



# **GTX 35R/45R Installation Manual (Non-Certified Aircraft)**



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#### RECORD OF REVISIONS

Revision	Revision Date	Subject
1	10/23/17	Initial Release
2	01/30/25	Updated rack installation info

## CURRENT REVISION DESCRIPTION

Revision	Page Number(s)	Section Number	Description of Change
2	4-9	<a href="#">4.7.1</a>	Updated rack installation info

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### **WARNING**

*A warning means injury or death is possible if the instructions are not obeyed.*



### **CAUTION**

*A caution means that damage to the equipment is possible.*



### **NOTE**

*A note gives more information.*



### **WARNING**

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*Perchlorate Material – special handling can apply.*

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## 1 SYSTEM OVERVIEW

### 1.1 Scope

This manual is intended to provide mechanical and electrical information for use in the planning and design of an installation of the GTX 35R/45R into an aircraft. This manual is not a substitute for an approved airframe-specific maintenance manual, installation design drawing, or complete installation data package. Attempting to install equipment by reference to this manual alone and without first planning or designing an installation specific to your aircraft may compromise your safety and is not recommended.

### 1.2 Equipment Description

The GTX 35R/45R models include Mode S/ES transponders. These units are controlled through the GDU displays in a G3X system.

**Table 1-1 GTX 35R/45R Units**

Feature	GTX 35R	GTX 45R
Mode S/ES	X	X
ADS-B traffic in (UAT and 1090 MHz)		X
Connex (via RS-232 and Bluetooth)		X
FIS-B In		X
TIS-A traffic	X	
Pressure sensor module (optional)	X	X
Interface to Garmin G3X	X	X

## 1.3 Definitions and Abbreviations

### ***Definitions***

References made to GTX 35R/45R apply to all GTX 35R/45R models, except when noted.

The term squitter refers to a burst or broadcast of aircraft-tracking data that is periodically transmitted by a Mode S transponder without radar interrogation. The GTX 35R/45R Mode S/ES models transmit ADS-B Out ES. These transmissions contain additional aircraft information that includes GPS based location information.

### ***Abbreviations***

These abbreviations and acronyms are used in this document.

AC	Advisory Circular
ADF	Automatic Direction Finder
ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-R	Automatic Dependent Surveillance-Rebroadcast
AFMS	Aircraft Flight Manual Supplement
AIRMET	Airmen Meteorological Information
API	Appliance Project Identifier
CDTI	Cockpit Display of Traffic Information
ATCRBS	Air Traffic Control Radar Beacon System
CFR	Code of Federal Regulations
CG	Center of Gravity
CONUS	Continental United States
CSA	Conflict Situational Awareness
DC	Direct Current
DME	Distance Measuring Equipment
EQF	Environmental Qualification Form
ES	Extended Squitter
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FCU	Flight Control Unit
FIS-B	Flight Information Services-Broadcast
FMS	Flight Manual Supplement
GAE	Garmin Altitude Encoder
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GTX	Garmin Transponder
HSDB	High Speed Data Bus
LAT	Latitude
LON	Longitude
MCP	Mode Control Panel
METAR	Meteorological Aviation Report
MFD	Multifunction Display
MSR	Message Success Rate
NOTAM	Notice to Airmen
NEXRAD	Next Generation Radar

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PED	Portable Electronic Device
PIREP	Pilot Weather Report
POH	Pilot Operating Handbook
RAIM	Receiver Autonomous Integrity Monitoring
RFMS	Rotorcraft Flight Manual Supplement
SATCOM	Satellite Communications
SBAS	Satellite-Based Augmentation System
SIGMET	Significant Meteorological Information
SIL	Source Integrity Level
SPI	Special Position Indicator
SUA	Special Use Airspace
TAF	Terminal Area Forecast
TAS	Traffic Advisory System
TCAS	Traffic Collision Avoidance System
TIS	Traffic Information Service
TIS-B	Traffic Information Service-Broadcast
TSO	Technical Standard Order
UAT	Universal Access Transceiver
UHF	Ultra-High Frequency
USB	Universal Serial Bus
VHF	Very High Frequency
VSWR	Voltage Standing Wave Ratio
WAAS	Wide Area Augmentation System

## 1.4 ADS-B Capabilities

### 1.4.1 ADS-B Out

The GTX 35R/45R include ADS-B Out capabilities when installed with GPS position source that meets the TSO performance requirements specified in 14 CFR 91.227

#### 1.4.1.1 Garmin Altitude Encoder

In most installations, the GTX 35R/45R receives pressure altitude data from the G3X system. An optional GAE sensor module is available for installations requiring pressure altitude data that meets the requirements of TSO-C88b. The sensor module connects to the aircraft static system. The module attaches to the rear connector plate with two screws, and has short, unshielded wires to connect to the GTX 35R/45R unit through the rear D-sub connector.



#### NOTE

*The GAE sensor does not need to be disconnected if the GTX 35R/45R is removed from the mounting rack.*

### 1.4.2 ADS-B In

The GTX 45R includes receivers for both the UAT and the 1090 MHz frequency bands for all ADS-B In data reception capabilities. The GTX 45R receives ADS-B transmissions from other ADS-B Out equipped aircraft, ADS-R, and TIS-B information from ground stations. The GTX 45R supplies ADS-B data to G3X Touch displays, certain Garmin panel-mount navigators, and certain portable devices via Bluetooth.

### 1.4.3 Installation Approval for ADS-B Systems

The conditions and tests necessary for TSO approval of the GTX 35R/45R are minimum performance standards. It is the responsibility of the installer to determine if the aircraft installation conditions are within the TSO standards.

All GTX 35R/45R unit functions are design-approved under the TSO. Changes or modifications to any unit that are not approved can void the compliance to necessary regulations and authorization for continued equipment usage.

It is the installer's responsibility to make sure the ADS-B Out system installation is compliant with 14 CFR 91.227.

## 1.5 FIS-B Capabilities

FIS-B information is for pilot-planning and pilot near-term decisions. The information shown are areas of inclement weather that are out of visual range or are not easily seen.

The GTX 45R receives FIS-B information from UAT ground stations in the United States. A direct line-of-sight between the ground station and aircraft is necessary to receive FIS-B data. The GTX 45R supplies FIS-B data to G3X Touch displays, certain Garmin panel-mount navigators, and certain portable devices via Bluetooth. Supported FIS-B data includes:

- NOTAM (includes TFRs)
- AIRMET
- SIGMET
- SUA
- METAR
- TAFs
- PIREP
- Winds/Temps Aloft

- Regional NEXRAD
- CONUS NEXRAD

## 1.6 TIS-A System Capabilities

The GTX 35R supplies information about nearby traffic through the FAA provided radar based TIS-A service. Advisory traffic information is shown on G3X/G3X Touch displays, and compatible Garmin panel-mount navigators.

## 1.7 Interface Summary

**Table 1-2 Interface Summary**

Interface Description	Input/Output	GTX 35R Qty	GTX 45R Qty
RS-232	I/O	3	4
ARINC 429	O	1	1
	I	2	2
HSDB	I/O	N/A	2
RS-422	I or O	N/A	1
Suppression bus	I/O	1	1
1PPS	O	1	1
GAE module interface	I/O	1	1
USB interface	I/O	1	1

## 1.8 General Specifications

**Table 1-3 Physical Characteristics**

Characteristic	Specification
Height, standard mount	1.7 inches (43 mm)
Width, standard mount	6.3 inches (160 mm)
Length, standard mount (unit, mount, and connector backshells)	9.9 inches (252 mm)
GTX 35R weight (unit only)	1.7 lb (0.77 kg)
GTX 45R weight (unit only)	2.0 lb (0.91 kg)
GTX 35R weight with standard mounting tray, backplate, and connectors	2.5 lb (1.13 kg)
GTX 45R weight with standard mounting tray, backplate, and connectors	2.9 lb (1.32 kg)
Operating temperature range	-40°F to 158°F (-40°C to + 70°C) For more details refer to the EQF.
Maximum operating altitude	55,000 feet
Humidity	95% non-condensing
Cooling	External cooling not necessary

## 1.9 Transponder Specifications

**Table 1-4 Transponder Specifications**

Characteristic	Specification
Transmitter frequency	1090 MHz $\pm$ 1 MHz
Transmitter power	125 W min at antenna, with max 2dB cable loss 250 W nominal at unit
Receiver frequency	1030 MHz $\pm$ 0.01 MHz
Receiver sensitivity	-74 dBm nominal for 90% replies
External suppression input	$\geq$ 10 VDC to suppress
External suppression output	$\geq$ 18 VDC with 300 ohm load, 28 VDC typical with no load

## 1.10 UAT Receiver Specifications (GTX 45R Only)

**Table 1-5 UAT Receiver Specifications**

Characteristic	Specification
Frequency	978 MHz $\pm$ 20 ppm
Modulation	Continuous phase FSK, $h = 0.6$ , raised cosine shaping, $a = 0.5$
Data rate	1.04 Mbps
Sensitivity	-96 dBm for 90% MSR

## 1.11 1090 MHz Receiver Specifications

**Table 1-6 1090 MHz Receiver Specifications**

Characteristic	Specification
Frequency	1090 MHz $\pm$ 1 MHz
Modulation	Binary pulse-position
Data rate	1 Mbps
Sensitivity	-81 dBm for 90% MSR

## 1.12 Power Specifications

GTX 35R/45R units require an input voltage of between 9 VDC and 33 VDC. The maximum input power and current is based upon maximum reply rates.

**Table 1-7 Power Specifications**

Unit	Characteristic	Specification	
		14 VDC	28 VDC
GTX 35R	Power input	8 W typical, 15 W maximum	
	Input current, typical	0.57 A	0.29 A
	Input current, maximum	0.86 A	0.43 A
GTX 45R	Power input	10 W typical, 18 W maximum	
	Input current, typical	0.72 A	0.36 A
	Input current, maximum	1.30 A	0.65 A

## 1.13 Certification

The GTX 35R/45R meets compliance with the TSO(s) when interfaced with equipment and installed in accordance with the requirements and limitations as outlined in this manual.

FIS-B information, including weather information, NOTAMs, and TFR areas, are intended to assist in long- and near-term planning decision making. The system lacks sufficient resolution and updating capability necessary for aerial maneuvering associated with immediate decisions.

The Appliance Project Identifier (API) for the GTX 35R/45R is GMN-01216. The API is used for project identification with the FAA. Refer to applicable hardware and software part numbers to identify appliance approvals.

Refer to the GTX 35R/45R Transponder TSO Installation Manual (190-01499-04) for TSO compliance information (including applicable part numbers, deviations, and non-TSO functions).

### 1.13.1 Design Assurance Levels

**Table 1-8 Software Design Assurance Levels**

System Function	DO-178B Level
Mode S transponder functionality	C
Display of TIS-A traffic data	C
Flight information data (FIS-B, including weather information) processing and output to display	D
1090 ADS-B transmission	C
1090/UAT ADS-B reception	B
Correlation of TCAS traffic with ADS-B, ADS-R, and TIS-B traffic	B
Conflict Situational Awareness (CSA) including visual and aural alerts	B
External UAT ADS-B control	C
Pressure sensor module	C
Flight ID	C
Bluetooth output	E
HSDB packet forwarding	B
Data concentrator	C

**Table 1-9 Complex Hardware Design Assurance Levels**

Function	DO-254
Main board, transponder, and I/O	C
ADS-B board, 978 MHz and 1090 MHz receivers	C

### 1.13.2 Transmitter Grant of Equipment Authorization

**Table 1-10 Equipment Authorization**

Model	FCC ID
GTX 35R	IPH-02133
GTX 45R	IPH-02256

### 1.14 License Requirements



#### **CAUTION**

*The UHF transmitter in this equipment is guaranteed to meet Federal Communications Commission acceptance over the operating temperature range. Modifications not expressly approved by Garmin could invalidate the license and make it unlawful to operate the equipment.*



#### **NOTE**

*For non-US installations consult the local spectrum management agency for requirements.*

The Telecommunications Act of 1996, effective February 8, 1996, provides the FCC discretion to eliminate radio station license requirements for aircraft and ships. The GTX 35R/45R installation must obey current transmitter licensing requirements. In the US, to find out the specific details on whether a particular installation is exempt from licensing, visit the FCC website <http://wireless.fcc.gov/aviation>.

If an aircraft license is necessary, apply for a license on FCC Form 404, *Application for Aircraft Radio Station License*. The FCC also has a fax-on-demand service to supply forms by fax. The GTX 35R/45R owner accepts all responsibility for obtaining the proper licensing before using the transponder.

