ejected).

The Airport Directory contains airport statistics such as pattern altitudes, noise abatement information, FBO phone numbers, hours of operation, local attractions, ground transportation, lodging, and services.

The optional SiriusXM Radio entertainment audio feature offers more than 170 channels of music, news, and sports.

Optional checklists help to quickly find the proper procedure on the ground or during flight.

The Flight Data Logging feature automatically stores critical flight and engine data on an SD data card. A 2 GB SD card can store over 1,000 hours of flight data or up to 1,000 files (whichever comes first).

8.1 SYNTHETIC VISION (SVX)

⚠️ *WARNING: Use appropriate primary systems for navigation, and for terrain, obstacle, and traffic avoidance. Synthetic Vision is intended as an aid to situational awareness only and may not provide either the accuracy or reliability upon which to solely base decisions and/or plan maneuvers to avoid terrain, obstacles, or traffic.*

Synthetic Vision is a visual enhancement to the G3X. Synthetic Vision depicts a forward-looking attitude display of the topography immediately in front of the aircraft. Synthetic Vision information is shown on the Primary Flight Display (PFD). The depicted imagery is derived from the aircraft attitude, heading, GPS three-dimensional position, and databases of terrain, obstacles, and other relevant features. Loss of any of the required data, including temporary loss of the GPS signal, will cause Synthetic Vision to be disabled until the required data is restored.

The Synthetic Vision terrain display shows land contours (colors are consistent with those of the topographical map display), large water features, towers, and other obstacles over 200' AGL that are included in the obstacle database. Cultural features on the ground such as roads, highways, railroad tracks, cities, and state boundaries are not displayed even if those features are found on the Navigation Map. The terrain display also includes a north-south east-west grid with lines oriented with true north.

Terrain is integrated within Synthetic Vision to provide visual and auditory alerts to indicate the presence of terrain and obstacle threats relevant to the projected flight path. Terrain alerts are displayed in red and yellow shading on the PFD.

The terrain display is intended for situational awareness only. It may not provide the accuracy or fidelity on which to base decisions and plan maneuvers to avoid terrain or obstacles. Navigation must not be predicated solely upon the use of the terrain or obstacle data displayed by Synthetic Vision.

The following Synthetic Vision enhancements appear on the PFD:

- Pathways
- Flight Path Marker
- Traffic Display
- Airport Signs

- Runway Display
- Terrain Alerting
- Obstacle Alerting
- Zero-Pitch Line

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Synthetic Vision Imagery (PFD or PFD Page)

SYNTHETIC VISION OPERATION

Synthetic Vision is activated from the PFD or PFD Page Option Menu. When Synthetic Vision is enabled, the pitch scale increments are reduced.

Activating and deactivating synthetic vision:

1) From the full-screen PFD and/or split-screen PFD Page, press the **MENU** Key.

2) Move the **FMS** Joystick to highlight the 'Synthetic Vision' field.

3) Turn the **FMS** Joystick to highlight 'On' or 'Off'.

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Zero Pitch Line (ZPL)

Flight Path Marker

Airport Runway

Synthetic Vision on PFD

PATHWAYS
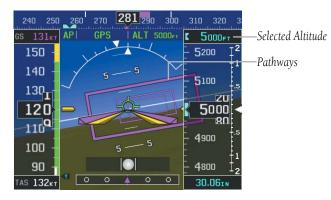
> **NOTE:** *Pathways and terrain features are not a substitute for standard course and altitude deviation information provided by the CDI, VSI, and VDI.*

> **NOTE:** *Pathways boxes may not be displayed for holding patterns, procedure turns and certain portions of the flight plan being received from an external GPS navigator.*

Pathways provide a three-dimensional perspective view of the selected route of flight shown as colored rectangular boxes representing the horizontal and vertical flight path of the active flight plan. The box size represents 700 feet wide by 200 feet tall during enroute, oceanic, and terminal flight phases. During an approach, the box width is 700 feet or one half full scale deviation on the HSI, whichever is less. Other than the descending portion of an ILS or WAAS GPS approach (starting from the leg leading into the FAF), pathways boxes are shown at the level of the altitude bug.

Selected Altitude

Pathways

Pathways (PFD or PFD Page)

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The color of the rectangular boxes may be magenta, green, or white depending on the route of flight and navigation source selected. The active GPS or GPS overlay flight plan leg is represented by magenta boxes that correspond to the Magenta CDI. A localizer course is represented by green boxes that correspond to a green CDI. An inactive leg of an active flight plan is represented by white boxes corresponding to a white line drawn on the Navigation Map indicated an inactive leg.

Pathways provide supplemental glidepath information on an active ILS, LPV, LNAV/ VNAV, and some LNAV approaches. Pathways are intended as an aid to situational awareness and should not be used independent of the CDI, VDI, glide path indicator, and glide slope indicator. They are removed from the display when the selected navigation information is not available. Pathways are not displayed beyond the active leg when leg sequencing is suspended and are not displayed on any portion of the flight plan leg that would lead to intercepting a leg in the wrong direction.

Activating and deactivating pathways:

1) From the full-screen PFD and/or the split-screen PFD Page, press the **MENU** Key.

2) Move the **FMS** Joystick to highlight the 'Pathways' field.

3) Turn the **FMS** Joystick to highlight 'On' or 'Off'.

DEPARTURE AND ENROUTE

Prior to intercepting an active flight plan leg, pathways are displayed as a series of boxes with pointers at each corner that point in the direction of the active waypoint. Pathways are not displayed for the first leg of the flight plan if that segment is a Heading-to-Altitude leg. The first segment displaying pathways is the first active GPS leg or active leg with a GPS overlay. If this leg of the flight plan route is outside the SVX field of view, pathways will not be visible until the aircraft has turned toward this leg. While approaching the center of the active leg and prescribed altitude, the number of pathway boxes decreases to a minimum of four.

Pathways are displayed along the flight plan route at the selected altitude for the leg. Climb profiles cannot be displayed due to the variables associated with aircraft performance. Flight plan legs requiring a climb are indicated by pathways displayed at a level above the aircraft at the altitude selected.

DESCENT AND APPROACH
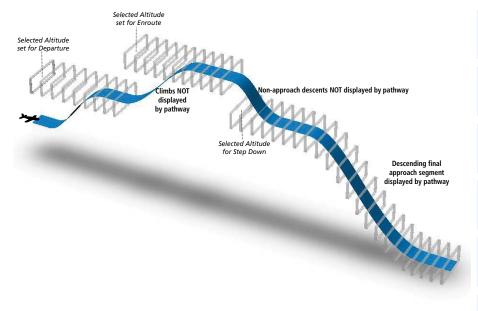
> *NOTE: During the final segment of an ILS or WAAS GPS approach, the pathways boxes automatically adjust to correspond with the localizer/glideslope (ILS) or horizontal/vertical (GPS) deviation signals received from the external navigator.*

When an approach providing vertical guidance is activated, Pathways are shown level at the selected altitude. Pathways are shown level at the selected altitude up to the point along the final approach course where the altitude intercepts the extended vertical descent path or glideslope. From the vertical path descent or glideslope intercept point, the pathways are shown inbound to the Missed Approach Point (MAP) along the published lateral and vertical descent path.

During an ILS approach, the initial approach segment is displayed in magenta at the segment altitudes if GPS is selected as the navigation source on the CDI. When switching to the localizer inbound with LOC selected as the navigation source on the CDI, pathways are displayed in green along the localizer and glideslope.

If GPS is the selected navigation source on the HSI, the pathways boxes are magenta. If LOC is the selected navigation source on the HSI, the pathways boxes are green for the ILS. Pathways boxes are not displayed for segments such as heading legs or VOR radials.

Selected Altitude set for Departure

Selected Altitude set for Enroute

Climbs NOT displayed by pathway

Non-approach descents NOT displayed by pathway

Selected Altitude for Step Down

Descending final approach segment displayed by pathway

Pathways - Enroute, Descent, and Approach

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MISSED APPROACH

Pathways are displayed at the selected altitude upon activating the missed approach on the external GPS navigator.

FLIGHT PATH MARKER

The Flight Path Marker (FPM), also known as a Velocity Vector, is displayed on the PFD at groundspeeds above 30 knots. The FPM depicts the approximate projected path of the aircraft accounting for wind speed and direction relative to the three-dimensional terrain display.

The FPM is always available when the Synthetic Vision feature is in operation. The FPM represents the direction of the flight path as it relates to the terrain and obstacles on the display, while the airplane symbol represents the aircraft heading.

The FPM may be used to identify a possible conflict with the aircraft flight path and distant terrain or obstacles. Displayed terrain or obstacles in the aircraft's flight path extending above the FPM could indicate a potential conflict, even before a terrain alert is issued. However, decisions regarding terrain and/or obstacle avoidance should not be made using only the FPM.

Flight Path Marker

Airport Runway

Wind Vector

Flight Path Marker (PFD or PFD Page)

Activating and deactivating the flight path marker:

1) From the full-screen PFD and/or split-screen PFD Page, press the **MENU** Key.

2) Move the **FMS** Joystick to highlight the 'Flight Path Marker' field.

3) Turn the **FMS** Joystick to highlight 'On' or 'Off'.

ZERO PITCH LINE

The Zero Pitch Line is drawn completely across the display and represents the aircraft attitude with respect to the horizon. It may not align with the terrain horizon, particularly when the terrain is mountainous or when the aircraft is flown at high altitudes.

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TRAFFIC

⚠️ **WARNING:** *Intruder aircraft at or below 500 ft. AGL may not appear on the Synthetic Vision display or may appear as a partial symbol.*

Traffic symbols are displayed in their approximate locations. Traffic symbols are displayed in three dimensions, appearing larger as they are getting closer, and smaller when they are further away. Traffic within 250 feet laterally of the aircraft will not be displayed on the Synthetic Vision display. Traffic symbols and coloring are consistent with that used for traffic displayed on the Inset Map or Map Page. If the traffic altitude is unknown, the traffic will not be displayed on the Synthetic Vision display. For more details refer to the Traffic Information Service (TIS-A) discussion in the Hazard Avoidance section. Arrows are depicted on the traffic message if traffic is outside the Synthetic Vision field of view.

Enabling/disabling traffic on the Synthetic Vision display:

1) From the full-screen PFD and/or split screen PFD Page, press the **MENU** Key.

2) Move the **FMS** Joystick to highlight the 'TRAFFIC' field.

3) Turn the **FMS** Joystick to highlight 'On' or 'Off'.

Synthetic Vision Traffic (PFD)

Traffic Outside the Field of View

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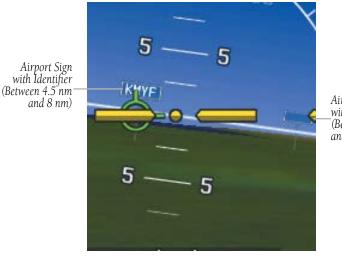
AIRPORT SIGNS

Airport Signs provide a visual representation of airport location and identification on the synthetic vision display. Airport Signs appear on the display when the aircraft is approximately 15 nm from and airport and disappear at approximately 4.5 nm. Airport signs are shown without the identifier until the aircraft is approximately eight nautical miles from the airport.

Airport Sign with Identifier (Between 4.5 nm and 8 nm)

Airport Sign without Identifier (Between 8 nm and 15 nm)

Airport Signs

RUNWAYS
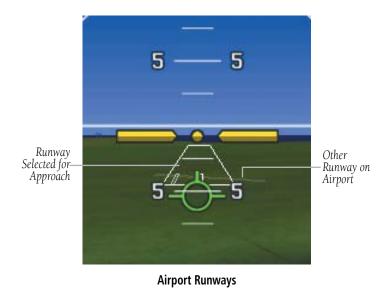
⚠ **WARNING:** *Do not use Synthetic Vision runway depictions as the sole means for determining the proximity of the aircraft to the runway or for maintaining the proper approach path angle during landing.*

✓ **NOTE:** *Not all airports have runways with endpoint data in the database, therefore, these runways are not displayed.*

Runway data provides improved awareness of runway location with respect to the surrounding terrain. All runway thresholds are depicted at their respective elevations as defined in the database. In some situations, where threshold elevations differ significantly, crossing runways may appear to be layered. As runways are displayed,

those within 45 degrees of the aircraft heading are outlined in white. Other runways (those NOT aligned with the aircraft heading) are outlined in gray When an approach for a specific runway is active, that runway appears brighter and is outlined with a white box, regardless of the runway orientation as related to aircraft heading. As the aircraft gets closer to the runway, more detail such as runway numbers and centerlines are displayed.

Runway Selected for Approach

Other Runway on Airport

Airport Runways
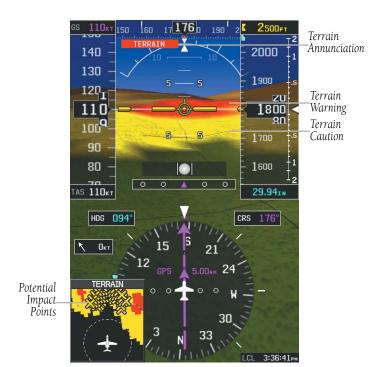
SYNTHETIC VISION TERRAIN AND OBSTACLE DATA

Terrain alerting on the synthetic vision display corresponds to the red and yellow X symbols on the Inset Map and Navigation Map. For more detailed information regarding Synthetic Vision Terrain and Obstacle Data, refer to the Hazard Avoidance Section.

In some instances, a terrain or obstacle alert may be issued with no conflict shading displayed on the synthetic vision. In these cases, the conflict is outside the Synthetic Vision field of view and the alert will have arrows indicating the direction of the alert.

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Synthetic Vision Terrain Alerts

Obstacles are represented on the synthetic vision display by standard two-dimensional tower symbols found on the Inset Map and Navigation Map. Obstacle symbols appear in the perspective view with relative height above terrain and distance from the aircraft. Unlike the Inset Map and Navigation Map display, obstacles on the synthetic vision display do not change colors to warn of potential conflict with the aircraft's flight path until the obstacle is associated with an actual terrain alert. Obstacles greater than 1000 feet below the aircraft altitude are not shown. Obstacles are shown behind the airspeed and altitude displays.

Obstacle Outside the Synthetic Vision Field of View

Synthetic Vision Obstacle Alerts
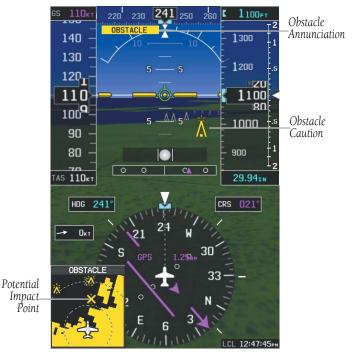
During unusual attitude conditions or when the terrain gradient is great enough to completely fill the display, a brown (earth) or blue (sky) colored bar at the top or bottom of the screen is displayed to prevent the pilot from losing sight of the horizon.

Blue Sky Bar with Full Display Terrain

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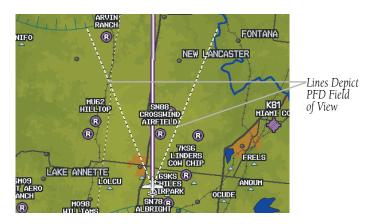
SYNTHETIC VISION FIELD OF VIEW

The PFD field of view can be represented on the MFD Navigation Map Page. Two dashed lines forming a V-shape in front of the aircraft symbol on the map, represent the forward viewing area shown on the PFD.

Lines Depict PFD Field of View

Synthetic Vision Field of View

Configuring field of view:

1) From the Map Page press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map' and press the **ENT** Key.

3) Turn the **FMS** Joystick to select the 'Miscellaneous' from the horizontal list.

4) Move the **FMS** Joystick to highlight 'Field of View'.

5) Turn the **FMS** Joystick to select 'On' or 'Off', and press the **ENT** Key.

8.2 SAFETAXI®

SafeTaxi is an enhanced feature that gives greater map detail when viewing airports at close range. When viewing at ranges close enough to show the airport detail, the map reveals taxiways with identifying letters/numbers, runway incursion "Hot Spots", and airport landmarks including ramps, buildings, control towers, and other prominent features. Resolution is greater at lower map ranges. The SafeTaxi feature can be seen on the Map Page and the Waypoint Page

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 by a red shaded area.

During ground operations the aircraft's position is displayed in reference to taxiways, runways, and airport features. When panning over the airport, features such as runway holding lines and taxiways are shown at the cursor.

SafeTaxi Depiction on the Map Page

Enabling/disabling SafeTaxi:

1) With the Map Page displayed, press the **Menu** Key. The Map Page Menu is displayed.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map' and press the **ENT** Key.

3) Turn the **FMS** Joystick to highlight the 'Airport' Category from the horizontal list.

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4)   Move the **FMS** Joystick to highlight the 'Safe Taxi' Field.

5)   Turn the **FMS** Joystick to access the menu options.

6)   Turn or move the **FMS** Joystick to select 'On' or 'Off', and press the **ENT** Key.

SAFETAXI CYCLE NUMBER AND REVISION

SafeTaxi database is revised every 56 days. SafeTaxi is always available for use after the expiration date. 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 SafeTaxi Region, Version, Cycle, Effective date, and Expiration date of the database cycle can also be found in the Main Menu, under 'Database Information'.

The SafeTaxi database is provided by Garmin. Refer to Appendix C for instructions on updating the SafeTaxi database.

8.3 CHARTVIEW

⚠️ *WARNING: Do not use the approach information provided by the VFR navigation database residing within the G3X as a means of navigating any instrument approach. The G3X VFR navigation database is limited to present only the waypoints for the final approach leg of a published procedure. These waypoints and associated course line are made available for monitoring purposes only.*

ChartView resembles the paper version of Jeppesen terminal procedure charts. The MFD depiction displays the aircraft position on the moving map in the plan view of the approach charts and on airport diagrams.

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. When turning on the system, the Powe-up Page displays the current status of the ChartView database.

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The ChartView database subscription is available from Jeppesen, Inc. Available data includes:
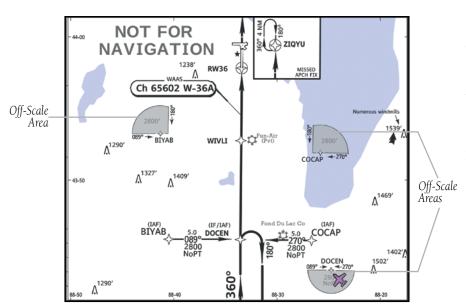
- Arrivals (STAR)
- Departure Procedures (DP)
- Approaches
- Airport Diagrams
- NOTAMs

The geo-referenced aircraft position is indicated by an aircraft symbol displayed on the chart when the current position is within the boundaries of the chart. Inset boxes are not considered within the chart boundaries. Therefore, when the aircraft symbol reaches a chart boundary line, or inset box, the aircraft symbol is removed from the display.

The figure below, shows examples of off-scale areas, indicated by the grey shading. Note, the grey shading is for illustrative purposes only and will not appear on the published chart or display. These off-scale areas appear on the chart to convey supplemental information. However, the depicted geographical position of this information, as it relates to the chart planview, is not the actual geographic position. Therefore, when the aircraft symbol appears within one of these areas, the aircraft position indicated is relative to the chart planview, not to the off-scale area.

Sample Chart Indicating Off-Scale Areas

Displaying ChartView:

1) With the Waypoint (WPT) Page displayed, press the **CHART** Softkey.

2) Press the **FMS** Joystick to activate the cursor.

3) Move the **FMS** Joystick to highlight the Airport Identifier Field and use the **FMS** Joystick to begin entering the desired airport.

   Or:

   a) Move the **FMS** Joystick to highlight the Chart Field.

   b) Turn the **FMS** Joystick to access a drop-down menu of available charts.

   c) Turn or move the **FMS** Joystick to select the desired chart, and press the **ENT** Key.

   Or:

1) From the Active Flight Plan Page (with a waypoint entered), press the **SEL APPR** Softkey. The 'Select Approach Window' is displayed.

2) Press the **MENU** Key.

3) Turn or move the **FMS** Joystick to select 'Show Chart', and press the **ENT** Key. The selected chart is displayed.

4) Press the **EXIT** Softkey to return to the previous page.

   Or:

1) From the Map Page or Active Flight Plan Page, use the Map Pointer to highlight the desired airport and press the **ENT** Key. The Airport Information Window is displayed.

2) Press the **CHART** Softkey.

3) With the 'Chart' Field highlighted, turn the **FMS** Joystick to access a drop-down menu of available charts.

4) Turn or move the **FMS** Joystick to select the desired chart, and press the **ENT** Key.

When a terminal procedure chart is not available for the requested airport or there is an error rendering the data, the banner "CHART NOT AVAILABLE" appears on the screen. The "CHART NOT AVAILABLE" banner does not refer to the ChartView subscription, but rather the availability of a particular airport chart selection or procedure for a selected airport.

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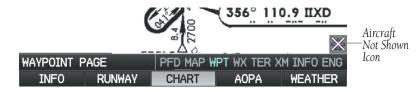
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CHART NOT AVAILABLE

Chart Not Available Banner

AIRCRAFT SYMBOL
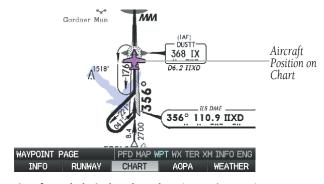
The aircraft symbol is shown in magenta on the chart only if the chart is to scale and the aircraft position is within the boundaries of the chart. The aircraft symbol is not displayed when the Aircraft Symbol Not Shown Icon (X over the aircraft symbol) appears in the lower right corner. The Aircraft Symbol Not Shown Icon may appear at certain times, even if the chart is displayed to scale.

Aircraft Position on Chart

Aircraft Symbol Displayed on Chart (Waypoint Page)
(Split-Screen)

Aircraft Not Shown Icon

Aircraft Not Shown Icon (Waypoint Page)
(Split-Screen)

Showing/Hiding the aircraft symbol on the chart:

Press the **CLR** Key to show/hide the aircraft symbol. The Aircraft Symbol Hidden Icon (circle with a line) is displayed in the lower right corner when the aircraft symbol is hidden.
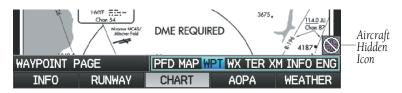
Aircraft Hidden Icon (Waypoint Page)
(Split-Screen)

CHART RANGE

Changing the chart range:

Use the down arrow on the **RNG** Key to zoom in (decreasing), or the up arrow to zoom out (increasing). Move the **FMS** Joystick to scroll the chart up, down, left, or right.

Or:

To quickly zoom all the way out, press the **CHART** Softkey. Press it again to return to the previous range (only available from the Waypoint Page).
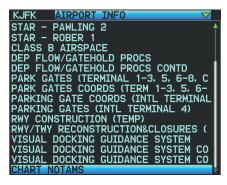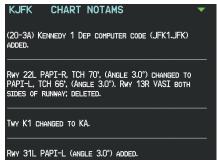
JEPPESEN DATABASE-PUBLISHED NOTAMS

NOTE: Only NOTAMs for the selected airport is shown (when available). There may be other NOTAMs available pertaining to the flight that may not be displayed. Contact Jeppesen for more information regarding Jeppesen database-published NOTAMs.

Recent NOTAMs applicable to the current ChartView cycle are included in the ChartView database. If NOTAMs are available for the selected airport, a 'Chart NOTAMs' option will be displayed at the bottom of the drop-down menu of available charts. Select the 'Chart NOTAMs' option from the chart menu to display the applicable NOTAM information.

Drop-down Chart Menu

Chart Notams

8.4 FLITECHARTS®

⚠️ **WARNING:** *Do not use the approach information provided by the VFR navigation database residing within the G3X as a means of navigating any instrument approach. The G3X VFR navigation database is limited to present only the waypoints for the final approach leg of a published procedure. These waypoints and associated course line are made available for monitoring purposes only.*

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

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

- Airport Diagrams
- Takeoff Minimums
- Alternate Minimums

The geo-referenced aircraft position is indicated by an aircraft symbol displayed on the chart when the current position is within the boundaries of the chart. An aircraft symbol may be displayed within an off-scale area depicted on some charts.

