DENGG POH

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TRANSPONDER

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FAA Approved
AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for the
GARMIN G5 ELECTRONIC FLIGHT INSTRUMENT
as installed in

PIPER PA28-161

Make and Model Airplane

Registration Number: _____ Serial Number: 28-7916083

This document serves as an Airplane Flight Manual Supplement or as a Supplemental Airplane Flight Manual when the aircraft is equipped in accordance with Supplemental Type Certificate SA01818WI for the installation and operation of the Garmin G5 Electronic Flight Instrument. This document must be carried in the airplane at all times.

The information contained herein supplements or supersedes the information made available to the operator by the aircraft manufacturer in the form of clearly stated placards or markings, or in the form of an FAA approved Airplane Flight Manual, only in those areas listed herein. For limitations, procedures and performance information not contained in this document, consult the basic placards or markings, or the basic FAA approved Airplane Flight Manual.

FAA APPROVED BY: _____

Robert Murray

ODA STC Unit Administrator

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Log of Revisions

FAA Approved AIRPLANE FLIGHT MANUAL SUPPLEMENT

or

SUPPLEMENTAL AIRPLANE FLIGHT MANUAL

GARMIN G5 ELECTRONIC FLIGHT INSTRUMENT

REV NO.	PAGE NO(S)	DESCRIPTION	DATE OF APPROVAL	FAA APPROVED
1	ALL	Original Issue	7/22/2016	Robert Murray ODA STC Unit Administrator
2	ALL	Added information regarding G5 DG/HSI.	4/28/2017	Robert Murray ODA STC Unit Administrator
3	ALL	Added interface to 3rd party autopilots.	10/18/2017	Robert Murray ODA STC Unit Administrator
4	ALL	Added note to General section.	10/26/17	Paul Mast ODA STC Unit Administrator
5	ALL	Reformatted document. Updated system messages interface. Added DG/HSI reversion description.	See Cover	See Cover

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SECTION 1 – GENERAL

The G5 Electronic Flight Instrument can display the following information to the pilot depending on the installation and location of the G5 instrument.

- Primary attitude
- Primary slip and turn rate information
- Primary heading
- Secondary airspeed
- Secondary altimeter
- Secondary ground track

When installed in place of the attitude indicator, the primary function of the G5 is to provide attitude information to the pilot. When installed in place of the rate of turn indicator, the primary function of the G5 is to provide turn rate and slip ball information to the pilot. When installed in place of the directional gyro, the primary function of the G5 is to provide directional information to the pilot.

NOTE:

The pilot is reminded to perform appropriate flight and navigation instrument cross checks for the type of operation being conducted.

In case of a loss of aircraft electrical power, a backup battery (optional when installed as a DG/HSI) sustains the G5 Electronic Flight Instrument for up to four hours.

An optional GAD 29B may be installed to provide course and heading datum to an autopilot based on the data selected for display on the HSI.

Abbreviations and Terminology

The following glossary is applicable within the airplane flight manual supplement

ADI	Attitude Direction Indicator
AFMS	Airplane Flight Manual Supplement
ATT	Attitude
CDI	Course Deviation Indicator
DG	Directional Gyro
DR	Dead Reckoning
FAA	Federal Aviation Administration
GPS	Global Positioning System
GPSS	GPS Roll Steering
HDG	Heading
HSI	Horizontal Situation Indicator
ILS	Instrument Landing System
LOC	Localizer (no glideslope available)
LOI	Loss of Integrity
VFR	Visual Flight Rules
VHF	Very High Frequency
VOR	VHF Omni-directional Range

SECTION 2 – LIMITATIONS

System Software Requirements

The G5 must utilize the following or later FAA approved software versions for this AFMS revision to be applicable:

Component	Software Version
G5 Electronic Flight Instrument	5.00

Use of Secondary Instruments

The original type design approved instruments for airspeed, altitude and vertical speed remain the primary indications for these parameters.

If the G5 Electronic Flight Instrument is installed in place of the rate of turn indicator, the original type design approved instrument for attitude remains in the primary indication for attitude.

If the G5 Electronic Flight Instrument is installed in place of the directional gyro, the original type design approved instruments for attitude remains the primary indication for attitude.

NOTE:

For aircraft approved for VFR-only operations, the G5 Electronic Flight Instrument may be installed as an attitude indicator and rate of turn indicator.

Kinds of Operations

No Change.

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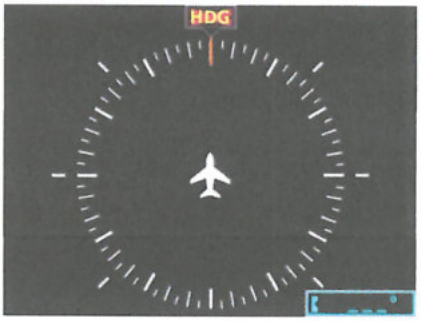
SECTION 3 – EMERGENCY PROCEDURES

G5 Failure Indications

If a G5 function fails, a large red 'X' is typically displayed over the instrument(s) or data experiencing the failure. Upon G5 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 G5 should be serviced by a Garmin-authorized repair facility.



Attitude Failure

Attitude failure is indicated by removal of the sky/ground presentation, a red X, and a yellow "ATTITUDE FAIL" on the display.

Rate-of-turn and slip information will not be available.

1. Use standby instruments.
2. Seek VFR conditions or land as soon as practical.

Heading Failure, Loss of Magnetometer Data, or Magnetic Field Error

A heading failure, loss of magnetometer data, or magnetic field error is indicated by removal of the digital heading readout, a red X, and a yellow "HDG" on the display.

1. Use standby magnetic compass.

NOTE:

If the G5 DG/HSI has a valid GPS signal the G5 DG/HSI instrument will display the GPS track information in magenta.

GPS Failure

If GPS navigation receivers and/or navigation information are not available or invalid, the G5 will display Dead Reckoning mode (DR) or Loss of Integrity mode (LOI) on the HSI in the lower left corner.

If Alternate Navigation Sources (ILS, LOC, VOR) Are Available:

1. Use alternate navigation source.

If No Alternate Navigation Sources Are Available:

If DR is Displayed on HSI:

1. Use the amber CDI for course information.
2. Fly toward known visual conditions.

If LOI is Displayed on HSI:

1. Fly toward known visual conditions.

For aircraft equipped with a GAD 29B interfaced to an autopilot, GPSS will be displayed in amber text when GPSS emulation has been selected from the G5 menu.

1. Deselect GPSS from the G5 menu and select a different autopilot mode.

Attitude Aligning

During system initialization, the G5 displays the message 'ALIGNING' over the attitude indicator. The G5 will typically display valid attitude within the first minute of power-up. The G5 can also align itself while taxiing and during level flight.

If the "ALIGNING" indication occurs during flight and attitude remains displayed, the attitude display is acceptable for use for flight in instrument conditions. The message will clear when the attitude solution is within the systems internal accuracy tolerances. It is recommended to maintain wings level to reduce the time for the system to align.

Attitude Aligning / Keep Wings Level

If the "ALIGNING KEEP WINGS LEVEL" indication occurs during flight, the G5 has detected an invalid attitude solution and will not display any attitude information.

1. Use standby instruments to maintain wings level flight. The system will display attitude when internal accuracy tolerances have been met.
2. If attitude does not return, seek VFR conditions or land as soon as practical.

Loss of Electrical Power to the G5 Display

In the event of a loss of aircraft electrical power to the G5 attitude display, the indicator will continue to function on its internal battery. If an internal battery is installed on the optional G5 HSI, the indicator will continue to function on the internal battery if aircraft power is lost. Internal battery endurance is indicated on the G5 display in hours and minutes. The charging symbol will be removed and the internal battery will not be charged.

In the event the G5 attitude display powers down, the optional G5 HSI will automatically revert to displaying attitude information. It will not revert back to the DG/HSI format if the G5 attitude unit regains power. The DG/HSI presentation may be selected from the G5 menu on the G5 DG/HSI unit after reversion to the attitude display.

Loss of Electrical Power to the GAD 29B (If Installed)

In the event of a loss of aircraft electrical power to the optional GAD 29B, the heading and course datum will be unavailable to the autopilot and the autopilot may deviate from the intended path or may disconnect. GPS flight plan course information may be displayed on the HSI and VFR will be displayed in amber text on the HSI. GPSS will be displayed in amber text, if GPSS mode is selected.

1. Deselect GPSS from the G5 menu and select a different autopilot mode.
2. Lateral GPS course guidance may only be used in VFR conditions.

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SECTION 4 – NORMAL PROCEDURES

G5 Power Button and Knob

The G5 display will power on with the application of aircraft power. The G5 power button is used to turn the display on and off. Press and hold the power button to turn the display off.

The knob performs the following functions:

Press	Press to access the Menu. From the Menu, press to select the desired menu item. Press to accept the displayed value when editing numeric data or selecting from a list. Press to sync the heading or track bug for the HSI.
Turn	From the Menu, turn the Knob to move the cursor to the desired menu item. For the ADI, rotate to adjust the baro setting on the secondary altitude display. For the HSI, rotate to adjust the heading or track bug. Turn to select the desired value when editing numeric data or selecting from a list.

Backlight Intensity Adjustment

The power up state of the G5 backlight is in Auto adjustment mode.

To adjust the backlighting:

To select Manual mode from Auto mode:

1. While the unit is turned on, press the Power button.
2. Turn the knob to manually adjust the backlight intensity.
3. Press the knob to close the backlight page.

To select Auto mode from Manual mode:

1. While the unit is turned on, press the Power button.
2. Press the Power button again to select Auto.
3. Press the knob to close the backlight page.

Prior to Flight in Instrument Meteorological Conditions

1. Press the Power button on the G5 attitude indicator.
2. Verify the battery status indicator is green on the G5 attitude indicator.

Autopilot Operations with the G5 HSI

The G5 and optional GAD 29B offer various integration capabilities dependent upon the type of autopilot installed in a particular aircraft.

The G5 Electronic Flight Instrument installation in this aircraft provides the following autopilot functions (appropriate boxes will be checked):

- ☐ This installation does not interface with the autopilot (basic wing leveling autopilot or no autopilot is installed in the aircraft).
- ☐ A GAD 29B Adapter is installed in this aircraft.
  - ☐ Course / NAV Selection coupling to the autopilot.
  - ☐ Heading Bug coupling capability to the autopilot.
  - ☐ Roll Steering (GPSS) emulated via heading mode.

    OR
  - ☐ Roll Steering capable autopilot (GPSS menu function for emulation not applicable).

Course / NAV Selection Coupling to the Autopilot (If Configured)

When operating the autopilot in NAV mode, the deviation information from the installed navigation sources (i.e. GPS or NAV) is switched via the navigation source. The NAV source displayed on the HSI is the NAV source the autopilot is following. Many autopilots also use the course datum to determine the best intercept angles when operating in NAV mode.

Heading Bug Coupling Capability to the Autopilot (If Configured)

When operating the autopilot in HDG mode, the difference between the HDG bug location on the HSI and the actual aircraft heading creates an error signal which the autopilot will minimize by turning in the direction of the bug. If the bug is turned more than 180 degrees, the autopilot may turn the airplane in the opposite direction of the desired turn.

Roll Steering (GPSS) Emulated via HDG Mode (If Configured)

For autopilots that do not support digital GPSS signals, GPSS functionality may be emulated by operating the autopilot in HDG mode and selecting GPSS from the G5 menu. If the autopilot is already designed to receive roll steering information, the data is transmitted digitally from the navigator to the autopilot.

When GPSS is selected on the G5 menu, the heading bug on the HSI changes to a hollow outline and a crossed-out heading bug appears on the G5 HSI display indicating that the autopilot is not coupled to the heading bug. The bug is still controllable and may still be used for reference.

When GPSS is selected on the G5, GPSS turn commands are converted into a heading error signal to the autopilot. When the autopilot is operated in HDG mode, the autopilot will fly the turn commands from the GPS

navigator. If the GPSS data is invalid (for example, if there is no active GPS leg) or the selected HSI source on the G5 HSI is not GPS, the annunciated GPSS text will be yellow and a zero turn command will be sent to the autopilot.

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SECTION 5 – PERFORMANCE

No change.

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SECTION 6 – WEIGHT AND BALANCE

See current weight and balance data.

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SECTION 7 – SYSTEM DESCRIPTION

Refer to Garmin G5 Electronic Flight Instrument Pilot's Guide for Certified Aircraft, part number 190-01112-12 Rev A (or later approved revisions), for a description of the G5 electronic flight instrument. This reference material is not required to be on board the aircraft but does contain a more in depth description of all the functions and capabilities of the G5.

The ATT circuit breaker supplies power to the G5 instrument for normal power operation and to charge the internal battery.

The DG circuit breaker supplies power to the G5 instrument for normal power operation when configured as a DG, and to charge the internal battery (if installed).

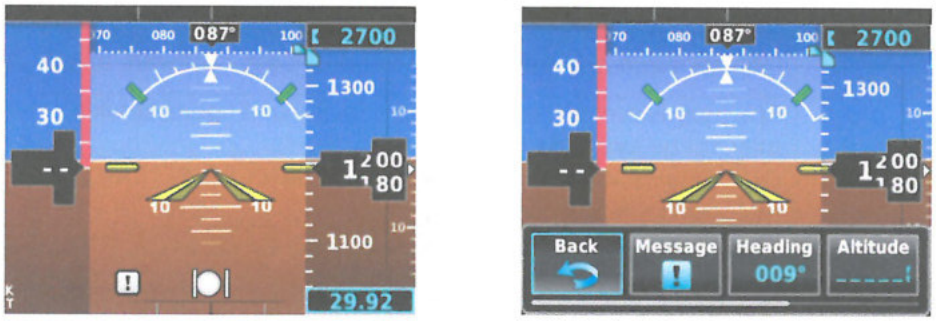
The HSI circuit breaker supplies power to the G5 instrument for normal power operation when configured as an HSI, and to charge the internal battery (if installed).

The GAD circuit breaker supplies power to the optional GAD 29 adapter for normal power operation.

System Messages

The G5 has the capability to display system messages to the crew along the bottom of the display. A system message is indicated through a white ⚠ indication on the G5.

Messages can be displayed by pressing the G5 knob, and selecting the Message menu item.



(For Reference Only)

The following table shows the meaning of each message. System messages are displayed in white text.

