GARMIN

GTN 6XX/7XX
AML STC
Installation Manual

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Please send comments on this manual to Techpubs.Salem@garmin.com.

Garmin International, Inc.
1200 E. 151st Street
Olathe, KS 66062 USA
Telephone: 913-397-8200
Aviation Dealer Technical Support Line (Toll Free): 888.606.5482
http://www.garmin.com

Garmin (Europe) Ltd.
Liberty House
Bull Copse Road
Hounsdown Business Park
Southampton, SO40 9RB, UK
Telephone: +44 (0) 870 850 1243

Garmin AT, Inc.
2345 Turner Rd., SE
Salem, OR 97302 USA
Telephone: 503.581.8101

RECORD OF REVISIONS

Revision	Revision Date	Description
2	3/3/11	See current revision description for complete list of changes.
3	5/23/11	Updated for Software version 2.01.
4	12/17/12	Updated for Software Version 3.00. See current revision description for list of changes.

CURRENT REVISION DESCRIPTION

Section	Description
Page D	Added definitions of warnings, cautions, and notes.
1.1	Added STC information for GMA 35.
1.3	Rewrote section.
1.3.4	Added new section about required documentation for all installations.
1.5.1	Added new section and subsections about GTN/GTX installation overview.
1.6.1	Added new section about environmental qualification forms.
1.6.2	Added new section about power requirements.
1.6.3	Added new section about system documentation.
1.8.5 – 1.8.7	Added information and new phone number about databases.
2.2	Added enablement card part numbers.
2.2.2.2	Added statement about MIL-W-22759/18 wire.
2.3.2.5	Added new section about materials required for instrument panel bonding.
2.4.1.1 – 2.4.1.3	Added new subsections to section 2.4.1, Minimum System Configuration.
2.4.3	Added new section about GDL 88 installation considerations.
2.4.4.1	Rewrote entire section.
2.4.5	Added new section about electrical bonding.
2.4.10.1	Added paragraph to section about if a GNS 400W/500W is installed concurrently with a GTN.
2.4.16	Added new section about considerations for weather radar wiring.
3.1	Updated part numbers of antennas in subsections.
3.3.3.1	Added recommended hardware to use for NAV antenna cable splitter installations.
3.3.3.2	Added recommended hardware to use for NAV antenna cable diplexer installations.
3.4.4	Added section about GMA 35 unit insertion and removal.
3.5	Added sample aircraft weight and balance calculation.
3.6.3.2	Added section and subsections about configuration module installations.
3.6.8	Added section and subsections about instrument panel bonding procedures.
3.7	Added information about electrical load analysis.
3.8	Added section and subsections about AFMS completion.
4.1.2	Updated pin names of P1002 connector.
4.1.5	Updated pin names of the P1005 connector.
4.2.2	Updated pin names of P3502 connector.
5.3	Rewrote procedure for connector engagement check.
5.4.4 – 5.4.5	Added sections on GWX 68/70 and GDL 88 software loading.
5.5.1.1	Added tables about ARINC 429 DATA IN and OUT selections.

Section	Description
5.5.1.2	Added tables about RS-232 input and output selections.
5.5.1.4.3	Added new section about GDL 88.
5.5.1.4.5	Added new section about GWX.
5.5.1.4.6	Added new section about GSR 56.
5.5.1.8	Added information about the traffic page concerning the installation of a GDL 88.
5.5.1.9	Added information concerning upgrading from software version 2.00 to 3.00.
5.5.1.12	Added new section about ARINC 453/708 configuration page.
5.5.2.4	Added new section about Digital Radar.
5.5.2.5	Added new section about GWX 70 advanced features.
5.5.3.14	Added new section about clear configuration module.
5.5.4.5.1	Added new section about Ryan TCAD.
5.5.4.7.2	Clarified descriptions of items found on the remote XPDR configuration page.
5.5.4.8.2	Added new information about the GMA 35 audio panel configuration settings.
5.5.4.9	Added new section and subsections about GDL 88 configuration.
5.7.8	Added new subsections about GWX 68/70, ARINC 708, GSR 56, and Ryan TCAD interface checks.
5.7.9	Added new section about GDL 88 interface check.
5.7.11	Added new section about EMI/RFI checks.
5.10.3	Revised the GTN Post-Installation Checkout Log.
7.2.7	Added information to GPS/WAAS Antenna Limitations section.

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INFORMATION SUBJECT TO EXPORT CONTROL LAWS

This document may contain information which is subject to the Export Administration Regulations ("EAR") issued by the United States Department of Commerce (15 CFR, Chapter VII, Subchapter C) and which may not be exported, released, or disclosed to foreign nationals inside or outside of the United States without first obtaining an export license. A violation of the EAR may be subject to a penalty of up to 10 years imprisonment and a fine of up to $1,000,000 under Section 2410 of the Export Administration Act of 1979. Include this notice with any reproduced portion of this document.

DEFINITIONS OF WARNINGS, CAUTIONS, AND NOTES

WARNING

Warnings are used to bring to the installer's immediate attention that not only damage to the equipment but personal injury may occur if the instruction is disregarded.

CAUTION

Cautions are used to alert the individual that damage to equipment may result if the procedural step is not followed to the letter.

NOTE

Notes are used to expand and explain the preceding step and provide further understanding of the reason for the particular operation.

WARNING

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

WARNING

Perchlorate Material – special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate.

CAUTION

The GTN 6XX and 7XX has a display coated with a special anti-reflective coating that is very sensitive to waxes and abrasive cleaners. CLEANERS CONTAINING AMMONIA WILL HARM THE ANTI-REFLECTIVE COATING. It is very important to clean the display using a clean, lint-free cloth and an eyeglass lens cleaner that is safe for anti-reflective coatings.

NOTE

All screen shots used in this document are current at the time of publication. Screen shots are intended to provide visual reference only. All information depicted in screen shots, including software file names, versions, and part numbers, is subject to change and may not be up to date.

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1 GENERAL DESCRIPTION

1.1 Introduction

This manual is written for software version 2.00 or later. The software version and information in this document are subject to change without notice. Visit the Dealer Resource Center on Garmin's website (www.garmin.com) for current updates and supplemental information concerning the operation of this and other Garmin products.

This manual describes the physical, mechanical, and electrical characteristics as well as instructions, conditions, and limitations for installation and approval of the GTN 6XX and 7XX navigators as well as the optional GMA 35. The GTN AML STC SA02019SE-D applies to the optional GMA 35 audio panel as well as the GTN 625/635/650 and GTN 725/750.

1.2 Terminology

Except where specifically noted, references made to the 'GTN' will equally apply to the GTN 625/635/650/725/750. In addition, 'GTN 7XX' refers specifically to the GTN 725 and GTN 750, and 'GTN 6XX' refers specifically to the GTN 625, GTN 635, and GTN 650.

Throughout this document references will be made to 'metallic' and 'nonmetallic' aircraft. For the purposes of this installation manual, metal aircraft will be those with an aluminum skin. Nonmetallic aircraft will refer to all other aircraft (e.g., wooden aircraft, aircraft with composite skin, or aircraft with tube and fabric construction).

SBAS (Satellite-Based Augmentation System) refers to a system that supports wide-area augmentation through the use of broadcast messages from satellites to improve the GPS navigation system accuracy. SBAS is a general term used to describe systems such as WAAS (Wide Area Augmentation System) and EGNOS (European Geostationary Navigation Overlay Service).

1.3 Scope

This installation manual applies to the modification of an aircraft under AML STC SA02019SE-D to install the equipment described in Table 1-1. Interfaces between the equipment listed in the second column and the GTN and/or GMA 35 are covered by STC SA02019SE-D.

Table 1-1. Scope of STC SA02019SE-D

Equipment Installation Covered by STC SA02019SE-D	Equipment Installation NOT Covered by STC SA02019SE-D
• GTN 625 • GTN 635 • GTN 650 • GTN 725 • GTN 750 • GMA 35 • NAV Antenna Cable Splitter • NAV Antenna Cable Diplexer • Equipment necessary to support installation of the equipment above, such as the installation kit accessories (Section 2.3.1) and the wiring and circuit breakers shown in Appendix E and Appendix F.	• GPS/SBAS Antenna(s) • VHF COM Antenna(s) • VHF NAV Antenna(s) • Marker Beacon Antenna • Equipment listed in Appendix C (except those listed in the left column of this table) • Equipment listed in Appendix D (except those listed in the left column of this table)

This STC approves the interface to the equipment listed in Appendices C and D. However, this STC assumes that these devices are existing. Additional airworthiness approval beyond this STC will be required to install these devices.

This STC is applicable for implementation in Part 23 aircraft that are on the Approved Model List (AML).

Only the equipment and systems interfaces described in this manual have been determined to be mutually compatible and operationally suitable; these are approved for use as characterized herein.

1.3.1 Approved Aircraft with Systems Not Covered by the STC

Aircraft identified on the Approved Model List have been determined to meet a minimum required configuration for applicability of the STC. However, since some of these aircraft may have been modified over the years or may have been manufactured with systems which are not identified or approved in this manual for integration with the GTN, it may be difficult to use the data herein to completely substantiate the installation in compliance with the STC. It is the installer's responsibility to make the final determination of applicability for each aircraft. Use this manual to assess each installation prior to modifying any Type Certified aircraft to ensure the applicability of the GTN AML STC.

It is possible/permissible for installers and other appropriately certificated persons to seek FAA approval for installation and operational use of the GTN equipment with systems not identified in this manual, such as for aircraft certificated under 14 CFR parts 25, 27, or 29, by means of a field approval, STC, or TC. Refer to FAA Advisory Circular (AC) 20-138( ) and other applicable guidance when applying for installation and operational approval. AC 21-40 provides guidance for the STC approval process and AC 43-210 provides guidance for the field approval process. If the field approval process is used, it is advisable to consider the conditions and stipulations in FAA Flight Standards Information Bulletin for Airworthiness (FSAW), 94-32c, "Guidance for Performing Field Approvals of Installation and Operational Use of Global Positioning Systems (GPS) or GPS with Wide Area Augmentation Systems (GPS/SBAS), Referred to as Global Navigation Satellite Systems (GNSS) Equipment", as revised.

1.3.2 Part 23 Aircraft Not Identified on the AML

Aircraft identified in AC 23.1309-1D as Class I, II, III, or IV airplanes which are not identified on the GTN AML STC may be valid candidates for installation of the GTN/GMA 35. Installers should contact Garmin Tech Support with detailed drawings of the aircraft's proposed installation. Engineering analysis may allow for the inclusion of these aircraft in a future revision of the FAA Approved Model List. Also, data provided in this manual may be used to perform the alteration but additional FAA approval is required.

1.3.3 Other Aircraft Not Covered by the AML

Transport Category Aircraft (Part 25), and Rotorcraft (Part 27/29) are not part of this GTN AML STC. However, these aircraft may be valid candidates for installation of this system. Installers may contact Garmin for possible additional information that may support an installation of this type. Data provided in this manual may be used to perform the alteration but additional FAA approval is required.

1.3.4 Required Documentation for All Installations

Regardless of applicability of the AML STC or alternative field approval application for installation and operational approval, the aircraft must be returned to service in a means acceptable to the cognizant aviation authority. An example would be submission of an FAA Form 337; "Major Repair and Alteration Airframe, Powerplant, Propeller, or Appliance" to the appropriate FAA Flight Standards District Office describing the work accomplished. The FAA Form 337 must detail the equipment and systems to which the respective GTN System is interfaced and reflect appropriately approved or acceptable data for which any follow-on FAA Field Approval is being sought. See AC 43.9-1F for instructions for completing the FAA Form 337. In addition, the Configuration and Checkout Log must be completed and attached with the Instructions for Continued Airworthiness such that any aircraft with the modifications detailed in this manual may be properly maintained.

1.4 GTN/GMA 35 System Overview

The GTN WAAS navigators are a family of aviation panel mounted retro-fit products that are intended to supersede the Garmin 400/500 WAAS series GPS, GPS/COM, and GPS/NAV/COM retro-fit products. The GTN 6XX product family consists of the GTN 625 GPS/SBAS navigator, the GTN 635 GPS/SBAS/COM navigator, and the GTN 650 GPS/SBAS/NAV/COM navigator. The GTN 7XX product family consists of the GTN 725 GPS/SBAS navigator, and the GTN 750 GPS/SBAS/NAV/COM navigator. See Appendix E for an overview of the system interfaces to the GTN unit.

The optional GMA 35 audio panel is both a marker beacon receiver and an audio panel with 6-place intercom that interfaces to the GTN 7XX, communications and navigation radios, headsets, microphones, and speakers. The GMA 35 is feature-rich, but is similar in basic function to the GMA 340 and GMA 347 audio panels, except that the GMA 35 is remote-mounted and relies upon the GTN 725 or GTN 750 to control and display the audio functions. The GTN 7XX controls and displays the functions of the GMA 35 via digital interface.

1.4.1 GTN Unit Descriptions

Table 1-2 shows the attributes of each GTN unit.

Table 1-2. Attributes of GTN Units

	GTN 625	GTN 635	GTN 650	GTN 725	GTN 750
GPS/SBAS	✓	✓	✓	✓	✓
COM Radio		✓	✓		✓
NAV Radio			✓		✓
GMA 35 Control				✓	✓

1.4.1.1 GTN 7XX Series Description

The GTN (Garmin Touch Navigation) 7XX WAAS navigators are a family of GPS/NAV/COM aviation panel-mounted products that supersede the Garmin 500W Series GPS/NAV/COM navigators. The GTN 7XX series units include the GTN 725 and GTN 750. The GTN 7XX units are 6.25 inches wide and 6.00 inches tall. They feature a 600 by 708 pixel color LCD touchscreen which provides a rich and intuitive user interface. The GTN 725 is a GPS/SBAS unit that meets the requirements of Technical Standard Order (TSO)-C146c and may be approved for IFR en route, terminal, oceanic, non-precision, and precision approach operations when installed in accordance with the instructions in the manuals referenced in the GTN AML STC. The GTN 750 includes all of the features of the GTN 725 in addition to an airborne VHF communications transceiver and airborne VOR/localizer (LOC) and glideslope (G/S) receivers. The GTN 725 and 750 also have the ability to remotely control GMA 35 audio panel functions.

1.4.1.2 GTN 6XX Series Description

The GTN 6XX WAAS navigators are a family of panel-mounted products that supersede the 400W series GPS/NAV/COM navigators. The GTN 6XX series units include the GTN 625, GTN 635, and GTN 650. They are 6.25 inches wide and 2.65 inches tall. The GTN 6XX features a 600 by 266 pixel color LCD touchscreen. The GTN 625 is a GPS/SBAS unit that meets the requirements of Technical Standard Order (TSO)-C146c and may be approved for IFR en route, terminal, Oceanic, non-precision, and precision approach operations when installed in accordance with the instructions in the manuals referenced in the GTN AML STC. The GTN 635 includes all of the features of the GTN 625 in addition to an airborne VHF communications transceiver. The GTN 650 includes all of the features of the GTN 625 in addition to an airborne VHF communications transceiver and airborne VOR/localizer (LOC) and glideslope (G/S) receivers.

1.4.2 GMA 35 Audio Panel Description (Optional)

The GMA 35 is a remote mounted audio panel that interfaces via RS-232 to the GTN 7XX for control and display of audio panel functions. The system delivers reliability and versatility for all audio controlling functions. The GMA 35 can be optionally installed with the GTN 7XX. With the increased size of the GTN 7XX over the previous 500W series GPS/SBAS navigator, the 7XX has the option of incorporating the audio panel into a much more intuitive touch-screen interface.

Additionally, the GMA 35 includes a six-position intercom system (ICS) with electronic cabin noise de-emphasis, two stereo music inputs, and independent pilot, copilot, and passenger volume controls. To further simplify cockpit workload, the intercom provides three selectable isolation modes. A pilot-selectable cabin speaker output can be used to listen to the selected aircraft radios or to broadcast PA announcements.

The GMA 35 also includes a marker beacon receiver with dual sensitivity and audio muting with automatic re-arming.

Features Summary

- User-friendly, intuitive control via the GTN 7XX touchscreen navigator
- Six position intercom: pilot, copilot, and four passengers
- 3D Audio
- Three stereo headset amplifiers: one for pilot, one for copilot, and one for the passengers
- Two stereo music source inputs
- Three selectable intercom operational modes
- Independent pilot, copilot, and passenger volume controls
- Individual VOX circuits for each of six (6) mic inputs
- Automatic selection of radio audio source when corresponding mic is selected
- Split COM transceiver function. Copilot may transmit and receive on COM2 while pilot transmits and receives on COM1
- COM swap function
- TX indication via GTN 7XX
- Speaker output for radios or PA function
- Power-off fail-safe to connect Pilot PTT, mic, and Headset to COM1 if unit is turned off or loses power
- Power loss fail-safe warning audio

1.4.3 GTN Interface Summary

The GTN utilizes ARINC 429, RS-232, discrete inputs/outputs, and Garmin High Speed Data Bus (HSDB) interfaces to communicate with other LRUs and Systems on the aircraft. A summary of the GTN interfaces are shown in Figure 1-1. For more detail, refer to Appendix E.

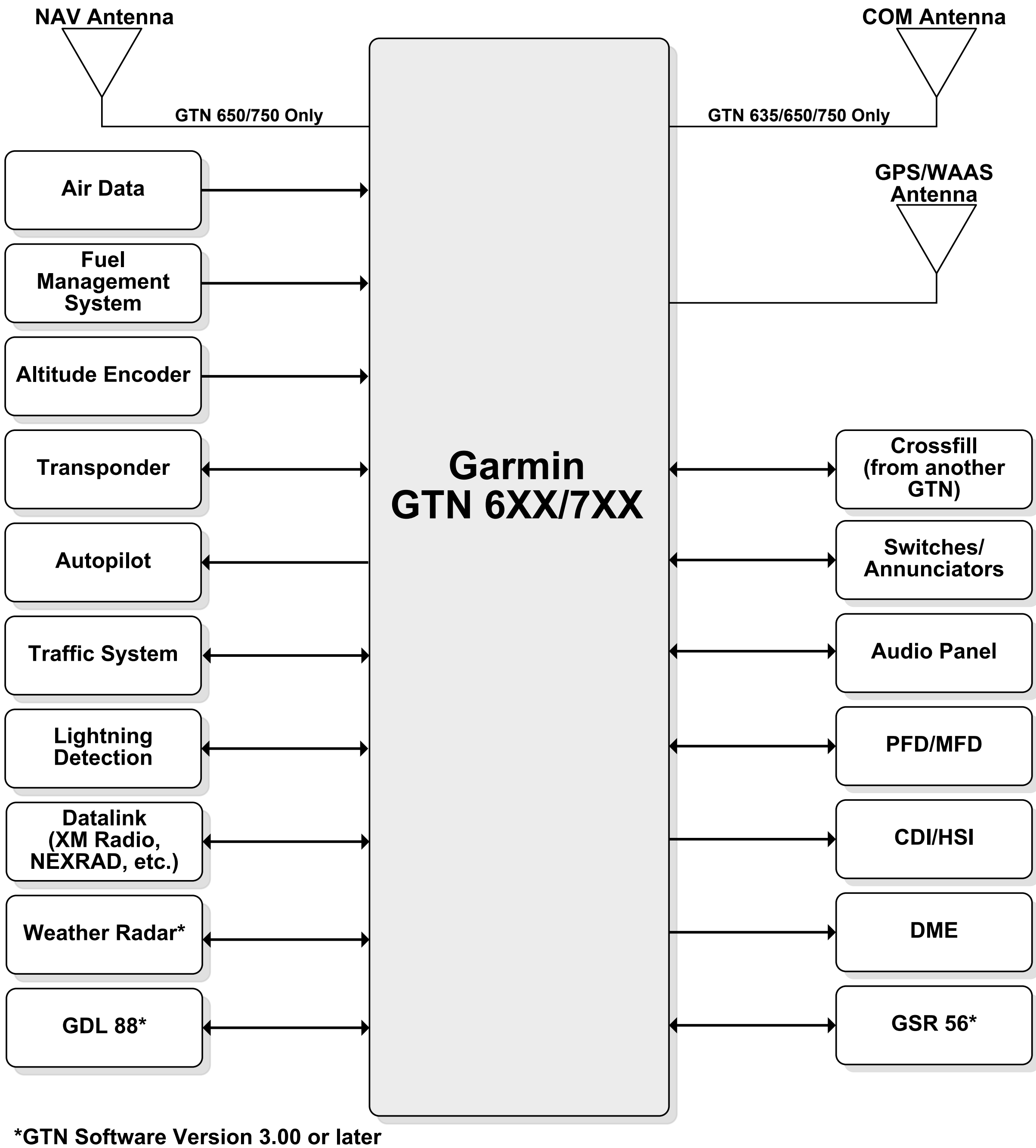


Figure 1-1. GTN System Interface Overview

1.4.4 GMA 35 Interface Summary

A summary of the GMA 35 interfaces is shown in Figure 1-2.

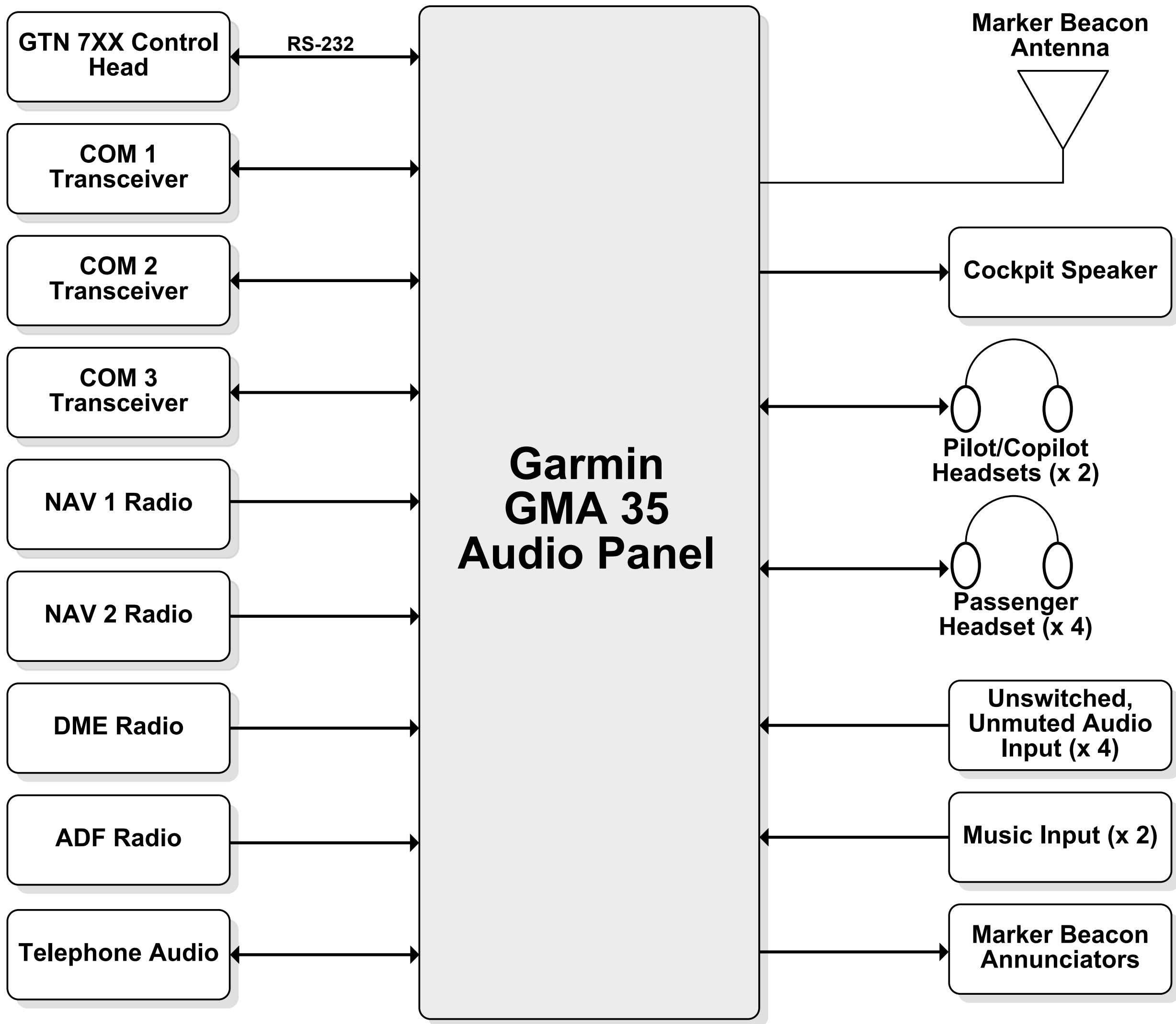


Figure 1-2. GMA 35 System Interface Overview

The GMA 35 utilizes RS-232, discrete inputs/outputs, and analog audio inputs/outputs to communicate with other systems on the aircraft. For more detail, refer to Appendix F.

1.5 GTN/GMA 35 Installation Overview

Always follow acceptable avionics installation practices per AC 43.13-1B, AC 43.13-2B, or later FAA approved revisions of these documents. The GPS/SBAS installation instructions have been prepared to meet the guidance material contained in AC 20-138A, "Airworthiness Approval of Global Navigation Satellite System (GNSS) Equipment". The communications installation instructions have been prepared to meet the guidance material defined by AC 20-67B, "Airborne VHF Communications Equipment Installations". Follow the installation procedure in this section, as it is presented, to accomplish a successful installation. Read the entire section before beginning the work.

Prior to installation, consider the structural integrity of the GTN/GMA 35 installation as defined in Section 3.4. Complete an electrical load analysis in accordance with the instructions in Section 3.6.8 on the aircraft prior to starting the modification to ensure the aircraft has the ability to carry the additional GTN and optional GMA 35 electrical load. Once the installation is complete, perform the post installation checkout described in Chapter 5 before closing the work area in case problems occur.

1.5.1 GTN/GTX Installation Overview

This section contains considerations for connecting GTN units with the GTX 32/33/327/328/330 transponders. The GTN utilizes RS-232 to communicate with the GTX transponders. If GTN control of the transponder is desired, see Section 1.5.1.1 for more information. If GTN control of the GTX 327 or 330 is not desired, see Section 1.5.1.2 for more information.

Pressure altitude is transmitted from the GTN to the GTX over the RS-232 connections discussed below. Pressure altitude is not transmitted from the GTX to the GTN over these RS-232 connections (except for some GTX 327 installations, see Section 1.5.1.1 for more information). For this reason, it is recommended that the aircraft's pressure altitude source be connected directly to the GTN.

If there is only one GTN and one GTX, they communicate over a direct RS-232 connection as shown in Figure 1-3.

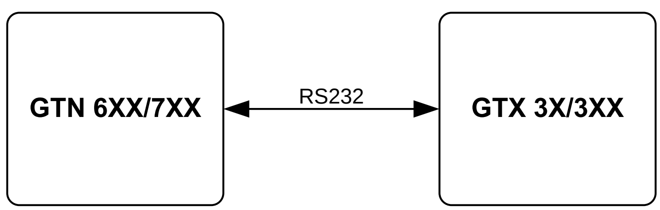


Figure 1-3. Interface between One GTN and One GTX

If there are two GTX units, they must both be connected to the GTN as shown in Figure 1-4. In this case, the GTN can control both GTX #1 and GTX #2.

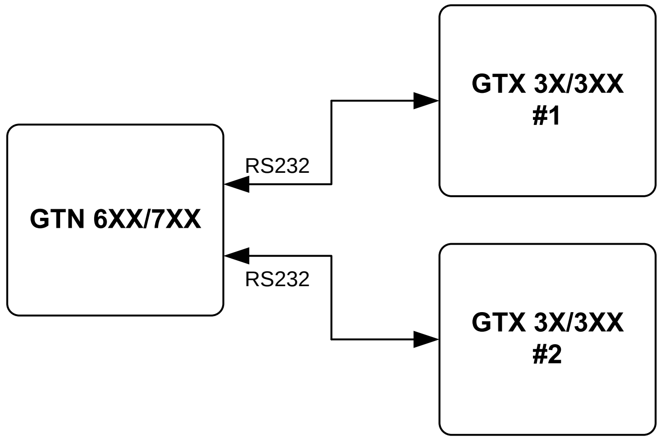


Figure 1-4. Interface between One GTN and Two GTXs

Similarly, to connect one GTX to dual GTNs, each of the GTNs needs to have an RS-232 connection to the single GTX as shown in Figure 1-5. In this case, both GTN #1 and GTN #2 can control the transponder.

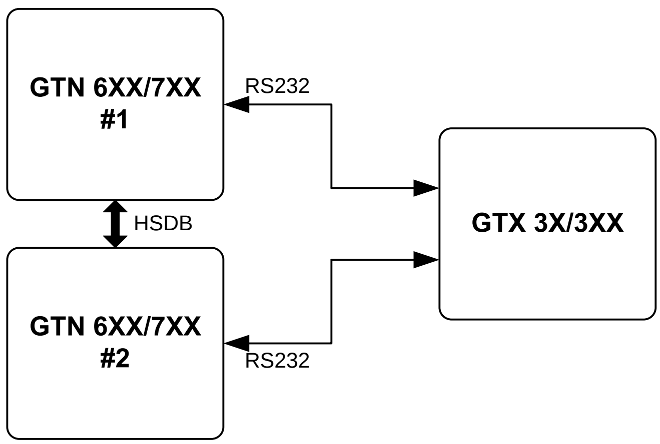


Figure 1-5. Interface between Two GTNs and One GTX

If there are two GTXs connected to dual GTNs, GTN #1 should be connected to GTX #1 and GTN #2 should be connected to GTX #2 as shown in Figure 1-6. In this configuration, each of the GTN units is capable of controlling either GTX through the HSDB interface.

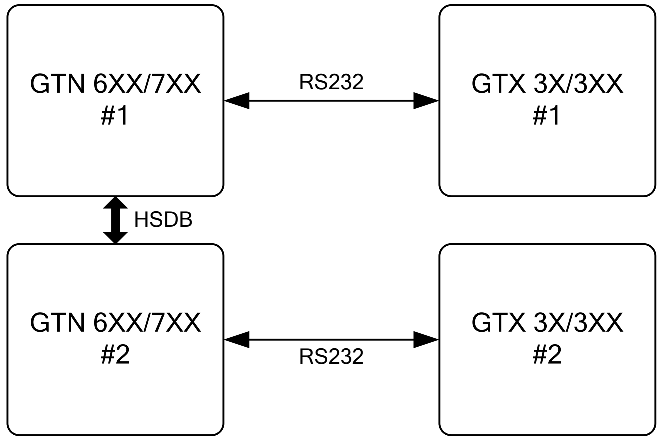


Figure 1-6. Interface Between Two GTNs and Two GTXs

To enable TIS traffic for the combination of two GTXs connected to dual GTNs, each of the GTX units must be connected to both GTNs because the TIS data is not transmitted over HSDB. Also, only the GTX 33 and the GTX 330 are capable of receiving TIS traffic data. This arrangement is shown in Figure 1-7. The pressure altitude source must also be connected to both GTNs.

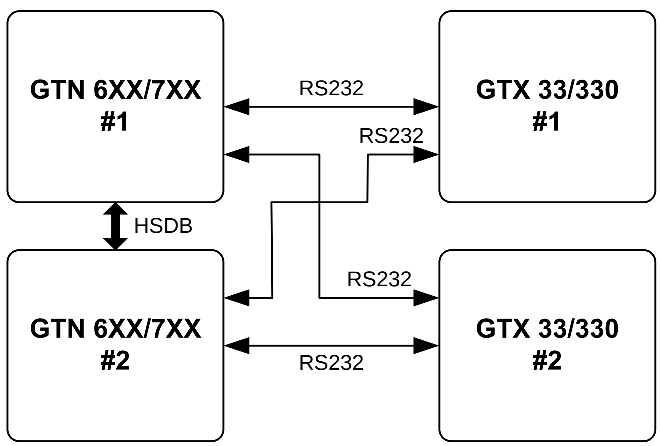


Figure 1-7. Interface Between Two GTNs and Two GTXs with TIS Traffic

1.5.1.1 Installation with GTN Control of GTX Transponder

When connected to a GTX 32/33/327/328/330, the GTN can control the transponder as well as transmit pressure altitude (if a pressure altitude source is connected to the GTN). GTN and GTX configuration settings can be found in Section C.8 and Figure E-12, respectively.

1.5.1.2 Installation without GTN Control of GTX Transponder

The GTX 327, 328, and 330 can be connected to the GTN without allowing the GTN to control the transponder functions. GTN and GTX configuration settings can be found in Section C.8 and Figure E-12, respectively.

If the GTN is not set to control the GTX 327, the interface to the GTX 327 is not required. However, the GTN can send GPS groundspeed to the transponder. Also, if the GTN is not controlling the GTX 327, the GTN can optionally receive pressure altitude from the GTX 327.

NOTE

When the GTN is not controlling the GTX 327 transponder, pressure altitude data is not sent from the GTN to the GTX 327. Instead, the pressure altitude source must be connected to the transponder.

For the GTX 330, TIS traffic can still be sent to the GTN even if the GTN is not controlling the transponder. If GTN control of the GTX 330 and display of TIS traffic from the transponder on the GTN is not desired, GPS position, track, and velocity can still be sent to the transponder.

1.5.2 Pre-Installation Checklist

Before beginning a GTN/GMA 35 installation, it is important to ensure the aircraft meets the pre-requisites for the installation of the GTN system under this STC. The following checklist is provided to help the installer determine the necessary requirements that must be met before beginning installation of the GTN in a specific aircraft. Ensure each of the items outlined are completed as necessary before beginning the modification.

Table 1-3. Pre-Installation Checklist

Item	Reference	GTN 625	GTN 635	GTN 650	GTN 725	GTN 750	GMA 35	Complete
Aircraft is on Approved Model List (AML)	MDL (P/N 005-00533-C0) Sections 1.4, 1.5, 1.6	✓	✓	✓	✓	✓	✓	❑
Acceptable mounting provisions have been identified for GTN	Appendix B	✓	✓	✓	✓	✓		❑
Acceptable mounting provisions have been identified for GMA 35	Appendix B						✓	❑
Acceptable GPS/SBAS antenna installed	Section 1.7	✓	✓	✓	✓	✓		❑
NAV antenna installed	Section 2.4.4.6			✓		✓		❑
COM antenna installed	Section 2.4.4.6		✓	✓		✓		❑
Marker beacon antenna installed for GMA 35 installations	Section 2.4.4.6.2						✓	❑
External annunciations supplied if required for IFR installations	Section 2.4.10.1	✓	✓	✓	✓	✓		❑
Planned equipment interfaces are approved under the STC or have other FAA Approval	Appendix C, Appendix D	✓	✓	✓	✓	✓	✓	❑
Installation/operational limitations reviewed to ensure no adverse impact to the installation	Section 7	✓	✓	✓	✓	✓	✓	❑
Aircraft electrical system is sufficient for GTN and optional GMA 35 installation	Section 3.7	✓	✓	✓	✓	✓	✓	❑
External CDI for IFR installations	Section 2.4.1.2	✓	✓	✓	✓	✓		❑
Second GPS navigator, COM radio, or NAV radio for IFR Installations	Section 2.4.1.2	✓	✓	✓	✓	✓		❑
Determination of applicable lightning protection needed for each aircraft model	Section 2.3.2.4, Section 2.4.1.2, Section 2.4.1.3, Appendix G	✓	✓	✓	✓	✓		❑

1.6 Technical Specifications

For GTN 6XX technical specifications, see GTN 625/635/650 TSO Installation Manual, P/N 190-01004-02. For GTN 7XX technical specifications, see GTN 725/750 TSO Installation Manual, P/N 190-01007-02.

1.6.1 Environmental Qualification Forms

The latest revision of the Environmental Qualification Forms for the GTN 6XX and 7XX as well as the GMA 35 are available directly from Garmin under the part numbers listed in Table 1-4.

Table 1-4. GTN 6XX/7XX and GMA 35 Environmental Qualification Forms

Document	Garmin Part Number
GTN 625/635/650 Environmental Qualification Form	005-00532-13
GTN 725/750 Environmental Qualification Form	005-00533-13
GMA 35 Environmental Qualification Form	005-00567-01

To obtain a copy of these forms, see the Dealer Resource Center on Garmin's website.

1.6.2 Power Requirements

The GTN and GMA 35 are capable of operating at either 14 or 28 VDC. See the individual GTN 6XX/7XX or GMA 35 Environmental Qualification Forms for details on surge ratings and minimum/maximum operating voltages. See Table 1-5 for current draw specifications.

Table 1-5. GTN and GMA 35 Current Specifications

LRU	14 Volt Current Draw		28 Volt Current Draw	
	Typical	Maximum	Typical	Maximum
GTN 625, 635, 650 (Main Connector)	1.6 A [1]	2.8 A [2]	0.8 A [1]	1.5 A [2]
GTN 635, 650 (COM Connector)	0.45 A	4.02 A (10W COM)	0.21 A	2.33 A (16W COM) 1.76 A (10W COM)
GTN 650 (NAV Connector)	0.60 A	1.16 A [2]	0.30 A	0.58 A [2]
GTN 725, 750 (Main Connector)	2.4 A [1]	3.4 A [2]	1.2 A [1]	1.8 A [2]
GTN 750 (COM Connector)	0.45 A	4.02 A (10W COM)	0.21 A	2.33 A (16W COM) 1.76 A (10W COM)
GTN 750 (NAV Connector)	0.60 A	1.16 A [2]	0.30 A	0.58 A [2]
GMA 35	0.80 A	1.50 A	0.40 A	1.0 A

[1] The specified current draw is with the display backlight set to 100% and the fan operating at low speed. If the superflags are connected, their current draw must be added in addition to the specified current. The superflags will supply up to 320 mA each regardless of the GTN's input voltage.

[2] The specified current draw does not include the superflags. If connected, their current draw must be added to the specified current. The superflags will supply up to 320 mA each regardless of the GTN's input voltage.

1.6.3 System Documentation

Table 1-6. Garmin GTN 6XX/7XX Reference Documentation

Document	Garmin P/N
Master Drawing List, GTN 6XX/7XX	005-00533-C0
Equipment List, GTN 6XX/7XX AML STC	005-00533-C1
GTN 6XX/7XX Series Training Software	006-A0411-00
GTN 625/635/650 TSO Installation Manual	190-01004-02
GTN 625/635/650 Pilot's Guide	190-01004-03
GTN 625/635/650 Cockpit Reference Guide	190-01004-04
GTN 725/750 TSO Installation Manual	190-01007-02
GTN 725/750 and GMA 35 Pilot's Guide	190-01007-03
GTN 725/750 Cockpit Reference Guide	190-01007-04
GTN 6XX/7XX System Maintenance Manual, GTN 6XX/7XX Part 23 AML STC	190-01007-A1
Airplane Flight Manual Supplement for Garmin GTN 6XX/7XX GPS/SBAS Navigation System	190-01007-A2
GTN 6XX/7XX AML STC Installation Manual	190-01007-A3
VFR GPS Limited Airplane Flight Manual Supplement for Garmin GTN 6XX/7XX GPS/SBAS Navigation System	190-01007-A5
GTN 6XX/7XX Installation Checklist	190-01007-E1

Table 1-7. Garmin GMA 35 Reference Documentation

Document	Garmin P/N
GMA 35 Installation Manual	190-00858-11

Table 1-8. Other Reference Documentation

Document	P/N
FAA Advisory Circular, Airborne VHF Communications Equipment Installations	FAA AC 20-67B
FAA Advisory Circular, Acceptable Methods, Techniques, and Practices – Aircraft Inspection and Repair	FAA AC 43.13-1B
FAA Advisory Circular, Acceptable Methods, Techniques, and Practices – Aircraft Alterations	FAA AC 43.13-2B
FAA Advisory Circular, Airworthiness Approval of Global Navigation Satellite System (GNSS) Equipment	FAA AC 20-138A
Aerospace Systems Electrical Bonding and Grounding for Electromagnetic Compatibility and Safety	SAE ARP1870
Standard Guide for Aircraft Electrical Load and Power Source Capacity Analysis	ASTM F2490-05e1

Table 1-9. Garmin Product Reference Documentation

Document	Garmin Part Number
400W Series Installation Manual	190-00356-02
500W Series Installation Manual	190-00357-02
G500 AML STC Installation Manual	190-01102-06
G600 AML STC Installation Manual	190-00601-06
GA 35, GA 36, GA 37 Antenna Installation Instructions	190-00848-00
GDL 69/69A Installation Manual	190-00355-02
GDL 88 STC Installation Manual	190-01310-00
GDU 620 Installation Manual	190-00601-04
GMA 35 Installation Manual	190-00858-11
GMA 350/350H Installation Manual	190-01134-11
GMX 200 Installation Manual	190-00607-04
GNS 480 (CNX80) Color GPS/NAV/COM Installation Manual	560-0982-01
GSR 56 Installation Manual	190-00836-00
GTX 32 Installation Manual	190-00303-60
GTX 327 Transponder Installation Manual	190-00187-02
GTX 328 Transponder Installation Manual	190-00420-04
GTX 33 Transponder Installation Manual	190-00906-00
GTX 330/330D Transponder Installation Manual	190-00207-02
GWX 68 Installation Manual	190-00286-01
GWX 70 Installation Manual	190-00829-01

1.7 GPS/WAAS Antenna Requirements

Antenna Performance is critical to GPS/SBAS operation. Table 1-10 lists antennas that meet Garmin's minimum performance specifications. The GTN must be installed with one of these antennas to achieve acceptable performance. The installation of these antennas must be previously FAA-approved (i.e. field approval) or installation must be completed via Garmin GPS/WAAS antenna AML STC SA02018SE-D. Before starting any modifications for the GTN STC, ensure that the GPS/WAAS antenna(s) can be installed on the aircraft via one of these methods.

Table 1-10. GPS/WAAS Antennas

Model, Description	Connector Type	Manufacturer	Part Number	Garmin Order Number
GA 35, GPS/WAAS [1]	TNC	Garmin	013-00235-( )	013-00235-( )
GA 36, GPS/WAAS	TNC	Garmin	013-00244-( )	013-00244-( )
GA 37, GPS/WAAS/XM	TNC	Garmin	013-00245-( )	013-00245-( )
A33W, WAAS Antenna [5]	TNC	Garmin [3]	013-00261-( )	013-00261-( )
GPS/VHF Antenna	TNC/BNC [2]	Comant [3]	CI-2580-200	N/A
GPS/VHF Antenna	TNC/BNC [2]	Comant [3]	CI-2728-200	N/A
GPS/XM/VHF Antenna	TNC/BNC [2]	Comant [3]	CI-2580-410	N/A
GPS/XM/VHF Antenna	TNC/TNC/BNC [4]	Comant [3]	CI-2728-410	N/A
GPS Antenna	TNC	Comant [3]	CI-428-200	N/A
GPS/XM Antenna	TNC/TNC	Comant [3]	CI-428-410	N/A

[1] Same mounting hole pattern as GA 56, but GA 35 antenna has a physically larger footprint.
[2] The GPS/WAAS connector is a TNC type. The VHF connector is a BNC type.
[3] Installation of this antenna is not covered by the GA antenna STC SA02018SE-D
[4] The GPS/WAAS connector is a TNC type. The XM connector is a TNC type. The VHF connector is a BNC type.
[5] Same mounting hole pattern as A33.
[6]

1.8 GTN Databases

The GTN utilizes various databases. With the exception of the Navigation, Basemap, SafeTaxi, and Obstacle databases which reside internal to the GTN, all databases are stored in a single SD memory card that is inserted into the vertical slot on the left side of the GTN. The following describes each database and how the databases are updated. See Table 1-11 for a summary of the database location and update rate.

The GTN Database card, Garmin Part Number 010-00900-00, includes the following databases: Basemap, Obstacle, SafeTaxi, and Navigation.

CAUTION

The databases on the Supplemental Data Card are locked to specific GTN installations. The first time the Supplemental Data Card is inserted into a GTN, it associates exclusively with that particular GTN and will not work in other installations.

Table 1-11. GTN Database Summary

Database	Update Rate	Stored Location
Terrain Database	Periodic (When available)	SD Card
FliteCharts Database	28 Days	SD Card
ChartView Database	14 Days	SD Card
Obstacle Database	56 Days	Internal
SafeTaxi Database	56 Days	Internal
Basemap Database	Periodic (When available)	Internal
Navigation Database	28 Days	Internal

1.8.1 Basemap Database

The basemap provides ground-based references such as major roads and bodies of water. The database is stored in the GTN internal memory. The basemap does not have a scheduled update cycle and as such does not have an expiration date. The basemap database is updated infrequently. Should this database need to be updated in the future, Garmin will provide details on how to load the updated data into the GTN.

1.8.2 Navigation Database

The Jeppesen navigation database provides the GTN with the required information for displaying flight plan information.

The GTN utilizes a database stored on an SD memory data card for easy updating and replacement. The navigation database may be updated by inserting an updated navigation database update card into the vertical SD card slot on the left side of the GTN. The actual database is downloaded into the unit, so the card can be removed after the update. Each card will only update one system. Alternately, the navigation database may be updated by copying the database to the Garmin-supplied Supplemental Data card. It will be downloaded into the GTN on first use, and the file can be left on the Supplemental Data card until the next update cycle.

The navigation database on the GTN database card is generated from current Jeppesen Sanderson data and converted to a format that is used by the GTN. The data conversion process is performed using software that is developed and maintained under Garmin configuration management according to RTCA/DO-200A, Level 1, 2, Standards for Processing Aeronautical Data. GTN users update their database card by purchasing database subscription updates from Garmin. The database card is programmed using an SD card reader. Contact Garmin at 866-739-5687, www.fly.garmin.com, or www.jeppdirect.com/Garmin for more information and instructions.

1.8.3 FliteCharts® Database (GTN 7XX Only)

FliteCharts resemble the paper version of AeroNav Services (formerly named National Aeronautical Charting Office) terminal procedures charts. The charts are displayed with high-resolution and in color for applicable charts. FliteCharts database subscription is available from Garmin. The FliteCharts database is stored on the GTN SD card. When viewing these charts on the GTN, the aircraft position is not depicted on the chart. The FliteCharts database is updated by removing the database card from the GTN, updating the database on the card and reinserting the card. Each card can only be used with one system. GTN users update their database card by purchasing database subscription updates from Garmin. The database card is programmed using an SD card reader. Contact Garmin at 866-739-5687 or www.fly.garmin.com for more information and instructions.

1.8.4 ChartView™ Database (GTN 7XX Only)

ChartView resembles the paper version of Jeppesen terminal procedures charts. The charts are displayed in full color with high-resolution. The GTN depiction shows the aircraft position on the moving map in the plan view of approach charts and on airport diagrams. The ChartView database is stored on the SD memory card that remains in the GTN for normal operation. The ChartView database is updated by removing the database card from the GTN, updating the database on the card and reinserting the card. Each card can only be used with one system. GTN users update their ChartView data by purchasing database subscription updates from Jeppesen Sanderson. The database card is programmed using an SD card reader and Jeppesen-provided software. Contact Jeppesen at 800-621-5377 or www.jeppesen.com for more information and instructions.

ChartView is an optional feature that must be activated for use. Instructions for activating the ChartView function are found in Section 5.5.2.2.

1.8.5 SafeTaxi® Database

SafeTaxi diagrams provide detailed taxiway, runway, and ramp information at more than 900 airports in the United States. The data conversion process is performed using software that is developed and maintained under Garmin configuration management according to RTCA/DO-200A, Level 2, Standards for Processing Aeronautical Data.

The SafeTaxi database is stored internally in the GTN for normal operation. The SafeTaxi database is updated by removing the database card from the GTN, updating the database on the card and reinserting the card. Each card can only be used with one system. GTN users update their database card by purchasing database subscription updates from Garmin. The database card is programmed using an SD card reader. Contact Garmin at 866-739-5687 or www.fly.garmin.com for more information and instructions.

1.8.6 Terrain Database

The Terrain database is used to provide basic terrain awareness functionality. The terrain database is stored on the GTN SD card. The terrain database is also used to provide TAWS alerts to the pilot (with TAWS software only). The data conversion process is performed using software that is developed and maintained under Garmin configuration management according to RTCA/DO-200A, Level 2, Standards for Processing Aeronautical Data.

