

**ENSTROM 480B OPERATOR'S MANUAL
AND
FAA APPROVED
ROTORCRAFT FLIGHT MANUAL
SUPPLEMENT
GTX 345 ADS-B TRANSPONDER**

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REPORT NO. 28-AC-078

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
GTX 345 INSTALLATION. CHAPTERS 1, 2, 3, AND 4 ARE
FAA APPROVED.**

FAA APPROVED

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

DATE DEC 19 2018

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FAA Approved: Dec 19/18

Report No. 28-AC-078

Dec 3/18

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LOG OF REVISIONS

Rev. No.	Issue Date	FAA Approved / Date
-	Dec 3/18	 Seri: AIR-713 DEC 19 2018

**Approved by the Manager,
Southwest Flight Test Section, AIR-713
Federal Aviation Administration
Ft. Worth, TX**

FAA Approved: Dec 19/18
Report No. 28-AC-078

Dec 3/18

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GTX 345 TRANSPONDER

INTRODUCTION

Intro-1. General

This supplement contains the operating instructions, procedures, and limitations for the Garmin GTX 345 Transponder with Automatic Dependent Surveillance-Broadcast (ADS-B) functionality.

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 GTX 345 is installed.

Intro-2. List of Abbreviations

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

Intro-1. List of Abbreviations

ADS-B	Automatic Dependent Surveillance - Broadcast
ADS-R	Automatic Dependent Surveillance - Rebroadcast
ATC	Air Traffic Control
CFR	Code of Federal Regulations
ES	Extended Squitter
FAA	Federal Aviation Administration
FIS-B	Flight Information Service - Broadcast
GPS	Global Positioning System
ICS	Intercom System
MHz	Megahertz
PABI	Pressure Altitude Broadcast Inhibit
PED	Portable Electronic Device
RFM	Rotorcraft Flight Manual
SBAS	Satellite-Based Augmentation System
SW	Software
TAS	Traffic

TIS-B	Traffic Information Services - Broadcast
TX	Transmit
UAT	Universal Access Transceiver
VOX	Voice Transmission

CHAPTER 1. OPERATING LIMITATIONS

1-1. Minimum Equipment

1. The GTX 345 must have the following system interfaces fully functional in order to be compliant with the requirements of 14 CFR 91.227 ADS-B Out operations:

Table 1-1. ADS-B Out Required Equipment

Interfaced Equipment	Number Installed	Number Required
Barometric Pressure Altitude Source	1	1
GPS SBAS Position Source	1	1

1-2. ADS-B Out

1. The GTX 345 only complies with 14 CFR 91.227 for ADS-B Out when all required functions are operational as indicated by the absence of any ADS-B Out (1090ES) transmit failure message on the GTX 345 front panel display.

1-3. Software Version

1. The system must utilize the main software version shown in Table 1-2. The software version is displayed on the splash screen during system start-up.

Table 1-2. Software Versions

Main SW Version	2.12*
ADS-B SW Version	2.10*
*or later FAA approved version	

2. Subsequent software versions may support different functions. Check the GTX 335/345 Series Pilot's Guide for further information.

1-4. Pressure Altitude Broadcast Inhibit

1. Pressure Altitude Broadcast Inhibit (PABI) shall only be enabled when requested by ATC while operating within airspace requiring an ADS-B Out compliant transmitter, per 14 CFR 91.227.

1-5. Traffic Displays and Alerting

1. Traffic display and alerting is an aid to visual acquisition and may not be used as the sole basis for rotorcraft maneuvering.

1-6. Datalinked Weather Display

1. Do not use datalink weather information for maneuvering in, near, or around areas of hazardous weather.

NOTE

Weather information provided by datalink weather products may not accurately depict current weather conditions. Also, weather information shown by the datalink weather product may be significantly older than the indicated weather product age.

1-7. Placards

1. A placard in close proximity to the GTX 345 shall state:

ADS-B IN/OUT INSTALLED

NOTE

The ADS-B Out system operates on frequency 1090 MHz. This frequency is also accepted for ADS-B Out equipment in most countries.

1-8. Pilot's Guide

The following pilot's guides must be accessible to the crew:

1. GTX 335/345 Series Pilot's Guide, Part Number 190-01499-00, latest revision.
2. GTN 625/635/650 Pilot's Guide, P/N 190-01004-03, latest revision, or GTN 625/635/650 Cockpit Reference Guide, Part Number 190-01004-04, latest revision (interfaced display, transponder control, and GPS source operation).

