

**ENSTROM 480B OPERATOR'S MANUAL
AND
FAA APPROVED
ROTORCRAFT FLIGHT MANUAL
SUPPLEMENT**

GARMIN GTN 650/750 NAVIGATION SYSTEM

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REPORT NO. 28-AC-064

HELICOPTER SERIAL NO. _____

HELICOPTER REGISTRATION NO. _____

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**THIS SUPPLEMENT MUST BE CARRIED IN THE
HELICOPTER AT ALL TIMES IF EQUIPPED WITH THE
GARMIN GTN 650/750 INSTALLATION. CHAPTERS 1, 2,
3, AND 4 ARE FAA APPROVED.**

FAA APPROVED *Dennis Barbini*

for: ACTING MANAGER, SOUTHWEST FLIGHT TEST SECTION,
AIR-713
FEDERAL AVIATION ADMINISTRATION
FT. WORTH, TX

DATE June 19, 2019

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**Approved by the Manager,
Southwest Flight Test Section, AIR-713
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GARMIN GTN 650/750 NAVIGATION SYSTEM

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INTRODUCTION

Intro-1. General

This supplement contains the operating instructions, procedures, and limitations for the Garmin GTN 650/750. The supplement is divided into two basic parts, the FAA approved RFM Supplement and Supplemental Data provided by the Enstrom Helicopter Corporation (Enstrom). Chapters 1, 2, 3, and 4 make up the FAA approved RFM Supplement. It is required by Federal Regulations that this supplement be carried in the helicopter at all times if the Garmin GTN 650/GTN 750 unit is installed.

Intro-2. List of Abbreviations

Abbreviations noted in this supplement are listed in Intro-1.

Intro-1. List of Abbreviations

BC	Back Course
CB	Circuit Breaker
CDI	Course Deviation Indicator
COM	Communication
DR	Dead Reckoning
FAA	Federal Aviation Administration
FIS-B	Flight Information Service Broadcast
GPS	Global Positioning System
GS	Glideslope
HTAWS	Helicopter Terrain Awareness and Warning System
ICAO	International Civil Aviation Organization
ICS	Intercom System
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
LDA	Localizer-type Directional Aid

Intro-1. List of Abbreviations - Continued

LNAV	Lateral Navigation
LOC	Localizer
LPV	Localizer Performance with Vertical guidance
MB	Megabyte
MLS	Microwave Landing System
NAV	Navigation
NAVAID	Navigation Aid
RFM	Rotorcraft Flight Manual
SBAS	Space-Based Augmentation System
SDF	Simplified Directional Facility
SW	Software
TAS	Traffic Advisory System
TCAS	Traffic Collision Avoidance System
TIS	Traffic Information Service
TSO	Technical Standard Order
TX	Transmitter
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
VOR	VHF Omni-Directional Range
VOX	Voice Activated
WAAS	Wide Area Augmentation System

CHAPTER 1. OPERATING LIMITATIONS

1-1. Kinds of Operation

Rotorcraft operations with the GTN 650/750 are limited to VFR only.

A placard in close proximity to the GTN 650/750 shall state:

GPS TO BE USED FOR VFR ONLY

1-2. System Software

The system must utilize the software versions listed in Table 1-1 (or later FAA approved version). Subsequent software versions may support different functions. Check the applicable pilot's guide for further information.

The software versions are displayed during system initialization after power-up or they can be accessed in the System function page.

Table 1-1. Approved Software Versions

Software Item	Approved Software Version	
	GTN 650	GTN 750
Main	5.00	6.51
GPS/WAAS	5.0	5.2
COM	2.13	2.30
NAV	6.02	6.03

1-3. SD Card

The SD card must be present in the unit at all times.

1-4. Ground Operations

SafeTaxi or Chartview (GTN 750 only) functions shall not be used as the sole basis for ground maneuvering.

1-5. HTerrain Proximity Function

The GTN 650/750 is configured with the standard Terrain (HTerrain) Proximity function. Aircraft maneuvers and navigation must not be predicated upon the use of the terrain display.

Table 1-2 lists the compatible terrain database cards for the GTN 650/750 and the area of coverage available.