The figure below shows examples of off-scale areas, indicated by the grey shading. Note, these areas are not shaded on the published chart. These off-scale areas appear on the chart to convey supplemental information. However, the depicted geographical
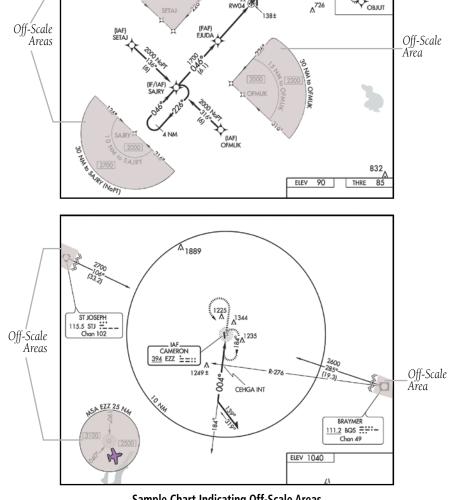
position of this information, as it relates to the chart planview, is not the actual geographic position. Therefore, when the aircraft symbol appears within one of these areas, the aircraft position indicated is relative to the chart planview, not to the off-scale area.

Sample Chart Indicating Off-Scale Areas

NOTE: Do not maneuver the aircraft based solely upon the geo-referenced aircraft symbol.

Displaying FliteCharts:

1) With the Waypoint (WPT) Page displayed, press the **CHART** Softkey.

2) Press the **FMS** Joystick to activate the cursor.

3) Move the **FMS** Joystick to highlight the Airport Identifier Field and use the **FMS** Joystick to begin entering the desired airport.

Or:

a) Move the **FMS** Joystick to highlight the Chart Field.

b) Turn the **FMS** Joystick to access a drop-down menu of available charts.

c) Turn or move the **FMS** Joystick to select the desired chart, and press the **ENT** Key.

Or:

1) From the Active Flight Plan Page (with a waypoint entered), press the **SEL APPR** Softkey. The 'Select Approach Window' is displayed.

2) Press the **MENU** Key.

3) Turn or move the **FMS** Joystick to select 'Show Chart', and press the **ENT** Key. The selected chart is displayed.

4) Press the **EXIT** Softkey to return to the previous page.

Or:

1) From the Map Page or Active Flight Plan Page, use the Map Pointer to highlight the desired airport and press the **ENT** Key. The Airport Information Window is displayed.

2) Press the **CHART** Softkey.

3) With the 'Chart' Field highlighted, turn the **FMS** Joystick to access a drop-down menu of available charts.

4) Turn or move the **FMS** Joystick to select the desired chart, and press the **ENT** Key.

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Airport Identifier Field

Chart Field

Available Approaches

FliteChart Softkey

FliteCharts (Waypoint Page)
(Split-Screen)
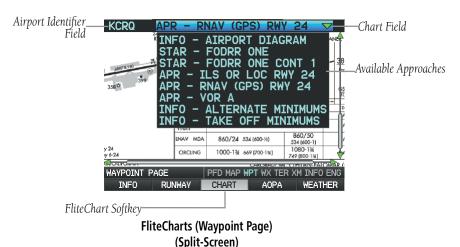
When a terminal procedure chart is not available for the requested airport or there is an error rendering the data, the banner "CHART NOT AVAILABLE" appears on the screen. The "CHART NOT AVAILABLE" banner does not refer to the FliteCharts subscription, but rather the availability of a particular airport chart selection or procedure for a selected airport.
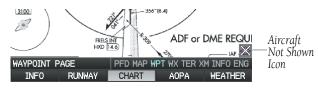
CHART NOT AVAILABLE

Chart Not Available Banner

AIRCRAFT SYMBOL

The aircraft symbol is shown in magenta on the chart only if the chart is to scale and the aircraft position is within the boundaries of the chart. The aircraft symbol is not displayed when the Aircraft Not Shown Icon appears. The Aircraft Not Shown Icon may appear at certain times, even if the chart is displayed to scale.

Sidebar tabs: System Overview, Flight Instruments, EIS, CNS Interface, GPS Navigation, Flight Planning, Hazard Avoidance, Additional Features, AFCS, Annun/Alerts, Appendix, Index

Aircraft Position on Chart

Aircraft Symbol Displayed on Chart (Waypoint Page)
(Split-Screen)

Aircraft Not Shown Icon

Aircraft Not Shown Icon (Waypoint Page)
(Split-Screen)

CHART RANGE

Changing the chart range:

Use the down arrow on the **RNG** Key to zoom in (decreasing), or the up arrow to zoom out (increasing). Move the **FMS** Joystick to scroll the chart up, down, left, or right.

Or:

To quickly zoom all the way out, press the **CHART** Softkey. Press it again to return to the previous range (only available from the Waypoint Page).

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FliteCharts (Zoomed Out)
(Split-Screen)

Scroll Arrow

Scroll Bar

FliteCharts (Zoomed In)
(Split-Screen)

FLITECHARTS CYCLE NUMBER AND EXPIRATION DATE

FliteCharts data is revised every 28 days. FliteCharts do not expire and will remain viewable after the expiration date. The Power-up Page indicates any of four different possible criteria for chart availability. These indications are whether the databases are not configured, not available, current or out of date.

8.5 AIRPORT DIRECTORY DATA

The Airport Directory contains airport statistics such as pattern altitudes, noise abatement information, FBO phone numbers, hours of operation, local attractions, ground transportation, lodging, and services.

The AOPA Airport Directory provides data on airports and heliports throughout the U.S. and it is updated on a 56-day cycle. Detailed information for over 5,300 U.S. airports, along with the names and phone numbers of thousands of FBOs can be viewed. This service allows the pilot to plan an overnight, choose fuel stops, find ground transportation, etc.

Optional airport directory databases such as AC-U-KWIK are also supported. AC-U-KWIK provides complete listings of FBOs, charter companies, fuel suppliers, ground transportation, maintenance and catering services at public airports across the world.

If the AOPA database is in use, the **AOPA** Softkey is displayed on the Waypoint (WPT) Page. If another airport directory database is in use, such as AC-U-KWIK, the **DIRECTORY** Softkey is displayed on the Waypoint (WPT) Page.
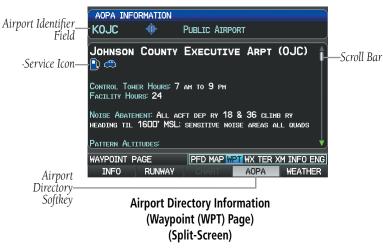
Viewing Airport Directory information:

From the Waypoint (WPT) Page, press the **AOPA** or **DIRECTORY** Softkey.

Or:

1) From any map highlight an airport using the Map Pointer, and press the **ENT** Key. The Airport Information Window is displayed.

2) Press the **AOPA** or **DIRECTORY** Softkey.

3) To return to the map, press the **ENT** Key, the **CLR** Key, or the **FMS** Joystick.

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Airport Identifier Field

Service Icon

Scroll Bar

Airport Directory Softkey

AOPA INFORMATION
KOJC   PUBLIC AIRPORT

JOHNSON COUNTY EXECUTIVE ARPT (OJC)

CONTROL TOWER HOURS: 7 AM TO 9 PM
FACILITY HOURS: 24

NOISE ABATEMENT: ALL ACFT DEP RY 18 & 36 CLIMB RY HEADING TIL 1600' MSL: SENSITIVE NOISE AREAS ALL QUADS

PATTERN ALTITUDES:

WAYPOINT PAGE   PFD MAP WPT WX TER XM INFO ENG
INFO   RUNWAY   CHART   AOPA   WEATHER

Airport Directory Information
(Waypoint (WPT) Page)
(Split-Screen)

Icon	Description
	Restaurant on Field
	Self Serve Fuel
	Courtesy Car

Airport Directory Service Icons

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8.6 SɪʀɪᴜꜱXM RADIO ENTERTAINMENT (OPTIONAL)

> *NOTE: See the G3X Installation Manual for SiriusXM activation instructions.*

> *NOTE: SiriusXM Radio is only available with the optional GDU 375.*

> *NOTE: Refer to the Hazard Avoidance Section for information about XM Weather products.*

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.

ACTIVATING SIRIUSXM SATELLITE RADIO SERVICES

The service is activated by providing SiriusXM Satellite Radio with a coded ID (Radio ID).

To access the Radio ID from the XM Audio Page press the **INFO** Softkey.

Accessing the Radio ID:

From the XM Audio Page press the **INFO** Softkey.

Or:
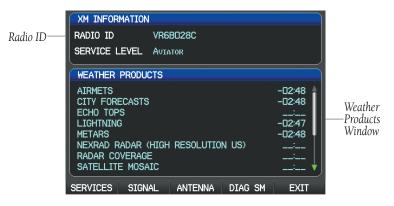
From the XM Audio Page select Channel '0' in the 'All Channels' Category.

Or:

1) From the WX Page press the **MENU** Key to display the WX Page Menu.

2) Turn or move the **FMS** Joystick to highlight 'Weather Products' and press the **ENT** Key.

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Radio ID

Weather Products Window

XM Information Page
(Split-Screen)

USING SIRIUSXM RADIO

The XM Audio Page provides information and control of the audio entertainment features of the SiriusXM Satellite Radio.

Selecting the XM Audio Page:

1)   If necessary, press the **FMS** Joystick to interact with the page navigation bar.

2)   Turn the **FMS** Joystick to select the XM Audio Page.

Categories

Selected Channel

Active Channel Box:
-Artist Name
-Song Title
-Category
-Channel

Signal Strength

Volume

XM Audio Page
(Split-Screen)

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CATEGORY

The Category Field of the XM Audio Page cycles through a horizontal list of categories such as jazz, rock, or news.

Selecting a category:

1) Press the **CATEGORY** Softkey on the XM Audio Page. The Category Field is highlighted.

XM AUDIO
◀ DECADES ▶

Category Field (Split-Screen)

2) Turn the **FMS** Joystick to highlight the desired category.

Or:

1) Press the **FMS** Joystick to activate the cursor. Move the **FMS** Joystick to highlight the Category Field (if necessary).

2) Turn the **FMS** Joystick to highlight the desired category.

Press and hold the **CATEGORY** Softkey to view the 'All Channels' Category.

ACTIVE CHANNEL AND CHANNEL LIST

The Channels List of the XM Audio Page shows a list of the available channels for the selected category. The currently selected channel will flash blue. The Active Channel is denoted by an arrow.

Arrow ───── FREE   ALL RIGHT NOW
                ▶ 7   THE 70s

Active Channel

The Active Channel Box (split-screen) or the Now Playing Box (full-screen) shows the currently selected channel, signal strength, and volume.

Selecting a channel:

1) From the XM Audio Page, press the **CHANNEL** Softkey. The Channel Field is highlighted.

2) Turn the **FMS** Joystick to highlight the desired channel and press the **ENT** Key.

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Or:

1) Press the **FMS** Joystick. Move the **FMS** Joystick to highlight the Channel Field (if necessary).

2) Turn the **FMS** Joystick to highlight the desired channel and press the **ENT** Key.

   Or:

1) From the XM Audio Page, press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Enter Channel' and press the **ENT** Key.

3) Turn the **FMS** Joystick to enter the desired channel and press the **ENT** or **CLR** Key.

USING FAVORITES

Favorites is a customized category of up to 30 of your SiriusXM Radio favorites.

Adding a channel to Favorites:

1) With the favorites channel selected, press the **MENU** Key.

2) With 'Add To Favorites' selected, press the **ENT** Key.

3) With 'Yes' selected, press the **ENT** Key.

Adding a Channel to Favorites

Selecting Favorites:

1) Press the **FAVORITE** Softkey on the XM Audio Page. The Favorites category is displayed.

2) Press the **FMS** Joystick to activate the cursor.

3) Move the **FMS** Joystick to select the desired channel and press the **ENT** Key.

   Or:

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1) Press the **FMS** Joystick to activate the cursor. Move the **FMS** Joystick to highlight the Category Field (if necessary).

2) Turn the **FMS** Joystick to highlight the Favorites category.

3) Move the **FMS** Joystick to select the desired channel and press the **ENT** Key.

Deleting a channel from Favorites:

1) With the Favorites channel selected, press the **MENU** Key.

2) With 'Remove Favorite' selected, press the **ENT** Key.

> **Or**:

Highlight 'Remove All Favorites' and press the **ENT** Key to delete all channels from your Favorites list.

VOLUME
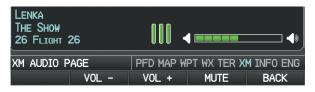
Radio volume is shown in the Now Playing Box in the lower right corner of the display. Volume level is controlled by pressing the **VOLUME** Softkey, which brings up the **MUTE** Softkey, and the volume increase (**VOL +**) and decrease (**VOL –**) softkeys.

Adjusting the volume:

1) With the XM Audio Page displayed, press the **VOLUME** Softkey.

2) Press the **VOL –** Softkey to reduce volume or press the **VOL +** Softkey to increase volume.

3) Press the **MUTE** Softkey to mute the audio. Press the **MUTE** Softkey again to unmute the audio.

> **Or**:

Press and hold the **VOLUME** Softkey to mute and unmute the audio.

Volume Control (Split-Screen)

8.7 VERTICAL POWER (OPTIONAL)

The Vertical Power electronic circuit breaker (VP-X) integrates with the G3X system to provide a visual display of the aircraft's electrical system. From the Vertical Power (VP-X) Page pilots control, view and respond to electrical faults. The Vertical Power (VP-X) Page only appears when a VP-X is connected, configured and operational.

When an electrical device is selected, device sensitive softkeys appear, which provide the pilot with control of the device from the GDU. Devices connected to the VP-X can be controlled via dedicated switches or via softkeys on a GDU. The Vertical Power system can be connected to the PFD or MFD, but the associated softkeys will only appear on the GDU to which the Vertical Power system is connected.

Device Softkeys	Description
ON/OFF	Device sensitive softkeys for devices such as; Fuel Pump, Landing light, or anything else that would have an on/off type function.
TRIM UP/TRIM DN	Device sensitive softkeys for Pitch Trim devices.
TRIM L/TRIM R	Device sensitive softkeys for Roll Trim devices.
FLAPS UP/FLAP DN	Device sensitive softkeys for a Flap motor.
AUTO	Only appears when the landing light(s) have been configured to 'wig-wag'. When AUTO (default) is selected the VP-X will automatically pulse (wig-wag) the landing lights based on the current phase of flight. When AUTO is not selected the landing lights will remain steady-on (no wig-wag).
RESET	Only appears when the selected device is in a fault condition. By selecting 'RESET' the VP-X will attempt to clear the fault (similar to resetting the circuit breaker).

Device Sensitive Softkeys

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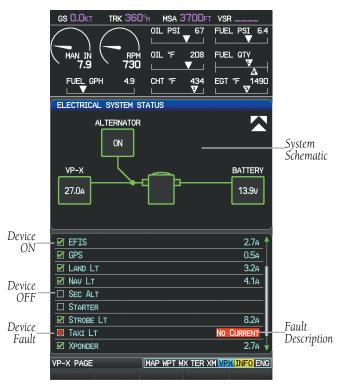
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Selecting and controlling an electrical device from the list:

1) With the VP-X Page displayed, press the **FMS** Joystick to activate the cursor.

2) Move the **FMS** Joystick to highlight the desired device.

3) Using the device sensitive softkeys select the desired function.

Or:

Select 'RESET' to reset a faulted device.

Vertical Power (VP-X) Page

8.8 ELECTRONIC CHECKLISTS (OPTIONAL)

✓ *NOTE: The information described in this section is not intended to replace the checklist information described in the AFM.*

✓ *NOTE: Garmin does not create, modify, or update G3X checklists and thus cannot be responsible for the availability and/or content.*

✓ *NOTE: Checklists cannot be edited from within the system.*

The G3X is capable of displaying checklists (if available from the aircraft manufacturer) which allow a pilot to quickly find the proper procedure on the ground and during each phase of flight. The G3X accesses the checklist file (*.ace) from the root directory (/*. ace) of the SD card. If a checklist file is available on the SD card, the 'Checklists' Main Menu Option will appear.

8.9 FLIGHT DATA LOGGING

The flight data logging feature automatically stores flight and engine data to an SD card. Data is recorded to the SD card every second. A data file is created each time the system is powered on with an SD card inserted, or each time an SD card is inserted after power on. A 2 GB SD card can store over 1,000 hours of flight data or up to 1,000 files (whichever comes first). The data files stored on the SD card have an extension of .csv. This file format can be opened using a spread sheet application on a personal computer. Garmin recommends using a 2 GB SanDisk or Toshiba SD card.

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Blank Page

SECTION 9 AUTOMATIC FLIGHT CONTROL SYSTEMS (OPTIONAL)

> ✓ **NOTE:** *The approved Pilot's Operating Handbook (POH) always supersedes the information in this Pilot's Guide.*

> ✓ **NOTE:** *Refer to the approved Pilot's Operating Handbook (POH) for emergency procedures.*

> ✓ **NOTE:** *VOR, LOC, and GS modes are all GPS-aided. You must have a GPS position and a valid navigation database to use VOR, LOC, or GS modes.*

AFCS SYSTEM ARCHITECTURE

An Automatic Flight Control System (AFCS) is typically comprised of two major components: A Flight Director (FD) and Autopilot servos. The Flight Director provides pitch and roll commands to the autopilot servos. These pitch and rolls commands are displayed on the PFD as Command Bars. When the Flight Director is active the pitch and roll commands can be hand-flown by the pilot or when coupled with the autopilot, the autopilot servos drive the flight controls to follow the commands issued by the Flight Director. The Flight Director operates independently of the autopilot servos, but in most cases the autopilot servos can not operate independent of the Flight Director. On G3X installations that do not have a separate and independent Flight Director, the Flight Director is always coupled to the autopilot.

AUTOPILOT AND YAW DAMPER OPERATION

The autopilot and optional yaw damper operate the flight control surface servos to provide automatic flight control. The autopilot controls the aircraft pitch and roll attitudes following commands received from the flight director. Pitch, Roll, and Yaw (if installed) auto-trim provides trim commands to each servo to relieve any sustained effort required by the servo(s). Autopilot operation is independent of the optional yaw damper.

The optional yaw damper reduces Dutch roll tendencies, coordinates turns, and provides a steady force to maintain directional trim. It can operate independently

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of the autopilot and may be used during normal hand-flight maneuvers. Yaw rate commands are limited to 6 deg/sec by the yaw damper.

FLIGHT CONTROL (GSA 28 AND GMC 305)

Pitch and roll commands are provided to the servos based on the active flight director modes. Yaw commands are provided by the yaw servo. Servo motor control limits the maximum servo speed and torque. The servo mounts are equipped with electronic slip-clutches. Slip-clutch torque values are set at installation, see the G3X installation manual for installation instructions. This allows the servos to be overridden in case of an emergency. Third party autopilot systems my not allow servos to be overridden, consult third party autopilot documents for limitations.

PITCH AXIS AND TRIM

The autopilot pitch axis uses pitch rate to stabilize the aircraft pitch attitude during flight director maneuvers. Flight director pitch commands are rate and attitude-limited, combined with pitch damper control, and sent to the pitch servo motor. The pitch servo measures the output effort (torque) and provides this signal to the pitch trim motor. The pitch trim servo commands the motor to reduce the average pitch servo effort.

> *NOTE: Auto-trim may also be configured for the roll and/or yaw axis. Consult the G3X installation manaul for configuration and installation options.*

ROLL AXIS

The autopilot roll axis uses roll rate to stabilize aircraft roll attitude during flight director maneuvers. The flight director roll commands are rate- and attitude-limited, combined with roll damper control, and sent to the roll servo motor.

YAW AXIS

The yaw damper uses yaw rate and roll attitude to dampen the aircraft's natural Dutch roll response. It also uses lateral acceleration to coordinate turns and reduce or eliminate the need for the pilot to use rudder pedal force to maintain coordinated flight during climbs and descents.

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G3X AFCS INSTALLATIONS OPTIONS

The G3X offers multiple Automatic Flight Control System installation options. The following options are discussed in this section:

- GDU 370/375 Primary Flight Display (PFD), plus a third party autopilot unit. This option does not include a separate Flight Director (FD). Selecting a FD mode engages the autopilot.

- GDU 370/375 Primary Flight Display (PFD), plus GSA 28 servos. This option does not include a separate Flight Director (FD). Selecting a FD mode engages the autopilot.

- GDU 370/375 Primary Flight Display (PFD), plus third party autopilot, plus GMC 305 Mode Controller. This option includes a separate FD. The FD can be on independent of the autopilot. Selecting a FD mode does not engage the autopilot. This option does not support a Yaw Damper (YD).

- GDU 370/375 Primary Flight Display (PFD), plus GSA 28 servos, plus GMC 305 Mode Controller. This option includes a separate FD. The FD can be on independent of the autopilot. Selecting a FD mode does not engage the autopilot. This option supports a Yaw Damper (YD).

CONTROL WHEEL STEERING (CWS) (OPTIONAL)

> **NOTE:** Not all third party autopilot units support Control Wheel Steering (CWS).

Control Wheel Steering allows the aircraft to be hand-flown without disengaging the AFCS. Press and hold the autopilot unit's CWS Button (if equipped) to temporarily disengage the pitch and roll servos from the flight control surfaces and hand-fly the aircraft. The G3X autopilot control is synchronized to the aircraft attitude during Control Wheel Steering. The green 'AP' annunciation is temporarily replaced by a white 'CW' for the duration of Control Wheel Steering maneuvers.

In most scenarios, releasing the CWS Button reengages the Autopilot with a new reference. Refer to (Vertical Modes) and (Lateral Modes) for Control Wheel Steering behavior in each mode.
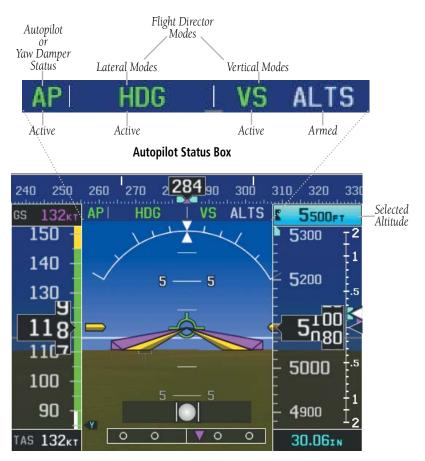
G3X AFCS STATUS BOX

The AFCS status box displays Autopilot (AP), Optional Yaw Damper (YD), and Flight Director (FD) mode annunciations on the PFD. When a third party autopilot unit is engaged and the G3X is issuing commands to it, lateral and vertical modes are displayed. When a third party autopilot unit is engaged but it is operating in a standalone mode (i.e., not responding to the G3X commands), the Autopilot status (AP) is displayed; however, the lateral/vertical modes are not displayed.

Autopilot (AP) status is displayed on the far left of the G3X Autopilot Status Box. Lateral modes are displayed in the center, and vertical modes are displayed on the right. Armed modes are displayed in white and active in green.

Autopilot Status Box

Autopilot Display (PFD)

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9.1 AFCS OPERATION

When a GMC 305 is installed AFCS functionality is distributed across the following Line Replaceable Units (LRUs):

- GDU 370/375 Display Unit.
- GSU 73/25 ADAHRS Unit
- GMC 305 AFCS Mode Control Unit
- GSA 28 AFCS Pitch/Roll/Yaw Damper (optional) servos.

The AFCS system can be divided into these main operating functions:

• **Flight Director (FD)** — Flight director operation takes place within GDU 370/375. Flight director commands are displayed on the PFD. The flight director provides:

- Command Bars showing pitch/roll guidance
- Vertical/lateral mode selection and processing
- Autopilot communication

• **Autopilot (AP)** — Autopilot operation occurs within the pitch, roll, and pitch servos. It also provides servo monitoring and automatic flight control in response to flight director steering commands, Air Data and Attitude and Heading Reference System (ADAHRS) attitude, rate information, and airspeed.

• **Yaw Damper (YD**) — The yaw servo (optional), is self-monitoring and provides Dutch roll damping and turn coordination in response to yaw rate, roll angle, lateral acceleration, and airspeed. If installed the YD comes on when the autopilot is engaged and stays on after disengaging the autopilot. The YD can be turned on/off independent of the autopilot using the **YD Key**.

• **Manual Electric Trim (MET)** — Manual electric trim may provide trim capability for any properly configured axis (pitch, roll, or yaw) when the autopilot is not engaged.

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The G3X can also communicate with various third-party autopilot units. With an appropriate third-party autopilot installed and the G3X Integrated Autopilot Interface is configured (refer to the G3X Installation Manual), the G3X issues pitch and roll steering commands to the autopilot unit. The autopilot unit is then responsible for moving the flight controls.

This section contains the following terminology:

- Autopilot Unit: Refers to the third-party autopilot box.

- Integrated Autopilot Interface: Refers to the functionality available when the Autopilot Unit and the G3X are working together.

