

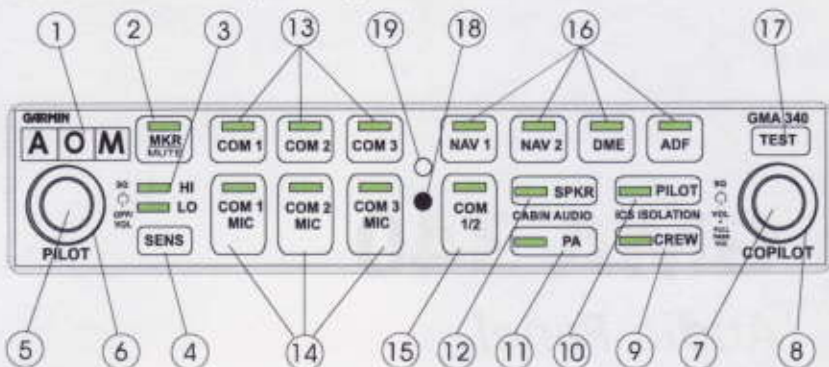
GMA 340

Audio Panel

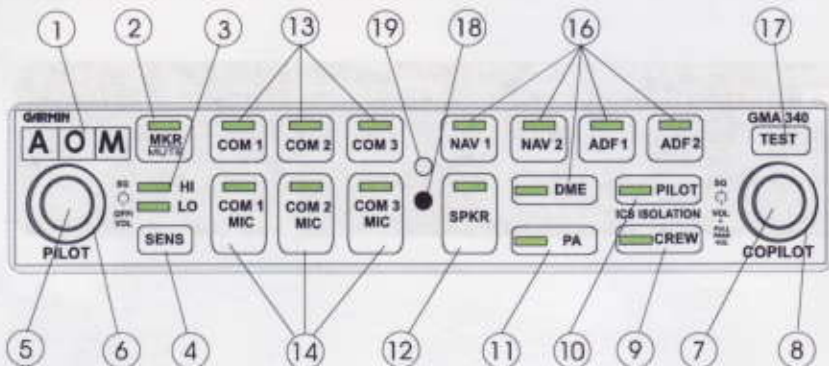


pilot's guide

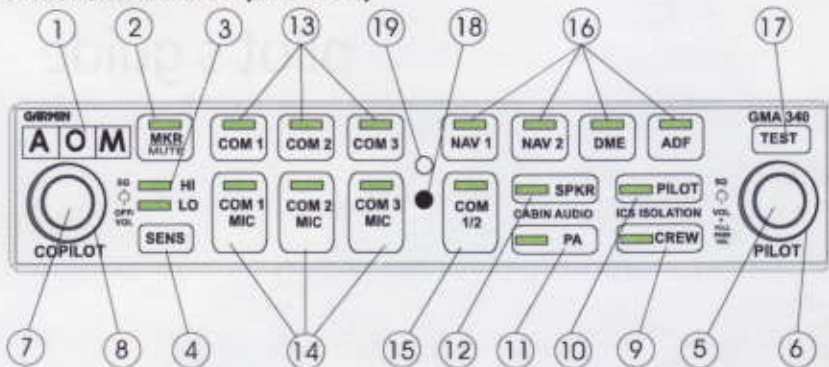
Front Panel Controls (GMA 340)

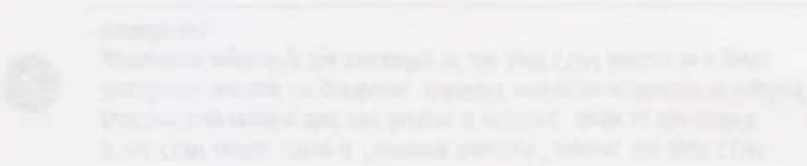


Front Panel Controls (GMA 340 Dual ADF)



Front Panel Controls (GMA 340H)





Function	Switch Number
Marker Beacon Lamp	1
Marker Beacon Receiver Audio Select/Mute Button	2
Marker Beacon Receiver Sensitivity Indicator LEDs	3
Marker Beacon Receiver Sensitivity Selection Button	4
Pilot Intercom System (ICS) Volume (Also Passenger Volume on 340H)	5
Pilot ICS Voice Activated (VOX) Intercom Squelch Level	6
Copilot and Passenger ICS Volume Control (Pull out for Passenger Volume)	7
Copilot and Passenger VOX Intercom Squelch Level	8
Crew Isolation Intercom Mode Button	9
Pilot Isolation Intercom Mode Button	10
Passenger Address (PA) Function Button	11
Speaker Function Button	12
Transceiver Audio Selector Buttons (COM 1, COM 2, COM 3)	13
Transmitter (Audio/Mic) Selection Buttons	14
Split COM Button (Not Available in Dual ADF)	15
Aircraft Radio Audio Selection Buttons (NAV 1, NAV 2, DME, ADF 1, ADF 2)	16
Annunciator Test Button	17
Locking Screw Access	18
PhotoCell - Automatic Annunciator Dimming	19

COM/NAV

ICS

MKR/BCN

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

Function Selection Switches

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 effect 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.

THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING ANY LIABILITY ARISING UNDER WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY OR OTHERWISE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, WHICH MAY VARY FROM STATE TO STATE.

IN NO EVENT SHALL GARMIN BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE OR INABILITY TO USE THIS PRODUCT OR FROM DEFECTS IN THE PRODUCT. SOME STATES DO NOT ALLOW THE EXCLUSIONS OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

To obtain warranty service, call the GARMIN Customer Service department (913/397.8200) for a returned merchandise tracking number. The unit should be securely packaged with the tracking number clearly marked on the outside of the package, and sent freight prepaid and insured to a GARMIN warranty service station. A copy of the original sales receipt is required as the proof of purchase for warranty repairs. GARMIN retains the exclusive right to repair or replace the unit or software or offer a full refund of the purchase price at its sole discretion. SUCH REMEDY SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.

GMA 340H



GMA 340 Dual ADF



GMA 340





© 2001 GARMIN Corporation

GARMIN International, Inc.
1200 East 151st Street, Olathe, Kansas 66062, U.S.A.

GARMIN (Europe) Ltd.
Unit 5, The Quadrangle, Abbey Park Industrial Estate, Romsey, SO51 9AQ, U.K.

GARMIN Corporation
No. 68, Jangshu 2nd Road, Shijr, Taipei County, Taiwan

www.garmin.com

Part Number 190-00149-10 Rev. C

Garmin International, Inc.
1200 E. 151st Street
Olathe, Kansas 66062 U.S.A.

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL

for the
Garmin GTN 625, 635, 650, 725, or 750 GPS/SBAS Navigation System
as installed in

Cessna 172N

Make and Model Airplane

Registration Number: N73977 Serial Number: 17267769

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 SA02019SE-D for the installation and operation of the Garmin GTN 625, 635, 650, 725, or 750 GPS/SBAS Navigation System. This document must be incorporated into the FAA Approved Airplane Flight Manual or provided as an FAA Approved Supplemental Airplane Flight Manual.

The information contained herein supplements the information in the FAA Approved Airplane Flight Manual. For limitations, procedures, loading and performance information not contained in this document, refer to the FAA Approved Airplane Flight Manual, markings, or placards.