## 1.15 Reference Documents

These documents are additional sources of information to install the GTX 35R/45R. The technician should read all related reference materials along with this manual before unit installation.

**Table 1-11 Reference Documents**

Document	P/N
<i>Aerospace Systems Electrical Bonding and Grounding for Electromagnetic Compatibility and Safety</i>	SAE ARP 1870
<i>Application for Aircraft Radio Station License</i>	FCC Form 404
<i>FAA Advisory Circular, Acceptable Methods, Techniques, and Practices – Aircraft Inspection and Repair</i>	FAAAC 43.13-1B
<i>FAA Advisory Circular, Acceptable Methods, Techniques, and Practices – Aircraft Alterations</i>	FAAAC 43.13-2B

## 2 LIMITATIONS

The GTX 35R/45R meets the minimum performance and quality control standards that are necessary by the TSOs.

## 3 INSTALLATION OVERVIEW

### 3.1 Introduction

Equipment information to install the GTX 35R/45R and optional accessories is in this section. Cabling is made by the installer to fit each particular aircraft. Always follow permitted avionics installation procedures as outlined in AC 43.13-1B and AC 43.13-2B or later FAA approved revisions.

### 3.2 Unit Configurations

**Table 3-1 GTX 35R/45R Configurations**

Model	ADS-B In	Unit P/N	Unit Only Kit	Standard Kit
GTX 35R		011-04286-00	010-01756-00	010-01756-01
GTX 45R	X	011-04287-00	010-01757-00	010-01757-01

### 3.3 Accessories Supplied

**Table 3-2 Accessories Supplied**

Unit	Kit P/N	Item	P/N
GTX 35R, standard mount	010-01756-01	Install rack	115-01771-00
		Backplate assembly	011-02976-00
		Connector kit	011-02977-00
		Product information kit	K00-00598-07
GTX 45R, standard mount	010-01757-01	Install rack	115-01771-00
		Backplate assembly	011-02976-00
		Connector kit	011-02977-01
		Product information kit	K00-00598-08

### 3.4 Optional Accessories

GAE altitude encoder, Garmin part number 011-03080-00

### 3.5 Necessary Installation Materials and Accessories Not Supplied

The GTX 35R/45R is installed with standard aviation materials. The following items are necessary for installation, but not supplied.

- Wire (MIL-W-22759/16 or equivalent)
- Shielded wire (MIL-C-27500 or equivalent)
- Aircraft grade category 5 Ethernet cable or MIL-27500 shielded twisted-pair cable is necessary for installations utilizing the HSDB interfaces (GTX 45R to GTN and/or GTS installations only)
- Mounting hardware
- Circuit breaker of applicable rating
- Tie wraps and/or lacing cord
- Ring terminals for grounding
- Coaxial cable (RG-400 or equivalent)
- Coax connectors – BNC connectors for the transponder antenna

### 3.6 Necessary Special Tools



#### NOTE

*Insertion/extraction tools from ITT Cannon are all plastic. The others are plastic with metal tips.*

Some connectors use crimp contacts. Use crimp tools in table 3-3 to make sure reliable crimp contact connections for the rear D-sub connectors are correct.

**Table 3-3 Recommended Crimp Tools**

Manufacturer	Hand Crimping Tool	22-28 AWG (P3251, P3252)	
		Positioner	Insertion/Extraction Tool
Military PN	M22520/2-01	M22520/2-09	M81969/14-01 M81969/1-04
Positronic	9507-0-0-0	9502-4-0-0	M81969/1-04
ITT Cannon	995-0001-584	995-0001-739	000849490 274-7048-000MIL
AMP	601966-1	601966-6	91067-1 2031838-1
Daniels	AFM8	K42	M81969/14-01 M81969/1-04
Astro	615717	615725	M81969/14-01 M81969/1-04

### 3.7 Transponder Antenna



#### NOTE

For the GTX 45R some types of transponder antennas that utilize thin radiator elements are only intended for use at 1030 and 1090 MHz. These types of antennas should be evaluated on a model-by-model basis to determine their suitability for UAT receivers.

The GTX 35R/45R must have an UHF antenna. The antennas in table 3-4 are approved for use with the GTX 35R/45R. Other antennas are permitted if they meet these specifications:

- Standard 50 ohm vertically polarized antenna with a VSWR  $\leq 1.7:1$  at 978 MHz and  $\leq 1.5:1$  at 1090 MHz
- TSO-C66( ), TSO-C74( ), or TSO-C112( ) antennas that also meet the VSWR specification

**Table 3-4 Acceptable UAT/1090 Antennas**

Manufacturer	P/N	Model/Description	Connector Type	Notes
Aero Antenna	AT130-16	DME Transponder	TNC	DC Grounded
Comant	CI-100	DME Transponder	BNC	Open Circuit
	CI-100-2	DME Transponder	TNC	Open Circuit
	CI-105	DME Transponder	BNC	Open Circuit
	CI-105-3	DME Transponder	BNC	Open Circuit
	CI-105-16	DME Transponder	BNC	Open Circuit
	CI-110-40-30	DME Transponder	C	Open Circuit
	CI-110-41-30	DME Transponder	C	DC Grounded
	CI-110-60-30	DME Transponder	C	Open Circuit
	CI-110-61-30	DME Transponder	C	DC Grounded
Dayton-Granger	L10-611-( )	L-Band Blade	C	DC Grounded
Garmin	590-0052 or 013-00219-00	A-40	TNC	Open Circuit
	590-0051 or 013-00174-00	A-41	TNC	DC Grounded

### 3.8 Minimum Systems Configuration

- GTX
- Transponder antenna
- G3X system
- An appropriate GPS position source

### 3.9 GTX Pressure Altitude Input

In most installations, the GTX 35R/45R receives pressure altitude data from the G3X system. An optional GAE sensor module is available for installations requiring pressure altitude data that meets the requirements of TSO-C88b. When a GAE is installed and configured, the GTX 45R/45R will prioritize pressure altitude from by the GAE over altitude data from the G3X system. Configuration and calibration of the GAE requires the use of the dealer-only software tool described in Section 6.4.

**Table 3-5 Pressure Altitude Setting Source Priority**

Priority	Source
1	GAE altitude encoder module (if installed)
2	G3X ADAHRS

### 3.10 ADS-B In Considerations (GTX 45R Only)

The GTX 45R provides ADS-B In data regardless of the state of the transponder. HSDB ADS-B In displays cannot connect to more than one ADS-B In source.



#### NOTE

*Do not install with a GDL 88.*

### 3.11 Bluetooth Considerations (GTX 45R Only)

For optimal connectivity with a GTX 45, the Bluetooth antenna must point towards the passenger area of the aircraft. This is identifiable by the Garmin logo sticker. Bluetooth performance may be limited by aircraft obstructions.

## 3.12 Antenna Considerations

Mounting location considerations for the antenna(s) are provided in this section.

### 3.12.1 Transponder Antenna



#### NOTE

*Ground planes must be considered for installations on composite aircraft. Conductive wire mesh, radials, or thin aluminum sheets embedded in the composite material supply the ground plane to maximize the antenna pattern (gain). This can improve transponder performance.*

The antenna mounting must use the aircraft manufacturer's type certificated antenna location and style. The antenna must be installed in accordance with manufacturer instructions and/or AC 43.12-2A Chapter 3.

Transponder antenna considerations help the installer to select the best location for the antenna. The antenna should:

- Be attached away from major protrusions, such as engines, nacelles, propellers, and antenna masts.
- Be as far as practical from landing gear doors, access doors, or other openings that could affect its radiation pattern.
- Be vertically attached on the bottom of the aircraft.
- Not be attached within three feet of the ADF sense antenna or any other communication antenna.
- Not be attached within six feet of a DME antenna.
- Be attached to a minimum of three feet of cable from the GTX 35R/45R to prevent RF interference.

### **3.13 Electrical Bonding**

Make sure the transponder antennas are electrically bonded to the aircraft.

### **3.14 Cabling and Wiring**

Use AC 43.13-1B chapter 11, sections 8 through 13 to install wiring. The considerations are as follows:

- It should not be possible for the cable harness to be exposed to wire chafing.
- The cable harness should not be located near flight control cables, high capacity electrical lines (e.g., DC electric motor cables), or fuel lines.
- Do not put cables near high energy sources (e.g., DC motors, high heat sources).
- Wiring that must be shielded must be done as shown in appendix D.
- Shield pigtails must be less than 3.0 inches.

### **3.15 Electrical Bonding Considerations**

Bond electrical equipment, supporting brackets, and racks to the aircraft's main structure. Refer to SAE ARP 1870 section 5 when surface preparation is necessary to get an electrical bond. Use a calibrated milliohm meter to measure the resistance of the bond between the equipment and the adjacent aircraft structure. The bond must have a DC resistance no more than 2.5 milliohms.

### **3.16 Cooling Requirements and Considerations**

There are no cooling requirements or considerations for the GTX 35R/45R. The chassis has provisions for a fan, however one is not necessary or provided.

## 4 INSTALLATION PROCEDURE

### 4.1 Wire Harness Installation

All electrical connections, except for the antenna(s) and shield grounds, are made through the D-sub connectors on the rear of the unit. The shield grounds terminate to the connector backshells.

For additional information:

- Refer to section 5 for rear connector pinout and descriptions of interface connections
- Refer to appendix 10 for interconnect diagrams
- Refer to section 3.6 for special tools

Give sufficient space for installation of cables and connectors. The installer supplies and assembles all cables. Cable lengths are dependent upon the installation.

To install pins into connectors and build a wire harness:

1. Remove 0.17 inches of insulation from wires going to the connectors.
2. Put the wire into the pin and crimp with one of the recommended (or equivalent) crimping tools.
3. Put the pin into the connector housing location as specified by the interconnect drawings in appendix 10.
4. Gently pull on the wire to make sure the pin is properly engaged into the connector.
5. Route and attach the cable run from the GTX 35R/45R to the other units. Refer to section 3.14.

## 4.2 Backshell Assembly Parts

The GTX 35R/45R connector kits include backshell assemblies and ground adapter assemblies. Use the shield block ground kit to terminate shield grounds to the backshell housing. Garmin part numbers for the D-sub connectors and the backshell assemblies are in table 4-1.

**Table 4-1 Backshell Assembly**

Refer to Figure 4-2	Description	Garmin P/N	Notes
1	Backshell (P3251) Backshell (P3252)	125-00084-00 125-00081-00	[1]
2	Shield block (P3251) Shield block (P3252)	117-00147-01 117-00147-00	[2]
3	Screw, 4-40 x.250, FLHP100°, SS/P, nylon	211-63234-08	[2]
6	Screw, 4-40x.375, PHP, SS/P, with nylon	211-60234-10	[1]
7	Strain relief (P3251) Strain relief (P3252)	115-00499-03 115-00499-00	[1]
8	Cover (P3251) Cover (P3252)	115-00500-03 115-00500-00	[1]
9	Screw, 4-40x.187, FLHP100, SS/P, with nylon	211-63234-06	[1]
10	Connector, D-sub, HD, 62-pin (P3251) Connector, D-sub, HD, 15-pin (P3252)	330-00185-62 330-00185-15	[3]
11	Multiple conductor shielded cable	As necessary	[4]
12	Shield terminator	As necessary	[4] [5]
13	Wire, insulated, 20-22 AWG (3 inches maximum length)	As necessary	[4] [5]
14	Pin contacts, #22D	336-00021-00	[3]
15	Ring terminal, #8, insulated, 18-22 AWG, 14-16 AWG	MS25036-149, MS25036-153, MS25036-156	[4] [6]
16	Screw, PHP, 8-32 x .312", stainless or cad plated steel	MS51957-42, MS35206-242	[4] [6]
17	Split washer, #8, (.045" compressed thickness) stainless or cad-plated steel	MS35338-137, MS35338-42	[4] [6]
18	Flat washer, #8, .032" thick, .174" ID, .375" OD, stainless or cad plated steel	NAS1149CN832R, NAS1149FN832P	[4] [6]
19	Silicone fusion tape	249-00114-00	[4]

Notes:

- [1] Supplied as part of backshell kits, P/N 011-00950-03 (P3251), and P/N 011-00950-00 (P3252). These are included in the connector kits, P/N 011-02977-( ).
- [2] Supplied as part of ground adapter kits P/N 011-01169-01 (P3251) and P/N 011-01169-00 (P3252). These are included in the connector kits, P/N 011-02977-( ).
- [3] Supplied as part of GTX connector kit P/N 011-02977-00 (GTX 35R), and P/N 011-02977-01 (GTX 45R).
- [4] Not supplied – must be purchased separately.
- [5] Solder sleeve with pre-installed shield drain wire may be used instead of items 12 and 13.
- [6] Not a Garmin part number.