> ✓ *NOTE: Refer to the G3X Installation Manual and the third-party autopilot vendor documentation for information on installing and configuring the G3X Integrated Autopilot Interface.*

> ✓ *NOTE: This section covers the operation of the G3X when configured with specific third-party autopilot models. Refer to the third-party autopilot vendor documentation for standalone autopilot functionality and control features.*

> ✓ *NOTE: In a multiple display configuration, the autopilot unit is connected to a single GDU (most likely the PFD). In the event that the GDU connected to the autopilot unit fails, the Integrated Autopilot Interface capability will be lost; however, the autopilot unit will retain any standalone functionality it may support on its own.*

AFCS PRE-FLIGHT ACTIONS

To ensure that the Automatic Flight Control System (AFCS) is operating properly prior to flight, perform the following Garmin recommended preflight checks.

Before takeoff checklist - Garmin autopilot with GSA 28 servos, no mode controller:

1) Autopilot - ENGAGE (using **AP/CWS** button)

2) Flight controls - CHECK (verify autopilot can be overpowered in both pitch and roll)

3) **AP** DISC button - PRESS (verify autopilot disengages and audio alert is heard)

4) Flight controls - CHECK (verify autopilot servos are disengaged from pitch and roll controls, and all controls move freely)

5) Elevator trim control - SET FOR TAKEOFF

Before takeoff checklist - Garmin autopilot with GSA 28 servos and GMC 305 mode controller:

1) Autopilot - ENGAGE (using AP/CWS button, or **AP** button on mode controller)

2) Flight controls - CHECK (verify autopilot can be overpowered in both pitch and roll)

3) **AP** DISC button - PRESS (verify autopilot disengages and audio alert is heard)

4) Yaw damper - OFF (if installed) (verify yaw damper disengages and audio alert is heard)

5) Flight director - SET FOR TAKEOFF (select TO or VS mode or push FD Button to turn off the Flight Director)

6) Flight controls - CHECK (verify autopilot servos are disengaged from pitch, roll, and yaw controls, and all controls move freely)

7) Elevator trim control - SET FOR TAKEOFF

AFCS CONTROLS

GMC 305 AFCS CONTROLS

The GMC 305 AFCS Control Unit has the following controls:

①	**HDG Key**	Selects/deselects Heading Select Mode
②	**NAV Key**	Selects/deselects Navigation Mode. Cancels GS Mode if LOC Mode is either active or armed. Cancels GP Mode if GPS Mode is either active or armed. Cancels LOC Mode if GPS Mode is active and LOC Mode is armed.
③	**AP Key**	Engages/disengages the autopilot
④	**LVL Key**	Engages the autopilot (if the autopilot is disengaged and the aircraft is within the autopilot engagement limitations) in level vertical and lateral modes

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⑤	**NOSE UP/DN Wheel**	Adjusts the vertical mode reference in Pitch Hold, Vertical Speed, Indicated Airspeed, and Altitude Hold modes
⑥	**IAS Key**	Selects/deselects Indicated Airspeed Mode
⑦	**ALT Key**	Selects/deselects Altitude Hold Mode
⑧	**VNV Key**	Selects/deselects Vertical Path Tracking Mode for Vertical Navigation flight control
⑨	**VS Key**	Selects/deselects Vertical Speed Mode
⑩	**YD Key** (if installed)	Engages/disengages the yaw damper
⑪	**FD Key**	Activates/deactivates the flight director only
		Pressing once turns on the director in the default vertical and lateral modes. Pressing again deactivates the flight director and removes the Command Bars. If the autopilot is engaged, the key is disabled.
⑫	**APR Key**	Selects/deselects Approach Mode
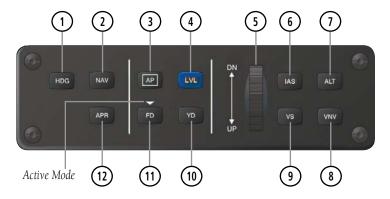
GMC 305 AFCS Control Unit

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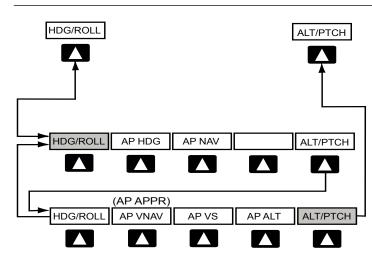
INTEGRATED AUTOPILOT INTERFACE SPLIT-SCREEN PFD PAGE & FULL-SCREEN PFD SOFTKEY CONTROLS

NOTE: *Unless otherwise specified, all mode softkeys are alternate action (i.e., press on, press off).*

HDG/ROLL Softkey selected

HDG/ROLL	Initial press allows the pilot to adjust the heading bug and displays lateral mode softkeys; subsequent press returns to top-level softkeys
AP HDG	Selects/deselects heading mode
AP NAV	Selects/deselects navigation mode. Cancels GS Mode if LOC Mode is either active or armed. Cancels GP Mode if GPS Mode is either active or armed. Cancels LOC Mode if GPS Mode is active and LOC Mode is armed.
ALT/PTCH	Initial press allows the pilot to adjust the selected altitude and displays the vertical mode softkeys; subsequent press returns to top-level softkeys

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ALT/PTCH Softkey selected

HDG/ROLL	Initial press allows the pilot to adjust the heading bug and displays lateral mode softkeys; subsequent press returns to top-level softkeys
AP VNAV	Selects/deselects vertical navigation
or	
AP APPR	Selects/deselects approach mode
AP VS	Selects/deselects vertical speed mode
AP ALT	Selects/deselects altitude hold mode
ALT/PTCH	Initial press allows the pilot to adjust the selected altitude and displays the vertical mode softkeys; subsequent press returns to top-level softkeys

FMS Joystick

Moving the **FMS** Joystick up/down adjusts the mode reference for Vertical Speed (VS), Altitude Hold (ALT), and Pitch Hold (PIT) modes.

Moving the **FMS** Joystick left/right adjusts the mode reference for Roll Hold (ROL) mode. The **FMS** Joystick cannot be used to increase the roll reference bank angle, only to drive the aircraft towards wings-level.

The following AFCS controls are located separately from the GDU softkeys and GMC 305 AFCS Control Unit:

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CWS/AP DISC Button (Autopilot Disconnect)

An AP DISC/CWS Button is located on the pilot's control stick. This button combines the functions of Autopilot Disconnect and Control Wheel Steering. (Note: the Control Wheel Steering function can be disabled in config mode, which causes the button to perform the Autopilot Disconnect function only)

Press and release the AP DISC/CWS Button to disengage the autopilot. Pressing and releasing the button again will acknowledge an autopilot disconnect alert and mute the associated aural tone.

Pressing and holding the AP DISC/CWS Button when the autopilot is engaged will temporarily disengage the pitch and roll servos and interrupt auto-trim operation. The pilot can then hand-fly the aircraft to a new attitude and release the AP DISC/CWS button to re-engage the autopilot servos and synchronize the flight director to the aircraft's new attitude. The ability to use Control Wheel Steering may be disabled in config mode if desired.

If the configuration supports it, pressing and holding the AP DISC/CWS button while the autopilot is not engaged will cause the autopilot to engage. If the flight director was previously off, the default FD modes (PIT and ROL) will be selected. The ability to engage the autopilot using the CWS button may be disabled in config mode if desired.

TO/GA Button (Takeoff/Go Around)

Selects flight director Takeoff (on ground) or Go Around (in air) Mode

When properly configured with a GTN, if an approach procedure is loaded, this switch also activates the missed approach when the selected navigation source is GPS or when the navigation source is VOR/LOC and a valid frequency has been tuned.

MET Switch (Manual Electric Trim)

Used to command manual electric trim for any properly configured servo (pitch, roll, or yaw).

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ENGAGING THE AUTOPILOT

An initial press of a softkey listed below (when the Autopilot is not engaged) will engage the Autopilot with the listed lateral and vertical modes (some modes may require an external navigator or NAV receiver):

Control Pressed	Modes Selected			
	Lateral		Vertical	
	Mode/Annunciation		Mode/Annunciation	
Autopilot Unit	Roll Hold	ROL	Pitch Hold	PIT
CWS Button (if equipped) (press and hold)	Roll Hold	ROL	Pitch Hold	PIT
AP HDG Softkey	Heading	HDG	Pitch Hold	PIT
AP NAV Softkey	Navigation	GPS VOR LOC	Pitch Hold	PIT
AP ALT Softkey	Roll Hold	ROL	Altitude Hold	ALT
AP VS Softkey	Roll Hold	ROL	Vertical Speed	VS
AP VNAV Softkey	Roll Hold	ROL	Vertical Navigation	VNAV
AP APPR Softkey	Approach	GPS LOC	Glidepath Glideslope	GP GS

Engaging the Autopilot

The **AP NAV** and **AP APPR** Softkeys must have a valid VLOC signal or an active GPS course to activate the autopilot.

The **AP VNAV** Softkey must have an active flight plan and VNAV enabled to activate the autopilot.

ENGAGING THE AUTOPILOT (GMC 305)

An initial press of the **AP** Key on the GMC 305 will activate the Flight Director and engage the autopilot in the default PIT and ROL modes.

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DISENGAGING THE AUTOPILOT

The Autopilot is manually disengaged by pushing the disconnect button on the autopilot unit, or by pressing the autopilot disconnect button on the control stick or yoke or by pressing the **AP** Key on the GMC 305. Manual disengagement is indicated by a five-second flashing yellow 'AP' annunciation and an aural alert. Cancel the aural alert by pressing and releasing the **AP/CWS** Button again (GSA 28 autopilot only)

Automatic disengagement is indicated by a flashing red 'AP' annunciation and an aural alert. The flashing indication continues until acknowledged by pressing the **ENT** Key. Automatic disengagement occurs due to:

- System failure
- Invalid sensor data
- Inability to compute default autopilot modes

DISENGAGING THE AUTOPILOT WHEN A MALFUNCTION IS SUSPECTED

If an autopilot failure or trim failure is suspected to have occurred, perform the following steps:

1) Firmly grasp the control wheel.

2) Press and hold the AP DISC Switch. The autopilot will disconnect and power is removed from the trim motor. Power is also removed from all primary servo motors and engaged solenoids. Note the visual and aural alerting indicating autopilot disconnect.

3) Retrim the aircraft as needed. Substantial trim adjustment may be needed.

4) Pull the appropriate circuit breaker(s) to electrically isolate the servo and solenoid components.

5) Release the AP DISC Switch.

OVERPOWERING AUTOPILOT SERVOS

In the context of this discussion, "overpowering" refers to any pressure or force applied to the pitch controls when the autopilot is engaged. A small amount of pressure or force on the pitch controls can cause the autopilot automatic trim to run to an out-of-trim condition. Therefore, any application of pressure or force to the controls should be avoided when the autopilot is engaged.

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Overpowering the autopilot during flight will cause the autopilot's automatic trim to run, resulting in an out-of-trim condition or cause the trim to hit the stop if the action is prolonged. In this case, larger than anticipated control forces are required after the autopilot is disengaged.

The following steps should be added to the preflight check:

1) Check for proper autopilot operation and ensure the autopilot can be overpowered.

2) Note the forces required to overpower the autopilot servo clutches.

FLIGHT DIRECTOR OPERATION

The flight director function provides pitch and roll commands to the pilot and autopilot, which are displayed on the PFD. With the flight director active, the aircraft can be hand-flown to follow the path shown by the Command Bars. The Flight Director has the following maximum commands: pitch (-15°, +20°) and roll (30°) angles.

ACTIVATING THE FLIGHT DIRECTOR USING THE GMC 305

An initial press of a key listed in the table below (when the flight director is not active) activates the flight director in the listed modes. The flight director may be turned off and the Command Bars removed from the display by pressing the **FD** Key again. The **FD** Key is disabled when the autopilot is engaged.

Control Pressed	Modes Selected			
	Lateral		**Vertical**	
FD Key	Roll Hold (default)	ROL	Pitch Hold (default)	PIT
AP Key	Roll Hold (default)	ROL	Pitch Hold (default)	PIT
TO/GA Button	Takeoff (on ground)Go Around (in air)	TO GA	Takeoff (on ground)Go Around (in air)	TO GA
ALT Key	Roll Hold (default)	ROL	Altitude Hold	ALT
VS Key	Roll Hold (default)	ROL	Vertical Speed	VS
VNV Key	Roll Hold (default)	ROL	Vertical Navigation*	VNAV
IAS Key	Roll Hold (default)	ROL	Indicated Airspeed	IAS
APR Key	Approach**	GPS VOR LOC	Pitch Hold (default)	PIT

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Control Pressed	Modes Selected			
	Lateral		**Vertical**	
NAV Key	Navigation**	GPS VOR LOC BC	Pitch Hold (default)	PIT
HDG Key	Heading Select	HDG	Pitch Hold (default)	PIT
LVL Key	Level Hold	LVL	Level Hold	LVL

*Valid VNV flight plan must be entered before **VNV** Key press activates flight director.*

The selected navigation receiver must have a valid VOR or LOC signal or active GPS course before **NAV or **APR** Key press activates flight director.*

Flight Director Activation (GMC 305)

FLIGHT DIRECTOR MODES

Flight director modes are normally selected independently for the pitch and roll axes. Unless otherwise specified, all mode keys are alternate action (i.e., press on, press off). In the absence of specific mode selection, the flight director reverts to the default pitch and/or roll modes.

Armed modes are annunciated in white and active in green in the AFCS Status Box. Under normal operation, when the control for the active flight director mode is pressed, the flight director reverts to the default mode(s) for the axis(es). Automatic transition from armed to active mode is indicated by the white armed mode annunciation moving to the green active mode field and flashing for 10 seconds.

If the information required to compute a flight director mode becomes invalid or unavailable, the flight director automatically reverts to the default mode for that axis. A flashing yellow mode annunciation and annunciator light indicate loss of sensor (ADC) or navigation data (VOR, LOC, GPS, VNAV) required to compute commands. When such a loss occurs, the system automatically begins to roll the wings level (enters Roll Hold Mode) or maintain the pitch angle (enters Pitch Hold Mode), depending on the affected axis. The flashing annunciation stops when the affected mode key is pressed or another mode for the axis is selected. If after 10 seconds no action is taken, the flashing annunciation stops.

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The flight director is automatically disabled if the attitude information required to compute the default flight director modes becomes invalid or unavailable.

Autopilot Status

Autopilot Manually Disengaged

COMMAND BARS

Upon activation of the flight director, Command Bars are displayed in magenta on the PFD. If the aircraft is being flown by hand, the command bars are displayed hollow. The Command Bars do not override the Aircraft Symbol. The Command Bars move together vertically to indicate pitch commands and bank left or right to indicate roll commands.

Hollow Command Bars (Pilot Hand Flying Aircraft, FD Only)

Solid Command Bars (Autopilot Engaged)

Aircraft Symbol

Command Bars

If the attitude information being sent to the flight director becomes invalid or unavailable, the Command Bars are removed from the display.

9.2 VERTICAL MODES

The table lists the vertical modes with their corresponding controls and annunciations. The mode reference is displayed next to the active mode annunciation for Altitude Hold, Vertical Speed, and Indicated Airspeed modes. The **NOSE UP/DN** Wheel (GMC 305 only) or **FMS** Joystick, can be used to change the vertical mode reference while operating under Pitch Hold, Vertical Speed, Indicated Airspeed (GMC 305 only), or Altitude Hold modes. Increments of change of values for each of these references using the **NOSE UP/DN** Wheel or **FMS** Joystick, are also listed in the table.

Vertical Mode	Description	Control	Annunciation		Reference Change Increment
Pitch Hold	Holds the current aircraft pitch attitude; may be used to climb/descend to the Selected Altitude	(default)	PIT		0.5°
Selected Altitude Capture	Captures the Selected Altitude	*	ALTS		
Altitude Hold	Holds the current Altitude	**ALT** Key (GMC 305) or **AP ALT** Softkey	ALT	nnnnn FT	10 ft
Vertical Speed	Maintains the current aircraft vertical speed; may be used to climb/descend to the Selected Altitude	**VS** Key (GMC 305) or **AP VS** Softkey	VS	nnnn FPM	100 fpm
Indicated Airspeed (IAS)	Maintains the current aircraft airspeed in IAS while the aircraft is climbing/descending to the Selected Altitude	**IAS** Key (GMC 305 only)	IAS	nnn KT	1 kt

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Vertical Mode	Description	Control	Annunciation	Reference Change Increment
Vertical Navigation	Captures and tracks descent legs of an active vertical profile	**VNV** Key (GMC 305) or **AP VNAV** Softkey	VNAV	
VNV Target Altitude Capture	Captures the Vertical Navigation (VNV) Target Altitude	**	ALTV	
Glidepath	Captures and tracks the SBAS glidepath on approach	**APR** Key (GMC 305) or **AP APPR** Softkey	GP	
Glideslope	Captures and tracks the ILS glideslope on approach		GS	
Takeoff	Commands a constant pitch angle and wings level on ground in preparation for takeoff	**GA** Button	TO	
Go Around	Commands a constant pitch angle and wings level in the air		GA	

*   *ALTS armed automatically when PIT, VS, IAS, or GA active, and under VNAV when Selected Altitude is to be captured instead of VNV Target Altitude*

** *ALTV armed automatically under VNAV when VNV Target Altitude is to be captured instead of Selected Altitude*

Flight Director Vertical Modes

PITCH HOLD MODE (PIT)

When the flight director is activated (the **FD** Key is pressed) or when the Autopilot is activated, Pitch Hold Mode is selected by default. Pitch Hold Mode is indicated as the active vertical mode by the green 'PIT' annunciation. This mode may be used for climb

or descent to the Selected Altitude (shown above the Altimeter), since Selected Altitude Capture Mode is automatically armed when Pitch Hold Mode is activated.
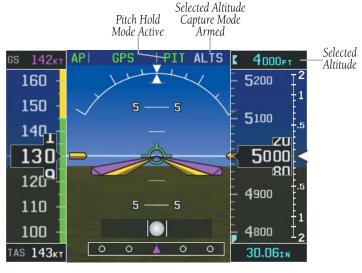
In Pitch Hold Mode, the flight director maintains a constant pitch attitude. The pitch reference is set to the aircraft pitch attitude at the moment of mode selection. If the aircraft pitch attitude exceeds the flight director pitch command limitations, the flight director commands a pitch angle equal to the nose-up/down limit.

CHANGING THE PITCH REFERENCE:

When operating in Pitch Hold Mode, the pitch reference can be adjusted by using the **NOSE UP/DN** Wheel (GMC 305 only) or **FMS** Joystick.

Or

Hold the Control Wheel Steering (CWS) Button (if equipped, and the autopilot unit supports CWS), establish the desired pitch attitude, then release the CWS Button.

Pitch Hold Mode Active

Selected Altitude Capture Mode Armed

Selected Altitude

Pitch Hold & Selected Altitude Capture Modes

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SELECTED ALTITUDE CAPTURE MODE (ALTS)

Selected Altitude Capture Mode is automatically armed with activation of the following modes:

- Pitch Hold
- Vertical Speed
- Indicated Airspeed (GMC 305)
- TO/Go Around (GMC 305)

- Vertical Path Tracking (if the Selected Altitude is to be captured instead of the VNV Target Altitude)

The white 'ALTS' annunciation indicates Selected Altitude Capture Mode is armed. Press the **AP ALT** Softkey or **ALT** Softkey, and turn the **FMS** Joystick to set the Selected Altitude (shown above the Altimeter) until Selected Altitude Capture Mode becomes active.

Selected Altitude

As the aircraft nears the Selected Altitude, the flight director automatically transitions to Selected Altitude Capture Mode with Altitude Hold Mode armed. This automatic transition is indicated by the green 'ALTS' annunciation flashing for up to 10 seconds and the appearance of the white 'ALTS' annunciation. The Selected Altitude is shown as the Altitude Reference beside the 'ALTS' annunciation.

Automatic transition to ALTS Mode with ALT Mode armed

At 50 feet from the Selected Altitude, the flight director automatically transitions from Selected Altitude Capture to Altitude Hold Mode and holds the reference altitude. As Altitude Hold Mode becomes active, the white 'ALTS' annunciation moves to the active vertical mode field and flashes green for 10 seconds to indicate the automatic transition.

Automatic transition to ALTS
Mode with ALT Mode armed

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Setting the selected altitude (Integrated Autopilot Interface):

1) From the PFD Page (one display) or PFD (two display), press the **ALT/PTCH** Softkey.

2) Turn the **FMS** Joystick to set the Selected Altitude in 100-ft increments

Setting the selected altitude (GMC 305):

1) From the PFD Page (one display) or PFD (two display), press the **ALT** Softkey.

2) Turn the **FMS** Joystick to set the Selected Altitude in 100-ft increments

Use of the **FMS** Joystick to change the Selected Altitude while Selected Altitude Capture Mode is active causes the autopilot to revert to Pitch Hold Mode with Selected Altitude Capture Mode armed for the new Selected Altitude.

ALTITUDE HOLD MODE (ALT)

Altitude Hold Mode can be activated by pressing the **AP ALT** Softkey or **ALT** Key (GMC 305); the AFCS maintains the current aircraft altitude (to the nearest 10 feet) as the Altitude Reference. The Altitude Reference, shown in the G3X Autopilot Status Box, is independent of the Selected Altitude, displayed above the Altimeter. Altitude Hold Mode active is indicated by a green 'ALT' annunciation in the G3X Autopilot Status Box.

Altitude Hold Mode is automatically armed when in Selected Altitude Capture Mode. Selected Altitude Capture Mode automatically transitions to Altitude Hold Mode when within 50 feet of the Selected Altitude. In this case, the Selected Altitude becomes the Altitude Reference.

CHANGING THE ALTITUDE REFERENCE

When operating in Altitude Hold Mode, the Altitude Reference can be adjusted in the following ways:

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- The Altitude Reference can be adjusted up or down in 10-foot increments by pressing the **FMS** Joystick up or down or rolling the **NOSE UP/DN** Wheel (GMC 305). Using this method, up to 200 feet of altitude change can be commanded. To change the Altitude Reference by more the 200 feet, use the CWS button (if equipped) as described below, or climb/descend using another vertical mode (PIT, VS) to capture the desired Selected Altitude.

- If the aircraft is equipped with a CWS Button, pressing the CWS Button allows the aircraft to be hand-flown to a new Altitude Reference. When the CWS Button is released at the desired altitude, the new altitude is established as the Altitude Reference.

Altitude Hold Mode Active   *Altitude Reference*   *Selected Altitude*

Altitude Hold Mode Softkey

Altitude Hold Mode

NOTE: *While operating in Altitude Hold Mode, using the FMS Joystick to change the Selected Altitude does NOT affect the autopilot (i.e., does not change the Altitude Reference, and does not cancel the mode).*

VERTICAL SPEED MODE (VS)

In Vertical Speed Mode, the flight director acquires and maintains a Vertical Speed Reference. Current aircraft vertical speed (to the nearest 100 fpm) becomes the Vertical Speed Reference at the moment of Vertical Speed Mode activation. This mode may be used for climb or descent to the Selected Altitude (shown above the Altimeter) since Selected Altitude Capture Mode is automatically armed when Vertical Speed Mode is selected.

When Vertical Speed Mode is activated by pressing the **VS** Key (GMC 305) or **AP VS** Softkey, 'VS' is annunciated in green in the Autopilot Status Box along with the Vertical Speed Reference. The Vertical Speed Reference is also displayed above the Vertical Speed Indicator. A Vertical Speed Reference Bug corresponding to the Vertical Speed Reference is shown on the indicator.

CHANGING THE VERTICAL SPEED REFERENCE

The Vertical Speed Reference may be adjusted in the following ways:

- Use the **NOSE UP/DN** Wheel (GMC 305) or Move the **FMS** Joystick up or down to adjust the Vertical Speed Reference in increments of 100 fpm. The current Vertical Speed Reference is displayed in the G3X Autopilot Status Box for 10 seconds after a change is made and as a reference bug on the Vertical Speed Indicator. To dismiss the Vertical Speed Reference display, press **ENT**.

- Press the CWS Button (if equipped) and hand-fly the aircraft to a new Vertical Speed Reference. When the CWS Button is released, the aircraft's vertical speed (to the nearest 100 fpm) is established as the new Vertical Speed Reference.

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Vertical Speed Mode Active

Vertical Speed Reference

Selected Altitude

Vertical Speed Reference Bug

Vertical Speed Mode Softkey

Vertical Speed Mode

INDICATED AIRSPEED MODE (IAS) (GMC 305 ONLY)

Indicated Airspeed Mode is selected by pressing the **IAS** Key. This mode acquires and maintains the Airspeed Reference (IAS) while climbing or descending. When Indicated Airspeed Mode is active, the flight director continuously monitors Selected Altitude, airspeed and altitude.