NOTE

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

Table 1-2. Approved Database Cards

Database	Coverage Area
P/N 010-01157-41 (Americas – North)	Latitudes: 0° to N90° Longitudes: W180° to W30°
P/N 010-01157-42 (Americas – South)	Latitudes: N30° to S90° Longitudes: W180° to W30°
P/N 010-01157-43 (Atlantic – North)	Latitudes: 0° to N90° Longitudes: W30° to E90°
P/N 010-01157-44 (Atlantic – South)	Latitudes: N30° to S90° Longitudes: W30° to E90°
P/N 010-01157-45 (Pacific – North)	Latitudes: 0° to N90° Longitudes: W60° to E180°
P/N 010-01157-46 (Pacific – South)	Latitudes: N30° to S90° Longitudes: E60° to E180°

1-6. HTAWS and HTerrain Alerting Function

The optional HTAWS and HTerrain Alerting feature is not approved for this installation.

1-7. Navigation

No navigation is authorized north of 89° north latitude or south of 89° south latitude.

1-8. Weather Display (Optional)

Data link (FIS-B) weather information is approved, if equipped.

1-9. Traffic Display (Optional)

ADS-B traffic is approved; however, display of traffic is an aid to visual acquisition and shall not be utilized for aircraft maneuvering.

1-10. Music Services

The Services/Music feature (music, phone, text) is not configured for this installation.

1-11. Glove Use

No article shall be used to cover fingers used to operate the GTN unless it has been qualified in accordance with Paragraph 18.4 of the GTN 625/635/650 Pilot's Guide or Paragraph 19.4 of the GTN 725/750 Pilot's Guide, as applicable (see Table 7-1).

1-12. Flight Planner/Calculator Functions

The Fuel Planning page must not be used as a means to determine actual fuel on board the aircraft.

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CHAPTER 2. NORMAL PROCEDURES

2-1. General

Refer to the applicable pilot's guide (see Table 7-1) for normal operating procedures and a complete list of system messages and associated flight crew actions.

2-2. Unit Power On

After the setting Avionics master (**AVI MSTR**) switch ON (basic RFM para. 2-19) and prior to Engine Runup:

1. During GTN system initialization, perform the following start-up screen procedures when prompted. Press the **Continue** key when finished.
 - a. Software and Database Versions and Dates Screen:
 - 1) Review effective dates.
 - 2) Ensure the applicable Terrain SD card is loaded if utilizing the HTerrain Proximity feature.
 - b. Panel Self-Test and Fuel Settings Page:
 - 1) Check to ensure CDI/HSI outputs and other displayed data are correct on the external interfaced equipment.
 - 2) Touch each of the Fuel value keys and set the appropriate values as desired.

2-3. Before Takeoff

1. Review system messages and annunciators.
 - a. When a message has been issued by the unit, the **MSG** annunciator will blink. Touch the **MSG** key to view, then touch the **Back** key to return to the previous page.

2-4. Approaches

CAUTION

GPS-based approaches with vertical navigation (LNAV+V, L/VNAV, and LPV) have not been evaluated in the 480B. Installation of this equipment is for reference only and does not constitute operational authority for use in IFR/IMC conditions.

NOTE

GPS is to be used for VFR only.

1. During GPS approaches, the pilot must verify the GTN is operating in the approach mode (LNAV, LNAV+V, L/VNAV, or LPV).
2. Accomplishment of an ILS, LOC, LOC-BC, LDA, SDF, MLS, VOR approach, or any other type of approach not approved for GPS overlay, is not authorized with GPS navigation guidance.
3. Use of the GTN VOR/LOC/GS receiver to fly approaches not approved for GPS requires VOR/LOC/GS navigation data to be present on the external indicator (i.e. proper CDI source selection).

CHAPTER 3. EMERGENCY PROCEDURES

3-1. General

Refer to the basic RFM.

3-2. Loss of GPS/SBAS Navigation Data

CAUTION

GPS-based approaches with vertical navigation (LNAV+V, L/VNAV, and LPV) have not been evaluated in the 480B. Installation of this equipment is for reference only and does not constitute operational authority for use in IFR/IMC conditions.

1. If the Dead Reckoning (DR) annunciation is displayed, the map will continue to be displayed with “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 En Route and Oceanic modes. Terminal and Approach modes do not support Dead Reckoning. If the unit is in or transitions to a Terminal and Approach phase of flight when Dead Reckoning takes place, “No GPS Position” will be displayed on the map pages and all navigation data will be dashed.
 - a. If the GTN 650 GPS navigation information is not available, or is invalid, utilize other remaining operational navigation equipment as appropriate.
2. If the Loss of Integrity annunciation is displayed, revert to an alternate means of navigation appropriate to the route and phase of flight.
3. If, during a GPS LPV precision approach or GPS LNAV/VNAV approach, the message “APPROACH DOWNGRADE” is displayed, vertical guidance will be removed from the external CDI/HSI display.