The terrain database is available from Garmin for updating as needed. The terrain database is updated by removing the database card from the GTN, updating the database on the card and reinserting the card in the vertical card slot on the left side of the GTN. The terrain database can be downloaded via the internet and the card can be programmed using an SD card reader. Contact Garmin at 866-739-5687 or www.fly.garmin.com for more information or instructions.

1.8.7 Obstacle Database

The obstacle database provides identification of known obstacles greater than 200 feet AGL. This database is also used with Terrain awareness and TAWS functionality. The data conversion process is performed using software that is developed and maintained under Garmin configuration management according to RTCA/DO-200A, Level 2, Standards for Processing Aeronautical Data.

The obstacle database is stored internal to the GTN. The Obstacle database is updated by removing the database card from the GTN, updating the database on the card and reinserting the card. The Obstacle database can be downloaded via the internet and the card programmed using an SD card reader. Contact Garmin at 866-739-5687 or fly.garmin.com for more information or instructions.

1.9 Fault Detection and Exclusion (FDE)

The GTN, when installed as defined in this manual, complies with the requirements for GPS primary means of navigation in oceanic and remote airspace when used in conjunction with the provided FDE prediction program.

The GTN includes internal Fault Detection and Exclusion (FDE) software which is active for all flight phases including oceanic and remote operations, en route and terminal, and precision and non-precision approaches. FDE does not require any pilot interaction. The FDE consists of two parts:

- The fault detection function detects a satellite failure that can affect navigation; and
- The exclusion function is the capability to exclude one or more failed satellites and prevent them from affecting navigation.

The FDE Prediction program is used to predict FDE availability. This program must be used prior to all oceanic or remote area flights for all operators using the GTN as a primary means of navigation under FAR parts 91, 121, 125, and 135. The FDE program is part of the GTN trainer, available for download from the GTN product information page of Garmin's website, www.garmin.com.

1.10 STC Permission

Consistent with Order 8110.4B and AC 21-40, a permission letter to use this STC data is available for download from the Dealer Resource Center on Garmin's website.

2 INSTALLATION OVERVIEW

2.1 Introduction

This chapter is an overview of the steps required for the installation of the GTN 6XX and 7XX navigators.

2.2 Available Equipment

The GTN and GMA 35 are available under the part numbers listed in Table 2-1. The GPS/WAAS antennas are available under the part numbers listed in Table 1-10.

Table 2-1. GTN 6XX/7XX Unit Part Numbers

Model	Unit P/N	Catalog P/N	Voltage (VDC)
GTN 625	011-02254-00	010-00811-00	11-33
GTN 635	011-02255-00	010-00812-00	
GTN 650	011-02256-00	010-00813-00	
	011-02256-50 [1]	010-00889-00 [1]	
GTN 725	011-02281-00	010-00819-00	
GTN 750	011-02282-00	010-00820-00	
	011-02282-50 [1]	010-00890-00 [1]	

[1] Indicates gray bezel part number.

Table 2-2. GTN Options Available

Item	Part Number
GTN 6XX/7XX 16 Watt COM Enablement Card [1] [2]	010-00878-04
GTN 7XX ChartView Enablement Card [1]	010-00878-40
GTN 6XX/7XX Internal TAWS-B Enablement Card [1]	010-00878-01
GTN 7XX Digital Radar Enablement Card [1]	010-00878-42
GTN 7XX Radar AGCS Enablement Card [1]	010-00878-44
GTN 7XX Radar Turbulence Detection [1]	010-00878-45

[1] An SD enablement card is required to enable the indicated feature. Each enablement card can only be used one time, and once used, the card will only work with that particular installation.

[2] The 16 Watt COM Enablement Card is allowed only for 28 VDC aircraft only.

Table 2-3. Optional GMA 35 Unit Part Numbers

Model	Unit P/N	Catalog P/N	Voltage (VDC)
GMA 35	011-02299-00	010-00831-00	11-33

2.3 Installation Materials

2.3.1 Accessories Available from Garmin

Table 2-4 through Table 2-11 list the items provided in the GTN and GMA 35 installation kits.

Table 2-4. GTN Installation Kit P/N 010-00811-50 Accessories

Used With	Item	Part Number
GTN 625 (Black)	Connector Kit, GTN 625	011-02325-00
	Database Card, GTN 6XX/7XX	010-00900-00
	SMP, Mounting Rack, GTN 6XX	115-01293-00
	Backplate Sub-Assembly, GTN 625	011-02245-00
	Configuration Module Kit	011-00979-03
	Product Info Kit, GTN 6XX	K00-00487-00
	Cleaning Kit, GTN 6XX/7XX	010-11527-00

Table 2-5. GTN Installation Kit P/N 010-00812-50 Accessories

Used With	Item	Part Number
GTN 635 (Black)	Connector Kit, GTN 635	011-02325-01
	Database Card, GTN 6XX/7XX	010-00900-00
	SMP, Mounting Rack, GTN 6XX	115-01293-00
	Backplate Sub-Assembly, GTN 635	011-02245-01
	Configuration Module Kit	011-00979-03
	Product Info Kit, GTN 6XX	K00-00487-00
	Cleaning Kit, GTN 6XX/7XX	010-11527-00

Table 2-6. GTN Installation Kit P/N 010-00813-50 Accessories

Used With	Item	Part Number
GTN 650 (Black)	Connector Kit, GTN 650	011-02325-02
	Database Card, GTN 6XX/7XX	010-00900-00
	SMP, Mounting Rack, GTN 6XX	115-01293-00
	Backplate Sub-Assembly, GTN 650	011-02245-02
	Configuration Module Kit	011-00979-03
	Product Info Kit, GTN 6XX	K00-00487-00
	Cleaning Kit, GTN 6XX/7XX	010-11527-00

Table 2-7. GTN Installation Kit P/N 010-00819-50 Accessories

Used With	Item	Part Number
GTN 725 (Black)	Connector Kit, GTN 725	011-02326-00
	Database Card, GTN 6XX/7XX	010-00900-00
	SMP, Mounting Rack, GTN 7XX	115-01294-00
	Backplate Sub-Assembly, GTN 725	011-02246-00
	Configuration Module Kit	011-00979-03
	Product Info Kit, GTN 7XX	K00-00488-00
	Cleaning Kit, GTN 6XX/7XX	010-11527-00

Table 2-8. GTN Installation Kit P/N 010-00820-50 Accessories

Used With	Item	Part Number
GTN 750 (Black)	Connector Kit, GTN 750	011-02326-02
	Database Card, GTN 6XX/7XX	010-00900-00
	SMP, Mounting Rack, GTN 7XX	115-01294-00
	Backplate Sub-Assembly, GTN 750	011-02246-02
	Configuration Module Kit	011-00979-03
	Product Info Kit, GTN 7XX	K00-00488-00
	Cleaning Kit, GTN 6XX/7XX	010-11527-00

Table 2-9. GTN Installation Kit P/N 010-00889-50 Accessories

Used With	Item	Part Number
GTN 650 (Gray)	Connector Kit, GTN 650	011-02325-02
	Database Card, GTN 6XX/7XX	010-00900-00
	SMP, Mounting Rack, GTN 6XX	115-01293-00
	Backplate Sub-Assembly, GTN 650	011-02245-02
	Configuration Module Kit	011-00979-03
	Product Info Kit, GTN 6XX	K00-00487-00
	Cleaning Kit, GTN 6XX/7XX	010-11527-00

Table 2-10. GTN Installation Kit P/N 010-00890-50 Accessories

Used With	Item	Part Number
GTN 750 (Gray)	Connector Kit, GTN 750	011-02326-02
	Database Card, GTN 6XX/7XX	010-00900-00
	SMP, Mounting Rack, GTN 7XX	115-01294-00
	Backplate Sub-Assembly, GTN 750	011-02246-02
	Configuration Module Kit	011-00979-03
	Product Info Kit, GTN 7XX	K00-00488-00
	Cleaning Kit, GTN 6XX/7XX	010-11527-00

Table 2-11. Optional GMA 35 Installation Kit P/N 010-00831-01 Accessories

Used With	Item	Part Number
GMA 35	Backplate Assembly, GMA 35	011-02300-00
	Connector Kit, GMA 35	011-02302-00
	Install Rack, SMP	011-02645-00

Table 2-12. Replacement Fan Part Numbers

Used With	Item	Part Number
GTN 625 GTN 635 GTN 650 GTN 725 GTN 750	Fan, w/ connector	371-00014-01
	Fan mounting screws, qty 4	211-60234-23

2.3.2 Materials Required but not Supplied

2.3.2.1 Accessories Required but not Supplied

The following installation accessories are required for the installation but not supplied by Garmin.

Table 2-13. Accessories Required but Not Supplied

Item	Requirements
COM Antenna (GTN 635/650/750 only)	Shall meet TSO-C37( ) and C38( ) or TSO-C169( ). 50 Ω, vertically polarized with coaxial cable
NAV Antenna (GTN 650/750 only)	Shall meet TSO-C40( ) and C36( ). 50 Ω, horizontally polarized with coaxial cable. Note that if the NAV antenna is a combined VOR/LOC/GS antenna, it must meet TSO-C40( ), C36( ), and C34( ).
Glideslope Antenna (GTN 650/750 only)	Shall meet TSO-C34( ). 50 Ω, horizontally polarized with coaxial cable or low-loss splitter used with the VOR/LOC antenna.
Headphones	500Ω nominal impedance
Microphone	Low impedance, carbon or dynamic, with transistorized pre-amp

2.3.2.2 Materials Required but Not Supplied for GTN Installations

The GTN unit and GMA 35 are intended for use with standard aviation accessories. The following items are required for installation, but not supplied:

- Wire (MIL-W-22759/16 or equivalent) – If MIL-W-22759/18 wire is utilized because the smaller insulation diameter works better with the high density contacts used in the GTN system, care must be taken to adequately support and protect the wiring due to its thinner insulation.
- Shielded Wire (MIL-C-27500 cable utilizing M22759/18 wire (TG) or ETFE jacket (14), or equivalent)
- Aircraft Grade Category 5 Ethernet Cable (required only for installations utilizing HSDB interfaces such as a second GTN, a GDL 69/69A or the GTS 8XX). See interconnect diagrams in Appendix E and Appendix F for Ethernet cable part number.
- Mounting Hardware for GTN (8 minimum – NASM24693 Screw, Machine, Flat Countersunk Head 100°, Cross Recessed with .1380-32 UNC-2A Thread, Corrosion Resistant Steel (alternates include MS24693 or AN507) and NASM21042 Nut, Self-Locking, Reduced Height with .1380-32 UNJC-3B Thread (alternates include MS21042 and Monadnack Clip Nut 6-32))
- Push/pull manually resettable circuit breakers (see drawings in Appendix E for circuit breaker ratings)
- Tie Wraps or Lacing Cord
- Ring Terminals (for grounding and circuit breaker connections)
- Coaxial Cable (RG-400, RG-142B or equivalent – Refer to Section 2.4.11.2 for additional information)
- Shield Terminators (See Figure 3-2)
- Silicon Fusion Tape, Garmin P/N 249-00114-00

2.3.2.3 Materials Required but Not Supplied for Optional GMA 35 Installations

- Mounting Screws for the GMA 35 (6 minimum – MS24693 Screw, Machine, Flat Countersunk Head 100°, Cross Recessed with .1380-32 UNC-2A Thread, corrosion resistant steel)
- Marker Beacon Antenna approved to TSO-C35( )
- Stereo headphone jacks (up to 6), microphone jacks (up to 6), 3.5mm stereo jacks (up to 2), and insulating washers for all.

2.3.2.4 Materials Required for Lightning Protection (Nonmetallic Aircraft Only)

If additional lightning protection is required for a particular aircraft, the following items may also be required for the installation. Refer to Appendix G for detailed information regarding which parts are required for a particular aircraft model.

Applicable to certain nonmetallic aircraft (Except VFR only aircraft). Refer to Appendix G.

- Transient Voltage Suppressor 30KPA48A
  OR
  Transient Voltage Suppressor 15KPA48A
  Referred to as TVS1 in the interconnect drawings in Appendix E
- Fuse, 3AG Fast-Acting, 4A Littelfuse P/N 0312-004
  Referred to as F1 in Figure E-4
- Fuse Holder, Inline, Cooper Bussmann P/N HFB
  Referred to as F1 in Figure E-4
- Four same P/N TVSs (identified as TVS1 above) are combined in accordance with Section 3.6.5.1.1 to make an assembly referred to TVS2 in Appendix E.
- Connector, 4-Pin Plug (socket housing) and Cap (pin housing), Tyco Electronics P/Ns 1-480424-0 and 1-480426-0 respectively
  Referred to as 4 Pin Connector in Section 3.6.5.1.1 and Appendix E.
  Sockets, Qty. 4, Tyco Electronics P/N 60617-1 or 60619-1 *(Section 3.6.5.1.1)*
- Pins, Qty. 4, Tyco Electronics, P/N 60618-1 or 60620-1 *(Section 3.6.5.1.1)*
- Tinned Copper Braid, 1/4” nominal flat width, 32 Amp current carrying capacity. Aircraft Spruce P/N 863. (For GPS/WAAS antenna cable overbraid)
- Electrical Tie-Down connector, MS3367-1-X *(Section 3.3.1.1)*
- Aluminum foil tape, 3M P/N 438 *(Section 2.4.4.4)*

2.3.2.5 Materials Required for Instrument Panel Bonding

If the instrument panel is electrically isolated from the aircraft structure, additional bonding may also be required for the installation. Refer to Section 3.6.8 for the installation procedure of the instrument panel bonding strap. The following items are required but not supplied:

- Tinned copper flat braid, 3/4”, QQB575F36T0781 (recommended)
  OR Tinned copper tubular braid, 7/16”, QQB575R30T0437
- Terminal lug, 5/16-inch, uninsulated, MS20659-131
- Bolt, AN5-XA
- Locking nut, 5/16-inch
- Washer, NASM970-516 (AN970-516)

2.3.2.6 Manufacturer Information

NOTE

Manufacturer information is provided for convenience only. It was current at the time of initial publication and may change at any time.

Aluminum Foil Tape:

3M
3M Corporate Headquarter
3M Center
St. Paul, MN 55144-1000
Phone: 1-888-364-3577
www.3m.com

Fuse:

Littelfuse World Headquarters
8755 West Higgins Road Suite 500
Chicago, IL 60631 USA
Phone: (773) 628-1000
Fax: (847) 391.0894
www.littelfuse.com

Tinned Copper Braid:

Alpha Wire Company
711 Lidgerwood Avenue
Elizabeth, NJ 07207-0711
Phone: 1-800-522-5742
Fax: (908) 925-6923
www.alphawire.com

OR

Daburn Electronics & Cable
44 Richboynton Road
Dover, NJ 07801
Phone: (973) 328-3200
Fax: (973) 328-3130
www.daburn.com

4-Pin Connector & Contacts:

Tyco Electronics Corporation
1050 Westlakes Drive
Berwyn, PA 19312
Phone: (610) 893-9800
www.tycoelectronics.com

Fuse holder:

COOPER Bussmann
114 Old State Road
Ellisville, MO 63021-5942
Phone: 636-527-1270
Fax: 636-527-1607
www.cooperbussmann.com

Resistor:

Vishay Americas (Vishay Dale)
One Greenwich Place
Shelton, CT 06484
Phone: (402) 563-6866
Fax: (402) 563-6296
www.vishay.com

TVS:

Microsemi Commercial Business Unit
Macau
Phone: (853) 787991
Fax: (858) 787995
www.microsemi.com

OR

Littelfuse World Headquarters
8755 West Higgins Road Suite 500
Chicago, IL 60631 USA
Phone: (773) 628-1000
Fax: (847) 391.0894
www.littelfuse.com

2.3.2.7 Materials Required for Some GTN 650/750 NAV Antenna Installations

Some aircraft may require the use of a splitter or diplexer for connection of the VOR/LOC and G/S antennas, or combination VOR/LOC/GS antennas. Refer to Figure E-18 to determine if a splitter or diplexer is required for the installation.

- Garmin Part Number 013-00112-00 (Mini-Circuits ZFSC-2-1B+BNC.)
- Comant Diplexer VOR/GS, Model CI-507.

2.3.3 GTN Software Loader Card

A GTN Software Loader card may be created using a GTN Downloadable Software SD Card P/N 010-01000-00 in conjunction with a GTN software application downloaded from the Dealer Resource Center on Garmin's website. As an alternative, a pre-programmed software loader card may be purchased from Garmin. Refer to the Equipment List (005-00533-C1) for the correct part number of the pre-programmed GTN Software Loader Card.

NOTE

The downloadable application to create the GTN Software Loader Card only runs on Windows PCs (Windows 2000, XP, Vista, and Windows 7 are supported). There is no Mac support at this time.

NOTE

An SD card reader is needed to create the GTN Software Loader Card using the application that is downloaded from Garmin. The approved readers are SanDisk SDDR-99 and SDDR-93, although other SD card readers will work.

Create a GTN Software Loader Card as follows:

1. Go to the Dealer Resource Center on Garmin's website.
2. Download the GTN Software Loader Image. Refer to the Equipment List (P/N 005-00533-C1) for the correct Software Loader Image part number.
3. Ensure that you have an SD card reader connected to the PC. Insert the GTN Downloadable Software SD Card P/N 010-01000-00 into the card reader.
4. Run the executable file. The window shown in Figure 2-1 will appear.

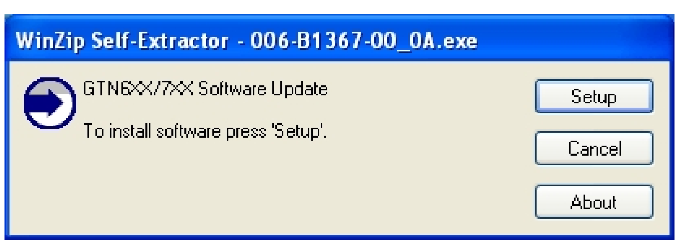


Figure 2-1. GTN Software Updater Installation

5. Click Setup. The window shown in Figure 2-2 will appear to guide you through the software loader card creation process.

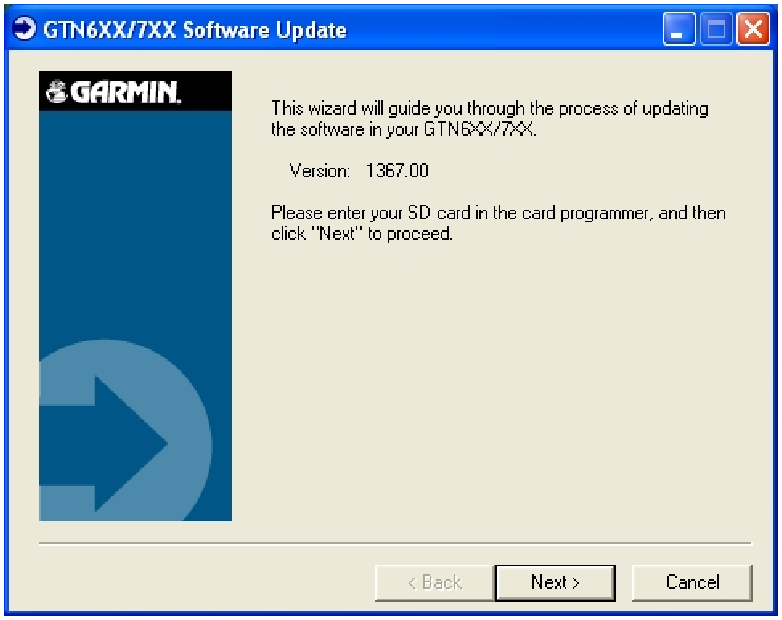


Figure 2-2. System and Software Version

6. Click **Next** to get to the window shown in Figure 2-3.

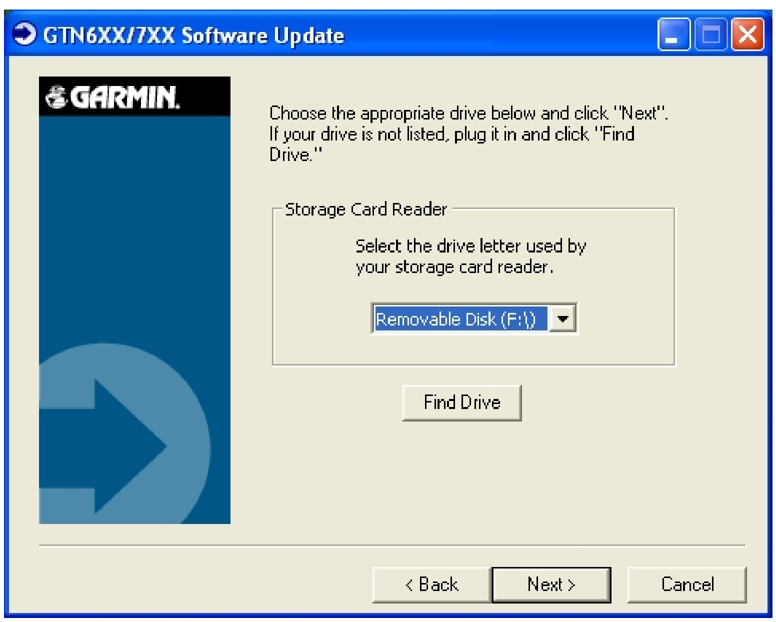


Figure 2-3. GTN Software Loader Card Formatting

CAUTION

In order to create a GTN Software Loader Card, the drive that you select will be completely erased.

7. Ensure that the correct drive is selected. Click **Next** to create the card. Click Next to acknowledge any warnings that appear. The progress window shown in Figure 2-4 will appear when the card is being created.

Figure 2-4. Update Progress Window

8. After the card has been created, the window shown in Figure 2-5 will appear. Click **Finish** to complete the update process.

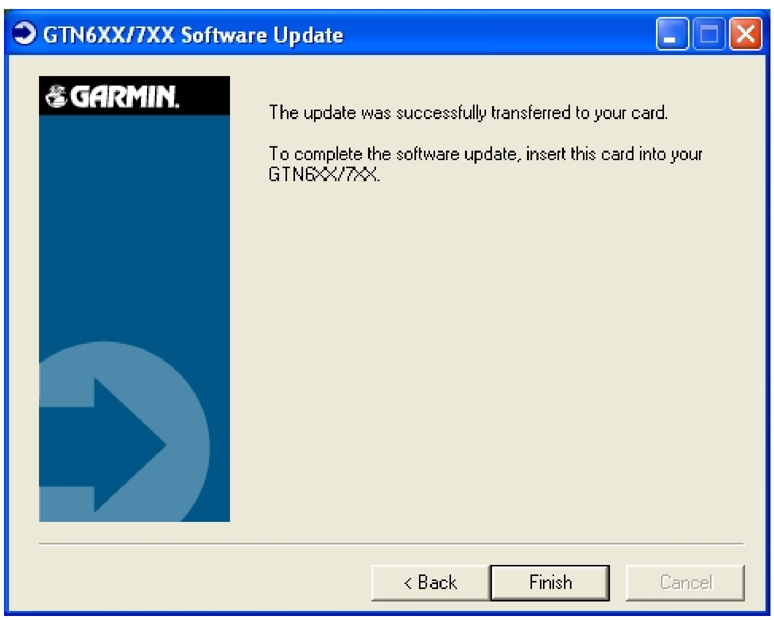


Figure 2-5. Update Completion

9. Eject the card from the card reader (or stop the card reader in Windows). The GTN Software Loader Card is now ready to use.

2.3.4 Special Tools Required

Some of the connectors use crimp contacts. The table below identifies crimp tools required to ensure consistent, reliable crimp contact connections for the rear D-sub connectors.

A milliohm meter with an accuracy of ± 0.1 mΩ (or better) is required to measure the electrical bonding between the GTN and GMA 35 system components and aircraft ground.

Table 2-14. Recommended Crimp Tools

Manufacturer	Hand Crimping Tool	Standard Density 20-24 AWG (Power/Ground)		High Density 22-28 AWG (P1001-P1005)	
		Positioner	Insertion/ Extraction Tool	Positioner	Insertion/ Extraction Tool
Military Specification P/N	M22520/2-01	M22520/2-08	M81969/14-02 M81969/1-02	M22520/2-09	M81969/14-01 M81969/1-04
Positronic	9507	9502-5	M81969/1-02	9502-3	M81969/1-04
ITT Cannon	995-0001-584	995-0001-604	980-2000-426	995-0001-739	N/A
AMP	601966-1	601966-5	91067-2	601966-6	91067-1
Daniels	AFM8	K13-1	M81969/1-02	K42	M81969/1-04
Astro	615717	615724	M81969/1-02	615725	M81969/1-04

2.4 Installation Considerations

2.4.1 Minimum System Configuration

The following section describes the minimum configuration required for IFR and VFR installations of the GTN.

2.4.1.1 VFR GPS Installation

The minimum GTN unit installation requires the following items for a VFR Installation:

- GTN 6XX/7XX unit (installed in the aircraft manufacturer approved location for 6.25 inch wide avionics equipment).
- GPS/WAAS antenna required for GPS navigation functions.
- An external CDI and proper source selection annunciation are required for installations using the VOR navigation and glideslope information. If the GTN does not meet the field-of-view requirements outlined in Section 2.4.10.1.1, then remote source selection annunciators must be installed. The GTN provides these annunciations if mounted within the required field of view.
- A NAV antenna is required for VHF NAV functions. (GTN 650/750 only).
- A COM antenna is required for COM functions. (GTN 635/650/750 only).

VFR installations must be placarded “GPS LIMITED TO VFR USE ONLY” in clear view of the pilot. The placard must be located immediately adjacent to the GTN. See Section 2.4.6 for additional placard requirements. VFR GPS installations should use the VFR GPS Limited Airplane Flight Manual Supplement for Garmin GTN 6XX/7XX GPS/SBAS Navigation System (P/N 190-01007-A5).

2.4.1.2 IFR Installation of a GTN 625/635/725

For an IFR installation of a GTN 625, GTN 635, or GTN 725, the criteria in Section 2.4.1.1 must be met in addition to the following:

- If the GTN is installed for GPS primary navigation, then the GTN must be interfaced to a navigation indicator installed in the pilot’s primary field-of-view (or in the aircraft manufacturer approved mounting location). The indicator must have a vertical deviation indicator (GS) in order to perform approaches with vertical guidance. EFIS, EHSI, and NAV Indicators approved by this STC are listed in Appendix C.
- A second GPS navigator (Garmin or non-Garmin) is required if the aircraft requires GPS coaxial cable overbraid (reference Appendix G).
- Either a second GPS navigator (Garmin or non-Garmin) or a separate VHF navigation radio (Garmin or non-Garmin) must be installed. See the following section if installing a GTN 650 or GTN 750.

For installations meeting these requirements, use the Airplane Flight Manual Supplement for Garmin GTN 6XX/7XX GPS/SBAS Navigation System (P/N 190-01007-A2).

2.4.1.3 IFR Installation of a GTN 650/750

For an IFR installation of a GTN 650 or GTN 750, the criteria in Section 2.4.1.1 must be met in addition to the following:

- If the GTN is installed for GPS primary navigation, then the GTN must be interfaced to a navigation indicator installed in the pilot's primary field-of-view (or in the aircraft manufacturer approved mounting location). The indicator must have a vertical deviation indicator (GS) in order to perform approaches with vertical guidance. EFIS, EHSI, and NAV Indicators approved by this STC are listed in Appendix C.
- If the GTN does not meet the field-of-view requirements outlined in Section 2.4.10, then remote source selection annunciators must be installed. The GTN provides these annunciations if mounted within the required field of view.
- A second GPS navigator (Garmin or non-Garmin) is required if the aircraft requires GPS coaxial cable overbraid (reference Appendix G).
- Either a second GPS navigator (Garmin or non-Garmin) or a separate VHF navigation radio (Garmin or non-Garmin) is required in the following installations:
    - Aircraft with a maximum certified gross takeoff weight of greater than 6000 pounds.
    - Aircraft that are turbine-powered.
    - Multi-engine aircraft.
    - Installations in which a CDI is connected to connector P1004 pin 29 (Reference Figure E-9, Figure E-10, and Figure E-11), and there is no other way of displaying VHF navigation deviation information from the GTN 650/750. This is not required for installations which have a CDI or HSI connected to the Main connector P1001, which can be switched to output either GPS or VHF navigation information.

For installations meeting these requirements, use the Airplane Flight Manual Supplement for Garmin GTN 6XX/7XX GPS/SBAS Navigation System (P/N 190-01007-A2).

2.4.2 GTN External Sensors and Devices

When the GTN is interfaced to external sensors, these sensors must be installed in accordance with the sensor manufacturer's data. See Appendix C for a list of sensors approved to interface with the GTN. This manual does not provide data for the installation mounting or approval of any external sensors or devices.

The GTN can accept data from multiple sources. If multiple sources are used, the GTN will accept data as described below. The input priority of each external data source cannot be configured. If available, ensure that the higher priority sources are connected to the GTN.

2.4.2.1 Multiple Uncorrected Pressure Altitude Sources

The GTN unit can accept uncorrected pressure altitude from multiple ARINC 429 and RS-232 sources.

If multiple sources of altitude data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. The priorities of the altitude sources are as follows from highest to lowest:

1. ARINC 429 label 203 from Airdata
2. ARINC 429 label 203 from Airdata/AHRS
3. ARINC 429 label 203 from GDU Format 1, 2, 3, or 4
4. ARINC 429 label 203 from EFIS Format 2
5. ARINC 429 label 203 from Data Concentrator
6. ARINC 429 label 203 Traffic Format 1, 2, 3, 4, 5, or 6
7. RS-232 FADC Format 1 or Airdata Format 1
8. RS-232 Altitude Format 1 or 3

NOTE

Only certain altitude sources are acceptable for providing altitude to the GDL 88. Refer to Section 2.4.3 for more information.

2.4.2.2 Multiple Baro-Corrected Altitude Sources

NOTE

Barometric altitude is not required by the GTN unit to meet the requirements of TSO-C146c; however, to take full advantage of the GTN unit capabilities, an optional barometric altitude source is recommended for automatic sequencing of altitude leg types. If no barometric altitude data is provided to the GTN unit, altitude leg types must be manually sequenced.

The GTN unit can accept baro-corrected altitude from multiple ARINC 429 and RS-232 sources.

If multiple sources of baro-corrected altitude data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. The priorities of the baro-corrected altitude sources are as follows from highest to lowest:

1. ARINC 429 label 204 from Airdata
2. ARINC 429 label 204 from GDU Format 1
3. ARINC 429 label 204 from EFIS Format 1, 2, 3, or 4
4. ARINC 429 label 204 from Data Concentrator
5. RS-232 FADC Format 1 or Airdata Format 1

2.4.2.3 Multiple Heading Sources

NOTE

Heading is not required by the GTN; however, to take full advantage of the GTN unit capabilities, an optional heading source is recommended to allow the map to be oriented to heading up, to provide autopilot roll steering on ARINC 424 heading legs, to display TAS traffic and WX-500 Stormscope data on the moving map, and to calculate winds if airspeed is also available.

The GTN unit can accept heading data from multiple ARINC 429, RS-232, and Synchro sources. If multiple sources of heading data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. The priorities of the heading sources are as follows from highest to lowest:

1. ARINC 429 label 314 from EFIS Format 1 or Format 3
2. ARINC 429 label 320 from EFIS Format 1 or Format 3
3. ARINC 429 label 320 from EFIS Format 2
4. ARINC 429 label 320 from GDU Format 1
5. ARINC 429 label 314 from INS/IRU
6. ARINC 429 label 314 from Data Concentrator
7. ARINC 429 label 320 from INS/IRU
8. ARINC 429 label 320 from Airdata/AHRS
9. ARINC 429 label 320 from GAD Format 1
10. ARINC 429 label 320 from EFIS Format 4
11. ARINC 429 label 314 from GAD Format 1
12. XYZ Synchro
13. ARINC 429 label 320 from Data Concentrator
14. ARINC 429 label 320 from Traffic Format 1, 2, 3, 4, 5, or 6
15. RS-232 FADC Format 1 or Airdata Format 1
16. RS-232 bus from Lightning Detector 1

2.4.2.4 Multiple Indicated Airspeed Sources

The GTN unit can accept indicated airspeed data from multiple ARINC 429 and RS-232 sources. If multiple sources of indicated airspeed data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. The priorities of the indicated airspeed sources are as follows from highest to lowest:

1. ARINC 429 label 206 from GDU Format 1
2. ARINC 429 label 206 from Airdata/AHRS
3. ARINC 429 label 206 from Data Concentrator
4. RS-232 bus from FADC Format 1 or Airdata Format 1

2.4.2.5 Multiple True Airspeed Sources

NOTE

True Airspeed is not required for the GTN; however, the GTN uses true airspeed to calculate winds aloft if heading is also available.

The GTN unit can accept true airspeed data from multiple ARINC 429 and RS-232 sources. If multiple sources of true airspeed data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. The priorities of the true airspeed sources are as follows from highest to lowest:

1. ARINC 429 label 210 from Airdata
2. ARINC 429 label 210 from Airdata/AHRS
3. ARINC 429 label 210 from GDU Format 1
4. ARINC 429 label 210 from EFIS Format 2
5. ARINC 429 label 210 from GAD Format 1
6. ARINC 429 label 210 from Data Concentrator
7. RS-232 bus from FADC Format 1 or Airdata Format 1

2.4.2.6 Multiple VLOC Selected Course Sources

The GTN unit can accept VLOC Selected Course data from the sources list below. If multiple sources of VLOC Selected Course data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. The priorities of the VLOC selected course sources are as follows from highest to lowest:

1. ARINC 429 label 100 from EFIS Format 4
2. ARINC 429 label 110 from GAD Format 1
3. TO/FROM course from an Omni-Bearing Selector (OBS) control

2.4.2.7 Multiple GPS Selected Course Sources

The GTN unit can accept GPS selected course data from multiple ARINC 429 sources. If multiple sources of GPS selected course data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. The priorities of the GPS selected course sources are as follows from highest to lowest:

1. ARINC 429 label 100 from EFIS Format 1 or 3
2. ARINC 429 label 100 from GDU Format 1
3. ARINC 429 label 100 from EFIS Format 2
4. ARINC 429 label 100 from EFIS Format 4
5. ARINC 429 label 100 from GAD Format 1
6. ARINC 429 label 100 from Data Concentrator
7. TO/FROM course from an Omni-Bearing Selector (OBS) control

2.4.2.8 Multiple Total Air Temperature Sources

The GTN unit can accept total air temperature data from multiple ARINC 429 and RS-232 sources. If multiple sources of total air temperature data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. The priorities of the total air temperature sources are as follows from highest to lowest:

1. ARINC 429 label 211 from Airdata
2. ARINC 429 label 211 from GDU Format 1
3. ARINC 429 label 211 from EFIS Format 2
4. ARINC 429 label 211 from Data Concentrator
5. RS-232 bus from FADC Format 1 or Airdata Format 1

2.4.2.9 Multiple Static Air Temperature Sources

The GTN unit can accept static air temperature data from multiple ARINC 429 sources. If multiple sources of static air temperature data are supplied to the GTN, only valid data from the highest priority source is used. If the highest priority source becomes unavailable, data is taken from the next-highest priority source. The priorities of the static air temperature sources are as follows from highest to lowest:

1. ARINC 429 label 213 from Airdata
2. ARINC 429 label 213 from GDU Format 1
3. ARINC 429 label 213 from EFIS Format 2
4. ARINC 429 label 213 from Data Concentrator

2.4.3 GDL 88 Installation Considerations

When a GDL 88 is installed with a GTN, altitude data can be forwarded from sources connected to the GTN to the GDL 88. The GTN is also capable of forwarding Grey Code received from an altimeter connected to a GTX transponder. All of these sources must meet the minimum performance requirements of TSO-C10 or TSO-C106, or altitude digitizers/encoders must meet TSO-C88. (Reference AC 20-165, Section 3-4(a)(1) and (2)).

If a compatible TAS system and the GDL 88 are installed in an aircraft, the compatible TAS system should be directly connected to the GDL 88. The traffic data is then sent from the GDL 88 to the GTN over HSDB. Refer to Figure E-40 for more information on the connection.

For more information on configuration of the GDL 88 and systems connected to the GDL 88, refer to the GDL 88 Installation Manual, P/N 190-01122-00 and the GDL 88 Part 23 AML STC Installation Manual, P/N 190-01310-00.

2.4.4 Antenna Considerations

This section contains mounting location considerations for the antennas required for the GTN units. General installation guidance is provided to ensure the installed antennas meet the GTN requirements; however, the approval of antenna installations is beyond the scope of the GTN AML STC. For mounting the GPS/WAAS antennas, refer to Garmin Antenna STC SA02018SE-D. The installer may use other FAA approved data to gain a separate antenna installation approval from this STC.

Figure 2-6 shows the recommended placement of GPS/SBAS and COM antennas.

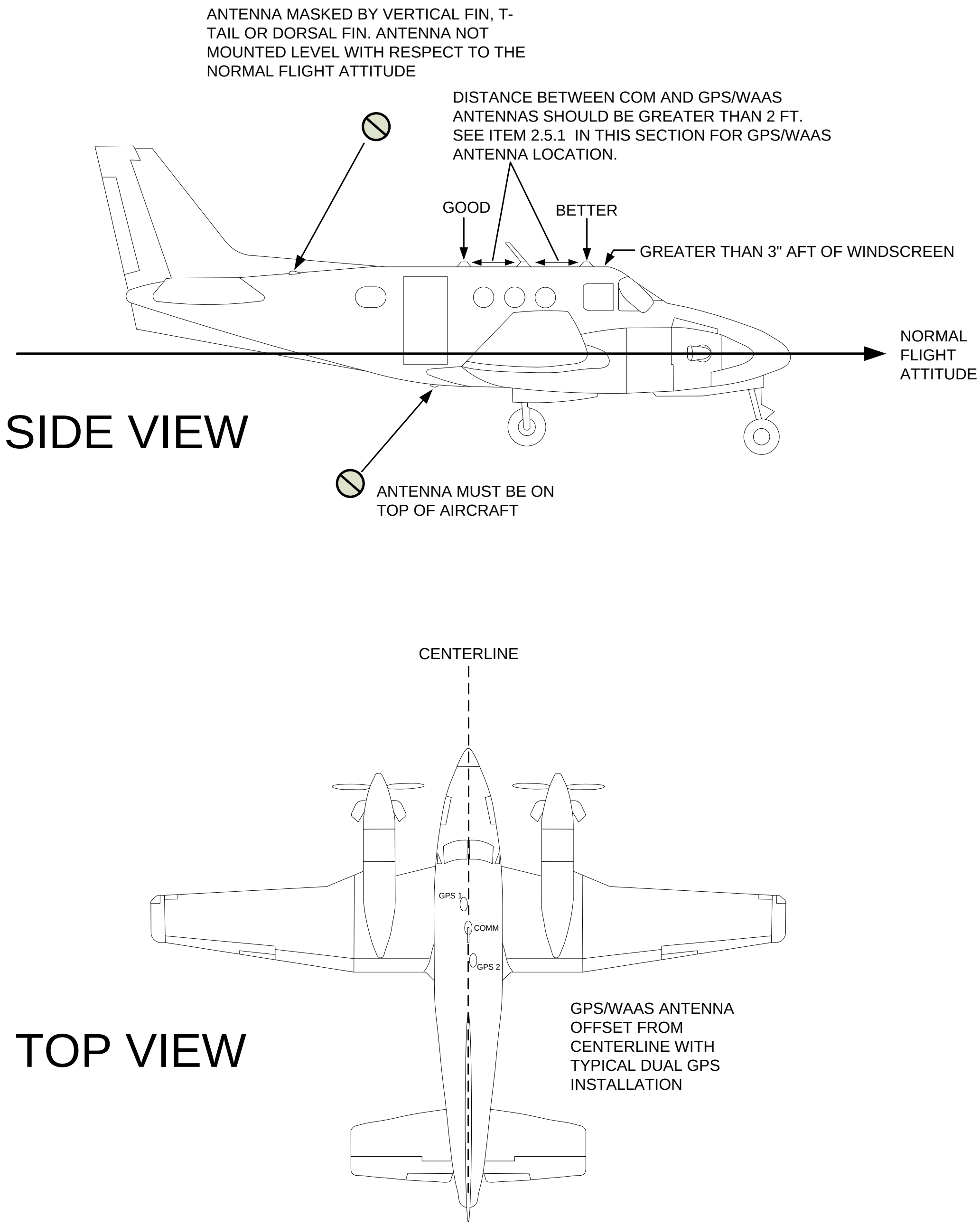


Figure 2-6. GPS/WAAS Antenna Mounting Considerations

2.4.4.1 GPS Antenna Location

The GPS antenna is a key element in the overall system performance and integrity for a GPS/SBAS system. The mounting location, geometry, and surroundings of the antenna can affect the system performance and/or availability. The following guidance provides information to aid the installer in ensuring that the most optimum location is selected for the installation of the GPS antenna. The installation guidelines presented here meet the intent of the latest revision of AC 20-138A Chapter 12, Section 12-1. The greater the variance from these guidelines, the greater the chance of decreased signal availability. Because meeting all of these installation guidelines may not be possible on all aircraft, these guidelines are listed in order of importance to achieve optimum performance. The sub-items of step 3 below are of equal importance and their significance may depend on the aircraft installation. The installer should use their best judgment to balance the installation guidelines.

Figure 2-6 shows the recommended placement of the GPS antenna.

1. Mount the antenna as close to level as possible with respect to the normal cruise flight attitude of the aircraft. If the normal flight attitude is not known, substitute with the waterline, which is typically referenced as level while performing a weight and balance check. A shim may be used to level the antenna.
2. The GPS antenna should be mounted in a location to minimize the effects of airframe shadowing during typical maneuvers. Typically mounting farther away from the tail section reduces signal blockage seen by the GPS antenna.
3. The GPS antenna should be mounted:
    a. no closer than two feet from any VHF COM antenna or any other antenna which may emit harmonic interference at the L1 frequency of 1575.42 MHz. An aircraft EMC check (see Section 5) can verify the degradation of GPS in the presence of interference signals. If an EMC check reveals unacceptable interference, either insert a GPS notch filter in line with the offending VHF COM or the (re-radiating) ELT transmitter, or select a different GPS Antenna location.

NOTE

When mounting a combination antenna, the recommended distance of two feet or more is not applicable to the distance between the antenna elements in a combination antenna (e.g. GPS and COM, GPS and SiriusXM) provided the combination antenna is TSO authorized and has been tested to meet Garmin's minimum performance standards.

    b. no closer than two feet from any antennas emitting more than 25 watts of power. An aircraft EMC check can verify the degradation of GPS in the presence of interference signals. If an EMC check reveals unacceptable interference, select a different GPS Antenna location.
    c. no closer than nine inches (center to center) from other antennas, including passive antennas such as another GPS Antenna or XM antenna. This will minimize the effects of shadowing at 5° elevation angles.
4. To maintain a constant gain pattern and limit degradation by the windscreen, avoid mounting the antenna closer than 3 inches from the windscreen.
5. For multiple GPS installations, the antennas should not be mounted in a straight line from the front to the rear of the fuselage (i.e. so that a single lightning strike does not damage all GPS systems). This is required in non-metallic aircraft, and recommended for all aircraft. Also varying the mounting location will help minimize any aircraft shading by the wings or tail section (in a particular azimuth, when one antenna is blocked the other antenna may have a clear view).

6. A 12-inch center-to-center spacing between GPS antennas is needed to achieve the best possible low-elevation antenna gain by minimizing pattern degradation due to shadowing and near-field interaction. When practical, 12-inch center-to-center spacing between GPS antennas must be used. If 12-inch spacing is not practical, the maximum center-to-center spacing possible must be used, but never less than 9-inch center-to-center spacing. Spacing less than 9 inches center-to-center results in unacceptable antenna pattern degradation.

2.4.4.2 COM Antenna Location

The GTN 635/650/750 COM antenna should be mounted well away from all projections that could interfere with RF communications, engines and propellers. The ground plane surface directly below the antenna should be a flat plane over as large an area as possible (18 inches square, minimum). The COM antenna must be grounded to the ground plane. The antenna should be mounted a minimum of six feet from other COM antennas for best performance, four feet from any ADF sense antennas, and two feet from the GTN unit and its GPS/WAAS antenna. The COM antenna should also be mounted as far apart as practical from the ELT antenna.

Some ELTs have exhibited re-radiation problems generating harmonics that may interfere with GPS signals. This can happen when the COM (GTN COM or any other COM) is transmitting on certain frequencies such as 121.15 or 121.175 MHz, which may cause the ELT output circuit to oscillate from the signal coming in on the ELT antenna coaxial. In addition, the COM antennas should be spaced for maximum isolation. A configuration of one topside antenna and one bottom side antenna is recommended.

2.4.4.3 NAV Antenna Location

The GTN 650/750 NAV antenna should be mounted well away from all projections, engines and propellers. It should have a clear line of sight if possible. The antenna must be mounted along the centerline of the aircraft, minimizing the lateral offset.

2.4.4.4 Ground Plane

Ensure that the GPS/NAV/COM antennas are electrically bonded to the aircraft. Follow the aircraft manufacturers' instructions for the NAV and COM antenna installations, or obtain other FAA approval.

The GPS/WAAS antenna requires a minimum ground plane radius of 7.5 inches around the perimeter of the antenna. Refer to Figure 2-7. For metal aircraft, the surrounding metal skin on which the antenna is mounted supplies the ground plane. For non-metal aircraft, the ground plane can be composed of heavy duty aluminum foil tape, such as 3M P/N 438 or other adhesive backed dead soft aluminum foil minimum 0.012 inches thick. It should be noted that if the antenna is struck by lightning, the foil by itself may not be sufficient to dissipate lightning currents. Additional protection may be needed depending on the construction of the structure to which the antenna is mounted.

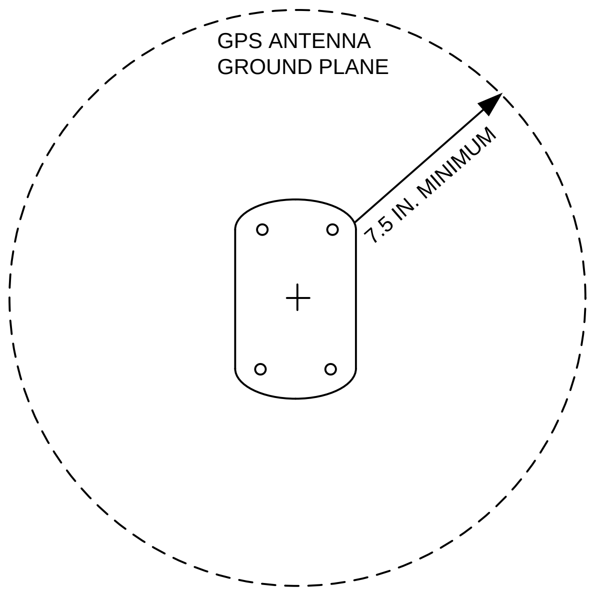


Figure 2-7. GPS/WAAS Antenna Minimum Ground Plane Radius

2.4.4.5 Interference of GPS

On some installations, VHF COM transceivers, Emergency Locator Transmitter (ELT) antennas, and Direction Finder (DF) receiver antennas can re-radiate harmonics that can potentially interfere with the GPS antenna. The GTN unit COM does not interfere with its own GPS section. However, placement of the GPS antenna relative to a COM transceiver and COM antenna (including the GTN 635/650/750 COM antenna), ELT antenna, and DF receiver antenna is important.

Use the following guidelines, in addition to others in this document, when locating the GTN unit and its antennas.

- GPS/WAAS antenna—Locate as far as possible from all COM antennas and all COM transceivers (including the GTN unit COM), ELT antennas, and DF receiver antennas. The GPS/WAAS antenna is less susceptible to harmonic interference if a 1.57542 GHz notch filter is installed on the COM transceiver antenna output.
- Locate the GTN unit as far as possible from all COM antennas.