FAA Approved By:



Michael Warren
ODA STC Unit Administrator
Garmin International, Inc.
ODA-240087-CE

Date: 12-APR-2013

LOG OF REVISIONS

Revision Number	Page		Description	FAA Approved
	Date	Number		
1	03/18/11	All	Complete Supplement	<p style="text-align: center;"><i>Robert Grove</i></p> <p>Robert Grove ODA STC Unit Administrator GARMIN International, Inc. ODA-240087-CE Date: <u>3/18/11</u></p>
2	12/18/12	6	<p><u>Table 1</u></p> <ul style="list-style-type: none"> • Added new functions 	See Page 1
		8	<p><u>Section 1.2</u></p> <ul style="list-style-type: none"> • Added capabilities checkboxes • Added GPS approaches without vertical • Added reference to EASA AMC 20-4 	
		10	<p><u>Section 1.3</u></p> <ul style="list-style-type: none"> • Removed suggestion for secondary charts • Changed to Type B Software in accordance with AC 120-76B. 	
		10	<p><u>Section 1.4</u></p> <ul style="list-style-type: none"> • Added ADS-B, AEG, FIS-B, NOTAM, TFR 	
		12	<p><u>Section 2.2</u></p> <ul style="list-style-type: none"> • Removed VFR only limitation 	
		12	<p><u>Section 2.3</u></p> <ul style="list-style-type: none"> • Clarified secondary navigation source requirement 	

LOG OF REVISIONS

Revision Number	Date	Number	Description	FAA Approved
		Page		
18		18	Section 2.14 • Modified datalinked weather limitations	
18		18	Section 2.16 • Modified limitation	
19		19	Section 2.17 • Modified limitation	
19		19	Section 2.21 • New limitation	
24 & 25		24 & 25	Section 3.2.8 and 3.2.9 • Modified section title	
25		25	Section 3.2.10 • New section	
26		26	Section 4.1 • Added telephone audio deactivation	
27		27	Section 4.3 • Modified caution statement	
27		27	Section 4.4 • Added caution statement	
29		29	Section 4.6 • New section	
31		31	Section 7.7 • Added TCAD and GDL 88 as optional traffic systems	
32		32	Section 7.8 • Modified Heading Not Available operation	
34 - 35		34 - 35	Sections 7.12 - 7.16 • New sections	

Table of Contents

SECTION	PAGE
Section 1. GENERAL	7
1.1 Garmin GTN Navigators	7
1.2 System Capabilities	9
1.3 Electronic Flight Bag	11
1.4 Definitions	11
Section 2. LIMITATIONS	13
2.1 Cockpit Reference Guide	13
2.2 Kinds of Operation	13
2.3 Minimum Equipment	13
2.4 Flight Planning	14
2.5 System Use	16
2.6 Applicable System Software	16
2.7 SD Card	16
2.8 Navigation Database	16
2.9 Ground Operations	17
2.10 Approaches	17
2.11 Autopilot Coupling	18
2.12 Terrain Proximity Function (All Units)	18
2.13 TAWS Function (Optional)	18
2.14 Datalinked Weather Display (Optional)	19
2.15 Traffic Display (Optional)	19
2.16 StormScope [®] Display (Optional)	19
2.17 Flight Planner/Calculator Functions	20
2.18 Glove Use / Covered Fingers	20
2.19 Demo Mode	20
2.20 Active Weather Radar	20
2.21 Telephone Audio	20
Section 3. EMERGENCY PROCEDURES	21
3.1 Emergency Procedures	21
3.2 Abnormal Procedures	22
Section 4. NORMAL PROCEDURES	26
4.1 Unit Power On	26
4.2 Before Takeoff	26
4.3 HSI and EHSI Operation	27
4.4 Autopilot Operation	27
4.5 Coupling the Autopilot during approaches	28
4.6 Telephone & SMS Text (Optional)	29
Section 5. PERFORMANCE	29
Section 6. WEIGHT AND BALANCE	29
Section 7. SYSTEM DESCRIPTIONS	30
7.1 Pilot's Guide	30
7.2 Leg Sequencing	30
7.3 Auto ILS CDI Capture	30

Section 1. GENERAL

1.1 Garmin GTN Navigators

The Garmin GTN navigation system is a GPS system with a Satellite Based Augmentation System (SBAS), comprised of one or more Garmin TSO-C146c GTN 625, 635, 650, 725, or 750 navigator(s) and one or more Garmin approved GPS/SBAS antenna(s). The GTN navigation system is installed in accordance with AC 20-138A.

GTN system functions are shown in Table 1.

	GTN 625	GTN 635	GTN 650	GTN 725	GTN 750
GPS SBAS Navigation: <ul style="list-style-type: none"> • Oceanic, enroute, terminal, and non-precision approach guidance • Precision approach guidance (LP, LPV) 	X	X	X	X	X
VHF Com Radio, 118.00 to 136.990, MHz, 8.33 or 25 kHz increments		X	X		X
VHF Nav Radio, 108.00 to 117.95 MHz, 50 kHz increments			X		X
LOC and Glideslope non-precision and precision approach guidance for Cat 1 minimums, 328.6 to 335.4 MHz tuning range			X		X
Moving map including topographic, terrain, aviation, and geopolitical data	X	X	X	X	X
Display of datalink weather products, SiriusXM, FIS-B, Connex (all optional)	X	X	X	X	X
Control and display of airborne weather radar (optional)				X	X
Display of terminal procedures data (optional)				X	X
Display of traffic data, including ADS-B (optional)	X	X	X	X	X
Display of StormScope SM data (optional)	X	X	X	X	X
Display of marker beacon annunciators (optional)				X	X
Remote audio panel control (optional)				X	X
Remote transponder control (optional)	X	X	X	X	X
Remote audio entertainment datalink control (optional)	X	X	X	X	X
TSO-C151b Class B TAWS (optional)	X	X	X	X	X
Supplemental calculators and timers	X	X	X	X	X
Control of GSR 56 Iridium Satellite Phone and SMS Text	X	X	X	X	X

Table 1 – GTN Functions

The GPS navigation functions and optional VHF communication and navigation radio functions are operated by dedicated hard keys, a dual concentric rotary knob, or the touchscreen.



Figure 1 - GTN 750 Control and Display Layout

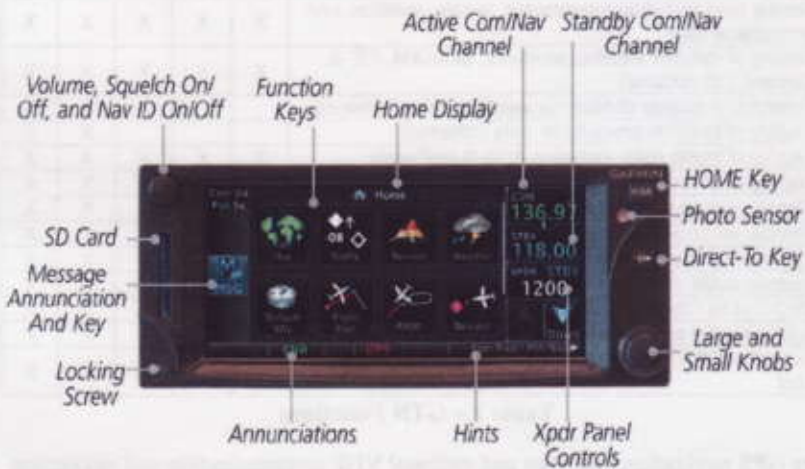


Figure 2 - GTN 635/650 Control and Display Layout

1.2 System Capabilities

The GTN system and associated navigation interface in this aircraft have the following capabilities, in addition to the core multifunction display capability:

- VHF Communication Radio
- Primary VHF Navigation
- Primary GPS Navigation (Enroute) and Approach Capability (LP/LNAV) – See below
- Primary GPS Approach Capability with Vertical Guidance (LNAV/VNAV, LPV) – See below
- TSO-C151b Terrain Awareness and Warning System – See section 2.13

GPS/SBAS TSO-C146c Class 3 Operation

The GTN complies with AC 20-138A and has airworthiness approval for navigation using GPS and SBAS (within the coverage of a Satellite Based Augmentation System complying with ICAO Annex 10) for IFR en route, terminal area, and non-precision approach operations (including those approaches titled “GPS”, “or GPS”, and “RNAV (GPS)” approaches). The Garmin GNSS navigation system is composed of the GTN navigator and antenna, and is approved for approach procedures with vertical guidance including “LPV” and “LNAV/VNAV” and without vertical guidance including “LP” and “LNAV,” within the U.S. National Airspace System.

The Garmin GNSS navigation system complies with the equipment requirements of AC 90-105 and meets the equipment performance and functional requirements to conduct RNP terminal departure and arrival procedures and RNP approach procedures without RF (radius to fix) legs. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval from the FAA.