Message	Meaning
External Power Lost	Aircraft power has been removed from the G5.
Critical battery fault! Powering off	Battery has critical fault condition and the unit is about to power off to avoid damage to the battery.
Battery fault	Battery has a fault condition – unit needs service.
Battery charger fault	Battery charger has a fault condition – unit needs service.
Low battery	Battery charge level is low.
Hardware fault	Unit has a hardware fault – unit needs service.
Power supply fault	Unit power supply fault detected – unit needs service.
Unit temperature limit exceeded	Unit is too hot or too cold.
Network address conflict	Another G5 with the same address is detected on the network (most commonly a wiring error on one of the units).
Communication error	General communication error (most commonly appears in conjunction with Network Address Conflict message).
Factory calibration data invalid	Unit calibration data not valid – unit needs service.
Magnetic field model database out of date	Internal magnetic field database is out of date - software update required.
Magnetometer Hardware fault	The magnetometer has detected a fault – unit needs service. Heading data may not be available.
Using external GPS data	GPS data from another network LRU is being used. The unit's internal GPS receiver is enabled, but unable to establish a GPS fix.
Not receiving RS-232 data	The G5 is not receiving RS-232 data from the GPS navigator – system needs service.
Not receiving ARINC 429 data	The G5 is not receiving ARINC 429 data from the navigation source – system needs service.
GPS receiver fault	The G5 on-board GPS receiver has a fault.
ARINC 429 interface configuration error	The G5 ARINC 429 port is receiving information from an incorrect source – system needs service.
Software version mismatch	The G5 attitude indicator and the G5 HSI units have different software. Cross fill of baro, heading and altitude bugs is disabled.

These messages remain while the condition persists.

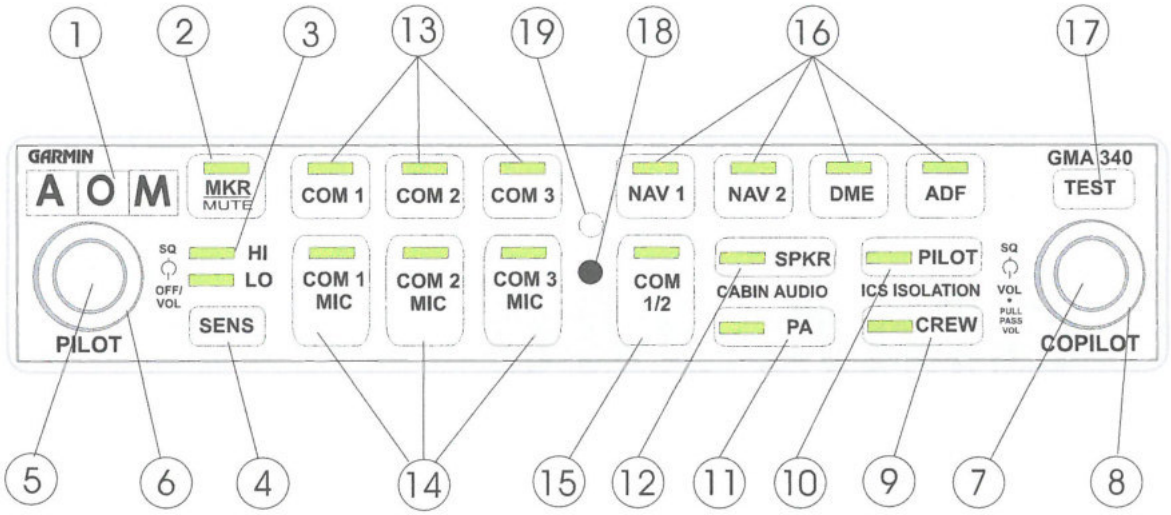
GARMIN

GMA 340

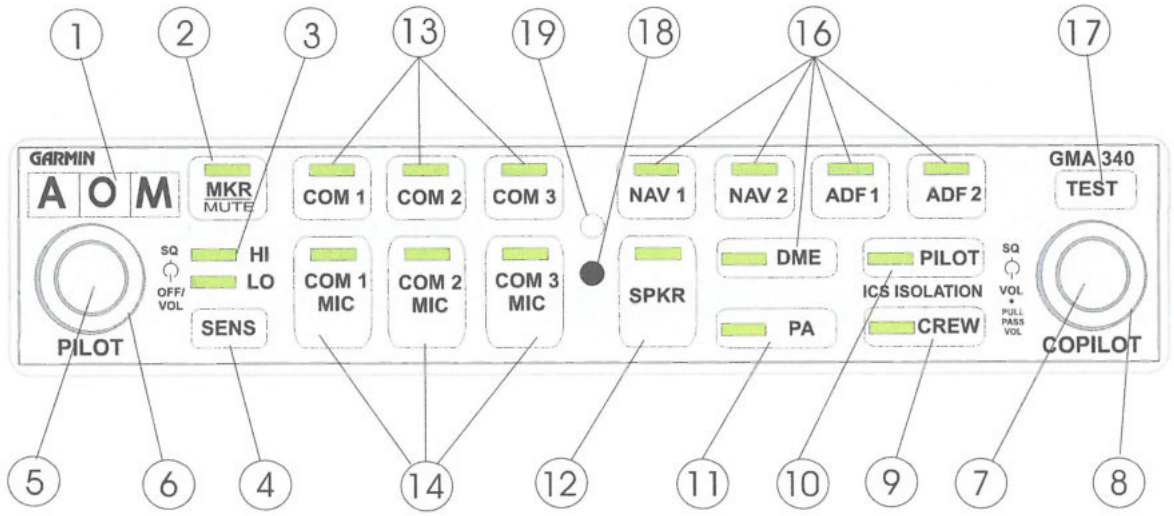
Audio Panel

pilot's guide

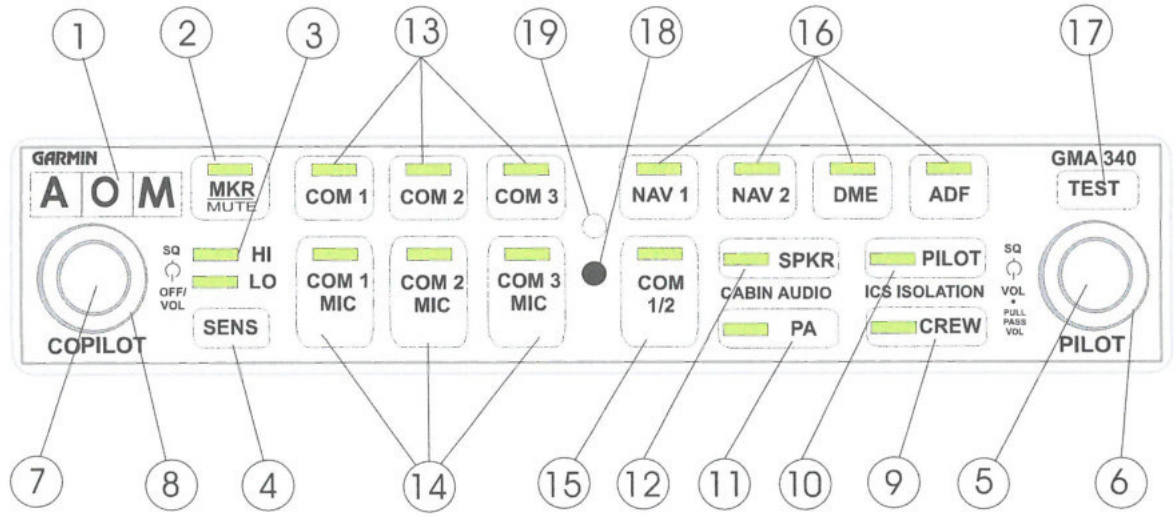
Front Panel Controls (GMA 340)



Front Panel Controls (GMA 340 Dual ADF)



Front Panel Controls (GMA 340H)



Function Selection Switches

The left small knob (5, 7) on all units controls ON/OFF function.

MKR BCN

1. Marker Beacon Lamps
2. Marker Beacon Receiver Audio Select/Mute Button
3. Marker Beacon Receiver Sensitivity Indicator LED's
4. Marker Beacon Receiver Sensitivity Selection Button

ICS

5. Pilot Intercom System (ICS) Volume (Also Passenger Volume on 340H)
6. Pilot ICS Voice Activated (VOX) Intercom Squelch Level
7. Copilot and Passenger ICS Volume Control (Pull out for Passenger Volume)
8. Copilot and Passenger VOX Intercom Squelch Level
9. Crew Isolation Intercom Mode Button
10. Pilot Isolation Intercom Mode Button

11. Passenger Address (PA) Function Button
12. Speaker Function Button

COM/ NAV

13. Transceiver Audio Selector Buttons (COM 1, COM 2, COM 3)
14. Transmitter (Audio/Mic) Selection Buttons
15. Split COM Button (Not Available in Dual ADF)
16. Aircraft Radio Audio Selection Buttons (NAV 1, NAV 2, DME, ADF 1, ADF 2)

17. Annunciator Test Button
18. Locking Screw Access
19. Photocell – Automatic Annunciator Dimming

On, Off, and Failsafe Operation

The GMA 340 is powered off when the left small knob (5, 7) is rotated fully CCW into the detent. To turn the unit on rotate the knob clockwise past the click. The left small knobs also functions as the pilot or copilot's ICS volume control on the appropriate unit. A failsafe circuit connects the pilot's headset and microphone directly to COM 1 in case the power is interrupted or the unit is turned off.

Lighting

LED Button annunciator and marker beacon lamp intensity are controlled automatically by a built-in photocell on the front panel. Nomenclature backlighting is controlled by the aircraft dimmer buss.

Transceivers

Audio level is controlled by the selected COM radio volume control.

Selection of either COM 1, COM 2, or COM 3 (13) for both MIC and audio source is accomplished by pressing either COM 1 MIC, COM 2 MIC, or COM 3 MIC (14). The active com audio is always heard on the headphones.

Additionally, each audio source can be selected independently by pressing COM 1, COM 2, or COM 3 (13). When selected in this way, they remain active as audio sources regardless of which transceiver has been selected for microphone use.

When a microphone is keyed, the active transceiver's MIC button LED blinks approximately once per second to indicate that the radio is transmitting.

Split COM (Not Available on Dual ADF)

Pressing the COM 1/2 button (15) activates the Split COM function. When this mode is active, COM 1 is dedicated solely to the pilot for MIC/audio while COM 2 is dedicated to the copilot for MIC/audio. The pilot and copilot can simultaneously transmit in this mode over separate radios. Both pilots can still listen to COM 3, NAV 1, NAV 2, DME, ADF, and MKR as selected. The Split COM mode is cancelled by pressing the COM 1/2 button a second time.

When in the Split COM mode the copilot may make PA announcements while the pilot continues using COM 1 independently. When the PA button is pressed after the Split COM mode is activated, the copilot's mic is output over the cabin speaker when keyed. A second press of the PA button returns the copilot to normal Split COM operation.

If the COM radios utilize a "transmit interlock" system, the Split COM function may require that this feature is enabled. Refer to the radio's installation manual for guidance. GARMIN makes no expressed or implied guarantees regarding the suitability of the Split COM feature in a given installation.

Com Swap Function

The GMA 340 allows the use of a remote mounted switch (typically on the yoke) to alternately transfer the active microphone back and forth between COM 1 and COM 2. Pressing the remote switch will have no affect if COM 3 is the active transceiver. Ask your installing agency for details.

Aircraft Radios & Navigation

Audio level is controlled by the selected NAV radio volume control.

Pressing NAV 1, NAV 2, DME, ADF 1, ADF 2(16), or MKR (2) (see MKR Beacon Receiver, page 8) selects each audio source. A second button press deselects the audio.

In addition, the GMA 340 provides inputs for an unswitched aircraft radio (TEL RINGER) and an unmuted, unswitched aircraft radio (ALT WRN).

Speaker Output

Pressing the SPKR button (12) selects aircraft radios over the cabin speaker. The speaker output is muted when a COM microphone is keyed. The GMA 340 speaker output level can be adjusted by your installing agency.

PA Function

The PA mode is activated by pressing the PA button (11). Then, when either the pilot's or copilot's microphone is keyed, the corresponding mic audio is heard over the cabin speaker. If the SPKR button is also active, then any selected speaker audio is muted while the microphone is keyed. The SPKR button does *not* have to be previously active in order to use the PA function. Pilot and copilot PA microphone speaker levels are adjustable by your installing agency.

Auxiliary Entertainment Inputs

The GMA 340 and 340H provide two stereo entertainment inputs: MUSIC 1 and MUSIC 2. The 340 Dual ADF has only MUSIC 1. MUSIC 1 is soft-muted during all aircraft radio activity and normally during ICS activity. MUSIC 2 is a non-muted input. These inputs are compatible with popular portable entertainment devices such as cassette tape or CD players. The headphone outputs of these devices are used and plugged into MUSIC 1 or MUSIC 2. Two 3.5 mm stereo phone jacks should be installed in a convenient location for this purpose. MUSIC 1 and MUSIC 2 have characteristics that are affected by the active intercom mode. Refer to the table on page 7.

Intercom System (ICS) (Pilot and Copilot functions are reversed on the 340H)

Intercom volume and squelch (VOX) are adjusted using the following front panel knobs:

- ***LEFT SMALL KNOB —*** Unit ON/OFF power control and Pilot ICS volume. Full CCW DETENT position is OFF.

- ***LEFT LARGE KNOB —*** Pilot ICS mic VOX squelch level. CW rotation increases the amount of mic audio (VOX level) required to break squelch. Full CCW is the "hot mic" position.

- ***RIGHT SMALL KNOB —*** IN position: Copilot ICS volume. OUT position: Passenger ICS volume.

- ***RIGHT LARGE KNOB —*** Copilot and passenger mic VOX squelch level. CW rotation increases the amount of mic audio (VOX level) required to break squelch. Fully CCW is the "HOT MIC" position.

Each of the six microphone inputs have dedicated VOX circuits ensuring that only the active microphone(s) is/are heard when squelch is broken. This represents a vast improvement over the party-line systems and reduces the amount of background noise in the headphones during cockpit communications. After the operator has stopped talking, the intercom channel remains momentarily open to avoid closure between words or normal pauses.

The GMA 340 provides three intercom modes: PILOT, CREW and ALL. The mode selection is accomplished using the PILOT and/or CREW buttons.

Pressing a mode button activates the corresponding ICS mode. Pressing again deactivates the mode. The operator can switch directly from PILOT to CREW or from CREW to PILOT by pressing the other mode button. The ALL mode is active when neither PILOT nor CREW LED are lit. To switch from PILOT to CREW mode, press the CREW button; from CREW to PILOT, press the PILOT button. An LED ON indicates the isolation mode is active.

- ***PILOT mode*** isolates the pilot from everyone else and dedicates the aircraft radios to the pilot exclusively. The copilot and passengers share communication between themselves but cannot communicate with the pilot or hear the aircraft radios.
- ***CREW mode*** places the pilot and copilot on a common ICS communication channel. The passengers are on their own intercom channel and can communicate with each other, but cannot communicate with the crew or hear the aircraft radios.
- ***ALL mode*** allows full intercom communication between everyone plugged in to the GMA 340. Aircraft radios are heard by all.
- ***MUSIC 1 and MUSIC 2*** stereo entertainment inputs are affected by the intercom mode selected.