If a COM antenna is found to be the problem, a 1.57542 GHz notch filter (Garmin P/N 330-00067-00) may be installed in the VHF COM coax, as close to the COM as possible. This filter is not required for the GTN 635/650/750 transmitter.

If a COM is found to be radiating, the following can be done:

1. Replace or clean VHF COM rack connector to ensure good coaxial ground.
2. Place a grounding brace between the GTN unit, VHF COM and ground.
3. Shield the VHF COM wiring harness.

2.4.4.6 COM and NAV Antenna Installation Considerations

Install the COM and NAV antennas according to the manufacturer's recommendations, and obtain FAA approval. (Other FAA approval for installation of the COM and NAV antennas are required, and is not a part of this STC.) Ensure that the COM and NAV antennas are electrically bonded to the aircraft. Avoid running other wires and coaxial cables near the NAV antenna cable. If there are two separate COM antennas, attempt to run the COM coaxial cables independently of each other and provide zonal separation as much as possible in the aircraft to avoid loss of both COMs in a single event.

2.4.4.6.1 NAV Antenna Cable Splitter/Diplexer Considerations

The GTN 650/750 includes one NAV antenna input. It is recommended that a single VOR/Localizer/Glideslope antenna be used for the installation. Some installations will require the use of a splitter or diplexer. Use Splitter, Garmin P/N 013-00112-00 or Comant Diplexer, P/N CI 507. Refer to Figure E-18 for splitter and diplexer installation wiring details. Install the splitter and diplexer in accordance with Section 3.3.3.

2.4.4.6.2 Marker Beacon Antenna Installation Considerations

Install the marker beacon antenna according to the manufacturer's recommendations. (Other FAA approval for installation of the marker beacon antenna is required, and is not a part of this STC.) The marker beacon antenna should be mounted on a flat surface on the underside of the aircraft body. Mount the marker beacon antenna so that there is a minimum of structure between it and the ground radio stations. Locate it as far as possible from transmitter antennas.

NOTE

Do not install the antenna inside the aircraft fuselage. Installing the antenna inside the aircraft fuselage limits the antenna reception, especially on metal aircraft and increases the antenna's susceptibility to RF radiation from components inside the aircraft.

2.4.5 Electrical Bonding

Electrical equipment chassis, shield/ground terminations, antennas, supporting brackets, and racks must be electrically bonded to the aircraft's main structure (metallic or tube/fabric aircraft) or instrument panel (composite aircraft). Refer to SAE ARP 1870 Section 5 when surface preparation is required to achieve electrical bond. The electrical bond must achieve direct current (DC) resistance less than or equal to:

- 2.5 milliohms to local structure in equipment mounting locations for metallic or tube and fabric aircraft.
- 5.0 milliohms to the instrument panel for composite aircraft.

For some aircraft the instrument panel is attached with vibration mounts. For these aircraft, it must be verified that the vibration-isolated instrument panel is grounded to the airframe metallic structure with a bonding jumper the same or equivalent to the specification below. If no such jumper is installed, a bonding strap meeting the following criteria must be installed to accomplish this:

- The cross sectional area of the strap must be greater than 0.016 square inches (approx 20800 circular mils). A 7/16 inch or wider tubular braid (QQB575R30T437, 24120 circular mils) or a 3/4 inch or wider flat braid (QQB575F36T781, 20,800 circular mils) must be used.
- The strap length should be as short as possible and must not exceed 6 inches. Detailed design of a bonding strap meeting these requirements is shown in Section 3.6.8.

Compliance must be verified by inspection using a calibrated milliohm meter.

The antenna ground plane must be electrically bonded to the antenna baseplate. The electrical bond must achieve direct current (DC) resistance less than or equal to 2.5 milliohms. Do not remove paint on outer skin of aircraft under the footprint of the antenna baseplate unless necessary to meet bonding requirements. The painted surface prevents corrosion and should be left intact if possible.

Brackets installed to main structure or instrument panel with four or more rivets can provide sufficient electrical bond to allow equipment chassis or equipment rack to be bonded to the bracket. More rivets or surface preparation may be needed for brackets that will carry large DC/AC or lightning currents.

The correct material finish is important when mating untreated or bare dissimilar metals. They should be galvanically compatible. When corrosion protection is removed to make an electrical bond any exposed area after the bond is completed should be protected again. Additional guidance can be found in AC 43.13-1B and SAE ARP1870.

Typical electrical bonding preparation examples are shown in Figure 2-8, Figure 2-9, and Figure 2-10. Aluminum surface preparation is detailed in Section 2.4.5.1.

2.4.5.1 Aluminum Surface Preparation

To prepare an aluminum surface for proper bonding, this general procedure should be followed. For a more detailed procedure, reference SAE ARP1870 Sections 5.1 and 5.5.

1. Clean grounding location with solvent.
2. Remove non-conductive films or coatings from the grounding location.
3. Apply a chemical conversion coat such as Alodine 1200 to the bare metal.
4. Once the chemical conversion coat is dry, clean the area.
5. Install bonding aluminum tape or equipment at grounding location.
6. After the bond is complete, if any films or coatings were removed from the surface, reapply a suitable film or coating to the surrounding area.

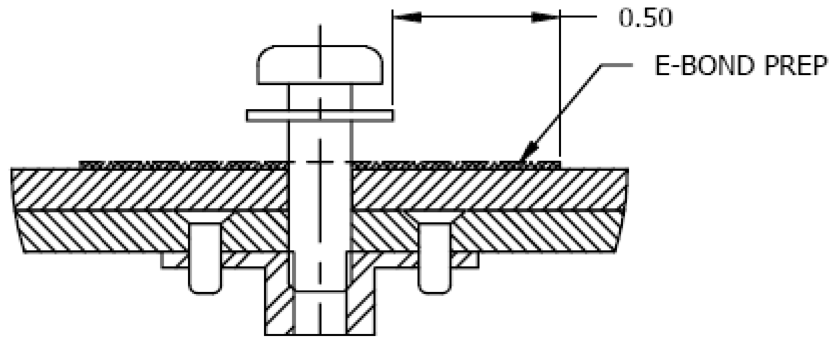
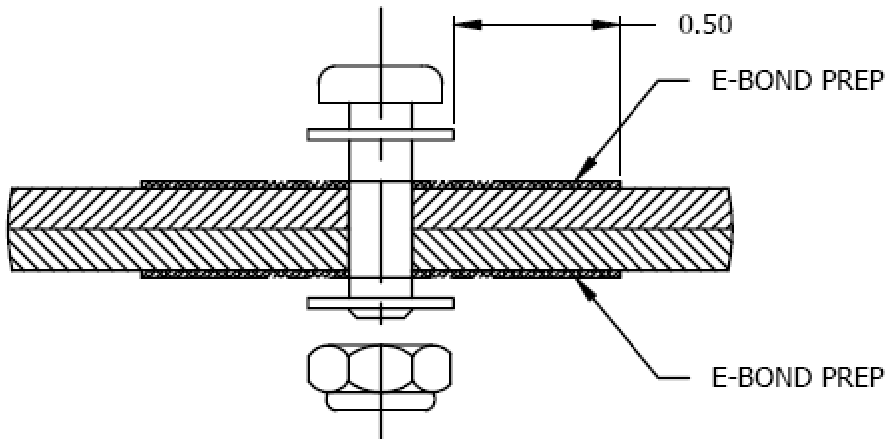
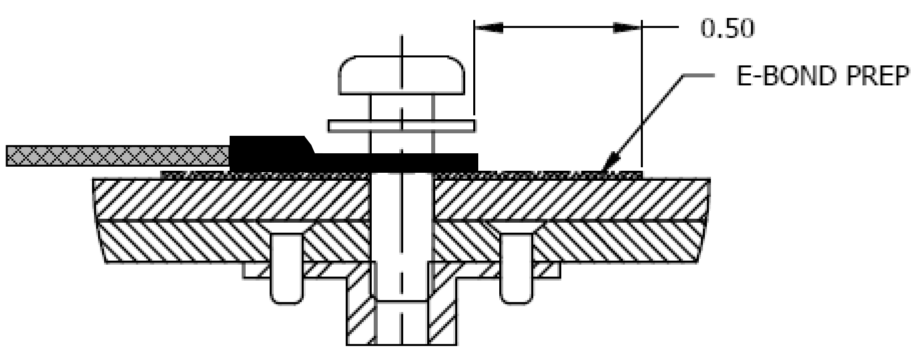


Figure 2-8. Electrical Bonding Preparation – Nut Plate



(LOCKING WASHER SHOULD BE USED)

Figure 2-9. Electrical Bonding Preparation – Bolt/Nut Joint



ELECTRICAL BOND PREP – TERMINAL LUG.
(LOCKING WASHER SHOULD BE USED)

Figure 2-10. Electrical Bonding Preparation – Terminal Lug

2.4.6 Placards and Labels

All placards and labels must be readable in all cockpit lighting conditions. Ambient flood lighting is acceptable. Placards added as part of the GTN and GMA 35 installation must be displayed in a conspicuous place and must not be easily erased, disfigured, or obscured. Text height must be a minimum of 0.10 inch, and the text must contrast with the placard surroundings such that it is easily readable. The text must be a high-quality, solid-color font of at least 300 DPI (dots per inch). Dot-matrix fonts are unacceptable.

New circuit breakers and switches installed for the GTN or GMA 35 unit must be labeled as shown in the applicable interconnect drawing in Appendix E or Appendix F.

2.4.7 Power Distribution

For the purpose of this section, an avionics bus is considered to be any group of circuit breakers fed from a common source or multiple sources with a remote switch for the intent of controlling the power to avionics equipment.

2.4.7.1 Circuit Protection

Circuit protection devices for the GTN and GMA 35 must be push-pull manually resettable circuit breakers (e.g. Klixon 7274 or 7277 Series circuit breakers). Refer to Figure E-4 for GTN circuit breaker ratings or Figure F-2 for GMA 35 circuit breaker ratings. The circuit breakers must be labeled as specified in the interconnect diagrams in Appendix E and Appendix F and the circuit breakers must be readily accessible to the pilot.

A single circuit breaker must be dedicated to the GTN Main and NAV power inputs as shown in Figure E-4. A single circuit breaker must also be dedicated to the COM input for the GTN 635/650/750. See Figure E-4 for more information. Do not combine more than one unit on the same circuit breaker.

2.4.7.2 Power Distribution – Single GTN, Aircraft Weight Less than 6000 Pounds

When one GTN is installed in aircraft with a maximum certified gross takeoff weight of less than 6000 pounds, the GTN should be connected to the avionics bus. The NAV/GPS and COM circuit breakers (Reference Figure E-4) must be connected to the same avionics bus.

When the GTN is the second NAV/COM unit being installed in the aircraft, the GTN should be connected to the avionics bus. The NAV/GPS and COM circuit breakers (Reference Figure E-4) must be connected to the same avionics bus. The GTN and other NAV/COM must be grounded at separate ground terminal/stud locations on the aircraft. The power and ground wiring for the GTN should be routed separately from the power and ground wiring for the other NAV/COM. This method, shown in Figure 2-11, will maximize system redundancy if the ground connection for one radio fails.

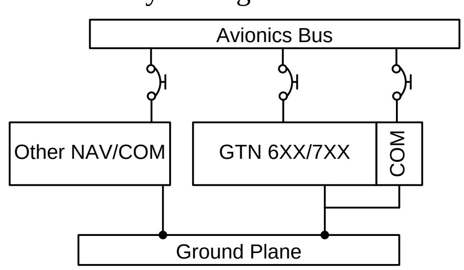


Figure 2-11. Power and Ground Distribution - Single GTN, Aircraft Weight Less Than 6000 lb

2.4.7.3 Power Distribution – Dual GTNs, Aircraft Less than 6000 Pounds

When two GTNs are installed in aircraft with a maximum certified gross takeoff weight of less than 6000 pounds, connect GTN #1 to the avionics bus. The NAV/GPS and COM circuit breakers (reference Figure E-4) for GTN #1 must be connected to the same avionics bus. If a second avionics bus is available, connect GTN #2 to the second avionics bus; otherwise connect GTN #2 to the same avionics bus as GTN #1. The NAV/GPS and COM circuit breakers for GTN #2 must be connected to the same avionics bus.

The GTNs must be grounded at separate ground terminal/stud locations on the aircraft. Power and ground wiring for GTN #1 should be routed separately from the power and ground wiring for GTN #2, as shown in Figure 2-12. This will maximize system redundancy if the ground connection for one GTN fails.

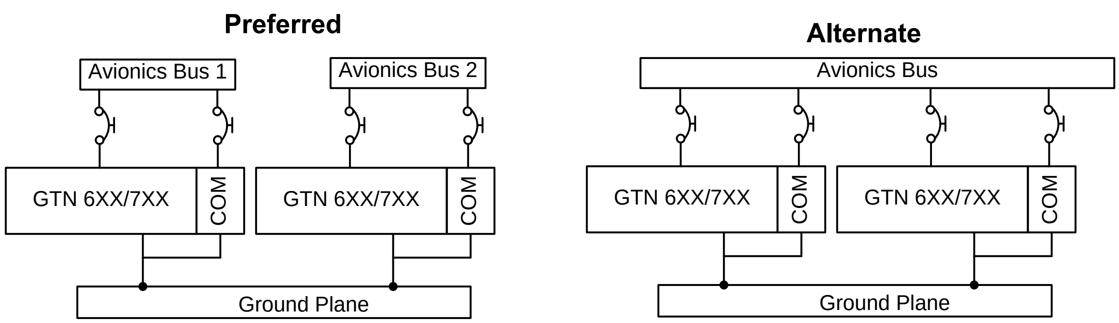


Figure 2-12. Power and Ground Distribution - Dual GTNs, Aircraft Weight Less Than 6000 lb

2.4.7.4 Power Distribution – Single GTN, Aircraft Greater than 6000 Pounds

When a single GTN is installed in aircraft with a maximum certified gross takeoff weight of 6000 pounds or greater, the GTN must be installed on a bus (main or avionics bus) separate from that of other pre-existing NAV/COM systems in the aircraft, as shown in Figure 2-13. The GTN NAV/GPS and COM circuit breakers (reference Figure E-4) must be connected to the same avionics bus.

The GTN and other NAV/COM must be grounded at separate ground terminal/stud locations on the aircraft. The power and ground wiring for the GTN must be routed separately from the power and ground wiring for the other NAV/COM, including no shared connectors. This will maximize system redundancy if the ground connection for one radio fails.

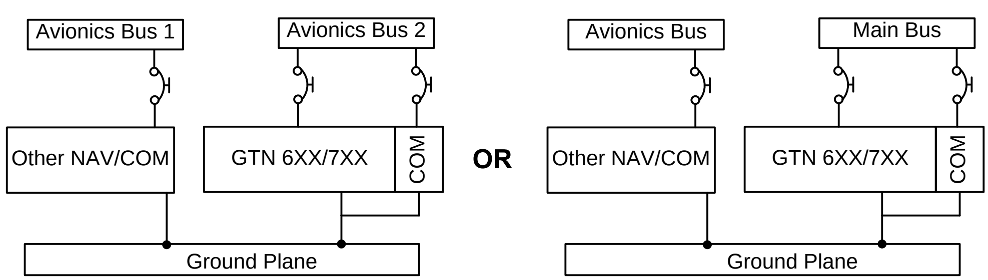


Figure 2-13. Power and Ground Distribution - Single GTN, Aircraft Weight Greater Than 6000 lb

2.4.7.5 Power Distribution – Dual GTNs, Aircraft Greater than 6000 Pounds

When dual GTNs are installed in aircraft with a maximum certified gross takeoff weight of 6000 pounds or greater, each GTN must be installed on a separate avionics bus. If two avionics busses are not available in the aircraft, install GTN #1 on the main bus and GTN #2 on the avionics bus. Both options are shown in Figure 2-14. Preferably, GTN# 1 should not be connected to the bus that supplies power to the GTN #2 avionics bus. The GTN #1 NAV/GPS and COM circuit breakers (reference Figure E-4) must be connected to the same bus, and the GTN #2 NAV/GPS and COM circuit breakers must also be connected to the same bus.

The GTNs must be grounded at separate ground terminal/stud locations on the aircraft. The power and ground wiring for GTN #1 must be routed separately from the power and ground wiring for GTN #2, including no shared connectors. This will maximize system redundancy if the ground connection for one GTN fails.

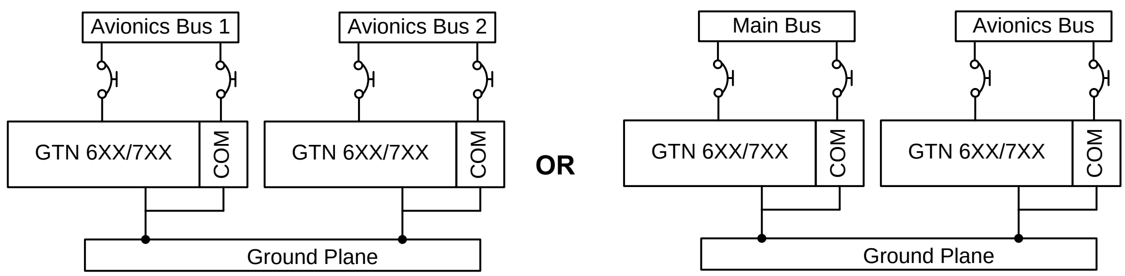


Figure 2-14. Power and Ground Distribution - Dual GTNs, Aircraft Weight Greater than 6000 lb

2.4.7.6 Power Distribution – GMA 35 Audio Panel

When a GMA 35 audio panel is installed, it should be connected to an avionics bus. If GTN #1 and GTN #2 are on separate electrical buses, the GMA 35 must be connected to the same avionics bus as the GTN that is controlling the GMA 35.

2.4.8 Optional Switch Installation

If optional switches are installed as part of the GTN 6XX/7XX and GMA 35 installation, each switch installed must meet the following requirements:

- The switch must be labeled as specified in the interconnect drawings in Appendix E.
- The label must be adjacent to the switch.
- The switch must be readily accessible to the pilot.

2.4.9 External Annunciators

Installations completed in accordance with the requirements specified in this manual may not require the use of any external annunciators, since all annunciations are provided on the GTN unit's front panel. Refer to Section 2.4.10.1.1 to determine whether or not external annunciators are required.

If external GPS annunciators are required as part of the GTN installation, the preferred annunciator is the Mid-Continent MD 41-151X, as shown in Figure E-7. The MD 41-151X provides SUSP annunciations when the GTN is in Suspend Mode. Suspend mode is active when the GTN is not automatically sequencing waypoints.

The annunciator panels designed for the Garmin 400/500 series units, such as the MD41-14XX, annunciate OBS mode but do not annunciate Suspend mode. If it is desired to use a pre-existing MD41-14XX, wiring changes will be required as outlined in Figure E-7. A placard must also be installed with the following text: 'Green OBS indicates OBS or SUSP mode – GTN annunciator bar indicates which is active. Push OBS button to change OBS or SUSP mode.' The placard must be located immediately adjacent to the annunciator panel and must meet the requirements outlined in Section 2.4.5.

2.4.10 Unit Mounting Considerations

2.4.10.1 GTN Mounting Considerations

The GTN unit is designed to mount in the avionics stack in the aircraft instrument panel within view and reach of the pilot. The primary unit location should minimize pilot head movement when transitioning between looking outside of the cockpit and viewing or operating the GTN. The location should be such that the GTN unit is not blocked by the glare shield on top, or by the engine controls, control yoke, etc. on the bottom. If the aircraft has a throw-over yoke, ensure that it does not interfere with the GTN.

For VFR-only installations, the GTN unit must be mounted in the aircraft manufacturer's approved location or other FAA approved location. No CDI/HSI interface is required but if provided, proper source selection annunciation must be used.

In accordance with AC 20-138A, for IFR GPS installations the GTN unit must be mounted in the aircraft manufacturer's approved location or other FAA approved location, and the required CDI/HSI must be mounted in the primary field of view. CDI/HSI navigation source selection annunciation must be on or near the affected display and any additional annunciations must be mounted within the normal field-of-view.

An FAA issue paper was written to clarify the TSO-C146c annunciation requirement of "…on or near the affected display." This issue paper said, in order to preclude the need for external source selection annunciations (i.e. using the annunciation within the GTN unit), the source selection annunciation displayed on the GTN unit must be within 13.9 inches of pilot view centerline. If the CDI is to the left or right of centerline, it must favor the same side as the GTN unit placement (i.e. typically the radio stack is on the right of the pilot's view centerline, so the CDI should be on the right side of the basic primary flight instruments). A CDI/HSI with a built-in annunciation may also be used in lieu of a separate external annunciator to satisfy the source selection annunciation requirement. In addition, any required GPS navigation annunciations must be within 16.8 inches of the pilot view centerline. If the GTN unit display is within this area, then no external GPS navigation annunciations are required.

The GTN unit, as a redundant or secondary TSO-C146c certified navigation device, may be installed outside the acceptable view parameters if the unit is used as a backup system. Example: To the right of a center radio stack, when two columns of avionics are available. This places the unit too far from the pilot's normal scan. As such, IFR flights may not originate or be predicated on this unit unless the primary system has failed.

If the GNS 400W/500W is installed concurrently with a GTN 6XX/7XX, there are special mounting guidelines. The GTN crossfills flight plan and user waypoint data to the GNS. Since the data flows from the GTN to the GNS, it is recommended that the GTN be mounted in the #1 position relative to the GNS in a GTN/GNS installation. In a typical radio stack, this would be above the GNS. This recommendation is only applicable if the GTN-GNS crossfill function is utilized in the installation.

2.4.10.1.1 Determination of Acceptable Field of View

The FAA has determined that the acceptable field-of-view for TSO-C146c annunciations related to navigation source selection is approximately ±30° horizontally from the center of the attitude indicator (or centerline of the pilot's seat/yoke), and that the acceptable field-of-view for TSO-C146c annunciations related to GPS navigation data is approximately ±35° horizontally from the center of the attitude indicator. These angles are based on the closest panel distance of 24 inches resulting in a measured offset from the attitude indicator of 13.9 inches and 16.8 inches respectively.

The acceptable vertical field-of-view includes the area from the top of the instrument panel to the portion of the instrument panel that is immediately below the basic 'T' instruments. For an IFR-approved GPS installation, either (i) the GTN unit must be located within the ±35° horizontal acceptable field-of-view or (ii) source selection and GPS annunciations are required to be installed. If the GTN unit is installed between ±30° and ±35°, at a minimum, source selection annunciation must be installed. Note that Figure 2-15, Figure 2-16, and Figure 2-17 show a GTN 7XX. The dimensions shown in these drawings are also applicable to the GTN 6XX. If the GTN is installed within ±30°, no external annunciations are required.

NOTE

If a GTN is installed with an external EFIS in the primary field of view that provides the annunciations discussed in the following sections, then separate external annunciators are not required. The GDU 620 provides all of the annunciations required by these sections.

2.4.10.1.2 Source Selection Annunciation

Use the steps below to determine whether or not the integrated source selection annunciation displayed on the GTN unit to be installed is within the acceptable field-of-view. See Figure 2-15.

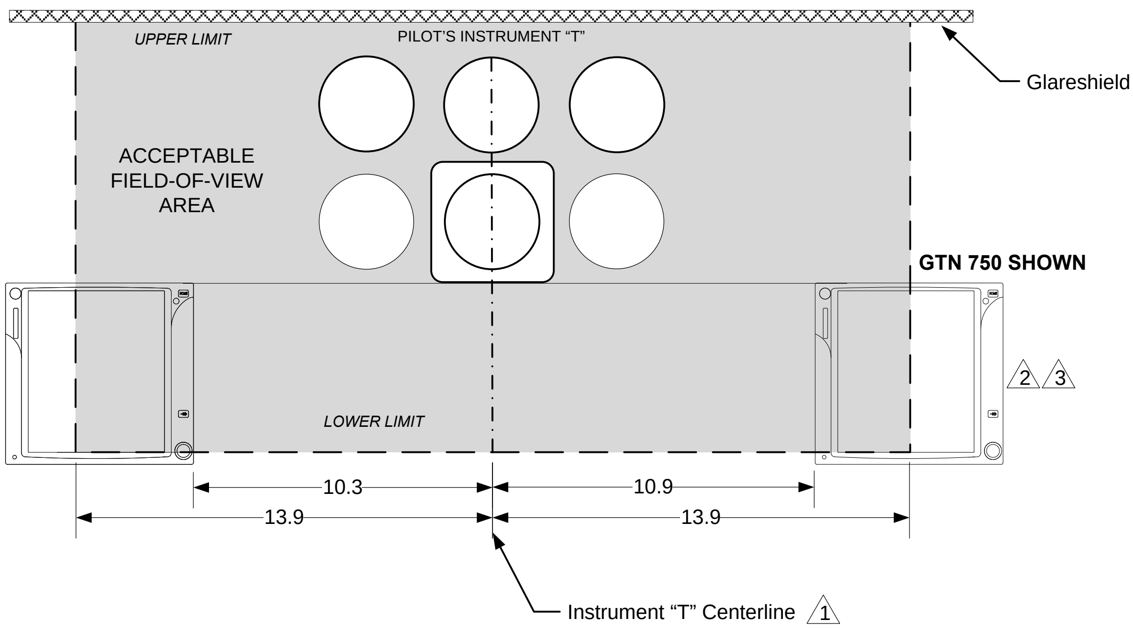
1. Determine the pilot's primary view centerline, utilizing the following criteria:
   - For aircraft with a basic "T" instrument configuration with the attitude indicator in the upper center location, the center of this instrument should be used as the primary view centerline.
   - If the basic "T" is offset away from the radio stack with respect to the control yoke or a non-standard instrument cluster is present in the aircraft, the center of the control yoke or stick in the neutral position may be used as the primary view centerline.
   - If the control yoke/stick is offset from the center of the pilot's seat, an imaginary line extended through the center of the pilot's seat may be used as the primary view centerline.
2. Measure the horizontal distance from the primary view centerline to the left or right edge of the GTN unit, as appropriate.
3. If the GTN unit is mounted to the **right** of the primary instruments, the internal display of annunciation within the GTN is considered to be within the acceptable field-of-view if the following criteria are met:
   - The left edge of the GTN unit bezel is within 10.6 ± 0.25 inches of the primary view centerline and;

  - The top edge of the GTN unit is no lower than the bottom edge of the primary flight instruments or the unit is line abreast with the affected CDI.

4. If the GTN unit is mounted to the **left** of the primary instruments, the internal display of annunciation within the GTN unit is considered to be within the acceptable field-of-view if the following criteria are met:
   - The right edge of the GTN unit is within 10.0 ± 0.25 inches of the primary view center line and;
   - The top edge of the GTN unit is no lower than the bottom edge of the primary flight instruments or the unit is line abreast with the affected CDI.

If the internal display of annunciation within the GTN unit does not meet the criteria for acceptable field-of-view as defined above, an external source selection annunciator must be integrated in the affected CDI/HSI or an additional annunciator which clearly indicates the CDI/HSI source as VLOC or GPS must be installed within 13.6 ± 0.25 inches of the view centerline.

All annunciations must be within 13.6 ± 0.25 inches of the view centerline.



NOTES:

1. FOR AIRCRAFT WITHOUT THE BASIC INSTRUMENT "T" CONFIGURATION, THE CENTER OF THE PILOT'S YOKE OR CONTROL STICK IN THE NEUTRAL POSITION SHOULD BE USED TO DETERMINE THE CENTERLINE. IF THE CONTROL YOKE/STICK IS OFFSET FROM THE CENTER OF THE PILOT'S SEAT, AN IMAGINARY LINE EXTENDED THROUGH THE CENTER OF THE PILOT'S SEAT MAY BE USED AS THE PRIMARY VIEW CENTERLINE.

2. THE TOP EDGE OF THE GTN UNIT SHOULD BE NO LOWER THAN THE BOTTOM EDGE OF THE PRIMARY FLIGHT INSTRUMENTS.

3. FOR AIRCRAFT IN WHICH THE TYPE CERTIFICATED CDI OR HSI LOCATION IS BELOW THE BASIC "T", THE LOWER LIMIT OF THE ACCEPTABLE FIELD-OF-VIEW SHOULD BE THE BOTTOM OF THE CDI OR HSI.

Figure 2-15. GTN CDI Source Selection Annunciation Field of View (±30°)

2.4.10.1.3 GPS Navigation Annunciation

Use the steps below to determine whether or not the integrated GPS navigation annunciation displayed on the GTN unit to be installed is within the acceptable field of-view as depicted in Figure 2-16.

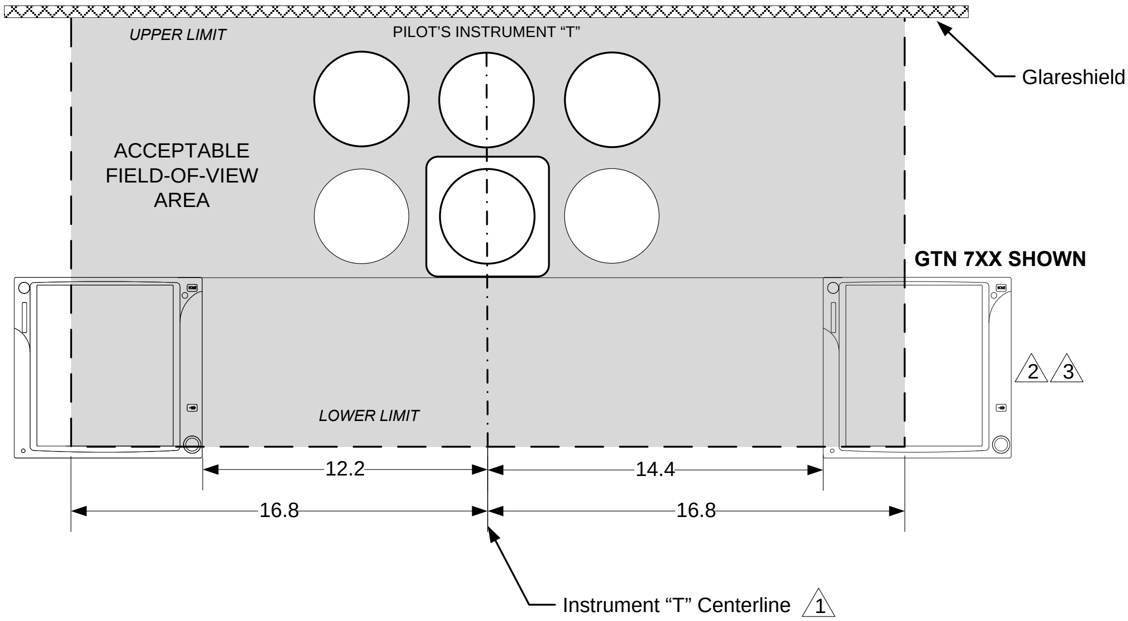
1. Determine the pilot's primary view centerline, as defined in Step 1 of Section 2.4.10.1.2.
2. Measure the horizontal distance from the primary view centerline to the left or right edge of the GTN unit, as appropriate.
3. If the GTN unit is mounted to the right of the primary instruments, the internal display of annunciation within the GTN is considered to be within the acceptable field-of-view if the following criteria are met:
   - The left edge of the GTN unit bezel is within 14.4 inches of the primary view centerline.
   - The top edge of the GTN unit is no lower than the bottom edge of the primary flight instruments or the unit is line abreast with the affected CDI.
4. If the GTN unit is mounted to the **left** of the primary instruments, the internal display of annunciation within the GTN unit is considered to be within the acceptable field-of-view if the following criteria are met:
   - The right edge of the GTN unit bezel is within 12.2 inches of the primary view center line.
   - The top edge of the GTN unit is no lower than the bottom edge of the primary flight instruments or the unit is line abreast with the affected CDI.

If the internal display of GPS navigation annunciation within the GTN unit does not meet the criteria for acceptable field-of-view as defined above, an external annunciator unit must be installed within 16.8 inches of the view centerline.

The external GPS Navigation annunciator unit must contain, at a minimum, the following annunciations:

- INTEG, INTG or LOI
- TERM
- APR
- MSG
- WPT

All annunciations must be within 16.8 inches of the view centerline.



NOTES:

1. FOR AIRCRAFT WITHOUT THE BASIC INSTRUMENT "T" CONFIGURATION, THE CENTER OF THE PILOT'S YOKE OR CONTROL STICK IN THE NEUTRAL POSITION SHOULD BE USED TO DETERMINE THE CENTERLINE. IF THE CONTROL YOKE/STICK IS OFFSET FROM THE CENTER OF THE PILOT'S SEAT, AN IMAGINARY LINE EXTENDED THROUGH THE CENTER OF THE PILOT'S SEAT MAY BE USED AS THE PRIMARY VIEW CENTERLINE.

2. THE TOP EDGE OF THE GTN UNIT SHOULD BE NO LOWER THAN THE BOTTOM EDGE OF THE PRIMARY FLIGHT INSTRUMENTS.

3. FOR AIRCRAFT IN WHICH THE TYPE CERTIFICATED CDI OR HSI LOCATION IS BELOW THE BASIC "T", THE LOWER LIMIT OF THE ACCEPTABLE FIELD-OF-VIEW SHOULD BE THE BOTTOM OF THE CDI OR HSI.

Figure 2-16. GTN Unit GPS Navigation Annunciation Field of View (±35°)

2.4.10.1.4 TAWS Annunciation (units with TAWS only)

Use the steps below to determine whether or not the integrated TAWS annunciations displayed on the GTN unit to be installed is within the acceptable field of view as depicted in Figure 2-17.

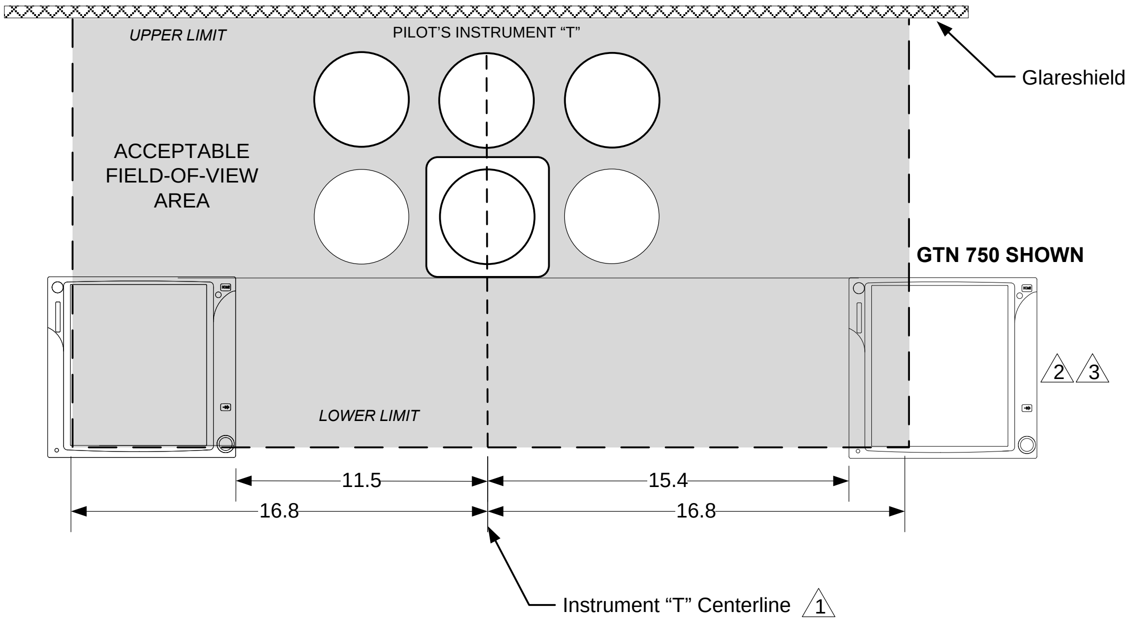
1. Determine the pilot's primary view centerline, as defined in Step 1 of Section 2.4.10.1.2.
2. Measure the horizontal distance from the primary view centerline to the left or right edge of the GTN unit, as appropriate.
3. If the GTN unit is mounted to the right of the primary instruments, the internal display of annunciation within the GTN is considered to be within the acceptable field-of-view if the following criteria are met:
   - The left edge of the GTN unit bezel is within 15.4 inches of the primary view centerline.
   - The top edge of the GTN unit is no lower than the bottom edge of the primary flight instruments or the unit is line abreast with the affected CDI.
4. If the GTN unit is mounted to the **left** of the primary instruments, the internal display of annunciation within the GTN unit is considered to be within the acceptable field-of-view if the following criteria are met:
   - The right edge of the GTN unit bezel is within 11.5 inches of the primary view center line.
   - The top edge of the GTN unit is no lower than the bottom edge of the primary flight instruments or the unit is line abreast with the affected CDI.

If the internal display of TAWS annunciation within the GTN unit does not meet the criteria for acceptable field-of-view as defined above, an external annunciator unit must be installed within 16.8 inches of the view centerline.

The external TAWS annunciator unit must contain, at a minimum, the following annunciations:

- PULL UP (terrain warning) – red
- TERR (terrain caution) – amber/yellow
- TER N/A (terrain not available) – amber/yellow
- TER INHB (terrain inhibited) – white

All annunciations must be within 16.8 inches of the view centerline.



NOTES:

1. FOR AIRCRAFT WITHOUT THE BASIC INSTRUMENT "T" CONFIGURATION, THE CENTER OF THE PILOT'S YOKE OR CONTROL STICK IN THE NEUTRAL POSITION SHOULD BE USED TO DETERMINE THE CENTERLINE. IF THE CONTROL YOKE/STICK IS OFFSET FROM THE CENTER OF THE PILOT'S SEAT, AN IMAGINARY LINE EXTENDED THROUGH THE CENTER OF THE PILOT'S SEAT MAY BE USED AS THE PRIMARY VIEW CENTERLINE.

2. THE TOP EDGE OF THE GTN UNIT SHOULD BE NO LOWER THAN THE BOTTOM EDGE OF THE PRIMARY FLIGHT INSTRUMENTS.

3. FOR AIRCRAFT IN WHICH THE TYPE CERTIFICATED CDI OR HSI LOCATION IS BELOW THE BASIC "T", THE LOWER LIMIT OF THE ACCEPTABLE FIELD-OF-VIEW SHOULD BE THE BOTTOM OF THE CDI OR HSI.

Figure 2-17. TAWS Annunciation Field of View (±35°)

2.4.10.1.5 Angle of Regard

To prevent the bezel from obscuring the display screen, the GTN must be mounted so that the pilot's angle of regard with reference to the display surface is within the following angles:

- From the left: 45°
- From the right: 35°
- From the top: 30°
- From the bottom: 10°

2.4.11 Cable and Wiring Considerations

Wiring should be installed in accordance with AC 43.13-1B Chapter 11, sections 8 through 13. The following issues should be addressed:

- It should not be possible for the cable harness to be exposed to wire chafing;
- It should not be possible for a cable harness to be exposed to wire chafing in a manner that both GPS units fail simultaneously;
- The cable harness should not be located near flight control cables, high capacity electrical lines (e.g. DC electric motor cables) or fuel lines;
- The cable harness should be located in a protected area of the aircraft (i.e. isolated from engine rotor burst); and
- Do not route cable near high-energy sources. (i.e. DC motors, high heat sources)
- Wiring which is required to be shielded per the interconnect diagrams in Appendix E must be shielded.
- Pigtail lengths must be less than 3.0 inches.
- For dual GTN unit installations, care should be taken to ensure separation between wires of redundant systems to reduce the possibility of loss of navigation due to a single event.

Refer to Sections 3.3 and 3.6.7 for recommended coaxial cable types.

Refer to Appendix E and Appendix F for the appropriate wiring connections to assemble the wiring connectors.

2.4.11.1 Pressurized Aircraft Considerations

In pressurized aircraft, wiring that penetrates the pressure vessel must be installed in accordance with the Type Design of the aircraft. Any wires that penetrate the pressure bulkhead must use existing provisions such as spare pins in the existing bulkhead connectors, or existing sealed wire through holes in accordance with the aircraft maintenance manual.

Substantiation for additional holes in the pressure vessel is beyond the scope of this manual and would require additional data from the aircraft manufacturer or other FAA approved data.

2.4.11.2 Coaxial Cable Considerations

When routing coaxial cables, observe the following precautions:

5. All cable routing should be kept as short and as direct as possible.
6. Avoid sharp bends.
7. Avoid routing cables near power sources (e.g., 400 Hz generators, trim motors, etc.) or near power for fluorescent lighting.

See Section 3.6.6 for more information on the installation of coaxial cable.

2.4.11.3 Marker Beacon Antenna Cable Installation

When routing marker beacon antenna cables, observe the following precautions:

- All cable routing should be kept as short and as direct as possible.
- Avoid sharp bends.
- Avoid routing cables near power sources (e.g., 400 Hz generators, trim motors, etc.) or near power for fluorescent lighting.

Avoid routing the marker beacon antenna cable near other antenna cables (e.g. ADF, COM, NAV, GS). See Section 3.6.7 for marker beacon antenna termination technique.

2.4.11.4 Shield Termination Consideration

Shield termination at non-Garmin equipment end must be as short as possible and not to exceed 3.0” taking into consideration any non-Garmin equipment’s installation requirements. When there are no requirements given by the non-Garmin equipment installation manual, then the shields may be connected to the metal connector backshell when the backshell is grounded to airframe chassis ground. Alternately, the shield termination may be directly connected to airframe chassis ground. Although the interconnects in Appendix E do not show intermediate connectors, all shields must have continuity at any intermediate connectors used unless otherwise specified. When shields are terminated to the aircraft ground or metal backshell to provide this continuity, the shield drain wire must be no longer than 3 inches, unless non-Garmin equipment requires shorter length. The termination method from Section 3.6.3.1 may be used at these locations unless this conflicts with the requirement of non-Garmin equipment.

If intermediate connectors are used on an audio line, run the shields through a pin on all intermediate connectors. Audio line shields should be continuous from end to end and be grounded only at one end to prevent ground loops. See Section 2.4.12.

Shield splicing should be done at the GTN end close to the connector, similar to other non-spliced shields, unless this conflicts with requirements from remote-end equipment. Honeywell equipment with EMI backshells (e.g. 360 degree circular connectors, backshells with shields terminated inside a metal backshell) require the shields to be terminated at the remote end from the GTN utilizing the EMI backshell.

If a wire from the GTN connector goes to a connector at the remote end that includes overbraided wires then the new wiring added at the remote end connector must also be overbraided. Any wires spliced into this wire must also be overbraided. If the wiring passes through bulkhead connectors then each segment shall be overbraided and the overbraid must be grounded at both ends, unless otherwise shown in the remote equipment’s installation manual. The overbraid must be terminated as close to the connector as possible taking into account any requirements imposed by the non-Garmin equipment. These additional wires must be separately overbraided and ensure they are routed with the existing cable where possible. The overbraid shall have a minimum of 90% optical coverage.

2.4.11.5 GTN Cooling Requirements

The GTN unit meets all TSO requirements without external cooling. However, as with all electronic equipment, lower operating temperatures extend equipment life. Reducing the operating temperature may reduce the mean time between failures (MTBF).

Units tightly packed in the avionics stack heat each other through radiation, convection, and sometimes by direct conduction. Even a single unit operates at a much higher temperature in still air than in moving air. Fans or some other means of moving the air around electronic equipment are usually a worthwhile investment.

The GTN has a cooling fan integrated into the backplate to draw forced-air cooling through the unit. There are inlets along the left, right, and bottom sides of the GTN bezel that allow air to flow through the unit. Ensure that there are no obstructions to the air inlets or fan exhaust. Airflow should be unrestricted from the bezel inlets to the fan outlet in the backplate on the rear of the unit.

2.4.11.6 GMA 35 Cooling Requirements

The GMA 35 does not have provisions for attaching cooling air and does not generate an excessive amount of heat during typical operations, however the thermal characteristics of the installation should always be assessed. An undesirable thermal condition could be created due to the unit's own internal power dissipation combined with restricted ventilation, or due to heat generated by adjacent equipment. Limiting thermal build up, by means of an external fan or natural convection is always a good practice and is recommended to increase the product life.

2.4.12 Audio Electrical Noise

Because the audio panel is a point in the aircraft where signals from many pieces of equipment are brought together, take care to minimize effects from coupled interference and ground loops. Coupled interference can creep into audio system interconnecting cables when they are routed near large AC electric fields, AC voltage sources and pulse equipment (strobes, spark plugs, magnetos, EL displays, CRTs, etc). Interference can also couple into audio system interconnecting cables by magnetic induction when they are routed near large AC current-carrying conductors or switched DC equipment (heaters, solenoids, fans, autopilot servos, etc).

Ground loops are created when there is more than one path in which return currents flow or when signal returns share the same path as large currents from other equipment. These large currents create differences in ground potential between the various equipment operating in the aircraft. These differences in potential can produce an additive effect on audio panel input signals. The audio panel may “hear” the desired input signal plus an unwanted component injected by ground differentials, a common cause of alternator-related noise. This is the main reason why all audio jacks should be isolated from ground. Terminating audio shields at one end eliminates a potential ground loop injection point. The audio shields should only be grounded at one end to prevent ground loops. The wiring diagrams and accompanying notes in this manual should be followed closely to minimize noise effects.

2.4.13 Transmit interlock and Split COM Operation

In small aircraft, COM and NAV receiver interference is affected by both the distance between antennas and the tuned frequency separation. With transmit interlock activated in the COM transceivers, split COM operation between a flight crew of more than one pilot is affected.

In aircraft that have a transmit interlock feature, when either transmitter is keyed, all other receivers are muted so that they won’t pick up interference from the active COM transmitter. This is the preferred option for single pilot operation.

For aircraft with two flight crew members, transmit-interlock would likely interfere with communications. When the pilot or the copilot transmit, no audio is heard on any other receiver. This means that if the pilot is communicating with ATC while the copilot transmits on another radio, all pilot reception is cut off during the time of copilot transmission.

If the installation does not have transmit-interlock activated, all the receivers are listening all the time whether any radio is transmitting or not. Split COM performance varies significantly across installations. If the transceivers interfere with each other, transmission by one radio produces static or squeal, thus loss of communication from any other radio.

2.4.14 GMA 35 Wiring Considerations for Failsafe Operation

The GMA 35 includes a failsafe circuit that connects the pilot's headset and microphone directly to COM1 in the event that power is interrupted or RS-232 communication with the GTN is lost.

When the GMA 35 is installed with a GTN 750 and a second COM radio, the GTN 750 COM must be connected to the COM 2 pins (J3501-13,-14,-15) on the GMA 35. The other radio should be connected to the COM 1 pins. This will prevent the loss of both COM radios if power to the GMA 35 or RS-232 communication to the GMA 35 is lost. The GTN includes a configuration setting to allow the GTN 750 COM radio to appear as COM 1 in the GTN user interface. 'COM 1 is connected as COM 2' should be set to 'True' in this case. See Section 5.5.4.8 for information about this setting.

If the GMA 35 is installed with a GTN 725 (no COM) and two other COM radios, wire COM 1 to the COM 1 pins on the GMA 35, and COM 2 to the COM 2 pins. 'COM 1 is connected as COM 2' should be set to 'False' in this case. See Section 5.5.4.8 for information about this setting.

If the GMA 35 is installed with dual GTN 750s, wire GTN 750 #1 to the COM 1 pins on the GMA 35, and wire GTN 750 #2 to the COM 2 pins on the GMA 35. 'COM 1 is connected as COM 2' should be set to 'False' in this case.

2.4.15 Magnetic Compass Recalibration

After reconfiguring the avionics in the cockpit panel, if the GTN unit is mounted less than 12 inches from the compass, recalibrate the compass and make the necessary changes for noting correction data.

2.4.16 Weather Radar Wiring Considerations

The GTN can interface with weather radar only in a metal aircraft. Any HSDB weather radar wiring in the radome area must be overbraided. Refer to Section G.1.1 for more information.

Weather radar data can be displayed only on GTN 7XX units. Weather radars that use ARINC 453/708 for data transfer must be connected directly to the GTN 7XX. For an installation that includes a GWX 68/70 and two GTNs (one of which must be a GTN 7XX), the GWX 68/70 can be connected to any GTN and the data will be forwarded over HSDB to the GTN 7XX.