The Airspeed Reference is set to the current airspeed upon mode activation. Indicated Airspeed Mode is indicated by a green 'IAS' annunciation beside the Airspeed Reference in the Autopilot Status Box. The Airspeed Reference is also displayed as a light blue bug corresponding to the Airspeed Reference along the airspeed tape.

Engine power must be adjusted to allow the autopilot to fly the aircraft at a pitch attitude corresponding to the desired flight profile (climb or descent) while maintaining the Airspeed Reference.

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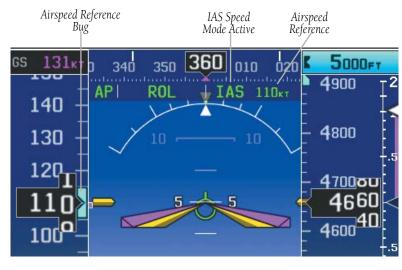
CHANGING THE AIRSPEED REFERENCE

The Airspeed Reference (shown in both the Autopilot Status Box and above the Airspeed Indicator) may be adjusted by using the **NOSE UP/DN** Wheel or **FMS** Joystick.

Indicated Airspeed Mode

VERTICAL NAVIGATION MODE (VNAV)

> *NOTE: If another vertical mode softkey is pressed while VNAV Mode is selected, VNAV Mode reverts to armed.*

> *NOTE: Pressing the CWS Button (if equipped) while VNAV Mode is active does not cancel the mode. The autopilot guides the aircraft back to the descent path upon release of the CWS Button.*

Vertical Navigation (VNAV) Mode is available for enroute/terminal cruise and descent operations any time that VNAV flight planning is available. Refer to Section 2.3 (Vertical Navigation) for more information.

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Vertical Navigation Mode Active

Vertical Navigation Target Altitude Capture Mode Armed

Selected Altitude

Vertical Deviation Indicator

Required Vertical Speed Bug
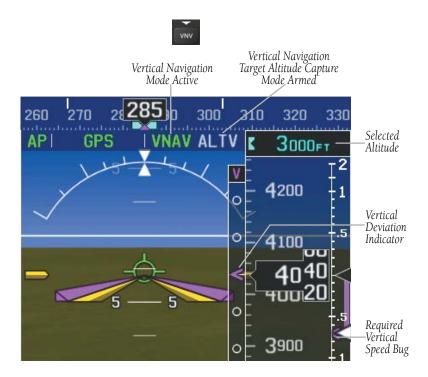
Vertical Navigation Mode

Activating Vertical Navigation Mode:

❶ When a flight plan is active, VNAV data is valid, and the **VNV** Key (GMC 305) or **AP VNAV** Softkey is pressed, VNAV mode is armed in preparation for descent path capture. 'VNAV' is annunciated in white in the G3X Autopilot Status Box. If applicable, the appropriate altitude capture mode is armed for capture of the VNAV Target Altitude (ALTV) or the Selected Altitude (ALTS), whichever is greater.

❷ When a descent leg is captured (i.e., vertical deviation becomes valid), VNAV Mode is activated and tracks the descent profile. An altitude capture mode (ALTS or ALTV) is armed as appropriate.

❸ When approaching the VNAV Target Altitude (or Selected Altitude) the system automatically transitions to ALTS or ALTV Mode with ALT Mode armed.

Selected Altitude

If the altimeter's barometric setting is adjusted while VNAV mode is active, the autopilot increases/decreases the descent rate by up to 500 fpm to re-establish the aircraft on the descent path (without commanding a climb). For large changes, it may take several minutes for the aircraft to reestablish on the descent path. If the change is made while nearing the VNAV waypoint, the aircraft may not reestablish on the descent path in time to level off at the VNAV Target Altitude. In this case, the autopilot will revert to Pitch Hold mode upon passing the VNAV waypoint, and Selected Altitude Capture (ALTV) mode will be automatically armed.

AUTOMATIC REVERSION TO PITCH HOLD MODE

Several situations can occur while VNAV Mode is active which cause the AFCS to revert to Pitch Hold Mode:

- Vertical deviation exceeds 200 feet during an overspeed condition.

- Vertical deviation becomes invalid (the Deviation Indicator is removed from the PFD).

Following a reversion to Pitch Hold Mode, VNAV Mode and the appropriate altitude capture mode become armed to allow for possible profile recapture.

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VNAV TARGET ALTITUDE CAPTURE MODE (ALTV)

VNAV Target Altitude Capture is analogous to Selected Altitude Capture Mode and is armed automatically after the **VNV** Key (GMC 305) or **AP VNAV** Softkey is pressed if the VNAV Target Altitude is to be intercepted before the Selected Altitude. The annunciation 'ALTV' indicates that the VNAV Target Altitude is to be captured. Refer to Section 2.3 (Vertical Navigation) for more information on setting up the VNAV target altitude.

As the aircraft nears the VNAV Target Altitude, AFCS automatically transitions to VNAV Target Altitude Capture Mode with Altitude Hold Mode armed. This automatic transition is indicated by the green 'ALTV' annunciation flashing for up to 10 seconds and the appearance of the white 'ALT' annunciation.

At 50 feet from the VNAV Target Altitude, the AFCS automatically transitions from VNAV Target Altitude Capture to Altitude Hold Mode and selects the VNAV target altitude as the new Autopilot Altitude Reference. As Altitude Hold Mode becomes active, the white 'ALT' annunciation moves to the active vertical mode field and flashes green for 10 seconds to indicate the automatic transition.

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Automatic Transition to ALTV Mode with ALT Mode Armed

Selected Altitude Below VNAV Altitude

Automatic Transition from ALTV to ALT Mode

Altitude Reference

Automatic Mode Transitions During Altitude Capture

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GLIDEPATH MODE (GP) (WITH EXTERNAL WAAS ENABLED IFR NAVIGATOR ONLY)

Glidepath Mode is used to track a WAAS or other satellite-based augmentation system SBAS generated glidepath. When Glidepath Mode is armed, 'GP' is annunciated in white in the Autopilot Status Box.

Selecting Glidepath Mode:

1) <u>EXTERNAL NAVIGATOR</u>: Ensure a GPS approach with vertical guidance (LPV, LNAV/VNAV, LNAV +V) is loaded into the active flight plan. The active waypoint must be part of the flight plan (cannot be a direct-to a waypoint not in the flight plan).

2) Ensure that GPS is the selected navigation source (use the **CDI SRC** Softkey to cycle through navigation sources if necessary).

3) Press the **APR** Key (GMC 305) or Press the **ALT/PTCH** Softkey to access the autopilot pitch modes and press the **AP APPR** Softkey (only available when an external GPS navigation source (i.e., GTN or GNS Series) is configured).

✓ *NOTE: Some RNAV (GPS) approaches provide a vertical descent angle as an aid in flying a stabilized approach. These approaches are NOT considered Approaches with Vertical Guidance (APV). Approaches that are annunciated on the HSI as LNAV or LNAV+V are considered Nonprecision Approaches (NPA) and are flown to an MDA even though vertical glidepath (GP) information may be provided.*

⚠ *WARNING: When flying an LNAV approach (with vertical descent angle) with the autopilot coupled, the aircraft will not level off at the MDA even if the MDA is set in the altitude preselect.*

Upon reaching the glidepath, the flight director transitions to Glidepath Mode and begins to capture and track the glidepath.

Once the following conditions have been met, the glidepath can be captured:

• The active waypoint is at or after the final approach fix (FAF).

• Vertical deviation is valid.

- The CDI is at less than full-scale deviation
- Automatic sequencing of waypoints has not been suspended (no 'SUSP' annunciation on the HSI)

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Glidepath Mode Active

Glide Path Marker

Approach Mode Softkey

Glidepath Mode

GLIDESLOPE MODE (GS)

Glideslope Mode is available for LOC/ILS approaches to capture and track the glideslope. When Glideslope Mode is armed (annunciated as 'GS' in white), LOC Approach Mode is armed as the lateral flight director mode.
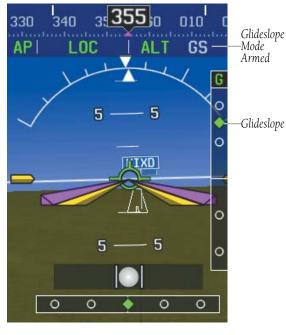
Selecting Glideslope Mode:

1) <u>EXTERNAL NAVIGATOR</u>: Tune and activate the desired localizer frequency.

2) <u>EXTERNAL NAVIGATOR</u>: Ensure that LOC is the selected navigation source (use the **CDI SRC** Softkey to cycle through external navigation sources if necessary).

3) Press the **APR** Key (GMC 305) or press the **ALT/PTCH** Softkey to access the autopilot pitch modes and press **AP APPR** Softkey. This simultaneously selects LOC and GS (Glideslope) Modes.

> **Or**:

1) <u>EXTERNAL NAVIGATOR</u>: Tune and activate the desired localizer frequency.

2) <u>EXTERNAL NAVIGATOR</u>: Load the approach (LOC, ILS, LDA, SDF, etc) into the flight plan.

3) Press the **APR** Key (GMC 305) or press the **ALT/PTCH** Softkey to access the autopilot pitch modes and press **AP APPR** Softkey. This simultaneously selects LOC and GS (Glideslope) Modes.

Once LOC is the navigation source, the localizer and glideslope can be captured. Upon reaching the glideslope, the flight director transitions to Glideslope Mode and begins to capture and track the glideslope.

Glideslope Mode Armed

Glideslope

Glideslope Mode Armed

GO AROUND (GA) AND TAKEOFF (TO) MODES (GMC 305 ONLY)

Go Around and Takeoff modes are coupled pitch and roll modes and are annunciated as both the vertical and lateral modes when active. In these modes, the flight director commands a constant set pitch attitude and keeps the wings level. The GA Switch is used to activate both modes. The mode entered by the flight director depends on whether the aircraft is on the ground or in the air.

Takeoff Mode provides an attitude reference during rotation and takeoff. This mode can be selected only while on the ground by pushing the **TO/GA** Button. The flight director Command Bars assume a wings-level, pitch-up attitude.

Pressing the **TO/GA** Button while in the air activates the flight director in a wings-level, pitch-up attitude, allowing the execution of a missed approach or a go around. Go Around Mode arms Selected Altitude Capture Mode automatically, and attempts to modify the aircraft attitude (i.e., with the **NOSE UP/DN** Wheel or **FMS** Joystick) result in reversion to Pitch and Roll Hold modes.

Go Around (GA) Mode Armed

9.3 LATERAL MODES

The following table lists the lateral modes and respective control(s) and annunciation. Refer to the vertical modes section for information regarding Takeoff and Go Around Modes.

Lateral Mode	Description	Control	Annunciation
Roll Hold	Holds the current aircraft roll attitude or rolls the wings level, depending on the commanded bank angle	(default)	ROL
Heading Select	Captures and tracks the Selected Heading	**HDG** Key (GMC 305) or **AP HDG** Softkey	HDG
Navigation, GPS	Captures and tracks the selected navigation source (GPS, VOR, LOC)	**NAV** Key (GMC 305) or **AP NAV** Softkey	GPS
Navigation, VOR Enroute Capture/Track			VOR
Navigation, LOC Capture/ Track (No Glideslope)			LOC
Navigation, Backcourse Capture/Track	Captures and tracks a localizer signal for backcourse approaches		BC

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Lateral Mode	Description	Control	Annunciation
Approach, GPS	Captures and tracks the selected navigation source (GPS, VOR, LOC)	**APR** Key (GMC 305) or **AP APPR** Softkey	GPS
Approach, VOR Capture/Track			VAPP
Approach, LOC Capture/Track (Glideslope Mode automatically armed)			LOC
Takeoff	Commands a constant pitch angle and wings level on ground in preparation for takeoff	**TO/GA** Button	TO
Go Around	Commands a constant pitch angle and wings level in the air		GA

The AFCS limits turn rate to 3 degrees per second (standard rate turn).

Flight Director Lateral Modes

The CWS Button (if equipped) does not change lateral references for HDG or NAV modes. The autopilot guides the aircraft back to the Selected Heading/Course upon release of the CWS Button.

ROLL HOLD MODE (ROL)

NOTE: If Roll Hold Mode is activated as a result of a mode reversion, the flight director rolls the wings level.

When the flight director is activated or switched, Roll Hold Mode is selected by default. This mode is annunciated as 'ROL' in the Autopilot Status Box. The current aircraft bank angle is held, subject to the bank angle condition.

Roll Hold Mode Annunciation

Bank Angle	Flight Director Response
< 6°	Rolls wings level
6 to 20°	Maintains current aircraft roll attitude
>20°	Limits bank to 20°

Roll Hold Mode Responses

CHANGING THE ROLL REFERENCE

When operating in Roll Hold Mode, the roll reference can be adjusted in the following ways:

- To decrease the roll reference, move **FMS** Joystick (PFD) to the left or right and hold. The AFCS slowly decreases the bank angle. The current bank angle as the **FMS** Joystick is released is held (if the bank angle exceeds 6°). If the bank angle is less than 6° as the **FMS** Joystick is released, the AFCS will roll the aircraft wings level. The roll reference cannot be increased using the **FMS** Joystick.

- Hold the CWS Button (if equipped), establish the desired bank angle, then release the CWS Button.

HEADING SELECT MODE (HDG)

Heading Select Mode is activated by pressing the **AP HDG** Softkey or **HDG** Key (GMC 305). Heading Select Mode acquires and maintains the Selected Heading. The Selected Heading is shown by a light blue bug on the HSI and in the box to the upper left of the HSI.

CHANGING THE SELECTED HEADING

> *NOTE: Press and hold the FMS Joystick (on the PFD or PFD Page) to synchronize the Selected Heading to the current heading.*

Changing the selected heading (Integrated Autopilot Interface):

1) From the PFD Page (one display) or PFD (two display), press the **HDG/ROLL** Softkey (if necessary). The Heading Box is highlighted.

2) Turn the **FMS** Joystick to select the desired heading. The Selected Heading is shown to the left of the HSI.

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Changing the selected heading (GMC 305):

1) From the PFD Page (one display) or PFD (two display), press the **HDG** Softkey (if necessary). The Heading Box is highlighted.

2) Turn the **FMS** Joystick to select the desired heading. The Selected Heading is shown to the left of the HSI.

3) Press the **HDG** Key on the GMC 305 to activate HDG Mode

Holding the CWS Button (if equipped) and hand-flying the aircraft does not change the Selected Heading. The autopilot guides the aircraft back to the Selected Heading upon release of the CWS Button.

Turns are commanded in the same direction as Selected Heading Bug movement, even if the Bug is turned more than 180˚ from the present heading (e.g., a 270˚ turn to the right). However, Selected Heading changes of more than 330˚ at a time result in turn reversals.

Heading Mode Annunciation

NAVIGATION MODES (GPS, VOR, LOC, BC)

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> ✅ *NOTE: The selected navigation receiver must have a valid VOR or LOC signal or active GPS course for the flight director to enter Navigation Mode.*

> ✅ *NOTE: When intercepting a flight plan leg, the flight director gives commands to capture the active leg at approximately a 45° angle to the track between the waypoints defining the active leg. The flight director does not give commands fly to the starting waypoint of the active leg.*

> ✅ *NOTE: When making a backcourse approach, set the Selected Course to the localizer front course.*

Pressing the **NAV** Key or **AP NAV** Softkey selects Navigation Mode. Navigation Mode acquires and tracks the selected navigation source (GPS, VOR, LOC). The flight director follows GPS roll steering commands when GPS is the selected navigation source. When the navigation source is VOR or LOC, the flight director creates roll steering commands from the Selected Course and deviation. Navigation Mode can also be used to fly non-precision GPS and LOC approaches where vertical guidance is not required.

Backcourse Navigation Mode is selected when the localizer front course is greater than 105° from the aircraft heading. Backcourse Navigation Mode captures and tracks a localizer signal in the backcourse direction. The annunciation 'BC' in the Autopilot Status Box indicates Backcourse Navigation Mode.

If the Course Deviation Indicator (CDI) shows greater than one dot when the **NAV** Key or **AP NAV** Softkey is pressed, the selected mode is armed. If the CDI is less than one dot, Navigation Mode is automatically captured when the **NAV** Key or **AP NAV** Softkey is pressed. The armed annunciation appears in white to the left of the active roll mode.

Navigation Mode Annunciation

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When the CDI has automatically switched from GPS to LOC during a LOC/ILS approach, GPS Navigation Mode remains active, providing GPS steering guidance until the localizer signal is captured. LOC Navigation Mode is armed when the automatic navigation source switch takes place. If the **APR** Key or **AP NAV** Softkey is pressed prior to the automatic navigation source switch, LOC Navigation Mode is armed.

If Navigation Mode is active and either of the following occur, the flight director reverts to Roll Hold Mode (wings rolled level):

- Different VOR tuned while in VOR Navigation Mode (VOR Navigation Mode reverts to armed)

- Navigation source manually switched (with the **CDI SRC** Softkey)

- During a LOC/ILS approach, the FAF is crossed while in GPS Navigation Mode after the automatic navigation source switch from GPS to LOC

CHANGING THE SELECTED COURSE

The Selected Course is controlled by pressing the **OBS CRS** Softkey, **VOR CRS** Softkey, or **LOC CRS** Softkey, (while in OBS, VOR, LOC, or BC Mode) and turning the **FMS** Joystick on the G3X PFD (or PFD Page) to select the desired course (or press **XPDR/CRS** > **OBS CRS** / **VOR CRS** / **LOC CRS** from the PFD (or PFD Page) if a transponder is configured).

LOC Mode is activated when the automatic navigation source switch takes place. If the **APR** Key or **AP APPR** Softkey is pressed prior to the automatic navigation source switch, LOC Mode is armed.

In the right circumstances, LOC and GS Modes can be armed while GPS Mode is still active and the external navigator is set to GPS (not VLOC).

Arming LOC & GS Modes while GPS Mode is still active:

1) <u>EXTERNAL NAVIGATOR</u>: Tune and activate the desired localizer frequency.

2) <u>EXTERNAL NAVIGATOR</u>: Load the approach (LOC, ILS, LDA, SDF, etc) into the flight plan.

3) <u>G3X</u>: While GPS is still the selected navigation source on the external navigator, press the **APR** Key (GMC 305) or **AP APPR** Softkey to arm LOC and GS (Glideslope) Modes even with GPS Mode still active. The external navigator will switch from GPS to VLOC automatically and the G3X will capture the localizer and then the glideslope.

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If Navigation Mode is active and either of the following occur, the AFCS reverts to Roll Hold Mode (wings rolled level):

- Different VOR tuned while in VOR Navigation Mode (VOR Navigation Mode reverts to armed)

- Active navigation source manually switched (with the **CDI SRC** Softkey on the PFD/PFD Page, or the CDI Key on the external navigator)

- Active flight plan is deleted (only GPS-based modes)

- GPS reception is lost

If VOR Navigation Mode is active and the VOR signal is lost, the autopilot reverts to Roll Hold Mode (wings rolled level) and reverts VOR Mode to armed in the event the VOR signal is reestablished.

OBS MODE

In OBS Mode the Selected Course is controlled using the **OBS CRS** Softkey. Or press **XPDR/CRS** > **OBS CRS** when a transponder is configured and turn the **FMS** Joystick.

Enabling/disabling OBS Mode (without external GPS navigator):

1) From the Active Flight Plan Page, press the **MENU** Key while navigating a flight plan or Direct-to.

2) With 'Set OBS and Hold' highlighted, press the **ENT** Key. The OBS Mode Box is highlighted.

3) Turn the **FMS** Joystick to select the desired course to/from the waypoint.

4) To cancel OBS Mode and return to automatic waypoint sequencing, press the **MENU** Key, with 'Release Hold' highlighted, press the **ENT** Key.

Enabling/disabling OBS Mode (with external GPS navigator configured):

1) EXTERNAL NAVIGATOR: Press the **OBS** Key. The 'Set OBS and Hold' Active Flight Plan Page menu option is now available.

2) G3X: Turn the **FMS** Joystick to select the desired course to/from the waypoint.
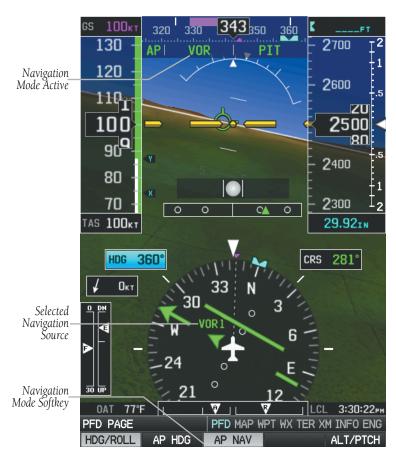
VOR MODE FOR NAVIGATION

VOR Mode can be used for navigation when an external navigation receiver is configured.

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Navigation Mode Active

Selected Navigation Source

Navigation Mode Softkey

Tracking Direct-to a VOR:

1) EXTERNAL NAVIGATOR: Tune and activate the desired VOR frequency. If a GTN or GNS series unit is not configured skip to Step 3.

2) EXTERNAL NAVIGATOR (GTN or GNS series units only): Ensure the 'VLOC' indication is showing in the lower-left corner. If not, press the CDI Key.

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3) <u>G3X</u>: Ensure that VOR1 or VOR2 is the selected navigation source (use the **CDI SRC** Softkey on the PFD or PFD Page to cycle through external navigation sources if necessary). It should say 'VOR1' or 'VOR2' on the HSI and the needle should be green.

4) <u>G3X</u>: From the PFD or PFD Page, press the **VOR CRS** Softkey (or press **XPDR/CRS** > **VOR CRS** if a transponder is configured) and turn the **FMS** Joystick until the CDI is centered with a 'TO' indication.

   Or:

   From the PFD or PFD Page press the **VOR CRS** Softkey (or press **XPDR/CRS** > **VOR CRS** if a transponder is configured), then press and hold the **FMS** Joystick to automatically center the CDI.

5) <u>G3X</u>: From the PFD or PFD Page, press the **HDG/ROLL** Softkey to access the autopilot lateral modes and then press the **AP NAV** Softkey to activate VOR Mode.

Or: Press the **NAV** Key on the GMC 305.

A green 'VOR' indication is displayed in the autopilot status bar and the autopilot tracks the selected course to the VOR.

Intercepting and tracking a VOR radial:

1) <u>EXTERNAL NAVIGATOR</u>: Tune and activate the desired VOR frequency. If a GTN or GNS series unit is not configured skip to Step 3.

2) <u>EXTERNAL NAVIGATOR (GTN or GNS series units only)</u>: Ensure the 'VLOC' indication is showing in the lower-left corner of the. If not, press the CDI Key.

3) <u>G3X</u>: Ensure that VOR1 or VOR2 is the selected navigation source (use the **CDI SRC** Softkey on the PFD or PFD Page to cycle through external navigation sources if necessary). It should say 'VOR1' or 'VOR2' on the HSI and the needle should be green.

4) <u>G3X</u>: From the PFD or PFD Page, press the **VOR CRS** Softkey (or press **XPDR/CRS** > **VOR CRS** if a transponder is configured) and turn the **FMS** Joystick to select the desired radial.

5) <u>G3X</u>:   From the PFD or PFD Page, press the **HDG/ROLL** Softkey to access the autopilot lateral modes and then press the **AP NAV** Softkey.

Or: Press or the **NAV** Key on the GMC 305.

If there is less than half-scale deviation when the **AP NAV** Softkey or **NAV** Key is pressed, VOR Mode will activate (green text), intercept, and track the selected radial. If there is more than half-scale deviation when the **AP NAV** Softkey is pressed, VOR Mode will arm (white text) first, then activate when closer to the radial.

Intercepting and Tracking a VOR Radial

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> **NOTE:** The selected navigation receiver must have a valid VOR or LOC signal or active GPS course for the flight director to enter Approach Mode.

> **NOTE:** For the autopilot to enter a VLOC mode, the G3X must have GPS reception, a valid navigation database, and the external navigation receiver must have a valid signal (VOR or LOC).

Press the **AP NAV** Softkey or **NAV** Key (GMC 305) to arm/activate VOR, LOC/BC, and GPS (LNAV only) lateral modes. Lateral modes acquire and track the selected navigation source (GPS, VOR, or LOC), depending on the loaded approach. These modes use the selected navigation receiver deviation and desired course inputs to fly the approach. Press the **AP NAV** Softkey when the CDI is greater than one dot to arm the selected modes (annunciated in white). Press the **AP NAV** Softkey when the CDI deviation is less than one dot to activate, capture and track the selected navigation source (GPS, VOR, or LOC).