The following table summarizes the ICS operation for the different modes supported by the GMA 340:

MODE	PILOT HEARS	COPILOT HEARS	PASSENGER HEARS	MUSIC 1 MUTING TRIGGERED BY
PILOT (LED LIT)	Selected Radios. Pilot.	Copilot. Passengers. MUSIC 1.	Passengers. Copilot. MUSIC 1.	Copilot or passenger ICS activity.
CREW (LED LIT)	Selected Radios. Pilot. Copilot. MUSIC 1.	Selected Radios. Copilot. Pilot. MUSIC 1.	Passengers. MUSIC 2. (MUSIC 1 in Dual ADF)	Aircraft radio activity. MKR activity. Pilot or Copilot ICS activity.
ALL LED's OFF)	Selected Radios. Pilot. Copilot. Passengers. MUSIC 1.	Selected Radios. Pilot. Copilot. Passengers. MUSIC 1.	Selected Radios. Pilot. Copilot. Passengers. MUSIC 1.	Aircraft radio activity. MKR activity. ICS activity.

MUSIC 1 is normally muted during ICS activity. However an installation option is available to disable ICS MUTE. Then muting of MUSIC 1 will not occur due to ICS activity. A panel mounted switch may be installed for this function. The MUSIC 1 mute trip level is adjustable by the installing agency.

Mono/Stereo Headset

The use of stereo headsets is highly recommended.

If monaural headsets are plugged into stereo jacks that do not have a switch installed, the unit will not be damaged.

If the pilot uses a monaural headset in a stereo jack, no audio will be heard during failsafe operation. When using a monaural headset the pilot's jack must be equipped with a stereo/mono switch and it must be set to the 'mono' position for proper failsafe operation.

A person listening on a monaural headset will hear only the left channel from the GMA 340 in both ears. If a monaural headset is used at one of the passenger positions, any other passenger listening on a stereo headset will hear audio in their left ear only, unless their headset has a stereo/mono switch and it is set for mono.

Marker Beacon Receiver

The marker beacon is used as part of an ILS approach, and in certain instances, to identify an airway. In addition to the normal marker beacon functions, the GMA 340 provides an audio muting function. The lamps illuminate, and an associated keyed-tone is heard when MKR audio is selected, when the aircraft passes over a 75 MHz marker beacon transmitter.

Audio Frequency	Audio Keying	Lamp Actuated
400 Hz		Blue (Outer)
1300 Hz		Amber (Middle)
3000 Hz		White (Airway/Inner)

The lamp and audio keying for ILS approach operation are summarized below:

The marker beacon audio level is aligned at the factory to produce its rated audio output. However, the output level is adjustable by your avionics installing agency.

The GMA 340's marker beacon receiver controls are located on the left side of the front panel (1 through 4). The SENS button selects either high or low sensitivity as indicated by the HI or LO LED being lit. Low sensitivity is used on ILS approaches while high sensitivity allows operation over airway markers or to get an earlier indication of nearing the outer marker during an approach.

The marker audio is selected initially by pressing the MKR/mute button (2). If no marker beacon signal is received, then pressing again will deselect the marker audio. This operation is similar to selecting any other audio source on the GMA 340. However, if the second button press occurs while a marker beacon signal is received, then the marker audio is muted but not deselected. The button's LED will remain lit to indicate that the source is still selected.

The GMA 340's ***SmartMute***™ function then monitors the marker signal and automatically unmutes the audio when the current marker signal is no longer being received.

In all cases, the marker beacon lamps operate independently of any audio selection and cannot be turned off. The GMA 340 can drive external marker lamps if required.

Limited Warranty

GARMIN Corporation warrants this product to be free from defects in materials and workmanship for one year from the date of purchase. GARMIN will, at its sole option, repair or replace any components which fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts or labor. The customer is, however, responsible for any transportation costs. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alteration or repairs.

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GMA 340

GMA 340 Dual ADF

GMA 340H

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Part Number 190-00149-10 Rev. C

GARMIN

GNC 255A/255B

Pilot's Guide

This manual reflects the operation of *System* Software version 2.00, or later. Some differences in operation may be observed when comparing the information in this manual to later software versions.

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All Garmin avionics products are warranted to be free from defects in materials or workmanship for: two years from the date of purchase for new Remote-Mount and Panel-Mount products; one year from the date of purchase for new portable products and any purchased newly-overhauled products; six months for newly-overhauled products exchanged through a Garmin Authorized Service Center; and 90 days for factory repaired or newly-overhauled products exchanged at Garmin in lieu of repair. Within the applicable 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 or labor, provided that the customer shall be responsible for any transportation cost. This warranty does not apply to: (i) cosmetic damage, such as scratches, nicks and dents; (ii) consumable parts, such as batteries, unless product damage has occurred due to a defect in materials or workmanship; (iii) damage caused by accident, abuse, misuse, water, flood, fire, or other acts of nature or external causes; (iv) damage caused by service performed by anyone who is not an authorized service provider of Garmin; or (v) damage to a product that has been modified or altered without the written permission of Garmin. 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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To obtain warranty service, contact your local Garmin Authorized Service Center. For assistance in locating a Service Center near you, visit the Garmin web site at http://www.garmin.com or contact Garmin Customer Service at 866-739-5687.

WARNING: *For safety reasons, GNC 255 operational procedures must be learned on the ground.*

CAUTION: *The Garmin GNC 255 does not contain any user-serviceable parts. Repairs should only be made by an authorized Garmin service center. Unauthorized repairs or modifications could void both the warranty and the pilot's authority to operate this device under FAA/FCC regulations.*

CAUTION: *The GNC 255 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.*

NOTE: *Garmin recommends that if flying in a region with 8.33 kHz COM channel spacing, the radio should remain in 8.33 kHz mode. This will prevent the loss of stored user and recent frequencies.*

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

NOTE: *All visual depictions contained within this document, including screen images of the GNC 255 bezel and displays, are subject to change and may not reflect the most current GNC 255 software. Depictions of equipment may differ slightly from the actual equipment.*

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

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

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

NOTE: This device complies with Part 15 of the FCC limits for Class B digital devices. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Furthermore, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference, the user is encouraged to try to correct the interference by relocating the equipment or connecting the equipment to a different circuit than the affected equipment. Consult an authorized dealer or other qualified avionics technician for additional help if these remedies do not correct the problem.

Operation of this device is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

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

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

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Product Registration and Support

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

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Record of Revisions			
Part Number	**Revision**	**Date**	**Description**
190-01182-01	A	11/19/12	Initial release

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Contents

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1 GETTING STARTED

1.1 Product Description

Combining a powerful VHF communications transceiver with 200 channel VOR, Localizer and Glideslope receivers, the GNC 255 provides a full-functioned navigation and communications solution in a small footprint at a very affordable price. Besides traditional Nav/Com features, the GNC 255 also incorporates workload-reducing functions such as automatic decoding of the Morse code station identifier for VOR/LOC, most-used frequency storage in memory, built-in course deviation indicator, and more.

The GNC 255 has the ability to monitor the standby Com frequencies. The GNC 255's Com radio operates in the aviation voice band, from 118.000 to 136.975 MHz, in 25 kHz steps (default). For European operations, a Com radio configuration of 8.33 kHz steps is also available. The GNC 255 VHF Nav receiver operates from 108 MHz to 117.95 MHz decoding both the VHF Omni Range and Localizer navigation signals. The built-in Glideslope receiver will automatically tune the corresponding glideslope paired frequencies (328 MHz to 335 MHz) when the localizer is tuned. The GNC 255 is available in 10 and 16 watt com transmitter versions. The GNC 255A is available with a 10 watt com transmitter. The GNC 255B is available with a 16 watt com transmitter.

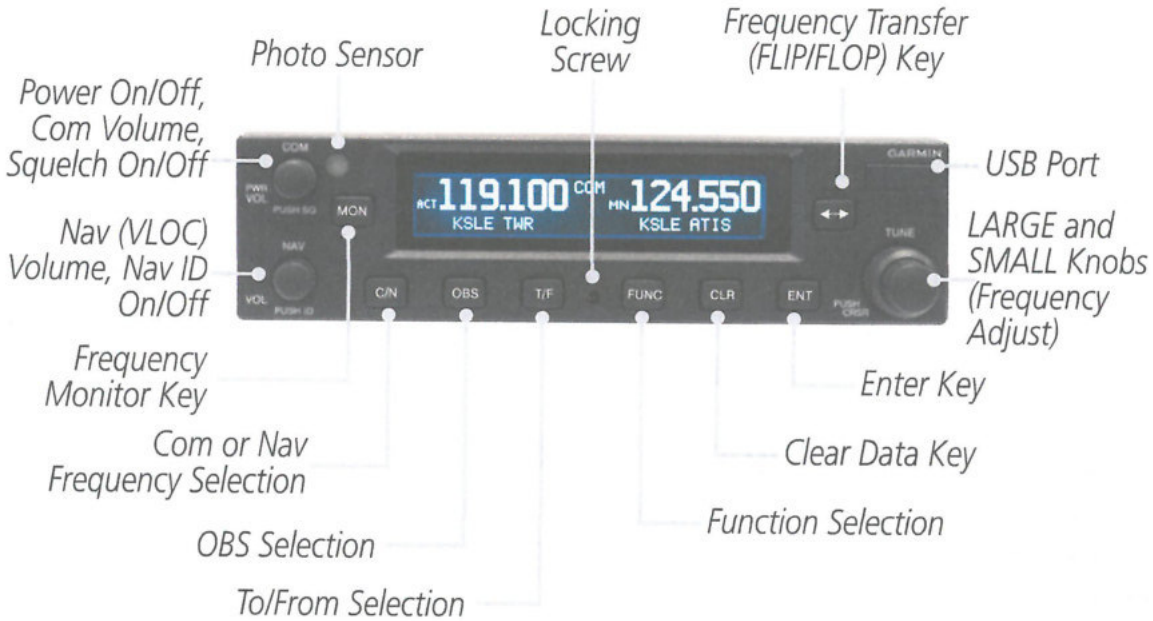


Figure 1-1 GNC 255 Front Panel Description

1.2 Pilot Controls

The GNC 255 controls have been designed to simplify operation of the system and minimize workload and the time required to access sophisticated functionality. Controls are comprised of dual concentric knobs for frequency tuning, Com volume/squelch knob, Nav volume/ID knob, and bezel keys.

1.2.1 Power/Com Volume/Squelch Knob

The **Power/Com Volume/Squelch** knob located in the top left corner of the bezel controls audio volume for the Com radio. Rotating the knob clockwise past the detent turns power on and counter-clockwise turns power off. When the Com radio is active, press the **Power/Com Volume/Squelch** knob to toggle automatic squelch control On/Off for the Com radio.

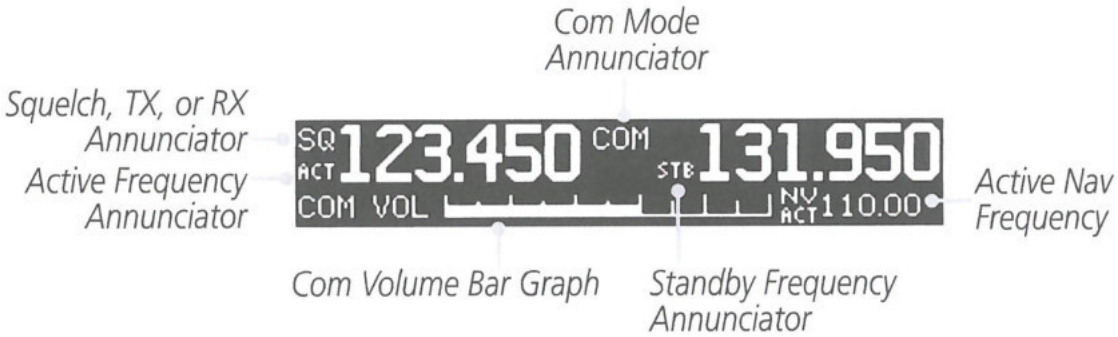


Figure 1-2 Com Volume and Squelch Display Description

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

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

1.2.2 Nav Volume/ID Knob

The **Nav Volume/ID** knob located in the bottom left corner of the bezel controls audio volume for the Nav radio. Press the **Nav Volume/ID** knob and the Morse code tones will be heard. When Morse code tone is active, "ID" will appear to the left of the Nav active frequency.

1.2.3 Tuning LARGE/SMALL Concentric (Cursor) Knobs

The **LARGE right** and **SMALL right** knobs are used for tuning frequencies and data entry.

1.2.4 FLIP/FLOP Key

Press and release the **FLIP/FLOP** key to switch between the active (left-most) and standby (right-most) frequency. Switching between Com frequencies is disabled while you are transmitting.

1.2.5 C/N (Com/Nav) Key

Press the **C/N** key to select the Com or Nav (VLOC) radio mode.

1.2.6 OBS Key

Press the **OBS** key to see the current OBS setting and graphic CDI. The OBS page will be disabled if the unit is installed with an external converter.

1.2.7 T/F (To/From) Key

Press the **T/F** key to toggle between the bearing TO or radial FROM the active VOR. The T/F page also shows Distance/Speed/Time information. The **T/F** key does not operate for Localizer frequencies.

1.2.8 CLR (Clear) Key

Pressing the **CLR** key erases information, cancels entries, and resets timers.

1.2.9 ENT (Enter) Key

Press the **ENT** key to save selected values, to confirm a prompt, or to save the Standby frequency.

1.2.10 FUNC (Function) Key

FUNC

The **FUNC** (Function) key accesses function categories for the following: the Com Radio, Nav Radio, ICS Configuration, System Configuration, and Timer. Pressing the **FUNC** key once displays the Function mode. Pressing the **FUNC** key a second time exits the Function mode.

1.2.11 MON (Monitor) Key

MON

The **MON** (Monitor) key will engage the monitor function where the Standby frequency may be monitored while still listening to the Active frequency.

1.3 USB Port

The USB port is used to update the frequency database in the GNC 255.

***NOTE:** Garmin recommends the use of a USB 2.0 compatible USB flash drive for updating the database.*

2 BASIC OPERATION

2.1 Power On

Turn the GNC 255 on by either turning the **Power/Com Volume/ Squelch** knob clockwise to turn the power on or, if installed, turning on the master switch that powers the radios.

2.2 Com Radio

2.2.1 Selecting a Com Frequency

New frequencies are first selected as a Standby frequency and then toggled to the Active side with the **FLIP/FLOP** key. While viewing the Standby frequency display, use the **LARGE** and **SMALL** knobs on the right side of the GNC 255 to select the desired frequency.