3 INSTALLATION PROCEDURE

3.1 Optional Accessories

3.1.1 GPS/WAAS Antenna Options

For information regarding antenna selection, refer to Section 1.10. Once the antenna type is decided upon, refer to the information below for detailed parts information for antennas available from Garmin. Contact the antenna manufacturer directly for non-Garmin antennas.

3.1.1.1 GA 35 Antenna

The GA 35 antenna, Garmin P/N 013-00235-XX, contains one of the items listed in Table 3-1.

Table 3-1. GA 35 Antenna

Item	Part Number	Qty
GA 35 GPS/WAAS Antenna [1]	013-00235-00 (White)	1
	013-00235-01 (Black)	
	013-00235-02 (Olive Green)	

[1] Antenna includes 8-32 UNC-2A x 1.00” Stainless Steel mounting screws (qty 4) and O-ring (qty 1).

An antenna doubler may also be required. Refer to Section 3.1.2 for additional information.

To secure the antenna #8 washers (qty 4) and #8 (qty 4) self-locking nuts are required in addition to the antenna, or suitable nutplates may be installed on the doubler.

To connect the GPS antenna coaxial cable to the antenna a TNC plug is required.

3.1.1.2 GA 36 Antenna

The GA 36 antenna, Garmin P/N 013-00244-XX, contains one of the items listed in Table 3-2.

Table 3-2. GA 36 Antenna

Item	Part Number	Qty
GA 36 GPS/WAAS Antenna [1]	013-00244-00 (White)	1
	013-00244-01 (Black)	
	013-00244-02 (Olive Green)	

[1] Antenna includes 8-32 UNC-2A x 1.00” Stainless Steel mounting screws (qty 4) and O-ring (qty 1).

An antenna doubler may also be required. Refer to Section 3.1.2 for additional information.

To secure the antenna #8 washers (qty 4) and #8 (qty 4) self-locking nuts are required in addition to the antenna, or suitable nutplates may be installed on the doubler.

To connect the GPS antenna coaxial cable to the antenna a TNC plug is required.

3.1.1.3 GA 37 Antenna

The GA 37 antenna, Garmin P/N 013-00245-XX, contains the one of the items listed in Table 3-3.

Table 3-3. GA 37 Antenna

Item	Part Number	Qty
GA 37 GPS/WAAS + XM Antenna [1]	013-00245-00 (White)	1
	013-00245-01 (Black)	
	013-00245-02 (Olive Green)	

[1] Antenna includes 8-32 UNC-2A x 1.00” Stainless Steel mounting screws (qty 4) and O-ring (qty 1).

An antenna doubler may also be required. Refer to Section 3.1.2 for additional information.

To secure the antenna #8 washers (qty 4) and #8 (qty 4) self-locking nuts are required in addition to the antenna, or suitable nutplates may be installed on the doubler.

To connect the GPS antenna coaxial cable to the antenna a TNC plug is required.

3.1.2 GPS Antenna Doubler

If installing the GPS/WAAS antenna onto existing provisions a doubler may not be required. If installing the GPS antenna using AML STC SA02018SE-D as the basis for approval, one of the following antenna doublers is required:

- Antenna doubler P/N 115-00846-00, for the GA 36 and GA 37 antennas. This doubler contains nut plates (qty. 4) for the antenna mounting screws.
- Antenna doubler P/N 115-00846-10, for the GA 35 antenna. This doubler does not contain nut plates.
- Antenna doubler P/N 115-00873-00, for the GA 36 and GA 37 antennas. This doubler contains nut plates (qty. 4) for the antenna mounting screws.

The above doublers may be purchased from Garmin or fabricated in accordance with the Antenna STC Installation Manual, P/N 190-01284-00.

3.2 Miscellaneous Options

The connector used to connect the coaxial cable to the antenna is listed in Table 3-4.

Table 3-4. Miscellaneous Options - Other

Item	Amphenol P/N
Connector, TNC, Male, Crimp	031-4452

3.3 Antenna Installation and Connections

3.3.1 GPS/WAAS Antenna

This section provides information on the antenna cable installation. Refer to Section 2.4.4.1 for antenna installation location considerations.

NOTE

The internal GTN unit COM does not interfere with its own GPS receiver. However, placement of the GTN unit antenna relative to other COM transceivers and antennas (including the GTN unit COM antenna) is critical.

It is permissible to temporarily locate the GPS antenna with a coaxial cable connected to the GTN and check the GPS performance as described in Section 5.7.2. Permanently mount the antenna once a suitable location has been verified.

Once the antenna mounting position has been established, route the coaxial cable from the antenna to the GTN. Proper selection of coaxial cable and assembly of connectors is critical to GPS signal performance.

NOTE

GPS/WAAS antenna cable loss must be between 1.5 dB and 6.5 dB in order to maintain proper rejection of interference signals.

Additional loss from coaxial connectors and adapters, such as TNC to BNC, should be considered when computing cable loss. A typical loss of 0.2 dB can be used for each connection. To maintain integrity of the WAAS signal, the GPS antenna coaxial cable must have a minimum of two shields (e.g. RG-400 or RG-142B).

NOTE

GPS antennas listed in Section 3.3 require a cable loss between 1.5 dB and 6.5 dB. If RG-142B or RG-400 is used, 1.5 dB equates to a length of approximately 6.5 feet of cable with a connector on each end. RG-142B or RG-400 cable can be used as long as the length is less than 35 feet. For longer lengths, use low-loss double or triple-shielded, 50Ω coaxial.

For very short runs, where the loss is less than 1.5 dB, additional cable should be used to increase the loss to within 1.5 dB and 6.5 dB. This additional cable may be coiled, taking into account the minimum bend radius of the cable.

During the post-installation checkout, susceptibility to harmonics of VHF COM transmitters will be evaluated. If problems arise, better isolation or distance may be required between the GPS and COM antennas, or a 1575.42 MHz notch filter may be installed in series with the antenna coaxial of the VHF COM transceiver to reduce or eliminate the harmonic interference. A notch filter for this use (P/N 330-00067-00) is available from Garmin.

If a VHF COM transmitter causes problems with the GPS on the selected frequencies as listed in the post-installation checkout, the problem may be due to the ELT. This can be verified by disconnecting the ELT antenna coaxial at the ELT unit. If the ELT is found to cause the problem, then contact the ELT manufacturer or replace the ELT.

3.3.1.1 GPS/WAAS Antenna Cable Installation for IFR-Certified Non-Metal Aircraft

The GPS/WAAS antenna cable for non-metal aircraft must be overbraided to protect against lightning currents being injected into the antenna port during a lightning strike to the aircraft. Aircraft constructed of metal tube and fabric that have the antenna grounded to the metal tubes do not require this overbraid. See Appendix G for a list of aircraft requiring this overbraid. Both GPS/WAAS antenna cables must be overbraided in a dual GTN installation. Nonmetallic VFR-only aircraft do not need overbraid on the GPS/WAAS antenna cable. Install the overbraid in accordance with the procedure below and measure the length of cable needed to route it through the aircraft from the mounted antenna location to the GTN backplate in the radio stack. Cut the cable to the measured length. The length of overbraid required will be the length of the GPS/WAAS antenna cable plus 6 inches.

1. Slide the overbraid over the entire length of the GPS/WAAS antenna cable.
2. Route the GPS/WAAS antenna cable/connector assembly with overbraid from the GPS/WAAS antenna to the GTN backplate in the radio stack per the instructions in Section 3.3.1.
3. Roll back approximately 1.5 inches of the overbraid end at the antenna end.
4. Leaving the rolled-back portion free, secure the outboard end of the overbraid around the GPS/WAAS antenna connector with an electrical tie-down strap.
5. Fold the free overbraid ends back over the tie-down strap and secure them to the cable with two additional tie-down straps.

NOTES:

1. THE OVERBRAID MUST BE INSERTED INTO THE GROUNDING LUG BY COMBING OUT AND TWISTING THE WIRE STRANDS AND BEFORE TERMINATING THEM IN A TERMINAL LUG.

2. WHEN INSTALLING OVERBRAID AT CONNECTOR END OF PIGTAIL, THE OVERBRAID IS PUSHED DOWN UNTIL IT TOUCHES THE TOP SURFACE OF THE CONNECTOR. CONTINUE PUSHING BRAID DOWN BY SPREADING IT OUT ALONG THE TOP SURFACE OF THE CONNECTOR. APPLY THE FIRST TIE WRAP AROUND THE BRAID AND ANTENNA CABLE WHERE IT ENTERS THE CONNECTOR. THEN LIFT THE SPREAD PORTION OF THE BRAID UP TO COVER THE FIRST TIE-WRAP, DOUBLING BACK ON ITSELF. INSTALL THE REMAINING TWO TIE-WRAPS ABOVE THE BULGE CREATED BY THE FIRST TIE-WRAP WHICH IS NOW COVERED BY THE BRAID.

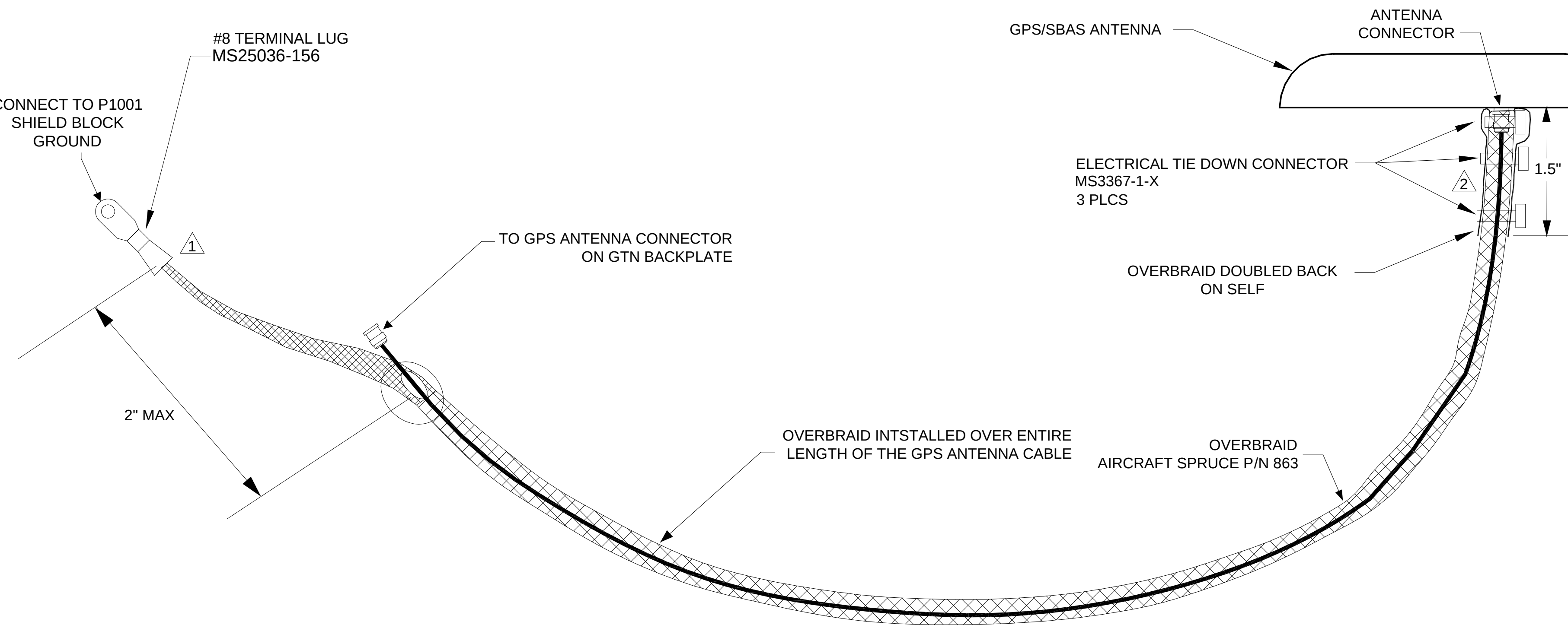


Figure 3-1. GPS/WAAS Antenna Cable Overbraid Installation Details

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3.3.2 COM Antenna Cable Considerations

The GTN requires a standard 50Ω vertically polarized antenna. Follow the antenna manufacturer's installation instructions for mounting the antenna, and gain other FAA approval.

For optimum performance the antenna should be mounted on a metal surface or a ground plane with a minimum area of 18 x 18 inches. Refer to Section 2.4.4.2 for installation location considerations.

The antenna coaxial cable must be made of RG-142B, RG-400 or a comparable quality 50Ω coaxial.

Check for insertion loss and VSWR (voltage standing wave ratio). VSWR should be checked with an in-line type VSWR/wattmeter inserted in the coaxial transmission line between the transceiver and the antenna. The VSWR/ wattmeter should be inserted as close to the transceiver as possible. When rack and harness buildup is performed in the shop, the coaxial termination may be provisioned by using a 6 inch inline BNC connection. This would be an acceptable place to insert the VSWR. Any problem with the antenna installation is most likely seen as high reflected power. A VSWR of 3:1 may result in up to a 50% loss in transmit power.

3.3.3 NAV Antenna

The NAV antenna is a standard 50Ω horizontally polarized NAV/VOR/Localizer/Glideslope antenna. The NAV antenna receives VOR frequencies between 108.00 and 117.95 MHz and localizer frequencies between 108 and 112 MHz and glideslope information between 328.6 and 335.4 MHz Follow the antenna manufacturer's installation instructions for mounting antennas, and gain other FAA approval. It is recommended that the installer use RG-142B, RG-400 or equivalent 50Ω coaxial for the NAV antenna(s).

3.3.3.1 NAV Antenna Cable Splitter Installation

The splitter P/N 013-00112-00 is required to be installed with the NAV antenna coaxial cable wiring in certain configurations, and it must be installed in accordance with the guidance below. Connecting the splitter is installation-dependent. Wire the splitter as shown in the applicable diagram in Figure E-18. When determining a proper location to mount the splitter, use the following guidance:

- Locate the splitter such that minimal coaxial cable is used in the installation. In general, this will be as close to the GTN as practical.
- Install the splitter on a flat surface in the fuselage in a location free from excessive vibration.
- Splitter installation requires four (4) 4-40 fasteners (torque within 5 to 6 in-lbs). The following fasteners are recommended:

Stainless Hardware

Name	Part Number
Screw, Pan Head, Stainless	MS51957, (AN515C)
Washer, .016 thickness	NAS1149CN416R, (AN960C-4L)
Washer, .032 thickness	NAS1149CN432R, (AN960C-4)
Nut, Self-locking Metal, Hex, Thin	NASM21043-04, NAS1291C04, (MS21043-04)
Nut, Self-locking Metal, Hex	NASM21046C04, (MS21046C04)
Nutplate, One Lug, Fixed	MS21052, MS21054, MS21072
Nutplate, One Lug, Floating	MS21062
Nutplate, Two Lug, Fixed	MS21048, MS21050, MS21070
Nutplate, Two Lug, Floating	MS21060, MS21076
Nutplate, Corner	MS21056, MS21058, MS21074
Nutplate, Side-by-side	MS21087

Note: Part numbers in parentheses are inactive or cancelled part numbers; these numbers may still be available and/or referenced on packaging material.

Steel Hardware

Name	Part Number
Screw, Pan Head, Low Carbon Steel	NASM35206, (MS35206), (AN515)
Screw, Pan Head, Alloy Steel	NAS600
Washer, .016 thickness	NAS1149FN416P, (AN960-4L)
Washer, . 032 thickness	NAS1149FN432P, (AN960-4)
Nut, Self-locking Metal, Hex, Thin	NASM21042L04, NAS1291-04, (MS21042L04)
Nut, Self-locking Metal, Hex	NASM21045L04, (MS21045L04)
Nutplate, One Lug, Fixed	MS21051, MS21053, MS21071
Nutplate, One Lug, Floating	MS21061
Nutplate, Two Lug, Fixed	MS21047, MS21049, MS21069
Nutplate, Two Lug, Floating	MS21059, MS21075
Nutplate, Corner	MS21055, MS21057, MS21073
Nutplate, Side-by-side	MS21086

Note: Part numbers in parentheses are inactive or cancelled part numbers; these numbers may still be available and/or referenced on packaging material.

3.3.3.2 NAV Antenna Cable Diplexer Installation

The Comant CI-507 diplexer is required to be installed with the NAV antenna coaxial cable wiring in certain configurations, and it must be installed in accordance with the guidance below. Connecting the diplexer is installation-dependent. Wire the diplexer as shown in the applicable diagram in Figure E-18. When determining a proper location to mount the diplexer, use the following guidance:

- Locate the diplexer such that minimal coaxial cable is used in the installation. In general, this will be as close to the antennas as practical.
- Install the diplexer on a flat surface in the fuselage in a location free from excessive vibration.
- Diplexer installation requires two (2) 10-32 fasteners (torque within 22 to 25 in-lbs). The following fasteners are recommended:

Stainless Hardware

Name	Part Number
Screw, Pan Head, Stainless	NASM51958, (MS51958), (AN520C)
Washer, .032 thickness	NAS1149C0332R, (AN960C-10L)
Washer, .063 thickness	NAS1149F0363P, (AN960C-10)
Nut, Self-locking Metal, Hex, Thin	NASM21043-3, NAS1291C3, (MS21043-3)
Nut, Self-locking Metal, Hex	NASM21046C3, MS20365C1032C, NAS1021C3, (MS21046C3), (AN363C1032)
Nutplate, One Lug, Fixed	MS21052, MS21054, MS21072
Nutplate, One Lug, Floating	MS21062
Nutplate, Two Lug, Fixed	MS21048, MS21050, MS21070
Nutplate, Two Lug, Floating	MS21060, MS21076
Nutplate, Corner	MS21056, MS21058, MS21074
Nutplate, Side-by-side	MS21087

Note: Part numbers in parentheses are inactive or cancelled part numbers; these numbers may still be available and/or referenced on packaging material.

Steel Hardware

Name	Part Number
Screw, Pan Head, Low Carbon Steel	NASM35207, (MS35207), (AN520)
Screw, Pan Head, Alloy Steel	NAS603
Washer, .032 thickness	NAS1149F0332P, (AN960-10L)
Washer, .063 thickness	NAS1149F0363P, (AN960-10)
Nut, Self-locking Metal, Hex, Thin	NASM21042L3, NAS1291-3, (MS21042L3)
Nut, Self-locking Metal, Hex	NASM21045L3, (MS21045L3), (AN363-1032)
Nutplate, One Lug, Fixed	MS21051, MS21053, MS21071
Nutplate, One Lug, Floating	MS21061
Nutplate, Two Lug, Fixed	MS21047, MS21049, MS21069
Nutplate, Two Lug, Floating	MS21059, MS21075
Nutplate, Corner	MS21055, MS21057, MS21073
Nutplate, Side-by-side	MS21086

Note: Part numbers in parentheses are inactive or cancelled part numbers; these numbers may still be available and/or referenced on packaging material.

3.4 GTN/GMA 35 Location and Mounting

3.4.1 GTN Rack Installation

Use the dimensions shown in Figure A-4 (GTN 6XX) or Figure A-6 (GTN 7XX) to prepare the mounting holes for the GTN 6XX or GTN 7XX unit. The GTN 6XX or GTN 7XX unit mounting rack itself may also be used as a template for drilling the mounting holes.

1. The backplate of the rack may optionally be removed for ease of mounting in the aircraft panel. To do so, remove the two #4-40 screws, tilt the backplate away from the tray, and then slide the backplate to the side.
2. Figure A-9 shows outline dimensions for the aviation rack for the various GTN units. Install the rack in a rectangular 6.320" x 4.600" hole (or gap between units) in the instrument panel (See Figure A-10). The lower-front lip of the rack should be flush with, or extend slightly beyond, the face of aircraft instrument panel.

NOTE

If the front lip of the mounting rack is behind the surface of the aircraft panel, the GTN unit connectors may not fully engage.

3. Make sure that no screw heads or other obstructions prevent the unit from fully engaging in the rack (see Section 5.3). Exercise caution when installing the rack into the instrument panel. Deformation of the rack may make it difficult to install and remove the GTN.
4. Install the rack in the aircraft panel using six #6-32 flat head screws and six self-locking nuts. The screws are inserted from the inside through the holes in the sides of the rack. Torque screws 12-15 in-lbs.
5. Verify GTN/GMA rack is electrically bonded to aircraft structure or instrument panel as required in Section 2.4.5.
6. If the backplate was previously removed (see Step 1), replace the backplate by positioning the tabs on the backplate in the slots of the left side of the rack (viewing it from the cockpit) and attaching it by replacing the two #4-40 screws. Torque 5 to 6 in-lbs.

3.4.2 GTN Unit Insertion and Removal

It may be necessary to insert the hex drive tool into the access hole and rotate the cam mechanism 90° counterclockwise to ensure correct position prior to placing the unit in the rack. The GTN is installed in the rack by sliding it straight in until it stops, about 1 inch short of the final position. A 3/32-inch hex drive tool is then inserted into the access hole at the bottom of the unit face. Rotate the hex tool clockwise while pressing on the left side of the bezel until the unit is firmly seated in the rack.

To remove the unit from the rack, insert the hex drive tool into the access hole on the unit face and rotate counterclockwise until the unit is forced out about 3/8 inches and can be freely pulled from the rack.

Be sure not to over-tighten the unit into the rack. The application of hex drive tool torque exceeding 15 in-lbs can damage the locking mechanism.

NOTE

After installing a GTN unit, verify that the unit power-up self-test sequence is successfully completed and no failure messages or configuration error messages are annunciated. Section 5.7.1 outlines the power-up self-test sequence.

3.4.3 GMA 35 Rack Installation

Use the six 6-32 screws that accompany the GMA 35 installation kit to install the GMA 35 mounting rack to a GTN 7XX mounting rack. The screws are installed from the bottom side of the GTN 7XX mounting rack using through-holes to access the mounting locations on the GMA 35 mounting rack. Refer to Figure A-2 and Figure A-8.

3.4.4 GMA 35 Unit Insertion and Removal

The GMA 35 is installed into the rack by sliding it straight in until it stops. A 3/32-inch hex drive tool is then inserted into the hex hole at the bottom center of the unit. Rotate the hex tool clockwise while pressing the unit on the front until the GMA 35 is firmly seated in the rack.

To remove the GMA 35 from the rack, insert the hex drive tool into the hex hole on the bottom center of the unit and rotate counterclockwise until the unit is forced out about 3/8 inches and can be freely pulled from the rack.

Be sure not to over-tighten the unit into the rack. The application of hex drive tool torque exceeding 15 in-lbs can damage the locking mechanism.

3.5 Weight and Balance

Weight and balance computation is required after the installation of the GTN is complete. Follow the guidelines as established in AC 43.13-1B, Chapter 10, Section 2, as appropriate. Make appropriate entries in the equipment list indicating items added, removed, or relocated along with the date the installation was accomplished. Include your name and certificate number in the aircraft records. See Table 3-6 for a sample calculation. Include a copy of the updated aircraft weight and balance in the aircraft POH/AFM.

Table 3-5 lists GTN 6XX/7XX and GMA 35 unit weights. Refer to Figure A-3 (GTN 6XX) and Figure A-4 (GTN 7XX) for unit centers of gravity.

Table 3-5. LRU Weights

LRU	Std. Wt [Metric Wt.]
GTN 750 (unit only)	7.4 lb [3.38 kg]
GTN 750 (with rack and backplate)	9.3 lb [4.24 kg]
GTN 725 (unit only)	6.1 lb [2.80 kg]
GTN 725 (with rack and backplate)	7.7 lb [3.52 kg]
GTN 650 (unit only)	5.5 lb [2.48 kg]
GTN 650 (with rack and backplate)	7.0 lb [3.20 kg]
GTN 635 (unit only)	4.8 lb [2.18 kg]
GTN 635 (with rack and backplate)	6.2 lb [2.82 kg]
GTN 625 (unit only)	4.2 lb [1.90 kg]
GTN 625 (with rack and backplate)	5.4 lb [2.48 kg]
GMA 35 (unit only)	1.4 lb [0.64 kg]
GMA 35 (with rack and backplate)	2.2 lb [1.00 kg]

Table 3-6. Sample Aircraft Weight and Balance Calculation

Previous Aircraft Weight and Balance	**Useful Load (lb)**	**Empty Weight (lb)**	**C.G. (in)**	**Moment (lb-in)**
Calculated: 06/29/12	1093.3	2306.70	138.83	320233.96
Description of Items removed from aircraft		**Weight (lb)**	**Arm (in)**	**Moment (lb-in)**
SL15 Audio Panel		1.00	55.00	55.00
GMX200		4.60	55.00	253.00
CNX80/GNS480 Color GPS/NAV/COM		6.10	55.00	335.50
SL30 NAV/COM		2.30	55.00	126.50
Total Removed:		14.00		770.00
Description of items added to aircraft		**Weight (lb)**	**Arm (in)**	**Moment (lb-in)**
GTN 750		9.30	54.90	510.57
GTN 650		7.00	54.90	384.30
GMA 35		2.20	52.90	116.38
Total Added:		18.50		1011.25
Change		4.50		241.25
New Aircraft Weight and Balance	**Useful Load (lb)**	**Empty Weight (lb)**	**C.G. (in)**	**Moment (lb-in)**
Calculated: 08/29/12	1088.8	2311.2	138.66	320475.21

3.6 Electrical Installation Procedure

3.6.1 Special Tools Required

A crimp tool meeting MIL specification M22520/2-01 and a positioner/locator are required to ensure consistent, reliable crimp contact connections for the rear D-sub connectors. Refer to Table 2-14 for a list of recommended crimp tools. A milliohm meter is required to check GTN and optional GMA 35 installation bonding to aircraft structure or instrument panel.

3.6.2 Wire Harness Buildup

The installation kit for the GTN and optional GMA 35 include connectors and crimp contacts. Use wire specified in Section 2.3.2 for all connections. Make the crimp connections with a crimp tool as specified in Table 2-14.

Refer to the interconnect diagrams in Appendix E and Appendix F for the appropriate connections. Use 22 or 24 AWG wire for all connections. For power and ground, use the wire gauge specified in the interconnect drawing in Appendix E, then 22 AWG for the short length from the splice to the connector, for high-density connectors only. Install the configuration module as described in Section 3.6.3.2. Once the cable assemblies have been made, use anti-chafe tape and attach the backshell/connector to the rear of the mounting unit. Route the wiring bundle as appropriate. Avoid sharp bends that may damage the wire bundle.

Allow adequate space for installation of cables and connectors. The installer supplies and fabricates all of the cables. See interconnect diagrams in Appendix E and Appendix F. Refer to Section 4 for connector pinout information. All electrical connections to the GTN are made through the following connectors provided by Garmin:

- J1001 Main – 78-pin high-density D-Subminiature connector (male)
- J1002 Main – 26-pin high-density D-Subminiature connector (male)
- J1003 COM – 44-pin high-density D-Subminiature connector (male) (GTN 635/650/750 only)
- J1004 NAV – 62-pin high-density D-Subminiature connector (male) (GTN 650/750 only)
- J1005 I/O – 62-pin high-density D-Subminiature connector (male) (GTN 7XX only)

All electrical connections to the GMA 35 are made through the following connectors provided by Garmin:

- J3501 – 44-pin high-density D-Subminiature connector (male)
- J3502 – 44-pin high-density D-Subminiature connector (male)

Construct the wiring harness according to the information contained in this and the following sections. Cable lengths will vary depending upon installation. Strip all wires going to the connectors 0.17”. Insert the wire into the pin and crimp with one of the recommended (or equivalent) crimping tools. Insert the pin into the connector housing location as specified by the interconnect drawing in Appendix E. Verify that the pin is properly engaged into the connector by gently tugging on the wire. Route and secure the cable runs from the GTN and GMA 35 away from sources of electrical noise.

Section 4 provides the pin-out information for the GTN as well as the GMA 35. Required connectors and associated hardware are supplied with the connector kits.

CAUTION

Check wiring connections for errors before inserting the unit into the tray. Incorrect wiring could cause component damage.

Table 3-7. Socket Contact Part Numbers [1]

Wire Gauge	P1001-P1005 (including P1001 configuration module) [2]
	22-28 AWG
Garmin	336-00021-00
Military	M39029/58-360 [3]
AMP	204370-2 [3]
Positronic	MC8522D [3]
ITT Cannon	030-2042-000 [3]

[1] Recommended crimp tools are listed in Table 2-14.
[2] For configuration module pins, ensure that the crimp tool is set to crimp 28 AWG wire (indenter setting of ‘4’).
[3] Non-Garmin part numbers shown are not maintained by Garmin and are subject to change without notice.

3.6.3 Backshell Assembly and D-Subminiature Connectors

The GTN connector kits (P/N 011-02325-00 [GTN 625], P/N 011-02325-01 [GTN 635], P/N 011-02325-02 [GTN 650], P/N 011-02326-00 [GTN 725], and P/N 011-02326-01 [GTN 750]) include Garmin backshell assemblies and Garmin ground adapter assemblies. Backshell connectors give the installer the ability to terminate shield grounds at the backshell housing using the shield block ground kit. Table 3-8 lists Garmin part numbers for the D-sub connectors and the backshell assemblies.

Table 3-8. GTN Backshell Assembly

Figure 3-2 thru Figure 3-5 Ref	Description	Garmin P/N	Notes
1	Backshell (P1001) Backshell (P1002) Backshell (P1003) Backshell (P1004, P1005)	125-00085-00 125-00082-00 125-00083-00 125-00084-00	[2]
2	Shield block (P1002, P1003) Shield block (P1001, P1004, P1005)	117-00147-00 117-00147-01	[3]
3	Screw, 4-40 x.250, FLHP100°, SS/P, Nylon	211-63234-08	[3], [4]
6	Screw, 4-40 x.375,PHP,SS/P, w/Nylon	211-60234-10	[2]
7	Strain Relief (P1001, P1004, P1005) Strain Relief (P1002) Strain Relief (P1003)	115-00499-03 115-00499-01 115-00499-02	[2]
8	Cover (P1001) Cover (P1002) Cover (P1003) Cover (P1004, P1005)	115-00500-04 115-00500-01 115-00500-02 115-00500-03	[2]
9	Screw,4-40x.187, FLHP100,SS/P, w/Nylon	211-63234-06	[2]
10	Connector, D-Sub, HD, 78 Pin (P1001) Connector, D-Sub, HD, 26 Pin (P1002) Connector, D-Sub, HD, 44 Pin (P1003) Connector, D-Sub, HD, 62 Pin (P1004) Connector, D-Sub, HD, 62 Pin (P1005)	330-00185-78 330-00185-26 330-00185-44 330-00185-62 330-00185-62	[4]
11	Multiple Conductor Shielded Cable (See Interconnect Diagrams, Appendix E)	As Required	[5]
12	Shield Terminator	As Required	[5], [6]
13	Wire, Insulated (20-22 AWG), 3" max length	As Required	[5], [6]
14	Pin Contacts, #22D	336-00021-00	[4]
15	Ring terminal, #8, insulated, 18-22 AWG, 14-16 AWG, 12–10 AWG	MS25036-149, MS25036-153, MS25036-156	[5], [7]
16	Screw, PHP, 8-32x.312", Stainless or Cad Plated Steel	MS51957-42, MS35206-242	[5], [7]
17	Split Washer, #8, (.045" compressed thickness) Stainless or Cadmium plated steel	MS35338-137, MS35338-42	[5], [7]
18	Flat Washer, #8, .032" thick, .174"ID, .375" OD, Stainless or Cad Plated Steel	NAS1149CN832R, NAS1149FN832P	[5], [7]
19	Silicon Fusion Tape	249-00114-00	[5]

[1] All items are applicable to P1001, P1002, P1003, P1004, and P1005 unless otherwise specified.
[2] Supplied as part of Backshell Kits P/N 011-00950-04 (P1001), P/N 011-00950-01 (P1002), P/N 011-00950-02 (P1003) and P/N 011-00950-03 (P1004 and P1005).
[3] Supplied as part of Ground Adapter Kits P/N 011-01169-01 (P1001, P1004, P1005) and P/N 011-01169-00 (P1002, P1003).
[4] Supplied as part of GTN Connector Kit P/N 011-02325-00 (GTN 625), P/N 011-02325-01 (GTN 635), P/N 011-02325-02 (GTN 650), P/N 011-02326-00 (GTN 725), and P/N 011-02326-01 (GTN 750).
[5] Not supplied – must be purchased separately.
[6] Solder sleeve with pre-installed braid strap may be used instead of items 12 and 13.
[7] Not a Garmin part number.

Table 3-9. GMA 35 Backshell Assembly

Figure 3-2 thru Figure 3-5 Ref	Description	Garmin P/N	Notes
1	Backshell	125-00083-00	[2]
2	Shield block	117-00147-00	[3]
3	Screw, 4-40x.250, FLHP 100, SS/P	211-63234-08	[3]
6	Screw, 4-40x.437, FLHP100, SS/P, Nylon	211-60234-11	[2]
7	Strain Relief	115-00499-02	[2]
8	Cover	115-00500-02	[2]
9	Screw, 4-40x.187, FLHP100, SS/P, w/Nylon	211-63234-06	[2]
10	Connector, D-Sub, HD, 44 Pin	330-00185-44	[4]
11	Multiple Conductor Shielded Cable	As Required	[5]
12	Shield Terminator	As Required	[5], [6]
13	Wire, Insulated (20-22 AWG), 3” max length	As Required	[5], [6]
14	Pin Contacts, #22D	336-00021-00	[4]
15	Ring terminal, #8, insulated, 18-22 AWG,	MS25036-149	[5], [7]
16	Screw, PHP, 8-32x.312", Stainless or Cad Plated	MS51957-42,	[5], [7]
17	Split Washer, #8, (.045" compressed thickness)	MS35338-137	[5], [7]
18	Flat Washer, #8, .032" thick, .174"ID, .375" OD, Stainless or Cad Plated Steel	NAS1149CN832R, NAS1149FN832P	[5], [7]
19	Silicon Fusion Tape	249-00114-00	[5]

[1] All items are applicable to P3501 and P3502 unless otherwise specified.
[2] Supplied as part of Backshell Kit P/N 011-00950-02 (P3501 and P3502).
[3] Supplied as part of Ground Adapter Kit P/N 011-01169-00 (P3501 and P3502)
[4] Supplied as part of GMA 35 Connector Kit P/N 011-02302-00
[5] Not supplied – must be purchased separately.
[6] Solder sleeve with pre-installed braid strap may be used instead of items 12 and 13.
[7] Not a Garmin part number.

3.6.3.1 Shield Block Assembly Procedure

The parts for the connector and backshell assemblies for the GTN installation are listed in Table 3-8. The parts for the connector and backshell assemblies for the GMA 35 installation are listed in Table 3-9.

Backshell connectors give the installer the ability to terminate shield grounds at the backshell housing using the Shield Block ground kit. Table 3-8 and Table 3-9 list Garmin part numbers for the GTN and GMA 35 D-sub connectors and the backshell assemblies.

The three tapped holes on the shield block above the GTN fan must not be used for grounding shield terminal lugs on P1001. There is insufficient clearance between the fan case and the P1001 shield block to allow these holes to be used for grounding shield terminal lugs. Refer to Section 3.6.4 for more information. If the remaining three tapped holes on the shield block are unable to accommodate the shield terminal lugs, the extra shields can be daisy chained to allow the shields to be grounded to the shield block. A maximum of two shields can be daisy chained together. The daisy chaining method must only be used if the three tapped holes are insufficient to ground the shields on P1001. See Figure 3-3 for the daisy chaining method.

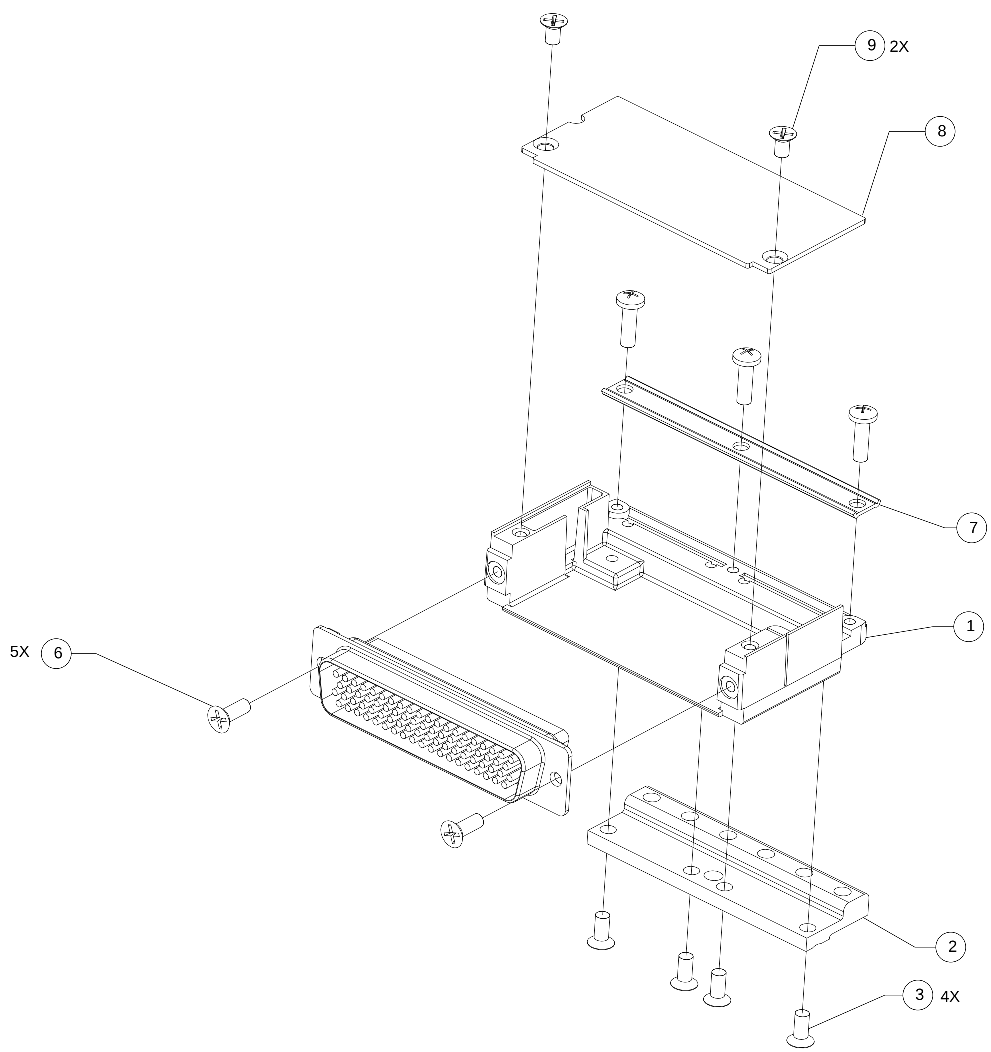
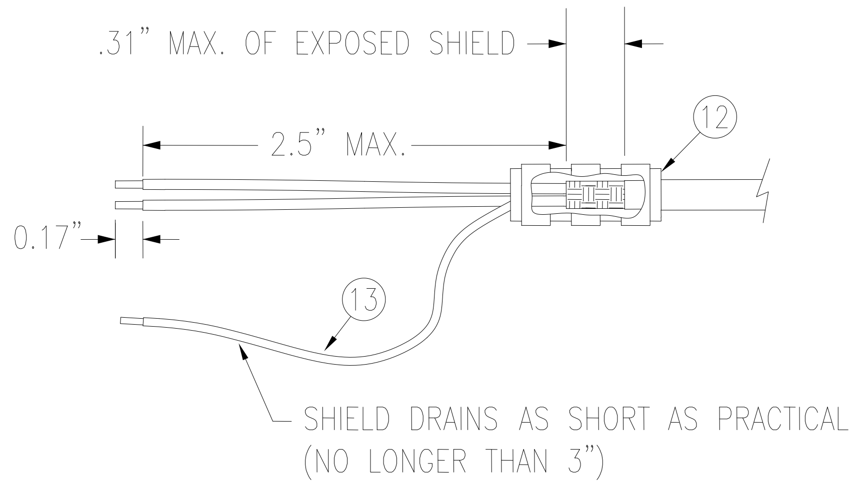
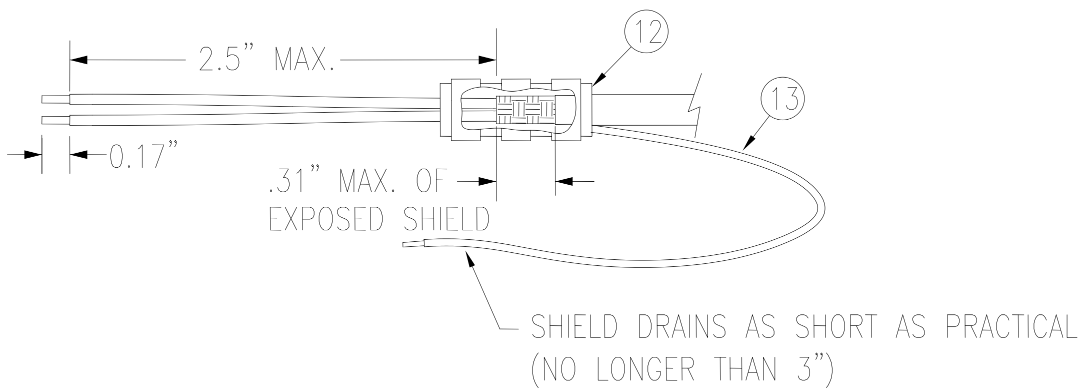


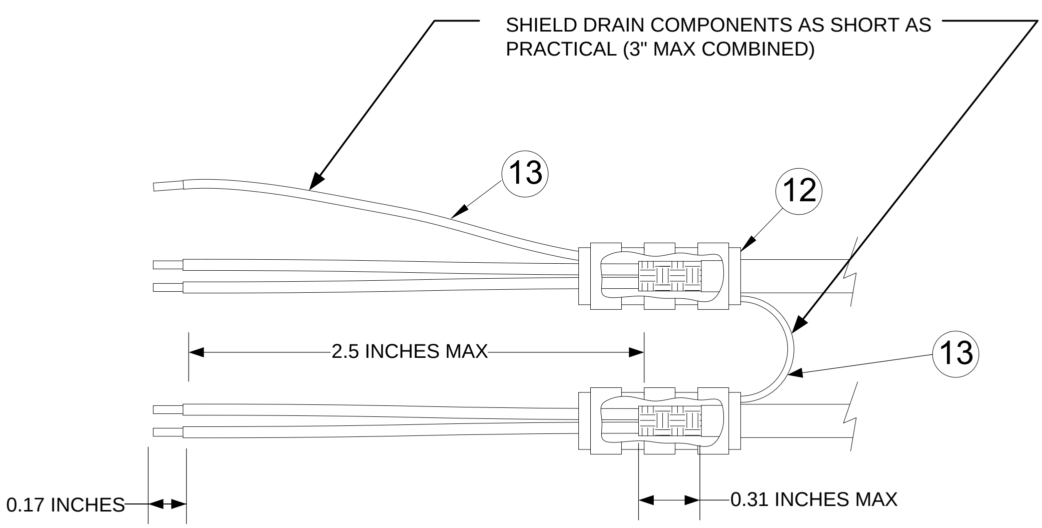
Figure 3-2. Connector and Backshell Assembly



PREFERRED METHOD



ALTERNATE METHOD 1



ALTERNATE METHOD 2 (DAISY CHAIN)

Figure 3-3. Shielded Cable Preparation

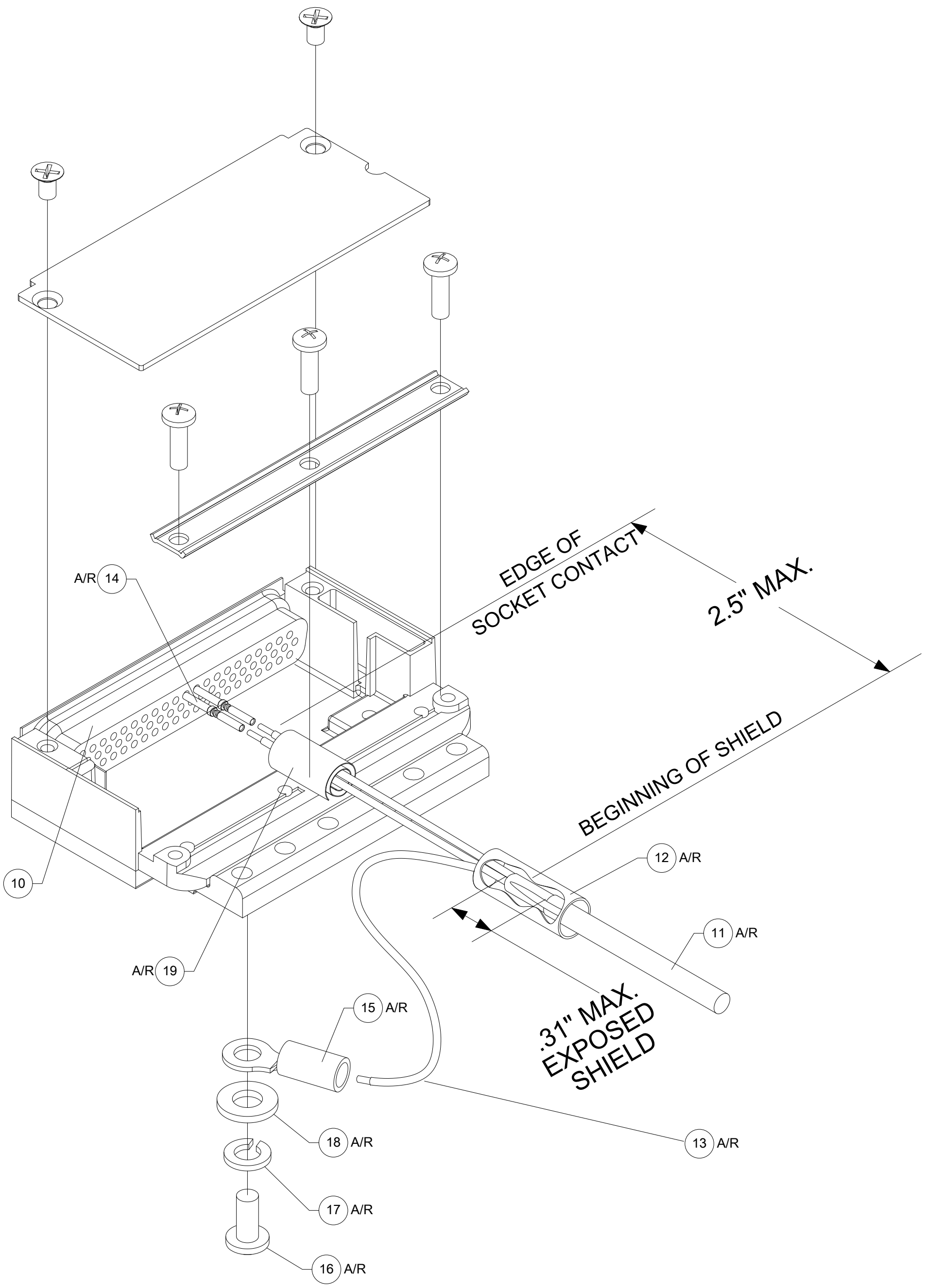


Figure 3-4. Shield Termination on Backshell Assembly (Preferred Method)

The screws (16) used to ground the shields to the shield block must not penetrate too far past the shield block when installed. If the screws are too long, they could potentially damage the wires going into the backshell.

Note that a maximum of three ring terminals per screw is allowed for grounding shields to the shield block. A maximum of two shield drains may be inserted into each ring terminal, meaning that one shield block grounding screw (16) may accommodate grounding of up to six shield drains. Figure 3-4 shows how to terminate the shields on the backshell. Note that only two wires are shown for clarity; the actual installation will utilize more than two wires.