Example	Control	Lateral Mode	Annunciation	Description
LNAV	**NAV** Key (GMC 305) **or** **AP NAV** Softkey	Approach, GPS	GPS	Captures and tracks the selected navigation source (GPS, VOR, LOC)
VOR		VOR Approach Capture/Track	VOR	
LOC		LOC Capture/Track (No Glideslope)	LOC	
BC		Backcourse Capture/Track	BC	Captures and tracks a localizer signal for backcourse approaches

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GPS APPROACH WITHOUT VERTICAL GUIDANCE

A GPS approach without vertical guidance (LNAV) is flown using GPS NAV Mode.

Selecting a GPS Approach without vertical guidance:

1) EXTERNAL NAVIGATOR: Ensure a GPS approach without vertical guidance (LNAV) is loaded into the active flight plan.

2) EXTERNAL NAVIGATOR: Ensure the 'GPS' indication is showing in the lower-left corner. If not, press the CDI Key.

3) G3X: Ensure that GPS1 is the selected navigation source on the PFD or PFD Page (use the **CDI SRC** Softkey to cycle through external navigation sources if necessary).

4) EXTERNAL NAVIGATOR: Select and activate the GPS approach using the PROC Key.

5) G3X: From the PFD or PFD Page, press the **HDG/ROLL** Softkey to access the autopilot lateral modes and then press the **AP NAV** Softkey to activate GPS Mode.

Or: Press or the **NAV** Key on the GMC 305

6) Adjust the aircraft's pitch axis as required.

VOR APPROACH

A VOR approach is flown using VOR Mode.

Selecting a VOR Approach:

1) EXTERNAL NAVIGATOR: Tune and activate the desired VOR frequency. If a GTN or GNS series unit is not configured skip to Step 3.

2) EXTERNAL NAVIGATOR (GTN or GNS series units only): Ensure the 'VLOC' indication is showing in the lower-left corner of the. If not, press the CDI Key.

3) G3X: Ensure that VOR1 or VOR2 is the selected navigation source (use the **CDI SRC** Softkey on the PFD or PFD Page to cycle through external navigation sources if necessary). It should say 'VOR1' or 'VOR2' on the HSI and the needle should be green.

4) G3X: From the PFD or PFD Page, press the **VOR CRS** Softkey (or press **XPDR/CRS** > **VOR CRS** if a transponder is configured) and turn the **FMS** Joystick to select the inbound approach course (radial).

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5) <u>G3X</u>: From the PFD or PFD Page, press the **HDG/ROLL** Softkey to access the autopilot lateral modes and then press the **AP NAV** Softkey.

Or: Press or the **NAV** Key on the GMC 305

If there is less than half-scale deviation when the **AP NAV** Softkey or **NAV** Key is pressed, VOR Mode will activate (green text), intercept, and track the selected radial. If there is more than half-scale deviation when the **AP NAV** Softkey or **NAV** Key is pressed, VOR Mode will arm (white text) first, then activate when closer to the radial.

6) Adjust the aircraft's pitch axis as required.

LOCALIZER APPROACH (NO GS)

LOC Mode is used to fly a localizer only approach (no glideslope).

Selecting LOC Mode for a localizer only approach:

1) <u>EXTERNAL NAVIGATOR</u>: Tune and activate the desired LOC frequency,

2) <u>G3X</u>: Ensure that LOC1 is the selected navigation source (use the **CDI SRC** Softkey on the PFD or PFD Page to cycle through external navigation sources if necessary). The HSI should automatically slew the needle to the correct course.

3) <u>G3X</u>: From the PFD, press the **HDG/ROLL** Softkey to access the autopilot lateral modes and then press the **AP NAV** Softkey to activate LOC Mode.

Or: Press or the **NAV** Key on the GMC 305

If the localizer deviation is less than half-scale when the **AP NAV** Softkey or **NAV** Key is pressed, the autopilot will activate LOC Mode and track the localizer, otherwise LOC Mode is armed and the pilot is responsible for intercepting the localizer. In some cases it may be necessary to use HDG Mode with LOC Mode armed to follow a vector to the localizer.

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BACKCOURSE APPROACH

✓ **NOTE:** *When making a backcourse approach, set the Selected Course to the localizer front course.*

✓ **NOTE:** *'BC' will not be displayed on the G3X HSI.*

Backcourse Mode captures and tracks a localizer signal in the backcourse direction. Backcourse is indicated by 'BC' in the autopilot status box.

If GS and LOC Mode are armed, the autopilot can only capture the localizer front course, indicated by 'LOC' in the autopilot status box. If only LOC Mode is armed (not GS Mode), the autopilot will capture either the front course or the backcourse based on the angle at which the aircraft intercepts the localizer.

Selecting BC Mode:

1) <u>EXTERNAL NAVIGATOR</u>: Tune and activate the desired LOC frequency.

2) <u>G3X</u>: Ensure that LOC1 is the selected navigation source on the (use the **CDI SRC** Softkey on the PFD or PFD Page to cycle through external navigation sources if necessary). The HSI should automatically slew the needle to the correct course.

3) <u>G3X</u>: From the PFD or PFD Page, press the **HDG/ROLL** Softkey to access the autopilot lateral modes and then press the **AP NAV** Softkey.

Or: Press or the **NAV** Key on the GMC 305

If the aircraft heading is within 75° of the localizer backcourse then BC Mode will be armed. If the aircraft heading is within 105° of the localizer front course, LOC Mode will be armed.

APPROACHES WITH LATERAL + VERTICAL GUIDANCE

Press the **AP APPR** Softkey or **APR** Key (GMC 305) to arm/activate both lateral and vertical modes for approach. When Glidepath (GP) Mode is armed for a GPS approach with vertical guidance, GPS Mode is automatically armed. When Glideslope (GS) Mode armed for an ILS approach, LOC Mode is automatically armed. Press the **AP APPR** Softkey or **APR** Key (GMC 305) when the CDI is greater than one dot to arm the selected modes (annunciated in white). Press the **AP APPR** Softkey or **APR** Key (GMC 305) when the CDI deviation is less than one dot to activate, capture and track the selected navigation source.

Example	Control	Modes	Annunciation	Description
LPV, LNAV/ VNAV, LNAV+V	**APR** Key (GMC 305) or **AP APPR** Softkey	Lateral: GPS	GPS	Captures and tracks the lateral portion of a GPS approach
		Vertical: Glidepath	GP	Captures and tracks a WAAS approach glidepath
LOC, ILS, LDA, SDF	**APR** Key (GMC 305) or **AP APPR** Softkey	Lateral: Localizer	LOC	Captures and tracks the localizer
		Vertical: Glideslope	GS	Captures and tracks the glideslope

Lateral + Vertical Approaches

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GPS APPROACH WITH VERTICAL GUIDANCE

> **NOTE:** *To cancel Glidepath (GP) Mode without cancelling GPS Mode, press the **AP NAV** Softkey once. Pressing it a second time cancels GPS Mode.*

When Glidepath (GP) Mode is armed for a GPS approach with vertical guidance, GPS Mode is automatically armed.

Selecting a GPS approach with vertical guidance:

1) EXTERNAL NAVIGATOR: Ensure a GPS approach with vertical guidance (LPV, LNAV/VNAV, LNAV+V) is loaded into the active flight plan.

2) EXTERNAL NAVIGATOR: Ensure the 'GPS' indication is showing in the lower-left corner. If not, press the CDI Key.

3) G3X: Ensure that GPS1 is the selected navigation source on the PFD or PFD Page (use the **CDI SRC** Softkey to cycle through external navigation sources if necessary).

4) EXTERNAL NAVIGATOR: Select and activate the GPS approach using the PROC Key.

5) G3X: From the PFD or PFD Page, press the **ALT/PTCH** Softkey to access the autopilot pitch modes and then press the **AP APPR** Softkey.

Or Press the **APR** Key on the GMC 305

LOCALIZER WITH GLIDESLOPE

LOC Mode (lateral) and GS Mode (vertical) are both armed by pressing the **ALT/PTCH** Softkey and then the **AP APPR** Softkey from the G3X PFD or by pressing the **APR** Key on the GMC 305. LOC/ILS approach captures are inhibited if the difference between aircraft heading and localizer course exceeds 105˚.

GARMIN.

LOC Mode Active   Glideslope Mode Active

Glideslope Indicator

Selected Navigation Source

ILS Approach PFD

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NOTE: *To cancel Glideslope (GS) Mode without cancelling LOC Mode, press the* ***AP NAV*** *Softkey once. Pressing it a second time cancels LOC Mode.*

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Selecting LOC Mode with GS Mode:

1) <u>EXTERNAL NAVIGATOR</u>: Tune and activate the desired LOC frequency.

2) <u>G3X</u>: Ensure that LOC1 is the selected navigation source (use the **CDI SRC** Softkey on the PFD or PFD Page to cycle through external navigation sources if necessary). The HSI should automatically slew the needle to the correct course.

Selected Navigation Source

CDI Source Softkey

3) <u>G3X</u>: From the PFD or PFD Page, press the **ALT/PTCH** Softkey to access the autopilot pitch modes and then press the **AP APPR** Softkey.

Or: Press the **APR** Key on the GMC 305

This simultaneously selects LOC Mode and GS (Glideslope) Mode. If the localizer deviation is less than half-scale when the **AP APPR** Softkey or **APR** Key is pressed, the autopilot will activate LOC Mode and track the localizer, otherwise LOC Mode is armed and the pilot is responsible for intercepting the localizer.

If the following occurs, the autopilot reverts to Roll Hold Mode (wings rolled level):

- Approach Mode is active and the Navigation source is manually switched

- The localizer signal is lost

If the Glideslope signal is lost , GS Mode will revert to Pitch Hold Mode and hold the last pitch attitude.

COUPLED ILS APPROACH WITH PROCEDURE TURN

✓ **NOTE:** *Configuration of a GNS 430 or GNS 530 is required for a coupled ILS approach.*

The external navigator (GNS 430/530), G3X, and autopilot can be used to fly a full ILS approach with procedure turn, from the enroute environment to the missed approach point.

Setting up a coupled ILS approach:

1) EXTERNAL NAVIGATOR: Ensure the 'GPS' indication is showing in the lower-left corner. If not, use the CDI Key.

2) G3X: Ensure that GPS1 is the selected navigation source on the PFD or PFD Page (use the **CDI SRC** Softkey to cycle through external navigation sources if necessary).

3) EXTERNAL NAVIGATOR: Select and activate the ILS approach using the PROC Key.

4) G3X: From the PFD or PFD Page, press the **HDG/ROLL** Softkey to access the autopilot lateral modes and then press the **AP NAV** Softkey to activate GPS Mode. The autopilot should start navigating to the IAF (Initial Approach Fix).

Or: Press the **NAV** Key on the GMC 305

5) EXTERNAL NAVIGATOR: Tune and identify the localizer frequency by pressing the VLOC Flip-flop Key. (Note: The external navigator should have automatically loaded the localizer frequency into the standby VLOC slot.)

6) G3X: From the PFD or PFD Page, press the **ALT/PTCH** Softkey to access the autopilot pitch modes and then press the **AP APPR** Softkey to arm LOC and GS modes. Press the **AP ALT** Softkey.

Or: Press the **APR** Key on the GMC 305

GPS Mode is now active and LOC Mode is armed in the roll axis. ALT Mode is active and GS is armed in the pitch axis. The autopilot should now navigate the entire approach from the IAF (Initial Approach Fix) to the MAP (Missed Approach Point) with the only adjustment being the throttle.

✓ **NOTE:** *Check step #5 if the external navigator doesn't automatically switch from GPS to VLOC Mode shortly after turning inbound on the final approach course.*

INTERCEPTING AND FLYING A DME ARC

The AFCS will intercept and track a DME arc that is part of the active flight plan provided that GPS Navigation Mode is engaged, GPS is the active navigation source on the CDI, and the DME arc segment is the active flight plan leg. It is important to note that automatic navigation of DME arcs is based on GPS. Thus, even if the APR key is pressed and LOC or VOR Approach Mode is armed prior to reaching the Initial Approach Fix (IAF), Approach Mode will not activate until the arc segment is completed.

If the pilot decides to intercept the arc at a location other than the published IAF (i.e. ATC provides vectors to intercept the arc) and subsequently selects Heading Mode or Roll Mode, the AFCS will not automatically intercept or track the arc unless the pilot activates the arc leg of the flight plan and arms GPS Navigation Mode. The AFCS will not intercept and fly a DME arc before reaching an IAF that defines the beginning of the arc segment. Likewise, if at any point while established on the DME arc the pilot deselects GPS Navigation Mode, the AFCS will no longer track the arc.

LEVEL MODE (GMC 305 ONLY)

Level Mode is coupled pitch and roll modes and is annunciated as both the vertical and lateral modes when active. Pressing the **LVL** Key engages the autopilot in Level vertical and lateral modes. Level Mode does not track altitude or heading. When the **LVL** Key is pressed all armed and active modes are cancelled and the autopilot and flight director revert to LVL mode for pitch and roll. While in level mode, all other modes are available by pressing the corresponding button.

Level (LVL) Mode Active

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AFCS ALERTS

Refer to Section 10.4, 'PFD Annunciations and Alerting Functions'.
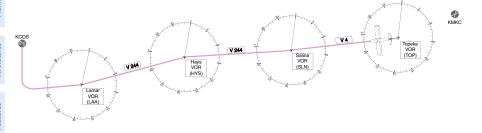
9.4 EXAMPLE AUTOPILOT FLIGHT PLAN

✓ *NOTE: The following example flight plan and diagrams (not to be used for navigation) in this section are for instructional purposes only and should be considered not current. Numbered portions of accompanying diagrams correspond to numbered procedure steps.*

This scenario-based set of procedures (based on an example flight plan from KMKC to KCOS) shows various GMC 305 and Integrate Autopilot interface procedures used during a flight. In this scenario, the aircraft departs Charles B. Wheeler Downtown Airport (KMKC), enroute to Colorado Springs Airport (KCOS). After departure, the aircraft climbs to 12,000 ft and receives vectors to intercept V4.

Airway V4 is flown to Salina VOR (SLN) using VOR navigation, then airway V244 is flown using GPS Navigation. The ILS approach for runway 35L and LPV (WAAS) approach for runway 35R are shown and a missed approach is executed.

Flight Plan Overview

DEPARTURE

Climbing to the Selected Altitude and flying an assigned heading:

1) Before takeoff:

    a) G3X: From the PFD or PFD Page, press the **ALT** Softkey and turn the **FMS** Joystick to set the Selected Altitude to 12,000 feet.

    b) GMC 305 Only: Push the **TO/GA** Button to activate Takeoff Mode. The flight director Command Bars establish a pitch up attitude to follow.

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	TO	↓	TO

c) GMC 305 Only: After takeoff press the **AP** Key to engage the autopilot in a climb, holding the pitch angle commanded in Takeoff Mode and wings level.

AP	TO	↓ TO	ALTS

2) In this example, Vertical Speed Mode is used to capture the Selected Altitude (Pitch Hold, Vertical Speed, or Indicated Airspeed Mode may be used).

   a) GMC 305 Only: Press the **VS** Key to activate Vertical Speed Mode.

   Or: G3X: After takeoff press the **AP VS** Softkey to activate Vertical Speed Mode.

   The Vertical Speed Reference may be adjusted after Vertical Speed Mode is selected using the **NOSE UP/DN** Wheel or **FMS** Joystick.

AP	ROL	↓VS	↑1000ғᴘм

3) G3X: From the PFD or PFD Page, press the **HDG** Softkey (if necessary). The Heading Box is highlighted. Turn the **FMS** Joystick to select the desired heading, and press the **FMS** Joystick, complying with ATC vectors to intercept Airway V4.

   a) GMC 305: Press the **HDG** Key to activate Heading Select Mode while the autopilot is engaged in the climb. The autopilot follows the Selected Heading Bug on the HSI and turns the aircraft to the desired heading.

Or: G3X: From the PFD or PFD Page, press the **HDG/ROLL** Softkey (if necessary). The Heading Box is highlighted. Turn the **FMS** Joystick to select the desired heading, and press the **FMS** Joystick, complying with ATC vectors to intercept Airway V4.

   a) Press the **AP HDG** Softkey to activate Heading Select Mode while the autopilot is engaged in the climb. The autopilot follows the Selected Heading Bug on the HSI and turns the aircraft to the desired heading.

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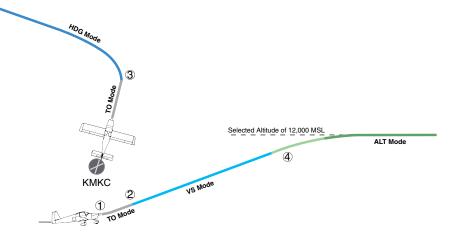
AP | HDG   ▼ VS   ALTS

4) As the aircraft nears the Selected Altitude, the flight director transitions to Selected Altitude Capture Mode, indicated by the green 'ALTS' annunciation flashing for up to 10 seconds.

AP | HDG   ▼ **ALTS** ALT

At 50 feet from the Selected Altitude, the green 'ALT' annunciation flashes for up to 10 seconds; the autopilot transitions to Altitude Hold Mode and levels the aircraft.

AP | HDG   ▼ ALT 12000ꜰᴛ

HDG Mode

③

TO Mode

KMKC

Selected Altitude of 12,000 MSL

ALT Mode

④

① ②

VS Mode

TO Mode

Departure

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INTERCEPTING A VOR RADIAL

During climb-out, the autopilot continues to fly the aircraft in Heading Select Mode. Airway V4 to Salina VOR (SLN) should now be intercepted. Since the enroute flight plan waypoints correspond to VORs, flight director Navigation Mode using either VOR or GPS as the navigation source may be used. In this scenario, VOR Navigation Mode is used for navigation to the first VOR waypoint in the flight plan.

Intercepting a VOR radial:

1) Arm VOR Navigation Mode:

    a) <u>EXTERNAL NAVIGATOR</u>: Tune and activate the desired VOR frequency. If a GTN or GNS series unit is configured, ensure the 'VLOC' indication is showing in the lower-left corner. If not, press the CDI Key.

    b) <u>G3X</u>: Press th**e CDI SRC** Softkey to set the navigation source to VOR.

    c) <u>G3X</u>: From the PFD or PFD Page, press the **VOR CRS** Softkey (or press **XPDR/CRS** > **VOR CRS** if a transponder is configured) and turn the **FMS** Joystick to the desired value, 255°. Note that at this point, the flight director is still in Heading Select Mode and the autopilot continues to fly the Selected Heading, 290°.

    d) <u>GMC 305</u>: Press the **NAV** Key. This arms VOR Navigation Mode and the white 'VOR' annunciation appears to the left of the active lateral mode.

    Or: <u>G3X</u>: Press the **AP NAV** Softkey. This arms VOR Navigation Mode and the white 'VOR' annunciation appears to the left of the active lateral mode.

2) As the aircraft nears the Selected Course, the flight director transitions from Heading Select to VOR Navigation Mode and the 'VOR' annunciation flashes green. The autopilot begins turning to intercept the Selected Course.

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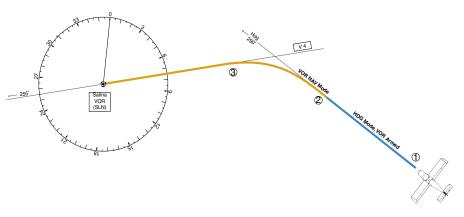
3) The autopilot continues the turn until the aircraft is established on the Selected Course.

Intercepting a VOR Radial

FLYING A FLIGHT PLAN/GPS COURSE

> *NOTE: Changing the navigation source cancels Navigation Mode and causes the flight director to revert back to Roll Hold Mode (wings rolled level).*

As the aircraft closes on Salina VOR, GPS is used to navigate the next leg, airway V244. The aircraft is currently tracking inbound on Airway V4.
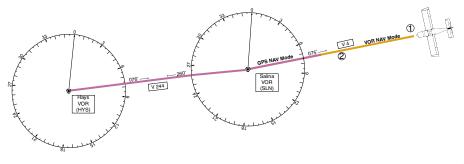
Flying a GPS flight plan:

1) Transition from VOR to GPS Navigation Mode:

    a) <u>G3X</u>: Press the **CDI SRC** Softkey until GPS is the selected navigation source.

    b) <u>GMC 305</u>: Press the **NAV** Key to activate GPS Navigation Mode. The autopilot guides the aircraft along the active flight plan leg.

    Or: <u>G3X</u>: Press the **AP NAV** Softkey to activate GPS Navigation Mode. The autopilot guides the aircraft along the active flight plan leg.

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AP | GPS | ALT 12000ꜰᴛ

2) Following the flight plan, the autopilot continues to steer the aircraft under GPS guidance. Note that in GPS Navigation Mode, course changes defined by the flight plan are automatically made without pilot action required.

Transition to GPS Flight Plan

DESCENT

While flying the arrival procedure, the aircraft is cleared for descent in preparation for the approach to KCOS. Two methods are presented for descent:

- Indicated Airspeed descent (GMC 305 Only)– Indicated Airspeed Mode can be used to descend to the Selected Altitude at a constant airspeed. This descent method does not account for flight plan waypoint altitude constraints.

- VNAV descent – VNAV Mode is used to follow the vertical descent path defined in the GPS flight plan. Altitude constraints correspond to waypoints in the flight plan.

Indicated Airspeed descent (GMC 305 Only):

1) Select Indicated Airspeed Mode:

a) G3X: From the PFD or PFD Page, press the **ALT** Softkey and turn the **FMS** Joystick to set the Selected Altitude to 10,000 feet.

b) GMC 305: Press the **IAS** Key to activate Indicated Airspeed Mode. The annunciation 'IAS' appears next to the Airspeed Reference, which defaults to the current aircraft airspeed. Selected Altitude Capture Mode is armed automatically.

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AP | GPS   ↓ IAS 130ᴋᴛ
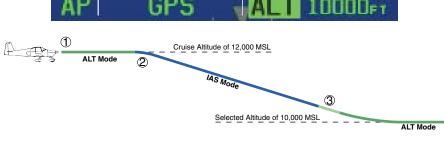
AP | GPS   ↓ IAS ALTS

2) Use the **NOSE UP/DN** Wheel or **FMS** Joystick to adjust the commanded airspeed while maintaining the same power, or reduce power to allow descent in Indicated Airspeed Mode while the autopilot maintains the current airspeed.

3) As the aircraft nears the Selected Altitude, the flight director transitions to Selected Altitude Capture Mode, indicated by the green 'ALTS' annunciation flashing for up to 10 seconds.

AP | GPS   ↓ **ALTS** ALT

The green 'ALT' annunciation flashes for up to 10 seconds upon reaching 50 feet from the Selected Altitude; the autopilot transitions to Altitude Hold Mode and levels the aircraft.

AP | GPS   ↓ **ALT** 10000ꜰᴛ

①
ALT Mode   Cruise Altitude of 12,000 MSL
②
IAS Mode
③
Selected Altitude of 10,000 MSL
ALT Mode

IAS Descent

VNAV descent to VNAV Target Altitude:

1) Select VNAV flight control:

a) <u>GMC 305</u>: Press the **VNV** Key to arm VNV Mode. The white annunciation 'VNAV' appears.

Or: <u>G3X</u>: Press the **AP VNAV** Softkey to arm Vertical Path Tracking Mode. The white annunciation 'VNAV' appears.

AP | GPS | ALT VNAV

b) G3X: From the PFD or PFD Page, press the **ALT** Softkey and turn the **FMS** Joystick to set the Selected Altitude to the flight plan's VNAV Target Altitude of 10,000 feet.

Or: G3X: From the PFD or PFD Page, press the **ALT/PTCH** Softkey and turn the **FMS** Joystick to set the Selected Altitude below the flight plan's VNAV Target Altitude of 10,000 feet.

If the Selected Altitude is not at least 75 ft below the VNAV Target Altitude, the flight director captures the Selected Altitude rather than the VNV Target Altitude once Vertical Path Tracking Mode becomes active (ALTS is armed rather than ALTV). If no altitude select value has been entered in the altitude select window, VNAV will flash white one minute prior to descent and the VNAV profile will not be captured.

2) When the top of descent (TOD) is reached, the flight director transitions to VNAV Mode and begins the descent to the VNAV Target Altitude. Intention to capture the VNAV Target Altitude is indicated by the white 'ALTV' annunciation.

AP | GPS | VNAV ALTV

3) As the aircraft nears the VNV Target Altitude, the flight director transitions to VNV Target Altitude Capture Mode, indicated by the green 'ALTV' annunciation flashing for up to 10 seconds.