1. Press **C/N**, if necessary, to reach the Com radio function. The COM annunciator on the top line of the display will show.

2. Turn the **LARGE** knob to change the values in one MHz increments. The MHz selection range is between 118 and 136 in one MHz steps.
3. Turn the **SMALL** knob to change the values in 25 kHz or 8.33 kHz increments. The kHz selection range is between 000 and 975 kHz in 25 kHz steps or 000 and 990 kHz in 8.33 kHz steps.
4. Turn the **LARGE** and **SMALL** knobs clockwise to increase and counterclockwise to decrease the frequency values. Standby frequency selection is not inhibited during transmit.
5. When connected to a position source, nearby station identifiers will be shown for the selected frequency. Frequencies with multiple types will have an asterisk next to the identifier.

Figure 2-1 Com Frequency Selection

6. Press and release the **FLIP/FLOP** key to toggle the Standby frequency to the Active frequency.

2.2.2 Monitoring the Standby Com Channel

The Frequency Monitoring function allows you to monitor the Standby frequency for activity, while listening to the Active frequency.

Press the **MON** key in the Com function to listen to the standby frequency. A small "MN" will replace the "STB" to the left of the Standby frequency.

Figure 2-2 Com Frequency Monitor Annunciation

When the Active frequency receives a signal, the unit will switch automatically to the Active frequency. The Active frequency quality is not affected. The Frequency Monitor function is turned off by pressing the **MON** key again. Monitoring is not canceled by switching to Nav mode.

2.2.3 Saving a Com Channel

The current Standby frequency may be saved into the Com User Frequency database from the Com display or the Com User Function. The Com User Frequency database can hold up to 15 frequencies.

***NOTE:** When switching from 8.33 kHz to 25 kHz mode, any 8.33 kHz-specific user frequencies will be deleted from the user frequency list. This only affects the user frequencies within the 8.33 kHz spectrum.*

1. Press **ENT**. The Standby frequency is selected and the Waypoint name field will be active.

2. Turn the **SMALL** knob to select characters.
3. Turn the **LARGE** knob to move the cursor.

Figure 2-3 Com User Frequency Name Selection

4. After selecting the desired characters, press **ENT**.

5. Turn the **LARGE** knob to select the waypoint Type.
6. Turn the **SMALL** knob to select the Type from the list.

Selected Wpt Type

Figure 2-4 Com User Frequency Type Selection

Frequency Type Symbol	Description
TWR	Tower
GND	Ground
ATIS	Automatic Terminal Information Service
AWS	Automated Weather Observing System
ATF	Aerodrome Traffic Frequency
ARR	Arrival
APPR	Approach
DEP	Departure
CLR	Clearance
CTAF	Common Traffic Advisory Frequency
FSS	Flight Service Station
RFS	Remote Flight Service Station
MF	Mandatory Frequency
UNI	Unicom
Blank	None

Table 2-1 - Com Frequency Type List

7. After making a selection, press **ENT**.

2.2.4 Com Database Look-Up

1. Press the **CURSOR** knob from the Com display to activate the database look-up function.

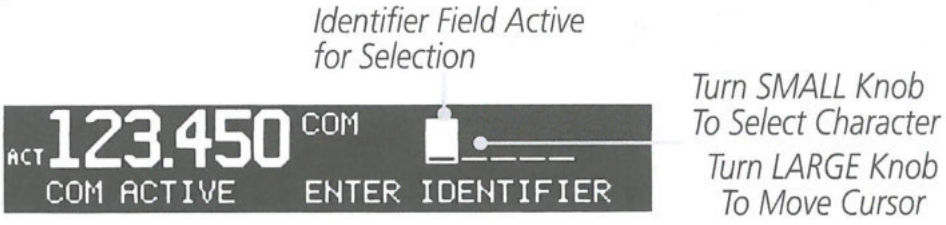


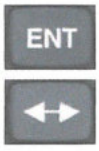
Figure 2-5 Database Identifier Active for Selection

2. Turn the **SMALL** knob to select characters and turn the **LARGE** knob to move the cursor.

Figure 2-6 Database Identifier Selection

3. After selecting the desired characters, press **ENT**. Turn the **SMALL** knob to scroll through the list of waypoint types. Waypoint Types with a "+" sign will have more frequencies for the same type. After selection, the selected waypoint and type will be remembered for 30 minutes.

Figure 2-7 Database Waypoint Type Selection



4. Press **ENT** to copy the frequency into the Standby frequency location. Press and release the **FLIP/FLOP** key to swap the Active and Standby frequencies.

2.2.5 Frequency Database Reverse Look-Up

The identifier and frequency type will be shown for Com and Nav frequencies that are in the database when the unit is receiving a valid position input. Waypoint Types with a "+" sign will have more frequencies for the same type.

Figure 2-8 Frequency Database Reverse Look-Up

2.2.6 Emergency Channel

1. Press and hold the **FLIP/FLOP** key or the Com Remote Transfer (COM RMT XFR) key for approximately two seconds.

Figure 2-9 Emergency Channel

2. The Emergency Channel will be inserted into the Active Frequency position and the previous Active Frequency will become the Standby Frequency.

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

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

2.2.7 Stuck Mic

The GNC 255 helps protect you from a situation where the microphone may get stuck in the ON or Transmit position. If the microphone is keyed for longer than 35 seconds, the GNC 255 will return to the receive mode on the selected frequency.

A "Stuck Mic" message will display until the transmit key is released. Alerts will display until the error clears or the user acknowledges it.

2.2.8 Remote Frequency Selection Control

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

The standby frequency isn't activated until a Com **FLIP/FLOP** switch (either bezel-mounted or remote (COM RMT XFR) is pressed. Remote Frequency Selection only functions on units configured for a remote Com Frequency recall switch.

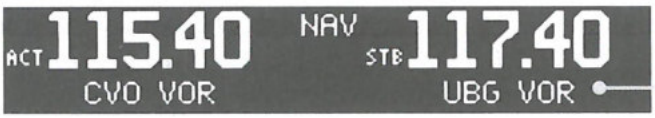
2.3 Nav Radio

2.3.1 Selecting a Nav Frequency

The selection of Nav frequencies is the same as for the Com frequencies.

1. Press the **C/N** key to reach the Nav radio function. The NAV annunciator on the top line of the display will show.

2. Turn the **LARGE** knob to change the values in one MHz increments. The MHz selection range is between 108 and 117 MHz in one MHz steps.
3. Turn the **SMALL** knob to change the values in 50 kHz increments.



Identifier and Type Shown For The Selected Frequency

Figure 2-10 Nav Frequency Selection

***CAUTION:** The Identifier is determined from the database and is not the decoded Nav Identifier.*

4. Press and release the **FLIP/FLOP** key to toggle the Standby frequency to the Active frequency.

***NOTE:** Both Nav and Com frequencies cannot be displayed at the same time.*

2.3.2 Saving a Nav Channel

The current Standby frequency may be saved into the Nav User Frequency database from the Nav or the Nav User Function. The Nav User Frequency database can hold up to 15 frequencies.

1. Press **ENT**. The Waypoint name field will be active.

2. Turn the **SMALL** knob to select characters.
3. Turn the **LARGE** knob to move the cursor.

Figure 2-11 Nav User Frequency Name Selection

4. After selecting the desired characters, press **ENT**.

5. Turn the **LARGE** knob to select the waypoint Type.
6. Turn the **SMALL** knob to select characters.
7. Turn the **LARGE** knob to move the cursor.

Figure 2-12 Nav User Frequency Type Selection

8. After selecting the desired characters, press **ENT**.

Frequency Type Symbol	Description
VOR	Very High Frequency Omni-Directional Range
DME	Distance Measuring Equipment
LOC	Localizer
ILS	Instrument Landing System
01-36	Runway Heading
Blank	None

Table 2-2 - Nav Frequency Type List

2.3.3 Listening to the Nav Audio Channel

Nav ident is enabled by pressing the **Nav Volume** knob when the Nav display is active. When Nav ident is enabled, the ID annunciation will appear to the left of the active Nav frequency.

Figure 2-13 Listening to the ID for a Nav Frequency

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

2.4 OBS Mode

If your system is configured with an external CDI/HSI, the OBS radial of your remote display will be decoded and displayed on the screen of the GNC 255.

***NOTE:** The Identifier is the decoded Nav Identifier from the Morse code broadcast by the station.*

1. Press the **OBS** key to see the current OBS setting and graphic CDI.

2. Use the **LARGE** and **SMALL** knobs to change the displayed OBS values.

The GNC 255 graphic CDI is shown as a graph of five dots right or left of the triangle icon. Each dot indicates two degrees deflection with ten degrees full deflection to each side. Fly towards the bar to be on-course.

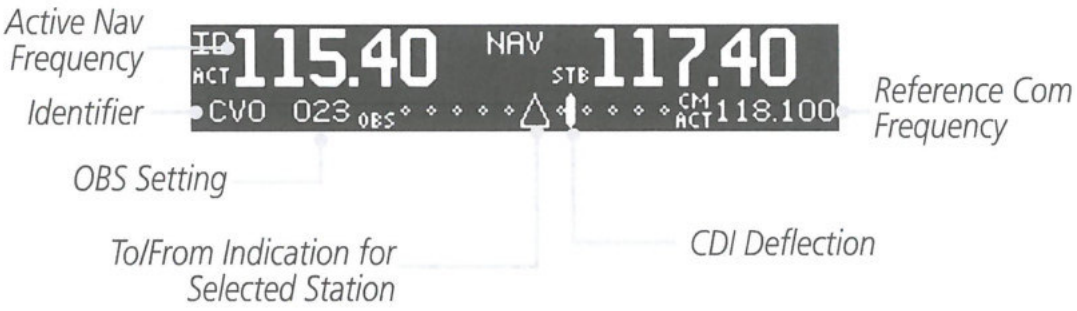


Figure 2-14 CDI Display

2.5 Distance/Speed/Time (DST) Display

When the GNC 255 has received data from an external device, such as a GPS receiver or DME sensor through the serial port, DST data will be available. If you are not connected to an external sensor, you will not see this display.

T/F

If DST data is not shown, pressing the **T/F** key will show DST data in the lower part of the display.

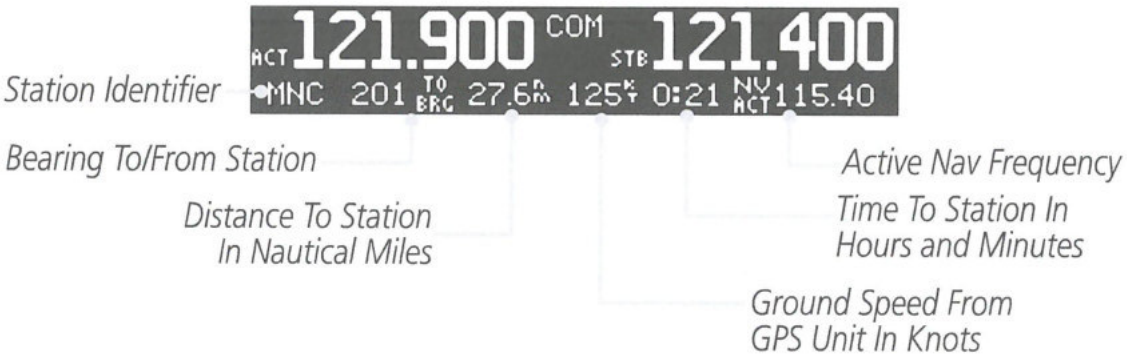


Figure 2-15 DST Data Display

NOTE: *The If both GPS and DME data sources are connected to the GNC and dashes are displayed when distance/speed/time data is expected to be displayed, press the T/F key to prompt the GNC to display DST data.*

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3 FUNCTIONS

The Functions section allows provides information about Com Frequencies, Nav Frequencies, Internal Communications System (ICS) Configuration, System Configuration (SYS), and Timers (TMR).

3.1 Functions Description

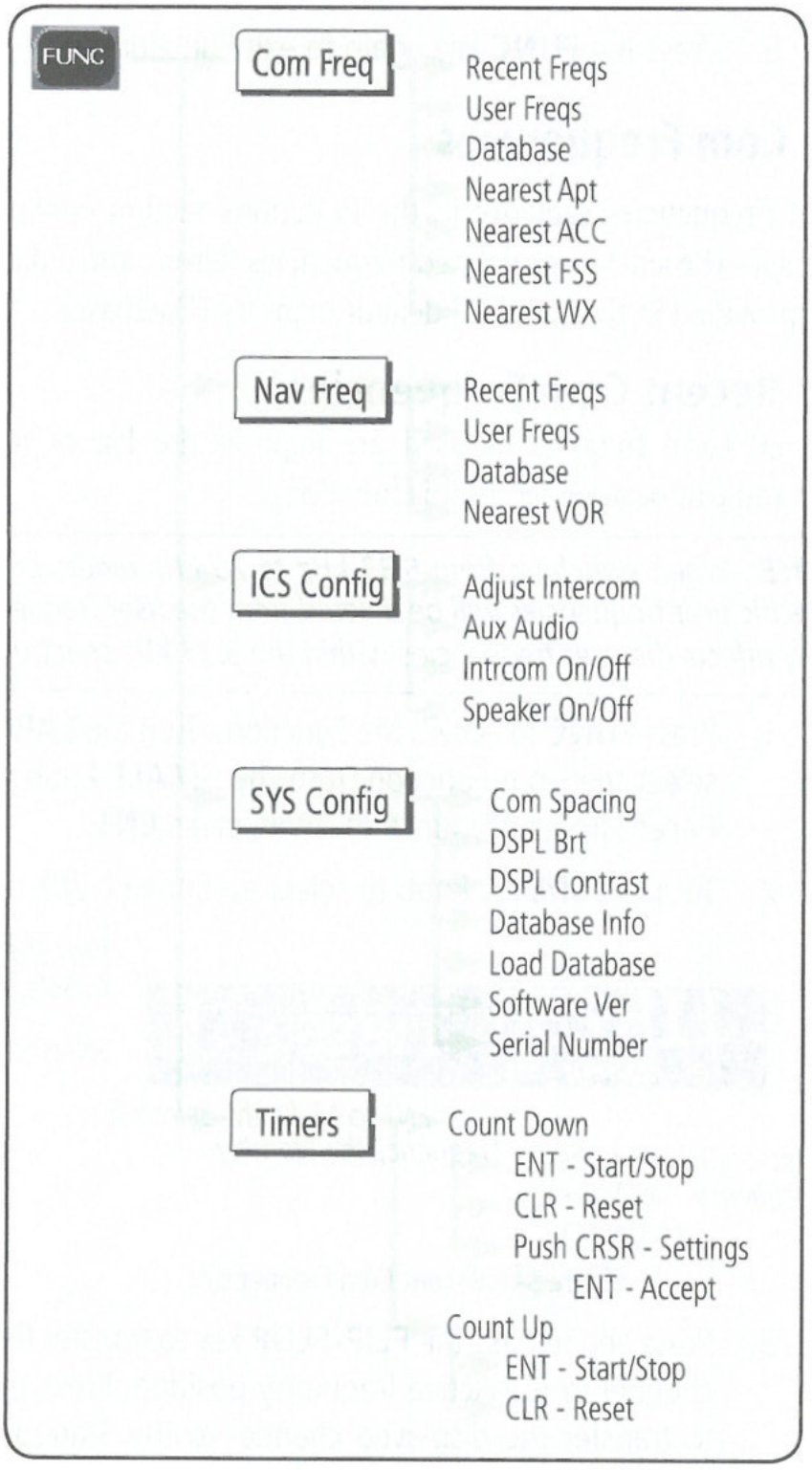


Figure 3-1 Functions Diagram

1. Press the **FUNC** key to access the Functions.

2. Turn the **LARGE** knob to select the COM, NAV, ICS, or SYS functions.
3. Turn the **SMALL** knob to view the choices in each function.