The Garmin GNSS navigation system complies with the equipment requirements of AC 90-100A for RNAV 2 and RNAV 1 operations. In accordance with AC 90-100A, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-100A are authorized to fly RNAV 2 and RNAV 1 procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval from the FAA.

Applicable to dual installations consisting of two Garmin GNSS units: The Garmin GNSS navigation system has been found to comply with the requirements for GPS Class II oceanic and remote navigation (RNP-10) without time limitations in accordance with AC 20-138A and FAA Order 8400.12A. The Garmin GNSS navigation system can be used without reliance on other long-range navigation systems. This does not constitute an operational approval.

The Garmin GNSS navigation system has been found to comply with the navigation requirements for GPS Class II oceanic and remote navigation (RNP-4) in accordance with AC 20-138A and FAA Order 8400.33. The Garmin GNSS navigation system can be used without reliance on other long-range navigation systems. Additional equipment may be required to obtain operational approval to utilize RNP-4 performance. This does not constitute an operational approval.

The Garmin GNSS navigation system complies with the accuracy, integrity, and continuity of function, and contains the minimum system functions required for P-RNAV operations in accordance with JAA Administrative & Guidance Material Section One: General Part 3: Temporary Guidance Leaflets, Leaflet No 10 (JAA TGL-10 Rev 1). The GNSS navigation system has one or more TSO-C146c Class 3 approved Garmin GTN Navigation Systems. The Garmin GNSS navigation system complies with the accuracy, integrity, and continuity of function, and contains the minimum system functions required for B-RNAV operations in accordance with EASA AMC 20-4. The Garmin GNSS navigation system complies with the equipment requirements for P-RNAV and B-RNAV/RNAV-5 operations in accordance with AC 90-96A CHG 1. This does not constitute an operational approval.

Garmin International holds an FAA Type 2 Letter of Acceptance (LOA) in accordance with AC 20-153 for database integrity, quality, and database management practices for the navigation database. Flight crew and operators can view the LOA status at FlyGarmin.com then select "Type 2 LOA Status."

Navigation information is referenced to the WGS-84 reference system.

Note that for some types of aircraft operation and for operation in non-U.S. airspace, separate operational approval(s) may be required in addition to equipment installation and airworthiness approval.

1.3 Electronic Flight Bag

The GTN 750/725 are operationally suitable as Class 3 Hardware, Type B Software in accordance with AC 120-76B EFB electronic aeronautical information when using current FliteChart or ChartView data.

1.4 Definitions

The following terminology is used within this document:

ADF:	Automatic Direction Finder
ADS-B:	Automatic Dependent Surveillance Broadcast
AEG:	Aircraft Evaluation Group (FAA)
APR:	Approach
CDI:	Course Deviation Indicator
DME:	Distance Measuring Equipment
EFB:	Electronic Flight Bag
EHSI:	Electronic Horizontal Situation Indicator
FIS-B:	Flight Information Services Broadcast
GNSS:	Global Navigation Satellite System
GPS:	Global Positioning System
GPSS:	GPS Roll Steering
GTN:	Garmin Touchscreen Navigator
HSI:	Horizontal Situation Indicator
IAP:	Instrument Approach Procedure
IFR:	Instrument Flight Rules
ILS:	Instrument Landing System
IMC:	Instrument Meteorological Conditions
LDA:	Localizer Directional Aid
LNAV:	Lateral Navigation
LNAV+V:	Lateral Navigation with advisory Vertical Guidance
L/VNAV:	Lateral/Vertical Navigation
LOC:	Localizer
LOC-BC:	Localizer Backcourse
LP:	Localizer Performance
LPV:	Localizer Performance with Vertical Guidance
MLS:	Microwave Landing System
NOTAM:	Notice to Airmen
OBS:	Omnibearing Select
RAIM:	Receiver Autonomous Integrity Monitoring

RMT:	Remote
RNAV:	Area Navigation
RNP:	Required Navigational Performance
SBAS:	Satellite Based Augmentation System
SD:	Secure Digital
SDF:	Simplified Directional Facility
SUSP:	Suspend
TACAN:	Tactical Air Navigation System
TAS:	Traffic Awareness System
TAWS:	Terrain Awareness and Warning System
TCAS:	Traffic Collision Avoidance System
TFR:	Temporary Flight Restriction
TIS:	Traffic Information Service
VHF:	Very High Frequency
VFR:	Visual Flight Rules
VLOC:	VOR/Localizer
VMC:	Visual Meteorological Conditions
VOR:	VHF Omnidirectional Range
WAAS:	Wide Area Augmentation System
WFDE:	WAAS Fault Data Exclusion
XFR:	Transfer

Section 2. LIMITATIONS

2.1 Cockpit Reference Guide

The Garmin GTN 6XX or GTN 7XX Cockpit Reference Guide, part number and revision listed below (or later revisions), *must* be immediately available to the flight crew whenever navigation is predicated on the use of the GTN.

- GTN 6XX Cockpit Reference Guide P/N 190-01004-04 Rev C
- GTN 7XX Cockpit Reference Guide P/N 190-01007-04 Rev C

2.2 Kinds of Operation

This AFM supplement does not grant approval for IFR operations to aircraft limited to VFR operations.

2.3 Minimum Equipment

The GTN must have the following system interfaces fully functional in order to be used for primary navigation during IFR operations:

Interfaced Equipment	Number installed	Number Required for IFR
External HSI/CDI/EHSI	1 or more	1
External GPS Annunciator	See Note 1	1

Table 2 – Required Equipment

Note 1: Certain installations require an external GPS annunciator panel. If installed, this annunciator must be fully functional to use the GTN GPS navigation for IFR operations.

Single engine piston aircraft under 6,000 lbs maximum takeoff weight:

Required Equipment for IFR operations utilizing GPS navigation: Single GTN Navigator

All other aircraft:

Required Equipment for IFR operations utilizing GPS navigation: Single GTN Navigator plus a second source of GPS navigation or a separate source of VHF navigation. The separate source of VHF navigation must not be the primary GTN, but it may be a secondary GTN.

Operation in remote or oceanic operation requires two sources of GPS navigation.

2.4 Flight Planning

For flight planning purposes, in areas where SBAS coverage is not available, the flight crew must check RAIM availability.

- Within the United States, RAIM availability can be determined using the Garmin WFDE Prediction program, Garmin part number 006-A0154-04 (included in GTN trainer) software version 3.00 or later approved version with Garmin approved antennas or the FAA's en route and terminal RAIM prediction website: www.raimprediction.net, or by contacting a Flight Service Station.
- Within Europe, RAIM availability can be determined using the Garmin WFDE Prediction program or Europe's AUGER GPS RAIM Prediction Tool at <http://augur.ecacnav.com/augur/app/home>.
- For other areas, use the Garmin WFDE Prediction program.

This RAIM availability requirement is not necessary if SBAS coverage is confirmed to be available along the entire route of flight. The route planning and WFDE prediction program may be downloaded from the Garmin website on the internet. For information on using the WFDE Prediction Program, refer to Garmin WAAS FDE Prediction Program, part number 190-00643-01, 'WFDE Prediction Program Instructions'.

For flight planning purposes, for operations within the U.S. National Airspace System on RNP and RNAV procedures when SBAS signals are not available, the availability of GPS RAIM shall be confirmed for the intended route of flight. In the event of a predicted continuous loss of RAIM of more than five minutes for any part of the intended route of flight, the flight shall be delayed, canceled, or rerouted on a track where RAIM requirements can be met. The flight may also be re-planned using non-GPS based navigational capabilities.

For flight planning purposes for operations within European B-RNAV/RNAV-5 and P-RNAV airspace, if more than one satellite is scheduled to be out of service, then the availability of GPS RAIM shall be confirmed for the intended flight (route and time). In the event of a predicted continuous loss of RAIM of more than five minutes for any part of the intended flight, the flight shall be delayed, canceled, or rerouted on a track where RAIM requirements can be met.