AP | GPS | ALTV ALT

The green 'ALT' annunciation flashes for up to 10 seconds upon reaching 50 feet from the VNV Target Altitude; the autopilot transitions to Altitude Hold Mode and levels the aircraft at the vertical waypoint.

AP | GPS | ALT 10000ʀᴛ

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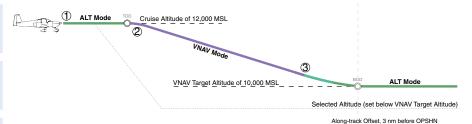
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VNAV Descent

APPROACH

Expecting vectors for ILS approach into KCOS

> **NOTE:** If an approach contains a DME arc, the arc must be flown in Navigation Mode with the GFC 3X. When receiving vectors from ATC, Navigation Mode must be selected prior to intercepting the ARC.

Flying an ILS approach:

1) Transition from GPS Navigation Mode to Heading Select Mode.

   a) <u>EXTERNAL NAVIGATOR</u>: Tune and activate the desired localizer frequency.

   b) <u>EXTERNAL NAVIGATOR</u>: Select the Runway 35L ILS approach for KCOS and select 'VECTORS' for the transition. Load and activate the approach into the flight plan.

   c) <u>G3X</u>: From the PFD or PFD Page, press the **HDG** Softkey (if necessary). The Heading Box is highlighted. Turn the **FMS** Joystick to select the desired heading, and press the **FMS** Joystick, to complying with ATC vectors.

   d) <u>GMC 305</u>: Press the **HDG** Key. The autopilot turns the aircraft to the desired heading.

   Or: <u>G3X</u>: Press the **AP HDG** Softkey. The autopilot turns the aircraft to the desired heading.

   e) Use Heading Select Mode to comply with ATC vectors as requested.

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```
AP|     HDG   | ALT  8100FT
```

2) Arm LOC Approach and Glideslope modes.

    a) <u>EXTERNAL NAVIGATOR</u>: Ensure the appropriate localizer frequency is tuned.

    b) <u>GMC 305</u>: Press the **APR** Key when cleared for approach to arm Approach and Glideslope modes. 'LOC' and 'GS' appear in white as armed mode annunciations.

    Or: Press the **AP APPR** Softkey when cleared for approach to arm Approach and Glideslope modes. 'LOC' and 'GS' appear in white as armed mode annunciations.

```
AP| LOC HDG | ALT   GS
```
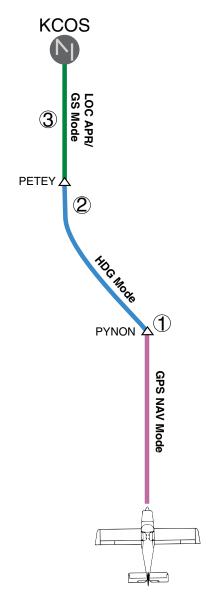
    c) The navigation source automatically switches to LOC. After this switch occurs, the localizer signal can be captured and the flight director determines when to begin the turn to intercept the final approach course. The flight director now provides guidance to the missed approach point.

```
AP|    LOC    |     GS
```

3) There are two options available at this point, as the autopilot flies the ILS approach:

- Push the **AP DISC** Button at the decision height and land the aircraft.
- Use the **TO/GA** Button (GMC 305 only) to execute a missed approach and apply TO/GA power.
- Push the **AP DISC** Button at the decision height to execute a missed approach and apply go-around power.

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KCOS

③ LOC APR/ GS Mode

PETEY

② HDG Mode

PYNON ①

GPS NAV Mode

ILS Approach to KCOS

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Flying a RNAV GPS approach with vertical guidance (SBAS Only):

1) Arm flight director modes for a RNAV GPS approach with vertical guidance:

    a) <u>G3X</u>: Press the **CDI SRC** Softkey until GPS is the selected navigation source.

    b) <u>EXTERNAL NAVIGATOR</u>: Select the Runway 35R LPV approach for KCOS. Load and activate the approach into the flight plan.

2) <u>GMC 305</u>: Press the **APR** Key once clearance for approach has been received. GPS Approach Mode is activated and Glidepath Mode is armed.

Or: Press the **AP APPR** Softkey once clearance for approach has been received. GPS Approach Mode is activated and Glidepath Mode is armed.

3) Once the glidepath is captured, Glidepath Mode becomes active. The flight director now provides guidance to the missed approach point.

4) There are two options available at this point, as the autopilot flies the approach:

- Push the **AP DISC** Button at the decision height and land the aircraft.
- Use the **TO/GA** Button (GMC 305 only) to execute a missed approach and apply TO/GA power.
- Push the **AP DISC** Button at the decision height to execute a missed approach and apply go-around power.

KCOS

④

CEGIX — **GPS APR/ GP Mode**

③

② FALUR — △ HABUK

PYNON △ ①

GPS NAV Mode
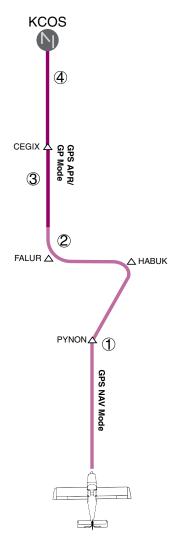
LPV Approach to KCOS

GO AROUND/MISSED APPROACH

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Flying a missed approach:

1) Push the **TO/GA** (if installed) Button at the Decision height and apply go-around power to execute a missed approach. The flight director Command Bars establish a nose-up climb to follow.

> **AP | GA   ↓ GA ALTS**

2) Start the climb to the prescribed altitude in the published Missed Approach Procedure (in this case, 10,000 ft).

GMC 305: Press the **NAV** Key to have the autopilot fly to the hold. (Only available if a GTN is configured)

G3X: Press the **AP NAV** Softkey to have the autopilot fly the hold.

> **AP | GPS   ↓ GA ALTS**

3) From the PFD or PFD Page, press the **ALT** Softkey and turn the **FMS** Joystick to set a Selected Altitude to hold.

To hold the current airspeed during the climb, press the **IAS** Key.

Or: Use an alternate vertical mode such as vertical speed on the integrate autopilot interface.

> **AP | GPS   ↓ IAS 130ᴋᴛ**

As the aircraft nears the Selected Altitude, the flight director transitions to Selected Altitude Capture Mode, indicated by the green 'ALTS' annunciation flashing for up to 10 seconds.

> **AP | GPS   ↓ ALTS ALT**

The green 'ALT' annunciation flashes for up to 10 seconds upon reaching 50 feet from the Selected Altitude; the autopilot transitions to Altitude Hold Mode and levels the aircraft.
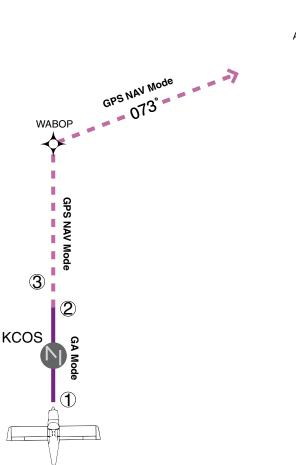
AP | GPS ▼ ALT 10000 Ft

4) The autopilot flies the holding pattern after the missed approach is activated.

④ ADANE

GPS NAV Mode 073°

WABOP

GPS NAV Mode

③

②

KCOS GA Mode

①

Go Around/Missed Approach

SECTION 10 ANNUNCIATIONS & ALERTS

10.1 MISCELLANEOUS MESSAGE ADVISORIES

Message	Comments
Approaching Target Altitude	Within 200 feet of final VNAV target altitude.
Approaching VNAV Profile	The aircraft is within one minute of reaching the initial VNAV decent point.
Arriving at XXX	The aircraft is nearing the destination.
Can't Unlock Maps	No applicable unlock code for one or more maps was found. All MapSource maps are not accessible.
Database Error	Internal problem with the system. Contact your dealer or Garmin Product Support to have the unit repaired.
Fuel Tank	A reminder for switching fuel tanks. The reminder message repeats at the specified interval after the beginning of each trip.
Lost Satellite Reception	The system is unable to receive satellite signals.
Memory Full	System memory is full, no further data can be saved.
Proximity Alarm XXXXX	You have reached the distance set for a proximity waypoint.
Next DTK XXX	The aircraft is nearing a turn in a route.
No XM Signal	The XM antenna is not receiving a signal.
Proximity Alarm Memory Full	No additional proximity waypoints can be saved.
Proximity Waypoints Overlap	The radius of two proximity waypoints overlap.
Route Already Exists	A route name that already exists has been entered.
Route Memory Full	No additional routes can be saved.
Route Truncated	Uploaded route from another device has more than 300 waypoints.
Route Waypoint Memory Full	No additional route waypoints can be saved.
Saving XM Program Information	An XM Radio channel lineup change has occurred and the unit is saving the channel lineup to memory.

Message	Comments
Steep Turn Ahead	Approaching a turn that requires a bank angle in excess of 25 degrees to stay on course.
Track Already Exists	A saved track with the same name already exists.
Track Log Full	The track log is full and track recording was turned off. To record more track points, you need to clear the track log and turn track recording on.
Track Memory Full	No more track data can be stored. Delete the old track data to store the new data.
Track Truncated	A complete uploaded track will not fit in memory. The oldest track log points have been deleted.
Transfer Complete	Data transfer was completed.
VNAV Cancelled	VNAV function has been cancelled due to a change in the active route.
Waypoint Already Exists	A waypoint with the same name already exists.
Waypoint Memory Full	The unit has stored the maximum number of waypoints.

Miscellaneous Message Advisories

AIRSPACE MESSAGES

Message	Comments
Inside Airspace	Inside the boundaries of the airspace.
Airspace Near and Ahead	Within two nautical miles of an airspace and your current course takes you inside the airspace.
Airspace Ahead, Within 10 Minutes	The projected course takes you inside an airspace within the next 10 minutes or less.
Airspace Near, Within 2 nm	Within two nautical miles of an airspace but not projected to enter it.
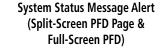
10.2 SYSTEM STATUS MESSAGES (INFO PAGE)

The 'INFO' Page on the Navigation Bar will flash yellow if there is a System Status Message (split-screen and full-screen MFD).

A yellow **MSG** (Message) alert will flash in the bottom right corner of the split-screen PFD Page or full-screen PFD to alert the pilot of System Status Messages on the **INFO** Page.

System Status Message Alert (Split-Screen PFD Page & Full-Screen PFD)
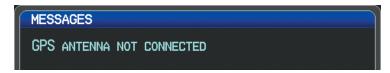
System Status Message Alert (Split-Screen and Full-Screen MFD)

Accessing the Info Page system status messages:

1) When the 'INFO' Page on the Page Navigation Bar is flashing, use the **FMS** Joystick to access the Info Page.

2) Press the yellow **MESSAGES** Softkey. The Messages Page is displayed.

System Status Message Alert (Info Page) (Split-Screen)

Messages Page (Split-Screen)

3) To return to the Info Page, press the **FMS** Joystick, **CLR** Key, or **EXIT** Softkey. The Info Page will stop flashing, but remain yellow until the message is resolved.

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The following system status messages may appear on the Info Page.

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Message	Comments
[LRU name] hardware fault	The specifice LRU has a hardware fault and requires service.
Config module error	The GDU has encountered a problem writing to/from the config module The G3X system should be serviced.
Config module missing	The PFD1 config module is not connected.
[LRU name] using backup RS-232 interface	The specified LRU was wired for both CAN and RS-232 communication paths, and the device is not communicating via CAN.
[LRU name] temperature out of spec	The specified LRU is either too hot or too cold. Check installation and/or hardware for cause.
[LRU name] power supply fault	The specified LRU's internal power supply has a problem or the input voltage is out of the required specifications.
AHRS [number] not calibrated	The specified AHRS is either not calibrated or requires the post installation calibration procedure. See G3X installation manual for calibration instructions.
AHRS [number] magnetometer not calibrated	The specified AHRS is either not calibrated or requires the magnetometer post installation calibration procedure. See G3X installation manual for calibration instructions.
AHRS [number] not receiving magnetometer data	The specified AHRS is not receiving magnetometer data. Check installation and configuration.
AHRS [number] not receiving air data	The specified AHRS is not receiving air data. Check installation and configuration.
AHRS [number] not receiving GPS data	The specified AHRS is not receiving any or any useful GPS information. Check installation and configuration.

Message	Comments
AHRS [number] magnetic anomaly - check mag installation	An anomaly has been detected in the magnetometer data. Heading may or may not be flagged invalid.
AHRS [number] magnetic field model invalid	The data being communicated by the GMU to the specified AHRS is invalid. Heading is flagged invalid and the AHRS will use GPS for backup mode operation.
AHRS [number] model out of date	The specified AHRS Earth magnetic field model is out of date. Update magnetic field model when practical.
Network communication error	Two or more LRUs may have the same network address. Check wiring and configuration.
[LRU name] Network address changed	One or more LRUs on the CAN bus have an indeterminate network address. This likely indicates a wiring issue or an intermittent connector pin. If the problem persists, the G3X system should be serviced.
[GDU name] software version mismatch	The PFD and MFD do not have the same software version installed. Display crosstalk is disabled. Ensure all installed display software matches.
[GDU name] obstacle database mismatch	The PFD and MFD have different obstacle database versions installed. Install the correct obstacle database on all displays for proper terrain/obstacle alerting.
[GDU name] obstacle database missing	The obstacle database is missing. Install the correct obstacle database on all displays for proper terrain/obstacle alerting.
[GDU name] terrain database mismatch	The PFD and MFD have different terrain database versions installed. Install the correct terrain database on all displays for proper terrain/obstacle alerting.

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Message	Comments
[GDU name] terrain database missing	The terrain database is missing. Install the correct terrain database on all displays for proper terrain/obstacle alerting.
[GDU name] navigation database mismatch	The PFD and MFD have different navigation database versions installed. Install the correct navigation database on all displays for proper navigation.
[GDU name] navigation database missing	The navigation database is missing. Install the correct navigation database on all displays for proper navigation.
[GDU name] audio database missing.	The audio database is missing. Return unit for service
[GDU name] audio database incompatible	The audio database is incompatible. Return unit for service
Using external GPS position data	The display that is configured for a GPS antenna connection is not available; the remaining displays are using 2D GPS position data from an external GPS navigator.
[GDU name] GPS antenna not connected	The display that is configured for a GPS antenna connection does not detect any antenna current draw from the GPS antenna RF connector.
[GDU name] GPS antenna shorted to ground	The display that is configured for a GPS antenna connection detects the GPS antenna RF connector is shorted to ground.
[GDU name] GPS receiver needs service	The internal GPS receiver in the specified GDU is not responding. The affected GDU should be serviced.
XM receiver needs service	The display should be serviced when possible.
Not receiving external GPS [number] RS-232 Aviation data	Not receiving RS-232 data from the specified external GPS navigator.
Not receiving GTX TIS-A RS-232 data	Not receiving RS-232 data from the GTX.

Message	Comments
Not receiving nav/comm [number] RS-232 data	Not receiving RS-232 data from the nav/comm.
Not receiving autopilot RS-232 data	Not receiving RS-232 data from the external third-party autopilot unit.
Autopilot fault detected	The third-party autopilot unit is reporting a fault and needs service.
VHF nav/comm communication error	Incorrect OBS value received from nav/comm. Check nav/comm OBS resolver setup (see Installation Manual guidance).
Not receiving ARINC 429 [port number] data	Data is not being received on the specified GSU 73 ARINC 429 input (port number can be 1-4).
ARINC 429 receiver error	Data received on an ARINC 429 input does not match the expected configuration.
Not receiving Vertical Power RS-232 data	Not receiving RS-232 data from the Vertical Power unit.
Using internal flight plan for navigation	Communication with the external GPS navigation source has failed. The G3X internal flight plan is being used for navigation.
Aviation waypoint was deleted	A waypoint that was part of a stored flight plan was deleted from the latest navigation database. Check stored flight plans
Aviation waypoint has moved	A waypoint that was part of a stored flight plan was moved. Check stored flight plans.
Demo Mode - Do not use for navigation	The system is in demo mode, do not use for navigation.

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10.3 AUDIO ALERTS

VOICE ALERTS

- "Five Hundred"—when the aircraft descends through 500 feet above the destination airport.

The following voice terrain alerts are issued when flight conditions meet parameters that are set within the software algorithms, and are dependent on the sensitivity level set in the Terrain Setup Menu.

Alert Severity	Terrain	Obstacle	Descent Rate
Caution	"caution, terrain" "caution, terrain ahead"	"caution, obstacle" "caution, obstacle ahead"	"caution, sink rate"
Warning	"terrain ahead! pull up!" "terrain! terrain! pull up! pull up!"	"obstacle ahead! pull up!" "obstacle! obstacle! pull up! pull up!"	"sink rate, pull up!" "pull up!"

Voice Alerts Summary

AOA AURAL ALERT

When a G3X is configured with a GSU 25, a GAP 26 and AOA is configured. The G3X will issue an aural alert when the aircraft's pitch attitude approaches a stall. A persistent beeping will begin at the first red chevron and will become progressively faster as the AOA is increased. A constant tone will be heard at the second red chevron indicating a stall condition.

Stall Warning
AOA (Flashes)
(Constant
Aural Tone)

Aural Beeping
begins

Angle of Attack Display (AOA)

10.4 PFD ANNUNCIATIONS AND ALERTING FUNCTIONS

The following annunciations and alerting functions are displayed on the PFD.
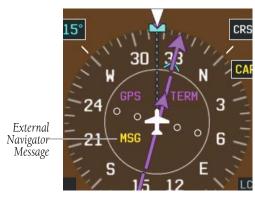
UNCERTAIN HEADING

If the G3X senses that the magnetic heading measurement is valid, but possibly outside of the internal accuracy limits, the numeric heading value on the PFD is display in yellow. When the system heading is uncertain, features that use heading data may not be available (e.g., autopilot HDG mode or PFD wind calculations). An uncertain heading value can be caused by magnetic anomalies or installation/calibration issues. Refer to the G3X installation manual for installation and calibration information for the magnetometer

Uncertain Heading

EXTERNAL NAVIGATOR MESSAGES (OPTIONAL)

When an external navigator has a pending message, a yellow 'MSG' annunciation will appear in the bottom left quadrant of the HSI.

External Navigator Message

External Navigator Messages (HSI)

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CAS MESSAGES (OPTIONAL)

The CAS messages displayed depend upon the current configuration, and will vary from the examples listed below. Refer to the G3X Installation Manual for more information on configuring CAS messages (if applicable).

CAS Messages are grouped by criticality (warning, caution, advisory, and safe):

- **WARNING (red):** Requires immediate attention. Warning messages will flash until acknowledged by pressing the **ENT** Key.

- **CAUTION (yellow)**: Requires pilot awareness and possible future corrective action.

- **ADVISORY (white):** Provides general information.

- **SAFE (green):** Indicates a safe condition (i.e., GEAR DOWN).

Warning annunciation text is shown in red in the CAS Annunciation Window on the full-screen PFD and/or split-screen PFD Page.

CAS Messages will appear to the right of the Horizontal Situation Indicator (dependent on number of CAS messages configured) on the full screen PFD and/or the split-screen PFD Page.

CAS Warning Example

Important CAS Messages my not be visible at all times (e.g., split-screen PFD Page is not displayed, or FPL or NRST Pages are displayed on the full-screen PFD). In that case
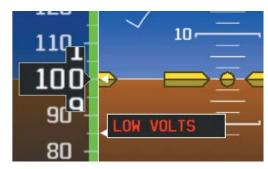
a Check Alerts Triangle is displayed to the right of the Airspeed Indicator as a reminder to check the CAS Messages.

CAS Warning Example (Check Alerts Triangle)

If less than four CAS Messages are configured for the system, the CAS Messages are displayed to the right of the Airspeed Indicator and the Check Alerts Triangle is not displayed.

CAS Warning Example

TERRAIN ANNUNCIATIONS

In addition to the Terrain Pop-up Alert in the lower left corner of the page, terrain and obstacle annunciations appear on the PFD and/or PFD Page in the upper left corner of the Attitude Indicator. Refer to the Hazard Avoidance Section for more details.

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Terrain Pop-up Alert

Terrain Alerts
(PFD and/or PFD Page)

TRAFFIC ANNUNCIATIONS

The G3X displays traffic symbolically on the Map Page, and the Traffic Warning Window (Inset Map) in the lower left corner of the display(s). Refer to the Hazard Avoidance Section and the Annunciations and Alerts section for more details.

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Inset Map (Traffic Warning Window)

Traffic Alerts

AHRS ALERTS (OPTIONAL)

MISCOMPARE

Critical values generated by redundant sensors are monitored by comparators. If differences in the sensors exceed a specified amount, the Comparator Window appears in the lower right corner of the PFD and the discrepancy is annunciated in the Comparator Window as a 'MISCOMP' (miscompare). If one or both of the sensed values are unavailable, it will be annunciated as a 'NO COMP' (no compare).

Comparator Window

Reversionary sensor selection is annunciated in a window on the right side of the PFD. These annunciations reflect reversionary sensors selected on the PFD. Pressing the **Menu** Key while on the PFD page accesses the PFD Setup page, select the Sensors Softkey, turn the FMS Joystick to select the desired ADAHRS source (**AUTO**, **ADAHRS1**, **ADAHRS2, or ADAHRS3)** softkeys. This allows for manual switching of the ADAHRS sensors being viewed on the PFD. The GPS sensor cannot be switched manually.

Reversionary Sensor Window

If an 'AP MISCOMP' annunciation is displayed in the comparator window the System will select the operating ADAHRS and the following message (e.g., 'USING AHRS2') appears in the reversionary sensor window. When the 'AP MISCOMP' annunciation appears, the pilot must then select the AHRS being used by the System (in this case AHRS2) and re-engage the autopilot. If ADAHRS1 is selected as the operating ADAHRS no annunciation will appear in the reversionary sensor window and the pilot can re-engage the autopilot.

AFCS ALERTS (OPTIONAL)

AFCS Alerts

STATUS ALERTS

If the commanded operation cannot be achieved due to the limitations configured, the following messages can be displayed over the pitch ladder. The annunciation is removed once the condition is resolved.

Alert Condition	Annunciation	Description
Up-elevator Trim Required	↑ TRIM UP ↑	The autopilot does not have the required elevator authority to reach the desired flight condition.
Down-elevator Trim Required	↓ TRIM DOWN ↓	

Status Alerts

The following messages are displayed in the G3X Autopilot Status Box.

Alert Condition	Annunciation	Description
Autopilot Failure	AP	Autopilot inoperative
Manual Autopilot Disengagement	AP	Autopilot Disengaged
Yaw Damper Failure	YD	Yaw Damper inoperative
Yaw Damper Manual Disengagement	YD	Yaw Damper Disengaged
Flight Director and Autopilot Failure	AFCS	Flight Director and Autopilot inoperative
Autopilot Failure		Autopilot inoperative, Flight Director operative (GMC 305 only)

AFCS System Alerts

SPEED ALERTS

If the remote autopilot unit supports speed alerts and the airspeed limitations configured have been reached, the following messages can be displayed over the pitch ladder. The annunciation is removed once the condition is resolved.

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Alert Condition	Annunciation	Description
High speed Protection	**MAX SPEED**	Autopilot unit will raise the nose to limit the aircraft's speed.
Low speed Protection	**MIN SPEED**	Autopilot unit will lower the nose to prevent the aircraft's speed from decreasing.

Speed Alerts

AFCS AURAL ALERT

Manual disengagement of the autopilot is indicated by a five-second flashing yellow 'AP' annunciation and an aural (bee-boop) alert. Cancel the aural alert by pressing and releasing the **AP/CWS** Button again (GSA 28 autopilot only)

VERTICAL POWER FAULT INDICATIONS

Device Fault	Description
OVER VOLTAGE	Voltage too high (only appears for alternator devices).
OVER CURRENT	Device current too high.
NO CURRENT	Device not drawing current (possible open circuit.
SHORT CIRCUIT	Short circuit detected.
RUNAWAY	Flap or trim runaway condition detected.
SWITCH DISABLED	Flap or trim switch disabled.
FAULT CODE XX	XX indicates an internal VP-X fault code (consult Vertical Power for details).
ERROR	Unable to clear fault or other error occurred.

Device Faults

SECTION 11 APPENDICES

APPENDIX A: DATA FIELD OPTIONS

DATA BAR FIELD OPTIONS

Data Bar Field	Definition
BRG - Bearing to Waypoint	The compass direction from the present position to the next waypoint.
CLG - Climb Gradient (Percent)	Current climb gradient (climb rate divided by groundspeed) in percent.
CLM - Climb Gradient (ALT/NM)	Current climb gradient (climb rate divided by groundspeed) in altitude per nautical mile.
DA - Density Altitude	Pressure Altitude adjusted for non-standard temperature.
DST - Distance to Waypoint	The distance to the next waypoint in the Active Flight Plan.
DTK - Desired Track	The desired course between the active "from" and "to" waypoints.
ECO - Fuel Economy	This value is calculated by dividing the current ground speed by the current fuel flow.
EDR - Fuel Endurance	This value is obtained by dividing the amount of fuel on board by the current fuel flow (endurance to empty - no reserve included).
ESA - 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.
ETA - Estimated Time of Arrival	The estimated time at which the aircraft should reach the next waypoint, based upon current ground speed and track.
ETE - Estimated Time En Route	The estimated time it takes to reach the next waypoint from the present position, based upon current ground speed.

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DATA BAR FIELD OPTIONS (CONT.)

Data Bar Field	Definition
FLT - Flight Time	The total time in flight.
FF - Fuel Flow	The current fuel flow.
G - G-Meter	The amount of positive or negative G's.
GS - Ground Speed	The velocity that the aircraft is traveling relative to a ground position.
LCL - Time of Day (Local)	The current time and date in 12-hour or 24-hour format.
MACH - Mach Number	A unit of speed that measures the ratio of the speed of an airplane to the speed of sound in the same atmospheric conditions.
MSA - Minimum Safe Altitude	Uses Grid MORAs to determine a safe altitude within ten miles of the aircraft's present position.
REM - Fuel Remaining	The current fuel remaining (gal) adjusted for fuel burn and based on fuel flow.
TRK - Ground Track	Direction of aircraft movement relative to a ground position.
USD - Fuel Used	The quantity of fuel used (gal) based on fuel flow.
UTC - Time	The current time and date in Universal (UTC) time.
VSR - Vertical Speed Required	The vertical speed necessary to descend/climb from the current position and altitude to the previously selected VNAV position and altitude, based upon current ground speed.
WPT - Next Waypoint	The next waypoint in the flight plan or direct-to route.
XTK - Crosstrack Error	The distance the aircraft is from a desired course in either direction, left or right.

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INFO PAGE DATA FIELD OPTIONS (FULL-SCREEN)

Info Page Data Field Option	Definition
Accuracy	The current accuracy of the GPS determined location.
Altitude (GPS ALT)	The current altitude in geometric height above Mean Sea Level (MSL).
Bearing (BRG)	The compass direction from the present position to a destination waypoint.
Climb Gradient (Percent) (CLG)	Current climb gradient in (climb rate divided by groundspeed) in percent.
Climb Gradient (ALT/NM) (CLM)	Current climb gradient (climb rate divided by groundspeed) in altitude per nautical mile.
Course to Steer (CTS)	The recommended direction to steer in order to reduce cross-track error and return to the course line.
Crosstrack Error (XTK)	The distance the aircraft is off a desired course in either direction, left or right.
Density Altitude (DENSITY ALT)	Pressure Altitude adjusted for non-standard temperature.
Desired Track (DTK)	The desired course between the active "from" and "to" waypoints.
Distance (Destination) (DIST DEST)	The distance to the destination waypoint in the Active Flight Plan.
Distance (Next) (DIST NEXT)	The distance to the next waypoint in the Active Flight Plan.
En Route Safe Altitude (ESA)	The recommended minimum altitude within ten miles left or right of the desired course on a active flight plan or direct-to.
Estimated Time En Route (Destination) (ETE DEST)	The estimated time it takes to reach the destination waypoint from the present position, based upon current ground speed.

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INFO PAGE DATA FIELD OPTIONS (FULL-SCREEN) (CONT.)

Info Page Data Field Option	Definition
Estimated Time En Route (Next) (ETE NEXT)	The estimated time it takes to reach the next waypoint form the present position, based upon current ground speed.
Estimated Time of Arrival (Destination) (ETA DEST)	The estimated time at which the aircraft should reach the destination waypoint, based upon current speed and track.
Estimated Time of Arrival (Next) (ETA NEXT)	The estimated time at which the aircraft should reach the next waypoint, based upon current speed and track.
Estimated Time to VNAV (VNAV TIME)	The estimated time it takes to reach the VNAV waypoint form the present position, based upon current ground speed.
Flight Timer (FLT TIMER)	Total time in-flight (HH:MM).
Fuel Economy (ECONOMY)	Current Mile Per Gallon (MPG), based upon ground speed and fuel flow.
Fuel Endurance (ENDURANCE)	This value is obtained by dividing the amount of fuel on board by the current fuel flow (endurance to empty - no reserve included).
Fuel Flow (FUEL FLOW)	The current fuel flow.
Fuel Remaining (FUEL REM)	The current fuel remaining (gal) adjusted for fuel burn and based on fuel flow.
Fuel Tank Timer (FUEL TIMER)	Elapsed time since the Fuel Tank Reminder Alarm was last issued (HH:MM).
Fuel Used (FUEL USED)	The quantity of fuel used (gal) based on fuel flow.
Glide Ratio (G/R)	The estimated distance an aircraft will move forward for any given amount of lost altitude.
Ground Speed	The velocity that the aircraft is traveling relative to a ground position.
Ground Track (TRK)	The direction of aircraft movement relative to a ground position.

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INFO PAGE DATA FIELD OPTIONS (FULL-SCREEN) (CONT.)

Info Page Data Field Option	Definition
Mach Number (MACH)	A unit of speed that measures the ratio of the speed of an airplane to the speed of sound in the same atmospheric conditions.
Minimum Safe Altitude (MSA)	Uses Grid MORAs to determine a safe altitude within ten miles of the aircraft's present position.
Next Waypoint	The next waypoint in the flight plan or direct-to route.
Sunrise	The time at which the sun rises on this day (current location).
Sunset	The time at which the sun sets on this day (current location).
Time (UTC)	The current time and date in Universal (UTC) time.
Time of Day (Local)	The current time and date in 12-hour or 24-hour format.
Vertical Speed (VS)	The rate of climb or descent (GPS-derived).
Vertical Speed Required (VSR)	The vertical speed necessary to descend/climb from the current position and altitude to the previously selected VNAV position and altitude, based upon current ground speed.
Weather (Altimeter) (WX ALTIM)	The altimeter setting at the nearest METAR reporting station.
Weather (Dew Point) (WX DEW PT)	The dew point at the nearest weather reporting station.
Weather (Rel. Humidity) (WX HUMIDITY)	The relative humidity at the nearest weather reporting station.
Weather (Temperature) (WX TEMP)	The temperature at the nearest weather reporting station.
Weather (Wind) (WX WIND)	The wind speed and direction at the nearest weather reporting station.

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> *NOTE: The Flight Log option is not available from the full-screen PFD Main Menu.*

FLIGHT LOG

The Flight Log shows a list of any recorded flights, including date, route of flight, and flight time. The G3X saves up to 50 recorded flights. Entries on this list are automatically created for each flight.

Recording begins when the aircraft reaches 250 feet of altitude. When the aircraft's groundspeed drops below 30 knots, the flight entry is saved and a new entry is recorded when departing the airport. A touch-and-go or brief stop of less than 10 minutes appends to the current flight record, rather than starting a new entry.

VIEWING THE FLIGHT LOG

Select any listed entry in the log to view additional information, including a map displaying the actual path flown.

Viewing details for a flight:

1) From the split-screen or full-screen MFD, press the **MENU** Key twice to display the Main Menu. (The 'Flight Log' option is not available from the full-screen PFD Main Menu).

2) Turn or move the **FMS** Joystick to select 'Flight Log', and press the **ENT** Key. (Hours and minutes can be displayed by pressing the **MENU** Key and selecting 'Show Hours and Minutes').

3) Turn or move the **FMS** Joystick to select the desired flight from the list, and press the **ENT** Key. Route, date, hours, distance, and actual flight path is displayed (full-screen). Use the **MAP** and **INFO** Softkeys to toggle between the Flight Log Map Page and the Flight Log Information Page (split-screen).

4) With 'Done' selected, press the **ENT** Key to return to the previous page.

Flight Log List (Split-Screen)

**Flight Log Information
(Split-Screen)**

**Flight Log Map
(Split-Screen)**

DELETING FLIGHT RECORDS

You can delete the highlighted flight record or delete all flight records from the Flight Log.

Deleting flight records:
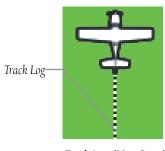
1) From the split-screen and/or full-screen MFD, press the **MENU** Key twice to display the Main Menu. (The 'Flight Log' option is not available from the full-screen PFD Main Menu).

2) Turn or move the **FMS** Joystick to select 'Flight Log', and press the **ENT** Key.

3) Select the desired flight (if applicable), and press the **MENU** Key.

4) Turn or move the **FMS** Joystick to select 'Delete Flight' or 'Delete All', and press the **ENT** Key.

TRACK LOG

NOTE: The Track Log option is not available from the full-screen PFD Main Menu.

The G3X draws an electronic breadcrumb trail or "track log" on the Map Page. The track log contains points along its path, including time and location for each point.

Track Log (Map Page)

The track log starts recording as soon as the G3X gets a location fix. For the best results, clear the track log before each flight. When the track log is full, new track points overwrite the oldest track points (if set to 'Wrap' in the Track Log Settings).

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The percentage of memory used by the current track log appears at the top of the Track Log Window. After the track log is cleared, it shows zero percent. When the screen reaches 100%, the most recent track points start to overwrite the least recent track points (if 'Wrap' is selected in the Record Mode Field). To avoid losing track points, save the track log when it approaches the 99% mark.

The Save feature allows storage of up to 15 track logs.

Displaying/removing the track log on the Map Page:

1) From the Map Page, press the **MENU** Key. The Map Page Menu is displayed. (The 'Track Log' option is not available from the full-screen PFD Main Menu).

2) Turn or move the **FMS** Joystick to select 'Set Up Map' from the Map Page Menu, and press the **ENT** Key.

3) Turn the **FMS** Joystick to highlight the 'Line' options from the horizontal list.

4) Move the **FMS** Joystick to highlight the 'Track Log' field.

5) Turn the **FMS** Joystick to select 'On' or 'Off', and press the **ENT** Key.

6) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the Map Page.

Map Page Menu (Split-Screen)

Map Setup Page

Changing track log settings:

1) From the split-screen or full-screen MFD, press the **MENU** Key twice. (The 'Track Log' option is not available from the full-screen PFD Main Menu).

2) Turn or move the **FMS** Joystick to select 'Track Log' from the Main Menu, and press the **ENT** Key.

3) Move the **FMS** Joystick to highlight the desired field.

4) Turn the **FMS** Joystick to select the desired setting.