### 4.3 Shielded Cable Preparation

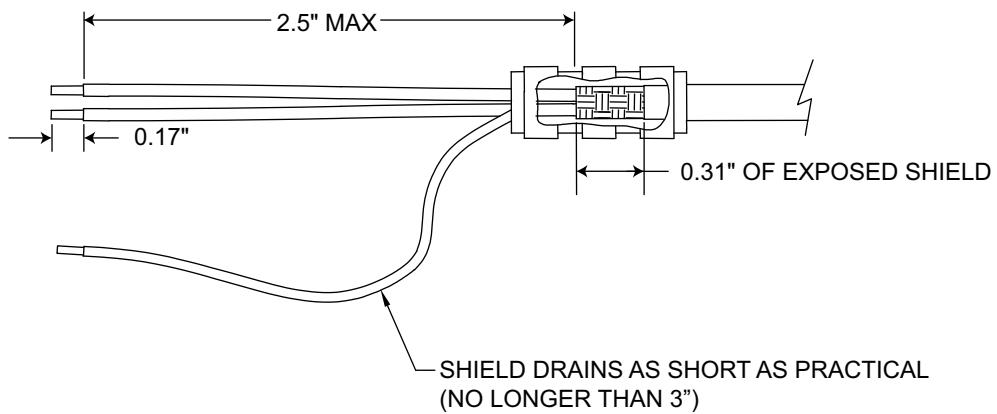


#### NOTE

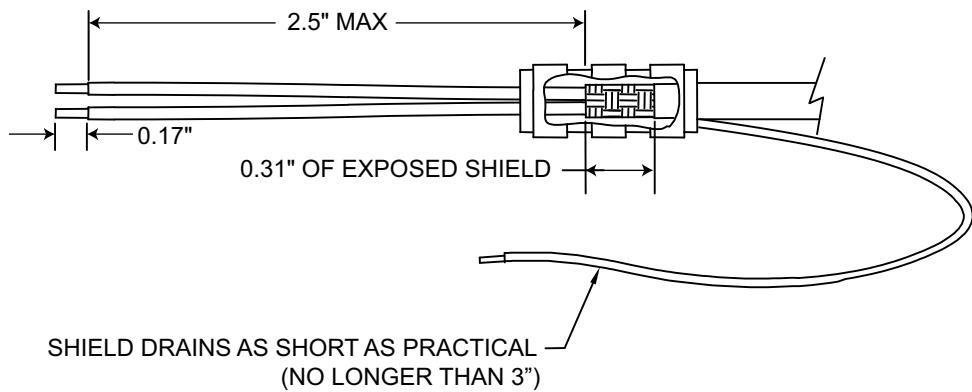
*Solder sleeves with pre-installed shield drains can be used instead of separate shield terminators (12) and individual wires (13). A preferred solder sleeve is M83519/2-X series with a pre-installed shield drain.*

Prepare all of the shielded cables using one of the methods shown in figure 4-1. Refer to figure 4-2 for details of the shield termination to the connector backshell.

1. At the end of the shielded cable (11), strip back a 2.5" maximum length of the jacket to expose the braid.
2. Remove the exposed braid.
3. Carefully score the jacket 1/4" to 5/16" from the end of the previously removed jacket and remove it to expose the braid.
4. Connect a 20 or 22 AWG wire (13) to the exposed shield of the prepared cable assembly. Refer to figure 4-1. AC 43.13 maybe a helpful reference for termination techniques.
5. Slide a shield terminator (12) onto the prepared cable assembly (11) and connect the shield wire (13) to the shield using a heat gun approved for use with solder sleeves.
6. Crimp contacts (14) onto the cable wires. Refer to section 4.1.
7. Repeat steps 1 through 6 as necessary for the remaining shielded cables.
8. Install a ring terminal (15) onto the cable shield termination wires (13).
9. Group wires as applicable for the connector. Refer to section 4.4.



### Preferred Method



### Alternate Method

**Figure 4-1** Shielded Cable Preparation

## 4.4 Connector and Backshell Assembly



### CAUTION

*Do not place the concave side of the strain relief clamp (9) across the cable bundle. The cable bundle can be damaged.*

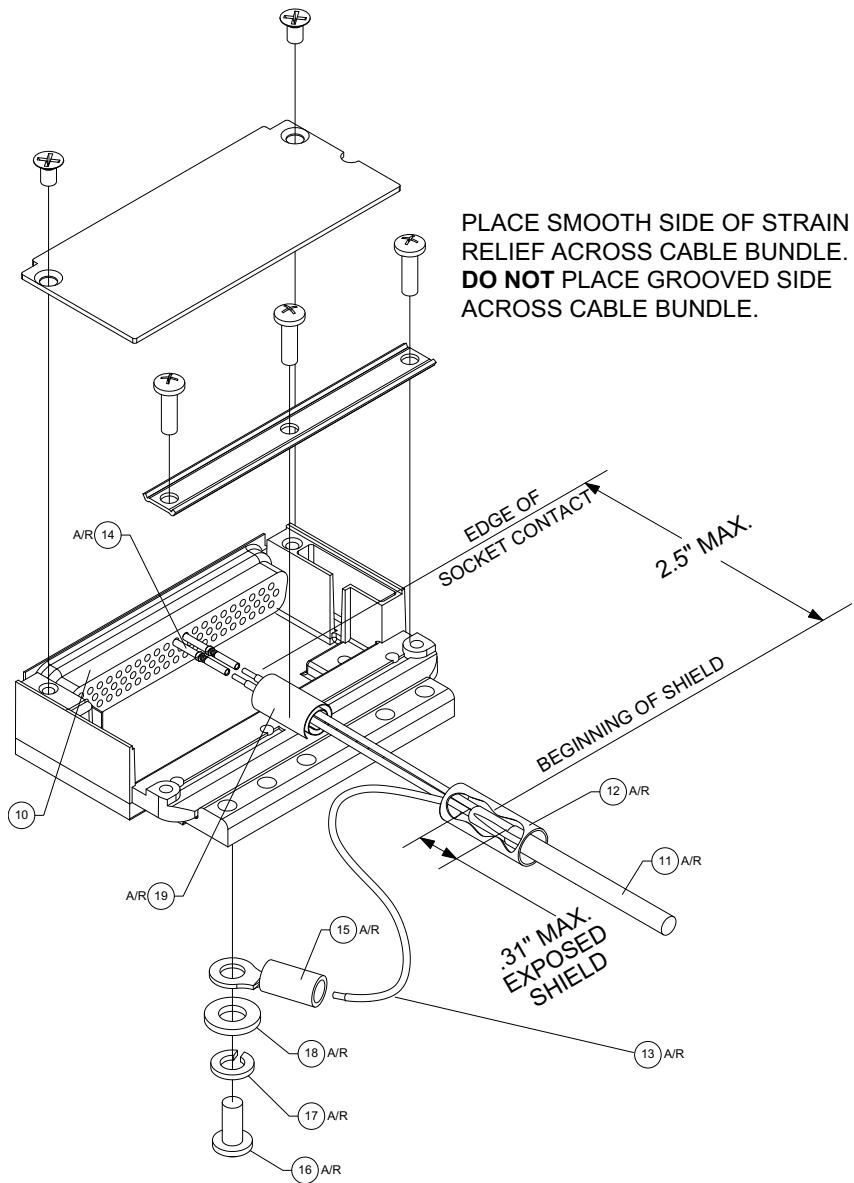


### NOTE

*Each tapped hole on the backshell (1) will only take two ring terminals (15). It is recommended to terminate a maximum of two wires (13) per ring terminal. This necessitates the use of a ring terminal, #8, insulated, 14-16 AWG (MS25036-153). If only a single wire is left or if only a single wire is necessary for this connector, a ring terminal, #8, insulated, 18-22 AWG (MS25036-149) can be used. If more wires exist for the connector than two per ring terminal, it is permitted to terminate three wires per ring terminal.*

Refer to figure 4-2 and for this procedure.

1. Insert flathead screws (3) through holes on the shield block (2).
2. Attach to the backshell (1).
3. Insert the crimped wire harness contacts (14) in the D-sub connector (10). Refer to appendix 10 for the chosen contact location.
4. Group wires as applicable for the connector.
5. Wrap the cable bundle with silicone fusion tape (19) so the backshell strain relief and cast housing touches the cable bundle.
6. Place the backshell around the connector and wire harness so it rests against the front of the backshell.
7. Place the smooth side of the backshell strain relief clamp (7) across the cable bundle.
8. Attach with three 4-40 x 0.375" pan head screws (6).
9. Attach the cover (8) to the backshell using two screws (9).
10. On the pan head screw(16) place in order:
  - Split washer (17)
  - Flat washer (18)
  - First ring terminal (15)
  - If necessary, second ring terminal
11. Insert the assembled pan head screw (16) into the tapped holes on the shield block (2).



**Figure 4-2 Shield Termination on Backshell Assembly**

## 4.5 Coaxial Cable Installation



### NOTE

*Make sure the length is set for the necessary cable loss. Some antennas have minimum cable loss specifications, that may need a cable longer than the physical run in the aircraft.*

Follow the steps below for installation of the coaxial cables.

1. Route the coaxial cable to the radio rack location keeping in mind the recommendations of section 3.14.
2. Attach the cable in accordance with AC 43.13-1B chapter 11, section 11.
3. Trim the coaxial cable to the applicable length.
4. Install the coaxial connectors per the manufacturer's instructions.

## 4.6 GAE Installation (optional)

Installation of the optional Garmin Altitude Encoder requires connection to the aircraft static pressure source.



### NOTE

*The GAE can remain connected to the aircraft static system if the GTX 35R/45R is removed.*

The GAE has 1/8-27 ANPT female connection port. Added static line connections to the GAE must:

- Use line and fitting identical to those specified in model specific illustrated parts catalog and purchased from aircraft manufacturer. Lines and fittings must be clear from fluid, sealant, or particles, and have no leaks when installed. Added line must be labeled near the GAE unit.
- Be routed away from moving parts of the control system and high temperature lines and avoid sharp bends. The GAE must not be the low point in the added line to avoid moisture collection at or near the unit.
- Not change the effectiveness of existing drains, alternate static source selector switch (if applicable), or the independence of dual static systems (if applicable).
- Not modify the static port surface or aircraft surface near the static port, and introduce changes that would affect static system calibration.

Connection of the GAE four conductor wire harness is shown in appendix A. Drawings in appendix C detail the installation of the GAE to the GTX 35R/45R backplate assembly.

**Table 4-2 Garmin Altitude Encoder Kit, P/N 011-03080-00**

Description	P/N	QTY
Sub-assembly, Garmin altitude encoder, unit only	011-03080-01	1
Screw, 4-40 x .250, PHP, SS/P with nylon	211-60234-08	2
Screw, 4-40 x .250, FLHP 100, SS/P, nylon	211-63234-08	2
Harness, 4 cond, GAE 12	325-00421-00	1

## **4.7 Equipment Rack Installation**

### **4.7.1 Standard Remote Mount Units**

The GTX 35R/45R standard remote mount racks can be mounted in any orientation as long as all six mounting screws are attached to a mounting bracket. Design the mounting bracket(s) for the GTX 35R/45R unit with the dimension shown in figure 8-2.

Attach the connectors and optional GAE, if used, to the connector backplate (refer to Appendix A).

Install the rack using #6-32 flat head screws and self-locking nuts. The screws are inserted from the inside through the holes in the sides of the rack.