Applicable to dual installations consisting of two Garmin GNSS units:

For flight planning purposes, for operations where the route requires Class II navigation the aircraft's operator or flight crew must use the Garmin WFDE Prediction program to demonstrate that there are no outages on the specified route that would prevent the Garmin GNSS navigation system to provide GPS Class II navigation in oceanic and remote areas of operation that requires RNP-10 or RNP-4 capability. If the Garmin WFDE Prediction program indicates fault exclusion (FDE) will be unavailable for more than 34 minutes in accordance with FAA Order 8400.12A for RNP-10 requirements, or 25 minutes in accordance

with FAA Order 8400.33 for RNP-4 requirements, then the operation must be rescheduled when FDE is available.

Both Garmin GPS navigation receivers must be operating and providing GPS navigation guidance for operations requiring RNP-4 performance.

North Atlantic (NAT) Minimum Navigational Performance Specifications (MNPS) Airspace operations per AC 91-49 and AC 120-33 require both GPS/SBAS receivers to be operating and receiving usable signals except for routes requiring only one Long Range Navigation sensor. Each display computes an independent navigation solution based on its internal GPS receiver.

Whenever possible, RNP and RNAV routes including Standard Instrument Departures (SIDs), Standard Terminal Arrival (STAR), and enroute RNAV "Q" and RNAV "T" routes should be loaded into the flight plan from the database in their entirety, rather than loading route waypoints from the database into the flight plan individually. Selecting and inserting individual named fixes from the database is permitted, provided all fixes along the published route to be flown are inserted. Manual entry of waypoints using latitude/longitude or place/bearing is prohibited.

It is not acceptable to flight plan a required alternate airport based on RNAV(GPS) LP/LPV or LNAV/VNAV approach minimums. The required alternate airport must be flight planned using an LNAV approach minimums or available ground-based approach aid.

Navigation information is referenced to the WGS-84 reference system, and should only be used where the Aeronautical Information Publication (including electronic data and aeronautical charts) conform to WGS-84 or equivalent.

2.5 System Use

In installations with two GTNs and an external GPS annunciator (See Table 2) the GTN connected to the external GPS annunciator must be used as the navigation source for all IFR operations.

The only approved sources of course guidance are on the external CDI, HSI, or EHSI display. The moving map and CDI depiction on the GTN display are for situational awareness only and are not approved for course guidance.

2.6 Applicable System Software

This AFMS/AFM is applicable to the software versions shown in Table 3.

The Main and GPS software versions are displayed on the start-up page immediately after power-on. All software versions displayed in Table 3 can be viewed on the System – System Status page.

Software Item	Software Version <i>(or later FAA Approved versions for this STC)</i>
Main SW Version	4.10
GPS SW Version	5.0
Com SW Version	2.10
Nav SW Version	6.02

Table 3 - Software Versions

2.7 SD Card

It is required that the SD card be present in the unit at all times.

2.8 Navigation Database

GPS/SBAS based IFR enroute, oceanic, and terminal navigation is prohibited unless the flight crew verifies and uses a valid, compatible, and current navigation database or verifies each waypoint for accuracy by reference to current approved data.

“GPS”, “or GPS”, and “RNAV (GPS)” instrument approaches using the Garmin navigation system are prohibited unless the flight crew verifies and uses the current navigation database. GPS based instrument approaches must be flown in accordance with an approved instrument approach procedure that is loaded from the navigation database.

Discrepancies that invalidate a procedure should be reported to Garmin International. The affected procedure is prohibited from being flown using data from the navigation database until a new navigation database is installed in the aircraft and verified that the discrepancy has been corrected. Navigation database discrepancies can be reported at FlyGarmin.com by selecting “Aviation Data Error Report.” Flight crew and operators can view navigation database alerts at FlyGarmin.com then select “NavData Alerts.”

If the navigation database cycle will change during flight, the flight crew must ensure the accuracy of navigation data, including suitability of navigation facilities used to define the routes and procedures for flight. If an amended chart affecting navigation data is published for the procedure, the database must not be used to conduct the procedure.

2.9 Ground Operations

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

2.10 Approaches

- a) Instrument approaches using GPS guidance may only be conducted when the GTN is operating in the approach mode. (LNAV, LNAV+V, L/VNAV, LPV, or LP)
- b) When conducting instrument approaches referenced to true North, the NAV Angle on the System -Units page must be set to **True**.
- c) The navigation equipment required to join and fly an instrument approach procedure is indicated by the title of the procedure and notes on the IAP chart. Navigating the final approach segment (that segment from the final approach fix to the missed approach point) of an ILS, LOC, LOC-BC, LDA, SDF, MLS, VOR, TACAN approach, or any other type of approach not approved for GPS, is not authorized with GPS navigation guidance. GPS guidance can only be used for approach procedures with GPS or RNAV in the procedure title. When using the Garmin VOR/LOC/GS receivers to fly the final approach segment, VOR/LOC/GS navigation data must be selected and presented on the CDI of the pilot flying.
- d) Advisory vertical guidance deviation is provided when the GTN annunciates LNAV + V. Vertical guidance information displayed on the VDI in this mode is only an aid to help flight crews comply with altitude restrictions. When using advisory vertical guidance, the flight crew must use the primary barometric altimeter to ensure compliance with all altitude restrictions.
- e) Not all published Instrument Approach Procedures (IAP) are in the navigation database. Flight crews planning to fly an RNAV instrument approach must ensure that the navigation database contains the planned RNAV Instrument Approach Procedure and that approach procedure must be loaded from the navigation database into the GTN system flight plan by its name. Users are prohibited from flying any approach path that contains manually entered waypoints.
- f) IFR approaches are prohibited whenever any physical or visual obstruction (such as a throw-over yoke) restricts pilot view or access to the GTN and/or the CDI.

2.11 Autopilot Coupling

The flight crew may fly all phases of flight based on the navigation information presented to the flight crew; however, not all modes may be coupled to the autopilot. All autopilots may be coupled in Oceanic (OCN), Enroute (ENR), and Terminal (TERM) modes.

This installation is limited to:

- Lateral coupling only for GPS approaches. Coupling to the vertical path for GPS approaches is not authorized.

2.12 Terrain Proximity Function (All Units)

Terrain and obstacle information appears on the map and terrain display pages as red and yellow tiles or towers, and is depicted for advisory use only. Aircraft maneuvers and navigation must not be predicated upon the use of the terrain display. Terrain and obstacle information is advisory only and is not equivalent to warnings provided by TAWS.

The terrain display is intended to serve as a situational awareness tool only. By itself, it may not provide either the accuracy or the fidelity on which to base decisions and plan maneuvers to avoid terrain or obstacles.

NOTE

Terrain and TAWS are separate features and mutually exclusive. If "TAWS B" is shown on the bottom right of the dedicated terrain page, then TAWS is installed.

2.13 TAWS Function (Optional)

Flight crews are authorized to deviate from their current ATC clearance to the extent necessary to comply with TAWS warnings. Navigation must not be predicated upon the use of TAWS.

If an external TAWS annunciator panel is installed in the aircraft, this annunciator panel must be fully functional in order to use the TAWS system.

NOTE

Terrain and TAWS are separate features and mutually exclusive. If "TAWS B" is shown on the bottom right of the dedicated terrain page, then TAWS is installed.

2.14 Datalinked Weather Display (Optional)

This limitation applies to datalinked weather products from SiriusXM via a GDL 69/69A, FIS-B via a GDL 88, and Connex via a GSR 56.

Do not use data link weather information for maneuvering in, near, or around areas of hazardous weather. Information provided by data link weather products may not accurately depict current weather conditions.

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

Do not rely solely upon data link services to provide Temporary Flight Restriction (TFR) or Notice to Airmen (NOTAM) information. Not all TFRs and NOTAMS can be depicted on the GTN.

2.15 Traffic Display (Optional)

Traffic may be displayed on the GTN when connected to an approved optional TCAS I, TAS, TIS, or ADS-B traffic device. These systems are capable of providing traffic monitoring and alerting to the flight crew. Traffic shown on the display may or may not have traffic alerting available. The display of traffic is an aid to visual acquisition and may not be utilized for aircraft maneuvering.