- a. Continue to fly the approach using published LNAV minimums.
4. The message “ABORT APPROACH” is triggered outside the MAP if the GTN system can no longer provide approach level of service. Vertical guidance will be removed from the external CDI/HSI display.
 - a. Initiate a climb to published safe altitude, abort the approach, and execute a non-GPS based approach.
5. The message “APPROACH NOT ACTIVE” is displayed if the GTN system is on approach and did not have the required position integrity to get to LNAV. It reverts to terminal limits.
 - a. Abort the approach and execute a non-GPS based approach.

3-3. Loss of COM Radio Tuning Functions

1. To quickly tune and activate 121.50, press and hold the volume knob or the external remote COM Flip/Flop key or the remote frequency transfer button on the cyclic for approximately two seconds.
2. 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.

CHAPTER 4. PERFORMANCE DATA

4-1. General

Refer to the basic RFM.

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CHAPTER 6. WEIGHT/BALANCE AND LOADING

6-1. General

This installation is included in the basic aircraft weight. Refer to the basic RFM.

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CHAPTER 7. SYSTEM DESCRIPTION AND OPERATION

7-1. Pilot's Guide

The pilot's or cockpit reference guides listed in Table 7-1 contain additional information regarding the GTN 650/750 control and function.

Table 7-1. Pilot's Guide References

GTN 625/635/650 Pilot's Guide	P/N 190-01004-03 (latest revision)
GTN 625/635/650 Cockpit Reference Guide	P/N 190-01004-04 (latest revision)
GTN 725/750 Pilot's Guide	P/N 190-01007-03 (latest revision)
GTN 725/750 Cockpit Reference Guide	P/N 190-01007-04 (latest revision)

7-2. System Description

The GTN 650/750 combines a VHF com transceiver, VOR/LOC/GS receivers, and a GPS/SBAS receiver in a single upper or lower panel-mounted unit. The GTN installation interfaces with navigation, audio, and fuel management systems, as well as integrates control and display of transponder functions. The system interface is shown in Figure 7-1.

7-3. Unit Power Up

Power to the GTN 650/750 is provided via the **NAV/GPS** circuit breaker (CB) (5 Amp) and the **COM** circuit breaker (CB) (5 Amp) located on the lower console.

NOTE

Removal of the SD card will result in certain features/databases not being available and/or slow system performance.

Database versions and system software version are displayed on the start-up page immediately after power-on. The software versions of the GTN and equipment interfaced to it can also be accessed in the **System** function page.

Refer to the applicable pilot's guide for additional information regarding database updates and downloading.

7-4. Pilot Controls

Controls are located on the bezel and on the touchscreen display (Figure 7-2, Figure 7-3). Most functions are operated and accessed by touching highlighted icons or keys from the main page. A brief explanation of the knobs and bezel keys is provided in Table 7-2.

Refer to the applicable pilot's guide for additional information regarding operation.

7-5. Lighting

When the **PNL LTS** switch is set to **OFF**, backlighting of the GTN display is automatically adjusted by the GTN photocell. When the **PNL LTS** switch is set to **ON**, the GTN display backlighting may be manually adjusted with the **RAD INST** dimmer. The bezel key backlighting is controlled by the photocell regardless of the **PNL LTS** switch setting.