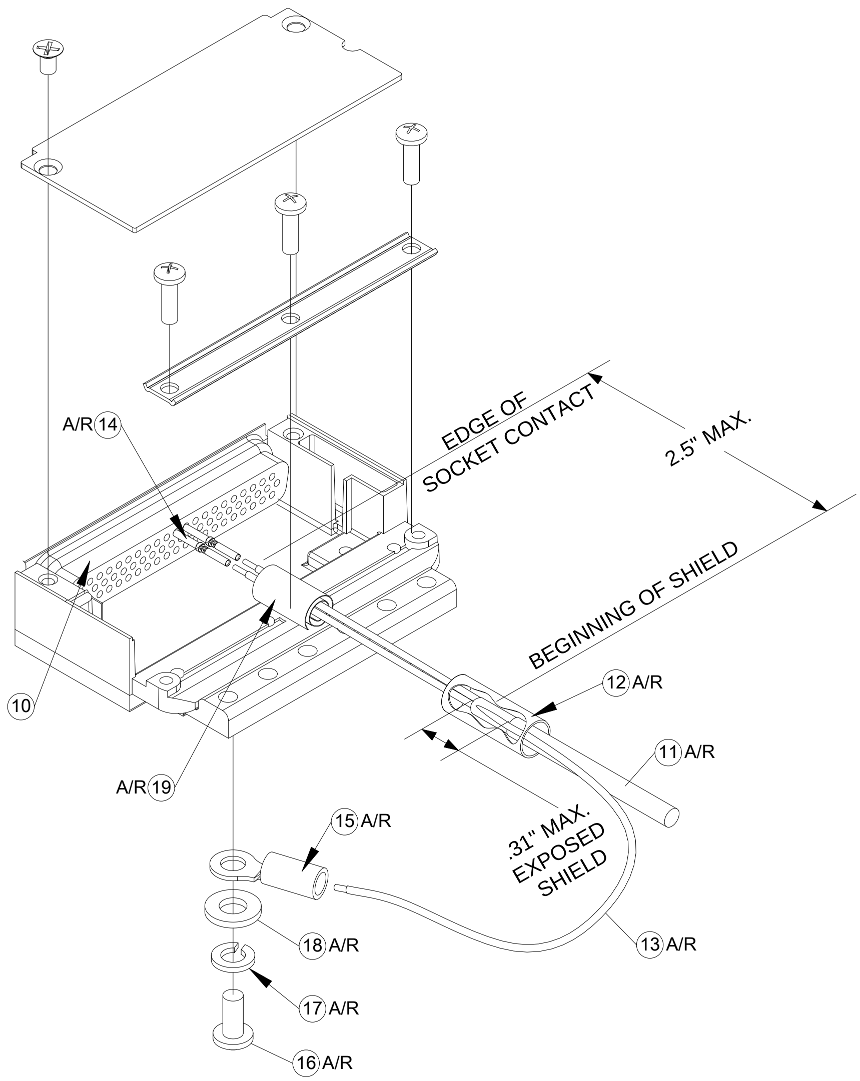


Figure 3-5. Shield Termination on Backshell Assembly (Alternate Method)

Prepare all of the shielded cables as shown in Figure 3-3. Refer to Figure 3-5 for details of the shield termination to the connector backshell. Skip to step 5 below for wires with no shielding.

1. At the end of the shielded cable (11), strip back a 2.5” maximum length of the jacket to expose the braid. Remove this exposed braid. Carefully score the jacket 1/4” to 5/16” from the end and remove the jacket to leave the braid exposed.

NOTE

Solder sleeves with pre-installed shield drains should be used instead of separate shield terminators and individual wires, although separate shield terminators and individual wires can be used.

2. Connect a 20 or 22 AWG wire (13) to the exposed shield of the prepared cable assembly. (See Figure 3-2). AC 43.13-1B Chapter 11 may be a helpful reference for termination techniques. Note that 3 methods are shown in Figure 3-2. The Daisy-Chain method should only be used on P1001 if there are insufficient holes in the shield block to accommodate the shields. Limit the combined length of the daisy chained shields to 3” maximum.

NOTE

A preferred solder sleeve is the Raychem S03 Series with the thermochromic temperature indicator. These solder sleeves come with a pre-installed lead and effectively take the place of items 12 and 13. For detailed instructions on product use, refer to Raychem installation procedure.

3. Slide a shield terminator (12) onto the prepared cable assembly (11) and connect the wire (13) to the shield using a heat gun approved for use with solder sleeves. The chosen size of solder sleeve must accommodate both the number of conductors present in the cable and the wire (13) to be attached.
4. Repeat steps 1 through 3 as needed for the remaining shielded cables. Note that a maximum of 2 shields can be daisy-chained together.
5. Crimp pins/sockets (14) onto the wires and terminate in the connector (10) in accordance with the aircraft wiring drawings.
6. For P1001, install the configuration module wires into the connector. Refer to Section 3.6.3.2 for instructions on installing the configuration module.

Complete the following steps to assemble the backshell onto the connector:

1. Attach the Shield Block (2) to the backshell (1) by inserting the flathead screws (3) through the holes on the Shield Block and threading into the tapped holes on the backshell (1) (See Figure 3-2).
2. Wrap the cable bundle with Silicone Fusion Tape (19 or a similar version) at the point where the backshell strain relief and cast housing will contact the cable bundle.
3. Place the smooth side of the backshell strain relief (7) across the cable bundle and secure using the three screws (6). Ensure that each half of the strain relief bar is supporting half of the cable bundle.

CAUTION

Placing the grooved side of the strain relief across the cable bundle may damage wires.

4. For P1001, install the configuration module into the connector backshell. Refer to Section 3.6.3.2 for instructions on installing the configuration module into the backshell.
5. Attach the cover (8) to the backshell using two screws (9).

NOTE

Each tapped hole on the shield block (2) may accommodate only three ring terminals (15). Two wires per ring terminal will necessitate the use of a ring terminal, #8, insulated, 14-16 AWG (MS25036-153). Each hole in the shield block can accommodate six shield drains.

6. Install ring terminals (15) onto the wires (13), grouping wires as appropriate for the connector.
7. Terminate the ring terminals to the shield block (2) by placing items on the pan head screw (16) in the following order: split washer (17), flat washer (18), first ring terminal, second ring terminal if needed, before finally inserting the screw into the tapped holes on the shield block.
8. Insert the assembled connector into the backplate. Using screws (6), secure the connector into the backplate.

3.6.3.2 Configuration Module Installation (P1001 only)

GTN P1001 connector assemblies serve as the housing for a configuration module. This sections lists configuration module assemblies for new and existing GTN installations.

Table 3-10. Configuration Module Wire Color Reference Chart

Color	Function	P1001 Contact
Red	Vcc	65
Black	Ground	64
Yellow	Data	62
White	Clock	63

NOTE

The pin contacts supplied with the GTN configuration module are specifically made to accommodate 28 AWG wire. The crimp tool should have the indenter set to the correct setting when crimping these contacts to the configuration module harness.

3.6.3.2.1 Configuration Module Assembly with Potted PCB (new installations)

Refer to Figure 3-6 for details and item numbers referenced in the following procedure.

1. Strip 0.17” of insulation from each wire prior to crimping.
2. Crimp pins (4) onto each wire of the four-conductor wire harness (3).
5. Insert the newly crimped pins and wires (3, 4) into the appropriate connector housing (5) locations shown in Figure 3-6 and Figure E-4.
6. Plug the four-conductor wire harness (3) into the connector on the PCB (1).
7. Insert the PCB (1) into the backshell (6) recess.
8. Attach cover (7) to backshell (6) using screws (8).

Table 3-11. Configuration Module Kit 011-00979-03 (P1001)

Figure 3-6 Reference	Description	Garmin P/N
1	Configuration Module, PCB Board Assembly w/EEPROM	011-02178-00
3	4-Conductor Harness	325-00122-00
4	Pin Contact, Crimp, #22D	336-00021-00

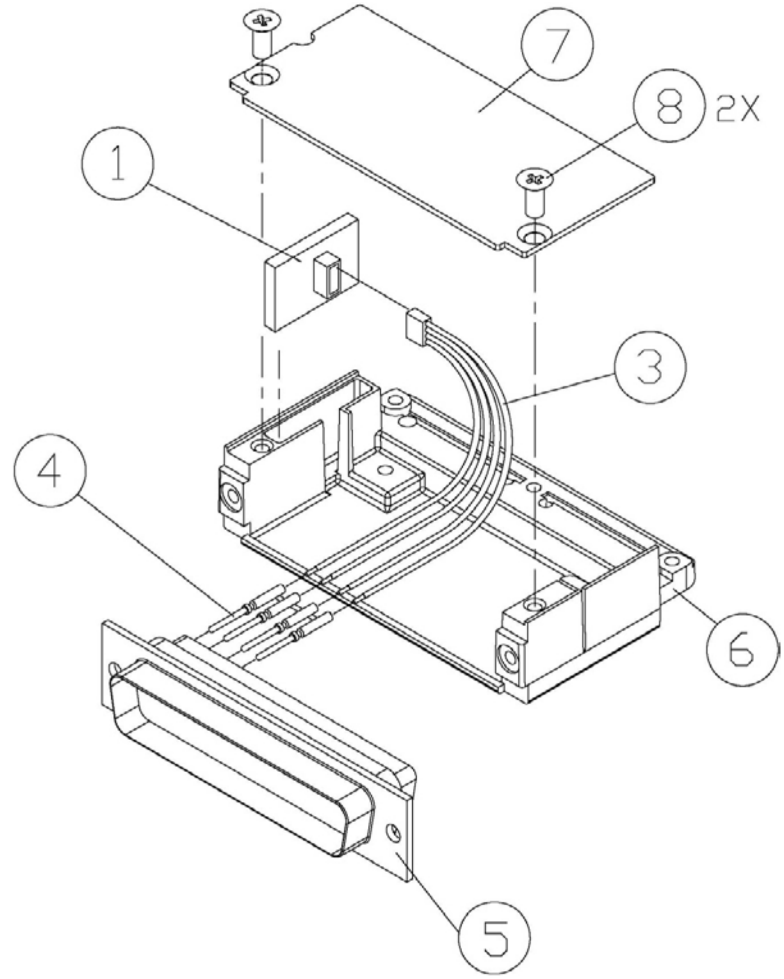


Figure 3-6. Backshell Assembly (Potted Configuration Module)

3.6.3.2.2 Configuration Module Assembly with Spacer (existing installations)

NOTE

Configuration module assembly P/N 011-00979-00 may not be available for new GTN installations. For new GTN installations, refer to Section 3.6.3.2.1.

Table 3-12. Configuration Module Kit 011-00979-00 (P1001)

Figure 3-7 Reference	Description	Garmin P/N
1	Configuration Module, PCB Board Assembly w/EEPROM	012-00605-00
2	Spacer, Configuration Module	213-00043-00
3	4-Conductor Harness	325-00122-00
4	Pin Contact, Crimp, #22D	336-00021-00

Refer to Figure 3-7 for details and item numbers referenced in the following procedure.

1. Strip 0.17" of insulation from each wire prior to crimping.
2. Crimp socket contacts (4) onto each wire of the four-conductor wire harness (3).
3. Insert newly crimped socket contacts and wires (3, 4) into the appropriate connector housing location shown in Figure 3-7 and Figure E-4.
4. Apply the spacer (2) by wrapping it around the PCB board (1) making sure to insert the plastic connector mounted on the board into the hole provided in the spacer.
5. Plug the four-conductor wire harness (3) into the connector on the PCB board (1).
6. With pad (2) in position, insert PCB board (1) into the backshell recess.
7. Orient the connector housing so that the inserted four conductor wire harness (3) is on the same side of the backshell as the inserted PCB board (1).

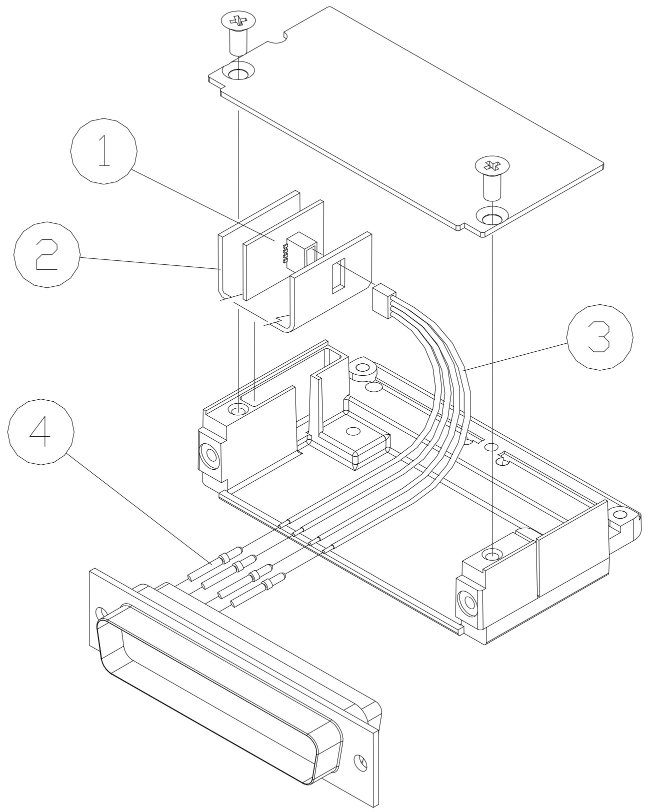


Figure 3-7. Backshell Assembly (Configuration Module with Spacer)

3.6.4 GTN Fan Installation

CAUTION

To avoid damage to the GTN, take precautions to prevent Electro-Static Discharge (ESD) when handling the GTN, connectors, fan, and associated wiring. ESD damage can be prevented by touching an object that is of the same electrical potential as the GTN before handling the GTN itself.

Table 3-13 lists part numbers for the Fan Kit which is used with P1001 only.

Table 3-13. Fan Kit

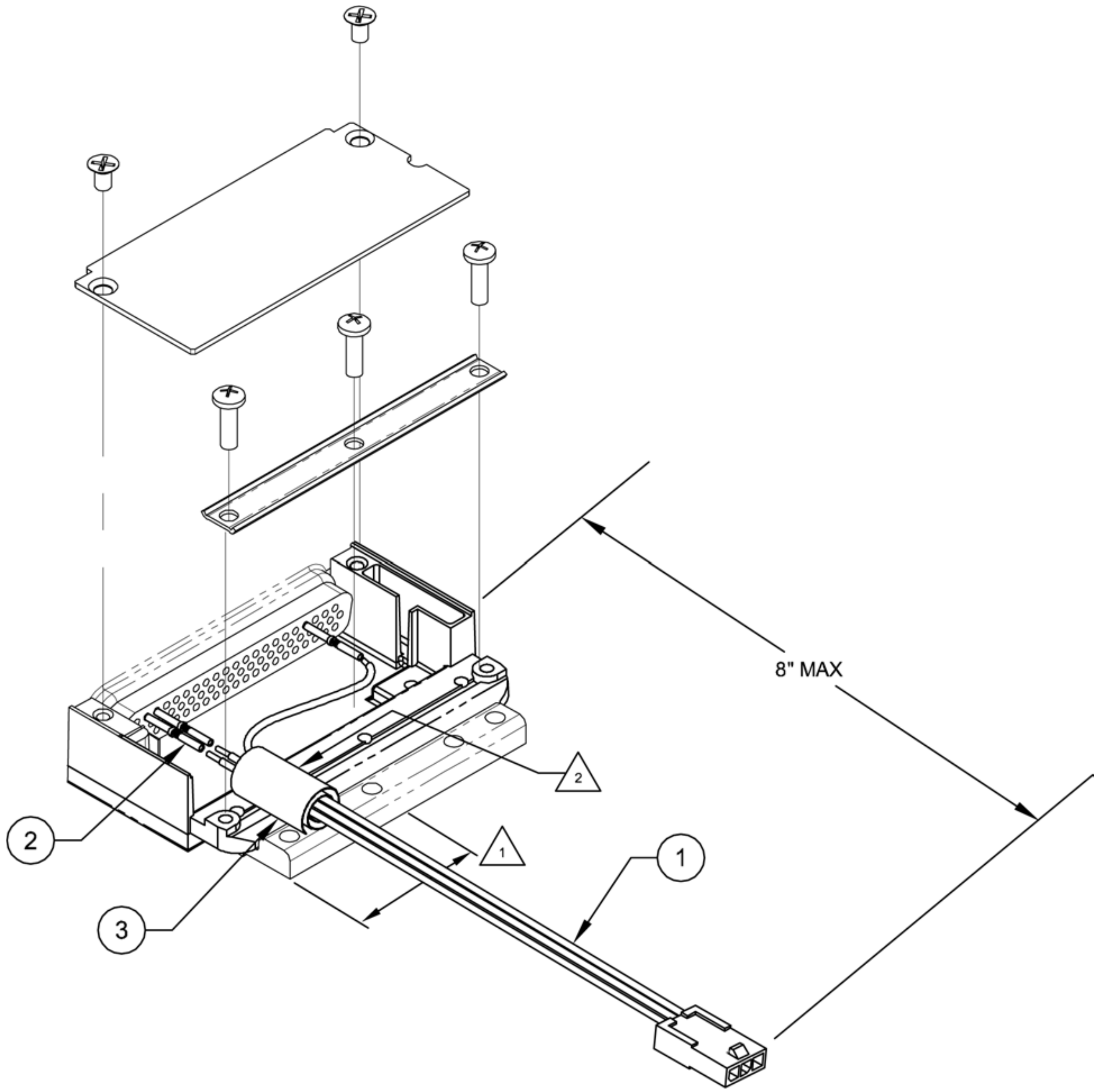
Figure 3-8 Ref	Description	Garmin P/N
1	Fan Cable Assembly, 3 conductor harness	320-00600-00
2	Pin Contact, Crimp, #22D	336-00021-00
3	Silicon Fusion Tape	249-00114-00

Table 3-14. Fan Cable Wire Color Reference Chart

Color	Function	P1001 Contact
Red	Power	59
Black	Ground	43
Yellow	Fan tach	58

The GTN backplate assembly has a cooling fan mounted to it. The cooling fan is mounted to the backplate assembly at the factory. The fan is necessary for proper cooling and air circulation within the unit. The fan is powered from the GTN and must be wired to the GTN connector, P1001.

1. Crimp socket contacts onto each wire of the three-conductor wire harness. Strip 0.17” of insulation from each wire prior to crimping. Insert newly crimped socket contacts and wires into the appropriate connector housing location as shown in Figure 3-8 and the interconnect drawings in Appendix E.
2. Plug the three-conductor wire harness connector into the connector on the fan.



1 Do not use 3 tapped holes on shield block above the fan. There is insufficient clearance between the fan casing and terminal lugs.

2 Wrap fan wires with fusion tape separately from the main harness to prevent the fan wires from being dislodged or damaged if there is movement between the main harness and the fan harness.

3 Ensure the fan wires do not exceed a length of 8 inches.

Figure 3-8. Fan Wiring Installation

3.6.5 TVS, Fuse and Resistor Installation *(nonmetallic aircraft only)*

This section applies to IFR, nonmetallic aircraft only. VFR, non-metal aircraft do not require the use of TVSs or fuses.

Certain nonmetallic aircraft will require TVSs at the main and NAV power inputs of the GTN. Refer to Appendix G to determine which aircraft require them. Refer to Section 2.3.2.4 for TVS component part numbers.

3.6.5.1 TVS/Fuse Installation

NOTE

Only TVS1/F1 are installed as described below. The TVS2 assembly uses standard terminal lugs and should be installed in accordance with the notes on the applicable interconnect diagram in Appendix E.

For all TVS/fuse assemblies that are required for lightning protection, install them in accordance with Figure 3-11 and the notes on the applicable interconnect diagram in Appendix E.

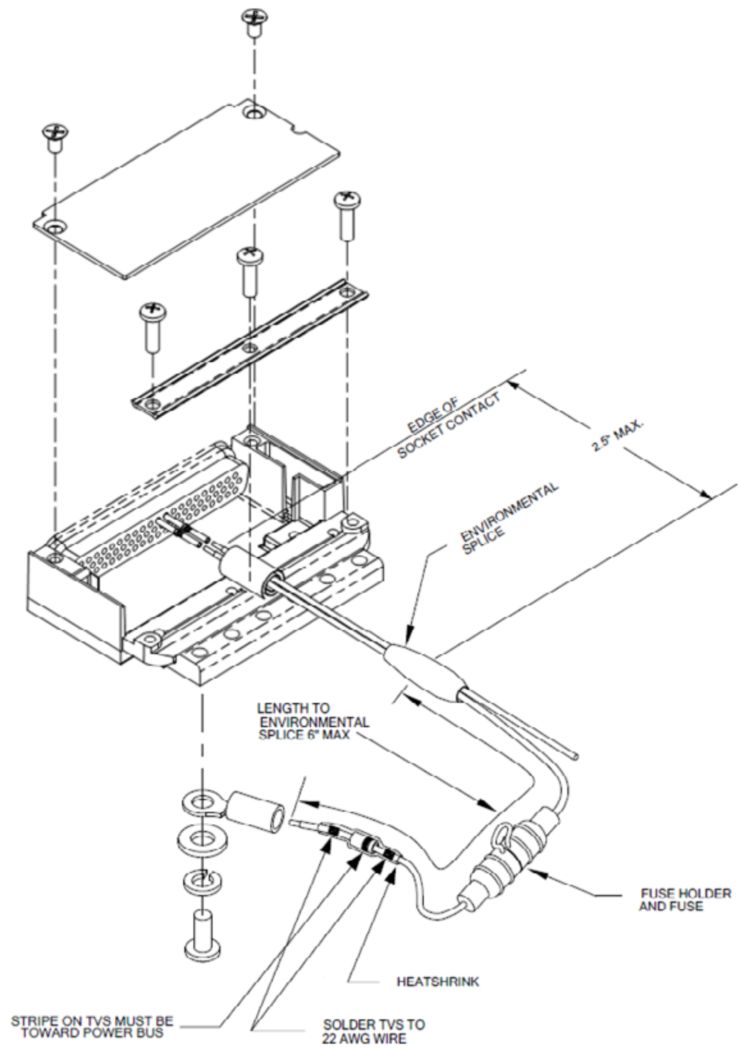


Figure 3-9. TVS/Fuse Installation (TVS1/F1)

3.6.5.1.1 TVS2 Assembly (Nonmetallic Aircraft Only)

Certain nonmetallic aircraft will require a TVS assembly at the power bus that supplies power to the GTN (refer to Appendix G to determine which aircraft require them). Refer to Section 2.3.2.4 for component part numbers. Refer to Figure E-4 for interconnect drawings that show the TVS installed.

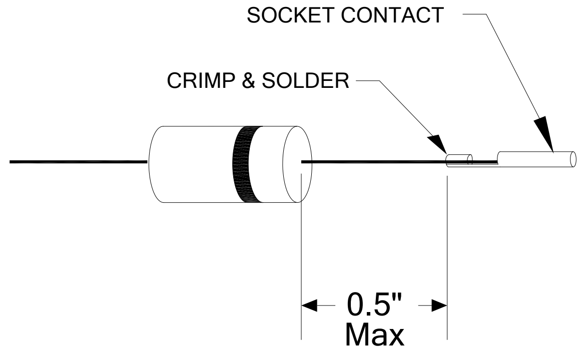


Figure 3-10. Detail of TVS Pin Assembly

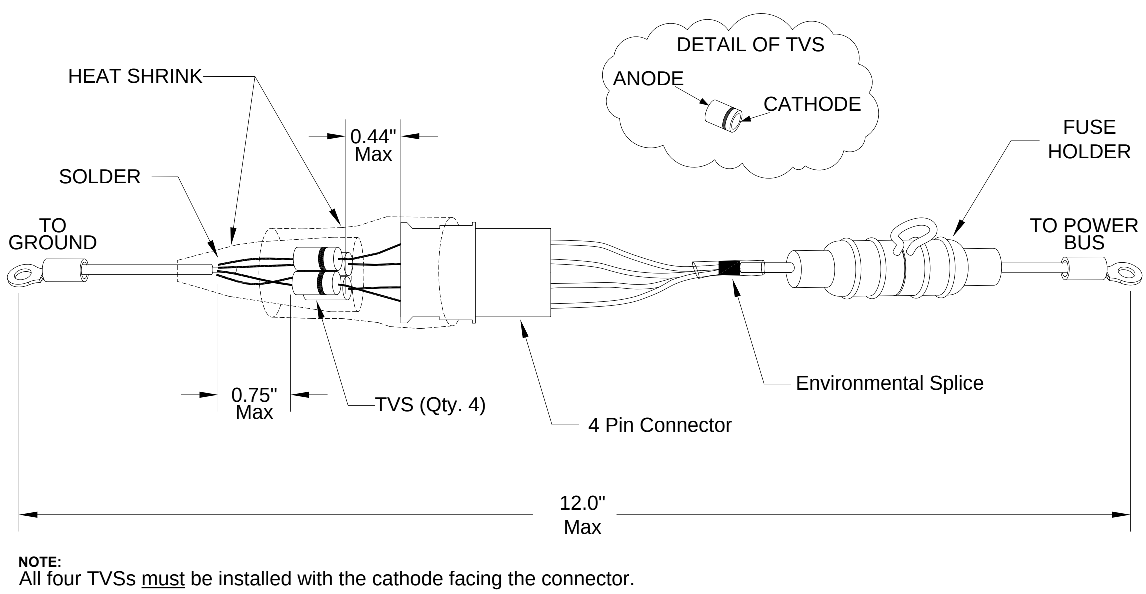


Figure 3-11. TVS 2 Assembly

3.6.5.1.2 TVS2 Fabrication

1. Cut the TVS leads to 0.75+0.00/-0.10 inches on both sides.
2. Crimp and solder each of the four TVS banded side (cathode) leads to their connector specific sockets (refer to Figure 3-10), and insert into the 4-pin connector with sockets.
3. Install heat shrink around the four TVSs – this will help to hold them in place during the following steps.

3.6.5.1.3 TVS2 Assembly Build

Refer to Figure 3-11 while completing the following steps.

1. Solder the four leads at the anode (ground) end of the assembly onto a length of 18 AWG wire. Attach a terminal lug onto the wire end.
2. Attach an appropriately sized piece of heat shrink to cover the soldered TVS leads and four TVS pieces. A second appropriately sized (larger) piece of heat shrink should then be attached to shrink over the 4-pin connector with sockets and back over the four TVSs. These two pieces of heat shrink should overlap along the entire length of the TVSs.
3. Crimp and solder four 18 AWG wires to their connector specific pins, and insert them into the 4-pin connector with pins.
4. Attach lengths of 18 AWG to both ends of the fuse and fuse holder assembly.
5. Splice the four wires from the connector with pins to one of the wires attached to the fuse assembly.
6. Attach a terminal lug onto the 18 AWG coming from the other end of the fuse assembly.
7. Connect the two four-pin connectors together.
8. Ensure that the fuse is installed in the fuse holder.

3.6.5.1.4 TVS2 Assembly Polarity Check

Using a multimeter that is set to the diode mode, check conductivity across the entire TVS2 assembly. In one direction, the meter should read open and in the other direction it should read 2.0 to 2.5 volts. When installed in the aircraft, the TVS assembly should be oriented so that it does not normally conduct from power to ground. The meter should indicate open when the red lead is attached to the power bus terminal lug, and the black lead is attached to the ground terminal lug. The meter should indicate 2.0 to 2.5 volts when the red lead is attached to the ground terminal lug, and the black lead is attached to the power bus terminal lug.

3.6.5.1.5 TVS2 Assembly Installation

Refer to Figure E-4 while completing the following steps.

1. Attach the fuse (power) end of the TVS assembly to the power bus at the specific point detailed in the drawing.
2. Attach the ground end of the TVS2 assembly to aircraft ground.

3.6.6 Coaxial Cable Termination

Follow the steps below for installation of coaxial cables:

1. Route the coaxial cable to the radio rack location, keeping in mind the recommendations above. Secure the cable in accordance with AC 43.13-1B Chapter 11, Section 11. If overbraid is required on the GPS antenna coaxial cable, refer to Figure 3-1.
2. Trim the coaxial cable to the desired length and install the TNC or BNC connectors per the cabling instructions in Figure 3-12 below. If the connector is provided by the installer, follow the connector manufacturer's instructions for cable preparation.

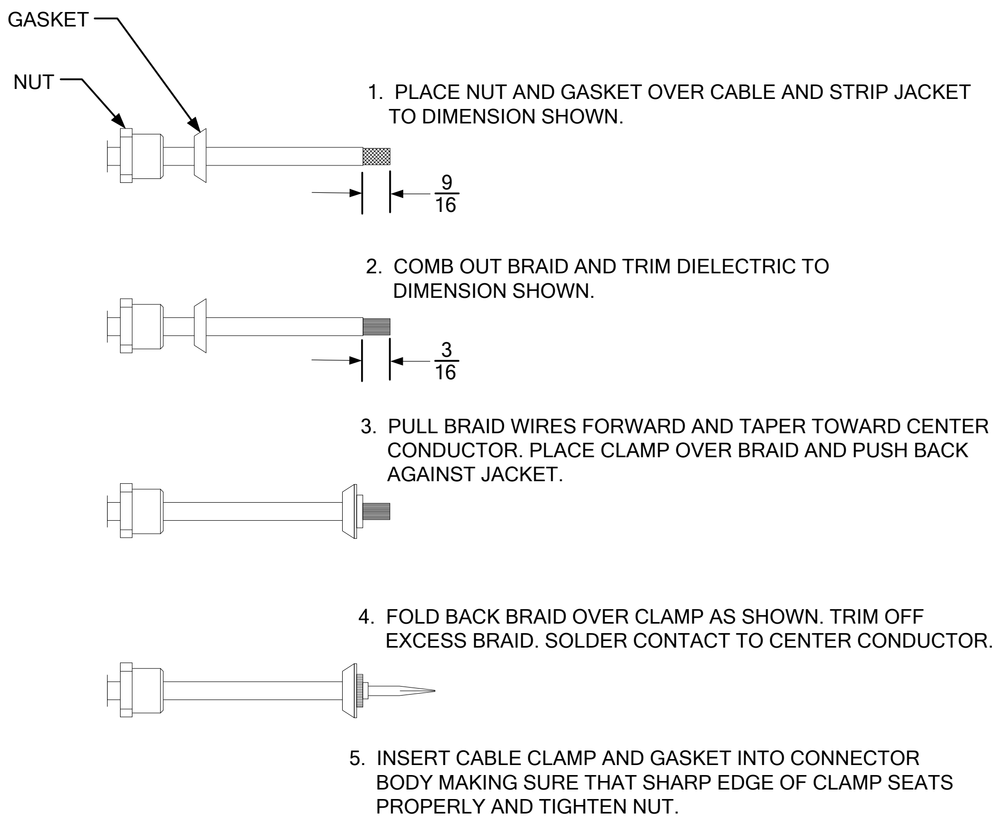


Figure 3-12. Coaxial Cable Installation

3.6.7 Marker Beacon Antenna Cable Termination

This section provides guidance for terminating the coaxial cable into the D-Sub connector. See Appendix F for pin assignments. RG-400 coaxial cable is recommended for the marker beacon antenna. Since RG-400 is too thick to fit through the backshell strain relief, RG-179 or RG-188 may be used instead. Route the cable to the D-Sub as described in Section 2.4.11.

When terminating the coaxial cable into the D-Sub observe the following guidance (refer to Figure 3-13)

- Keep the distance from the end of the exposed shield to D-Sub as short as practical.
- Ensure the distance from the beginning of the exposed shield to D-Sub is no more than 1.5 inches long.
- Terminate the center conductor by directly connecting it to the D-sub through a crimp pin without a pigtail.

Figure 3-13 below represents a suggested method for terminating the marker beacon coaxial cable using RG-188 terminated into a high density D-Sub connector. Refer to Table 2-14 for Crimp Tool, Pin, and Crimp Tool Insert part numbers. Terminate the antenna end with a BNC-F connector and attach to the marker beacon antenna.

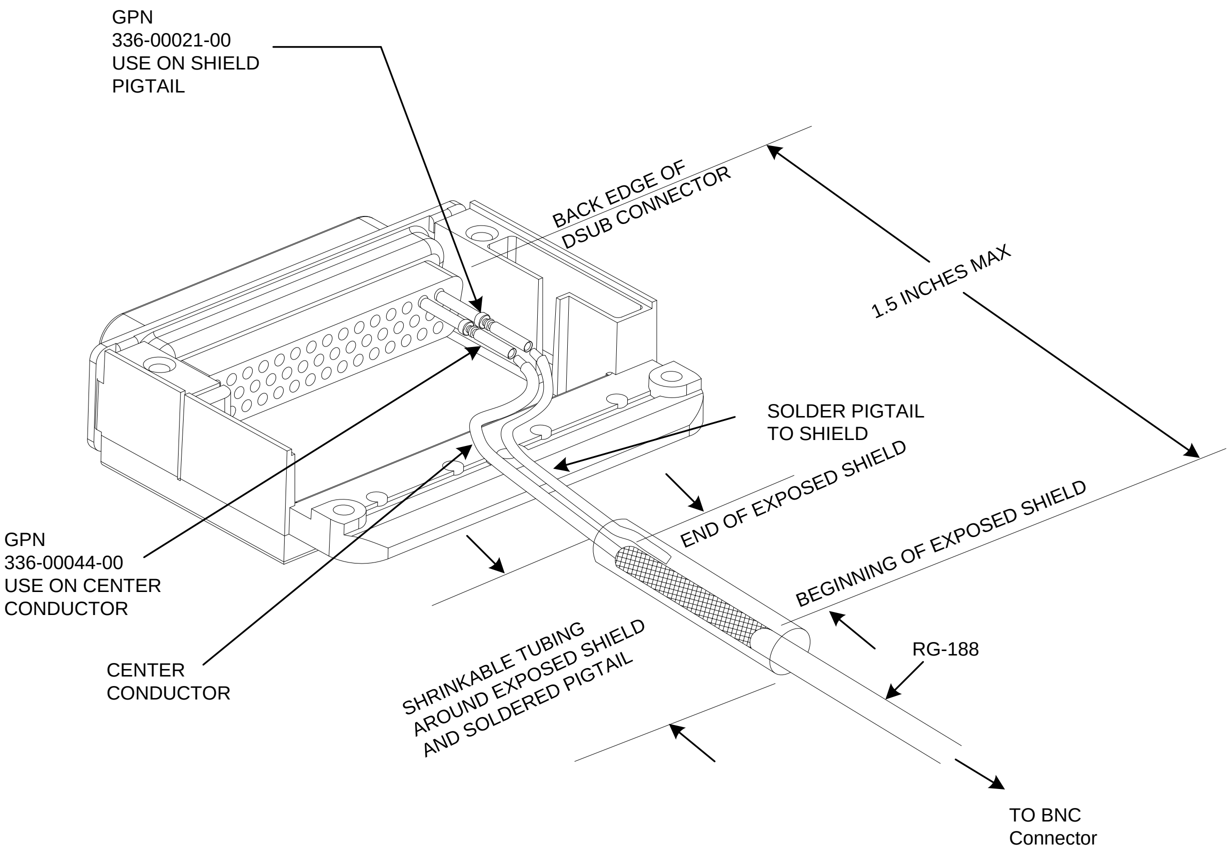


Figure 3-13. GMA 35 Marker Beacon Coaxial Cable D-Sub Termination

3.6.8 Instrument Panel Bonding Procedure

If the instrument panel is electrically isolated from the aircraft structure, additional bonding may also be required for the installation. A copper bonding strap with cross sectional area greater than 0.016 sq inches (approx 20816 circular mils) is required. A 7/16-inch or wider QQ-B-575B (24120 circular mils) overbraid meets this requirement. The strap length should be as short as possible and must not exceed six inches in length. The installation shall be such that it avoids the bonding strap looping back on itself. Refer to Section 2.3.2.5 for hardware specifications. Complete the installation using the following procedure along with the guidance in AC 43.13-2B, *Acceptable Methods, Techniques, and Practices - Aircraft Alterations*, AC 43.13-1B, *Acceptable Methods, Techniques, and Practices – Aircraft Inspection and Repair*, and aircraft make/model specific structural repair documentation, as indicated.

Construct a bonding strap by attaching 5/16-inch inside diameter terminal lugs to both ends of the overbraid.

Prepare the bonding strap installation on the instrument panel with following procedure:

1. Drill a 5/16-inch hole in the instrument panel.
2. Drill a 5/16-inch hole in an existing structure, gusset, or tab of minimum dimensions 1.5"L x 1.5"W x 0.063"T on the aircraft structure; or refer to Section 3.6.8.1 for guidance on attaching the bonding strap to tubular structure.
3. The bonding strap must be electrically bonded to the instrument panel and to the gusset or tab via a spot face at least 0.125” larger in diameter than the bonding strap terminal lug and washer.

Install the bonding strap with the following procedure:

1. Secure one end of the bonding strap to the instrument panel with a 5/16-inch bolt, washers, and nut in accordance with bonding requirements in Section 2.4.5. The washers must seat fully against the panel, without overhang or interference from other hardware.
2. Secure the other end of the bonding strap to the tab with a 5/16-inch bolt and nut in accordance with bonding requirements in Section 2.4.5. The washers must seat fully against the tab, without overhang or interference from other hardware.

3.6.8.1 Attaching Bonding Strap to Tubular Structure

A tab may be welded to the tubular structure, or a conductive clamp may be used with the following limitations. Complete the installation using the following procedures along with the guidance in AC 43.13-2B, *Acceptable Methods, Techniques, and Practices - Aircraft Alterations*, AC 43.13-1B, *Acceptable Methods, Techniques, and Practices – Aircraft Inspection and Repair*, and aircraft make/model specific structural repair documentation, as indicated.

If a gusset or tab on the tubular structure suitable for attaching the bonding strap is not available, add a new tab as follows:

1. Match the aircraft tube structure material with a tab of minimum dimensions 1.5"L x 1.5"W x 0.0.063"T.
2. Weld the tab to the tube.
3. Drill a 5/16-inch hole in the tab.
4. After assembly and bonding check, apply corrosion protection. Apply zinc chromate primer that meets FED STD TT-P-1757, or epoxy primer that meets MIL-P-23377, or other corrosion protection methods listed in the aircraft’s maintenance manual.

If using an electrical bonding clamp, the install must be in accordance with AC 43.13-1B Chapter 11 and the following criteria:

- The AN735 conductive clamp must not be installed in lightning zone 1A, 1B, or 2B.
- Use cadmium plated steel clamp, nut, and washers. Only AN735-6 and larger diameter clamps are permitted.
- Select location to minimize the presence of moisture and allow for easy inspection.
- Remove 0.38” square inches of finish on the tubular frame to ensure required contact surface.
- After assembly and bonding check, prime airframe tube and clamp in accordance with the approved maintenance manual or MIL-PRF-85285 Type I, Color to suit (36081 Flat Gray Preferable) Coating: Polyurethane, Aircraft And Support Equipment, or MIL-PRF-23377 Type I, Class N, Primer Coatings: Epoxy, High-Solids.

3.7 Electrical Load Analysis

A complete electrical load analysis (ELA) must be completed on each aircraft prior to installation to verify that the aircraft electrical system is capable of supporting the GTN and optional GMA 35. If it is determined that the modification results in an increase in electrical load then it must be further verified that the aircraft electrical system remains in compliance which includes both electrical generation capacity, and if loads have been increased, that reserve battery capacity remains adequate to support loads essential to continued safe flight and landing. If the existing battery does not meet the battery capacity requirements, a battery that has sufficient capacity must be installed. The installation of another battery is not approved by this manual and is beyond the scope of this manual and STC. Separate airworthiness approval must be obtained. The Blank Emergency Power Calculation Form, Figure 3-18, may be used for this reserve battery capacity calculation.

ASTM F2490-05, Standard Guide for Aircraft Electrical Load for Power Source Analysis, provides acceptable guidance for conducting a complete analysis of increased electrical load.

As part of the installation it must be shown that the maximum electrical system demand does not normally exceed 80% of the alternator data plate rating. Satisfactory completion of the ELA should be recorded on FAA Form 337. There are several approaches that could be taken, as described in the following sections. For each approach, use the values outlined in Table 1-5.

NOTE

Circuits should be protected in accordance with the approved data in this document (see Appendix E for recommended circuit breaker ratings) and the guidelines in AC 43.13-1B, Chapter 11, Section 4.

3.7.1 Aircraft with Existing Electrical Load Analysis

If there is an existing ELA for the aircraft, this must be updated to reflect the modification. It must show that the alternators/generators have adequate capacity to supply power to the modified systems in all anticipated conditions. Add the applicable typical current draw values from to the existing ELA under continuous operating conditions. Ensure that the new aircraft electrical load does not exceed the rated capacity of the installed generator/alternator. After performing the calculations, if the additional load of the GTN exceeds the rated capacity of the generator/alternator, proceed to the steps in Section 3.7.2. If the additional GTN load still exceeds the generator rated capacity, alternate FAA approval is required for installation of the GTN in the aircraft.

3.7.2 Aircraft without Existing Electrical Load Analysis

Prior to undertaking a complete electrical load analysis, the net change to the electrical load resulting from the GTN installation should be determined (refer to Figure 3-14 for a sample calculation). The results of this analysis will determine how to proceed further.

Items removed from aircraft:	Electrical Load (A) [1]	Comment
GNS 530W (Main Connector)	1.4 A	
GNS 530W (Com Connector)	0.015 A	Used non-transmitting current draw
GNS 530W (NAV Connector)	0.5 A	
PMA 7000M	2.5 A	
Subtotal:	4.415 A	

Items added to aircraft:	Electrical Load (A) [1] [2]	Comment
GTN 750 (Main Connector)	1.2 A	
GTN 750 (Com Connector)	0.21 A	Used non-transmitting current draw
GTN 750 (NAV Connector)	0.3 A	
GMA 35	0.40 A	
Subtotal:	1.91 A	

Net Change in Bus Load:	-2.305 A [3]

[1] Use typical current draw when performing this calculation
[2] Use 28V current draw values for this calculation
[3] To obtain the Net Change in bus load, subtract the 'Items Removed' subtotal from the 'Items Added' subtotal.

Figure 3-14. Sample Net Electrical Load Change Calculation

3.7.2.1 Electrical Load is Reduced Following Modification

In many instances when older systems are replaced with newer equipment, the electrical load presented to the power system may be reduced. If the overall load on the electrical system is reduced as a result of the GTN installation (as shown in the previous example), no further analysis is required. This assumes that the electrical system was within all limits prior to the GTN/GMA 35 installation. The amended electrical load calculation should be added to the aircraft permanent records to document the electrical load reduction.

3.7.2.2 Electrical Load is Increased Following Modification

If it is determined that the electrical load has increased, a complete electrical load analysis must be performed to show that the capacity of the alternator/generator and battery are sufficient for the additional electrical load. For guidance on preparing an ELA, refer to ASTM F2490-05: Standard Guide for Aircraft Electrical Load and Power Source Capacity Analysis.

Alternatively, the loads under various operating conditions may be measured, as described in Section 3.7.3.

3.7.3 Performing an Electrical Load Analysis by Measurement

NOTE

According to FAR 23.1351(a)(2)(ii), performing an ELA using electrical measurements is not acceptable for commuter category airplanes.

If the installation of the GTN/GMA 35 increases the overall load, an electrical load analysis must be performed. Due to the age of much of the equipment, adequate information regarding the current draw of this equipment may not exist. One acceptable method of performing an electrical load analysis is to determine the electrical loads by measurement. The measurements must account for loads applied to the electrical system in probable combinations and durations for aircraft operation. The maximum electrical demand should not exceed 80% of the alternator data plate rating. The following section describes how to perform an ELA for a single alternator / single battery electrical system. This should be modified accordingly for aircraft with multiple batteries or alternators, and it must be shown that the maximum electrical demand for each alternator does not exceed 80% of the alternator data plate rating.

In this section the following definitions are used:

normal operation: the primary electrical power generating system is operating normally

emergency operation: the primary electrical power generating system is inoperative

An in-circuit or clamp-on, **calibrated** ammeter with 0.5 A or better accuracy can be used for current measurement. Record the continuous (data plate / nameplate) rating for the alternator and battery.

1. Using the blank electrical load tabulation form provided in Figure 3-15, compile a list of electrical loads on the aircraft (generally, this is just a list of circuit breakers and circuit breaker switches). Refer to the example in Figure 3-17.
2. Identify whether each load is continuous (e.g. GPS) or intermittent (e.g. stall warning horn, landing gear).
3. Using the worst-case flight condition, identify whether each load is used in a particular phase of flight for normal operation. If some loads are mutually exclusive and will not be turned on simultaneously (e.g. pitot heat and air conditioning), use only those loads for the worst-case condition.
4. Identify whether each load is used in a particular phase of flight for emergency operation. As a minimum, these systems include:
    - COM Radio #1
    - NAV Radio #1
    - Transponder and associated altitude source
    - Audio Panel
    - Stall Warning System (if applicable)
    - Pitot Heat
    - Landing Light (switched on during landing only)
    - Instrument Panel Dimming

CAUTION

To avoid damage to equipment, ensure that the ammeter is capable of handling the anticipated load.

5. Insert/attach the calibrated ammeter in the line from the external power source to the master relay circuit as shown in Figure 3-15 (this will eliminate errors due to the charging current drawn by the battery).

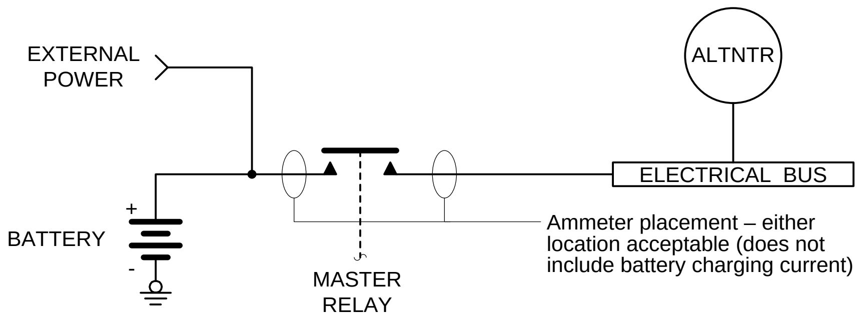


Figure 3-15. Ammeter Placement for Current Measurements

6. Ensure that all circuit breakers are closed.
7. Apply external power to the aircraft. Power source voltage should be set to nominal alternator voltage (usually 13.8 VDC or 27.5 VDC).
8. Turn on the battery master switch.

NOTE

Intermittent electrical loads are not measured. It is assumed that if additional current is required beyond what the alternator can supply, this short-duration demand will be provided by the battery.

9. Set the lighting as described below. These settings will be used for every current measurement that follows.
   - All instrument panel and flood lights should be set to maximum brightness.
   - The GTN backlight should be set to 50% brightness.
   - Any other displays with a backlight should be set to 50% brightness.
10. Using the tabulation completed above, switch on all *continuous* electrical loads used in the taxiing phase and record ammeter current reading (measurement (a) in Figure 3-15). The following items should be taken into consideration for this measurement:
    - The autopilot circuit breaker should be closed, but the autopilot should not be engaged.

CAUTION

The pitot heat should only be switched on long enough to take the current measurement and then switched off. The pitot probe may get hot so care should be exercised to avoid burns or damaging the unit.

11. Using the tabulation completed above, switch on all continuous electrical loads used in the normal takeoff/landing phase and record ammeter current reading. Measurements must be taken with the landing lights ON and OFF (measurements (b1) and (b2) in Figure 3-16).
12. The following items should be taken into consideration for this measurement:
    - The autopilot circuit breaker should be closed, and the autopilot should be engaged.
13. Using the tabulation completed above, switch on all continuous electrical loads used in the normal cruise phase and record the ammeter current reading (measurement (c) in Figure 3-16).
    - The autopilot circuit breaker should be closed, and the autopilot should be engaged.
14. Using the tabulation completed above, switch on all *continuous* electrical loads used in the *emergency* cruise phase and record the ammeter current reading. Record the current drawn with the Landing Light switched OFF and again with the landing light switched ON.
15. Using the tabulation completed above, switch on all *continuous* electrical loads that are used for the *emergency* landing phase and record the ammeter current reading.
16. Using the values measured and recorded, complete the ELA using the blank form in Figure 3-15. Verify that the maximum demand does not exceed 80% of the alternator data plate rating.