```
ACTIVE TRACK LOG
TRACK MEMORY USED     ▮▮▮
RECORD MODE         ◀WRAP          ▶
INTERVAL            ◀AUTO          ▶
SHOW ON MAP         ◀YES           ▶
MAP COLOR           ◀WHITE         ▶

SAVED TRACKS
TRACK 01          378NM   534 POINTS

CLEAR    SAVE                     EXIT
```

Track Log Window (Split-Screen)

- Record Mode—'Wrap' records over the oldest tracks when the track log reaches 100%. 'Fill' records a track log until the track log is full (100%).

- Interval—'Distance' records track points after a specified distance has been traveled. 'Time' creates track points after a specified time has elapsed.

- Show On Map—Select 'Yes' to display the track log on the map.

- Map Color—Select a color for the track when it appears on the map.

Clearing the track log:

1) From the split-screen or full-screen MFD, press the **MENU** Key twice. (The 'Track Log' option is not available from the full-screen PFD Main Menu).

2) Turn or move the **FMS** Joystick to select 'Track Log' from the Main Menu, and press the **ENT** Key.

3) Move the **FMS** Joystick to highlight the desired saved track, and press the **CLEAR** Softkey. (Or press the **MENU** Key, with 'Clear Active Track' selected, press the **ENT** Key.) The 'Clear Active Track Log?' window is displayed.

4) With 'Yes' selected, press the **ENT** Key.

Saving a track log:

1) From the split-screen or full-screen MFD, press the **MENU** Key twice. (The 'Track Log' option is not available from the full-screen PFD Main Menu).

2) Turn or move the **FMS** Joystick to select 'Track Log' from the Main Menu, and press the **ENT** Key.

3) Press the **SAVE** Softkey. (Or press the **MENU** Key, with 'Save Active Track' selected, press the **ENT** Key.) The 'Save Active Track?' window is displayed.

4) Turn the **FMS** Joystick to select 'Entire Active Track', 'Past 24 Hours', 'Past 7 Days', or 'Specify Dates'.

5) Move the **FMS** Joystick to highlight 'Save' and press the **ENT** Key.

Editing a track log:

1) From the split-screen or full-screen MFD, press the **MENU** Key twice. (The 'Track Log' option is not available from the full-screen PFD Main Menu).

2) Turn or move the **FMS** Joystick to select 'Track Log' from the Main Menu, and press the **ENT** Key.

3) Move the **FMS** Joystick to highlight the desired saved track, and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the desired field.

5) Turn the **FMS** Joystick to make the desired changes.
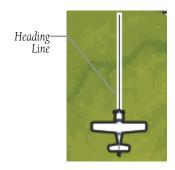
6) With 'Done' selected, press the **ENT** Key.

Exporting a track log:

1) From the split-screen or full-screen MFD, press the **MENU** Key twice. (The 'Track Log' option is not available from the full-screen PFD Main Menu).

2) Turn or move the **FMS** Joystick to select 'Track Log' from the Main Menu, and press the **ENT** Key.

3) Using the **FMS** Joystick highlight the desired track log to export.

4) With an SD card inserted, press the **EXPORT** Softkey.

HEADING LINE
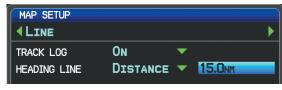
The G3X draws an electronic "heading line" on the Map Page. The heading line can be set to time or distance.

Heading Line

Heading Line (Map Page)

Changing the heading line settings on the Map Page:

1) From the Map Page, press the **MENU** Key. The Map Page Menu is displayed.

2) Turn or move the **FMS** Joystick to select 'Set Up Map' from the Map Page Menu, and press the **ENT** Key.

3) Turn the **FMS** Joystick to highlight the 'Line' options from the horizontal list.

4) Move the **FMS** Joystick to highlight the 'Heading Line' field.

5) Turn the **FMS** Joystick to select 'On/Off' , 'Distance', or 'Time' and press the **ENT** Key. If necessary, move the **FMS** Joystick to set the desired time or distance, and press the **ENT** Key.

Heading Line Settings (Map Setup Page)

6) Press the **FMS** Joystick, the **CLR** Key, or the **EXIT** Softkey to return to the Map Page.

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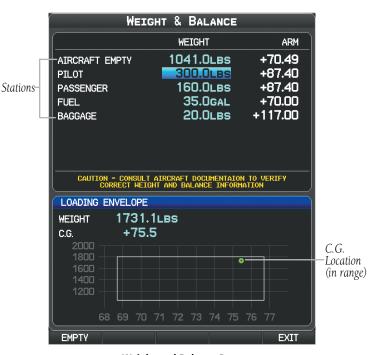
WEIGHT & BALANCE
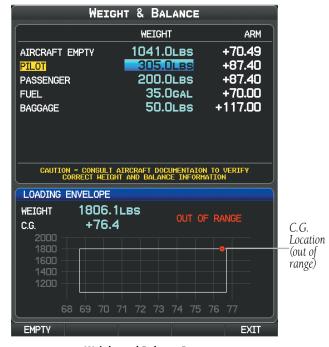
✓ **NOTE:** *Refer to the G3X Installation Manual for information on configuring the Weight & Balance Page.*

Weight & Balance may be used during pre-flight preparations to verify the weight and balance conditions of the aircraft. By entering the weight values on this page, the G3X can calculate the total weight, moment, and center of gravity (CG).

Stations

C.G. Location (in range)

**Weight and Balance Page
(C.G. in Range)**

Weight and Balance Page
(C.G. Out of Range)

> *NOTE: This information is only for flight planning purposes. Consult the aircraft's pilot operating handbook for the official weight and balance data.*

Performing weight and balance calculations:

1) Press the **MENU** Key twice to open the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'Weight & Balance', and press the **ENT** Key.

3) Move the **FMS** Joystick to select the desired station.

4) Turn the **FMS** Joystick to enter the desired weight and press the **ENT** Key.

5) Repeat Steps 3 and 4 using the **FMS** Joystick to enter the desired weights. Press the **ENT** Key after each entry. The calculated moment, weight, and CG figures appear at the bottom of the page.

6) To empty the aircraft, press the **MENU** Key and select 'Empty Aircraft', or press the **EMPTY** Softkey.

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Resetting weight & balance page:

1)   From the Weight & Balance page, press the **MENU** Key.

2)   Turn or move the **FMS** Joystick to highlight 'Empty Aircraft', and press the **ENT** Key. "Empty All Stations?" window is displayed.
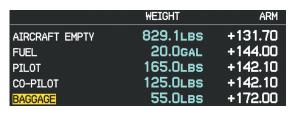
Weight & Balance Page Menu

Or:

Press the **EMPTY** Softkey. "Empty All Stations?" window is displayed.

3)   With 'Yes' highlighted, press the **ENT** Key.

If the Loading Limit for a particular station is exceeded, the station name will turn yellow.

Loading Limit Exceeded

EPE CIRCLE

Estimated Position Error (EPE) indicates the accuracy of the position fix. EPE uses Dilution of Precision (DOP) and other factors to calculate a horizontal position error. DOP measures satellite geometry quality (i.e., number of satellites received and where they are relative to each other).

Setting up and customizing the EPE circle for the map page:

1)   From the Map Page press the **MENU** Key.

2)   Turn or move the **FMS** Joystick to highlight 'Set Up Map' and press the **ENT** Key.

3)   Turn the **FMS** Joystick to select the 'Miscellaneous' from the horizontal list.

4) Move the **FMS** Joystick to highlight the desired feature.

5) Turn the **FMS** Joystick to select 'On' or 'Off', and press the **ENT** Key.

PROXIMITY WAYPOINTS

The Proximity Waypoints Page allows the pilot to define an alarm circle around a waypoint location.

Proximity Circle

Proximity Alarm

Proximity Waypoint Alarm

Defining proximity waypoints:

1) Press the **MENU** Key twice to open the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'User Waypoints', and press the **ENT** Key.

3) Press the **PROXIMITY** Softkey. The Proximity Waypoints Page is displayed.

4) Press the **NEW** Softkey. The New Proximity Waypoint Window is displayed.

5) Select 'Use Map' or 'Use Identifier', and press the **ENT** Key.

6) Select the desired waypoint using the Map or Select Waypoint Window, and press the **ENT** Key. The 'Distance' field is highlighted.

7) Using the **FMS** Joystick, enter the desired distance and press the **ENT** Key.

Setting up and customizing proximity waypoints for the map page:

1) Press the **MENU** Key twice to open the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'User Waypoints', and press the **ENT** Key.

3) Press the **PROXIMITY** Softkey. The Proximity Waypoints Page is displayed.

4) Turn the **FMS** Joystick to select 'On' or 'Off', and press the **ENT** Key.

   Or:

1) Press the **MENU** Key twice to open the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...', and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Alarms', and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the 'Proximity Alarm' Field.

5) Turn the **FMS** Joystick to select 'On' or 'Off', and press the **ENT** Key.

   Or:

1) From the Map Page press the **MENU** Key.

2) Turn or move the **FMS** Joystick to highlight 'Set Up Map' and press the **ENT** Key.

3) Turn the **FMS** Joystick to select the 'Point' from the horizontal list.

4) Move the **FMS** Joystick to highlight the 'Proximity Circle' Field.

5) Turn the **FMS** Joystick to access a list of options for each feature (On/Off, Auto, or range settings).

6) Highlight the desired setting and press the **ENT** Key.

Deleting proximity waypoints:

1) Press the **MENU** Key twice to open the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'User Waypoints', and press the **ENT** Key.

3) Press the **PROXIMITY** Softkey. The Proximity Waypoints Page is displayed.

4) Select the desired waypoint to be deleted.

5) Press the **CLR** Key or the **MENU** Key and select 'Remove Selected Waypoint' or 'Remove All Waypoints'.

6) Press the **ENT** Key. The 'Remove Proximity Waypoint for XXXX' Window is displayed.

7) With 'Yes' highlighted, press the **ENT** Key.

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APPENDIX C: SD CARD USE AND DATABASES

The G3X uses an SD Card for software updates, database updates, MapSource® data, checklist files, Chartview, Flight Data Logging, exporting Track Logs/User Waypoints, importing/exporting Flight Plans and user-downloaded vehicles. Garmin recommends using a 2 GB SanDisk or Toshiba SD Card.

MapSource detailed maps are available from your local Garmin dealer. Refer to the Garmin website (www.garmin.com) for instructions on downloading software updates. Refer to the lastest revision of the G3X Instillation Manual for software update instructions.

INSTALLING AND REMOVING SD CARDS

NOTE: SD Cards are not waterproof. They should not be exposed to moisture or excessive static charges, and should be stored in the case supplied with the card.

SD Card Slot

SD Card Slot(s)

Installing an SD Card:

1) Insert the card into the slot on the top, right, front of the bezel. Be sure the SD Card contacts are facing the display.

2) Firmly push the card into the unit. It is not necessary to force the card.

3) The unit takes a few seconds to read the card. When the data card has been properly installed and accepted, a summary screen noting the card details appears. Press **ENT** Key to acknowledge.

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If you insert an SD Card and get a card format not recognized message, try removing the card and reinserting it. If the card is still not recognized, contact Garmin Product Support or your Garmin dealer.

Removing an SD Card:

1)   Push the card into the unit until it stops.

2)   Release the card. The card should eject for easy removal.

3)   With the card ejected, pull the card out of the slot.

G3X DATABASES

The following databases are avialable with the G3X depending on the unit (Americas, Atlantic, or Pacific). See the Additional Feature section for information on Airport Directories, FliteCharts®, and SafeTaxi®. See the Hazard Avoidance section for information on Obstacles and Terrain.

Database	Americas	Atlantic	Pacific
Worldwide Basemap	+	+	+
Airport Directory (AOPA or AC-U-KWIK)	+		
Navigation Database (Jeppesen® or AeroNav (US only))	+	+	+
FliteCharts®	+		
SafeTaxi®	+	+	
Obstacle	+	+	
Terrain	+	+	+

Available Databases

BASEMAP

The basemap database contains data for the topography and land features, such as river, lakes, and towns. It is updated only periodically, with no set schedule. There is no expiration date.

AIRPORT DIRECTORY DATABASES

The AOPA Airport Directory provides data on airports and heliports throughout the U.S. and it is updated on a 56-day cycle. Detailed information for over 5,300 U.S. airports, along with the names and phone numbers of thousands of FBOs can be viewed. This service allows the pilot to plan an overnight, choose fuel stops, find ground transportation, etc.

Optional airport directory databases such as AC-U-KWIK are also supported. AC-U-KWIK provides complete listings of FBOs, charter companies, fuel suppliers, ground transportation, maintenance and catering services at public airports across the world.

NAVIGATION DATABASE

The G3X includes an internal navigation database that provides location and facility information for thousands of airports, VORs, NDBs, and more. Updates to the navigation database are available every 28 days online (www.fly.garmin.com). There are two navigation database products available: the Jeppesen Navigation Database, which is sourced by Jeppesen, and the US VFR Navigation Database sourced by AeroNav Products, a division of the FAA.

> **NOTE:** *Although the Jeppesen Navigation Database and the US VFR Navigation Database contain much of the same information, pilots may notice differences in behavior, nearest list functionality, direct-to functionality, and map page display due to data content variations. The US VFR Navigation Database, by AeroNav Products, does not contain any approach data.*

- *Airport—identifier, facility name, city/state/country, latitude/longitude, field elevation, available fuel types, runway designations and layout, runway surface, runway length, runway width, runway lighting, communication frequencies, and published approaches (Jeppesen Navigation Database only).

- Weather—frequencies associated with an airport (ASOS, ATIS, and AWOS).

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- *VORs—identifier, facility name, city/state/country, location (latitude/longitude), frequency, service volume (high, low, terminal), and type (such as VOR-DME, TACAN, and VORTAC).

- *NDBs—identifier, facility name, city/state/country, location (latitude/longitude), and frequency.

- Intersections—identifier, nearest VOR, radial and distance from nearest VOR, location (latitude/longitude), and region/country.

- ARTCC—Air Route Traffic Control Centers.

- Airspace—boundaries (Class B, Class C, Control Zones, SUAs, and MOAs), controlling agency, and vertical boundaries.

- FSS—Flight Service Stations.

* Symbology used for NDBs, VORs, and airports is consistent with those used on a sectional chart.

> **NOTE:** *After performing a navigation database update, verify all flight plan(s) (routes) are current. If there is an obsolete aviation point in a saved route, the route is locked and unusable. A new route with current navigation database points will need to be created.*

FLITECHARTS

The FliteCharts database contains procedure charts for the United States only. This database is updated on a 28-day cycle.

CHARTVIEW

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. The ChartView database is always on the SD Card and is not copied to the GDU's internal memory.

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.

OBSTACLE

The obstacle 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.

TERRAIN

✓ **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 terrain database is updated periodically and has no expiration date.

UPDATING G3X DATABASES

✓ **NOTE:** *The databases are stored internally on each GDU. When updating a system with multiple GDUs, each GDU will need to be updated individually using the same SD card.*

The G3X database updates can be obtained by visiting the 'flyGarmin' website (www.fly.garmin.com). The 'flyGarmin' website requires the unit's System ID to update databases. This allows the databases to be encrypted with the unit's unique System ID when copied to the SD Card.

Obtaining the System ID:

1) Press the **MENU** Key twice to access the Main Menu.

2) Select 'System Setup' and press the **ENT** Key.

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SOFTWARE VERSION 7.20   SYSTEM ID: 22B0200000001

EXIT
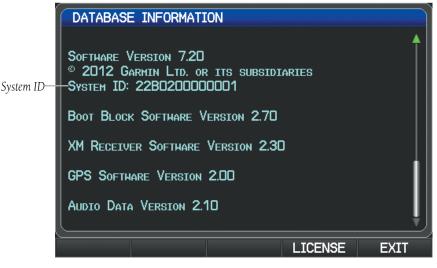
System Setup Page

Or:

Select 'Database Information' and press the **ENT** Key.

DATABASE INFORMATION

SOFTWARE VERSION 7.20
© 2012 GARMIN LTD. OR ITS SUBSIDIARIES

System ID — SYSTEM ID: 22B0200000001

BOOT BLOCK SOFTWARE VERSION 2.70

XM RECEIVER SOFTWARE VERSION 2.30

GPS SOFTWARE VERSION 2.00

AUDIO DATA VERSION 2.10

LICENSE   EXIT

Database Information Page

Updating G3X Databases:

Equipment required to perform the update:

- Windows-compatible PC computer (Windows 2000 or XP recommended)

- Verbatim 96504 SD Card Reader or equivalent

- Updated database obtained from the flyGarmin website

- SD Card, 2 GB recommended (Garmin recommends SanDisk or Toshiba SD cards)

1) After the data has been copied to the SD Card, insert the SD card in the SD card slot of the display.

2) Power on the display. The Update Databases Page is displayed. A green checkbox indicates that the database already installed on the G3X is up to date. An empty checkbox indicates that the database on the SD card is more current and should be installed.

Update Databases Page

3) With 'Update All' highlighted, press the **ENT** Key. The database status is updated.

Update Databases Page

Or:

Move the **FMS** Joystick to highlight a single database to update, and press the **ENT** Key. The database status is updated.

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Update Databases Page
(Database Status Updated)

4) Press the **RESTART** Softkey. Once the database(s) have been successfully updated, the SD Card can be removed from the unit.

Update Databases Page

5) Repeat steps 1-4 for the remaining GDUs if applicable.

EXPORTING TRACK LOGS AND USER WAYPOINTS

Exporting a track log:

1) From the split-screen or full-screen MFD, press the **MENU** Key twice. (The 'Track Log' option is not available from the full-screen PFD Main Menu).

2) Turn or move the **FMS** Joystick to select 'Track Log' from the Main Menu, and press the **ENT** Key.

3) Using the **FMS** Joystick highlight the desired track log to export.

4) With an SD card inserted, press the **EXPORT** Softkey.

Exporting User Waypoints:

1) From the split-screen or full-screen MFD, press the **MENU** Key twice.

2) Turn or move the **FMS** Joystick to select 'User Waypoints' from the Main Menu, and press the **ENT** Key.

3) With an SD card inserted, press the **Menu** Key.

4) Turn or move the **FMS** Joystick to select 'Export Waypoints' from the Option Menu, and press the **ENT** Key.

IMPORTING/EXPORTING FLIGHT PLANS

Importing flight plans:

1) With a flight plan saved to the SD Card, press the **FPL** Key and turn the **FMS** Joystick to display the Flight Plan List Page.

2) Press the **IMPORT** Softkey.

3) Using the **FMS** Joystick highlight the desired flight plan to import.

4) Press the **IMPORT** Softkey again and press the **ENT** Key.

Exporting flight plans:

1) Press the **FPL** Key and turn the **FMS** Joystick to display the Flight Plan List Page.

2) Press the **FMS** Joystick to activate the cursor, and turn or move the **FMS** Joystick to highlight the desired flight plan.

3) Press the **EXPORT** Softkey and press the **ENT** Key.

FLIGHT DATA LOGGING

The G3X also has the ability to log flight data. Refer to the Additional Features section for more information.

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APPENDIX D: MAP DATUM AND LOCATION FORMATS

MAP DATUMS

A datum is a mathematical model of the Earth that approximates the shape of the Earth and enables calculations to be carried out in a consistent and accurate manner. The datum is physically represented by a framework of ground monuments (such as trig. stations) whose locations have been accurately measured and calculated on this reference surface. Lines of latitude and longitude on a chart are referenced to a specific map datum. Every chart has a map datum reference and the G3X can be set to match most of those commonly used.

LOCATION FORMATS