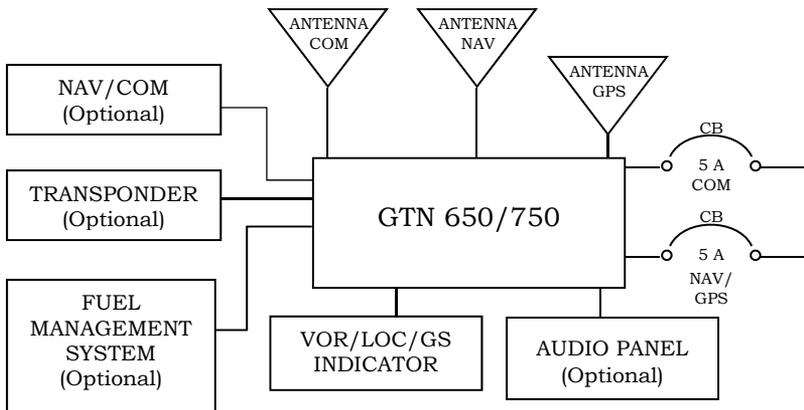


Figure 7-1. GTN 650/750 System Interface

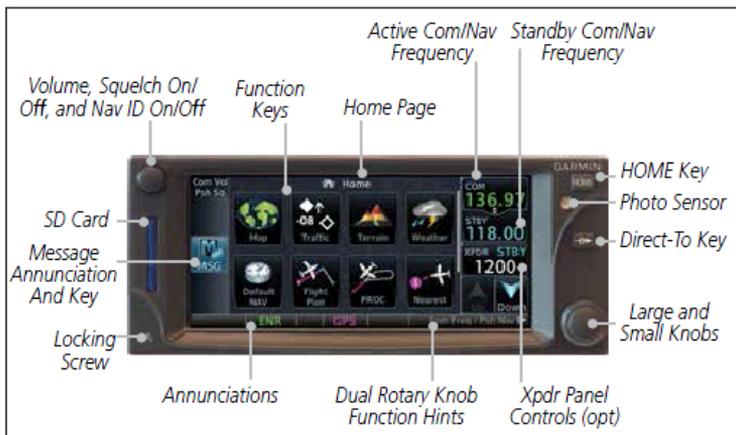


Figure 7-2. GTN 650 Control and Display

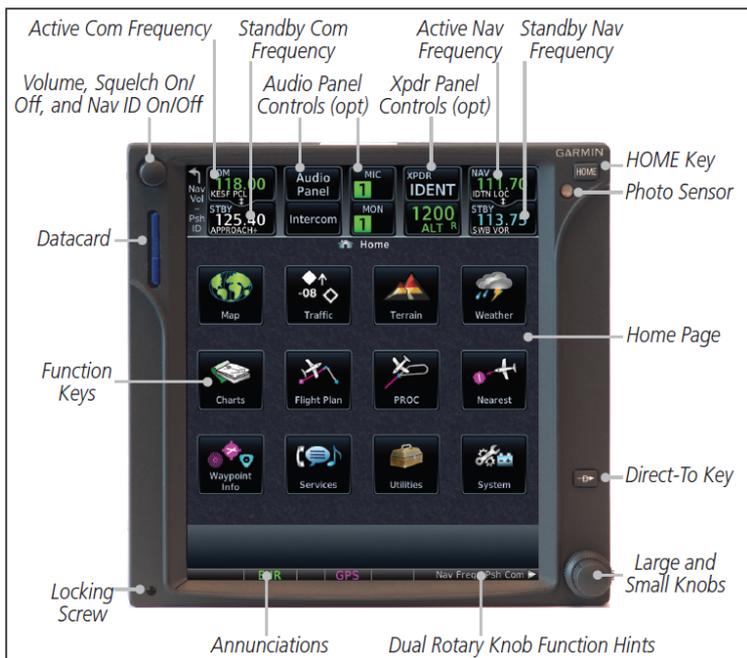


Figure 7-3. GTN 750 Control and Display Layout

Table 7-1. GTN 650/750 Front Panel Controls

Controls	Functions
Volume and Squelch Knob 	<p>Controls volume of the COM and NAV radios, and other volume levels for external audio input devices that are controlled via the GTN interface, if installed.</p> <p>Press to disable automatic squelch control of the COM radio.</p> <p>Press to use ident function of the NAV radio.</p> <p>Pressing and holding the volume knob will change the frequency to emergency frequency.</p>
HOME 	<p>A single press of the Home Key returns the user to the main page to access features.</p> <p>Pressing and holding the Home Key while on any page will display the default NAV page.</p>
(Direct-To) 	<p>Establish a direct course to a selected destination/waypoint</p>
Large and Small Knobs 	<p>Rotate either knob to enter selections.</p> <p>Press and hold in the small knob to flip-flop COM and NAV frequencies.</p>
Touchscreen	<p>Provides a visual display of touch- activated controls.</p> <p>Touch the icon or key to access the function or information.</p>
SD Card	<p>Used to load and store databases.</p>