NOTE

It is permissible to exceed 80% of the alternator data plate rating during the takeoff/landing phase of flight when the pitot heat and landing light are switched on simultaneously. However, for this condition (i) you must not exceed 95% of the alternator data plate rating, and (ii) you must not exceed 80% of the alternator data plate rating with the pitot heat on and the landing light off.

Date: _______________ **Electrical Load Measurement** Tail No.:_______________

			Normal Operation			Emergency Operation	
			Taxiing 10 min	TO/Land 10 min	Cruise 60 min	Cruise *(calculated)*	Land 10 min
Circuit/ System	Circuit Breaker No.	Operating Time	Used in this phase of flight?	Used in this phase of flight?	Used in this phase of flight?	Used in this phase of flight?	Used in this phase of flight?
			❑	❑	❑	❑	❑
			❑	❑	❑	❑	❑
			❑	❑	❑	❑	❑
			❑	❑	❑	❑	❑
			❑	❑	❑	❑	❑
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			❑	❑	❑	❑	❑
			❑	❑	❑	❑	❑
			❑	❑	❑	❑	❑
			❑	❑	❑	❑	❑

Figure 3-16. Blank Electrical Load Tabulation Form
Sheet 1 of 2

Date: _______________ **Electrical Load Measurement (cont'd)** Tail No.:_____________

			Normal Operation			**Emergency Operation**	
			Taxiing 10 min	**TO/Land 10 min**	**Cruise 60 min**	**Cruise *(calculated)***	**Land 10 min**
Circuit/ System	**Circuit Breaker No.**	**Operating Time**	**Used in this phase of flight?**	**Used in this phase of flight?**	**Used in this phase of flight?**	**Used in this phase of flight?**	**Used in this phase of flight?**
			❑	❑	❑	❑	❑
			❑	❑	❑	❑	❑
			❑	❑	❑	❑	❑
			❑	❑	❑	❑	❑
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			❑	❑	❑	❑	❑
			❑	❑	❑	❑	❑

MEASURED VALUE	(Amps):	________	________(a)	________(b1) *Ldg light ON* ________(b2) *Ldg light OFF*	________(c)	________(d)	________(e)
Alternator Rating	(Amps):	________					
Percent of Alternator Capacity Used:			________ (< 80 %)	________ *Ldg light ON* (< 95%) ________ *Ldg light OFF* (< 80%)	________ (< 80 %)	**N/A**	**N/A**

Figure 3-16. Blank Electrical Load Tabulation Form
Sheet 2 of 2

Date: 1/6/2010 Electrical Load Measurement Tail No.: N5272K

			Normal Operation			Emergency Operation	
			Taxiing 10 min	**TO/Land 10 min**	**Cruise 60 min**	**Cruise *(calculated)***	**Land 10 min**
Circuit/ System	**Circuit Breaker No.**	**Operating Time**	**Used in this phase of flight?**	**Used in this phase of flight?**	**Used in this phase of flight?**	**Used in this phase of flight?**	**Used in this phase of flight?**
Alternator Field	A1	*Continuous*	**X**	**X**	**X**		
Annunciator Panel	C1	*Continuous*	**X**	**X**	**X**	**X**	**X**
Vacuum Warning	C2	*Intermittent*					
Stall Warning	C3	*Intermittent*					
Gear Warning	C4	*Intermittent*					
Gear Actuator	C5	*Intermittent*					
Cluster Gage	D1	*Continuous*	**X**	**X**	**X**	**X**	**X**
Ignition	D2	*Intermittent*					
PFD	D3	*Continuous*	**X**	**X**	**X**	**X**	**X**
Turn Coordinator	D4	*Continuous*	**X**	**X**	**X**		
Gear Relay	D5	*Intermittent*					
ADC	E1	*Continuous*	**X**	**X**	**X**	**X**	**X**
Panel Lights	E2	*Continuous*	**X**	**X**	**X**	**X**	**X**
Glareshield Lights	E3	*Continuous*	**X**	**X**	**X**	**X**	**X**
AHRS	E4	*Continuous*	**X**	**X**	**X**	**X**	**X**
Flap Actuator	E5	*Intermittent*					
Com 1	F1	*Continuous*	**X**	**X**	**X**	**X**	**X**
GPS/NAV 1	F2	*Continuous*	**X**	**X**	**X**	**X**	**X**
Com 2	F3	*Continuous*	**X**	**X**	**X**		
GPS/NAV 2	F4	*Continuous*	**X**	**X**	**X**		
Autopilot	F5	*Continuous*	**X** *	**X**	**X**		
Audio Panel	G1	*Continuous*	**X**	**X**	**X**	**X**	**X**
Radio Blower	G2	*Continuous*	**X**	**X**	**X**		
ADF	G3	*Continuous*	**X**	**X**	**X**		
Transponder	G4	*Continuous*	**X**	**X**	**X**	**X**	**X**
GDL 69	H1	*Continuous*	**X**	**X**	**X**		
TCAD	H2	*Continuous*	**X**	**X**	**X**		
JPI Engine Monitor	H3	*Continuous*	**X**	**X**	**X**	**X**	**X**
Bose Headsets	H5	*Continuous*	**X**	**X**	**X**	**X**	**X**
Altitude Encoder	J1	*Continuous*	**X**	**X**	**X**	**X**	**X**
Strobe Light	SW1	*Continuous*	**X**	**X**	**X**	**X**	**X**
Nav Lights	SW2	*Continuous*	**X**	**X**	**X**	**X**	**X**
Recognition Lights	SW3	*Continuous*	**X**	**X**	**X**	**X**	**X**
Landing Light	SW4	*Continuous*	**X**	**X**			**X**
Pitot Heat	SW5	*Continuous*		**X**	**X**	**X**	**X**
Elevator Trim	SW6	*Intermittent*					
Boost Pump	SW7	*Intermittent*					
MEASURED VALUE	(Amps):		47.5 (a)	60.0 (b1) *Ldg light ON* 44.7 (b1) *Ldg light OFF*	43.5 (c)	34.0 (d)	48.1 (e)
Alternator Rating	(Amps):	70					
Percent of Alternator Capacity Used:			68 % (< 80 %) PASS	86 % *Ldg light ON* (< 95%) 64 % *Ldg light OFF* (< 80%) PASS	62 % (< 80 %) PASS	N/A	N/A

*Autopilot circuit breaker is closed, but autopilot is not engaged.

Figure 3-17. Example Electrical Load Tabulation

Date: ______________ Tail No.:______________

Power Sources

Item	Number Installed	Voltage (DC Volts)	Manufacturer	Model Number
Alternator				
Battery				

Battery Capacity: ___________ x 0.75 (derating factor) = ________ Ah x 60 min = ________ A-min [i]

Current drawn during Normal Cruise (amps): ________ (c) *enter current calculated in step 13. above*

Cruise consumption during recognition: (c)_____________A x 5 min = ________ A-min [ii]

Emergency Landing Current (amps): _________ (e) *enter current measured in step 15. above*

Emergency Landing Consumption: (e)_________ A x 10 min = ________ A-min [iii]

Capacity remaining for cruise: ([i] – [ii] – [iii]) ________ - ________ - ________ = ________ A-min [iv]

Emergency Cruise Current (amps): _________ (d) *enter current measured in step 14. above*

Emerg Cruise Duration ([iv] / (d)): ____________ [iv] / ___________ (d) = __________ min [v]

The total duration of flight on emergency power is determined by adding the time for recognition of the failure (5 minutes) to the time for emergency cruise (calculated above) to the time for landing (10 mins).

Total Duration for Flight on Emergency Power (5 + [v]_________ + 10) = ________ **min [vi]**

Verify that the total flight duration on emergency power [vi] is ≥ 30 minutes (for a typical Part 23 aircraft).

Assumptions:

1. Most severe operating condition is considered to be ____
2. Motor load demands are shown for steady state operation and do not include inrush current draw.
3. Load shedding is accomplished *(how)*____within five minutes of warning annunciation.

Measured loads using ____

Figure 3-18. Blank Emergency Power Operation Calculation Form

Date: 1/6/2012 Tail No.: N5272K

Power Sources

Item	Number Installed	Voltage (DC Volts)	Manufacturer	Model Number
Alternator	1	13.75	Prestolite	AL 12-P70
Battery	1	12	Gill	G-35

Battery Capacity: **35** x 0.75 (derating factor) = **26.25** Ah x 60 min = **1575** A-min [i]

Current drawn during Cruise (amps): **43.5** (c) *enter current calculated in step 13. above*

Cruise consumption during recognition: (c) **43.5** A x 5 min = **217.5** A-min [ii]

Emergency Landing Current (amps): **48.1** (e) *enter current measured in step 15. above*

Emergency Landing Consumption: (e) **48.1** A x 10 min = **481** A-min [iii]

Capacity remaining for cruise: ([i] – [ii] – [iii]) 1575 - 217.5 - 481 = 876.5 A-min [iv]

Emergency Cruise Current (amps): **34.0** (d) *enter current measured in step 14 above*

Cruise Duration ([iv] / (d)): **876.5** [iv] / **34.0** (d) = **25.8** min [v]

Total Duration for Flight on Emergency Power (5 + [h] **25.8** + 10) = **40.8 min [vi]**

The total flight duration on emergency power [vi] is ≥ 30 minutes. **[PASS]**

Assumptions:

1. Most severe operating condition is considered to be night IFR with the pitot heat operating.
2. Motor load demands are shown for steady state operation and do not include inrush current draw.
3. Load shedding is accomplished manually by the pilot within five minutes of warning annunciation.
4. Measured loads using a calibrated Extech clamp-on DC ammeter on the battery terminal to the master relay cable.

Figure 3-19. Example of Completed Emergency Power Operation Calculation

3.8 AFMS Completion

3.8.1 System Capabilities

Section 1.2 of the AFMS contains a list of system capabilities of the installed GTN system and associated navigation interface. This section contains six options in the Airplane Flight Manual Supplement for Garmin GTN 6XX/7XX GPS/SBAS Navigation System (P/N 190-01007-A2) and three options ([1], [2], and [5]) in the VFR GPS Limited Airplane Flight Manual Supplement for Garmin GTN 6XX/7XX GPS/SBAS Navigation System (P/N 190-01007-A5).

[1] VHF Communication Radio

[2] Primary VHF Navigation

[3] Primary GPS Navigation (Enroute) and Approach Capability (LP, LNAV)*

[4] Primary GPS Approach Capability with Vertical Guidance (LNAV/VNAV, LPV)*

[5] TSO-C151b Terrain Awareness and Warning System

*Not included in the VFR GPS Limited Airplane Flight Manual Supplement for Garmin GTN 6XX/7XX GPS/SBAS Navigation System (P/N 190-01007-A5)

Box [1] is checked if the installed GTN contains a COM radio (GTN 635, GTN 650, GTN 750).

Box [2] is checked if the installed GTN contains a NAV radio (GTN 650, GTN 750).

Box [3] is checked if the installation of the GTN meets the requirements of Section 2.4.1.2 or Section 2.4.1.3.

Box [4] is checked if the installation of the GTN meets the requirements of Section 2.4.1.2 or Section 2.4.1.3 and the interfaced navigation indicator includes a vertical deviation indication.

Box [5] is checked if the installed GTN has the TAWS-B feature enabled (see Section 5.5.2.1 for more information).

3.8.2 Autopilot Listed in GTN 6XX/7XX AML STC

For all autopilots listed in Section C.4, the appropriate limitations for that autopilot are identified in Table 3-15 and described in the paragraphs following the table.

Table 3-15. Autopilot Coupling Limitations

Manufacturer	Model	Capabilities			Limitations		Notes
		Lateral	Vertical	GPSS	AFMS Section 2	AFMS Section 4.5	
Honeywell (Bendix/King)	KAP 100	X			None	[3]	
	KAP 150	X	X			[2]	
	KAP 140	X	X			[1]	
	KFC 150/200/250/300	X	X			[2]	
	KFC 225	X	X	X		[1]	ARINC 429 roll steering
	KFC 275/325	X	X	X		[2]	ARINC 429 roll steering
Century	I/II	X			None	[3]	
	III/IV	X	X			[2]	
	21	X		(ii)		[3]	
	31/41	X	X	(ii)		[2]	
	2000	X	X	(ii)		[2]	
	Trident	X	X	(ii)		[2]	
Sperry	SPZ-200A/500	X	X		None	[2]	
S-TEC	System 20/30/40/50	X		(i)	None	[3]	
	System 55	X	X	(i)		[2]	
	System 55X	X	X	X		[2]	ARINC 429 roll steering
	System 60-1	X		(i)		[3]	
	System 60-2/65	X	X	(i)		[2]	
	System 60 PSS		X			[2]	
Cessna	300B/400B/800B	X	X		None	[2]	
	300 IFCS/400 IFCS/800 IFCS	X	X			[2]	
Bendix	M4C/M4D	X	X		None	[2]	
Collins	APS 65 ( )	X	X		None	[2]	

(i) Roll steering may be provided through the ST-901 GPSS converter.
(ii) Roll steering may be provided through the AK 1081 GPSS converter.

AFMS Section 2.11 Autopilot Coupling Limitations

This section of the AFMS contains one possible limitation:

[a] Lateral coupling only for GPS approaches. Coupling to the vertical path for GPS approaches is not authorized.

For all autopilots covered by the GTN 6XX/7XX AML STC, no limitations apply in this section and none should be checked on the AFMS. This section is not included in the VFR GPS Limited Airplane Flight Manual Supplement for Garmin GTN 6XX/7XX GPS/SBAS Navigation System (P/N 190-01007-A5).

AFMS Section 4.5 Autopilot Coupling

This section of the AFMS contains three possible choices:

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

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

[3] The installation does not support any vertical capture or tracking.

For all autopilots listed in the GTN 6XX/7XX AML STC, the appropriate check box for that autopilot is identified in Table 3-15. The corresponding limitation should be checked in the AFMS.

3.8.3 Autopilot Not Listed in GTN 6XX/7XX AML STC

If an installation has an autopilot interface that is not listed in the GTN 6XX/7XX AML STC, additional FAA approval is required. However, the AFMS provided with the AML STC should still be used, with the appropriate limitations specified as described below.

AFMS Section 2.11 Autopilot Coupling Limitations

This section of the AFMS contains one possible limitation:

[a] Lateral coupling only for GPS approaches. Coupling to the vertical path for GPS approaches is not authorized.

For all autopilots that are not listed in the GTN 6XX/7XX AML STC, limitation [a] applies, unless the autopilot is approved for interface to the Garmin G500/G600 under the G500 or G600 AML STC. Additional FAA approval from the Aircraft Certification Office (ACO) is required for a particular installation to remove the vertical GPS coupling limitations. This section is not included in the VFR GPS Limited Airplane Flight Manual Supplement for Garmin GTN 6XX/7XX GPS/SBAS Navigation System (P/N 190-01007-A5).

AFMS Section 4.5 Autopilot Coupling

This section of the AFMS contains three possible choices:

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

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

[3] The installation does not support any vertical capture or tracking.

For all autopilots that are not listed in the GTN 6XX/7XX AML STC, select the appropriate check box as follows:

Box [1] is checked for any installation that meets all of the following criteria:

- The GPS SELECT discrete is set to ‘Prompt’ on the Main System Config Page (refer to Section 5.5.1.9).

NOTE

The 6XX/7XX GPS SELECT discrete output is connected to the GPS Select input (or equivalent) on the autopilot. This input is used by the autopilot to determine if the navigation source is GPS or VLOC. The autopilot typically goes to “wings-level” mode automatically when the navigation source changes between GPS and VLOC. In order to prevent the autopilot from entering “wings-level“ mode without the pilot noticing the mode change, the unit prompts the pilot and requires pilot acknowledgement prior to switching the output signal state. Examples of autopilots that support this input are the Honeywell KAP 140 or KFC 225.

Box [2] is checked for any installation that meets all of the following criteria:

- The GPS SELECT discrete output is configured for ‘Auto’ on the Main System Config Page (refer to Section 5.5.1.9).
- The 6XX/7XX interface to the autopilot provides vertical deviation information.

Box [3] is checked for any installation that meets all of the following criteria:

- The GPS SELECT discrete is set to ‘Auto’ on the Main System Config Page (refer to Section 5.5.1.9).
- The 6XX/7XX interface to the autopilot provides no vertical deviation information (this is the case for autopilots with LNAV and altitude hold modes only; i.e., the autopilot does not provide vertical capture and/or vertical tracking).

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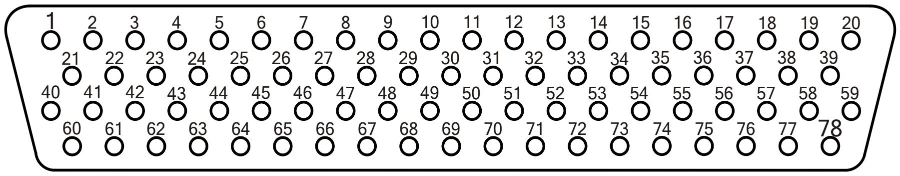
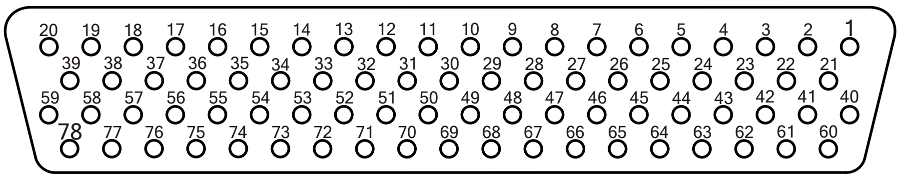
4 CONNECTOR PINOUT INFORMATION

4.1 GTN 6XX/7XX

4.1.1 P1001 Connector



LOOKING FROM PILOT'S SEAT



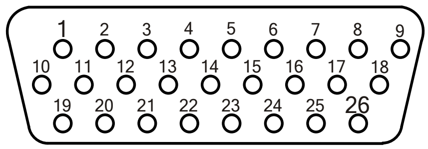
LOOKING AFT TOWARD PILOT'S SEAT

Pin	Pin Name	I/O
1	MAIN OBS ROTOR H (GND)	--
2	MAIN OBS ROTOR C	Out
3	TIME MARK OUT A	Out
4	AUDIO OUT HI	Out
5	RS-232 OUT 4	Out
6	RS-232 OUT 3	Out
7	RS-232 OUT 2	Out
8	RS-232 OUT 1	Out
9	ARINC 429 OUT 2A	Out
10	ARINC 429 OUT 1A	Out
11	MAIN +TO OUT	Out
12	MAIN VERTICAL +UP OUT	Out
13	MAIN LATERAL SUPERFLAG OUT	Out
14	OBS ANNUNCIATE*	Out
15	GPS ANNUNCIATE*	Out
16	OBS/SUSP MODE SELECT*	In
17	LIGHTING BUS 1 LO	In
18	LIGHTING BUS 1 HI	In
19	AIRCRAFT POWER	In
20	AIRCRAFT POWER	In
21	MAIN OBS STATOR D	In
22	TIME MARK OUT B	Out
23	AUDIO OUT LO	Out
24	RS-232 IN 4	In
25	RS-232 IN 3	In
26	RS-232 IN 2	In
27	RS-232 IN 1	In
28	ARINC 429 OUT 2B	Out
29	ARINC 429 OUT 1B	Out
30	MAIN +FROM OUT	Out
31	MAIN VERTICAL +DOWN OUT	Out
32	MAIN VERTICAL SUPERFLAG OUT	Out
33	WAYPOINT ANNUNCIATE*	Out
34	TERMINAL ANNUNCIATE*	Out
35	TAWS AUDIO ACTIVE OUT*	Out
36	AUDIO INHIBIT IN*	In
37	TAWS INHIBIT IN*	In
38	AIR/GROUND*	In
39	CDI SOURCE SELECT*	In

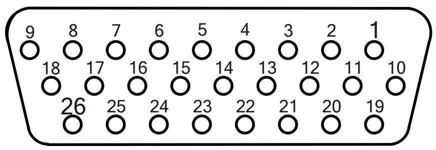
Pin	Pin Name	I/O
40	MAIN OBS STATOR E (GND)	--
41	MAIN OBS STATOR F	In
42	LIGHTING BUS 2 LO	In
43	FAN GROUND	--
44	RS-232 GND 3/4	--
45	RS-232 GND 2	--
46	RS-232 GND 1	--
47	ARINC 429 IN 2A	In
48	ARINC 429 IN 1A	In
49	MAIN LATERAL +LEFT OUT	Out
50	MAIN LATERAL +FLAG OUT	Out
51	MAIN VERTICAL +FLAG OUT	Out
52	VLOC ANNUNCIATE*	Out
53	LOI ANNUNCIATE*	Out
54	MESSAGE ANNUNCIATE*	Out
55	APPROACH ANNUNCIATE*	Out
56	ILS/GPS APPROACH*	Out
57	TAWS INHIBIT ANNUNCIATE*	Out
58	FAN TACH IN	In
59	FAN POWER OUT (12 VDC)	Out
60	MAIN OBS STATOR G (GND)	--
61	LIGHTING BUS 2 HI	In
62	CONFIG MODULE DATA	I/O
63	CONFIG MODULE CLOCK	Out
64	CONFIG MODULE GND	Out
65	CONFIG MODULE POWER	Out
66	ARINC 429 IN 2B	In
67	ARINC 429 IN 1B	In
68	MAIN LATERAL +RIGHT OUT	Out
69	MAIN LATERAL -FLAG OUT	Out
70	MAIN VERTICAL -FLAG OUT	Out
71	TAWS WARNING ANNUNCIATE*	Out
72	TAWS NOT AVAILABLE ANNUNCIATE*	Out
73	TAWS CAUTION ANNUNCIATE*	Out
74	GPS SELECT*	Out
75	TRAFFIC TEST*	Out
76	TRAFFIC STANDBY*	Out
77	AIRCRAFT GND	--
78	AIRCRAFT GND	--

* Indicates an Active Low

4.1.2 P1002 Connector



LOOKING FROM PILOT'S SEAT



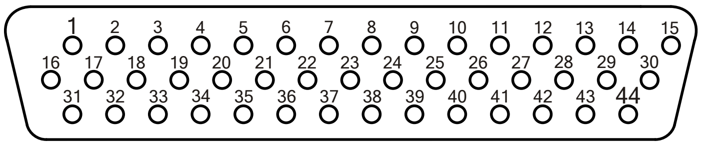
LOOKING AFT TOWARD PILOT'S SEAT

Pin	Pin Name	I/O
1	DEMO MODE SELECT*	In
2	RESERVED	In
3	SUSPEND ANNUNCIATE*	Out
4	ETHERNET OUT 4A	Out
5	ETHERNET OUT 4B	Out
6	ETHERNET IN 1A	In
7	ETHERNET IN 1B	In
8	ETHERNET OUT 1A	Out
9	ETHERNET OUT 1B	Out
10	SYSTEM ID PROGRAM*	In
11	GSR STATUS IN*	In
12	GSR REMOTE POWER OUT*	Out
13	ETHERNET IN 4A	In

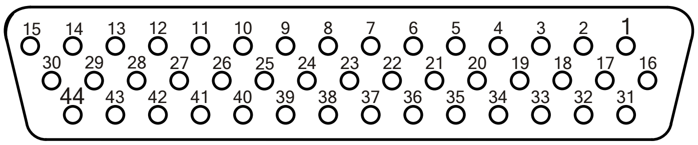
Pin	Pin Name	I/O
14	ETHERNET IN 4B	In
15	ETHERNET IN 2A	In
16	ETHERNET IN 2B	In
17	ETHERNET OUT 2A	Out
18	ETHERNET OUT 2B	Out
19	RS-422 IN A	In
20	RS-422 IN B	In
21	RS-422 OUT A	Out
22	RS-422 OUT B	Out
23	ETHERNET IN 3A	In
24	ETHERNET IN 3B	In
25	ETHERNET OUT 3A	Out
26	ETHERNET OUT 3B	Out

* Indicates an Active Low

4.1.3 P1003 GTN COM Connector (GTN 635/650/750 Only)



LOOKING FROM PILOT'S SEAT



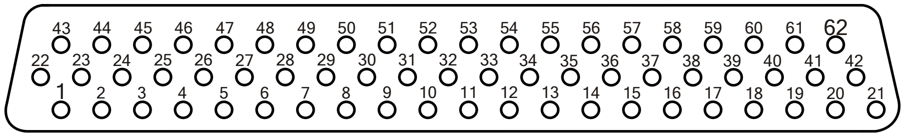
LOOKING AFT TOWARD PILOT'S SEAT

Pin	Pin Name	I/O
1	RESERVED	Out
2	RESERVED	In
3	RESERVED	--
4	RESERVED	--
5	COM MIC 1 AUDIO IN HI	In
6	RESERVED	--
7	500 Ω COM AUDIO HI	Out
8	RESERVED	In
9	RESERVED	In
10	RESERVED	In
11	COM MIC 1 KEY*	In
12	RESERVED	--
13	RESERVED	--
14	RESERVED	In
15	RESERVED	Out
16	RESERVED	In
17	RESERVED	In
18	500 Ω COM AUDIO LO	--
19	RESERVED	--
20	MIC AUDIO IN LO	In
21	RESERVED	--
22	RESERVED	In

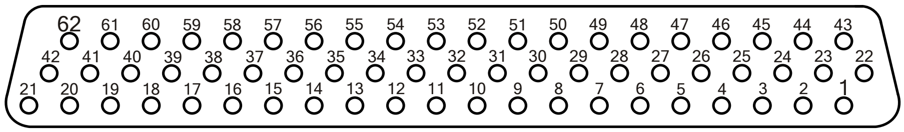
Pin	Pin Name	I/O
23	RESERVED	Out
24	RESERVED	Out
25	RESERVED	Out
26	RESERVED	--
27	COM REMOTE TRANSFER*	In
28	COM REMOTE TUNE UP*	In
29	COM REMOTE TUNE DOWN*	In
30	AIRCRAFT POWER	In
31	RESERVED	--
32	RESERVED	--
33	RESERVED	--
34	RESERVED	--
35	RESERVED	--
36	RESERVED	--
37	AIRCRAFT GND	--
38	AIRCRAFT GND	--
39	RESERVED	--
40	AIRCRAFT GND	--
41	RESERVED	In
42	RESERVED	In
43	AIRCRAFT POWER	In
44	AIRCRAFT POWER	In

* Indicates an Active Low

4.1.4 P1004 GTN NAV Connector (GTN 650/750 Only)



LOOKING FROM PILOT'S SEAT



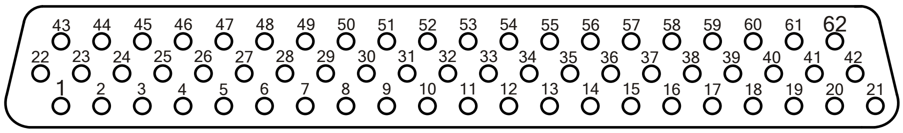
LOOKING AFT TOWARD PILOT'S SEAT

Pin	Pin Name	I/O
1	VOR/LOC +TO	Out
2	VOR/LOC +FROM	Out
3	VOR/LOC +FLAG	Out
4	VOR/LOC -FLAG	Out
5	VOR/LOC +LEFT	Out
6	VOR/LOC +RIGHT	Out
7	RESERVED	---
8	VOR/LOC COMPOSITE OUT	Out
9	VOR OBS ROTOR C	Out
10	VOR OBS ROTOR H (GND)	---
11	VOR OBS STATOR E (GND)	---
12	VOR OBS STATOR F	In
13	VOR OBS STATOR D	In
14	VOR OBS STATOR G (GND)	---
15	VOR/LOC SUPERFLAG	Out
16	500 Ω VOR/LOC AUDIO OUT HI	Out
17	500 Ω VOR/LOC AUDIO OUT LO	Out
18	SERIAL DME – CLOCK	In/Out
19	SERIAL DME – DATA	In/Out
20	SERIAL DME – RNAV/CH REQ	In
21	SERIAL DME – RNAV MODE	In
22	AIRCRAFT GND	--
23	VOR/ILS ARINC 429 OUT B	Out
24	VOR/ILS ARINC 429 OUT A	Out
25	VOR OBI CLOCK	In
26	VOR OBI SYNC	In
27	VOR OBI DATA	In
28	VLOC REMOTE TRANSFER	In
29	ILS ENERGIZE	Out
30	RESERVED	--
31	RESERVED	--
32	GLIDESLOPE +FLAG	Out

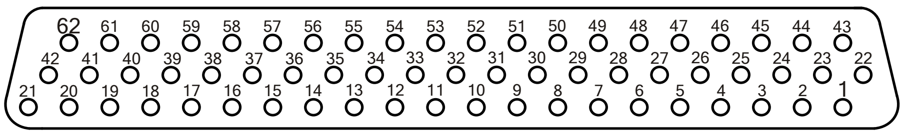
Pin	Pin Name	I/O
33	PAR DME 1MHZ-D/ SERIAL DME ON	Out
34	GLIDESLOPE +UP	Out
35	VOR/ILS ARINC 429 IN B	In
36	VOR/ILS ARINC 429 IN A	In
37	PAR DME 100KHZ-A/ SERIAL DME HOLD	Out
38	GLIDESLOPE SUPERFLAG	Out
39	PAR DME 100KHZ-B	Out
40	PAR DME 100KHZ-C	Out
41	DME COMMON	In
42	PAR DME 100KHZ-D	Out
43	PAR DME 50KHZ	Out
44	SERIAL DME – DME REQUEST	In/Out
45	PAR DME 1MHZ-A	Out
46	PAR DME 1MHZ-B	Out
47	PAR DME 1MHZ-C	Out
48	RESERVED	--
49	AIRCRAFT GND	--
50	RESERVED	--
51	AIRCRAFT POWER	In
52	AIRCRAFT POWER	In
53	GLIDESLOPE -FLAG	Out
54	PAR DME 100KHZ-E	Out
55	GLIDESLOPE +DOWN	Out
56	PAR DME 1MHZ-E	Out
57	RESERVED	--
58	GLIDESLOPE COMPOSITE OUT	Out
59	VOR/LOC DIGITAL AUDIO OUT	Out
60	AIRCRAFT GND	--
61	AIRCRAFT GND	--
62	AIRCRAFT GND	--

* Indicates an Active Low

4.1.5 P1005 Connector (GTN 7XX only)



LOOKING FROM PILOT'S SEAT



LOOKING AFT TOWARD PILOT'S SEAT

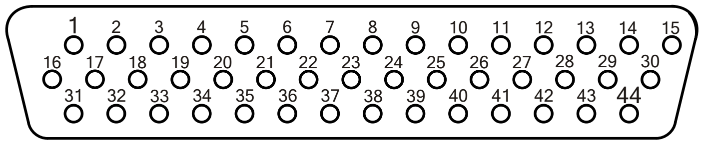
Pin	Pin Name	I/O
1	RESERVED	--
2	RESERVED	--
3	RESERVED	--
4	RESERVED	--
5	RESERVED	--
6	RESERVED	--
7	ARINC 429 OUT 3B	Out
8	RS-232 OUT 5	Out
9	RS-232 OUT 6	Out
10	RESERVED	--
11	RESERVED	--
12	RESERVED	--
13	RADAR ON*	Out
14	SYNCHRO Y	In
15	SYNCHRO REF LO	In
16	ARINC 429 IN 3B	In
17	ARINC 429 IN 4B	In
18	ARINC 453/708 IN 1A	In
19	ARINC 453/708 TERM 1B	--
20	ARINC 453/708 IN 2A	In
21	ARINC 453/708 TERM 2B	--
22	RESERVED	--
23	RESERVED	--
24	RESERVED	--
25	RESERVED	--
26	RESERVED	--
27	RESERVED	--
28	ARINC 429 OUT 3A	Out
29	RS-232 IN 5	In
30	RS-232 IN 6	In
31	RESERVED	--

Pin	Pin Name	I/O
32	RESERVED	--
33	SYNCHRO VALID INPUT (ACTIVE LO)	In
34	SPARE OUTPUT C	Out
35	SYNCHRO X	In
36	SYNCHRO REF HIGH	In
37	ARINC 429 IN 3A	In
38	ARINC 429 IN 4A	In
39	RESERVED	--
40	ARINC 453/708 TERM 1A	--
41	ARINC 453/708 TERM 2A	--
42	RESERVED	--
43	RESERVED	--
44	RESERVED	--
45	RESERVED	--
46	RESERVED	--
47	RESERVED	--
48	RESERVED	--
49	RS-232 GND 5	--
50	RS-232 GND 6	--
51	RESERVED	--
52	RESERVED	--
53	SPARE INPUT 1	--
54	SYNCHRO VALID INPUT (ACTIVE HI)	In
55	RESERVED	--
56	SYNCHRO Z	In
57	RESERVED	--
58	RESERVED	--
59	RESERVED	--
60	ARINC 453/708 IN 1B	In
61	ARINC 453/708 IN 2B	In
62	RESERVED	--

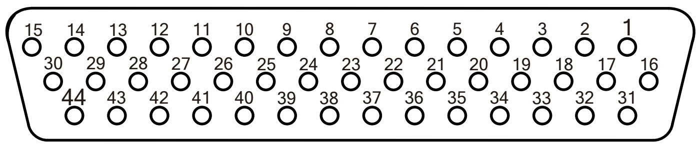
* Indicates an Active Low

4.2 GMA 35

4.2.1 P3501 Connector



LOOKING FROM PILOT'S SEAT



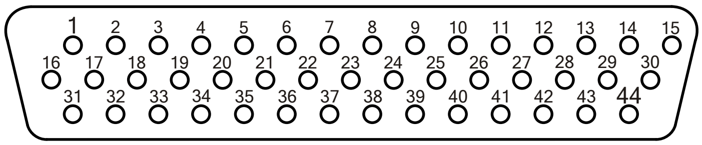
LOOKING AFT TOWARD PILOT'S SEAT

Pin	Pin Name	I/O
1	MARKER ANTENNA IN HI	In
2	MARKER ANTENNA IN LO	In
3	COM 3 AUDIO IN HI	In
4	COM 3 AUDIO LO	--
5	COM 3 MIC AUDIO OUT HI	Out
6	COM 3 MIC KEY* OUT	Out
7	RCVR 4 AUDIO IN HI	In
8	RCVR 4 AUDIO IN LO	In
9	COM 1 AUDIO IN HI	In
10	COM 1 AUDIO LO	--
11	COM 1 MIC AUDIO OUT HI	Out
12	COM 1 MIC KEY* OUT	Out
13	COM 2 AUDIO IN HI	In
14	COM 2 AUDIO LO	--
15	COM 2 MIC AUDIO OUT HI	Out
16	PILOT PUSH-TO-COMMANDKEY* IN	In
17	NAV 1 AUDIO IN HI	In
18	NAV 1 AUDIO IN LO	In
19	NAV 2 AUDIO IN HI	In
20	NAV 2 AUDIO IN LO	In
21	RCVR 3 AUDIO IN HI	In
22	RCVR 3 AUDIO IN LO	In

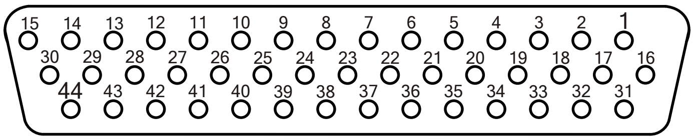
Pin	Pin Name	I/O
23	RCVR 5 AUDIO IN HI	In
24	COM ACTIVE* OUT	Out
25	TEL 4 AUDIO IN HI	In
26	TEL 4 AUDIO IN LO	In
27	TEL 4 MIC OUT HI	Out
28	TEL 4 MIC OUT LO	Out
29	ALERT 3 AUDIO IN HI	In
30	COM 2 MIC KEY* OUT	Out
31	ALERT 1 AUDIO IN HI	In
32	ALERT 1 AUDIO IN LO	In
33	PILOT MIC AUDIO IN HI	In
34	PILOT MIC KEY* IN	In
35	PILOT MIC AUDIO IN LO	In
36	INNER MARKER LAMP OUT	Out
37	OUTER MARKER LAMP OUT	Out
38	MIDDLE MARKER LAMP OUT	Out
39	MIDDLE MARKER SENSE OUT	Out
40	PASS HEADSET AUDIO OUT LEFT	Out
41	PASS HEADSET AUDIO OUT RIGHT	Out
42	PASS HEADSET AUDIO OUT LO	Out
43	ALERT 2,3,4 AUDIO IN LO	In
44	ALERT 4 (TEL RING) AUDIO IN HI	In

* Indicates an Active-Low

4.2.2 P3502 Connector



LOOKING FROM PILOT'S SEAT



LOOKING AFT TOWARD PILOT'S SEAT

Pin	Pin Name	I/O
1	PILOT HEADSET AUDIO OUT LO	Out
2	COPILOT HEADSET AUDIO OUT LO	Out
3	COPILOT HEADSET AUDIO OUT LEFT	Out
4	COPILOT HEADSET AUDIO OUT RIGHT	Out
5	RESERVED	In
6	RESERVED	--
7	RESERVED	In
8	AIRCRAFT POWER	In
9	AIRCRAFT POWER	In
10	AIRCRAFT GROUND	--
11	AIRCRAFT GROUND	--
12	PASSENGER ADDRESS MUTE* OUT	Out
13	MARKER HI SENSE* IN	In
14	PASS ICS KEY* IN	In
15	ALERT 2 AUDIO IN HI	In
16	PILOT HEADSET AUDIO OUT LEFT	Out
17	RS-232 IN	In
18	RS-232 OUT	Out
19	PA MODE SELECTED* OUT	Out
20	COM CYCLE* IN	In
21	RESERVED**	--
22	CLEARANCE RECORDER PLAYBACK* IN	In

Pin	Pin Name	I/O
23	MUSIC 1 IN LEFT	In
24	MUSIC 1 IN RIGHT	In
25	MUSIC 1 IN LO	In
26	MUSIC 2 IN LEFT	In
27	MUSIC 2 IN RIGHT	In
28	MUSIC 2 IN LO	In
29	FAILSAFE WARN AUDIO IN HI	In
30	COPILOT PUSH-TO-COMMAND KEY* IN	In
31	PILOT HEADSET AUDIO OUT RIGHT	Out
32	COPILOT MIC AUDIO IN HI	In
33	COPILOT MIC KEY* IN	In
34	COPILOT MIC AUDIO IN LO	In
35	PASS 1 MIC AUDIO IN HI	In
36	PASS 1 MIC AUDIO IN LO	In
37	PASS 2 MIC AUDIO IN HI	In
38	PASS 2 MIC AUDIO IN LO	Out
39	PASS 3 MIC AUDIO IN HI	In
40	PASS 3 MIC AUDIO IN LO	In
41	PASS 4 MIC AUDIO IN HI	In
42	PASS 4 MIC AUDIO IN LO	In
43	SPEAKER AUDIO OUT LO	In
44	SPEAKER AUDIO OUT HI	Out

* Indicates an Active-Low

** This is an Active-Low output, always asserted to ground.

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5 SYSTEM CONFIGURATION AND CHECKOUT

5.1 System Configuration Overview

This section contains instructions for configuring the GTN for each installation as well as checks to ensure the system is properly installed and functioning correctly. The steps that are not applicable to a particular installation may be skipped. A checkout log that is included in Table 5-66 at the end of this section should be filled out during the checkout procedures. The completed checkout log sheet should be maintained with the aircraft permanent records to document the configuration of this installation. A summary of the steps required for configuration and checkout of the GTN is as follows:

- Perform installation checks (Sections 5.2 and 5.3)
- Load software into the GTN (if required) (Section 5.4.1)
- Load software into interfacing LRUs if required (Section 5.4.2 through 5.4.5)
- Configure the GTN for the specific installation (Sections 5.5)
- Perform ground checks to verify the interfaces to external sensors (Sections 5.7 and 5.8)
- Perform the specified flight checks (Section 5.8)
- Complete the checkout log (Section 5.10.3)
- Update the aircraft documentation (Section 5.10)

NOTE

Throughout the next section, many screenshots and examples are used to illustrate the software loading and configuration and checkout process. Every effort has been made to ensure the accuracy of these examples; however, changes may occur that result in the examples being out of date. Always refer to the Equipment List (005-00533-C1) for the correct software versions and part numbers.

NOTE

Throughout the next section, many screenshots are shown of the GTN 7XX. The procedures and methods for accessing pages on the GTN 6XX are similar to what is described for the GTN 7XX, unless specifically noted.

5.2 Mounting, Wiring, and Power Checks

Verify that all cables are properly secured and shields are connected to the shield block of the connectors. Check the movement of the flight and engine controls to verify there is no interference between the cabling and control systems. Ensure that all wiring is installed in accordance with Section 2.4.11.

Prior to powering up the GTN, the wiring harness must be checked for proper connections to the aircraft systems and other avionics equipment. Point to point continuity must be checked on all wiring to expose any faults such as shorting to ground. Any faults or discrepancies must be corrected before proceeding. If any TVSs are installed as part of the installation, proper TVS installation should be verified prior to application of power. Refer to Section 3.6.5.1 for guidance on checking each TVS assembly. Also, check the lighting bus wiring to ensure it is wired correctly before applying power to the GTN.

CAUTION

Incorrect lighting bus wiring could cause damage to the GTN.

After accomplishing a continuity check, perform power and ground checks to verify proper power distribution to the GTN, including the lighting bus and any high level inputs to the GTN. Any faults or discrepancies should be corrected at this time. Remove power from the aircraft upon completion of the harness checkout.

The GTN can be installed after completion of the continuity and power checks. The GTN should be installed into the rack and secured appropriately, as described in Section 3.4.2. The GTN backplate must be connected to the wiring harness and antenna coaxial cables.

5.3 Connector Engagement Check

Prior to configuration and checkout of the GTN, the connector engagement should be checked as described below:

1. Ensure that the GTN GPS/NAV and COM circuit breakers are pulled.
2. Slide the GTN straight into the rack until it stops about 1 inch short of the fully seated position.
3. Insert a 3/32-inch hex drive into the unit retention mechanism access hole at the bottom of the unit face and rotate the tool clockwise while pressing the bezel until the unit is firmly seated in the rack.
4. With the GTN seated, reapply power by closing the circuit breakers and turning on the avionics master switch (if installed).
5. Again, insert the hex drive into the unit retention mechanism access hole. Rotate the tool counter-clockwise to back out the retention mechanism. Ensure that three (3) complete revolutions of the Allen screw can be performed without red ‘X’ indication or loss of power to the GTN.

NOTE

If power is lost or the red ‘X’ condition occurs with fewer than three (3) turns, ensure there are no obstructions to the unit fully seating in the rack. Also, the mounting rack may need to be moved aft (toward the pilot) such that the instrument panel does not obstruct the unit from properly engaging in the rack.

6. Re-seat the GTN per step 3.

5.4 Software Loading

NOTE

Prior to installing a version of the GTN main board software that is older than the currently installed version, all RS-232 and ARINC 429 ports should be set to **Off**.

NOTE

Screenshots in this section are provided for reference only. For actual GTN software versions, refer to the GTN 6XX/7XX AML STC Equipment List, 005-00533-C1.

The GTN comes pre-loaded with software. However, to ensure that the latest software is loaded it is recommended that software from a current GTN Software Loader Card, P/N 010-01000-00, be loaded into the GTN. For dual GTN installations the software loading procedures below must be carried out on each GTN. See Section 5.5 for instructions pertaining to entering configuration mode.

NOTE

A GTN Software Loader Card must be created. Refer to Section 2.3.3 for additional information. All RS-232 and ARINC 429 ports should be set to OFF prior to installing a version of the GTN main board software that is older than what is currently installed.

5.4.1 GTN Software Loading

1. Remove power from the GTN by opening the circuit breaker.
2. Insert the correct GTN Software Loader Card into the SD card slot. See Section 2.3.3 for instructions on how to create a loader card.
3. Restore power to the GTN by closing the circuit breaker.
4. The Configuration Mode home page, shown in Figure 5-1,should now be displayed. Touch Updates to display the software updates that are available.
5. Verify that the software version being loaded to the GTN matches the software version listed on the GTN STC Equipment List, 005-00533-C1. See Figure 5-3. The updates page displays the version that is installed on the unit and the version installed on the loader card.
6. Verify that the available GTN software updates are being displayed by ensuring that ‘GTN Software Updates’ is displayed on the key in the upper left corner of the display.
7. To update the GTN with all software available, touch Select All.
8. To begin the software update, touch Update on the bottom of the display.
9. The GTN will display the prompt, ‘Start GTN Software Updates?’.
10. Touch OK to allow the GTN to go through the update process.
11. When the updates are finished, the GTN will display ‘Update Complete!’. When finished, remove power from the GTN and remove the Software Loader Card. Reinsert the database card into the SD card slot.

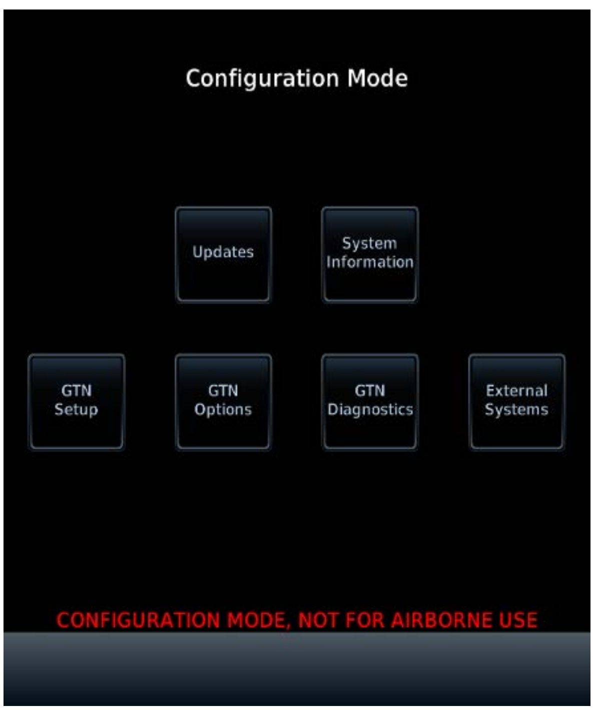


Figure 5-1. Configuration Mode

Figure 5-2. Updates Page

5.4.2 GMA 35 Software Loading

Before attempting to load software to the GMA 35, the GTN RS-232 port to which the GMA 35 is connected must be configured for ‘GMA Format 1’. See Section 5.5.1.2 for more information.

1. Remove power from the GTN by opening the circuit breaker
2. Insert the correct GMA 35 Loader Card into the GTN 7XX SD card slot. See Section 2.3.3 for instructions on how to create a loader card.
3. Hold down the **HOME** key until ‘Garmin’ is fully lit on the display after power is applied by closing the circuit breaker for the GTN 7XX.
4. Ensure the GMA 35 circuit breaker is closed.
5. The Configuration Mode home page should now be displayed. Touch the **Updates** key to display the software that is available.
6. To select GMA 35 software updates, touch the **GTN Software Updates** key on the top left corner of the display and select GMA 35 Software Updates.
7. To update the GMA 35 with all software available, touch **Select All**.
8. To begin the software update, touch the **Update** key on the bottom of the display.
9. The GTN will display the prompt, ‘Start GMA 35 Software Updates?’
10. Touch **OK** to allow the GTN to update the GMA 35.
11. When the updates are finished, the GTN will display ‘Update Complete!’
12. When finished, turn the GTN off (open the circuit breaker) and remove the Software loader card. Reinsert the database card in the SD card slot.
13. Cycle power on the GMA 35 and ensure the software was updated correctly by going to the ‘System Information’ page and selecting the GMA 35.

5.4.3 GDL 69/69A Software Loading

Although the GTN is a portal to install software for the GDL 69/69A, this STC does not cover the installation of the GDL 69/69A or its software. Refer to the GDL 69/69A Installation Manual, P/N 190-00355-02 or 190-00355-07.