2.16 StormScope® Display (Optional)

StormScope® lightning information displayed by the GTN is limited to supplemental use only. The use of the StormScope® lightning data on the display for hazardous weather (thunderstorm) penetration is prohibited. StormScope® lightning data on the display is intended only as an aid to enhance situational awareness of hazardous weather, not penetration. It is the flight crew's responsibility to avoid hazardous weather using official weather data sources.

When the GTN StormScope® page is operating without a heading source, as indicated by the "HDG N/A" label at the upper right corner of the StormScope® page, strikes must be cleared after each heading change.

2.17 Flight Planner/Calculator Functions

The Fuel Planning page uses Fuel on Board or Fuel Flow as received from an on board fuel totalizer, as entered by the pilot at system startup, or as entered by the pilot when on the Fuel Planning page. This *is not* a direct indication of actual aircraft fuel flow or fuel on board and those values are only used for the Fuel Planning page. The fuel required to destination is only a calculated and predicted value based on the data entered into the planner. It is not a direct indication of how much fuel the aircraft will have upon reaching the destination.

2.18 Glove Use / Covered Fingers

No device may be used to cover fingers used to operate the GTN unless the Glove Qualification Procedure located in the Pilot's Guide/Cockpit Reference Guide has been successfully completed. The Glove Qualification Procedure is specific to a pilot / glove / GTN 725, 750 or GTN 625, 635, 650 combination.

2.19 Demo Mode

Demo mode may not be used in flight under any circumstances.

2.20 Active Weather Radar

Radar is broadcasting energy while in Weather or Ground mapping modes. If the GTN 750/725 system is configured to control an airborne weather radar unit, observe all safety precautions, including:

- Do not operate in the vicinity of refueling operations.
- Do not operate while personnel are in the vicinity (approximately 20 feet) of the radar sweep area.

CAUTION

If a radar system is installed, it generates microwave radiation and improper use, or exposure, may cause serious bodily injury. Do not operate the radar equipment until you have read and carefully followed the safety precautions and instructions in the weather radar user manual and/or pilot's guide.

2.21 Telephone Audio

Telephone audio may not be distributed to the pilot or co-pilot unless a phone call is active.

Section 3. EMERGENCY PROCEDURES

3.1 Emergency Procedures

3.1.1 TAWS WARNING

Red annunciator and aural "PULL UP":

Autopilot.....
Aircraft Controls.....
Airspeed.....

After Warning Cases:

Power.....
Altitude.....
CLIMB AND MAINTAIN SAFE ALTITUDE
Advise ATC of Altitude Deviation, if appropriate.

NOTE

Only vertical maneuvers are recommended, unless either operating in visual meteorological conditions (VMC), or the flight crew determines, based on all available information, that turning in addition to the vertical escape maneuver is the safest course of action, or both.

3.2 Abnormal Procedures

3.2.1 LOSS OF GPS/SBAS NAVIGATION DATA

When the GPS/SBAS receiver is inoperative or GPS navigation information is not available or invalid, the GTN will enter one of two modes: Dead Reckoning mode (DR) or Loss Of Integrity mode (LOI). The mode is indicated on the GTN by an amber "DR" or "LOI".

If the Loss Of Integrity annunciation is displayed, revert to an alternate means of navigation appropriate to the route and phase of flight.

If the Dead Reckoning annunciation is displayed, the map will continue to be displayed with an amber 'DR' overwriting the ownship icon. Course guidance will be removed on the CDI. Aircraft position will be based upon the last valid GPS position, then estimated by Dead Reckoning methods. Changes in true airspeed, altitude, heading, or winds aloft can affect the estimated position substantially. Dead Reckoning is only available in Enroute and Oceanic modes. Terminal and Approach modes do not support Dead Reckoning.

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

Navigation..... USE ALTERNATE SOURCES

If No Alternate Navigation Sources Are Available:

DEAD RECKONING (DR) MODE:

Navigation..... USE GTN

NOTE

All information normally derived from GPS will become less accurate over time.

LOSS OF INTEGRITY (LOI) MODE:

Navigation..... FLY TOWARDS KNOWN VISUAL CONDITIONS

NOTE

All information derived from GPS will be removed.

NOTE

The airplane symbol is removed from all maps. The map will remain centered at the last known position. "NO GPS POSITION" will be annunciated in the center of the map.

3.2.2 GPS APPROACH DOWNGRADE

During a GPS LPV, LNAV/VNAV, or LNAV+V approach, if GPS accuracy requirements cannot be met by the GPS receiver, the GTN will downgrade the approach. The downgrade will remove vertical deviation indication from the VDI and change the approach annunciation accordingly from LPV, L/VNAV, or LNAV+V to LNAV. The approach may be continued using the LNAV only minimums.

During a GPS approach in which GPS accuracy requirements cannot be met by the GPS receiver for any GPS approach type, the GTN will flag all CDI guidance and display a system message "ABORT APPROACH-GPS approach no longer available". Immediately upon viewing the message, the unit will revert to Terminal navigation mode alarm limits. If the position integrity is within these limits lateral guidance will be restored and the GPS may be used to execute the missed approach, otherwise alternate means of navigation must be utilized.

3.2.3 LOSS OF COM RADIO TUNING FUNCTIONS

If alternate COM is available:

Communications **USE ALTERNATE COM**

If no alternate COM is available:

COM RMT XFR key (if installed)..... **PRESS AND HOLD FOR 2 SECONDS**

NOTE

This procedure will tune the active COM radio the emergency frequency 121.5, regardless of what frequency is displayed on the GTN. Certain failures of the tuning system will automatically tune 121.5 without flight crew action.

3.2.4 LOSS OF AUDIO PANEL FUNCTIONS (GMA 35 Only)

Audio Panel Circuit Breaker..... **PULL**

NOTE

This procedure will force the audio panel into fail safe mode which provides only the pilot with communications and only on a single COM radio. If any non GTN 750 COM is installed, communication will be only on that radio. If only a GTN 750 is installed in the aircraft, then the pilot will have only the GTN 750 COM available. No other audio panel functions including the crew and passenger intercom will function.

3.2.5 TAWS CAUTION (Terrain or Obstacle Ahead, Sink Rate, Don't Sink)

When a TAWS CAUTION occurs, take corrective action until the alert ceases. Stop descending or initiate either a climb or a turn, or both as necessary, based on analysis of all available instruments and information.

3.2.6 TAWS INHIBIT

The TAWS Forward Looking Terrain Avoidance (FLTA) and Premature Descent Alerts (PDA) functions may be inhibited to prevent alerting, if desired. Refer to GTN Cockpit Reference Guide for additional information.

To Inhibit TAWS:

Home Hardkey	PRESS
Terrain Button	PRESS
Menu Button	PRESS
TAWS Inhibit Button	PRESS TO ACTIVATE

3.2.7 TER N/A and TER FAIL

If the amber **TER N/A** or **TER FAIL** status annunciator is displayed, the system will no longer provide TAWS alerting or display relative terrain and obstacle elevations. The crew must maintain compliance with procedures that ensure minimum terrain and obstacle separation.

3.2.8 DATA SOURCE - HEADING SOURCE INOPERATIVE OR CONNECTION TO GTN LOST MESSAGE

Without a heading source to the GTN, the following features will not operate:

- GPSS will not be provided to the autopilot for heading legs. The autopilot must be placed in HDG mode for heading legs.
- Map cannot be oriented to Heading Up.
- All overlaying traffic data from a TAS/TCAS I or GDL 88 interfaced to an on board traffic system on the main map display. The flight crew must use the dedicated traffic page on the GTN system to display TAS/TCAS I or GDL 88 traffic data.
- All overlaying StormScope® data on the main map display. The flight crew must use the dedicated StormScope® page on the GTN system to display StormScope® data.

StormScope® must be operated in accordance with Section 7.8 when no heading is available.

Message	Priority	Category	Source
3.2.9 DATA SOURCE - PRESSURE ALTITUDE SOURCE	Low	Information	GTN
INOPERATIVE OR CONNECTION TO GTN LOST MESSAGE	Low	Information	GTN
Without a barometric altitude source to the GTN, the following features will not operate:			
• Automatic leg sequencing of legs requiring an altitude source. The flight crew must manually sequence altitude legs, as prompted by the system.			
3.2.10 UNRECOVERABLE LOSS OF ALL ELECTRICAL GENERATORS OR ALTERNATORS	High	Warning	GTN
Remove power from all equipment which is not necessary for flight, including GTN #2 if installed.			