CHAPTER 2. NORMAL PROCEDURES

2-1. General

Refer to the basic RFM for procedures not specific to the GTX 345.

The ADS-B Out system is a single point of entry system for Mode 3/A code, Flight ID, IDENT functionality and activating or deactivating emergency status for both transponder and ADS-B Out functions. Parameters are set in the transponder at the time of installation and are automatically incorporated in ADS-B Out broadcasts.

2-2. Before Takeoff

NOTE

The ADS-B Out system must be operational (“NO 1090ES TX” annunciator extinguished before takeoff) in certain airspaces after January 1, 2020, as specified by 14 CFR 91.225. Requirements outside of the US may vary based on local regulations.

NOTE

The annunciation “NO 1090ES TX” appears in the lower left corner of the GTX 345 when the ADS-B TX is manually turned off or when there is a transmission malfunction.

1. GTX Mode – Verify ALT.
2. “NO 1090ES TX” annunciation – extinguished.

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CHAPTER 3. EMERGENCY PROCEDURES

3-1. General

Refer to the basic RFM.

3-2. Abnormal Procedures

When the GPS/SBAS receiver is inoperative or GPS position information is not available or invalid, the GTX will no longer be transmitting ADS-B Out data.

Figure 3-1 shows when ADS-B is not transmitting.



Figure 3-1. ADS-B 1090 Failed Screen

Figure 3-2 shows if both the transponder and ADS-B are not transmitting.



Figure 3-2. ADS-B 1090 and Transponder Failed Screen

1. In the event of either a “NO 1090ES TX” or a “TRANSPONDER FAILED” annunciation, verify valid position with interfaced GPS position sources.

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CHAPTER 4. PERFORMANCE DATA

4-1. General

No change. 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.

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CHAPTER 7. SYSTEM DESCRIPTION AND OPERATION

7-1. General

1. The Garmin GTX 335/345 Series Pilot's Guide, document 190-01499-00, latest revision, contains additional information regarding GTX system description, control, and function.
2. The Garmin GTN 625/635/650 Pilot's Guide, document 190-01004-003, latest revision, contains additional information for interfaced operation and display.
3. The GTX 345 features include:
 - ADS-B Out
 - Dual-band ADS-B In traffic display output and aural alerting
 - Integration with TAS traffic system
 - FIS-B weather and flight information display output
 - Bluetooth interface provides traffic, weather, and attitude data to a PED
 - Altitude deviation alerting
 - Timers: count up, count down, flight, trip
 - Outside air temperature display
 - Density and pressure altitude display

7-2. System Description

1. The GTX 345 is located in the lower instrument console as shown in Figure 1. A schematic of interfaced equipment is shown in Figure 7-2.
2. Power to the GTX 345 is provided via the **XPNDR** circuit breaker (5 Amp). Power to the GTX 345 is also provided via the avionics master (**AVI MSTR**), if installed. The circuit breaker and switch are located on the instrument console (Figure 7-1).