## 4.8 Unit Installation and Removal



### CAUTION

*The application of hex drive tool torque more than 8 in-lbs can damage the locking mechanism.*



### NOTE

*When a unit is installed make sure it successfully powers up. Refer to section 6 for configuration procedures.*



### NOTE

*Before placing the unit in the rack, in order to make sure the position of the retention mechanism is correct, it can be necessary to insert the hex drive tool into the access hole and turn the hex drive tool counterclockwise until it fully stops.*

#### **Insertion**

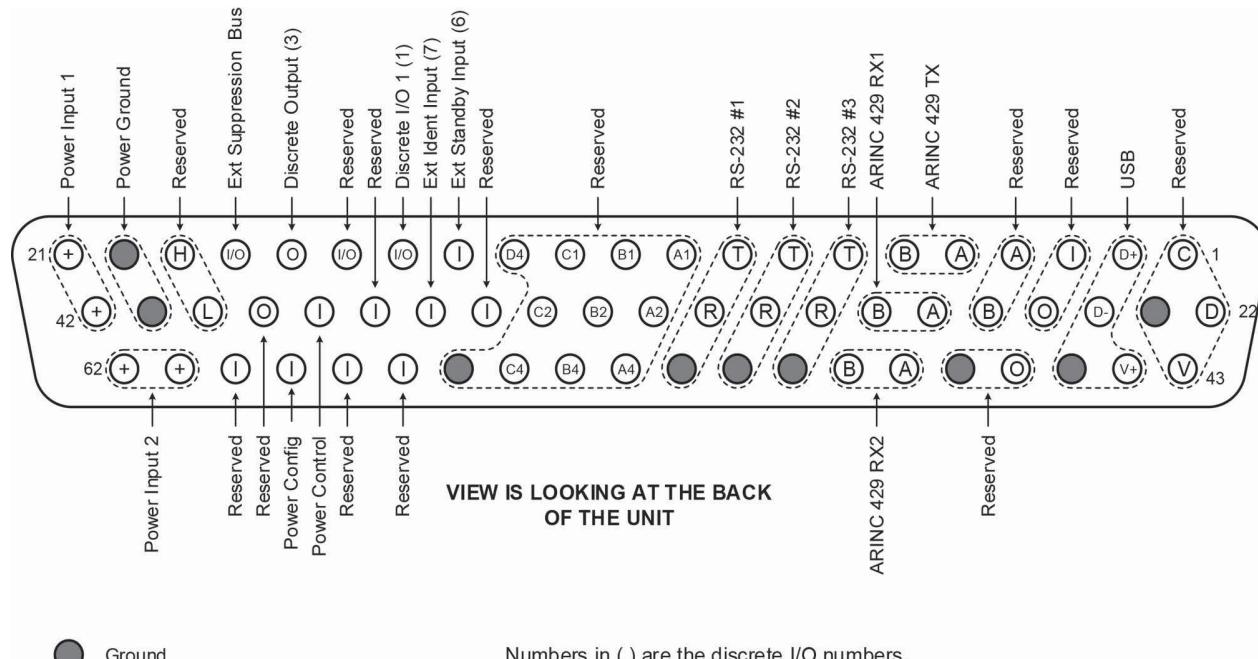
1. Slide unit in until it stops, approximately 3/8 inch short of the final position.
2. Insert a 3/32" hex drive tool into the access hole at the bottom of the unit face.
3. Push on the left side of the unit face and turn hex drive tool clockwise and apply 8 in-lbs of torque.

#### **Removal**

1. Insert the hex drive tool into the access hole on the unit face.
2. Turn hex drive tool counterclockwise until the hex drive tool stops.
3. Pull the unit from the rack.

## 5 CONNECTOR PINOUT INFORMATION

### 5.1 Main Board Connector - P3251



**Table 5-1 P3251 Connector**

Pin	Pin Name	I/O
1	RESERVED	--
2	USB DATA HI	I/O
3	RESERVED	--
4	RESERVED	--
5	ARINC 429 OUT A	O
6	ARINC 429 OUT B	O
7	RS-232 OUT 3	O
8	RS-232 OUT 2	O
9	RS-232 OUT 1	O
10	RESERVED	--
11	RESERVED	--
12	RESERVED	--
13	RESERVED	--
14	EXTERNAL STANDBY SELECT*	I
15	TIS-A SELECT (GTX 35R Only)*	I/O
16	RESERVED	--
17	XPDR FAIL 1*	O

Pin	Pin Name	I/O
18	EXTERNAL SUPPRESSION	I/O
19	RESERVED	--
20	AIRCRAFT GROUND	I
21	AIRCRAFT POWER 1	I
22	RESERVED	--
23	RESERVED	--
24	USB DATA LO	I/O
25	RESERVED	--
26	RESERVED	I/O
27	ARINC 429 IN 1A	I
28	ARINC 429 IN 1B	I
29	RS-232 IN 3	I
30	RS-232 IN 2	I
31	RS-232 IN 1	I
32	RESERVED	--
33	RESERVED	--
34	RESERVED	--
35	RESERVED	--
36	EXTERNAL IDENT SELECT*	I
37	RESERVED	--
38	POWER CONTROL*	I
39	RESERVED	--
40	RESERVED	--
41	AIRCRAFT GROUND	--
42	AIRCRAFT POWER 1	I
43	RESERVED	--
44	USB VBUS POWER	I
45	USB GND	--
46	RESERVED	--
47	RESERVED	--
48	ARINC 429 IN 2A	I
49	ARINC 429 IN 2B	I
50	RS-232 GND 3	--
51	RS-232 GND 2	--

Pin	Pin Name	I/O
52	RS-232 GND 1	--
53	RESERVED	--
54	RESERVED	--
55	RESERVED	--
56	RESERVED	--
57	RESERVED	--
58	RESERVED	--
59	POWER CONFIG*	I
60	RESERVED	I
61	AIRCRAFT POWER 2	I
62	AIRCRAFT POWER 2	I

An asterisk (\*) following a signal name denotes the signal is an Active-Low discrete, requiring a ground to activate. If there is no asterisk, the signal is an Active-High.

## 5.2 ADS-B Board Connector – P3252 (GTX 45R Only)

VIEW IS LOOKING AT THE BACK  
OF THE UNIT

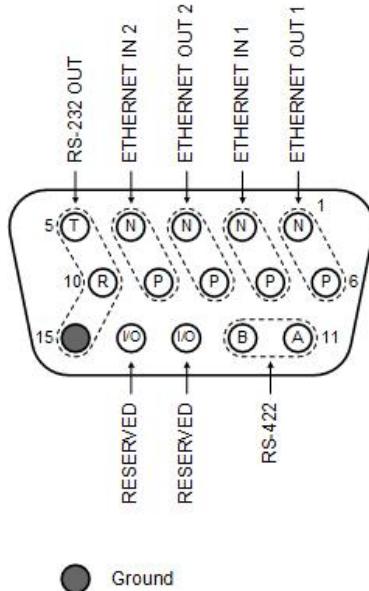


Table 5-2 P3252 Connector

Pin	Pin Name	I/O
1	ETHERNET OUT 1B	O
2	ETHERNET IN 1B	I
3	ETHERNET OUT 2B	O
4	ETHERNET IN 2B	I
5	RS-232 OUT 4	O
6	ETHERNET OUT 1A	O
7	ETHERNET IN 1A	I
8	ETHERNET OUT 2A	O
9	ETHERNET IN 2A	I
10	RS-232 IN 4	I
11	RS-422 A	O
12	RS-422 B	O
13	RESERVED	--
14	RESERVED	--
15	RS-232 GND 4	--

## 5.3 Power

The GTX 35R/45R is compatible with 14 VDC and 28 VDC aircraft electrical systems. The AIRCRAFT POWER 2 input is diode-isolated from AIRCRAFT POWER 1 and is used for connecting to an alternate power source, such as on an aircraft with two electrical buses.

**Table 5-3 Power Pins**

Pin Name	Connector	Pin	I/O
AIRCRAFT POWER 1	P3251	21	I
AIRCRAFT POWER 1	P3251	42	I
AIRCRAFT POWER 2	P3251	61	I
AIRCRAFT POWER 2	P3251	62	I
AIRCRAFT GROUND	P3251	20	--
AIRCRAFT GROUND	P3251	41	--

### 5.3.1 Power Configuration and Control Inputs

The POWER CONFIG input must be connected to ground.

The POWER CONTROL input can be used as a remote power on/off control. In most installations, POWER CONTROL is connected to ground, which causes the unit to automatically power on when power is applied.

**Table 5-4 Power Configuration and Control Inputs**

Pin Name	Connector	Pin	I/O
POWER CONFIG	P3251	59	I
POWER CONTROL	P3251	38	I

**Table 5-5 Power Configuration and Power Control Functions**

POWER CONFIG	POWER CONTROL	Description
Ground	Open	Power off
Ground	Ground	Power on

## 5.4 Altitude Inputs

The GTX 35R/45R uses pressure altitude inputs from several different sources:

- G3X ADAHRS (RS-232)
- The optional GAE module (Garmin P/N 011-03080-00)

Refer to section 3.9 for altitude source priorities. The Mode S transponder transmits altitude reporting in 25-foot resolution to ground stations and other aircraft.

### 5.4.1 Pressure Sensor Module

The optional GAE module (Garmin P/N 011-03080-00) is used for the GTX 35R/45R pressure altitude input in installations requiring pressure altitude data that meets the requirements of TSO-C88.

## 5.5 Discrete I/O

Active-Low discrete inputs are considered active if either the voltage to ground is <3.5 VDC or the resistance to ground is <375 ohms. These inputs are considered inactive if the voltage to ground is 6.5-33 VDC or the resistance to ground is >100 kilohm.

Each is an open drain output capable of sinking 250 milliamp when active.

**Table 5-6 Discrete Inputs and Outputs**

Pin Name	Connector	Pin	I/O
EXTERNAL STANDBY SELECT*	P3251	14	I
XPDR FAIL 1*	P3251	17	O
EXTERNAL IDENT SELECT*	P3251	36	I
TIS-A SELECT (GTX 35R only)*	P3251	15	I/O

## 5.6 Serial Data Interfaces

### 5.6.1 RS-232

The RS-232 outputs are compatible with EIA Standard RS-232C with an output voltage swing of at least  $\pm 5$  V when driving a standard RS-232 load. RS-232 ports 2 through 4 can be configured for different functions depending on the installation. Pins P3252-5, -10, and -15 are on the GTX 45R only.

In a G3X system, RS-232 IN/OUT 1 are always connected to the #1 ADAHRS LRU.

**Table 5-7 RS-232 Inputs and Outputs**

Pin Name	Connector	Pin	I/O
RS-232 OUT 1	P3251	9	O
RS-232 IN 1	P3251	31	I
RS-232 GND 1	P3251	52	O
RS-232 OUT 2	P3251	8	O
RS-232 IN 2	P3251	30	I
RS-232 GND 2	P3251	51	--
RS-232 OUT 3	P3251	7	O
RS-232 IN 3	P3251	29	I
RS-232 GND 3	P3251	50	--
RS-232 OUT 4	P3252	5	O
RS-232 IN 4	P3252	10	I
RS-232 GND 4	P3252	15	O

### 5.6.2 ARINC 429

The ARINC 429 output conforms to the ARINC 429 electrical specification when loaded with up to five standard ARINC 429 receivers. The ARINC 429 inputs and outputs are automatically configured for different functions depending on the installation.

**Table 5-8 ARINC 429 Inputs and Outputs**

Pin Name	Connector	Pin	I/O
ARINC 429 OUT A	P3251	5	O
ARINC 429 OUT B	P3251	6	O
ARINC 429 IN 1A	P3251	27	I
ARINC 429 IN 1B	P3251	28	I
ARINC 429 IN 2A	P3251	48	I
ARINC 429 IN 2B	P3251	49	I

### 5.6.3 HSDB

The HSDB interface uses Ethernet wiring to communicate with certain Garmin panel-mount navigators and active traffic systems.

**Table 5-9 Ethernet Inputs and Outputs**

Pin Name	Connector	Pin	I/O
ETHERNET OUT 1A	P3252	6	O
ETHERNET OUT 1B	P3252	1	O
ETHERNET IN 1A	P3252	7	I
ETHERNET IN 1B	P3252	2	I
ETHERNET OUT 2A	P3252	8	O
ETHERNET OUT 2B	P3252	3	O
ETHERNET IN 2A	P3252	9	I
ETHERNET IN 2B	P3252	4	I

### 5.6.4 RS-422

The RS-422 interface conforms to the electrical specifications of EIA standard RS-422.

**Table 5-10 RS-422 Outputs**

Pin Name	Connector	Pin	I/O
RS-422 A	P3252	11	O
RS-422 B	P3252	12	O

### 5.7 Suppression Bus

The EXTERNAL SUPPRESSION is intended for connection to other L-band equipment, such as a DME or UAT. The output is active whenever the GTX 35R/45R transmits. When driven by another source, the GTX 35R/45R transponder receiver and transmitter functions will be suppressed.

The EXTERNAL SUPPRESSION output is driven to  $\geq 18$  VDC when the GTX 35R/45R transmits. An input voltage of  $\geq 10$  VDC will suppress the GTX 35R/45R.

**Table 5-11 External Suppression Bus Pin**

Pin Name	Connector	Pin	I/O
EXTERNAL SUPPRESSION	P3251	18	I/O

## 5.8 Garmin Altitude Encoder

The optional GAE altitude encoder module (Garmin P/N 011-03080-00) is used only in installations requiring pressure altitude data that meets the requirements of TSO-C88.