Section 4. NORMAL PROCEDURES

Refer to the Cockpit Reference Guide defined in Section 2.1 of this document or the Pilot's Guide defined in Section 7.1 for normal operating procedures and a complete list of system messages and associated flight crew actions. This includes all GPS operations, VHF communication and navigation, traffic, data linked weather, StormScope[®], TAWS, and Multi-Function Display information.

The GTN requires a reasonable degree of familiarity to avoid becoming too engrossed at the expense of basic instrument flying in IMC and basic see-and-avoid in VMC. Garmin provides training tools with the Pilot's Guide and PC based simulator. Pilots should take full advantage of these training tools to enhance system familiarization.

4.1 Unit Power On

Database..... **REVIEW EFFECTIVE DATES**

Self Test..... **VERIFY OUTPUTS TO NAV INDICATORS**

Self Test - TAWS Remote Annunciator:

PULL UP..... **ILLUMINATED**

TERR..... **ILLUMINATED**

TERR N/A..... **ILLUMINATED**

TERR INHB..... **ILLUMINATED**

Self Test - GPS Remote Annunciator:

VLOC..... **ILLUMINATED**

GPS..... **ILLUMINATED**

LOI or INTG..... **ILLUMINATED**

TERM..... **ILLUMINATED**

WPT..... **ILLUMINATED**

APR..... **ILLUMINATED**

MSG..... **ILLUMINATED**

SUSP or OBS..... **ILLUMINATED**

Telephone Audio, if equipped:

Pilot, Co-pilot, Passenger..... **DEACTIVATED**

4.2 Before Takeoff

System Messages and Annunciators..... **CONSIDERED**

4.3 HSI and EHSI Operation

If an HSI is used to display navigation data from the GTN the pilot should rotate the course pointer as prompted on the GTN.

If an EHSI is used to display navigation data from the GTN the course pointer may autoslew to the correct course when using GPS navigation. When using VLOC navigation the course pointer will not autoslew and must be rotated to the correct course by the pilot. For detailed information about the functionality of the EHSI system, refer to the FAA approved Flight Manual or Flight Manual Supplement for that system.

CAUTION

The pilot must verify the active course and waypoint for each flight plan leg. The pilot must verify proper course selection each time the CDI source is changed from GPS to VLOC.

4.4 Autopilot Operation

The GTN may be coupled to an optional autopilot, if installed in the aircraft, when operating as prescribed in the LIMITATIONS section of this manual.

Autopilots coupled to the GTN system in an analog (NAV) mode will follow GPS or VHF navigation guidance as they would with existing VOR receivers.

Autopilots that support GPSS or GPS Roll Steering in addition to the analog course guidance will lead course changes, fly arcing procedures, procedure turns, and holding patterns if coupled in GPSS mode.

CAUTION

The GTN cannot provide course deviation to the autopilot for heading legs. Some autopilots do not allow the use of GPSS when course deviation is not provided.

For autopilot operating instructions, refer to the FAA approved Flight Manual or Flight Manual Supplement for the autopilot.

4.5 Coupling the Autopilot during approaches

CAUTION

When the CDI source is changed on the GTN, autopilot mode may change. Confirm autopilot mode selection after CDI source change on the GTN. Refer to the FAA approved Flight Manual or Flight Manual Supplement for the autopilot.

Analog only autopilots should use APR mode for coupling to LNAV approaches. Autopilots which support digital roll steering commands (GPSS) may utilize NAV mode and take advantage of the digital tracking during LNAV only approaches.

- This installation prompts the flight crew and requires the pilot to enable the approach outputs just prior to engaging the autopilot in APR mode.

To couple an approach:

Once established on the final approach course with the final approach fix as the active waypoint, the GTN will issue a flashing message indication.

Flashing Message Button **PRESS**
"Enable APR Output" Button **PRESS**

If coupled, Autopilot will revert to ROL mode at this time.

Autopilot **ENGAGE APPROACH MODE**

- This installation supports coupling to the autopilot in approach mode once vertical guidance is available.

To couple an approach:

Once established on the final approach course with the final approach fix as the active waypoint, the GTN will enable vertical guidance.

Vertical Guidance **CONFIRM AVAILABLE**
Autopilot **ENGAGE APPROACH MODE**

- The installation *does not* support any vertical capture or vertical tracking.

4.6 Telephone & SMS Text (Optional)

Audio from the GSR 56 Iridium datalink is routed through your aircraft's audio panel Audio from the GSR 56 must be deactivated (turned off) unless making a phone call. The primary indication of an incoming phone call or SMS text are the visual indications on the GTN.

Section 5. PERFORMANCE

No change.

Section 6. WEIGHT AND BALANCE

See current weight and balance data.

Section 7. SYSTEM DESCRIPTIONS

7.1 Pilot's Guide

The Garmin GTN 6XX or GTN 7XX Pilot's Guide, part number and revision listed below, contain additional information regarding GTN system description, control and function. The Pilot's Guides *do not* need to be immediately available to the flight crew.

- GTN 6XX Pilot's Guide P/N 190-01004-03 Rev C or later
- GTN 7XX Pilot's Guide P/N 190-01007-03 Rev C or later

7.2 Leg Sequencing

The GTN supports all ARINC 424 leg types. Certain leg types require altitude input in order to sequence (course to altitude, for example). If a barometric corrected altitude source is not interfaced to the GTN, a popup will appear prompting the flight crew to manually sequence the leg once the altitude prescribed in the procedure is reached.

- This installation *has* a barometric corrected altitude source. The GTN will automatically sequence altitude legs.
- This installation *does not have* a barometric corrected altitude source. The flight crew will be prompted to manually sequence altitude legs.

7.3 Auto ILS CDI Capture

Auto ILS CDI Capture will not automatically switch from GPS to VLOC for LOC-BC or VOR approaches.

7.4 Activate GPS Missed Approach

- This installation *will* autoswitch from VLOC to GPS when the "Activate GPS Missed Approach" button is pressed.
- This installation *will not* autoswitch from VLOC to GPS when the "Activate GPS Missed Approach" button is pressed. The pilot must manually switch from VLOC to GPS if GPS guidance is desired after the missed approach point.

7.5 Terrain Proximity and TAWS

- The Obstacle Database has an area of coverage that includes the United States and Europe, and is updated as frequently as every 56 days.
- To avoid unwanted alerts, TAWS may be inhibited when landing at an airport that is not included in the airport database.

NOTE

The area of coverage may be modified as additional terrain data sources become available.

- This installation supports *Terrain Proximity*. No aural or visual alerts for terrain or obstacles are provided. Terrain Proximity *does not* satisfy the TAWS requirement of 91.223.
- This installation supports *TAWS B*. Aural and visual alerts *will be* provided. This installation *does* support the TAWS requirement of 91.223.

7.6 GMA 35 Audio Panel (Optional)

The GTN 725 and 750 can interface to a GMA 35 remotely mounted audio panel and marker beacon receiver. Controls for listening to various radios, activating the cabin speaker, clearance playback control, and marker beacon are accessed by pressing the "Audio Panel" button on the GTN display screen. Volume controls for the audio panel are accessed by pressing the "Intercom" button on the GTN display screen.

7.7 Traffic System (Optional)

This system is configured for the following type of traffic system. The Garmin GTN 6XX or GTN 7XX Cockpit Reference Guide or Garmin GTN 6XX or GTN 7XX Pilot's Guide provides additional information regarding the functionality of the traffic device.

- No traffic system is interfaced to the GTN.
- A TAS/TCAS I traffic system is interfaced to the GTN.
- A TIS traffic system is interfaced to the GTN.
- A TCAD traffic system is interfaced to the GTN.
- A Garmin GDL 88 ADS-B traffic system is interfaced to the GTN.
- A Garmin GDL 88 ADS-B traffic system is interfaced to the GTN. The GDL 88 ADS-B traffic system is also interfaced to an on board traffic system.