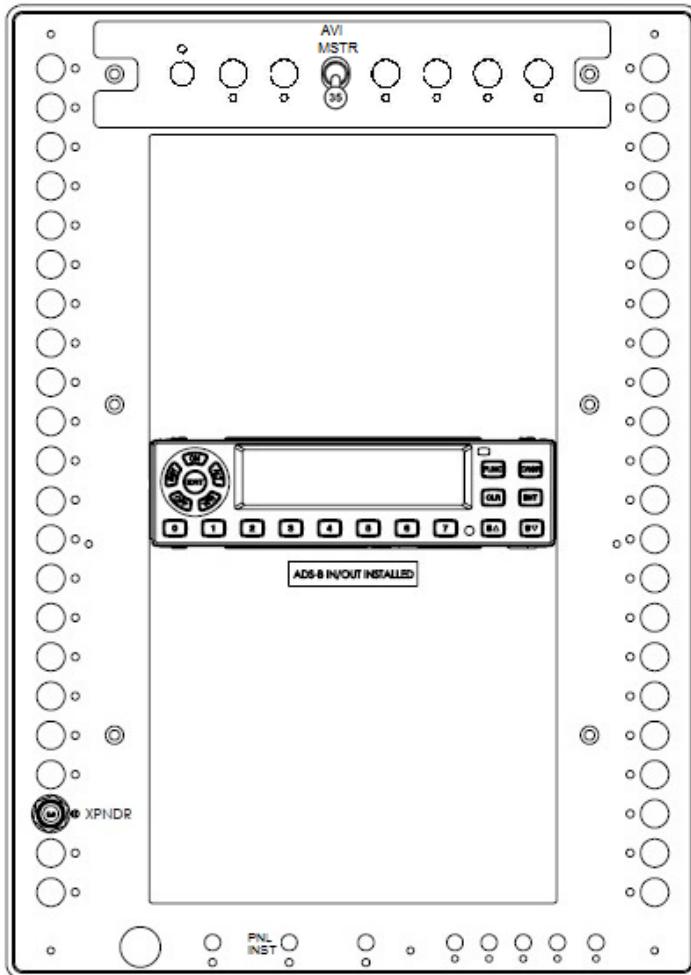


Figure 7-1. GTX 345 Installation

3. The GTX 345 is configured to transmit “in air” any time the collective is raised or the groundspeed is in excess of 15 knots.
4. The pilot and co-pilot cyclic sticks are configured with remote IDENT (RMT.XPNDR.IDENT) (optional) and traffic aural alert cancel (TRAFFIC CANCEL) switches.

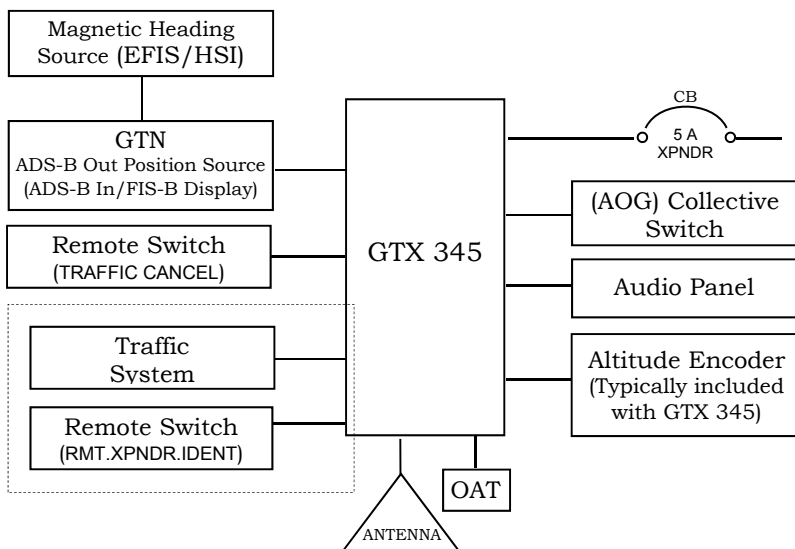


Figure 7-2. GTX 345 System Interface (system options indicated with dashed outline)

5. The GTX 345 receives ADS-B traffic data (ADS-B, ADS-R, TIS-B) through the UAT (978 MHz) and the 1090 MHz receivers. The GTX 345 may also receive traffic data from a TAS, if configured. Traffic data and alerting is provided via a visual annunciator on a GTN series navigator and audio callouts via an interfaced audio panel. Traffic data may also be displayed on a PED (tablet) via the built-in Bluetooth interface.
 - a. A pilot is able to view traffic information about surrounding aircraft if those aircraft are equipped with ADS-B out. This information includes altitude, relative bearing, speed, and distance to aircraft. In addition to receiving position reports from ADS-B out participants, TIS-B (USA-only) can provide position reports on non-ADS-B out-equipped aircraft if suitable ground equipment and ground radar exist. ADS-R re-transmits ADS-B position reports between UAT and 1090 MHz frequency bands.

- b. An aural message issues when an alert becomes active; for example, “Traffic! Two O’clock, Low, Two Miles.” Alerting parameters provide enough time after an alert is generated to acquire the target and maneuver the aircraft away from the conflicting traffic. The alerting parameters consider:
- Closure rate of each aircraft (ownship and target)
 - Altitude separation and trend
 - Speed
 - Angle

The GTN display will truncate traffic alerts to not include bearing, distance, and relative altitude information when less than 200 ft above the surface. Also, the GTX will reduce the protected volume when operating below 200 ft above the surface and less than 60 kts groundspeed to minimize nuisance alerts in airport areas while still providing traffic alerts on other eligible ADS-B Out equipped aircraft. When in the airport environment alerting envelope, aural traffic alerts are shortened to “Traffic.” There are no traffic alerts when groundspeed is less than 10 knots and within 50 feet of the ground.

CAUTION

Not all traffic is will be tracked by the GTX. The flight crew must use “see and avoid” procedures to visually acquire and avoid other aircraft. Do not rely on the GTX as the sole means of detecting other aircraft.