4. Press the **ENT** key to access the function.

5. Press the **FUNC** key again to exit Functions.

3.2 Com Frequencies

The Com Frequencies category in the Functions section contains recently used frequencies (Recent), user-defined frequencies (User), and a database of all frequencies provided in the standard default memory (Database).

3.2.1 Recent Com Frequencies

The last 20 Com frequencies used are kept in the list of Recent Com Frequencies and can be accessed in this function.

***NOTE:** When switching from 8.33 kHz to 25 kHz mode, any 8.33 kHz-specific user frequencies will be deleted from the user frequency list. This only affects the user frequencies within the 8.33 kHz spectrum.*

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the Com Function. Turn the **SMALL** knob to view the Recent frequency function. Then, press **ENT**.
2. Turn the **SMALL** knob to select an Entry (1-20).

Turn SMALL Knob To Select Entry

Selected Frequency

Press ENT to Make the Selected Frequency the Standby

Press <-> To Make the Selected Frequency The Active Frequency

Figure 3-2 Recent Com Frequencies

3. Press and release the **FLIP/FLOP** key to transfer the displayed channel to the Active frequency position. Press the **ENT** key to transfer the displayed channel to the Standby frequency position.

3.2.2 Com User Frequencies

Fifteen Com User Frequencies can be saved with an assigned waypoint (WPT) identifier and Type.

NOTE: *When switching from 8.33 kHz to 25 kHz mode, any 8.33 kHz-specific user frequencies will be deleted from the user frequency list. This only affects the user frequencies within the 8.33 kHz spectrum.*

3.2.2.1 Viewing the Com User Frequency

FUNC

ENT

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the Com Frequency Function.

Selected Frequency

Select Wpt Type

Select Wpt Name

Figure 3-3 Viewing User Com Frequencies

ENT

2. Turn the **SMALL** knob to view the Com User frequency function. Then, press **ENT**. Turn the **SMALL** knob to view the User Frequencies.

↔

3. Press and release the **FLIP/FLOP** key to set the displayed frequency as the Active frequency.

ENT

4. Press the **ENT** key to set the displayed frequency as the Standby frequency.

3.2.2.2 Deleting the Com User Frequency

CLR

1. Press the **CLR** key to delete this User frequency.

Press ENT Key To Delete Selected Freq

Active Frequency

Position In List. Turn SMALL Knob To Select Entry.

Press ENT To Confirm Deleting The Selected Freq

Selected Frequency

Figure 3-4 Deleting User Com Frequencies

ENT

2. Press the **ENT** key to confirm deletion of the displayed frequency.

3.2.2.3 Editing a Com User Frequency

FUNC

1. Press **FUNC**. Turn the **LARGE** knob to reach the Com functions and then turn the **SMALL** knob to select the Com User Frequencies. Press **ENT**.

ENT

Select User Freqs

Figure 3-5 Com User Frequency Function

2. Press the **CRSR** (**SMALL** knob) to start editing the Com User frequency. Turn the **SMALL** knob to select the MHz values and turn the **LARGE** knob to move the cursor and then the **SMALL** knob to select kHz values.

Select User Freq Value

Figure 3-6 Com User Frequency Value Selection

3. Turn the **LARGE** knob to select the Wpt Name. Turn the **SMALL** knob to select characters and turn the **LARGE** knob to move the cursor.

Select User Wpt Name

Figure 3-7 Com User Frequency Name Selection

ENT

4. After selecting the desired characters, press **ENT**.

5. Turn the **LARGE** knob to select the Waypoint Type field.
6. Turn the **SMALL** knob to select the Waypoint Type.

Select Wpt Type

Figure 3-8 Com User Frequency Type Selection

ENT

7. After selecting the Waypoint Type, press **ENT** to accept changes to the User Frequency.

3.2.3 Com Database Frequencies

The GNC 255 contains a large database of Com frequencies that may be recalled by identifier.

Figure 3-9 Com Database Frequencies

1. Press **FUNC** to access the Functions. With the Com Frequency Function highlighted, turn the **SMALL** knob to view the Com Database function. Then, press **ENT**.

2. Turn the **SMALL** knob to select the desired character.
3. Turn the **LARGE** knob to move the cursor to highlight a character.

4. Repeat steps 2 and 3 to complete the desired identifier and then press the **ENT** key.

5. If available, the Frequency Type will be highlighted. Turn the **SMALL** knob to select the desired frequency.

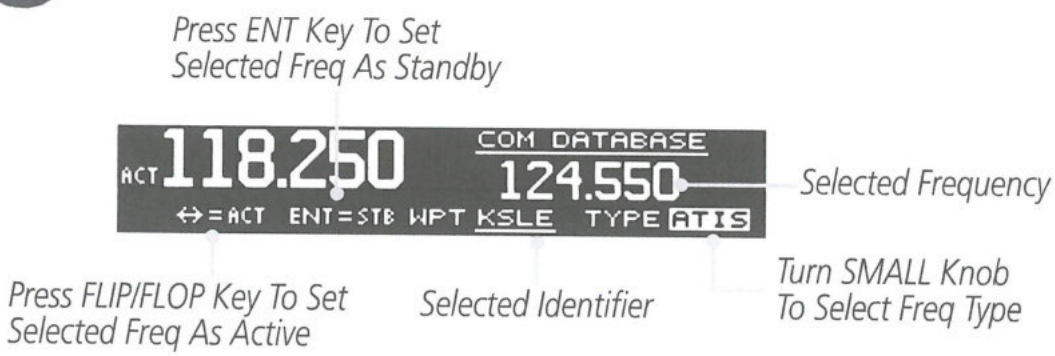


Figure 3-10 Selected Com Database Frequency

6. Press and release the **FLIP/FLOP** key to set the selected frequency as the Active frequency.

7. Press the **ENT** key to set the selected frequency as the Standby frequency.

3.2.4 Com Nearest Airports (APT)

The GNC 255 will report the 25 nearest Airports (APT), when interfaced with an appropriate GPS receiver.

Figure 3-11 Com Nearest APT Frequencies

1. Press **FUNC** to access the Functions. With the Com Frequency Function highlighted, turn the **SMALL** knob to view the Com Nearest APT function. Then, press **ENT**.

2. Turn the **SMALL** knob to display the available airports. Press the **ENT** key to select the displayed airport. The frequency type will be highlighted. Turn the **SMALL** knob to select the desired frequency type.

3. Then, press the **ENT** key to set the displayed airport frequency as the Standby or press and release the **FLIP/FLOP** key to set it as the Active frequency. Or, press the **CLR** key to return to the Functions display.

3.2.5 Com Nearest Area Control Center (ACC) Frequencies

The GNC 255, when interfaced with an appropriate GPS receiver, will report the 25 nearest Area Control Center (ACC) frequencies. ACCs are also known as Air Route Traffic Control Centers (ARTCC).

Turn SMALL Knob To Scroll Through Available Frequencies

Figure 3-12 Com Nearest ACC Frequencies

1. Press **FUNC** to access the Functions. With the Com Frequency Function highlighted, turn the **SMALL** knob to view the Com Nearest ACC function. Then, press **ENT**.
2. Turn the **SMALL** knob to display the available ACCs.
3. Press the **ENT** key to insert the highlighted frequency as the Standby frequency. Or, press the **CLR** key to return to the Functions display.
4. Press and release the **FLIP/FLOP** key to set the selected frequency as the Active frequency.

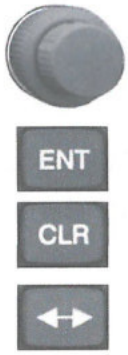
3.2.6 Com Nearest Flight Service Station (FSS) Frequencies

The GNC 255, when interfaced with an appropriate GPS receiver, will report the 25 nearest Flight Service Station (FSS) frequencies.

Turn SMALL Knob To Scroll Through Available Frequencies

Figure 3-13 Com Nearest FSS Frequencies

1. Press **FUNC** to access the Functions. With the Com Frequency Function highlighted, turn the **SMALL** knob to view the Com Nearest FSS function. Then, press **ENT**.



2. Turn the **SMALL** knob to display the available FSS frequencies.
3. Press the **ENT** key to insert the highlighted frequency as the Standby frequency. Or, press the **CLR** key to return to the Functions display.
4. Press and release the **FLIP/FLOP** key to set the selected frequency as the Active frequency.

3.2.7 Com Nearest Weather (WX) Frequencies

The GNC 255, when interfaced with an appropriate GPS receiver, will report the 25 nearest Weather (WX) frequencies.

Turn SMALL Knob To Scroll Through Available Frequencies

Figure 3-14 Com Nearest Weather Frequencies

1. Press **FUNC** to access the Functions. With the Com Frequency Function highlighted, turn the **SMALL** knob to view the Com Nearest Weather function. Then, press **ENT**.

2. Turn the **SMALL** knob to display the available Weather frequencies.

3. Press the **ENT** key to insert the highlighted frequency as the Standby frequency. Or, press the **CLR** key to return to the Functions display.

4. Press and release the **FLIP/FLOP** key to set the selected frequency as the Active frequency.

3.3 Nav Frequencies

The Nav Frequencies category in the Functions section contains remotely acquired frequencies (Remote), recently used frequencies (Recent), user-defined frequencies (User), and a database of all frequencies provided in the standard default memory (Database).

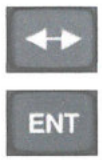
3.3.1 Recent Nav Frequencies

The last 20 Nav frequencies used are kept in the list of Recent Nav Frequencies and can be accessed in this function.

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the Nav Frequency Function. Turn the **SMALL** knob to view the Recent frequency function. Then, press **ENT**.

Figure 3-15 Recent Nav Frequencies

2. Turn the **SMALL** knob to select an Entry (1-20). If a GPS position is available, the area below frequency will show the nearest facility name/type, if available.



3. Press and release the **FLIP/FLOP** key to transfer the displayed channel to the Active frequency position or press the **ENT** key to transfer the displayed channel to the Standby frequency position.

3.3.2 Nav User Frequencies

Up to 15 Nav User Frequencies can be saved with an assigned waypoint (WPT) identifier and Type.

3.3.2.1 Viewing the Nav User Frequency

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the Nav Frequency List Function. Turn the **SMALL** knob to view the Nav User Frequency function. Then, press **ENT**.

Figure 3-16 Viewing User Nav Frequencies

2. Turn the **SMALL** knob to view the Nav User Frequencies.

3. Press and release the **FLIP/FLOP** key to set the displayed frequency as the Active frequency.

4. Press the **ENT** key to set the displayed frequency as the Standby frequency.

3.3.2.2 Deleting the Nav User Frequency

1. While viewing a Nav User frequency, press the **CLR** key to delete the displayed User frequency.

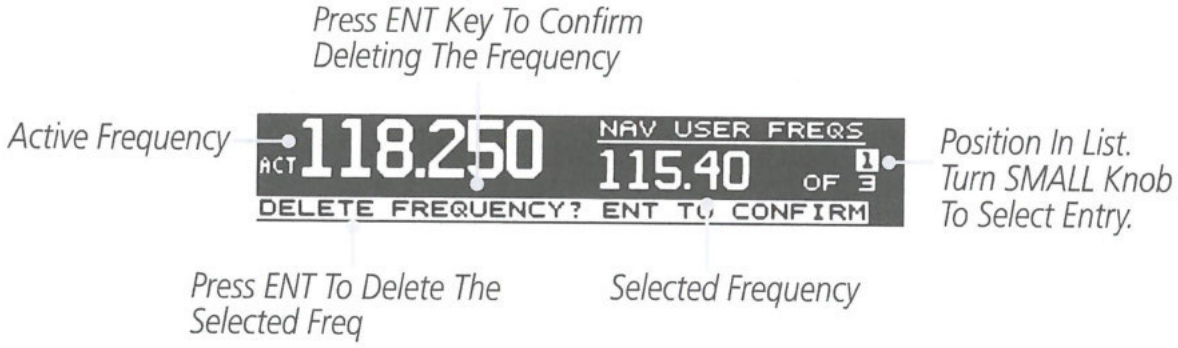


Figure 3-17 Deleting User Nav Frequencies

2. Press the **ENT** key to delete the displayed frequency.

3.3.2.3 Editing a Nav User Frequency

1. Press **FUNC**. Turn the **LARGE** knob to reach the Nav functions and then turn the **SMALL** knob to select the Nav User Frequencies. Press **ENT**.

Figure 3-18 Nav User Frequency Function

2. Turn the **SMALL** knob to select the desired Nav User frequency and then press **ENT**. Press the Cursor knob to enable editing. The frequency MHz value will be selected. Turn the **SMALL** knob to select the MHz frequency value. Turn the **LARGE** knob to move the cursor and then turn the **SMALL** knob to select the kHz frequency value.

3. Turn the **LARGE** knob to select the WPT name. Turn the **SMALL** knob to select characters and turn the **LARGE** knob to move the cursor.

Figure 3-19 Nav User Frequency Name Selection

4. After selecting the desired characters, press **ENT**.

5. Turn the **LARGE** knob to select the waypoint Type.

6. Turn the **SMALL** knob to select characters and Turn the **LARGE** knob to move the cursor.

Figure 3-20 Nav User Frequency Type Selection

7. After selecting the desired characters, press **ENT**.

3.3.3 Nav Database Frequencies

The GNC 255 contains a large database of Nav frequencies that may be recalled by identifier.

1. Press **FUNC** to access the Functions. With the Nav Frequency Function highlighted, turn the **SMALL** knob to view the Nav Database function. Then, press **ENT**.
2. Turn the **LARGE** knob to move the cursor to highlight a character.
3. Turn the **SMALL** knob to select the desired character.