7.8 StormScope® (Optional)

When optionally interfaced to a StormScope® weather detection system, the GTN may be used to display the StormScope® information. Weather information supplied by the StormScope® will be displayed on the StormScope® page of the GTN system. For detailed information about the capabilities and limitations of the StormScope® system, refer to the documentation provided with that system.

Heading Up mode:

If the GTN system is receiving valid heading information, the StormScope® page will operate in the heading up mode as indicated by the label “HDG UP” presented at the upper right corner of the display. In this mode, information provided by the StormScope® system is displayed relative to the nose of the aircraft and *is* automatically rotated to the correct relative position as the aircraft turns.

Heading Not Available mode:

If the GTN system is not receiving valid heading information, either because a compatible heading system is not installed, or the interfaced heading system has malfunctioned, the StormScope® page will continue to operate without a heading source and indicate “HDG N/A” in the upper right corner of the GTN display. In this mode, information provided by the StormScope® system is displayed relative to the nose of the aircraft but *is not* automatically rotated to the correct relative position as the aircraft turns. When operating in this mode, StormScope® strikes must be cleared after each turn the aircraft performs.

7.9 Power

- Power to the GTN is provided through a circuit breaker labeled NAV/GPS (1/2).
- Power to the optional GTN COM is provided through a circuit breaker labeled COMM (1/2)
- Power to the optional GMA 35 is powered through a circuit breaker labeled AUDIO.

7.10 Databases

Database versions and effective dates are displayed on the start-up page immediately after power-on. Database information can also be viewed on the System – System Status page.

The Obstacle Database coverage area includes the United States and Europe.

Table 4 – External Switches

Switch Label	Function
CDI	Toggles between GPS / VLOC sources. This switch may be part of an external annunciator panel.
COM CHAN DN	Toggles down through the preset com frequencies.
COM CHAN UP	Toggles up through the preset com frequencies.
COM RMT XFR	Transfers the com active / standby frequencies.
NAV RMT XFR	Transfers the nav active / standby frequencies.
OBS	Performs an OBS or SUSP function. This switch is part of an external annunciator panel and is placed with the following: "Green OBS indicates OBS or SUSP mode – GTN annunciator bar indicates which is active. Push OBS button to change OBS or SUSP mode."
OBS/SUSP	Performs an OBS or SUSP function.
TERR INHB	Toggles the TAWS Inhibit function on/off. This switch is part of an external annunciator panel. The terrain display is still presented if TAWS is inhibited.

7.11 External Switches
 External switches may be installed and interfaced to the GTN. These switches may be stand alone, or integrated with a TAWS or GPS annunciator. Table 4 lists the switches and function they perform:

7.12 Airspace Depiction and Alerts

The GTN aides the flight crew in avoiding certain airspaces with Smart Airspace and airspace alerts. Smart Airspace de-emphasizes depicted airspace that is not near the aircraft's current altitude. Airspace Alerts provide a message indication to the flight crew when the aircraft's current ground track will intercept an airspace type that has been selected for alerting.

NOTE

Smart Airspace and Airspace Alerts are separate features. Turning on/off Smart Airspace does not affect Airspace Alerts, and vice versa.

7.13 GDL 88 ADS-B Traffic System Interface (Optional)

The GDL 88 is an ADS-B traffic system that can interface to the GTN. The *nose* of the ownship symbol on both the GTN main map page and dedicated traffic page serves as the actual location of your aircraft. The *center* of the traffic target icon serves as the reported location for the target aircraft. Motion vectors for traffic may be displayed in either absolute or relative motion. The location of the traffic targets relative to the ownship are the same, regardless of the selected motion vector.

Absolute motion vectors are colored either cyan or white, depending on unit configuration. Absolute motion vectors depict the reported track of the traffic target referenced to the ground. An absolute motion vector pointed towards your ownship symbol *does not* necessarily mean the traffic target is getting closer to your aircraft.

Relative motion vectors are always colored green and depict the motion of the traffic target relative to your ownship symbol. The direction the traffic target is pointed may vary greatly from the motion vector and a target may be getting closer to your aircraft independent of the direction the target is pointed. A green relative motion vector pointed towards your ownship indicates that the traffic target *is* converging on your aircraft.

If more than one target is occupying the same area of the screen, the GTN will combine the two or more traffic targets into one traffic group. The presence of an asterisk to the left of a target indicates that traffic has been grouped. The highest priority traffic target in the group is displayed to the pilot. When applied to airborne targets the asterisk will be displayed in white or cyan depending on the traffic depiction color used in the installation. The asterisk will be brown for grouped ground targets. The asterisk will not turn amber, even if an alerted target is included in the group.

An alerted target may be placed in the same group as non-alerted targets. In this case, the alerted target will be displayed. Two alerted targets will not be placed in the same group. All alerted targets will be displayed on the screen.

Traffic targets displayed on the dedicated traffic page may be selected in order to obtain additional information about a traffic target or to view all targets in a grouped target. When a grouped target is selected, the "Next" button on the dedicated traffic page will cycle through all targets located in close proximity to where the screen has been touched.

7.14 GWX 70 Weather Radar (Optional)

The GWX 70 Weather Radar uses Doppler technology to provide advanced features to the flight crew such as turbulence detection and ground clutter suppression. These features that rely on Doppler technology are only supported by GWX 70 units that have a 12 inch antenna or larger. Turbulence detection is only supported at display ranges 40-160 nautical miles.

NOTE

Turbulence detection does not detect all turbulence, especially that which is occurring in clear air. The display of turbulence indicates the possibility of Severe or greater turbulence, as defined in the Aeronautical Information Manual.

7.15 Charts (Optional)

The GTN 750/725 can display both procedure charts and weather data on the main map page at the same time. When datalinked Nexrad or Precipitation is overlaid on the main map page, the weather data is displayed *below* an overlaid procedure chart. When airborne weather radar is overlaid on the main map page, the radar data is displayed *above* an overlaid procedure chart.

7.16 Transponder Control (Optional)

The GTN can be interfaced to a Garmin transponder for control and display of squawk code, mode, and additional transponder functions. The activation of the "Enable ES" button on the transponder page does not indicate the aircraft is in full compliance with an ADS-B Out solution in accordance with TSO-C166b (1090ES). Consult your transponder documentation for additional information.

Monitoring a Comm Frequency

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

Press the COM key while in the Comm function to listen to the Standby frequency. A small "m" will replace the "s" in front of the Standby frequency.

Press the COM key a second time to exit. Note that changing modes (NAV, SYS, etc.) will not disable the Comm frequency monitoring.

Monitoring a Nav Frequency

The Nav radio provides a monitor function for VORs in the Standby channel similar to the Comm radio. The monitor function is activated or deactivated by pressing the NAV button while in the Nav function. A small "m" will replace the "s" in front of the Standby frequency. The From radial for the Standby channel is shown in parentheses when the VOR monitor mode is activated. This replaces the station identifier, OBS course, or VOR/LOC indicator. The Standby VOR radial is updated once per second. You cannot monitor a Localizer channel and the Nav audio is temporarily disabled while the system is monitoring the Standby VOR.

If no signal can be tracked on the Standby channel, then it will be dashed out.

The VOR Monitor function is turned off when you flip/flop frequencies, recall a frequency, or press NAV again. Monitoring is not canceled by switching to Comm.