- c. On Scene Mode (via the GTN traffic page) changes traffic alerting volumes for other ADS-B equipped rotorcraft traffic. This allows helicopters to operate in closer proximity to each other without excessive nuisance alerts. On Scene Mode must be turned ON and OFF by the pilot using the controls in the menu of the GTN’s traffic page. See the GTN pilot’s guide for more information.

6. The following system limitations are applicable when there is no heading source (EFIS, EHSI, HSI, or CDI) interfaced to the GTX:
 - a. The traffic page is oriented to rotorcraft TRACK, and may or may not align with the rotorcraft heading.
 - b. The traffic display will not show ADS-B traffic when groundspeed is less than 15 kts. Aural traffic alerts will issue, appropriately. If interfaced with TAS:
 - TAS traffic targets will continuously display at all speeds.
 - If in excess of 15 knots in backward or sideward flight, TAS and ADS-B targets may not correlate. Two targets may appear on the display for each actual target being received over both ADS-B and TAS.

7-3. Operation

A view of the front panel is shown in Figure 7-3. The control keys and functions are briefly explained in Table 7-1.



Figure 7-3. GTX 345 Front Panel

1. Position the **AVI MSTR** switch to ON to apply system power, if not already switched on.
 - a. Press either the **ON**, **SBY**, or **ALT** keys to turn on the unit.
 - b. After power-on, a start-up page is displayed while the system performs a self-test. If the unit detects an internal failure, the screen displays “TRANSPONDER FAILED”.

- c. Press the **OFF** key to power off the unit. Switching the **AVI MSTR** switch to OFF will also turn off the unit.
2. Refer to the pilot's guides listed in paragraph 7-1 for additional information regarding GTX operation and troubleshooting as well as information for operation and display via the GTN interface.
 3. For night operation, the display brightness can be adjusted with the **PNL INST** dimmer (Figure 7-1).

Table 7-1. GTX 345 Control Keys and Functions

Key	Function
ON ALT VFR OFF SBY IDNT	<ul style="list-style-type: none"> • ON: Powers on, disables altitude reporting. <ul style="list-style-type: none"> ○ Transponder replies to interrogations, as indicated by the Reply Symbol (R). • ALT: Powers on, enables altitude reporting. <ul style="list-style-type: none"> ○ Transponder replies to identification and altitude interrogations, as indicated by the Reply Symbol (R). • VFR: Changes to the preprogrammed squawk code for VFR. <ul style="list-style-type: none"> ○ Press the VFR a second time to restore the previous identification code. • OFF: Powers off. • SBY: Powers on or changes into standby mode. <ul style="list-style-type: none"> ○ Transponder will not reply to any interrogations or transmit ADS-B Out. ○ Receives ADS-B In information, but will not be a TIS-B participant. • IDNT: Activates the Ident function for 18 seconds. <ul style="list-style-type: none"> ○ Word "IDENT" will appear in the upper left corner of the display.

Key	Function
FUNC CRSR CLR ENT	<ul style="list-style-type: none"> • FUNC: Cycles through the four menu groups. <ul style="list-style-type: none"> ○ Press the FUNC key to access a menu group (transponder, timers, altitude, and system). • CRSR: Removes the cursor and cancels the code entry. <ul style="list-style-type: none"> ○ Press the CRSR key when entering the code. (The last code entered is retained.) • CLR: Moves the cursor or cancels the code entry. <ul style="list-style-type: none"> ○ Press the CLR key to move the cursor back to the previous digit. ○ Press and hold CLR key to move the cursor back to the first digit. ○ When the cursor is on the first digit, press the CLR key to remove the cursor and cancel the code entry. (The last code entered is retained.) • ENT: Acknowledges menu item and pilot data entry selections and controls timer start/stop and altitude monitoring on/off operation.
0-7 8▲ 9▼	<ul style="list-style-type: none"> • 0-7: Enters the squawk code. <ul style="list-style-type: none"> ○ Press the 0-7 keys to enter the code. The new code is activated when the fourth digit is entered. • 8▲: Enters the number eight in Flight ID or Count Down timer. <ul style="list-style-type: none"> ○ Press 8▲ to enter number eight. ○ Press 8▲ to navigate up and between the functions and settings within a menu group. • 9▼: Enters the number nine in Flight ID or Count Down timer. <ul style="list-style-type: none"> ○ Press 9▼ to enter number nine. ○ Press 9▼ to navigate down and between the functions and settings within a menu group.

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