Turn SMALL Knob To Select Character

Turn LARGE Knob To Move Cursor

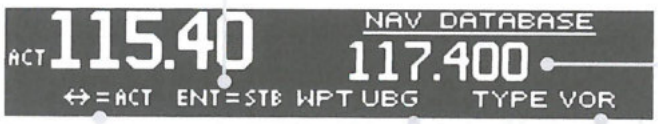
Press the ENT Key to Save the Displayed Value

Press the CLR Key To Return to the Previous Menu

Figure 3-21 Nav Database Frequencies

4. Repeat steps 2 and 3 to complete the desired identifier and then press the **ENT** key.
5. If available, the Frequency Type will be highlighted. Turn the **SMALL** knob to select the desired frequency.

Press ENT Key To Set Selected Freq As Standby



Selected Frequency

Wpt Type

Press FLIP/FLOP Key To Set Selected Freq As Active

Selected Identifier

Figure 3-22 Selected Nav Database Frequency

6. Press and release the **FLIP/FLOP** key to set the selected frequency as the Active frequency.

7. Press the **ENT** key to set the selected frequency as the Standby frequency.

Duplicate Identifiers

1. When duplicate identifiers are found, press **ENT**.

Figure 3-23 Selected Nav Database Frequency

2. Turn the **SMALL** knob to select the desired identifier and then press **ENT** and continue as described above.

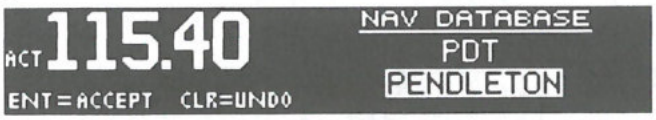


Figure 3-24 Selected Ident from Nav Database

3. Set the selected identifier as the standby or active frequency.

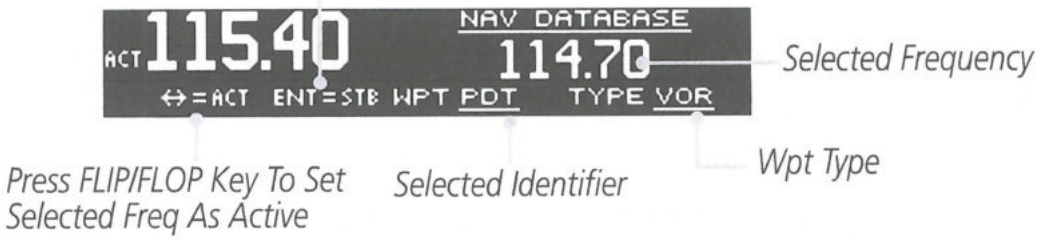


Figure 3-25 Set Selected Frequency as Active or Standby

3.3.4 Nav Nearest VOR

The GNC 255, when interfaced with an appropriate GPS receiver, will report the 25 nearest VORs.

Figure 3-26 Nav Nearest VOR Frequencies

1. Press **FUNC** to access the Functions. With the Nav Frequency Function highlighted, turn the **SMALL** knob to view the Nav Nearest VOR function. Then, press **ENT**.

2. Turn the **SMALL** knob to display the available VORs.

3. Press the **ENT** key to accept the displayed VOR and set it as the Standby frequency. Or, press the **CLR** key to return to the Functions display.

3.4 ICS Configuration

The Internal Communications System (ICS) Configuration allows you to adjust the intercom, set the Nav/Aux volume, turn the Intercom On/Off, and turn the intercom speaker On/Off.

3.4.1 Adjust Intercom

The Adjust Intercom function allows you to set values for the Intercom squelch and volume. The Intercom On/Off function must be set to On to make the Adjust Intercom function available.

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the ICS Function. Turn the **SMALL** knob to view the Adjust Intercom function. Then, press the **ENT** key.

Figure 3-27 Select the Adjust Intercom Function

2. Turn the **SMALL** knob to set the ICS Squelch value. Then, press the **ENT** key.

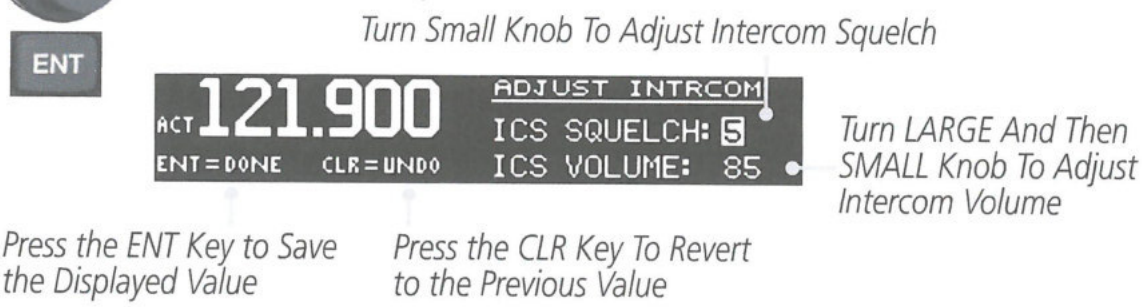


Figure 3-28 Adjust the Intercom Values

3. Turn the **LARGE** knob to select the ICS Squelch or Volume. Turn the **SMALL** knob to set the value. Then, press the **ENT** key to save the selected values.

3.4.2 Aux Audio

The Aux function allows you to turn Aux Audio On/Off and set the volume value.

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the ICS Function. Turn the **SMALL** knob to view the Aux Volume function. Then, press the **ENT** key.

Figure 3-29 Select the Aux Audio Function

2. Turn the **SMALL** knob to turn the Aux Audio On or Off.
3. Turn the **LARGE** knob to select the Aux Volume. Turn the **SMALL** knob to set the value. Then, press the **ENT** key.

Figure 3-30 Adjust Aux Audio

4. Press the **CLR** key to revert to the previous Volume value and then repeat step 3 to select a new value.

3.4.3 Intercom On/Off

The Intercom On/Off function toggles intercom on and off. The intercom can also be toggled on/off with a remote switch, if installed. The Intercom On/Off function must be set to On to make the Adjust Intercom function available.

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the ICS Function. Turn the **SMALL** knob to view the Intercom On/Off function. Then, press the **ENT** key.

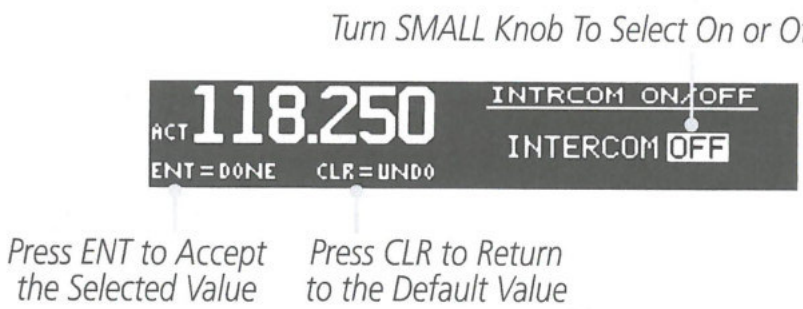


Figure 3-31 Turn the Intercom On/Off

2. Turn the **SMALL** knob to set the Intercom On or Off. Then, press the **ENT** key to save the selected value.

3.4.4 Speaker On/Off

The Speaker On/Off function toggles speaker output on and off.

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the ICS Function. Turn the **SMALL** knob to select the Speaker On/Off function. Then, press **ENT**.

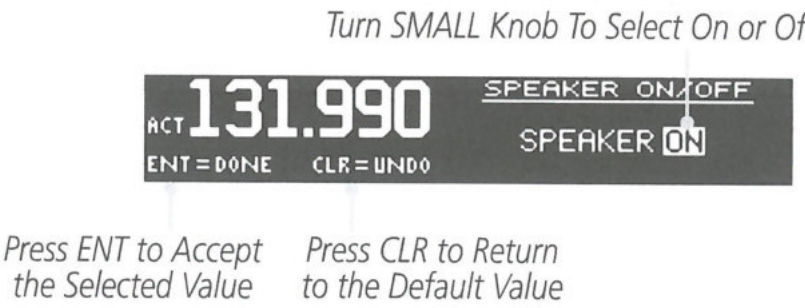


Figure 3-32 Turn the Speaker On/Off

2. Turn the **SMALL** knob to set the speaker output On or Off. Then, press the **ENT** key to save the selected value.

3.5 System Configuration

The System Configuration function will show the Software Version, Database Info, and Serial Number as well as, allowing you to set values for the Com spacing, Display Brightness, and Display Contrast, and use the Load Database feature to update databases.

3.5.1 Com Spacing

Com spacing may be selected between 8.33 kHz and 25 kHz to allow for regional requirements.

***NOTE:** When switching from 8.33 kHz to 25 kHz mode, any 8.33 kHz-specific user frequencies will be deleted from the user frequency list. This only affects the user frequencies within the 8.33 kHz spectrum.*

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the SYS Function. Turn the **SMALL** knob to view the Com spacing function. Then, press the **ENT** key.

Figure 3-33 Com Spacing Display

2. Turn the **SMALL** knob to set the Com spacing and then press the **ENT** key.

3.5.2 Display Brightness

As it arrives from the factory, the GNC 255 automatically adjusts its display brightness for the current lighting conditions. A small sensor on the display is used for this function. A manual adjustment is available for controlling the brightness level of the display as an offset from the "normal" or zero position.

The limits of the adjustment range are: -10 (Low Display Intensity) and 100 (High Display Intensity). A value above zero means brighter than normal and a value below zero means darker than normal. The range can be adjusted by using the **SMALL** knob to adjust the value.

The GNC 255 will either control dimming based on the photocell or the lighting bus. This is set in configuration mode during installation and is not selectable by the pilot.

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the SYS Function. Turn the **SMALL** knob to view the Display Brightness function. Then, press the **ENT** key.

Current Display Brightness

Press ENT to Accept the Selected Value

Press CLR to Return to the Previous Value

Turn the SMALL Knob to Select the Offset Value

Figure 3-34 Set Display Brightness

2. Turn the **SMALL** knob to set the value. Then, press the **ENT** key.

3.5.3 Display Contrast

The Display Contrast has a range from -50 (Low Display Contrast) and 50 (High Display Contrast) with 0 as the default. The range can be adjusted by using the **SMALL** knob to adjust the value.

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the SYS Function. Turn the **SMALL** knob to view the Display Contrast function. Then, press the **ENT** key.

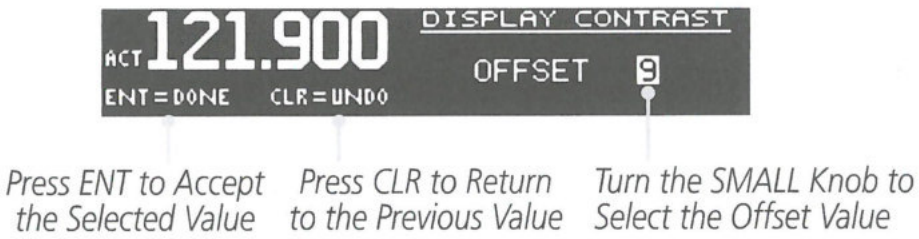


Figure 3-35 Set Display Contrast

2. Turn the **SMALL** knob to set the value. Then, press the **ENT** key.

3.5.4 Database Info

The Database information for the GNC 255 unit is displayed. This information is useful when contacting Customer Support.

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the SYS Function. Turn the **SMALL** knob to view the Database Version function. Then, press the **ENT** key.

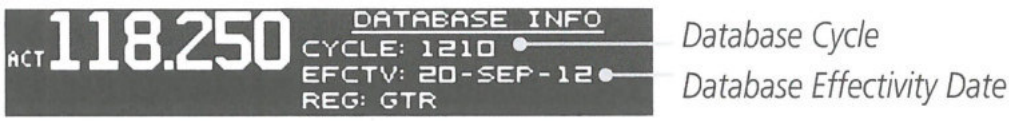


Figure 3-36 Database Info Display

2. Press the **FUNC** key to return to the main display.

3.5.5 Load Database

The GNC 255 has a USB connector to allow for easily updating the system databases.

NOTE: *Garmin recommends the use of a USB 2.0 compatible USB flash drive for updating the database.*

1. Insert the supplied cable into the USB port on the top right corner of the GNC 255.
2. Insert the USB memory device into the other end of the cable.

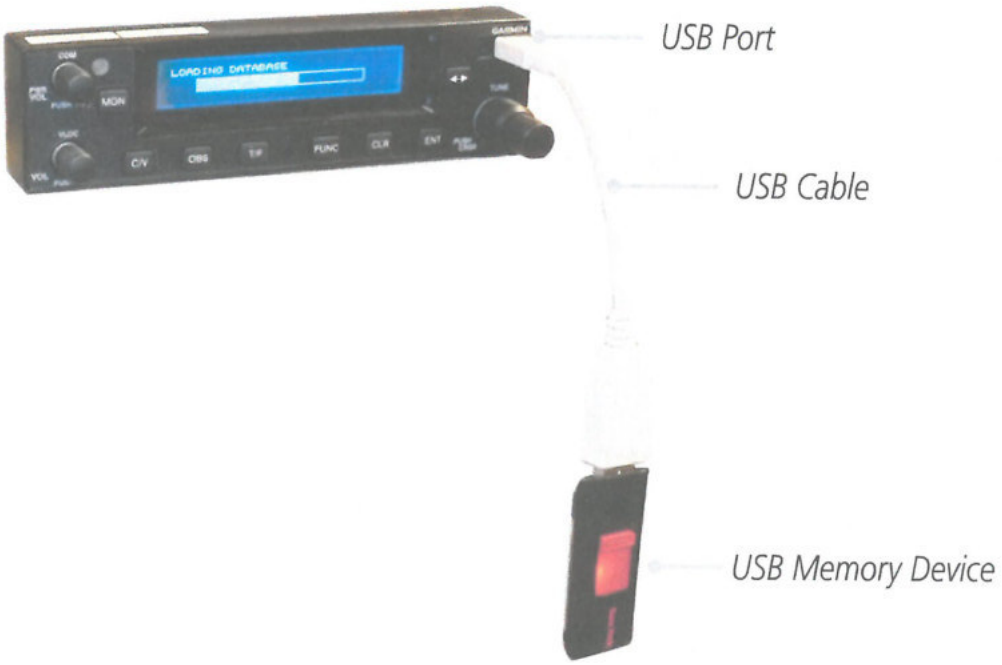


Figure 3-37 USB Update Progress

FUNC

ENT

3. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the SYS Function. Turn the **SMALL** knob to view the Load Database function. Then, press the **ENT** key.