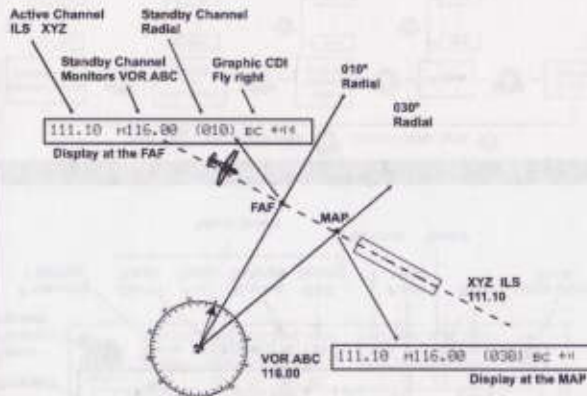
Listening to the Audio Channel

The audio for the active Nav channel is toggled between modes using the ID button. The annunciator above the button will light while the Nav audio is activated, and the detected audio signal will be sent to the Nav audio output circuit. Nav audio may also be mixed with the Comm audio output, if selected in the System mode. This feature is used for installations that do not use an external audio panel. When you are monitoring a VOR, Nav audio is suspended. There are three modes for the Nav audio (Ident code, voice ident, no ident). Press the ID button to start the ID mode. "IDENT" will be displayed for three seconds. The Morse code tones sent over the VOR/Localizer channels will be heard. If the ID button is pressed a second time, "VOICE" will be displayed for three seconds. The Morse code tone volume will be reduced so you can hear the voice transmission more clearly. Press ID again to turn the audio and ID annunciator off.

The last audio output selection is kept in memory until you change it, even when the SL30 is powered off. Using this feature, you may leave the audio enabled and then control it by an external audio panel.

Example Back Course and Monitoring a Standby VOR

1. Press NAV to select the Nav receiver.
2. Set the Localizer frequency of your approach as the Active channel.
3. Press SEL. The display will prompt you to enable the Back Course. Press ENT to enable the Back Course. Press SEL and ENT again to disable the back course when it's appropriate. When Back Course is enabled, it is noted by "bc" on the display. You may also have a "bc" annunciation on the external CDI.
4. Set the Standby channel to the appropriate VOR and note where a radial crosses the FAF and MAP for your approach. Press NAV a second time to "monitor" the Standby channel. A small "m" will replace the "s".
5. The internal CDI (on the right side of the display) and the external CDI, if installed, will guide you along the course to the runway.
6. The radial of the Standby channel you are monitoring will be shown in parentheses to the right of the Standby channel.
7. Use the monitored Standby channel to note your location along the approach.



GARMIN

GTX™ 327

Mode A/C Transponder



pilot's guide

Except as expressly provided herein, no part of this manual may be reproduced, copied, transmitted, disseminated, downloaded or stored in any storage medium, for any purpose without the express prior written consent of GARMIN. GARMIN hereby grants permission to download a single copy of this manual and of any revision to this manual onto a hard drive or other electronic storage medium to be viewed and to print one copy of this manual or of any revision hereto, provided that such electronic or printed copy of this manual or revision must contain the complete text of this copyright notice and provided further that any unauthorized commercial distribution of this manual or any revision hereto is strictly prohibited.

This manual is written for software version 2.10, and is not suitable for earlier software versions. Information in this document is subject to change without notice. Visit the GARMIN web site (www.garmin.com) for current updates and supplemental information concerning the operation of this and other GARMIN products.

Software License Agreement

BY USING THE GTX 327, 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.

You acknowledge that the Software is the property of GARMIN and is protected under the United States of America copyright laws and international copyright treaties. You further acknowledge that the structure, organization and code of the Software are valuable trade secrets of GARMIN and that the Software in source code form remains a valuable trade secret of GARMIN. You agree not to decompile, disassemble, modify, reverse assemble, reverse engineer or reduce to human readable form the Software or any part thereof or create any derivative works based on the Software. You agree not to export or re-export the Software to any country in violation of the export control laws of the United States of America.



CAUTION: *The GTX 327 should be turned off before starting or shutting down aircraft engine(s).*



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

Limited Warranty

This GARMIN product is warranted to be free from defects in materials or workmanship for one year from the date of purchase. Within this 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 cover failures due to abuse, misuse, accident or unauthorized alteration or repairs.

THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED OR STATUTORY, INCLUDING ANY LIABILITY ARISING UNDER ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY OR OTHERWISE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, WHICH MAY VARY FROM STATE TO STATE.

IN NO EVENT SHALL GARMIN BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE, OR INABILITY TO USE THIS PRODUCT OR FROM DEFECTS IN THE PRODUCT. Some states do not allow the exclusion of incidental or consequential damages, so the above limitations may not apply to you.

GARMIN retains the exclusive right to repair or replace the unit or software or offer a full refund of the purchase price at its sole discretion. SUCH REMEDY SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.

To obtain warranty service, contact your local Garmin Authorized Service Center. For assistance in locating a Service Center near you, call Garmin Customer Service at one of the numbers shown below.

Garmin International, Inc.
1200 East 151st Street
Olathe, Kansas 66062, U.S.A.
Phone: 913/397.8200
FAX: 913/397.8282

Garmin (Europe) Ltd.
Liberty House, Bulls Copse Road
Hounslow Business Park
Southampton, SO40 9RB, U.K.
Phone: +44/0870.8501241
FAX: +44/0870.8501251



NOTE: It is the responsibility of the GTX 327 owner to obtain proper licensing before using the transponder.



NOTE: The coverage expected from the GTX 327 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 327 transponder is powered on by pressing the **STBY**, **ON**, 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. If the unit detects an internal failure, the screen displays **SELF TEST FAILED**.

Mode Selection Keys

OFF — Powers off the GTX 327. 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 — Selects Mode A. In this mode, the transponder replies to interrogations, as indicated by the Reply Symbol (). Replies do not include altitude information.

ALT — Selects Mode A and Mode C. In **ALT** mode, the transponder replies to identification and altitude interrogations as indicated by the Reply Symbol (). 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.



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. The **CLR** key may be pressed 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.



Keys for Other GTX 327 Functions

IDENT

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

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

FUNC— Changes the page shown on the right side of the display. Display includes Pressure Altitude, Flight Time, Count Up, and Count Down timers.

**START
STOP**

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

CRSR

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

CLR

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

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

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: *Transponder options are normally set at time of installation. For changes to the GTX 327 parameters, contact your Garmin authorized service center.*

PRESSURE ALT
FL 123

PRESSURE ALT: Displays the altitude data supplied to the GTX 327 in feet, hundreds of feet (i.e., flight level), or meters, dependent upon installation configuration.

FLIGHT TIME
00:00:13

FLIGHT TIME: Displays the Flight Time, configured during installation as MANUAL, CLEAR, or ACCUMULATE (see Timer Operation for details). Timer is controlled by the **START/STOP** and **CLR** keys when configured as Manual.

COUNT UP
00:01:05

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

COUNT DOWN
00:03:25

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

CONTRAST

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

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

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 set during transponder installation.

Automatic ALT/STBY Mode Switching

If the GTX 327 is configured with Automated Airborne Determination, ALT mode selection occurs when lift-off is sensed. When the aircraft is on the ground, the transponder automatically selects and displays STBY. The transponder does not respond to ATCRBS interrogations when STBY is annunciated. When a delay time is set (dependent upon installation configuration), the GTX 327 waits the specified length of time after landing before changing to STBY mode.

ADS-B Control (GDL 90)

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 GTX 327 provides mode control for the optional GDL 90 Universal Access Transceiver (UAT) datalink. The GDL 90 provides ADS-B capabilities.

Timer Operation

To operate the Flight Timer:

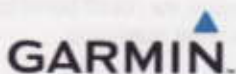
1. Press the **FUNC** key until FLIGHT TIME is displayed.
2. If the GTX 327 Flight Timer is configured as ACCUMULATE or CLEAR, the timer will begin automatically when the unit senses that the aircraft has become airborne. The timer may be reset to zero at every liftoff (CLEAR), continue accumulating time at liftoff (ACCUMULATE), or may be controlled manually (MANUAL).
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 pause 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 counting 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** begin to counting 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, and the time begins counting up.
6. Press **CLR** to reset the timer to the initial time value.



© 1999 - 2008 Garmin Ltd. or its subsidiaries

Garmin International, Inc.
1200 East 151st Street, Olathe, Kansas 66062, U.S.A.

Garmin (Europe) Ltd.
Liberty House, Bulls Copse Road, Hounsdown Business Park,
Southampton, SO40 9RB, U.K.

Garmin Corporation
No. 68, Jangshu 2nd Road, Shijr, Taipei County, Taiwan

www.garmin.com

Part Number 190-00187-00 Rev. D