The GAE module kits includes a wire harness for connection to the GTX 35R/45R D-sub connector. Connect using The wire colors are shown in Table 5-12.

**Table 5-12 Altitude Encoder Module Inputs and Outputs**

Pin Name	Color	Connector	Pin	I/O
ALT ENCODER CLOCK	White	P3251	1	O
ALT ENCODER DATA	Yellow	P3251	22	I/O
ALT ENCODER POWER	Red	P3251	43	O
ALT ENCODER GROUND	Black	P3251	23	O

## 5.9 USB Interface



### CAUTION

*Use the USB cable shipped with the unit. Do not lengthen or tie up in bundles with other electrical wires. Potential damage or interference due to coupling with other cables will occur.*

USB interface is only used by Garmin dealers for software updates and service while the aircraft is on the ground. Do not use during normal operation or when airborne.

**Table 5-13 USB Inputs and Outputs**

Pin Name	Connector	Pin	I/O
USB DATA HI	P3251	2	I/O
USB DATA LO	P3251	24	I/O
USB VBUS POWER	P3251	44	I
USB GND	P3251	45	O

## 6 POST INSTALLATION CONFIGURATION AND CHECKOUT

### 6.1 System Configuration Overview

The required GTX 35R/45R configuration and checkout procedures are as follows:

- Complete the installation checks.
- Configure the GTX 35R/45R for the specified installation.
- Complete ground checks to make sure it interfaces to external equipment.

### 6.2 Mounting, Wiring, and Power Checks

Examine the wire harness to make sure the connection to aircraft systems and avionics equipment is correct before the unit is energized. Point-to-point continuity must be examined to expose any faults such as shorting to ground or wiring discrepancies. All faults or discrepancies must be corrected before continuing.

Before and during the installation make sure:

- All cables are properly attached.
- Shields are connected to connector shield blocks.
- Movement of the flight and engine controls through the full range of motion do not touch cabling and control systems.
- Wire is installed as described in section 3.14.

Make sure these items are completed after the installation or a continuity check.

- Power and ground checks.
- Faults and discrepancies are corrected.
- Installation rack is correctly attached.
- Unit is correctly seated in the installation rack.

## 6.3 Configuration Mode and Settings

Except as noted in this section, all configuration of the GTX 35R/45R is performed via the displays in the G3X system.

Refer to the G3X Installation Manual (190-01115-01) for transponder configuration guidance.

### 6.3.1 ARINC 429 Ports

ARINC 429 ports are automatically configured by the G3X system as follows:

**Table 6-1 ARINC 429 Automatic Configuration**

ARINC 429 Port	Configuration
ARINC 429 IN 1	GTX 45R with GTS interfaced configured: "Traffic Format 1" format, high speed - for connection to GTS, otherwise not used
ARINC 429 IN 2	Not Used
ARINC 429 OUT	GTX 45R: "Traffic" format, high speed - for ADS-B traffic data output to GNS  GTX 35R with TIS-A data enabled: "Garmin TIS-A" format, high speed - for TIS-A traffic data output to GNS  GTX 35R with TIS-A data disabled: "Garmin + Garmin TAS" format, high speed - for connection to GTS

## 6.4 Unit Configuration and Software (Garmin Dealers Only)

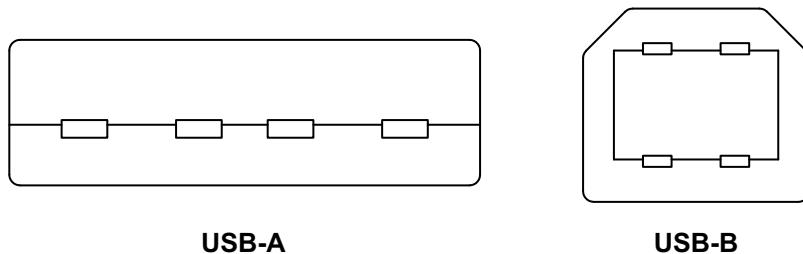
The GTX 34R/45R Installation Tool is used by Garmin dealers to update GTX unit software, and to perform calibration of the optional GAE altitude encoder module. All other configuration is performed via the displays in the G3X system.



## CAUTION

*Do not remove power from the unit when software upload is in progress.*

The GTX 35R/45R Installation Tool requires Windows 2000, XP, Vista, or Windows 7. There is no support at this time for Apple products. Use a PC or laptop and the GTX 35R/45R Install Tool to configure units without a display. The GTX 35R/45R Install Tool (P/N 006-A0271-01) is available at Garmin's [Dealer Resource Center](#). A USB-A plug to USB-B plug cable (not provided) is necessary.



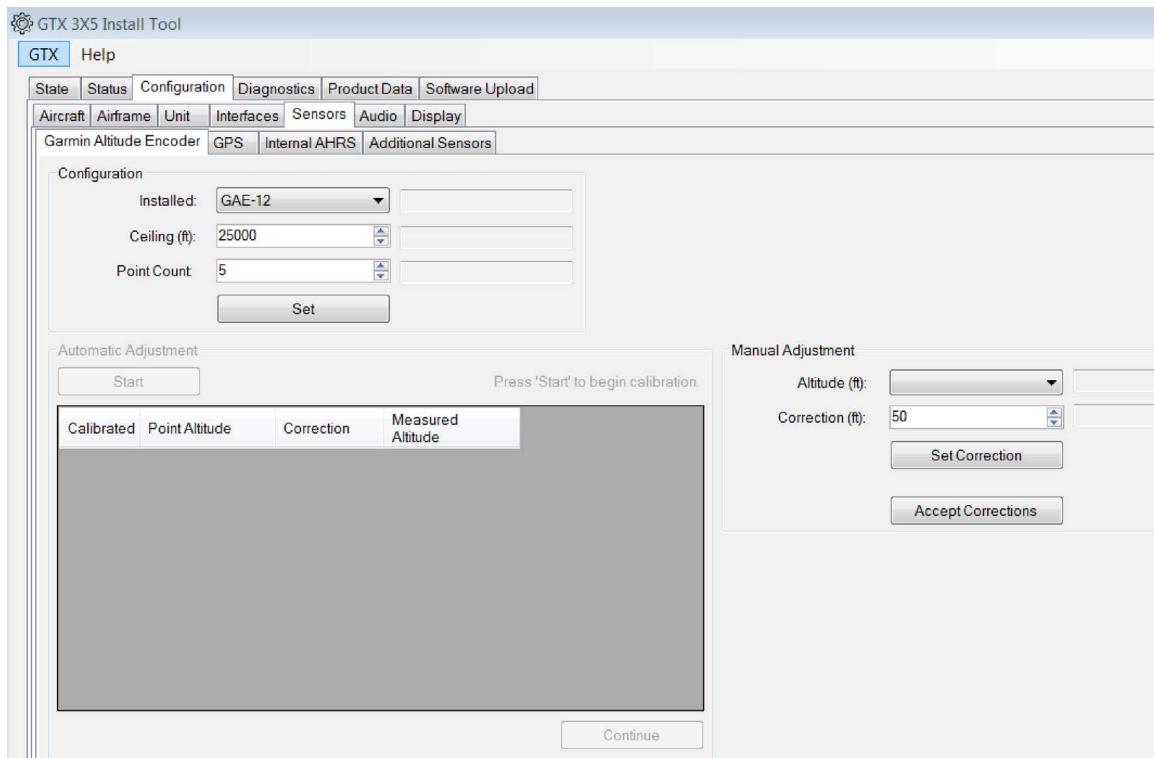
**Figure 6-1 USB-A and USB-B Connectors**

To use the GTX 35R/45R Install Tool:

1. Remove power from the unit.
2. Connect the USB-A to USB-B cable between the computer and the USB-B receptacle installed in the aircraft wire harness.
3. Apply power to unit.
4. Launch the GTX 35R/45R Install Tool.
5. Select the Configuration tab.

Select tabs to set parameters.

#### 6.4.1 GAE Calibration



**Figure 6-2 Sensor Configuration Page (Garmin Altitude Encoder)**

1. With a Pitot/static test set connected, select the GAE tab under the Sensor tab in the Configuration section.
2. Under the Installed option, select the GAE-12.
3. Select the appropriate ceiling based on the aircraft's maximum operating altitude.
4. Select a minimum of 3 Point Counts.
5. Select "Set."
6. Adjust the Pitot/static test set to match the first altitude test point.
7. Select "Start" under the automatic adjustment.
8. Once the correction value is stable and the measured altitude box turns green, select "Continue."
9. Adjust the Pitot/static test set to match the next altitude test point.
10. Once the Pitot/static test set matches the test point, select "Continue."
11. Once the correction value is stable and the measured value turns green, select "Continue."
12. Continue to calibrate the GAE using steps 9 through 11 until the calibration is complete.

## 6.5 Software Installation Procedure (Garmin Dealers Only)



### CAUTION

*Do not turn off the unit until “Update Complete” is shown next to all selected items. Failure to do so could result in equipment damage.*

Use the GTX 35R/45R Install Tool through the USB port to install software on the unit.

1. Download and launch the latest GTX 35R/45R software from the [Dealer Resource Center](#) on Garmin's website.
2. Under “Step 1 - Select a File,” select the **Browse** key and locate the Boot Block software file containing the GTX 35R/45R software previously loaded.
3. Under “Step 2 - Upload Options,” select the options to be updated.
4. Under “Step 3 - Start Upload,” select the **Upload** key.
5. Wait for the upload to complete. Individual files will be marked as complete as they are installed.
6. Under “Step 1 - Select a File,” select the **Browse** key and locate the Main System software file containing the GTX 35R/45R software previously downloaded.
7. Under “Step 2 - Upload Options,” select the remaining options to be updated.
8. Under “Step 3 - Start Upload,” select the **Upload** key.
9. Wait for the upload to complete. Individual files will be marked as complete as they are installed.
10. After successful completion of the update, make sure that the correct software versions and part numbers show on the Transponder page under the Product Data group. If any software items did not load, select those items and attempt to upload again.

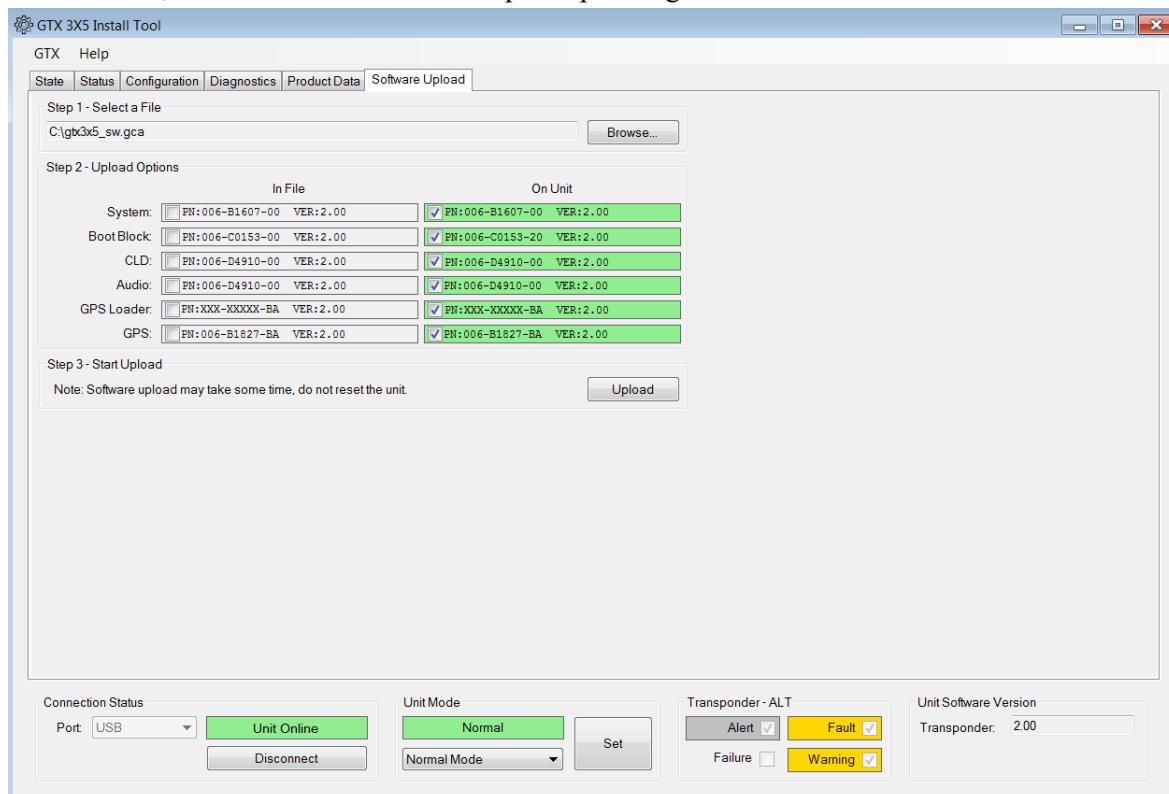


Figure 6-3 Software Upload Page

## 7 CONTINUED AIRWORTHINESS

Other than for regulatory periodic functional checks, maintenance of the GTX 35R/45R is “on condition” only. Periodic maintenance of the GTX 35R/45R is not required.