1. Remove power from the GTN by opening the circuit breaker.
2. Insert the correct GDL 69/69A Loader Card into the SD card slot.
3. Press and hold the **HOME** key while applying power until ‘GARMIN’ is fully lit on the GTN display. Power is applied by closing the GTN circuit breaker.
4. Ensure the GDL 69/69A circuit breaker is closed.
5. The Configuration Mode home page should now be displayed.
6. Touch the **Updates** key to display the updates that are available.
7. To select GDL 69/69A software updates, touch the **GTN Software Updates** key on the top left corner of the display and select the update type GDL 69/69A Software Updates.
8. To update the GDL 69/69A with all updates available, touch **Select All**.
9. To begin the software update, touch the **Update** key on the bottom of the display. The GTN will display the prompt, ‘Start GDL 69/69A Software Updates?’
10. Touch **OK** to allow the GTN to update the GDL 69/69A.
11. When the updates are finished, the GTN will display ‘Update Complete!’
12. When finished, turn the GTN off (open the circuit breaker) and remove the software loader card. Reinsert the database card in the SD card slot.
13. Cycle power on the GDL 69 and ensure the software was updated correctly by going to the ‘System Information’ page on the GTN and select the GDL 69/69A. The correct software version should be displayed.

5.4.4 GWX 68/70 Software Loading

This STC does not cover the installation of the GWX 68/70 or its software. To install software on the GWX 68/70, use the GWX Install Tool. Refer to the GWX 68 Installation Manual, P/N 190-00286-01 or the GWX 70 Installation Manual, P/N 190-00829-01.

5.4.5 GDL 88 Software Loading

Although the GTN is a portal to install software for the GDL 88, this STC does not cover the installation of the GDL 88 or its software. Refer to the GDL 88 Installation Manual, P/N 190-01310-00.

1. Remove power from the GTN by opening the circuit breaker.
2. Insert the correct GDL 88 Loader Card into the SD card slot.
3. Hold down the HOME key until the name 'Garmin' is fully lit on the display after power is applied by closing the circuit breaker.
4. Ensure the GDL 88 circuit breaker is closed.
5. The Configuration Mode home page should now be displayed. Touch the **Updates** key to display the updates that are available.
6. To select GDL 88 software updates, touch the **GTN Software Updates** key on the top left corner of the display and select the update type **GDL 88 Software Updates**.
7. To update the GDL 88 with all updates available, touch **Select All.**
8. To begin the software update, touch the **Update** key on the bottom of the display.
9. The GTN will display the prompt, ‘Start GDL 88 Software Updates?’ Touch **OK** to allow the GTN to update the GDL 88.
10. When the updates are finished, the GTN will display ‘Update Complete!’ When finished, turn the GTN off (open the circuit breaker) and remove the Software loader card. Reinsert the database card in the SD card slot.
11. Cycle power on the GDL 88 and ensure the software was updated correctly by going to the ‘System Information’ page on the GTN and select the GDL 88. The correct SW version should be displayed.

5.4.6 System Information Page

The System Information page, shown in Figure 5-3, allows information related to the system such as unit type, serial number, system ID, and software versions to be viewed. To access the System Information page, touch the System Information key from the configuration mode home page. System information for remote LRUs can also be viewed from this page. To select a remote LRU, touch the key at the top of the System Information page and select an LRU from the menu. Select the GTN or other LRU to view applicable LRU-specific system information.

Figure 5-3. System Information Page

5.5 Configuration Mode Operations

NOTE

A Garmin transponder (GTN 32/327/328/33/330) controlled by the GTN will reboot into the same mode as the controlling GTN; i.e., if the GTN boots into configuration mode, the transponder will also boot into configuration mode.

Before configuring the GTN, ensure that no Configuration Module service messages are displayed in the message queue. This would indicate that the configuration module is improperly wired or damaged. Configuration mode is used to configure the GTN settings for each specific installation. To access configuration mode, remove power from the GTN. With the GTN turned off (circuit breaker pulled), touch and hold the **HOME** key and reapply power to the GTN (push in the circuit breaker). Release the **HOME** key when the display activates and the name ‘Garmin’ appears fully lit on the screen. The first page displayed is the configuration mode home page, as shown in Figure 5-1. While in configuration mode, pages can be selected by touching the desired key on the display. Some pages may require page scrolling to view all of the information and keys on the page. This can be done by touching the screen and dragging the page in the desired direction, or by touching the **Up** or **Down** keys.

NOTE

The configuration pages shown here reflect main software version 3.00. Some differences in operation may be observed when comparing the information in this manual to earlier or later software versions.

5.5.1 GTN Setup Page

The following sections describe pages that are accessed from the main GTN Setup page, as shown in Figure 5-4 A and B. To access the GTN Setup page, touch the **GTN Setup** key from the Configuration Mode home page as shown in Figure 5-1. The **UPDATE CONFIG MODULE** key stores the current installation-specific configuration information in the configuration module. Updating the configuration module is done automatically, so this key will not normally need to be touched.

A. GTN 6XX

B. GTN 7XX

Figure 5-4. Setup Page

5.5.1.1 ARINC 429 Configuration Page

To access the ARINC 429 Configuration page, shown in Figure 5-6, first access the GTN Setup page from the Configuration Home page, shown in Figure 5-4 above, by touching **GTN Setup** key**.** Then touch the **ARINC 429** key. This page allows configuration of the ARINC 429 input ports and the ARINC 429 output ports. Select the correct speed for each port depending upon the installed interfaced equipment by touching the speed key and toggling the high or low selection.

Figure 5-5. Main ARINC 429 Configuration Page

NOTE

Refer to Appendix C for approved third-party equipment interfaces to the GTN. If the equipment and interface selections described below are not listed in Appendix C, other FAA approval is required for that interface.

Select the correct Data In and Data Out settings for each port. The correct setting is dependent upon the interfaced equipment. The data selections are described in Table 5-2, Table 5-3, and Table 5-4 below. See Appendix C for the correct data format selections for each piece of interfaced equipment.

Table 5-1. ARINC 429 Speed Selections

Selection	Description
Low	Standard low-speed ARINC 429 (nominally 12.5 Kb per second)
High	High-speed ARINC 429 (nominally 100 Kb per second)

Table 5-2. ARINC 429 DATA IN Selections

Selection	GNS Equivalent	Description	Notes
Off	Off	No unit(s) connected to this ARINC 429 input	
Airdata	Airdata	Altitude, temperature, and speed information from the following Air Data systems: • *B&D 90004-003* • *Bendix/King KDC281/481*	[1]
Airdata/AHRS	Airdata/AHRS	Heading, altitude, temperature, and speed information from Air Data/AHRS systems. This interface is not used in this STC	
Data Concentrator	Garmin GTX 330	This is a Garmin data concentration format. Only high speed ARINC 429 should be used. This interface is not used in this STC	
EFIS Format 1	EFIS	Selected course, true heading, and magnetic heading information from the following EFIS systems: • *Bendix/King EFS 40/50*	[2]
EFIS Format 2	EFIS/Airdata	Selected course, true heading, magnetic heading, altitude, temperature, and true airspeed information from the following systems: • *Bendix/King EFS 40/50*	[2]
EFIS Format 3	Honeywell EFIS	Selected course, true heading, and magnetic heading information from EFIS systems. This interface is not used in this STC	
EFIS Format 4	Sandel EHSI	Selected course and magnetic heading from the following EFIS systems: • *Avidyne EXP5000* • *Sandel SN 3308* • *Sandel SN 3500/4500*	[2]
GAD Format 1	Garmin GAD 42	Selected course, true heading, magnetic heading, and true airspeed information from the following system: • *Garmin GAD 42*	[3]
GDU Format 1	Garmin GDU	Selected course, magnetic heading, pressure altitude, baro-corrected altitude, temperature, calibrated airspeed, and true airspeed information from the following systems: • *Garmin GDU 620*	[2]
INS/IRU	INS/IRU	True heading and magnetic heading information from the following Inertial systems: • *Collins AHS-85E*	[4]
Traffic Format 1	Traffic Advisory	Traffic information from the following traffic systems: • *Garmin GTS 800*	[5]
Traffic Format 2	Traffic Advisory	Traffic information from the following traffic systems: • *Garmin GTS 820* • *Garmin GTS 850*	[5]

Selection	GNS Equivalent	Description	Notes
Traffic Format 3	Traffic Advisory	Traffic information from the following traffic systems: • *Skywatch HP SKY899*	[5]
Traffic Format 4	Traffic Advisory	Traffic information from the following traffic systems: • *Bendix/King KTA 870/970* • *Bendix/King KMH 880/980*	[5]
Traffic Format 5	Traffic Advisory	Traffic information from the following traffic systems: • *Avidyne TAS (Ryan 9900BX)*	[5]
Traffic Format 6	Traffic Advisory	Traffic information from the following traffic systems: • *Sky 497 Skywatch*	[5]

[1] For more information, refer to Section C.2.
[2] For more information, refer to Section C.5.
[3] For more information, refer to Section C.15.
[4] For more information, refer to Section C.7.
[5] For more information, refer to Section C.10.

NOTE

Refer to GTN 625/635/650 TSO Installation Manual, P/N 190-01004-02 and GTN 725/750 TSO Installation Manual, P/N 190-01007-02 for information about ARINC 429 labels.

Table 5-3. ARINC 429 DATA OUT Selections

Selection	GNS Equivalent	Description	Notes
Off	Off	No unit(s) connected to ARINC 429 output	
ARINC 429	ARINC 429	Standard ARINC 429 output data (non-GAMA).	
GAMA Format 1	GAMA 429	ARINC 429 data as defined by the *General Aviation Manufacturers' Association (GAMA) General Aviation Subset, 2nd Edition*. The output data includes navigation and flight plan information to the following systems: • *Bendix/King EFS 40/50*	[1]
GAMA Format 2	GAMA 429 Graphics	ARINC 429 data as defined by the *GAMA General Aviation Subset, 2nd Edition* including GAMA Graphics Protocol 'A'. This format outputs intersection symbols as generic waypoint symbols. The output data includes navigation and flight plan information (including graphical representation of flight plan procedures) to the following EFIS systems: • *Avidyne EX500/EX5000/EXP5000*	[1] [2]
GAMA Format 3	GAMA 429 Graphics w/Int	ARINC 429 data as defined by the *GAMA General Aviation Subset, 2nd Edition* including GAMA Graphics Protocol 'A'. The output data includes navigation and flight plan information (including graphical representation of flight plan procedures) to the following systems: • *Sandel SN3308* • *Sandel SN3500/4500*	[3]
GAMA Format 4	GAMA 429 Pro Line 21	ARINC 429 data as defined by the *GAMA General Aviation Subset, 2nd Edition*. The output data includes navigation and flight plan information.	
GAMA Format 5	GAMA 429 Sextant	ARINC 429 data as defined by the *GAMA General Aviation Subset, 2nd Edition*. The output data includes navigation and flight plan information.	
GAMA Format 6	GAMA 429 Bendix King	ARINC 429 data as defined by the GAMA *General Aviation Subset, 2nd Edition.* The output data includes navigation, flight plan and GPS vertical guidance information to the following systems: • *Bendix/King EFS 40/50*	[1]
Radar Format 1	N/A	ARINC 429 output for control of ARINC 708 weather radars.	[4] [5]

[1] For more information, refer to Section C.5.
[2] For more information, refer to Section C.14.
[3] For more information, refer to Section C.6.
[4] For more information, refer to Section C.17.
[5] GTN main software version 3.00 or later.

NOTE

Only one ARINC 429 output port can be configured to a GAMA Format output at one time. If more than one interfaced system requires a GAMA Format output, splice the GAMA 429 output wires from the GTN into each system requiring GAMA Format information.

Table 5-4. SDI Selections

Selection	Description
Common	RX: Accepts all ARINC 429 inputs TX: Generates all ARINC 429 outputs with SDI = 0.
LNAV 1	Number 1 (Pilot) long-range navigator RX: Accepts 429 inputs with SDI = 0 or 1. TX: Generates 429 outputs with SDI = 1.
LNAV 2	Number 2 (Copilot) long-range navigator RX: Accepts 429 inputs with SDI = 0 or 2. TX: Generates 429 outputs with SDI = 2.

5.5.1.2 RS-232 Configuration Page

Select the RS-232 Configuration page from the Main GTN Setup page, shown in Figure 5-4, by touching the **RS-232** key. Change the inputs or outputs to match the equipment that is interfaced to each channel. Touch the key corresponding to the RS-232 channel and select the applicable input or output setting. The input/output settings are described in Table 5-5. See Appendix C for the correct data format selections for each piece of interfaced equipment.

Figure 5-6. RS-232 Configuration Page

NOTE

Refer to Appendix C for approved third party equipment interfaces to the GTN. If the equipment and interface selections described below are not listed in Appendix C, other FAA approval is required for that interface.

Table 5-5. RS-232 Channel Input Selections

Selection	GNS Equivalent	Description	Notes
Off	Off	No unit(s) connected to input of this channel.	
Airdata Format 1	Shadin-adc	Serial air data information from the following units: • *Shadin ADC 200/2000*	[1]
Altitude Format 1	Icarus-alt	Serial altitude data from the following units: • *Icarus Instruments 3000* • *Sandia SAE5-35* • *Garmin GTX 327 Transponder* • *Trans-Cal Industries IA-RS232-X, SSD120* • *ACK Technologies A-30 (Mod 8 and above)*	[1]
Altitude Format 3	Shadin-alt	Serial altitude data from the following units: • *Shadin 8800T, 9000T, 9200T*	[1]
FADC Format 1	Shadin-FADC	Serial air data and fuel flow information from the following units: • *INSIGHT TAS 1000 Air Data Computer*	[2]
Fuel Format 1	Arnav/ei-fuel	Serial fuel flow information from the following units: • *ARNAV FC-10, FT-10* • *Electronics International FP-5L*	[1]
Fuel Format 2	Shadin-fuel	Serial fuel flow information from the following units: • *Shadin 91053XP, 91204XT(38)D, 91053, 912802-( ) Digital Fuel Management System* • *JP Instruments EDM-700 Engine Monitor*	[1]
GMA Format 1	N/A	This input format supports the GMA 35 audio panel interface.	[3]
GMA Format 2	N/A	This interface is not used in this STC.	[7]
GNS Crossfill	N/A	Select this format to transmit flight plan information automatically to a connected GNS 400W/500W navigator.	[7] [8]
GSR Format 1	N/A	Select this format for the Garmin GSR 56.	[6] [7]
GTX Mode C #1	N/A	Select this format for the GTX 32/327 transponder #1. Provides status data, and flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.	[4]

Selection	GNS Equivalent	Description	Notes
GTX Mode C #2	N/A	Select this format for the GTX 32/327 transponder #2. Provides status data, and flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.	[4]
GTX Mode S #1	N/A	Select this format for the GTX 33/33ES/328/330/330ES transponder #1. Provides status data, ICAO address, and Flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.	[4]
GTX Mode S+ #1	N/A	Select this format for the GTX 33ES/330ES transponder #1 with GTX software version 7.01 or later for AC 20-165 compliance. Provides status data, ICAO address, and Flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.	[4] [7]
GTX Mode S #2	N/A	Select this format for the GTX 33/33ES/328/330/330ES transponder #2. Provides status data, ICAO address, and Flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.	[4]
GTX Mode S+ #2	N/A	Select this format for the GTX 33ES/330ES transponder #2 with GTX software version 7.01 or later for AC 20-165 compliance. Provides status data, TIS data, ICAO address, and Flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.	[4] [7]
GTX w/TIS #1	N/A	Select this format for the GTX 33/33ES/330/330ES transponder #1. Provides status data, TIS data, ICAO address, and Flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.	[4] [7]
GTX w/TIS+ #1	N/A	Select this format for the GTX 33ES/330ES transponder #1 with GTX software version 7.01 or later for AC 20-165 compliance. Provides status data, TIS data, ICAO address, and Flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.	[4]
GTX w/TIS #2	N/A	Select this format for the GTX 33/33ES/330/330ES transponder #2. Provides status data, TIS data, ICAO address, and Flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.	[4]
GTX w/TIS+ #2	N/A	Select this format for the GTX 33ES/330ES transponder #2 with GTX software version 7.01 or later for AC 20-165 compliance. Provides status data, TIS data, ICAO address, and Flight ID. Choosing this input setting will automatically configure the corresponding channel output to the same setting.	[4] [7]
Panel GTX w/TIS #1	N/A	Select this format for the GTX 330/330ES transponder #1. This provides TIS data from the panel mount GTX 330/330ES transponder without controlling the transponder via the GTN.	[4] [7]
Panel GTX w/TIS+ #1	N/A	Select this format for the GTX 330ES transponder #1 with GTX software version 7.01 or later for AC 20-165 compliance. This provides TIS data from the panel mount GTX 330/330ES transponder without controlling the transponder via the GTN.	[4]

Selection	GNS Equivalent	Description	Notes
Panel GTX w/TIS #2	N/A	Select this format for the GTX 330/330ES transponder #2. This provides TIS data from the panel mount GTX 330/330ES transponder without controlling the transponder via the GTN.	[4]
Panel GTX w/TIS+ #2	N/A	Select this format for the GTX 330ES transponder #2 with GTX software version 7.01 or later for AC 20-165 compliance. This provides TIS data from the panel mount GTX 330/330ES transponder without controlling the transponder via the GTN.	[4] [7]
Lightning Detector 1	WX-500	Lightning strike information from an L-3 Communications WX-500 Stormscope.	[5]
Traffic Format 7	Ryan TCAD	Select this format for the Ryan TCAD 9900B Series traffic system.	[5] [7]
Traffic Format 8	Ryan TCAD	Select this format for the Ryan TCAD 9900BX Series traffic system.	[5] [7]

[1] For more information refer to Section C.3.
[2] For more information refer to Section C.2.
[3] For more information refer to Section C.1.
[4] For more information refer to Section C.7.
[5] For more information refer to Section C.10.
[6] For more information refer to Section C.18.
[7] GTN main software version 3.00 or later.
[8] If Auto GNS Crossfill is used, the GTN should be installed as the #1 navigator.

Table 5-6. RS-232 Channel Output Selections

Selection	GNS Equivalent	Description	Notes
Off	Off	No unit(s) connected to output of this channel.	
ADS-B	ADS-B	Serial communication of GPS data to Garmin panel mount mode S transponders. Note: This format is not required when using any other GTX output format.	[1]
ADS-B+	N/A	Serial communication of GPS data to Garmin panel mount mode S transponders with GTX software version 7.01 or later for AC 20-165 compliance. Note: This format is not required when using any other GTX output format that is described as being for AC 20-165 compliance.	[1] [7]
Aviation Output 1	Aviation	Serial position, GPS altitude, velocity, and navigation data to the following units: • *Garmin MX20 (V5.6 or later), GMX 200* • *Garmin GTX 327 Transponder*	[2]
Aviation Output 2	Aviation no alt	Serial position, velocity, and navigation data to the following units: • *Garmin MX20 (V5.5 or earlier)*	[2]
External EGPWS	HW EGPWS	Serial communication to a Bendix/King (Honeywell) KGP 560 EGPWS.	[3]
GMA Format 1	N/A	Control of GMA 35 Audio Panel functions.	[4]
GMA Format 2	N/A	This interface is not used in this STC.	[7]
GNS Crossfill	N/A	Select this format to transmit flight plan information automatically to a connected GNS 400W/500W navigator.	[5] [7]
GSR Format 1	N/A	Select this format for the Garmin GSR 56.	[6] [7]
GTX Mode C #1	N/A	Control of GTX 32/327 #1 transponder functions, pressure altitude data, and groundspeed data.	[1]
GTX Mode C #2	N/A	Control of GTX 32/327 #2 transponder functions, pressure altitude data, and groundspeed data.	[1]
GTX Mode S #1	N/A	Control of GTX 33/33ES/328/330/330ES #1 transponder functions, pressure altitude data, and groundspeed data.	[1]
GTX Mode S+ #1	N/A	Control of GTX 33ES/330ES #1 transponder functions, pressure altitude data, and groundspeed data. For use with GTX software version 7.01 or later for AC 20-165 compliance.	[1] [7]
GTX Mode S #2	N/A	Control of GTX 33ES/330ES #2 transponder functions, pressure altitude data, and groundspeed data.	[1]
GTX Mode S+ #2	N/A	Control of GTX 33ES/330ES #2 transponder functions, pressure altitude data, and groundspeed data. For use with GTX software version 7.01 or later for AC 20-165 compliance.	[1] [7]
GTX w/TIS #1	N/A	Control of GTX 33/33ES/330/330ES #1 transponder functions, pressure altitude data, groundspeed data, and TIS traffic.	[1]

Selection	GNS Equivalent	Description	Notes
GTX w/TIS+ #1	N/A	Control of GTX 33ES/330ES #1 transponder functions, pressure altitude data, groundspeed data, and TIS traffic. For use with GTX software version 7.01 or later for AC 20-165 compliance.	[1] [7]
GTX w/TIS #2	N/A	Control of GTX 33/33ES/330/330ES #2 transponder functions, pressure altitude data, groundspeed data, and TIS traffic.	[1]
GTX w/TIS+ #2	N/A	Control of GTX 33ES/330ES #2 transponder functions, pressure altitude data, groundspeed data, and TIS traffic. For use with software version 7.01 or later for AC 20-165 compliance.	[1] [7]
Panel GTX w/TIS #1	N/A	Select this format for the GTX 330/330ES transponder #1.This provides groundspeed, GPS PVT, and pressure altitude information to the transponder without controlling the transponder via the GTN.	[1]
Panel GTX w/TIS+ #1	N/A	Select this format for the GTX 330ES transponder #1.This provides groundspeed, GPS PVT, and pressure altitude information to the transponder without controlling the transponder via the GTN. For use with GTX software version 7.01 or later for AC 20-165 compliance.	[1] [7]
Panel GTX w/TIS #2	N/A	Select this format for the GTX 330/330ES transponder #2. This provides groundspeed, GPS PVT, and pressure altitude information to the transponder without controlling the transponder via the GTN.	[1]
Panel GTX w/TIS+ #2	N/A	Select this format for the GTX 330ES transponder #2. This provides groundspeed, GPS PVT, and pressure altitude information to the transponder without controlling the transponder via the GTN. For use with GTX software version 7.01 or later for AC 20-165 compliance.	[1] [7]
Lightning Detector 1	WX-500	Serial communication to an L-3 Communications WX-500 Stormscope.	[3]
MapMX	MapMX	Serial position, GPS altitude, velocity, and navigation data to the following units: • *Garmin MX20 (V5.6 or later), GMX 200*	[2]
Traffic Format 7	Ryan TCAD	Select this format for the Ryan TCAD 9900B Series traffic system.	[3] [7]
Traffic Format 8	Ryan TCAD	Select this format for the Ryan TCAD 9900BX Series traffic system.	[3] [7]

[1] For more information refer to Section C.7.
[2] For more information refer to Section C.14.
[3] For more information refer to SectionC.10.
[4] For more information refer to Section C.1.
[5] If Auto GNS Crossfill is used, the GTN should be installed as the #1 navigator.
[6] For more information refer to Section C.18.
[7] GTN main software version 3.00 or later.

5.5.1.3 HSDB Ethernet Configuration Page

The HSDB Ethernet configuration page can be accessed from the GTN Setup page. To configure each Ethernet port, touch the key next to the port to configure it as **Connected** or **Not Connected**. See Figure 5-7. If a Garmin LRU is connected to a specific Ethernet port, then configure the port as **Connected**. If no LRU is connected to the port, configure it as **Not Connected**.

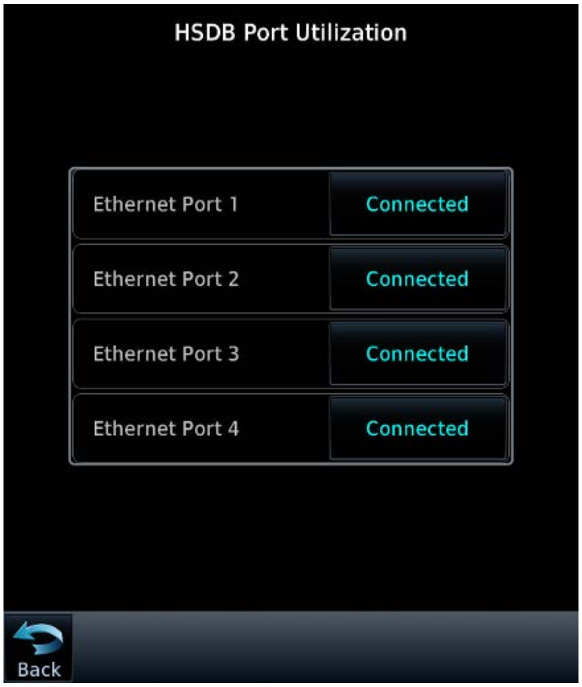


Figure 5-7. HSDB Ethernet Port Configuration Page

5.5.1.4 Interfaced Equipment Configuration Page

To access the Interfaced Equipment configuration page, touch the **Interfaced Equipment** key from the GTN Setup page, as shown in Figure 5-8 . This page configures which LRUs are installed and interfaced to the GTN. From the available list of LRUs, select either **Present** or **Not Present**. The Transponder Interfaced Equipment configuration should be pre-populated when the RS-232 data format is selected for each RS-232 channel.

5.5.1.4.1 Cross-Side Navigator (Not Shown in Figure 5-8)

In a single GTN installation, select **Not Present**. In a dual GTN installation, select **Present.**

5.5.1.4.2 GDL 69/69A

Select either **Present** or **Not Present**. If Present, select either **GDL 69** or **GDL 69A** based upon the installed LRU.

Figure 5-8. Interfaced Equipment Configuration Page

5.5.1.4.3 GDL 88

Select either **Present** or **Not Present**. If present, touch **GDL 88** to select the external traffic source (None, TCAD, or TAS/TCAS) connected to the GDL 88 and the GDL 88 ADS-B transmit state (Enable or Disabled). Configuration of these parameters enables portions of the GDL 88 user interface in normal mode and does not configure the GDL 88. For more information on configuring the GDL 88, refer to the GDL 88 STC Installation Manual, P/N 190-01310-00.

5.5.1.4.4 Transponder #1 and Transponder #2

Select either **GTX Mode C**, **GTX Mode S**, or **GTX Mode S+** based upon the interfaced transponder type. If the type of transponder connected to the cross-side navigator is **GTX w/TIS** or **GTX w/TIS+**, select **GTX Mode S** or **GTX Mode S+**, respectively. Note that if the correct data format is selected on the RS-232 configuration page, this will be filled in and grayed out. Ensure the correct transponder type is displayed. Also, the transponder should be configured as present even if it is connected to the other installed GTN. This setting enables the user interface in normal mode.

5.5.1.4.5 GWX (GTN 7XX Only)

Select either **Present** or **Not Present**. If **Present**, select GWX 68 or GWX 70, based upon the installed radar.

NOTE

If an ARINC 708 weather radar is configured, the **Present** key will not be available for selection for the GWX weather radar.

5.5.1.4.6 GSR 56

Select either **Present** or **Not Present**. In installations with multiple GTNs, this selection must be the same on all GTNs.

5.5.1.5 Main Indicator (Analog) Configuration Page

Select the Main Indicator (Analog) Configuration Page, shown in Figure 5-9, from the GTN Setup page. This page allows you to calibrate the OBS resolver, configure the CDI key, selected course for GPS and VLOC, as well as the V-Flag state. Configurable fields are described below.

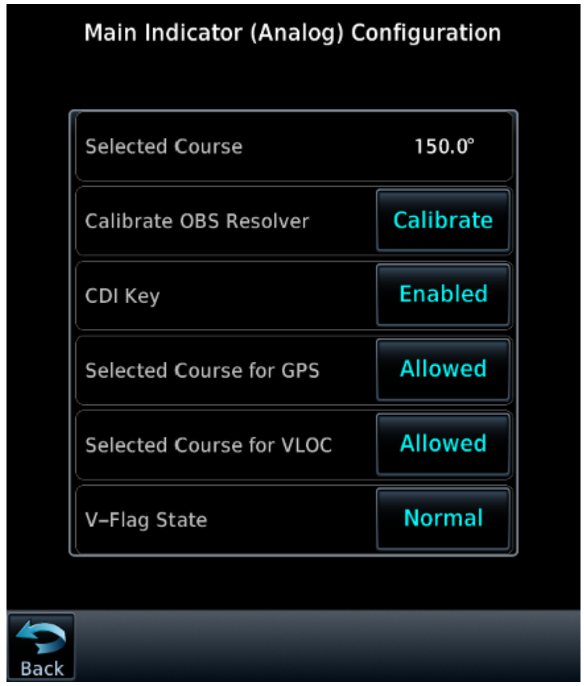


Figure 5-9. Main Indicator Configuration Page

OBS Resolver Calibration

To calibrate the OBS resolver, touch the **Calibrate** key from the Main Indicator Configuration page. Next, select 150˚ on the External CDI/HSI then touch the **OK** key, as prompted on the display. After the OBS resolver is finished calibrating, the GTN will display 'OBS Resolver Calibration Complete!'. Touch **OK** after the calibration is complete. Verify OBS operation by checking that the selected course displayed at the top of the page is within 2° of the selected course.

CDI Key

To enable or disable the CDI key, touch the key to the right of **CDI** key to toggle between enabling and disabling the **CDI** key. Disabling the **CDI** key causes the CDI source to always display as GPS and removes the **CDI** key. This may be necessary for certain EFIS systems where navigation sensor selection must be accomplished on the EFIS or its control panel.

Table 5-7. GPS Selected Course

Selection	Description
Allowed (Default)	Select if it is desired to allow a selected course input from the analog resolver or ARINC 429 for GPS operation in OBS mode.
Ignored	Select to cause the GTN to ignore a selected course input (either analog resolver or ARINC 429) for GPS operation in OBS mode.

Table 5-8. VLOC Selected Course

Selection	Description
Allowed (Default)	Select if it is desired to allow a selected course input from the analog resolver or ARINC 429 for VLOC operation in OBS mode.
Ignored	Select if it is desired to ignore a selected course input such that the VOR valid flag is dependent only on a valid VOR signal, with lateral deviation calculated by another display device.

Table 5-9. V-Flag State

Selection	Description
Declutter	Whenever vertical deviation is invalid, the vertical deviation bar is parked in the maximum UP position and the vertical flag is removed from view, except in the following cases: (i) the CDI is in VLOC mode and an ILS frequency is tuned, or (ii) the CDI is in GPS mode and a GPS approach with vertical guidance is active. In these cases, whenever the vertical deviation is invalid, the vertical deviation bar parks in the centered position and the vertical flag is shown.
Normal (Default)	Whenever vertical deviation is invalid the vertical deviation bar parks in the centered position and the vertical flag is shown.

NOTE

The V-Flag declutter setting should only be set for indicators in which 300mVDC is sufficient to drive the vertical deviation bar out of view.

5.5.1.6 Lighting Configuration Page

From the GTN Setup page shown in Figure 5-4 above, select the GTN **Lighting Configuration** page, shown in Figure 5-10 page allows you to set display parameters that affect the display backlight and key lighting brightness. Fields listed in Table 5-10 are adjusted separately for both the Display and Key lighting features. The display source can only be configured to track the photocell or lighting bus 1. The display source cannot be configured to track lighting bus 2.

Figure 5-10. Lighting Configuration Page

Table 5-10. Display and Key Lighting Adjustable Fields

Field	Description
Photocell	Backlight or key lighting level is determined by the ambient light level as measured by the photocell on the GTN.
Lighting Bus 1	Backlight or key levels track the Lighting Bus 1 levels.
Lighting Bus 2	Key lighting levels track the Lighting Bus 2 levels.

Minimum Level

This sets the minimum brightness of the keys or display. Touch the 'Minimum Level' key corresponding to either the Keys or the Display to adjust the minimum brightness. The minimum brightness level can be adjusted in a range from 0.05% to 100.00% when tracking the lighting bus, and from 0.14% to 100.00% when tracking the photocell, with 100.00% being the maximum brightness level. The default minimum display brightness level when tracking the lighting bus is 0.05%. The default minimum display brightness level when tracking the photocell is 0.14%. The default minimum bezel key brightness level is 0.00%.

5.5.1.6.1 Photocell Configuration Page

The photocell configuration page, shown in Figure 5-11, is reached by touching **Configure Photocell** on the lighting configuration page , shown in Figure 5-10. This page allows configuration of the photocell parameters listed below.

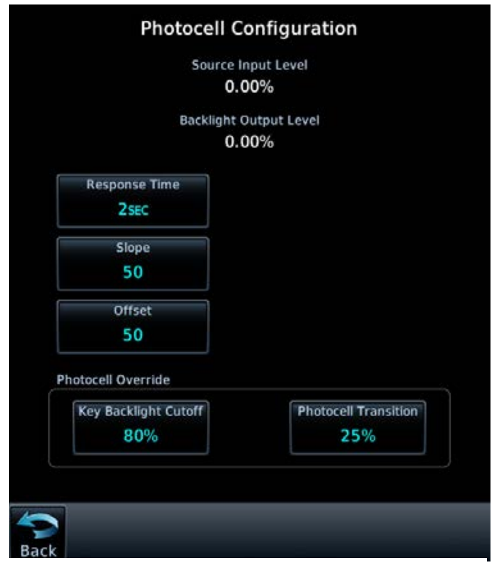


Figure 5-11. Photocell Configuration Page

Response Time

Sets the speed with which the key or display brightness responds to the input level (bus voltage or ambient light) changes. The higher the number the slower the display responds. This field has a range of two to seven seconds, and is set to two seconds as a default value.

Slope

Sets the sensitivity the brightness of the display or keys has to changes in the input level. Adjusting the slope higher will result in a brighter display for a given increase in the input level. This field has a range of 0 to 100, and is set to 50 as the default setting.

Offset

Adjusts the lighting level up or down for any given input level. This field has a range of 0 (zero) to 99, and is set to 50 as a default value. This may also be used to match lighting curves with other equipment in the panel.

5.5.1.6.1.1 Photocell Override Options

Key Backlight Cutoff

This parameter configures the point at which key backlighting is switched off in bright light. For example, a value of 70% results in the key backlights being turned off at photocell source input levels above 70%. This field has a range of 0 (zero) to 100% and is set to 80% as the default setting.

Photocell Transition

When a lighting bus is used to control the lighting of the display, this parameter sets the point on the lighting bus control below which the display brightness tracks the GTN's photocell. This field has a range of 5 to 50, and is set to 25 as the default setting.

5.5.1.6.2 Lighting Bus Configuration Page

The Lighting Bus Configuration page offers the same Response Time, Slope, and Offset adjustments as described in Section 5.5.1.6.1.

Lighting Bus Source

To configure the lighting bus source voltage, touch the **Lighting Bus 1** or **Lighting Bus 2** key. Select **14V DC**, **28V DC**, **5V DC**, or **5V AC**, depending on the lighting bus voltage source.

5.5.1.7 Audio Configuration Page

The Audio Configuration page allows the adjustment of Alert audio volume. See Figure 5-12.

Adjust Alert volume by touching the + or **-** signs to decrease or increase the volume accordingly. Volume is displayed as a percentage of maximum volume, with 0% being muted and 100% being maximum volume. The selected volume can be checked by selecting **Altitude**, **Terrain**, or **Test Tone** beneath the volume adjustment and then touching the triangle to the right of the key. See Section 5.6.7 for the TAWS audio check procedure.

Figure 5-12. Audio Configuration Page

5.5.1.8 Traffic Configuration Page

Access the Traffic Configuration page from the Main GTN Configuration home page. See Figure 5-15. The Traffic Configuration page allows the external control to be configured for each specific installation.

Configure the traffic intruder symbol color. If the GTN is installed with other traffic displays, choose the appropriate symbol color (**White** or **Cyan**) to maintain cockpit consistency.

Configure the GTN control of the traffic system. If the GTN is used to control the traffic system, select **Yes**. If a separate display device is used to control the traffic system, select **No**. The default selection is **No**.

If the GTN is interfaced to the Avidyne TAS (Ryan 9900BX) and configured to ARINC 429 ‘Traffic Format 5’, this setting must be configured to **No**. The Avidyne TAS does not include provisions for the necessary discrete signals to be controlled by the GTN.

If the GTN is connected to a GDL 88 that is interfaced with a TCAD system, the option to configure the GTN control of the TCAD system will be available. If the GTN is used to control the traffic system, select **Yes**. If a separate display device is used to control the traffic system, select **No**.

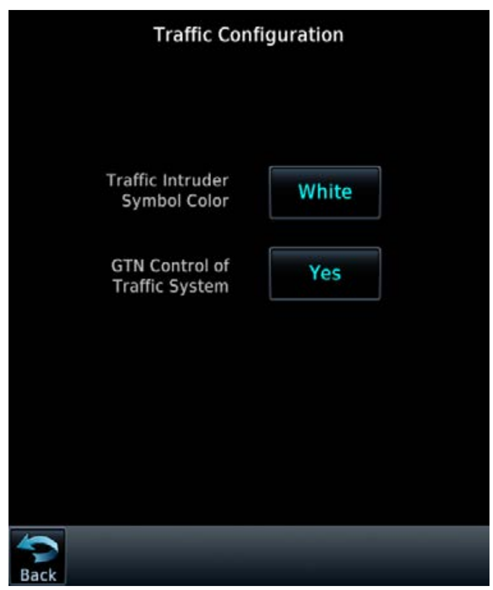


Figure 5-13. Traffic Configuration Page

5.5.1.9 Main System Configuration Page

Select ‘Main System’ from the GTN Setup page. This page displays miscellaneous configuration options as described below.

Figure 5-14. Main System Configuration Page

Air/Ground Threshold

The air/ground threshold is the groundspeed at which the GTN transitions from a ground state to an airborne state, and vice versa. To adjust the air/ground threshold, touch the key to the right and enter a value. This field has a range of 0 to 99 knots and is set to 30 knots as a default value.

Air/Ground Discrete

The AIR/GROUND discrete is active-low, and can be configured to interpret if the aircraft is airborne or on the ground based upon whether the input is grounded or open. If it is desired for the air/ground state to be airborne when the squat switch input is grounded, then toggle the AIR/GROUND discrete key to **Active for Airborne**. If it is desired for the air/ground state to be airborne when the squat switch input is open, then toggle the AIR/GROUND discrete key to **Active for Ground**. The default configuration is **Active for Airborne**.
Refer to Table 5-11.

Table 5-11. Air/Ground Discrete Configurations

AIR/GROUND Discrete Configuration	AIR/GROUND input state	GTN Air/Ground Status
Configured Active for Ground	Open	Airborne
	Grounded	On-Ground
Configured Active for Airborne	Open	On-Ground
	Grounded	Airborne

GPS Antenna Height Above Ground

This configures the height of the GPS antenna above ground level while the aircraft is sitting on the ground. Before proceeding, measure the GPS antenna vertical offset (to the nearest tenth of a foot) as shown in Figure 5-15. Enter the measured value by touching the key and typing the measured value into the keypad on the display. This field has a range of 0.0 to 99.9 feet.

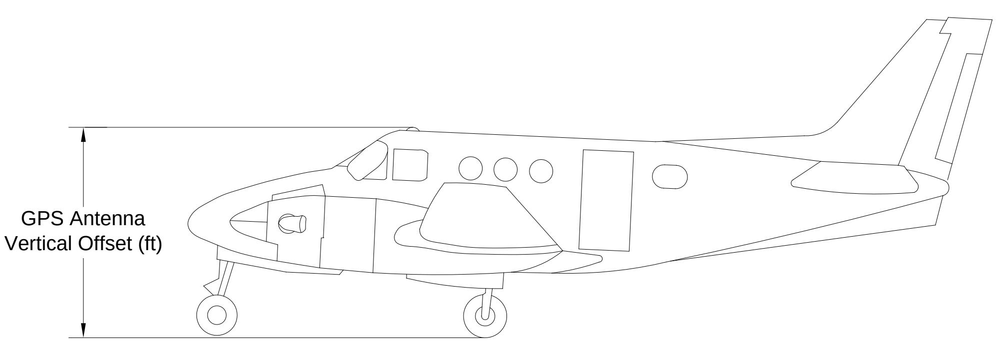


Figure 5-15. Measurement of GPS Antenna Vertical Offset

Table 5-12 . Fuel Type

Selection	Description
AV gas (Default)	The aircraft burns Aviation gas (5.8 lbs./gal.)
Jet A	The aircraft burns Jet A or Jet A-1 fuel (6.7 lbs./gal.)
Jet B	The aircraft burns Jet B (JP-4) fuel (6.5 lbs./gal.)

Table 5-13. Synchro Heading Input (GTN 7XX Only)

Selection	Description
Connected	A Synchro heading source is connected to the GTN 7XX.
Not Connected (Default)	A Synchro heading source is not connected to the GTN 7XX.

NOTE

In a dual GTN installation, both GTNs must be configured for the same GPS SELECT setting for the unit to function properly. If **Auto** is selected on one GTN, **Auto** must manually be selected on the other, and vice versa.

Table 5-14. GPS Select

Selection	Description
Auto (Default)	When in GPS mode, the GPS Select discrete is unasserted (open) whenever a GPS approach mode is active – no associated messages appear and no pilot action is required. The pilot is also allowed to select automatic or manual GPS to ILS CDI transitions on the AUX CDI/ALARMS page.
Prompt	When in GPS mode, the GPS Select discrete is unasserted (open) whenever a GPS approach mode is active and the pilot has enabled the A/P APR Outputs (an associated message is displayed telling the pilot to enable the A/P APR Outputs). This setting will not allow the pilot to select automatic GPS to ILS CDI transitions on the AUX CDI/ALARMS page (only manual transitions are permitted). *For Honeywell (Bendix/King) KFC 225 and KAP 140 autopilots.*

Heading Source Input (software version 3.00 or later)

When upgrading from GTN software version 2.00 to 3.00, this setting defaults to ‘Connected’. If a nuisance heading lost message appears a few minutes after power up and no heading source is present, configure this setting to 'Not Connected'.

Table 5-15. Heading Source Input

Selection	Description
Connected (Default)	A heading source is connected to the GTN.
Not Connected	A heading source is not connected to the GTN.

Altitude Source Input (software version 3.00 or later)

When upgrading from GTN software version 2.00 to 3.00, this setting defaults to ‘Connected’. If a nuisance altitude source lost message appears a few minutes after power up and no pressure altitude source is present, configure this setting to 'Not Connected'.

Table 5-16. Altitude Source Input

Selection	Description
Connected (Default)	A pressure altitude source is connected to the GTN.
Not Connected	A pressure altitude source is not connected to the GTN.

Voice Command (software version 3.00 or later)

Table 5-17. Voice Command *(software version 3.00 or later)*

Selection	Description
Enable	This setting enables Telligence Voice Command control of the GMA 35. Enabling this setting is not covered under this STC.
Disable (Default)	Telligence Voice Command is not enabled.

NOTE

The Voice Command setting will be unavailable until an RS-232 port is configured for GMA Format 1.

5.5.1.10 COM Configuration Page (GTN 635/650/750 Only)

Select the COM Configuration page, shown in Figure 5-16, from the main GTN Setup page, shown in Figure 5-4 above. These values are set at the factory and rarely require calibration.

To enable or disable the COM radio, touch the key to toggle between **Enabled** and **Disabled**. The COM radio defaults to the enabled state.

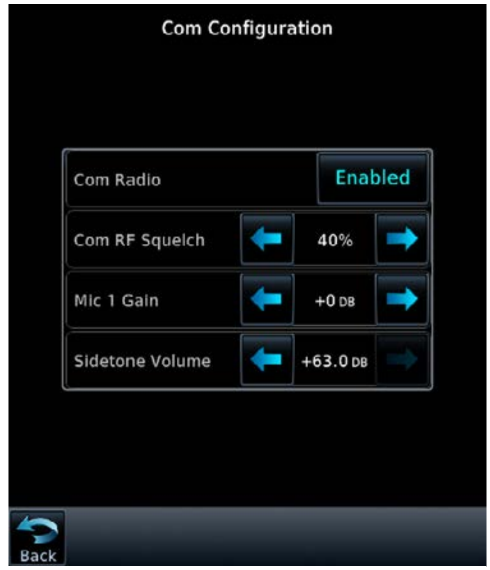


Figure 5-16. COM Configuration Page

COM RF Squelch

This setting configures the RF squelch threshold for the COM radio. This field may be set to any value between 0% and 100%. The default is 0%. 0% is the most sensitive (i.e. the weakest signal level necessary to break squelch). Increasing the value will require a stronger signal to break squelch.

Mic 1 Gain

The MIC 1 Gain can be adjusted from -12 dB to +30 dB in 6 dB increments. The default is +12 dB. For mics with low signal levels, this can be adjusted up to increase the signal strength. For mics with high signal levels, this can be adjusted down to decrease the signal strength.

Sidetone Volume

This parameter sets the audio side tone output level. Side tone refers to the audio spoken into the COM microphone. This setting only affects the volume of the side tone for the GTN COM during PTT. This value may be set to values between 0.0 dB and 63.0 dB in 0.5 dB increments. The default is 17.5 dB. The higher the setting, the louder the side tone will be. The side tone is only generated in the COM headset (low level) audio output.

5.5.1.11 VOR/LOC/GS Configuration Page (GTN 650/750 Only)

Select the **VOR/LOC/GS** key from the GTN Setup page by touching the key on the display shown in Figure 5-4 above. This page allows you to verify the CDI outputs from the VOR/LOC/GS receiver as well as the OBS resolver input to the VOR receiver. It also allows you to select the format for the DME tuning data.

NAV Radio

To enable or disable the NAV radio, touch the key to toggle between **Enabled** and **Disabled**. The NAV radio defaults to the enabled state.

Calibrate OBS Resolver

To calibrate the OBS resolver, touch the **Calibrate** key from the VOR/LOC/GS Configuration page. Next, select 150˚ on the external CDI/HSI, then touch the **OK** key when prompted by the display. Touch **OK** after calibration is complete. Verify OBS operation by checking that the selected course displayed at the top of the page is within 2° of the selected course.

Figure 5-17. VOR/LOC/GS Configuration Page

Table 5-18. ARINC 429 Configuration Speed (TX)

Selection	Description
Low	Standard low-speed ARINC 429 (nominally 12.5 kilobits per second)
High	High-speed ARINC 429 (nominally 100 kilobits per second)

Table 5-19. SDI

Selection	Description
Common	Generates all 429 outputs with SDI = 0.
VOR/ILS 1	Number 1 (Pilot) VOR/ILS Receiver TX: Generates 429 outputs with SDI = 1.
VOR/ILS 2	Number 2 (Copilot) VOR/ILS Receiver TX: Generates 429 outputs with SDI = 2.

Table 5-20. DME Mode

Selection	Description
Directed freq 1	If the GTN is connected to a multi-channel ARINC 429 DME, channel 1 of that DME is tuned. “Directed freq 1” should be selected if a single-channel ARINC 429 DME is to be tuned.
Directed freq 2	If the GTN is connected to a multi-channel ARINC 429 DME, channel 2 of that DME is tuned.

DME Channel Mode

This configuration setting allows you to set the format for DME tuning data output.

Table 5-21. DME Channel Mode

Selection	Description
King serial	King Serial DME tuning data
Parallel 2x5	2 of 5 parallel DME tuning.
Parallel BCD	Shifted BCD (Binary Coded Decimal) parallel DME tuning
Parallel slip	Slip-code parallel DME tuning
Narco 890/891	2 of 5 parallel DME tuning, compatible with the following DME units: • *Narco DME 890* • *Narco DME 891*

5.5.1.12 ARINC 453/708 Configuration Page (GTN 7XX Only)

Select the ARINC 708 key from the GTN Setup page by touching the key on the display shown in Figure 5-4. This page allows the ARINC 453/708 port to be configured for a compatible weather radar. Refer to Section 5.5.2.4 for information on ARINC 708 weather radar enablement, and Section 5.5.4.11.3 for information on ARINC 708 weather radar configuration.

5.5.2 GTN Options Configuration Page

Access the GTN Options configuration page, shown in Figure 5-18, by touching the **GTN Options** key on the Configuration Mode page. This page allows optional purchased features to be enabled. All optional features are activated using the GTN Options Configuration Page.

NOTE

The feature unlock card should be provided to the customer after the GTN installation.