Figure 3-38 Database Update Display

ENT

4. Verify the database version on USB. Then, press the **ENT** key. Updating will begin automatically.

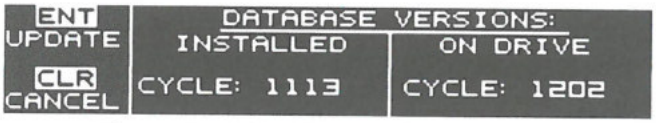


Figure 3-39 Verify Database Version

5. Wait until the updating process is complete and then remove the memory device and cable. The unit will reset automatically once the database is updated.
6. Verify the correct frequency database is loaded after power-up.

3.5.6 Software Version

The software versions of the GNC 255 unit are displayed. This information is useful when contacting Customer Support.

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the SYS Function. Turn the **SMALL** knob to view the Software Version function. Then, press the **ENT** key.

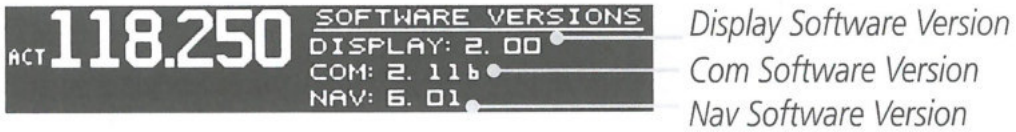


Figure 3-39 Software Versions Display

2. Press the **FUNC** key to return to the main menu.

3.5.7 Serial Number

The serial number of the GNC 255 unit is displayed. This information is useful when contacting Customer Support.

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the SYS Function. Turn the **SMALL** knob to view the Serial Number function. Then, press **ENT**.

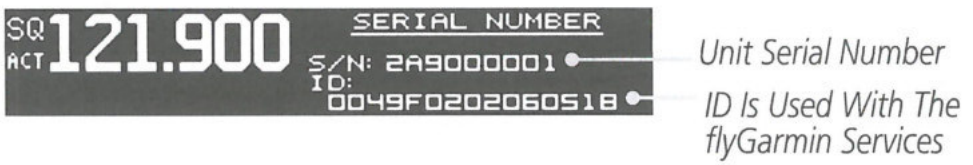


Figure 3-40 Serial Number Display

2. Press the **FUNC** key to return to the main menu.

3.6 Timers

The GNC 255 has both Count Up and Count Down timers, which may operate simultaneously and are shown in the lower right of the Com/Nav displays. The countdown timer always takes precedence if it is running.

3.6.1 Setting Up the Count Down Timer

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the Timer (TMR) function. Turn the **SMALL** knob to select either the Count Down Timer function. Now, press the **ENT** key.

Figure 3-41 Select the Count Down Timer Function

2. Press the **ENT** key to Start or Stop the timer. Press the **CLR** key to reset the timer to the starting value. Press the **CURSOR** knob to select a starting timer value.

Figure 3-42 Selecting the Count Down Timer

3. Turn the **SMALL** knob to select the timer value and turn the **LARGE** knob to move the cursor. After completing the time setting, press the **ENT** key. Press **ENT** again to start the timer.

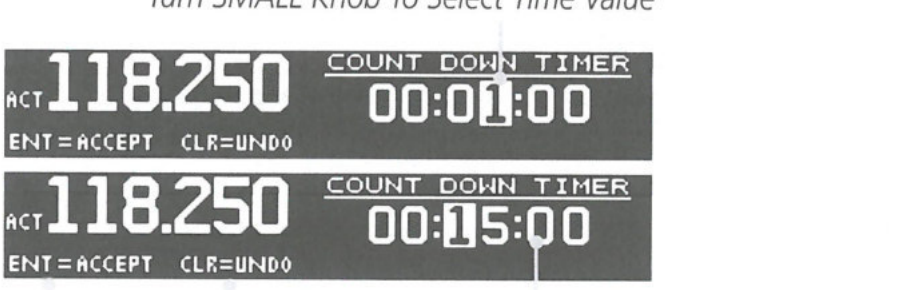


Figure 3-43 Setting the Count Down Timer Value

3.6.2 Setting Up the Count Up Timer

1. Press **FUNC** to access the Functions. Turn the **LARGE** knob to select the Timer (TMR) function. Turn the **SMALL** knob to select the Count Up Timer function. Now, press the **ENT** key.

Figure 3-44 Select the Count Up Timer Function

2. Press the **ENT** key to Start or Stop the timer. Press the **CLR** key to reset the timer to 0:00.

Figure 3-45 Selecting the Count Up Timer

3.6.3 Viewing Timers in the Com Display

When a timer is active, the timer value will be shown in the lower right corner of the Com display. While both timers may be actively counting at the same time, the Count Down Timer will have precedence in being shown. If the Count Down Timer is paused, the Count Up Timer will then be shown until the Count Down Timer is restarted.

Figure 3-46 Timer Value Shown in the Com Display

1. Pressing **CLR** and then **ENT** will reset the displayed Timer.

Figure 3-47 Stop or Clear the Timer in the Com Display

2. Pressing **ENT** twice will stop the displayed Timer.

When the Count Down Timer reaches 0:00, it will continue counting as a Count Up value. The Count Down Timer that is counting up will be highlighted. A Count Up Timer will continue counting separately.

Figure 3-48 Count Down Timer Value Now Counting Up

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4 APPENDIX

4.1 Troubleshooting

If efforts to resolve the problem fail, contact your dealer or the factory for technical assistance. The Garmin customer service staff will gladly assist you.

Please have the following information ready:

- System configuration (products, antennas, mounting locations, etc.)
- Model No., part number, and serial number
- Software versions
- Description of the problem
- Efforts made to isolate/solve the problem

Garmin International, Inc.
Aviation Products Customer Service Department
1200 East 151st Street
Olathe, KS 66062-3426 USA

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

US: 913-397-8200

US Toll Free: 1-866-739-5687

Canada Toll Free: 1-866-429-9296

e-mail: support.gat@garmin.com.

http://www.garmin.com

https://fly.garmin.com/fly-garmin

Problem	Possible Cause	Action
GNC 255 does not power on	No power to the GNC 255	Check power connections, breakers, and main avionics switch
	Faulty electrical wiring or connection	Contact your dealer to perform electrical system test
No Nav audio	Output disabled or set to a low level	Contact dealer
Nav audio in Com	Mixed with Com feature	Contact dealer
GNC 255 does not transmit	No power to Com	Check power connections
	Mic key connection	Check Mic key input connection
Intercom doesn't function	It can be enabled or disabled via a remote mounted switch or via the menu.	Check connections
	No voice activation, or if must talk too loud	Check ICS page, Intercom On/Off, Adjust Intercom
Can't change active frequency	Com Radio not communicating. The radio may also be in lockout mode. In this case the radio would be tuned to 121.50 and the active freq would not be able to be changed.	If in Lock Out mode, press the external Com FLIP/FLOP key for two seconds to return to normal operation or cycle the avionics power. If the condition persists, contact dealer.
OBS readout displays "---"	Resolver failure	Contact dealer
	Calibration error	Recalibrate resolver

Problem	Possible Cause	Action
Display shows "Incorrect Calibration Checksum" at start-up	Corrupted system calibration parameters	Contact factory

Table 4-1 Troubleshooting

4.2 Updating the Frequency Database

The GNC 255 uses a standard USB memory device to load the frequency database into the GNC 255. The memory device is not provided by Garmin. The Frequency database is stored internally and the USB memory device is only used to transfer the database into the unit.

The Garmin databases can be updated by following the instructions on *https://fly.garmin.com/fly-garmin*.

The following equipment is required to perform the update:

- Windows-compatible PC computer (Windows 2000, XP, Vista, or Windows 7 recommended)
- USB 2.0 compatible USB flash drive
- External USB cable
- Updated database obtained from the Garmin web site

***NOTE:** The data contained in the frequency database comes from government agencies. Garmin accurately processes and cross-validates the data, but cannot guarantee the accuracy and completeness of the data.*

4.2.1 Downloading the Frequency Database

The Frequency database is updated on a 28-day cycle. Frequency database updates are provided by Garmin and may be downloaded from the Garmin web site *https://fly.garmin.com/fly-garmin*.

4.2.2 Updating the GNC 255 Frequency Database

See Section 3.5.5 for details on updating the database.

4.3 Messages

When a Message has been issued by the unit, the Message will be shown on the display. After viewing the messages, touch the **ENT** key to acknowledge the message and return to the previously viewed page. An acknowledged message will not be redisplayed even if the condition persists. Messages provide an aid to troubleshooting system operation.

Figure 4-1 Message - Com PTT Key Stuck

Message	Description	Action
COM RADIO - Com radio needs service.	The com radio is reporting that it needs service. The com radio may continue to function.	Cycle the power to the COM radio. Contact dealer for service.
COM RADIO - Com radio may be inoperative.	The com radio is not communicating properly with the system.	Press and hold the volume knob or the external com remote transfer (COM RMT XFR) switch, if installed – this will force the com radio to 121.5 MHz. Contact dealer for service.
COM RADIO - Com overtemp or undervoltage. Reducing transmitter power.	Com radio is in overtemp or undervoltage mode and transmitting power has been reduced to prevent damage to the com radio. Radio range will be reduced.	Decrease length of com transmissions, decrease cabin temperature and increase cabin airflow (especially near the GTN). Check aircraft voltage and reduce electrical load as necessary. Contact dealer for service if this message persists.
COM RADIO - Com locked to 121.5 MHz. Hold remote com transfer key to exit.	Com radio is locked to 121.5 MHz.	The external com remote transfer (COM RMT XFR) switch has been held and the com radio is tuned to 121.5. To exit this mode, hold the com remote transfer (COM RMT XFR) switch for two seconds.

Message	Description	Action
COOLING FAN - The cooling fan has failed.	The GTN cooling fan is powered, but it is not turning at the desired RPM.	Decrease cabin temperature and increase cabin airflow (especially near the GTN) to prevent damage to the unit. Contact dealer for service.
DISPLAY - Display board needs service.	The display board is indicating that it needs service.	Contact dealer for service.
GLIDESLOPE - Glideslope receiver needs service.	The glideslope board is indicating that it needs service. The glideslope board may continue to function.	Verify glideslope deviation indications with another source and crosscheck final approach fix crossing altitude. If another glideslope source is not available for verification, fly a GPS based approach. Contact dealer for service.
GLIDESLOPE - Glideslope receiver has failed.	The glideslope board is not communicating property with the system.	Fly an approach that does not use the glideslope receiver (VOR, LOC, GPS). Contact dealer for service.
POWER ALERT - Unit will shut down if power switch is not restored immediately.	Power has been removed from the unit.	Re-apply power to the unit.
REMOTE KEY STUCK - Com push-to-talk key is stuck.	The Push To Talk key/ switch has been in pressed position for at least 30 seconds. This input will now be ignored and the com radio will no longer transmit.	Verify the Push To Talk key/switch is not stuck. Contact dealer for service if this message persists.

Message	Description	Action
REMOTE KEY STUCK - Com remote transfer key is stuck.	The remote com transfer (COM RMT XFR) key/switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the COM RMT XFR key/ switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - Com remote frequency increment key is stuck.	The remote com frequency increment (COM CHAN UP) key/ switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the COM CHAN UP key/ switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - Com remote frequency decrement key is stuck.	The remote com frequency decrement (COM CHAN DN) key/ switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the COM CHAN DN key/ switch is not stuck. Contact dealer for service if this message persists.

Message	Description	Action
REMOTE KEY STUCK - Nav remote transfer key is stuck.	The remote nav transfer (NAV RMT XFR) key/ switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the NAV RMT XFR key/ switch is not stuck. Contact dealer for service if this message persists.
VLOC RECEIVER - Navigation receiver needs service.	The nav radio is reporting that it needs service. The nav radio may continue to function.	Contact dealer for service.
VLOC RECEIVER - Navigation receiver has failed.	The nav radio is not communicating property with the system.	Contact dealer for service.

Table 4-2 Messages

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GARMIN

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Part Number 190-01182-01 Rev. A

GARMIN

GTX™ 330/330D

Mode S Transponder

software version 8 and up

Pilot's Guide

This manual is written for software version 8.01 or later, and is not suitable for earlier software versions. Refer to 190-00207-01 for earlier versions of software. Some differences in operation may be observed when comparing the information in this manual to earlier or later software versions.

Software License Agreement

BY USING THE GTX 330, YOU AGREE TO BE BOUND BY THE TERMS AND CONDITIONS OF THE FOLLOWING SOFTWARE LICENSE AGREEMENT. PLEASE READ THIS AGREEMENT CAREFULLY.

Garmin grants you a limited license to use the software embedded in this device (the "Software") in binary executable form in the normal operation of the product. Title, ownership rights and intellectual property rights in and to the Software remain in Garmin.

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***CAUTION:** The GTX 330 should be turned off before starting or shutting down aircraft engine(s).*

***NOTE:** Reference to the GTX 330 Transponder throughout this Pilot's Guide includes operation of the GTX 330D Diversity Transponder also.*

***NOTE:** Contact a Garmin authorized dealer for software updates.*

March, 2017 Part Number 190-00207-00 Rev. K Printed in USA

Aviation Limited Warranty

All Garmin avionics products are warranted to be free from defects in materials or workmanship for the earlier of: 2 years or 800 flight hours from the date of purchase for new TSO remote-mount and TSO panel-mount products; 1 year or 400 flight hours from the date of purchase for new Non-TSO remote-mount* and Non-TSO panel-mount*, portable products and any purchased newly-overhauled products; 6 months or 200 flight hours for factory repaired or newly-overhauled products exchanged through a Garmin Authorized Service Center. Within the applicable 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 or labor, provided that the customer shall be responsible for any transportation cost. This Limited Warranty does not apply to: (i) cosmetic damage, such as scratches, nicks and dents; (ii) consumable parts, such as batteries, unless product damage has occurred due to a defect in materials or workmanship; (iii) damage caused by accident, abuse, misuse, water, flood, fire, or other acts of nature or external causes; (iv) damage caused by service performed by anyone who is not an authorized service provider of Garmin; or (v) damage to a product that has been modified or altered without the written permission of Garmin. 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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*All new G3X units, including Non-TSO remote-mount or Non-TSO panel-mount, are warranted to be free from defects in materials or workmanship for the earlier of: 2 years or 800 flight hours from the date of purchase.

NOTE: It is the responsibility of the GTX 330 owner to obtain proper licensing before using the transponder.

NOTE: The coverage expected from the GTX 330 is limited to line of sight. Low altitude or aircraft antenna shielding by the aircraft itself may result in reduced range. Range can be improved by climbing to a higher altitude. It may be possible to minimize antenna shielding by locating the antenna where dead spots are only noticed during abnormal flight attitudes.

*The GTX 330 transponder is powered on by pressing the **STBY**, **ALT** or **ON** keys, or by a remote avionics master switch (if applicable). After power on, a start-up page is displayed while the unit performs a self test.*

Mode Selection Keys

OFF — Powers off the GTX 330. Pressing **STBY**, **ON,** or **ALT** key powers on the transponder displaying the last active identification code.