### NOTE

*The GTX 35R/45R will not reply to Mode S/A/C All Calls when not "Airborne." The GTX 35R/45R can be placed in a temporary Airborne. The GTX will be in Ground Test mode for one power cycle and override the air/ground determination to transmit as if the GTX is airborne.*

The GTX 35R/45R transponders are compliant with RTCA/DO-181D, which specifies that the selection of transponder ALT and GND modes may not be controlled by the pilot. To allow the transponder to be operated in ALT mode while on the ground, for the purposes of performing periodic testing in accordance with the requirements of 14 CFR Part 91.413, the G3X system provides a special transponder ground maintenance test mode. Refer to the G3X installation manual (190-01115-01) for information.

## APPENDIX 8 GTX X5 MECHANICAL DRAWINGS

STANDARD KIT	UNIT PN	UNIT DESC	CONNECTOR KIT	RACK	Backplate Assy	Mount Type	Dim A inch (mm)	Dim B inch (mm)	Dim C inch (mm)
010-01756-01	011-04286-00	Sub-Assy, GTX35R	011-02977-00	115-01771-00	011-02976-00	REMOTE	4.8 (120)	3.3 (84)	0.8 (20)
010-01757-01	011-04287-00	Sub-Assy, GTX45R	011-02977-01	115-01771-01	011-02976-00	REMOTE	5.0 (127)	3.0 (76)	0.8 (20)

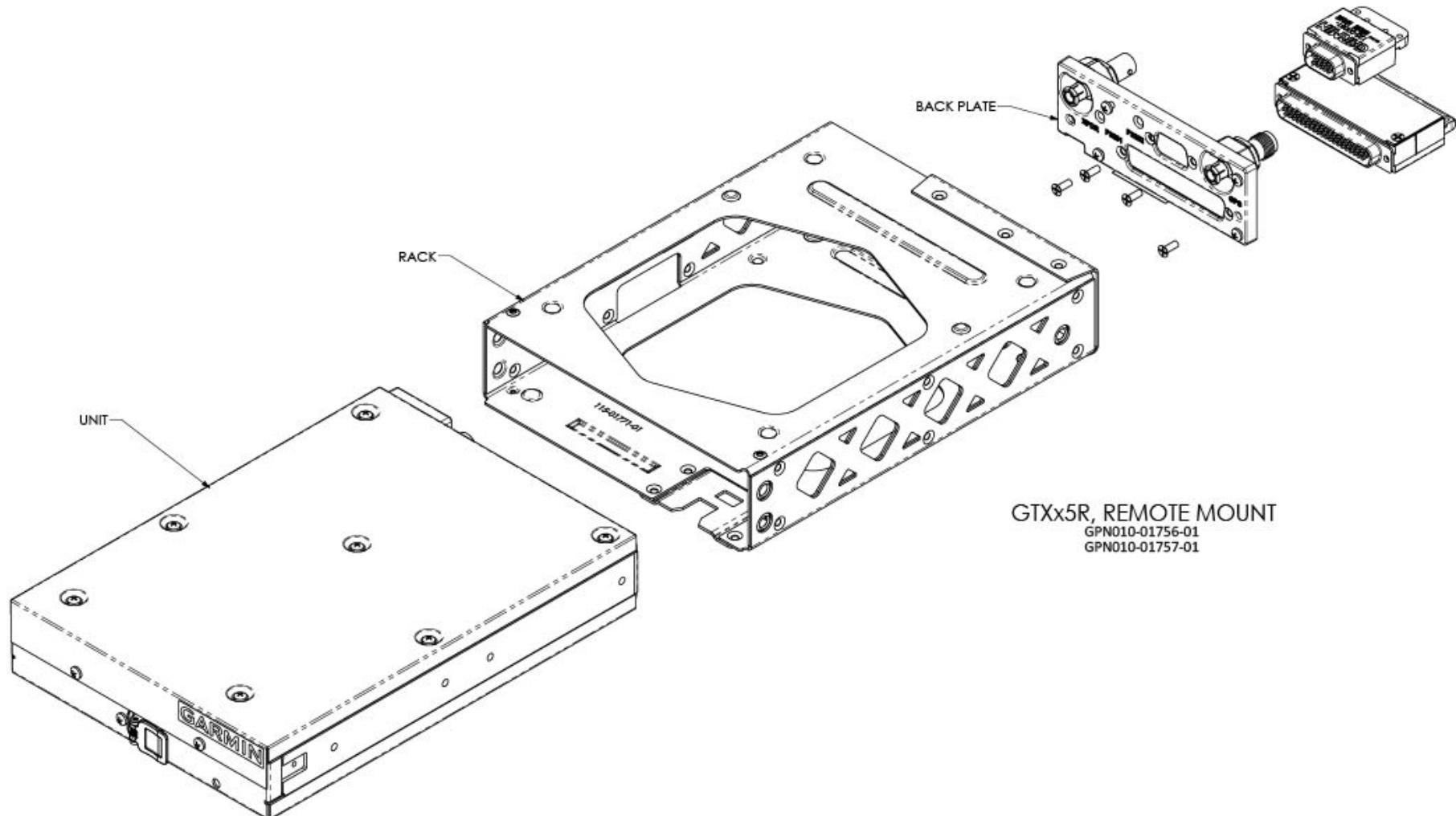
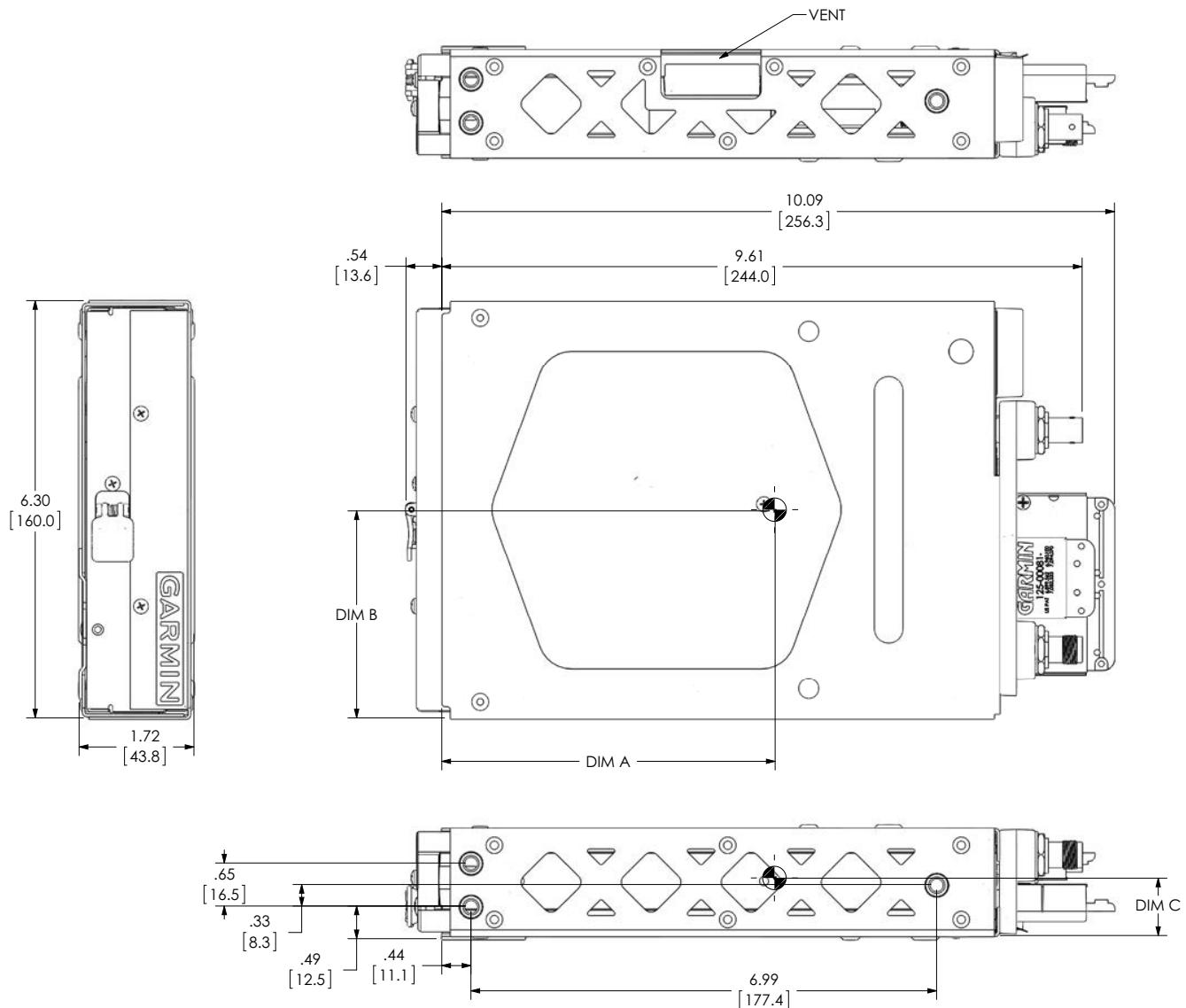
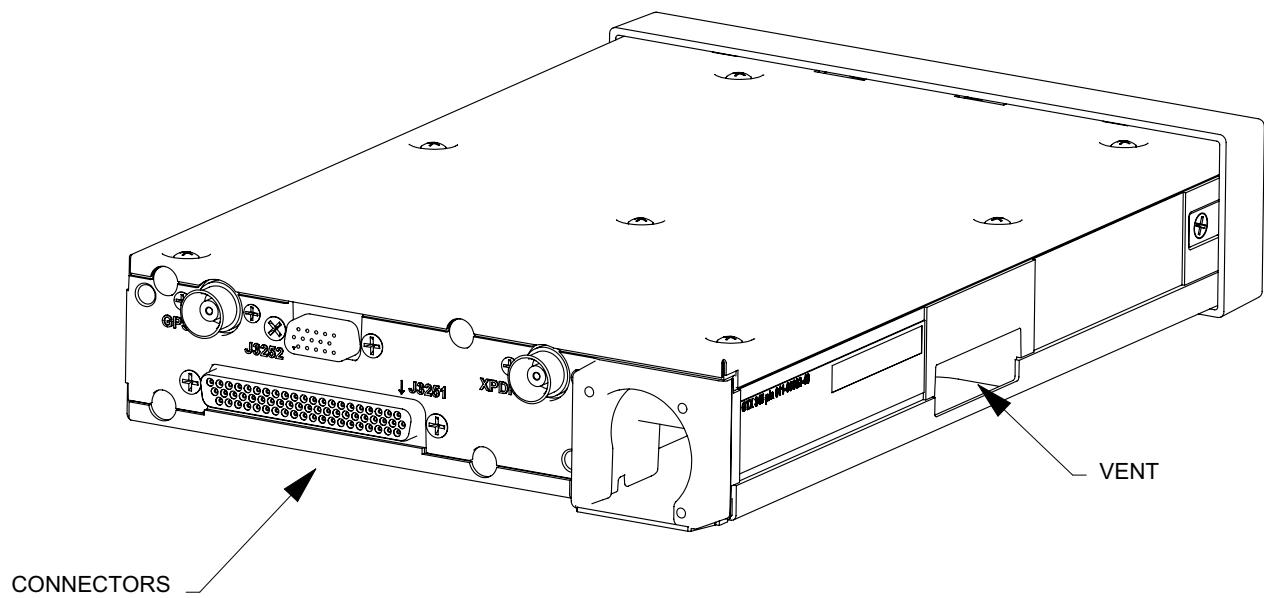