Your current location can be viewed on the GPS in the form of coordinates. Since different charts use different location formats, Garmin GPS units allow you to choose the correct coordinate system for the type of chart you are using. The most common format is latitude and longitude, which is used by all Garmin units. You can change the location format to use with other coordinate systems.

Map Datum and Location Format selection can be performed on the Position Setup Page.

Changing position settings:

1) Press the **MENU** Key twice to display the Main Menu.

2) Turn or move the **FMS** Joystick to highlight 'System Setup...' and press the **ENT** Key.

3) Turn or move the **FMS** Joystick to highlight 'Position' and press the **ENT** Key.

4) Move the **FMS** Joystick to highlight the desired field, and select the desired option by turning the **FMS** Joystick.

5) Press the **FMS** Joystick, the **CLR** Key, the **EXIT** Softkey or the **MENU** Key to remove the menu.

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APPENDIX E: GENERAL TIS-A INFORMATION

> ✓ **NOTE:** *Aircraft without an operational transponder are invisible to TIS-A.*

> ⚠ **WARNING:** *Do not rely solely upon the display of traffic information for collision avoidance maneuvering. The traffic display does not provide collision avoidance resolution advisories and does not, under any circumstances or conditions, relieve the pilot's responsibility to see and avoid other aircraft.*

> ⚠ **WARNING:** *Do not rely solely upon the display of traffic information to accurately depict all of the traffic within range of the aircraft. Due to lack of equipment, poor signal reception, and/or inaccurate information from aircraft or ground stations, traffic may be present that is not represented on the display.*

The Traffic Information Service (TIS-A) provides traffic advisory information to non-TAS/TCAS-equipped aircraft. TIS-A is a ground-based service providing the relative locations of all ATCRBS (Air Traffic Control Radar Beacon System) Mode-A and Mode-C transponder equipped aircraft within a specified service volume. The TIS-A ground sensor uses real-time track reports to generate traffic notification. The G3X displays TIS-A traffic information on the Map Page. Surveillance data includes all transponder-equipped aircraft within the coverage volume. The G3X displays up to eight traffic targets within a 7.5-nm radius, from 3,000 feet below, to 3,500 feet above the requesting aircraft.

TIS-A VS. TAS/TCAS

The main difference between the Traffic Information System (TIS-A) and Traffic Advisory (TAS) or Traffic Collision Avoidance Systems (TCAS) is the source of surveillance data. TAS/TCAS uses an airborne interrogator with a half-second update rate, while TIS-A utilizes the terminal Mode-S ground interrogator and accompanying data link to provide a five-second update rate. TIS-A and TAS/TCAS have similar ranges.

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TIS-A LIMITATIONS

TIS-A relies on surveillance of the Mode-S radar system, which is a "secondary surveillance" radar system similar to that used by ATCRBS. Many limitations are inherent in secondary radar surveillance. Information provided by TIS-A is neither better nor more accurate than the information used by ATC. TIS-A is intended only to assist in visual acquisition of other aircraft in visual meteorological conditions (VMC). While TIS-A is a useful aid for visual traffic avoidance, system limitations must be considered to ensure proper use. No recommended avoidance maneuvers are given, nor authorized, as a direct result of a TIS-A intruder display or TIS-A advisory.

- TIS-A operation may be intermittent during turns or other maneuvering.

- TIS-A is dependent on two-way, line-of-sight communications between the aircraft and the Mode-S radar antenna. Whenever the structure of the aircraft comes between the transponder antenna and the ground-based radar antenna, the signal may be temporarily interrupted.

> **NOTE:** *Refer to the TIS-A Limitations section of the Aeronautical Information Manual (AIM) for a more comprehensive explanation of limitations and anomalies associated with TIS-A.*

> **NOTE:** *TIS-A is unavailable at low altitudes in many area of the United States. This is often the case in mountainous regions.*

> **NOTE:** *Garmin is not responsible for Mode S geographical coverage. Operation of the ground stations is the responsibility of the FAA. Refer to the AIM for a Terminal Mode S radar site map.*

TIS-A information is collected during a single radar sweep. Collected information is then sent through the Mode S uplink on the next radar sweep. Because of this, the surveillance information is approximately five seconds old. TIS-A ground station tracking software uses prediction algorithms to compensate for this delay. These algorithms use track history data to calculate expected intruder positions consistent with the time of display. Occasionally, aircraft maneuvering may cause variations in this calculation and create slight errors on the Map Page which affect relative bearing information and the target track vector and may delay display of the intruder information. However,

intruder distance and altitude typically remain relatively accurate and may be used to assist in spotting traffic. The following errors are common examples:

- When the 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 intercepts the client aircraft course at a shallow angle (either overtaking or head-on) and either aircraft abruptly changes course within 0.25 nm, TIS-A may display the intruder aircraft on the incorrect side of the client aircraft.

These are rare occurrences and are typically resolved within a few radar sweeps once the client/intruder aircraft course stabilizes.

Pilots using TIS-A can provide valuable assistance in the correction of malfunctions by reporting observations of undesirable performance. Reports should identify the time of observation, location, type and identity of the aircraft, and describe the condition observed. Reports should also include the type of transponder and transponder software version. Since TIS-A performance is monitored by maintenance personnel, not ATC, malfunctions should be reported in the following ways:

- By telephone to the nearest Flight Service Station (FSS) facility

- By FAA Form 8000-7, Safety Improvement Report (postage-paid card can be obtained at FAA FSSs, General Aviation District Offices, Flight Standards District Offices, and General Aviation Fixed Base Operators)

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APPENDIX F: ABNORMAL OPERATION

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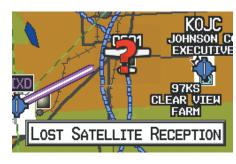
LOSS OF GPS POSITION

When the G3X loses the GPS signal for any reason, the following will occur:
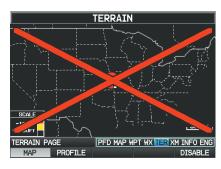
• A blinking red question mark will appear over the airplane icon on the map.

• The 'Lost Satellite Reception' message will display.

• Any GPS dependent data fields will not be available.

GPS Signal Lost

HAZARD DISPLAY WITH LOSS OF GPS POSITION

If the Terrain Page doesn't have at least a 3D fix (i.e. altitude unknown), a Red X will be displayed.

**Terrain Page Red X
(Split-Screen)**

**Map Page Red X (Terrain)
(Split-Screen)**

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G3X SYSTEM FAILURE ANNUNCIATIONS

When an LRU or an LRU function fails, a large red 'X' is typically displayed over the instrument(s) or data experiencing the failure. Upon G3X power-up, certain instruments remain invalid as equipment begins to initialize. All instruments should be operational within one minute of power-up. If any instrument remains flagged, the G3X should be serviced.

> **NOTE:** Refer to the Pilot's Operating Handbook for additional information regarding pilot responses to these annunciations.

G3X System Failure Annunciations
(Split-Screen)

UNUSUAL ATTITUDES

When the aircraft enters an unusual pitch attitude, red chevrons pointing toward the horizon warn of extreme pitch and data fields are decluttered (removed) from the display. The chevrons are displayed on the Attitude Indicator, starting at 50° above and 30° below the horizon line.

Pitch Attitude Warnings

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REVERSIONARY MODE (FULL-SCREEN)

In the event of a display failure, the G3X System automatically switches to reversionary (backup) mode. In reversionary mode, the information is presented on the remaining display in the split-screen configuration.

If a display failure occurs with the GDU 375, the **WX** and **XM** Pages will no longer be available since the XM receiver resides in the GDU 375.

G3X Full-Screen Reversionary Mode (Failed PFD)

AFCS REVERSIONARY MODE

In a two display system, in the event of a PFD failure, the MFD goes into reversionary mode, and the autopilot is disengaged. If the MFD fails, the PFD goes into reversionary mode and the autopilot continues to function.

In a GMC 305 installation, in the event of display failure(s), basic autopilot functionality remains as long as a ADAHRS unit is still available. The FD is no longer available, but LVL, AP, ALT, and YD are available.

FAILURE OF THE EXTERNAL GPS NAVIGATION SOURCE

If the external GPS navigation source fails, the system reverts to the internal GPS navigation source and 'REV' is shown in yellow in the upper left corner of the Data Bar as well as the lower left quadrant of the HSI.

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External GPS Failure. Reverted to Internal GPS

REV: *External Navigation Source failed. Reverted to internal VFR GPS for navigation.*

External GPS Navigation Failure

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SYNTHETIC VISION TROUBLESHOOTING

Synthetic Vision is intended to be used with traditional attitude, heading, obstacle, terrain, and traffic inputs (in most areas). Synthetic Vision is disabled when valid attitude or heading data is not available for the display. In case of invalid Synthetic Vision data, the PFD display reverts to the standard blue-over-brown attitude display.

Synthetic Vision becomes disabled without the following data resources:

- Attitude data

- Heading data

- GPS position data

- Terrain data

- The position of the aircraft exceeds the range of the terrain database

REVERSIONARY MODE WITH SYNTHETIC VISION

Synthetic Vision can be displayed on the remaining display(s) in Reversionary Mode. If it is enabled when the system switches to Reversionary Mode, Synthetic Vision may take up to 30 seconds to display. The standard display will be shown in the interim.

APPENDIX G: DISPLAY SYMBOLS

VFR SYMBOLS

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Item	Symbol
Unknown	●
Non-towered, Non-serviced	◐
Towered, Non-serviced	◐
Non-towered, Serviced	✦
Towered, Serviced	✦
Soft Surface, Non-serviced	◉
Soft Surface, Serviced	✦
Soft Surface, Private	®
Paved, Private	®
Seaplane Base	⚓
Heliport	Ⓗ

Americas/Pacific Database Airports

Item	Symbol
Civilian, Non-serviced	◐
Military, Non-serviced	◐
Civilian, Serviced	✦
Military, Serviced	✦
Civilian, Soft/Unknown Surface, Non-serviced	●
Civilian, Soft/Unknown Surface, Serviced	✦

Atlantic Database Airports

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Item	Symbol
Intersection	△
Visual Reporting Point	◆
LOM (compass locator at outer marker)	●
NDB (non-directional radio beacon)	●
VOR	◉
VOR/DME	▣
ILS/DME or DME only	▣
VORTAC	⬡
TACAN	⬡

Navaids

Item	Symbol
Interstate Highway	▮
US Highway	⬭
State Highway	⬭
National Highway	⬭
Small City	•
Medium City	●
Large City	●

Miscellaneous

IFR SYMBOLS

Item	Symbol
VFR, Soft/unknown Surface, Non-serviced	●
VFR, Soft/unknown Surface, Serviced	✦

Atlantic Database Airports

Item	Symbol
Low-Altitude	V108
High- Altitude	J146

Airways

Item	Symbol
Unknown	⬤
VFR Airport, Non-serviced	⬤
IFR Airport, Non-serviced	⬤
VFR Airport, Serviced	✦
IFR Airport, Serviced	✦
VFR, Soft Surface, Non-serviced	⬤
VFR, Soft Surface, Serviced	✦
VFR, Soft Surface, Private	Ⓡ
VFR, Paved, Private	Ⓡ
VFR Seaplane Base	⚓
VFR Heliport	Ⓗ

Americas/Pacific Database Airports

Item	Symbol
Intersection	△
LOM (compass locator at outer marker)	◈
NDB (non-directional radio beacon)	⦾
VOR	⬡
VOR/DME	◙
ILS/DME or DME Only	▫
VORTAC	⬡
TACAN	⬡

Navaids

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AIRSPACE SYMBOLS

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Item	Symbol
Class B, Class E, CTA	
Class A, Class C, TMA	
Class D	
Mode C Veil	
TRSA	
MOA	
Danger, Alert, or Training Area	
Restricted, Prohibited, or Warning Area	
Radar Area	
ATZ, TIZ	
MATZ	
ADIZ	
Misc/Unknown	

VFR Americas/Pacific Database

Item	Symbol
Class B, Class E, CTA	
Class A, Class C, TMA, TRSA	
Class D	
MOA	
Danger, Alert, or Training Area	
Restricted, Prohibited, or Warning Area	
Radar Area	
ATZ, TIZ	
Misc/Unknown	

IFR Americas/Pacific Database

Item	Symbol
Danger or Alert Area	
Restricted, Prohibited, or Warning Area	
Training Area	

VFR Atlantic Database Exceptions

Item	Symbol
Training Area	

IFR Atlantic Database Exceptions

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APPENDIX H: GLOSSARY

ADIZ	Air Defense Identification Zone
ADS-B	Automatic Dependant Surveillance-Broadcast
ADS-B In	Ability to receive ADS-B information from other aircraft and Ground Based Transceivers (GBTs)
ADS-B Out	Ability to transmit ADS-B data on 1090 ES or 978 MHz
ADS-B Participating Aircraft	An aircraft that has both ADS-B In and ADS-B Out capabilities.
ADS-R	Automatic Dependent Surveillance-Rebroadcast
AGL	Above Ground Level
AIM	Airman's Information Manual
AIRMET	Airman's Meteorological Information
AOA	Angle of Attack
AP	Autopilot
APT	airport
ASPC	airspace
ARTCC	Air Route Traffic Control Center
ASOS	Automated Surface Observing System
ATC	Air Traffic Control
ATIS	Automatic Terminal Information Service
AWOS	Automated Weather Observing System
Bearing	The compass direction from the present position to a destination waypoint.
ºC	degrees Celsius
Calibrated Airspeed	Indicated airspeed corrected for installation and instrument errors.
cm	centimeter

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COM	communication radio
Course	The line between two points to be followed by the aircraft.
Course to Steer	The recommended direction to steer in order to reduce course error or stay on course. Provides the most efficient heading to get back to the desired course and proceed along the flight plan.
Crosstrack Error	The distance the aircraft is off a desired course in either direction, left or right.
CTS	Course to Steer
dBZ	decibels 'Z' (radar return)
deg	degree
Desired Track	The desired course between the active "from" and "to" waypoints.
DIS	distance
Distance	The 'great circle' distance from the present position to a destination waypoint.
DME	Distance Measuring Equipment
DTK	Desired Track
Enroute Safe Altitude	The recommended minimum altitude within ten miles left or right of the desired course on an active flight plan or direct-to.
ENT	enter
ESA	Enroute Safe Altitude
Estimated Time of Arrival	The estimated time at which the aircraft should reach the destination waypoint, based upon current speed and track.
Estimated Time Enroute	The estimated time it takes to reach the destination waypoint from the present position, based upon current ground speed.
ETA	Estimated Time of Arrival
ETE	Estimated Time Enroute

ºF	degrees Fahrenheit
FAA	Federal Aviation Administration
FAF	Final Approach Fix
FCC	Federal Communication Commission
FPL	flight plan
fpm	feet per minute
FSS	Flight Service Station
ft	foot/feet
gal	gallon(s)
geodetic altitude	GPS calculated altitude
Glide Ratio, G/R	The estimated distance an aircraft will move forward for any given amount of lost altitude.
GND	ground
gph	gallons per hour
GPS	Global Positioning System
Grid MORA	Grid Minimum Off-Route Altitude; one degree latitude by one degree longitude in size and clears the highest elevation reference point in the grid by 1000 feet for all areas of the grid
Groundspeed	The velocity that the aircraft is travelling relative to a ground position.
Ground-Based Transceiver	Provides ADS-R, TIS-B and FIS-B broadcasts to ADS-B participating aircraft.
Ground Track	see Track
GS	Ground speed
Heading	The direction an aircraft is pointed, based upon indications from a magnetic compass or a properly set directional gyro.
Hg	mercury
hPa	hectopascal
hr	hour

HSI	Horizontal Situation Indicator
Hz	Hertz
IAF	Initial Approach Fix
IAT	Indicated Air Temperature
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
in	inch
Indicated	Information provided by properly calibrated and set instrumentation on the aircraft panel.
in HG	inches of mercury
kg	kilogram
kHz	kilohertz
km	kilometer
kt	knot
LAT	latitude
lb	pound
Leg	The portion of a flight plan between two waypoints.
LON	longitude
m	meter
MAP	Missed Approach Point
METAR	Meteorological Aviation Routine
MHz	megahertz
Minimum Safe Altitude	Uses Grid MORAs to determine a safe altitude within ten miles of the aircraft present position.
MOA	Military Operations Area

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MSA	Minimum Safe Altitude
MSL	Mean Sea Level
NAVAID	NAVigation AID
NDB	Non-directional Beacon
NEXRAD	Next Generation Radar
nm	nautical mile(s)
NRST	nearest
OAT	Outside Air Temperature
OBS	Omni Bearing Selector
psi	pounds per square inch
QTY	quantity
rpm	revolutions per minute
SBAS	Satellite-Based Augmentation System
SD	Secure Digital
sec	second(s)
SIGMET	Significant Meteorological Information
TACAN	Tactical Air Navigation System
TAF	Terminal Aerodrome Forecast
TAS	True Airspeed
TER	terrain
TFR	Temporary Flight Restriction
TOPO	topographic
TIS-A	Traffic Information Service

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TIS-B	Traffic Information Service-Broadcast
Track	Direction of aircraft movement relative to a ground position; also 'Ground Track'
TRSA	Terminal Radar Service Area
UTC	Coordinated Universal Time
VFR	Visual Flight Rules
VHF	Very High Frequency
VNAV	vertical navigation
VOL	volume
VOR	VHF Omni-directional Range
VORTAC	very high frequency omnidirectional range station and tactical air navigation
VSI	Vertical Speed Indicator
VSR	Vertical Speed Required
VTF	vector to final
WAAS	Wide Area Augmentation System
WPT	waypoint
WX	weather

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APPENDIX I: LICENSE AGREEMENT AND WARRANTY

CONTACT GARMIN

Contact Garmin if you have any questions while using your G3X. In the USA contact Garmin Product Support by phone: (913) 397-8200 or (800) 800-1020, Monday–Friday, 8 AM–5 PM Central Time; or go to www.garmin.com/support.

In Europe, contact Garmin (Europe) Ltd. at +44 (0) 870.8501241 (outside the UK) or 0808 2380000 (within the UK).

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The Garmin G3X LRU's that comply with TSO (Technical Standard Order) requirements for certification (GMU 44 and GTP 59) are warranted to be free from defects in materials or workmanship for two years from the date of purchase. The Garmin G3X LRU's that do not comply with TSO requirements for certification (GDU 370, GDU 375, and the GSU 73) are warranted to be free from defects in materials or workmanship for one year from the date of purchase. Within the specified period, Garmin will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labor, provided that the customer shall be responsible for any transportation cost. This warranty does not cover failures due to abuse, misuse, accidents, or unauthorized alterations or repairs. In addition, Garmin reserves the right to refuse warranty claims against products or services that are obtained and/or used in contravention of the laws of any country.

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Toll free (within U.K.): 0808 238 0000   Tel: 44/0870.8501241   Fax: 44/0870.8501251

Refer to the G3X Installation Manual for warranty registration instructions.

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