STBY — Selects the standby mode. When in standby mode, the transponder will not reply to any interrogations.

ON — In this mode, the transponder replies to interrogations, as indicated by the Reply Symbol (R). Replies do not include altitude information.

ALT — In **ALT** mode, the transponder replies to identification and altitude interrogations as indicated by the Reply Symbol (R). Replies to altitude interrogations include the standard pressure altitude received from an external altitude source, which is not adjusted for barometric pressure. The **ALT** mode may be selected in aircraft not equipped with an optional altitude encoder; however, the reply signal will not include altitude information.

Any time the function **ON** or **ALT** is selected the transponder becomes an active part of the Air Traffic Control Radar Beacon System (ATCRBS). The transponder also responds to interrogations from TCAS equipped aircraft.

***NOTE:** If Automatic Airborne Determination senses the aircraft is on the ground, the GTX 330 will not respond to ATCRBS or Mode S All-Call interrogations regardless of the operating mode.*

Code Selection

Code selection is done with eight keys (**0 – 7**) providing 4,096 active identification codes. Pushing one of these keys begins the code selection sequence. Digits that are not yet entered appear as dashes. The new code is activated when the fourth digit is entered. Pressing the **CLR** key moves the cursor back to the previous digit. Pressing the **CLR** key when the cursor is on the first digit of the code, or pressing the **CRSR** key during code entry, removes the cursor and cancels data entry, restoring the previous code. You may press the **CLR** key up to five seconds after code entry is complete to return the cursor to the fourth digit. The numbers 8 and 9 are not used for code entry, only for entering a Count Down time, and for adjusting contrast and display brightness.

When the transponder code is changed, a notification is sent to ATC by the GTX 330. This notification is temporary and will not be sent if the GTX is inactive (i.e., set to **STBY**) when the code is changed.

***NOTE:** On a dual transponder installation, change the code on the active transponder. This ensures the notification is transmitted to ATC.*

Keys for Other GTX 330 Functions

IDENT— Pressing the IDENT key activates the Special Position Identification (SPI) Pulse for 18 seconds, identifying your transponder return from others on the air traffic controller's screen. The word IDENT will appear in the upper left corner of the display during this time.

VFR— Sets the transponder code to the pre-programmed VFR code selected during installation configuration (this is set to 1200 at the factory). Pressing the VFR key again restores the previous identification code. If the VFR Key is pressed when disabled (dependent upon installation configuration) a VFR Key Disabled message appears to indicate that no operation took place.

FUNC— Changes the page shown on the right side of the display. Display data includes Pressure Altitude, Flight Time, Altitude Monitor, Count Up, and Count Down timers. Also displays Outside Air Temperature, Density Altitude, Contrast, Display, and ADS-B Operation (dependent upon installation configuration).

START/STOP— Starts and stops the Altitude Monitor, Count Up, Count Down, and Flight timers.

CRSR— Initiates starting time entry for the Count Down timer and cancels transponder code entry.

CLR— Resets the Count Up, Count Down, and Flight timers. Cancels the previous keypress during code selection and Count Down entry. Returns cursor to the fourth code digit within five seconds after entry.

8— Reduces Contrast and Display Brightness when the respective fields are displayed (dependent upon installation configuration) and enters the number eight into the Count Down timer.

9— Increases Contrast and Display Brightness when the respective fields are displayed (dependent upon installation configuration) and enters the number nine into the Count Down timer.

Function Display

NOTE: *GTX 330 options are normally set at time of installation. For changes to the GTX 330 parameters, contact your Garmin authorized dealer.*

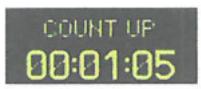
FLIGHT ID: Displays the Flight ID. The CRSR key opens the Flight ID entry dialog if the 'ALLOW PILOT TO EDIT FLT ID' option is enabled during installation configuration.

PRESSURE ALT: Displays the altitude data supplied to the GTX 330 in feet, hundreds of feet (i.e., flight level), or meters (dependent upon installation configuration).

FLIGHT TIME: Timer start is configured as either Manual or Automatic. When Manual, displays the Flight Time, controlled by the START/STOP and CLR keys. When Automatic, the timer begins when takeoff is sensed.

ALTITUDE MONITOR: Controlled by START/STOP key. Activates a voice alarm and warning annunciator when altitude limit is exceeded.

OAT/DALT: Displayed when the GTX 330 is configured with temperature input. Displays Outside Air Temperature and Density Altitude.

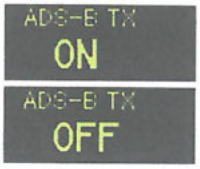


COUNT UP TIMER: Controlled by START/STOP and CLR keys.

COUNT DOWN TIMER: Controlled by START/STOP, CLR, and CRSR keys. The initial Count Down time is entered with the 0 – 9 keys.

CONTRAST: This page is only displayed if manual contrast mode is selected during installation configuration. Contrast is controlled by the 8 and 9 keys.

DISPLAY: This page is only displayed if manual backlighting mode is selected during installation configuration. Backlighting is controlled by the 8 and 9 keys.



ADS-B: This page is displayed if the ADS-B pilot set option is selected during installation configuration of an ES enabled GTX 330. ADS-B defaults to ON at each power cycle. ADS-B ON/OFF is controlled by the START/STOP key. Turn ADS-B OFF only at the request of ATC. NO ADSB will appear in the upper left corner when ADS-B is configured ON but cannot transmit the position of the aircraft, or when ADS-B TX is manually turned OFF.

Altitude Trend Indicator

When the PRESSURE ALT page is displayed, an arrow may be displayed to the right of the altitude, indicating that the altitude is increasing or decreasing. One of two sizes of arrows may be displayed depending on the vertical speed rate. The sensitivity of these arrows is initially set during transponder installation.

Timer Operation

To operate the Flight Timer:

1) Press the **FUNC** key until FLIGHT TIME is displayed.
2) If the GTX 330 is configured with Automated Airborne Determination, the timer begins automatically when the unit senses that the aircraft has become airborne. The timer may be reset to zero at every takeoff, continue accumulating time at takeoff, or may be controlled manually.
3) If desired, press **START/STOP** to pause or restart the timer.
4) Press **CLR** to reset the timer to zero.
5) If the timer is configured to start automatically it will stop when the Automated Airborne Determination senses that the aircraft is on the ground.

To operate the Count Up timer:

1) Press the **FUNC** key until COUNT UP is displayed.
2) If necessary, press **CLR** to reset the Count Up timer to zero.
3) Press **START/STOP** to begin count up.
4) Press **START/STOP** again to pause the timer.
5) Press **CLR** to reset the timer to zero.

To operate the Count Down timer:

1) Press the **FUNC** key until COUNT DOWN is displayed.
2) Press **CRSR** and use the **0 - 9** keys to set the initial time. All digits must be entered (use the 0 key to enter leading zeros).
3) Press **START/STOP** to begin count down.
4) Press **START/STOP** again to pause the timer.
5) When the Count Down timer expires, the COUNT DOWN banner is replaced with a flashing EXPIRED, the message "Timer Expired" is heard, and the time begins counting up.
6) Press **CLR** to reset the timer to the initial time value.

Automatic ALT Mode Switching

If the GTX 330 is configured for Automated Airborne Determination, the system automatically switches to ALT Mode when takeoff is sensed.

***NOTE:** Automatic mode switching can be disabled in software version 8.03 and later by setting Auto-ALT to OFF during installation configuration.*

Failure Annunciation

If the unit detects an internal failure or an ADS-B transmission failure, the screen displays FAIL. When FAIL is annunciated no transponder data is transmitted.

Altitude Monitor Operation

To operate the Altitude Monitor:

1) Climb to assigned altitude.
2) Press the **FUNC** key until ALT MONITOR is displayed.
3) Press **START/STOP** key to start monitoring altitude.
4) Press **START/STOP** key again to cancel Altitude Monitor.

Altitude deviation is shown in hundreds of feet ABOVE or BELOW the selected altitude. When the aircraft's altitude exceeds the deviation limit, ABOVE or BELOW flashes and an audio tone or the message "Leaving Altitude" is heard. ABOVE or BELOW flashes until the aircraft returns to within 100' of the selected altitude.

To select a new monitored altitude, press the **START/STOP** key to deactivate, then press again to activate the new monitored altitude.

If another function is selected for viewing, such as a Timer or Pressure Altitude, the Altitude Monitor is automatically displayed with a flashing alert when the altitude excursion exceeds the configured deviation value. The Altitude Monitor stops when the current deviation exceeds 1000 feet plus the configured deviation value.

The maximum configured deviation values that can be set by a Garmin authorized service center are as follows:

Flight Level or Feet Maximum Limits – 300 feet BELOW, 0 feet to 1999 feet ABOVE

Meters Maximum Limits – 300 meters BELOW, 0 meters to 609 meters ABOVE

Mode S Data Transmission

In addition to 4096 code and pressure altitude, the GTX 330 is capable of transmitting aircraft identification, transponder capability, and maximum speed range. Aircraft identification is commonly referred to as FLT ID (Flight Identification). The GTX 330 may be configured by the installer to allow the flight crew to enter FLT ID for each flight. An example is when air-carrier service requires changing the FLT ID.

The FLT ID may consist of the aircraft registration or a flight number as agreed upon with the local aviation authority. In either case, the FLT ID must be the same aircraft identification that appears in the flight plan to correlate the aircraft identification seen on ATC radar with the correct voice call sign for the aircraft. If no flight plan is filed with the aviation authority (as may be permitted by regulations), the FLT ID entered is the aircraft registration marking.

When flight crew entry of the FLT ID is not required, the installer configures the system to report the aircraft identification according to local aviation requirements. In this configuration, alteration of the FLT ID by the flight crew is not possible.

Flight ID Entry Dialog

When ALLOW PILOT TO EDIT FLT ID is enabled at installation, the flight crew may change the Flight ID after power up by navigating to the FLIGHT ID Page and pressing the **CRSR** key. This opens the Flight ID Entry dialog. After the flight crew enters the correct Flight ID, the aircraft identification that is transmitted in response to ATC radar interrogations will properly correlate with the associated call sign for voice communication with the aircraft.

If ALLOW PILOT TO EDIT FLT ID is required but is disabled, contact a Garmin authorized service center for GTX 330 configuration.

Flight ID Entry Dialog

Editing the Flight ID

When the Flight ID Entry dialog is displayed, press the **CRSR** key to begin editing the Flight ID. To change a character, press the number keys corresponding to the alphanumeric character entry. For example, to enter the letter R, press the **5** key four times. Each time an alphanumeric character is entered, press the **CRSR** key to move the cursor to the next blank field. Pressing the **CLR** key moves the cursor back to the previous character. Once the last character is entered, press the **CRSR** key to move the cursor over the remaining blank fields to complete Flight ID entry.

Editing the Flight ID

NOTE: *No space is needed when entering Flight ID characters. When a flight ID contains a space, the GTX 330 automatically removes the spaces upon completion of Flight ID entry.*

NOTE: If the entered Flight ID is blank (i.e. all spaces), the new Flight ID will not be saved by the GTX 330 and the dialog will remain open.

If an error is made while entering a Flight ID, press the **CLR** key to back up to any point. If the **CLR** key is pressed when the cursor is covering the first Flight ID character, the Flight ID will revert to the last Flight ID entered, and the dialog will remain open. If the **CLR** key is pressed when the Flight ID is not being edited, the dialog will close without saving.

When the transponder Flight ID is changed, a notification is sent to ATC by the GTX 330. This notification is temporary and will not be sent if the GTX 330 is inactive (i.e., set to **STBY**).

NOTE: For dual transponder installations, change the Flight ID on the active transponder. This ensures the notification is transmitted to ATC.

*NOTE: The GTX 330 must be set to **ON** or **ALT** during a Flight ID change in order for ATC to be notified of the change.*

Resetting the Flight ID to Default

If a default Flight ID is configured, the Flight ID Entry dialog will display an option in the lower right corner of the screen "8=<DEFAULT>", where <DEFAULT> is the configured default Flight ID. Press the 8 key to reset the Flight ID to this default and close the dialog. If a default Flight ID is required but is not configured, contact a Garmin authorized service center for GTX 330 configuration.

GTX 330 Mode S Transponder Features

GTX 330D Diversity Mode S Transponder

The GTX 330D Diversity Mode S Transponder incorporates antennas mounted on the top and bottom of the aircraft for dependable operation while maneuvering. Top and bottom antennas are less prone to antenna shadowing by the aircraft structure while turning. A top mounted antenna is in a better viewing position for interrogation and reply to overhead aircraft.

Traffic Information Service

The GTX 330 Mode S transponder provides a data link for Traffic Information Service (TIS). TIS is derived through a Mode S transponder data link and viewed on a multifunction display. ATC radar sends a traffic picture within a radius of 55 miles from select sites. The TIS protected area is a cylinder of 7-mile radius, extending 3500' above and 3000' below the aircraft. Refer to the AIM Chapter 1 for more details.

TIS provides a graphic display of traffic information in the cockpit for non-TCAS equipped aircraft. Transponder-equipped aircraft can be displayed within the coverage volume within range of your position on indicators such as a Garmin GNS 430 or GNS 530, GTN 6XX/7XX, GNS 480, and GMX 200. Aircraft without an operating transponder are invisible to TIS. Refer to 400/500 series, GTN 6XX/7XX, GNS 480, or GMX 200 pilot literature for details.

GTX 330 ES Options

Automatic Dependent Surveillance-Broadcast (ADS-B) technology improves situational awareness and flight safety. With ADS-B capabilities, position, velocity, and heading information are automatically transmitted to other aircraft and ground stations. The current air traffic control system depends on a transponder request for pertinent aircraft information and does not include 3D position. ADS-B provides automatic transmission of aircraft information without a request.

***NOTE:** The GTX 330 with software version 8.01 or later, has been shown to comply with TSO-C166b and AC 20-165 and is eligible for use as an ADS-B out Transmitter meeting the requirements of 14 CFR 91.225 and 91.227 when installed in accordance with Garmin's installation instructions. Refer to the AFMS for more information on your installation and whether it is ADS-B version 2 compliant.*

Audio Alerts

When connected to the aircraft audio system, the GTX 330 will emit important voice alerts at relevant times. The alerts the GTX 330 will emit are:

- "Leaving Altitude" - Altitude Monitor deviation is exceeded.
- "Traffic" - TIS traffic alert is received.
- "Traffic Not Available" - TIS service is not available or out of range.
- "Timer Expired" - Count down time has expired.

To change the volume of the alerts, and toggle between male voice, female voice, or tone alerts, refer to the installation guide.

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