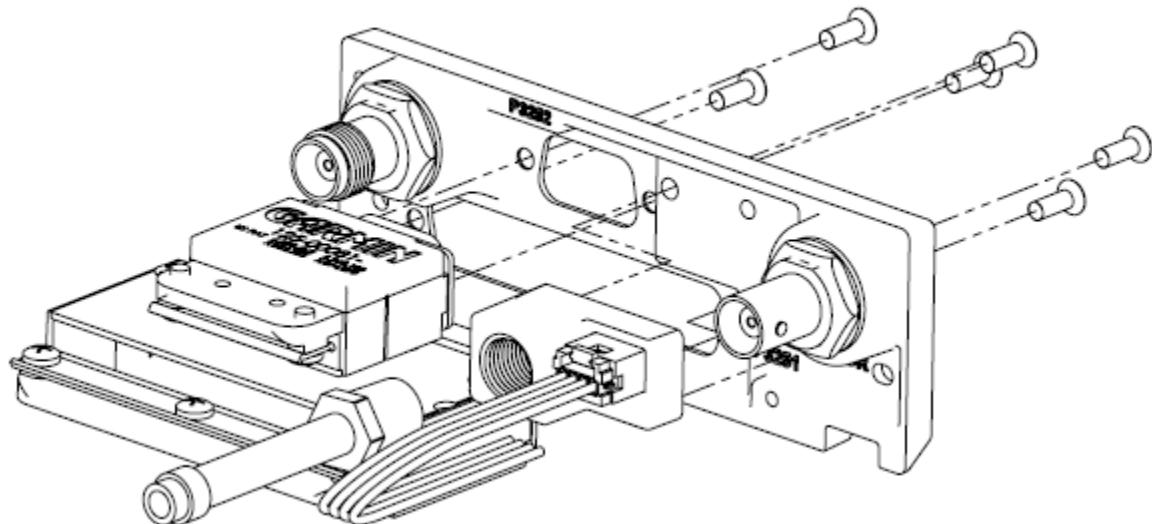
Figure 8-1 GTX 35R/45R Standard Remote Mount Assembly Shown



**Figure 8-2 GTX 35R/45R Standard Remote Mount Dimensions and CG Shown**



**Figure 8-3 GTX 35R/45R Connector and Vent Locations**



**Figure 8-4 Optional Garmin Altitude Encoder**

## APPENDIX 9 EQUIPMENT COMPATIBILITY AND CONFIGURATION

### 9.1 ADS-B In Displays (GTX 45R Only)

Table 9-1 ADS-B In Display

Manufacturer	Model	Data Format	Interface Configuration	GTX 45R Configuration Setting	Notes
Garmin	GDU 4xx	RS-232	Connext 57600 Baud	Connext Format 1	
	GNS 400W/500W Series <sup>1</sup>	RS-232	ADSB TFC	GNS	Supports traffic only (also includes GPS data from the GNS 400W/500W).
			ADSB TFC WX	GNS	Supports both traffic and weather (also includes GPS data from the GNS 400W/500W)
		ARINC 429	ADSB TFC	N/A	Supports ADS-B traffic without TAS/TCAS.
			ADSB TFC w/TCAS	N/A	Supports ADS-B traffic w/ TAS/TCAS correlation.
	GTN 6XX/7XX	HSDB	ADS-B In Source: GTX	GTN - Enabled	Supports both traffic and weather (also includes GPS data from the GTN 6XX/7XX)

Notes:

[1] The GNS 400W/500W interface requires the combination of one RS-232 and one ARINC 429 interface.

## 9.2 GPS Sources

**Table 9-2 GPS Source**

Manufacturer	Model	Data Format	Interface Configuration	GTX 35R/45R Configuration
Garmin	G3X <sup>1</sup>	RS-232	N/A	N/A
	GTN 6XX/7XX	RS-232	ADS-B OUT +	ADS-B+ GPS
		HSDB	ADS-B In Source: GTX	GTN - Enabled
	GNS 400W/ 500W	RS-232	ADSB TFC	GNS
			ADSB TFC WX	
			ADS-B OUT +	ADS-B+ GPS
	GNS 480	RS-232	ADS-B OUT +	ADS-B+ GPS
	GPS 20A	RS-232	N/A	ADS-B+ GPS

Notes:

[1] GPS position data provided by the G3X system does not meet the TSO performance requirements of 14 CFR 91.227. This GPS source will not pass the FAA ADS-B compliance report.

## APPENDIX 10 INTERCONNECT DRAWINGS

This section contains wiring interconnect details and examples for the connections necessary for the installation of the GTX 35R/45R Series transponders.

Each figure contained in this section has notes that must be followed. These general notes apply to all of the figures contained in this section.

- Unless specified differently, all wires are 24 AWG or larger.
- Power and ground connections are 22 AWG wire for run lengths less than 10 feet, if not, use 18 AWG.
- Use oversize contacts in the connector kit for wire sizes greater than 22 AWG.
- In 14 VDC installations, use two power pins and two ground pins for power and ground connections.
- In 28 VDC installations, use only one wire for power and ground connections.
- Antennas and associated cables are shown for reference only.
- If practical, power and ground wires should be routed separately for each transponder.
- Route grounds and wire separately to improve safety if there is a wiring or grounding system failure.
- Designations for ground connections:

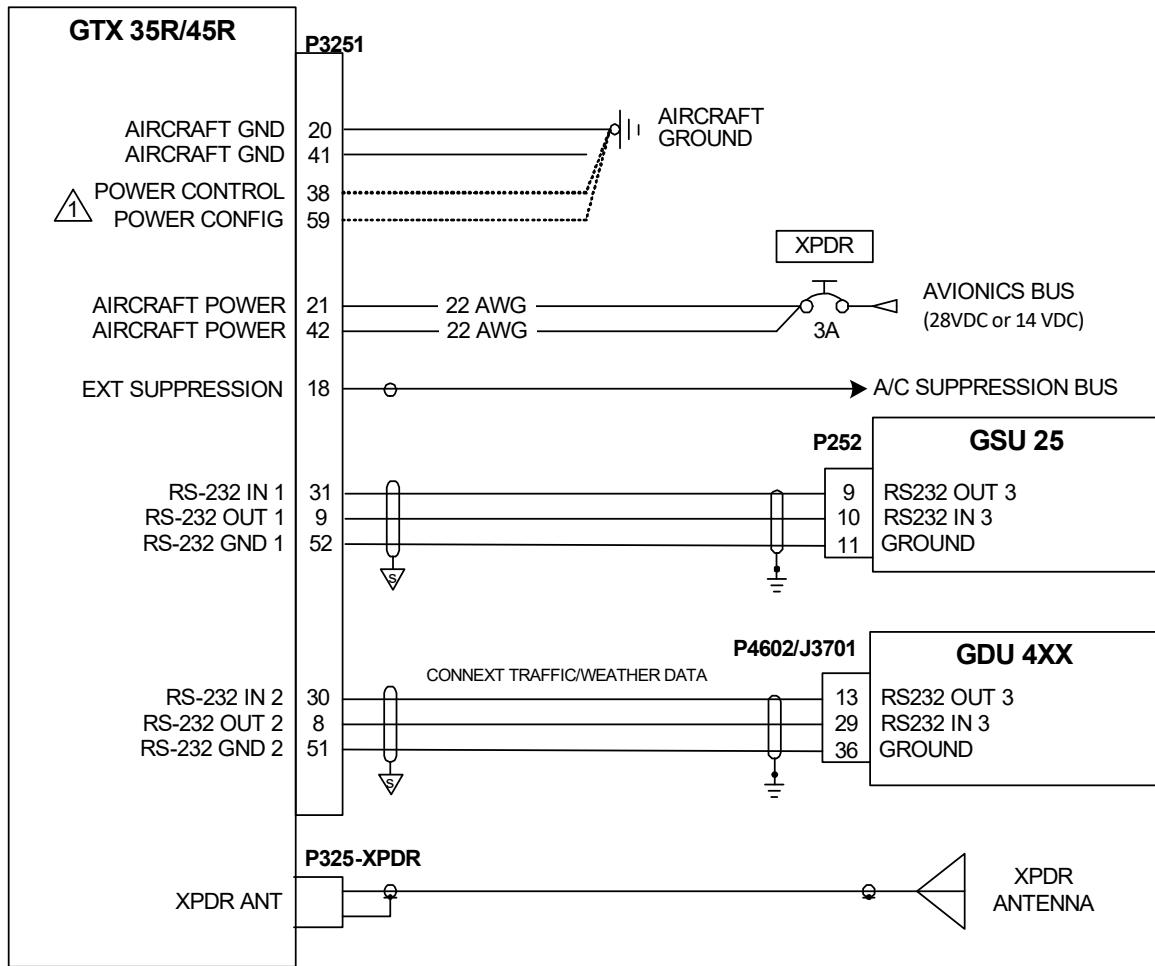
 Shield Block Ground  Airframe Ground

- Shield ground terminations to the connector backshell must be 3.0 inches or less in length.
- Ground terminations of interfaced equipment can vary. Refer to the manufacturer's installation manual for information.
- HDSB Ethernet wiring may use 22 AWG or 24 AWG aircraft grade category 5 Ethernet cable:

Manufacturer	P/N
PIC Wire and Cable	10424
Carlisle IT	39204

Or MIL-C-27500 shielded twisted-pair cable.

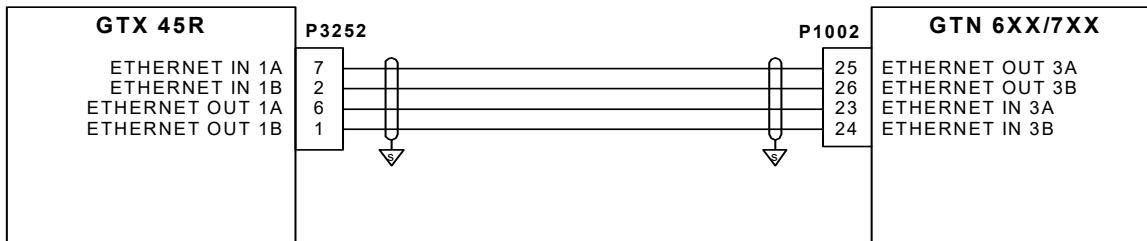
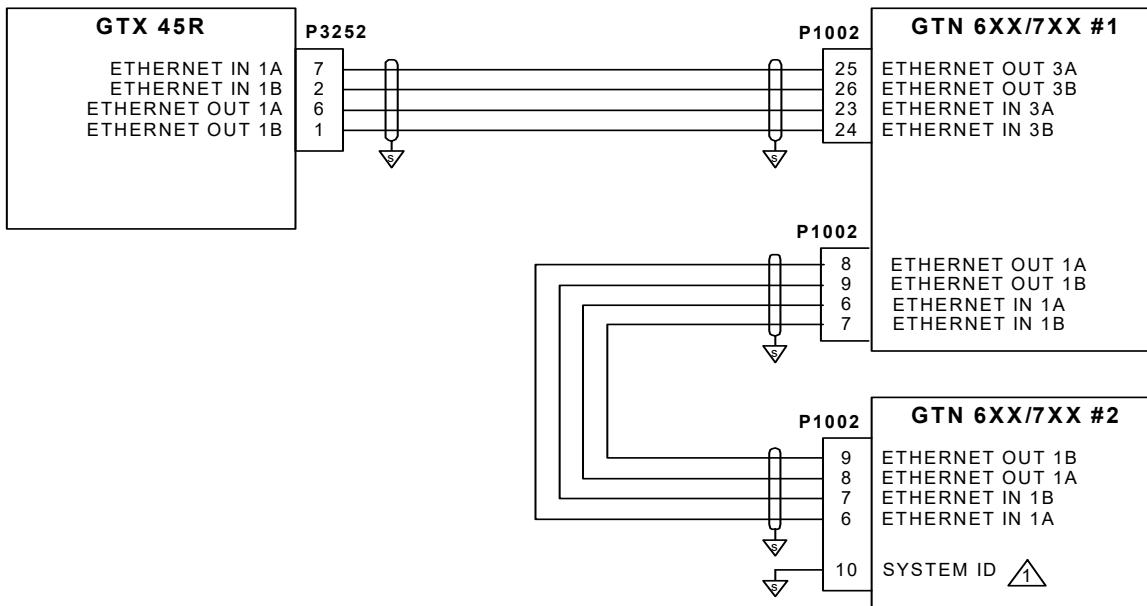
- Installations can require alternate port configurations and are acceptable provided the equipment interfaces and data formats are available on alternate ports.



REFER TO SECTION 5.3.1 FOR DETAILS

**Figure 10-1 GTX 35R/45R Typical Interconnect**

Refer to the G3X Installation manual for a complete wiring diagram.

**SINGLE 45R with SINGLE GTN 6XX/7XX**

**SINGLE GTX 45R with DUAL GTN 6XX/7XXs**


WHEN GTN 6XX/7XX IS THE ONLY INSTALLED GPS NAVIGATOR, OR GPS NAVIGATOR #1 IN A DUAL GPS NAVIGATOR INSTALLATION, CONFIGURE GTN 6XX/7XX AS GTN #1 BY LEAVING SYSTEM ID (P1002-10) NOT CONNECTED. WHEN THE GTN 6XX/7XX IS GPS NAVIGATOR #2 IN A DUAL GPS INSTALLATION, CONFIGURE GTN #2 BY GROUNDING SYSTEM ID (P1002-10) TO THE SHIELD BLOCK.



**Figure 10-2 GTX 45 - Single/Dual GTN 6XX/7XX Interconnect**

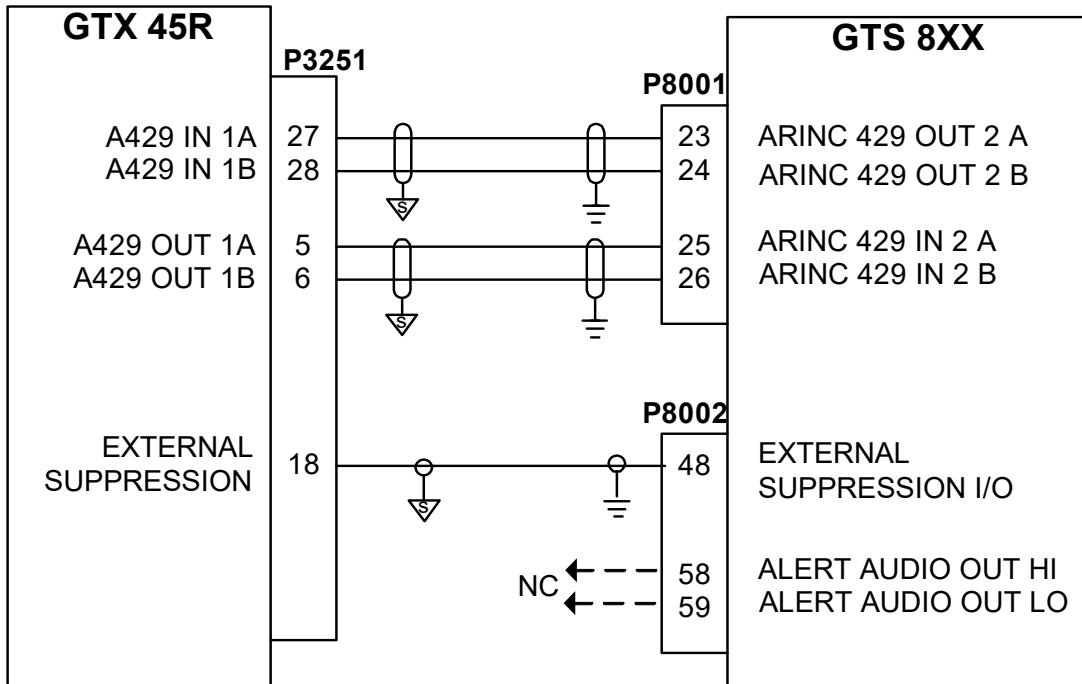


Figure 10-3 GTX 45R - GTS 8XX Interconnect

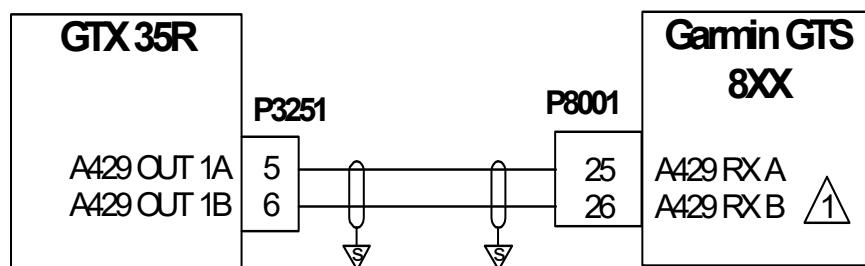
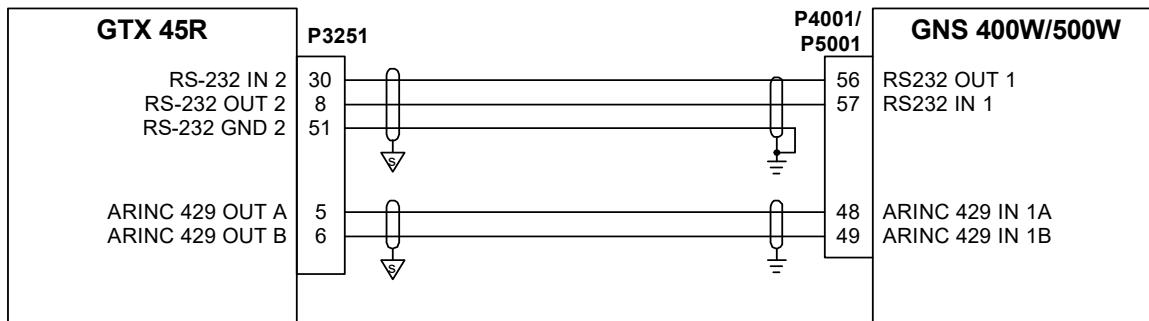
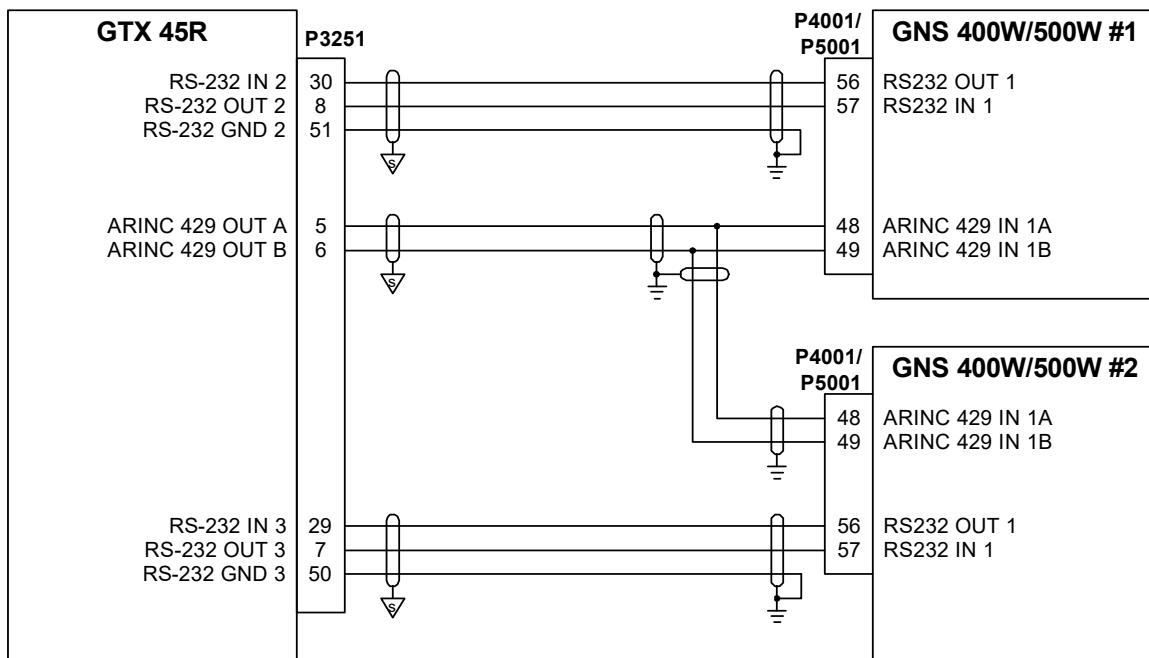


Figure 10-4 GTX 35R - GTS 8XX Interconnect

## **SINGLE GNS 400W/500W SERIES**



## **DUAL GNS 400W/500W SERIES**



**Figure 10-5 GTX 45 - Single and Dual 400W/500W Series Interconnect**

### GTX 35R with Single 400W/500W SERIES

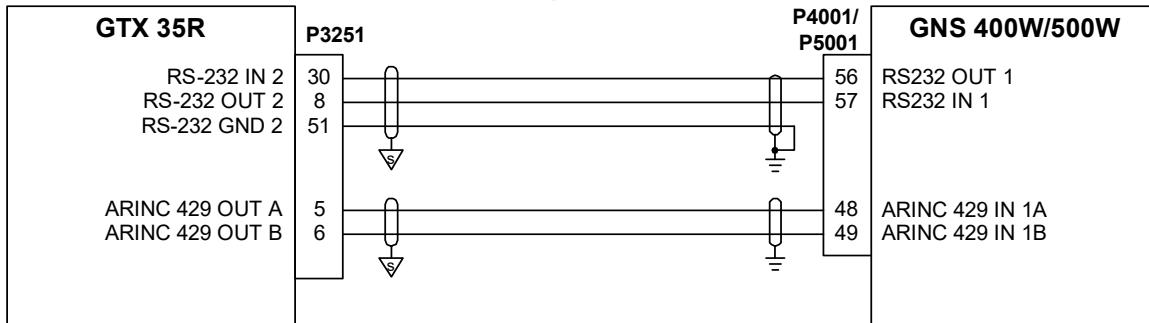


Figure 10-6 GTX 35R - GNS 400W/500W Series Interconnect

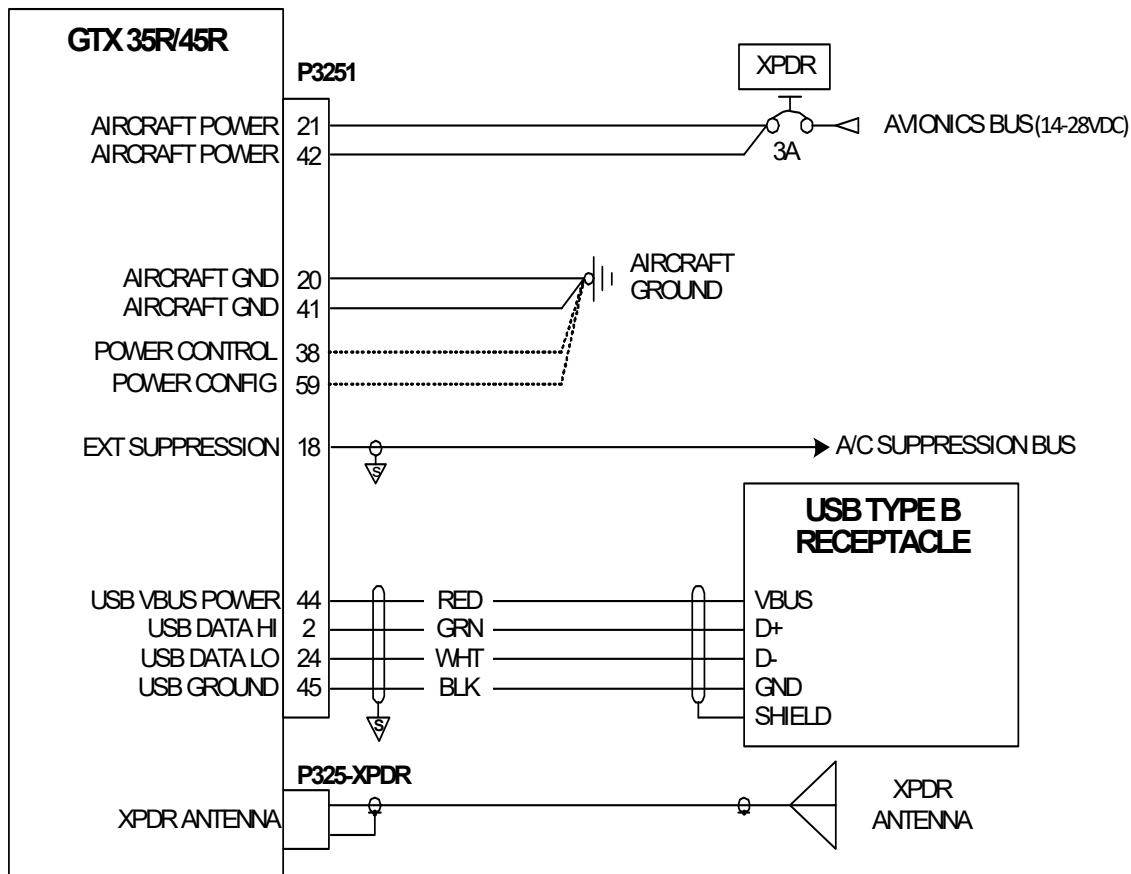


Figure 10-7 USB Programming Interface (Garmin Dealers Only)