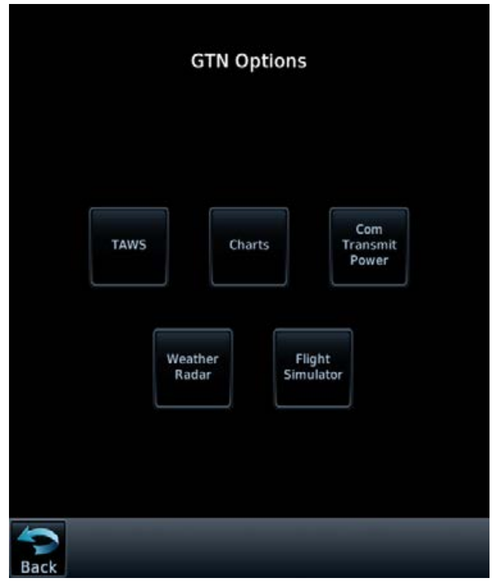


Figure 5-18. GTN Options Configuration Page

5.5.2.1 TAWS Enablement

When the optional TAWS feature is enabled, the GTN will provide Class B TAWS functionality. This section describes how to activate the TAWS feature in the GTN.

8. 1. Turn the GTN off by pulling the circuit breaker.
9. 2. Remove the database SD card from the SD card slot and insert a TAWS Enablement Card,
P/N 010-00878-01.
10. 3. Enter configuration mode by applying power (closing the circuit breaker) to the GTN while holding the HOME key.
11. 4. Go to the TAWS page, shown in Figure 5-18 from the GTN Options page. Touch the TAWS B key next to ‘TAWS Configuration’.
12. 5. A window will appear with ‘Enable TAWS-B? This will consume a feature unlock key when selected.’
13. 6. Touch **Yes** to enable TAWS-B.

When the TAWS feature is activated, the TAWS B key will be lit green, as shown in Figure 5-19.

Figure 5-19. TAWS Configuration Page

NOTE

If enabling TAWS on the GTN, the audio output from the GTN must be connected to an unswitched and unmuted input on the audio panel.
Refer to Figure E-14.

NOTE

TAWS-B should only be enabled on one GTN in dual GTN installations to prevent conflicting audio messages.

5.5.2.1.1 TAWS Audio Configuration (Only if TAWS is Enabled)

From the TAWS page in the GTN Options page group, touch the **Configure TAWS Audio** key. This page, shown in Figure 5-20, allows configuration of TAWS Audio. For each audio alert, select the desired audio text, as described in the following tables.

Figure 5-20. TAWS Audio Configuration Page

5.5.2.1.1.1 Caution Fields

Table 5-22. NCR-CAUTION Field

Selection	Description
Don't Sink	Sets the Negative Climb Rate (NCR) cautionary alert to the specified text. (Default)
Too Low - Terrain	Sets the Negative Climb Rate (NCR) cautionary alert to the specified text.

Table 5-23. EDR-CAUTION Field

Selection	Description
Sink Rate	Sets the Excessive Descent Rate (EDR) cautionary alert to the specified text.

Table 5-24. PDA-CAUTION Field

Selection	Description
Too Low - Terrain	Sets the Premature Descent Rate (PDA) cautionary alert to the specified text.

Table 5-25. IOI-CAUTION Field

Selection	Description
Obstacle Ahead (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Imminent Obstacle Impact (IOI) cautionary alert to the specified text. (Default)
Caution, Obstacle (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Imminent Obstacle Impact (IOI) cautionary alert to the specified text.

Table 5-26. ROC-CAUTION Field

Selection	Description
Caution, Obstacle (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Reduced Required Obstacle Clearance (ROC) cautionary alert to the specified text. (Default)
Obstacle Ahead (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Reduced Required Obstacle Clearance (ROC) cautionary alert to the specified text.

Table 5-27. ITI-CAUTION Field

Selection	Description
Terrain Ahead (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Imminent Terrain Impact (ITI) cautionary alert to the specified text. (Default)
Caution, Terrain (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Imminent Terrain Impact (ITI) cautionary alert to the specified text.

Table 5-28. RTC-CAUTION Field

Selection	Description
Caution, Terrain (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Reduced Required Terrain Clearance (RTC) cautionary alert to the specified text. (Default)
Terrain Ahead (2x)	Sets the Forward Looking Terrain Clearance (FTLA) Reduced Required Terrain Clearance (RTC) cautionary alert to the specified text.

5.5.2.1.1.2 Warning Fields

Table 5-29. IOI-WARNING Field

Selection	Description
Obstacle Ahead, Pull-Up (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Imminent Obstacle Impact (IOI) warning alert to the specified text. (Default)
Obstacle (2x); Pull-Up (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Imminent Obstacle Impact (IOI) warning alert to the specified text.

Table 5-30. ROC-WARNING Field

Selection	Description
Obstacle (2x); Pull-Up (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Reduced Required Obstacle Clearance (ROC) warning alert to the specified text. (Default)
Obstacle Ahead, Pull-Up (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Reduced Required Obstacle Clearance (ROC) warning alert to the specified text.

Table 5-31. ITI-WARNING Field

Selection	Description
Terrain Ahead, Pull-Up (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Imminent Terrain Impact (ITI) warning alert to the specified text. (Default)
Terrain (2x); Pull-Up (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Imminent Terrain Impact (ITI) warning alert to the specified text.

Table 5-32. RTC-WARNING Field

Selection	Description
Terrain (2x); Pull-Up (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Reduced Required Terrain Clearance (RTC) warning alert to the specified text. (Default)
Terrain Ahead, Pull-Up (2x)	Sets the Forward Looking Terrain Clearance (FLTA) Reduced Required Terrain Clearance (RTC) warning alert to the specified text.

Table 5-33. EDR-WARNING Field

Selection	Description
Pull Up	Sets the Excessive Descent Rate (EDR) warning alert to the specified text.

Table 5-34. VCO-WARNING Field

Selection	Description
Five Hundred	Sets the Voice Callout (VCO) advisory alert to the specified text.

5.5.2.1.2 Airport Criteria Configuration

For installations of the GTN with TAWS enabled, the GTN provides aural and visual terrain alerts. The alerting algorithm adapts the terrain alerting criteria based on nearby airports. The GTN must be configured to specify the minimum criteria that an airport must meet to be considered as a nearby airport for the purpose of TAWS/Terrain alerting. For installations with TAWS enabled, obtain the information listed in Table 5-35.

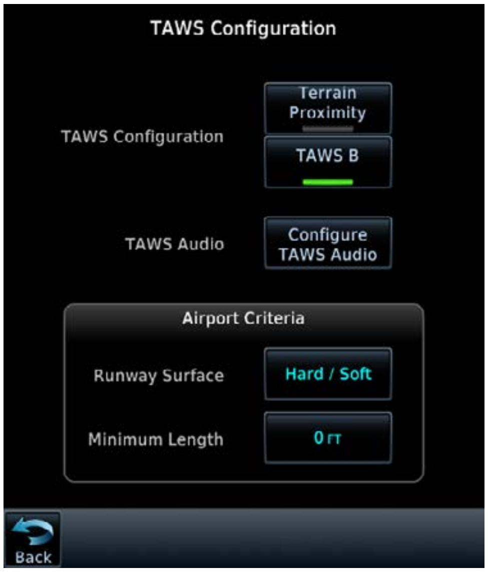


Figure 5-21. TAWS Configuration Page

Table 5-35. TAWS Airframe-Specific Configuration Data

Item	Description	POH/AFM Section	Note
Runway Surface	Type of surfaces that the runway must have for the aircraft to land.	N/A	Set to type of runway surface that the aircraft will typically use.
Minimum Length	Minimum length that runway must have before being considered a runway by TAWS alerting.	5-Performance	Set to the shortest ground roll distance required for takeoff/landing operations (typically the distance given for sea level using the coldest temperature given in the POH/AFM).

Configure TAWS Terrain Alerting and Airport Criteria as follows:

1. Access the GTN Options configuration page by touching the GTN Options key from the Configuration Mode Home page, then touch the TAWS key.
2. Touch the Runway Surface key and select the applicable runway surface type as determined from the information in Table 5-35.
3. Touch the Minimum Length key and enter the minimum length value from the information in Table 5-35. This field has a range of 0 to 25,000 ft and defaults to zero.

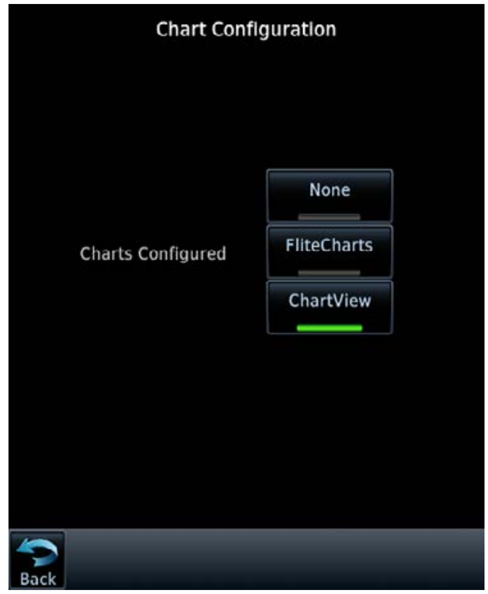
5.5.2.2 Charts (GTN 7XX Only)

The GTN 7XX can display Jeppesen charts using the optional ChartView feature, which must be activated. To configure which Charts to display, touch either None, FliteCharts, or ChartView. If ChartView is selected, it must be enabled as described below.

NOTE

The ChartView Enablement Card can only be used on one GTN (for dual GTN installations a separate ChartView Enablement Card must be used on each GTN).

1. Turn the GTN off by pulling the circuit breaker.
2. Remove the database SD card from the SD card slot and insert a ChartView Enablement Card, P/N 010-00878-40.
3. Enter configuration mode on the GTN by applying power to the GTN (closing the circuit breaker) while holding the HOME key.



4. Go to the Charts page from the GTN Options page. Touch the ChartView key.
5. When prompted, touch Yes to enable ChartView.
6. When the ChartView feature is activated, the ChartView key will be lit green, as shown in Figure 5-22.

Figure 5-22. Chart Configuration Page

NOTE

Navigation or chart data must not be programmed on the ChartView Enablement Card.

5.5.2.3 COM Transmit Power

When the optional 16W COM power is configured, the GTN COM will transmit with 16 watts rather than the standard 10 watts. 16W COM transmit power should be enabled for aircraft certified to fly above FL180. This section describes how to enable the 16W COM transmit power.

NOTE

The 16W COM Enablement must only be used in 28V installations.

NOTE

The 16W COM Enablement Card can only be used on one GTN (for dual GTN installations a separate Enablement Card must be used on each GTN). A new 16W COM Enablement Card must be used for each GTN that has the 16W COM feature activated.

1. Turn the GTN off by pulling the circuit breaker.
2. Remove the database SD card from the SD card slot and insert a 16W Enablement Card, P/N 010-00878-04.
3. Enter configuration mode by applying power to the GTN (closing the circuit breaker) while holding the HOME key.
4. Go to the COM Transmit Power page from the GTN Options page. Touch the 16W key.
5. A window will appear with ‘Enable 16W COM? This will consume a feature unlock key when selected.’
6. Touch Yes to enable 16W COM.
7. When the 16W COM feature is activated, the 16W key will be lit green, as shown in Figure 5-23.

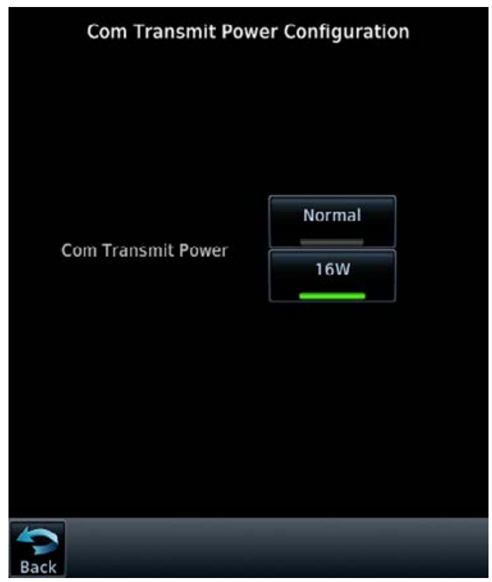


Figure 5-23. COM Transmit Power Configuration Page

5.5.2.4 Digital Radar (GTN 7XX Only)

This section describes how to enable the Digital Radar feature, which allows approved ARINC 708 Weather Radars to be interfaced with the GTN 7XX.

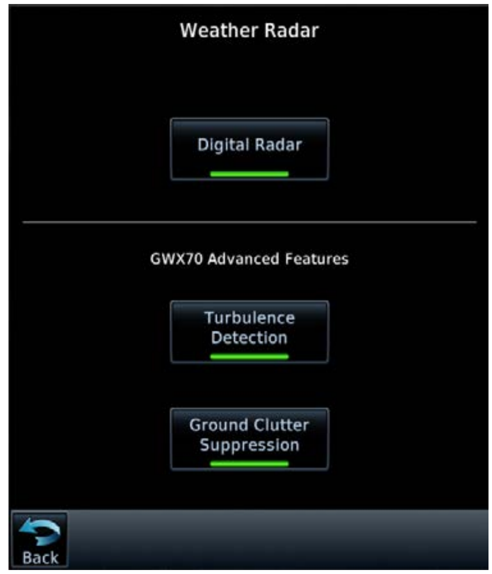


Figure 5-24. Weather Radar Enable Page

NOTE

The Digital Radar Enablement Card can only be used on one GTN (for dual GTN installations a separate Digital Radar Enablement Card must be used on each GTN).

1. Turn the GTN off by pulling the circuit breaker.
2. Remove the database SD card from the SD card slot and insert a Digital Radar Enablement Card, (P/N 010-00878-42).
3. Enter configuration mode on the GTN by applying power to the GTN (closing the circuit breaker) while holding the HOME key.
4. Go to the Weather Radar page from the GTN Options page. Touch the **Digital Radar** key, as shown in Figure 5-24.
5. When prompted, touch Yes to enable ARINC 708 Weather Radars. When the feature is activated, the **Digital Radar** key will be lit green.

5.5.2.5 GWX 70 Advanced Features (GTN 7XX Only)

The GTN 7XX can enable two Doppler radar features for the GWX 70 (12 inch and 18 inch antenna sizes only); Ground Clutter Suppression and Turbulence Detection. Each advanced feature requires a separate Enablement Card. This section describes how to enable these features.

NOTE

The Enablement Card can only be used on one GTN (for dual GTN installations a separate Enablement Card must be used on each GTN).

1. Turn the GTN off by pulling the circuit breaker.
3. Remove the database SD card from the SD card slot and insert a Radar AGCS Enablement Card, (P/N 010-00878-44), or Radar Turbulence Detection Enablement Card, (P/N 010-00878-45).
4. Enter configuration mode on the GTN by applying power to the GTN (closing the circuit breaker) while holding the HOME key.
5. Go to the Weather Radar page from the GTN Options page. Turbulence Detection or Ground Clutter Suppression key, as shown in Figure 5-24.
6. When prompted, touch Yes to enable the selected GWX 70 advanced feature. When the feature is activated, the selected GWX 70 advanced feature key will be lit green.

5.5.2.6 Flight Simulator

The Flight Simulator enablement is used to support GTN use in flight simulators. Selection of this setting is not approved under this STC.

5.5.3 GTN Diagnostics Page

The GTN Diagnostics page, shown in Figure 5-25, is accessed from the Configuration Mode Home page and is a useful tool for diagnosing issues and troubleshooting problems that arise during installation. Ground checks are also performed using the tools in this page. The following sections describe pages that are accessed from the GTN Diagnostics page.

Figure 5-25. GTN Diagnostics Page

5.5.3.1 ARINC Inputs

The ARINC Inputs diagnostics page allows the display of ARINC 429 data that is being received over each ARINC 429 port. Each port can be chosen for display by touching the **Port** key and toggling between the input ports. Select a port to display. The GTN will then display the label, SSM, Data, and SDI for each ARINC 429 input port. This is useful for determining if the expected labels are being received and also for troubleshooting incorrect or swapped wiring to the input ports. The data log can be paused by toggling the **Pause** key. Clear the data log by touching **Clear Log**.

5.5.3.2 Serial Inputs

The Serial Inputs diagnostics page allows the display of serial data that is being received and is useful for determining if the GTN is receiving data on each connected port. Select the desired port by touching the key labeled ‘Port’ and selecting the RS-232 channel from the list. The data log can be paused by toggling the **Pause** key. Clear the data log by touching **Clear Log**.

5.5.3.3 Discrete Inputs

The Discrete Inputs diagnostics page displays the state of each of the discrete input pins on the GTN. This page is useful for troubleshooting discrete wiring issues. Refer to Section 5.6.3 for the discrete input checkout procedure.

5.5.3.4 Discrete Outputs

The Discrete Outputs diagnostics page allows the state of each of the discrete outputs to be toggled between active and inactive. This is useful for ensuring that annunciator and signal outputs are properly connected to annunciator lights or 3rd party LRUs and that they are receiving the signal. Refer to Section 5.6.4 for the discrete output checkout procedure.

5.5.3.5 HSDB Ethernet

The HSDB Ethernet diagnostics page allows the status of each HSDB port to be displayed. This page displays whether or not each port is receiving data and displays whether the port is connected or not connected. The configuration status of each installed HSDB LRU is also displayed. See Section 5.5.1.3 HSDB port configuration instructions.

5.5.3.6 Main Indicator (Analog)

The Main Indicator diagnostics page allows the CDI connected to the main board (P1001) to be ground checked and allows the interface to be verified. For the Main Indicator checkout procedure, see Section 5.6.1.

5.5.3.7 Analog Inputs

The analog inputs diagnostics page displays the bus voltage setting for Lighting Bus 1 and Lighting Bus 2 as well is the input voltage setting for each bus. It also displays synchro heading input diagnostics information such as heading angle, heading valid status, AC voltage, and AC frequency.

5.5.3.8 Power Stats

The power statistics page displays the number of times the GTN has powered up as well as the total elapsed operating hours for the GTN.

5.5.3.9 WAAS Diagnostics

The WAAS diagnostics page displays the WAAS engine status, including UTC date/time, current Lat/Lon, overall navigation status, oscillator temperature, and AGC voltage. This page also allows the GPS/SBAS engine to be reset.

5.5.3.10 Temps

The Temps diagnostics page displays the current, minimum, maximum, and average board temperatures for the LED Board, Main Board, Display Interface Board, GPS/SBAS Board, and COM Board.

5.5.3.11 Error Log

The Error log diagnostics page allows the error log to be written to the SD card in the front slot. It also allows the error log to be cleared.

5.5.3.12 Main Data Inputs

The Main Data Inputs page allows the data on ARINC 429, RS-232, and other electrical inputs to be monitored. This is used for verifying electrical interfaces during installation and troubleshooting. Information that is not being received by the GTN is dashed out. The data displayed is prioritized according to the scheme outlined in Section 2.4.2 if the data is being received on multiple inputs. See Section 5.6.10 for checkout procedure utilizing this page.

5.5.3.13 VOR/ILS Indicator (Analog)

The VOR/ILS Indicator diagnostics page allows the CDI connected to the NAV board (P1004) to be ground checked and allows the NAV indicator interface to be verified. See Section 5.6.2 for the ground check.

5.5.3.14 Clear Config Module

CAUTION

This key should only be touched if the intent is to clear all configuration settings. Touching the **Clear Config Module** key opens a confirmation window to reset all of the settings stored in the configuration module to their defaults.

5.5.4 External Systems Configuration

The following section contains procedures for configuring remote-mount units that are connected to the GTN. To configure external systems using the GTN, touch the **External Systems** key from the main configuration Home page.

5.5.4.1 GDL 69/69A Configuration

If installed, the GDL 69/69A must be configured to match the installation. Follow the steps below.

1. Go to the GDL 69/69A configuration page. This can be accessed from the External Systems page, shown in Figure 5-26.
2. Adjust the Antenna Gain and Cable Loss to match the installation. Refer to the GDL 69/69A Installation Manual, P/N 190-00355-02, to determine the correct values.
3. Enable any GDL 69/69A Ethernet ports as required by the installation.

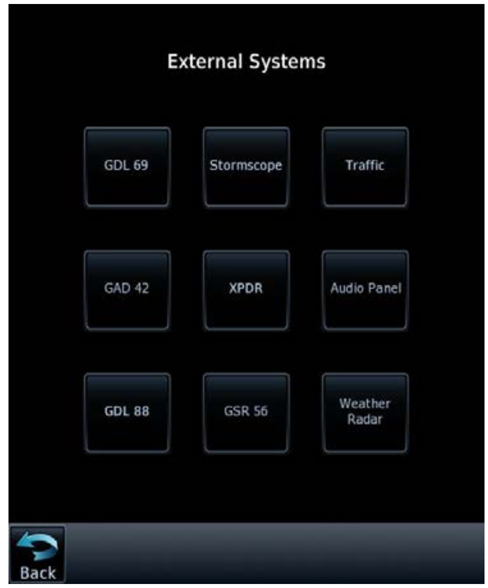


Figure 5-26. External Systems Configuration Page

NOTE

The GDL 69/69A XM must be activated before use. If XM activation has not already been done, see the GDL 69/69A Installation Manual, P/N 190-00355-02 or 190-00355-07, and the GDL 69/69A XM Activation Instructions, P/N 190-00355-04.

5.5.4.2 Stormscope Configuration

NOTE

The Stormscope pages are only available if the WX-500 is connected to the RS-232 channel that is configured for the WX-500.

Select the Stormscope configuration page from the External Systems page, shown in Figure 5-26. The L-3 Communications WX-500 Stormscope configuration is reported by the WX-500 through RS-232 data.

To display the Stormscope configuration information, touch the **Configure** key. Verify the Status field indicates ‘OK’, and that the other displayed parameters are correct based upon the installation. See the configuration information in the WX-500 Installation Manual to determine the correct configuration.

When a GTN is interfaced with a WX-500 Stormscope, the ‘Synchro’ or ‘Serial’ heading formats may be used. If another heading format is used, lightning strike information is visible on the Weather Page, but not the Map Page.

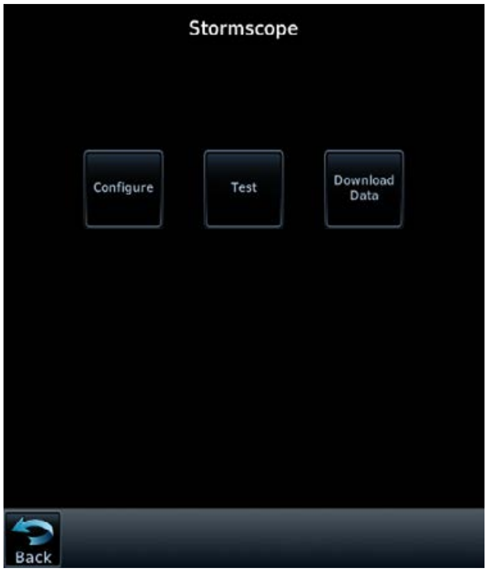


Figure 5-27. Stormscope Page

Figure 5-28. Stormscope Configuration Page

5.5.4.3 Stormscope Test Page

To access the Stormscope Test page, shown in Figure 5-29, select the **Stormscope Test** key from the Stormscope page, shown in Figure 5-27 above. This page shows current strike activity, WX-500 status, and the heading supplied by the WX-500. The WX-500 mode may be changed to **Cell**, **Strike**, **Noise**, **Strike Test**, **Self Test**, and **Demo**.

The strikes can be cleared from the display by touching the **Clear Strikes** key. The view can be changed by touching either the **360˚** key or the **Arc** key.

Verify that the WX-500 mode can be changed. Refer to the WX-500 manual for specific installation test procedures for the WX-500, using this page to view strike data, change the WX-500 mode, view WX-500 status, trigger count, and heading.

Figure 5-29. Stormscope Test Page

5.5.4.4 Stormscope Download Data Page

Select the **Download Data** key from the Stormscope page. This page shows raw data downloadable from the WX-500. Optional sets of data include WX-500 software version, configuration data, environment data, and fault log data.

Verify that the configuration data is correct as intended. To request which packet of data to display, touch the key underneath 'Data to Display' and select a data type from the menu.

5.5.4.5 Traffic Test Page

NOTE

The following pages are only available if one of the ARINC 429 or RS-232 inputs is configured for a traffic format.

The Traffic Test page displays the traffic system modes of operation and current traffic situation.

Depending on the type of traffic system installed, the information displayed on the traffic test page can vary.

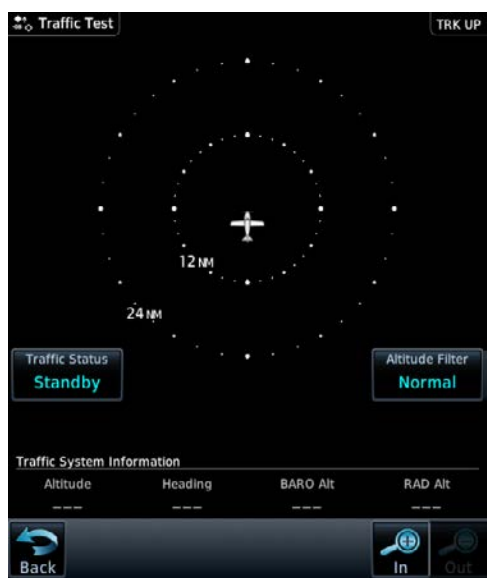


Figure 5-30. Traffic Test Page

5.5.4.5.1 Ryan TCAD

For Ryan TCAD, the Traffic Test page displays the following data:

- Current shield mode
- Altitude filter-Normal, Above, Below, and Unrestricted
- Barometric pressure

By touching **Menu**, the traffic menu can be displayed. Under **Traffic Audio**, the mute duration (9900B only) and traffic audio volume can be set and the TCAD can be toggled between voice and tone alerts. Under **Shield Setup**, the shield settings can be configured for the various shield types. Also, **Ground Mode** (9900BX only) and **APPR** Mode can be toggled.

5.5.4.5.2 Other Traffic Systems

For traffic systems other than Ryan TCAD, the Traffic Test page displays the following data:

- Altitude filter—Normal, Above, Below, and Unrestricted;
- Operating mode—Standby, Operate, or TAS Fail
- Altitude
- Heading
- BARO Alt and RAD Alt status

5.5.4.6 GAD 42 Configuration

The GAD 42 can be configured by the GTN if an ARINC 429 input is connected to the GAD 42. To configure the GAD 42, select the External Systems page group and then touch the **GAD 42** key.

The GAD 42 configuration page allows remote configuration of the GAD 42 Interface Adapter Unit. For details on how to configure the unit, see Chapter 5 of the GAD 42 Installation Manual, P/N 190-00159-00.

Figure 5-31. GAD 42 Configuration Page

5.5.4.7 Remote Transponder Configuration (GTX 32 or GTX 33)

A remote transponder can be configured by the GTN via RS-232 if a transponder is configured for one of the RS-232 ports. To configure the transponder, it must first be selected as present and the type of transponder installed must be specified. To do this, see Section 5.5.1.4.4. Next, go to the External Systems page and touch the **XPDR** key. This displays the page shown in Figure 5-32, which allows the remote transponder to be configured.

NOTE

If the GTN controls any transponder (GTX 32/33/327/328/330), then that transponder will boot into the same mode (Normal or Configuration) as the GTN.

NOTE

If the GTN is not communicating with the GTX transponder, all of the editable fields for the setup items shown in the following sections will be dashed out. If the fields are dashed out, check the wiring and pin connections from the GTN to the transponder.

NOTE

The GTN can interface to the GTX 327/328/330/330 ES; however, configuration of the panel-mounted GTX 327/328/330/330 ES is not supported. These transponders should be configured per their installation manuals rather than through the GTN.

5.5.4.7.1 Transponder Inputs and Outputs

Access the transponder inputs and outputs page, shown in Figure 5-33 by touching the Inputs and Outputs key from the Remote XPDR configuration page. The transponder RS-232 channel inputs can be configured by the GTN. RS-232 channel 1 input for the transponder can only be set to **Remote**, and is the default for channel 1 input. RS-232 channel 1 is used for control and remote configuring of the transponder.

5.5.4.7.1.1 RS-232 Configuration

The following outlines RS-232 channel settings and describes what each setting is used for. Select the correct input/output setting based upon the installed interfaced equipment. It is not necessary to select the baud rate for the transponder port to which the GTN is connected.

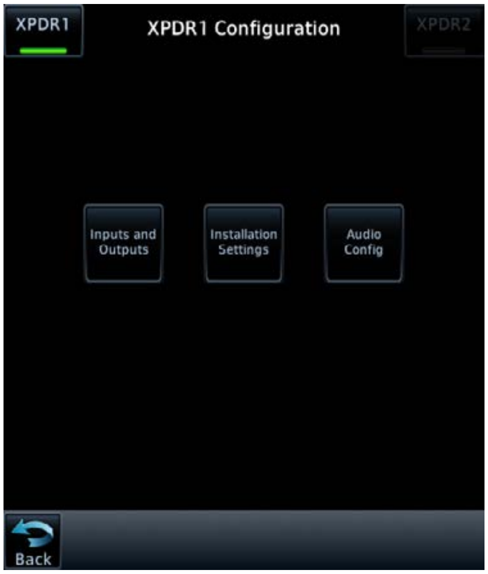


Figure 5-32. Remote XPDR Configuration Page

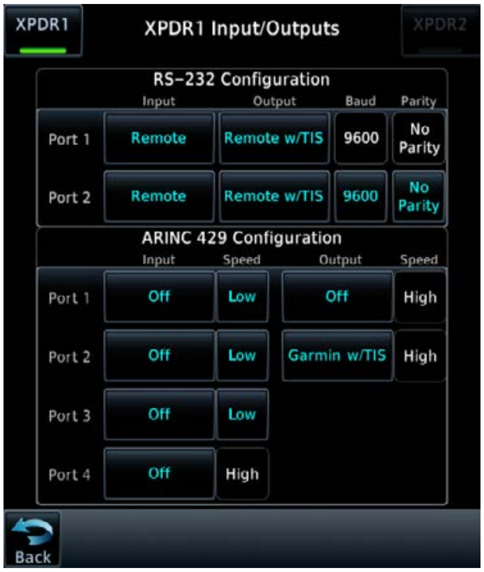


Figure 5-33. Remote XPDR Inputs/Outputs Page

Table 5-36. RS-232 Channel 1 Inputs

Selection	Description
Remote	The RS-232 port is configured for remote control by the GTN.

Table 5-37. RS-232 Channel 1 Outputs

Selection	Description
Remote	RS-232 serial output remote data.
Remote + TIS	RS-232 serial output remote data with TIS.

Table 5-38. RS-232 Channel 2 Inputs

Selection	Description
OFF	DEFAULT. The altitude code input is not from an RS-232 source.
Airdata Format 1	RS-232 serial air data information from Shadin ADC 200, 200+, 2000 plus altitude data. This input is the same as ‘ADC W/ALT’ in the GTX 330.
Airdata Format 2	RS-232 serial air data information from Shadin ADC 200, 200+, 2000. This input is the same as ‘ADC no ALT’ in the GTX 330.
Altitude Format 1	RS-232 serial altitude from an Icarus Instruments 3000. This input is the same as ‘ICARUS ALT’ in the GTX 330.
Altitude Format 2	Reports Icarus Instruments 3000 altitude in 25-foot increments. This input is the same as ‘ICARUS ALT 25 FT’ in the GTX 330.
Altitude Format 3	RS-232 serial altitude from Shadin 8800T, 9000T, 9200T. This input is the same as ‘SHADIN ALT’ in the GTX 330.
Altitude Format 4	Reports Shadin 8800T, 9000T, 9200T altitude in 25-foot increments. This is the same as ‘SHADIN ALT 25 Ft’ in the GTX 330.
FADC Format 1	RS-232 serial air data from Shadin 9628XX-X family of Air Data Computers and Fuel/Air Data Computers plus altitude data. This input is the same as ‘FADC w/ ALT’ in the GTX 330.
FADC Format 2	RS-232 serial air data from Shadin 9628XX-X family of Air Data Computers and Fuel/Air Data Computers. This input is the same as ‘FADC NO ALT’ in the GTX 330.
GPS	RS-232 groundspeed from a GPS device.
REMOTE	RS-232 serial input remote data.

Table 5-39. RS-232 Channel 2 Outputs

Selection	Description
OFF	Default for channel 2. No unit is connected to the output of this channel.
Altitude Format 1	RS-232 serial altitude from an Icarus Instruments 3000.
REMOTE	RS-232 serial output remote data.
REMOTE w/TIS	RS-232 serial output remote data with TIS.

Baud Rate Selection

Select the baud rate for each RS-232 channel.

Table 5-40. RS-232 Baud Rate Selections

Selection	Description
9600	Sets the baud rate to 9600 Bd.
19200	Sets the baud rate to 19200 Bd.
28800	Sets the baud rate to 28800 Bd.
38400	Sets the baud rate to 38400 Bd.
57600	Sets the baud rate to 57600 Bd.

Parity Selections

Select the parity for RS-232 channel 2.

Table 5-41. RS-232 Parity Selections

Selection	Description
Even Parity	Sets the Parity to Even.
No Parity	Sets the Parity to None.
Odd Parity	Sets the Parity to Odd.

5.5.4.7.1.2 ARINC 429 Configuration (GTX 33 Only)

Configure the four ARINC 429 input ports and the two ARINC 429 output ports. Select the correct speed for each port depending upon the installed interfaced equipment by touching the **Speed** key and toggling **High** or **Low**. Each port can be configured independently for the desired functions by selecting the desired data format from the menu.

Table 5-42. ARINC 429 Speed Selections

Selection	Description
Low	Standard low-speed ARINC 429 (nominally 12.5 Kb per second)
High	High-speed ARINC 429 (nominally 100 Kb per second)

ARINC 429 Input Selections

Select the correct Data In and Data Out settings for each port. The data selections are described below.

Table 5-43. ARINC 429 Input Selections

Channel	Selection	Description
All	OFF	No unit connected to this ARINC 429 input
1 Through 3	GPS	Selected waypoint information and GPS groundspeed recognition.
	ADC NO ALT	Temperature and speed information
	ADC W/ALT	Altitude, temperature and speed information
	AHRS	Attitude and heading information
	EFIS/ADC NO ALT	Selected course, heading, temperature, joystick waypoint and speed information
	EFIS/ADC W/ALT	Selected course, heading, temperature, joystick waypoint and speed information plus altitude data
	GARMIN DISPLAY	Same as GPS with added ability of receiving phase of flight data.
	GARMIN TAS	Traffic Advisory System discretes.
	GARMIN 743A	Standard GNSS output. Includes position, velocity, and integrity data.
	AFCS	Selected altitude, baro setting, and pitch discretes.
4	ADLP	Airborne Data Link Processor. ADLP is available only on channel 4.

The GTX 33 receives one of the following sets of ARINC 429 data. The labels are chosen when selected in ARINC 429 INPUT. Data may be received at either LOW or HIGH speed. The default is LOW. The transmit data labels are as follows:

Table 5-44. AHRS Labels

Label	Data
314	True Heading (degrees)
320	Magnetic Heading (degrees)
325	Roll Angle
365	Vertical Rate (feet/min)

Table 5-45. Air Data Computer (ADC) Labels

Label	Data
203 [1]	Pressure Altitude (feet)
204	Barometric Corrected Altitude (feet)
205	Mach Number
206	Indicated Air Speed (knots)
210	True Air Speed (knots)
211	Total Air Temperature (degrees)
212	Vertical Speed (feet/min)
213	Static Air Temperature (degrees)

[1] If ADC W/ALT or EFIS/ADC W/ ALT format selected.

Table 5-46. EFIS Display System (EFIS/ADC) Labels

Label	Data
100	Selected Course (degrees)
102	Selected Altitude (feet)
203 [1]	Pressure Altitude (feet)
204	Barometric Corrected Altitude (feet)
205	Mach Number
206	Indicated Air Speed (knots)
210	True Air Speed (knots)
211	Total Air Temperature (degrees)
212	Vertical Speed (feet/min)
213	Static Air Temperature (degrees)
234	Barometric Setting (hPa)
235	Barometric Setting (ºHg)
314	True Heading
320	Magnetic Heading (degrees)
325	Roll Angle

[1] Only if ADC W/ALT or EFIS/ADC W/ALT formats are selected.

Table 5-47. GPS/FMS Navigation System (GPS) Labels

Label	Data
102	Selected Altitude (feet)
310	GPS Latitude (degrees)
311	GPS Longitude (degrees)
312	Groundspeed (knots)
313	Track Angle (degrees)

Table 5-48. Garmin Display Labels

Label	Data
310	GPS Latitude (degrees)
311	GPS Longitude (degrees)
261	GPS Discretes
312	GPS Groundspeed (knots)
313	GPS Track Angle (degrees)
314	True Heading (degrees)
320	Magnetic Heading (degrees)

Table 5-49. Garmin TAS Labels

Label	Data
274	TAS Discretes

Table 5-50. AFCS Labels

Label	Data
102	Selected Altitude (feet)
234	Barometric Setting (hPa)
235	Barometric Setting (“Hg)
271	Pitch Discretes

ARINC 429 Output Selections

ARINC 429 Channel 1 defaults to Off. ARINC 429 channel 2 defaults to Garmin w/ TIS. The GTX 33 can be configured to include GPS, Airdata, AHRS, EFIS/Airdata, and ADLP ARINC 429 input, functioning as an ARINC 429 data concentrator. Each output port can be configured independently for the desired function. Both ARINC 429 outputs send high speed ARINC 429 data.

SELECTION	DESCRIPTION
CHANNEL 1 (DATA)	• DATA SOURCE: OFF, ADLP, GARMIN, GARMIN TAS, or GARMIN W/TIS. • DEFAULTS to OFF. • ARINC 429 input channel 4 sets the ARINC 429 output channel 1 to the same selection.
CHANNEL 2 (DATA)	• DATA SOURCE: OFF, GARMIN, GARMIN TAS, or GARMIN W/TIS. • DEFAULTS to GARMIN W/TIS. • Do not select GARMIN W/TIS if the aircraft contains another traffic detection system.

The Garmin format is a data concentration function. The following data is sent out at specified intervals using high speed ARINC 429 (100 kHz). The transmit data labels and their rates are as follows:

Table 5-51. Garmin Format Output Labels (1)

Label	Data	Rate
100	Selected Course (degrees)	200 ms
203	Pressure Altitude (feet)	100 ms
204	Barometric Corrected Altitude (feet)	100 ms
206	Indicated Air Speed (knots)	100 ms
210	True Air Speed (knots)	100 ms
211	Total Air Temperature (degrees)	100 ms
213	Static Air Temperature (degrees)	100 ms
314	True Heading	100 ms
320	Magnetic Heading (degrees)	100 ms
371	GA Equipment Identifier	500 ms
377	Equipment Identifier	500 ms

The following data are sent out in packets approximately every 0.5 seconds at high speed (100 kHz), in the specified sequence.

Table 5-52. Garmin Format Output Labels (2)

Sequence	Label	Data
1	350	Fault Summary
2	274	Transponder Control
3	313	Own Aircraft Track Angle
4	357 (RTS)	Request to Send
5	130	Intruder Range (0 – 8 sets)
6	131	Intruder Altitude (0 – 8 sets)
7	132	Intruder Bearing (0 – 8 sets)
8	357 (EXT)	End of Transmission

5.5.4.7.2 Transponder Installation Settings Page

VFR Key Code

Input a VFR transponder code by touching the key and typing the selected code into the keypad. This field has a range of 0000-7777.

NOTE

Exercise care when making routine code changes. Enter only valid VFR codes. Avoid using code 7500 and codes in the 7600-7777 range, as these codes trigger special indicators in automated facilities.

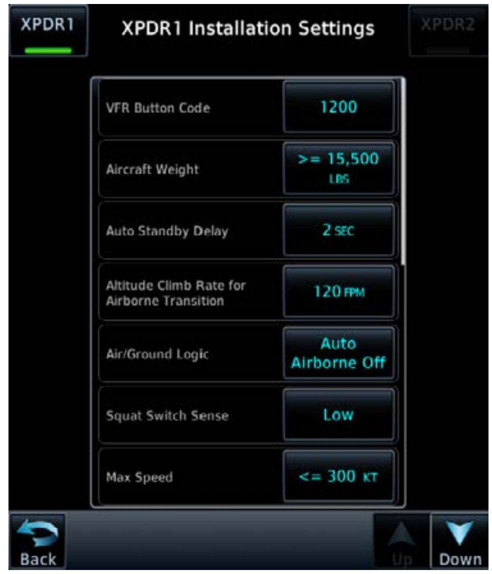


Figure 5-34. Remote XPDR Configuration page

Aircraft Weight

Select the weight of the aircraft in which the transponder is installed.

Table 5-53. Aircraft Weight

Selection	Description
<15,500 LBS	Configures the aircraft weight to less than 15,500 lbs.
>=15,500 LBS	Configures the aircraft weight to equal to or greater than 15,500 lbs.
ROTORCRAFT	Configures to rotorcraft use.
UNKNOWN	Aircraft weight is unknown.

Auto Standby Delay

This is the number of seconds the aircraft must be on the ground before the transponder automatically switches to GND mode when it has a means of determining the aircraft is on the ground. It has a range of 0 (zero) seconds to 99 seconds. The default value of 24 seconds is a nominal value for most aircraft. This value can be changed depending on the types of operations the aircraft is expected to perform.

Altitude Climb Rate for Airborne Transition

This is the climb rate that is required in order to transition from ground to airborne state. This field is adjustable from 100 fpm to 9999 fpm. This field should be set to the typical vertical speed climb rate of the aircraft. This number determined the rate of climb necessary for the GTX to assume liftoff for detecting an airborne state. Refer to the Pilot's Operation Handbook (POH) to determine this value. If the POH does not include aircraft climb rate information, use the default value of 300 fpm.

Air/Ground Logic

Select the source for the air/ground logic.

Table 5-54. Air/Ground Logic

Selection	Description
Auto Airborne Off	This is not a valid setting.
Squat Switch	The transponder is connected to a squat switch to determine airborne state.
GPS Data	The transponder is using GPS data to determine the airborne state. Only select this setting if a GTX input port is configured to **GPS**.
Altitude Data	Select this setting if a squat switch is not installed and no GTX input ports are configured for **GPS**.

Squat Switch Sense

The squat switch sense field may be set to either High or Low. If the air/ground logic field is set to squat switch, the squat switch sense field is used to define the state of the squat switch input. If the squat sense field is set to High, then when the squat switch input is high, the aircraft is considered to be on the ground. If the squat sense field is set to low, then when the squat switch input is low, the aircraft is considered to be on the ground.

Maximum Airspeed (GTX 33 Only)

Select the maximum true airspeed for the aircraft. The default is <= 150 KTS.

Table 5-55. Maximum Airspeed (GTX 33 only)

Selection	Description
<= 75 KTS	Max aircraft operating speeds less than or equal to 75 knots TAS.
<= 150 KTS	Max aircraft operating speeds less than or equal to 150 knots TAS.
<=300 KTS	Max aircraft operating speeds less than or equal to 300 knots TAS.
<=600 KTS	Max aircraft operating speeds less than or equal to 600 knots TAS.
<=1200 KTS	Max aircraft operating speeds less than or equal to 1200 knots TAS.
>1200 KTS	Max aircraft operating speeds greater than 1200 knots TAS.
UNKNOWN	Max aircraft speed is unknown.

Address Type (GTX 33 Only)

Select the method of entry of the aircraft address.

Table 5-56. Address Type (GTX 33 only)

Selection	Description
US Tail	N-Registration Number (GTN main software version 3.00 or later)
HEX ID	Allows technician to enter the aircraft registration number in hexadecimal code format.

Flight ID Type (GTX 33 Only)

Select the flight ID type. For operation requiring the flight crew to enter an aircraft identification designator, select the page identified as PILOT ENTRY. When this choice is selected and the crew enters the Flight ID correctly, the flight number call sign for radio contact with ATC is the same flight identification that the GTX 33 Mode S transponder replies to ATC radar interrogations.

Table 5-57. Aircraft Weight

Selection	Description
CONFIG ENTRY	Allows technician to enter Flight ID while in configuration mode only.
PILOT ENTRY	Allows pilot/technician to enter Flight ID in the GTN in normal mode.
SAME AS TAIL	If Address Type is US Tail, allows Flight ID to use the same number.

Selecting PILOT ENTRY allows the flight ID to remain the same as that entered during the previous flight until it is updated, the crew is not prompted to update the flight ID. The selections ‘SAME AS TAIL’ and ‘CONFIG ENTRY’ are fixed Mode S addresses.

Flight ID (GTX 33 Only)

Enter the flight ID number of the aircraft. This field allows 8 alphanumeric characters.

Aircraft Length (GTX 33 Only)

This field sets the length of the aircraft to less than or equal to 15 meters (49 ft), less than or equal to 25 meters (82 ft), less than or equal to 35 meters (115 ft), less than or equal to 45 meters (148 ft), less than or equal to 55 meters (180 ft), less than or equal to 65 meters (213 ft), less than or equal to 75 meters (246 ft), less than or equal to 85 meters (279 ft), or more than 85 meters (279 ft). Enter the aircraft’s minimum length category.

Aircraft Width (GTX 33 Only)

This field sets the wingspan of the aircraft to less than or equal to 11.5 meters (38 ft), less than or equal to 23.0 meters (75 ft), less than or equal to 28.5 meters (94 ft), less than or equal to 33.0 meters (108 ft), less than or equal to 34.0 meters (112 ft), less than or equal to 38.0 meters (125 ft), less than or equal to 39.5 meters (130 ft), less than or equal to 45.0 meters (148 ft), less than or equal to 52.0 meters (171 ft), less than or equal to 59.5 meters (195 ft), less than or equal to 67.0 meters (220 ft), less than or equal to 72.5 meters (238 ft), less than or equal to 80.0 meters (262 ft), or more then 80.0 meters (262 ft). Enter the aircraft’s minimum width category.

Enhanced Surveillance (GTX 33 Only)

This field sets Enhanced Surveillance (EHS) to **DISABLE** or **ENABLE**. When EHS is set to **DISABLE** the enhanced surveillance function is not available.

Surveillance Integrity Level (GTX 33 Only)

This field sets the correct GPS Integrity for the interfaced GPS receiver. Set to 1E-3, 1E-5, or 1E-7. When interfaced to the GTN, the GPS Integrity **must** be set to 1E-5.

NOTE

The GPS INTEGRITY configuration field indicates the integrity of the GPS sensor that is connected to the transponder. It is measured in errors per flight hour, 1E-3 being the worst and 1E-7 being the best rating. This data is used in ADS-B transmissions.

Temperature Switch Installed (GTX 33 Only)

This field determines if a temperature switch is connected to the GTX 33. Select **Yes** if a temperature switch is connected to the transponder. Select **No** otherwise.

5.5.4.7.3 Transponder Audio Configuration

Select the **Audio Config** key from the Transponder Configuration menu. The remote transponder audio configuration page, shown in Figure 5-35, will display the following information.

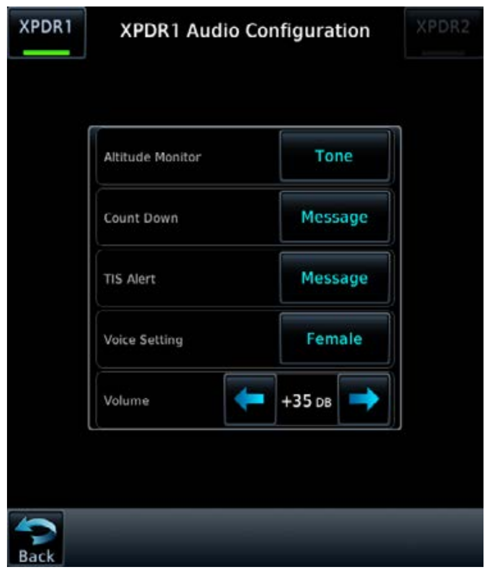


Figure 5-35. Remote XPDR Audio Configuration page

Altitude Monitor

Select the desired audio type for the Altitude Monitor alert. The choices are **Off**, **Tone**, or **Message**.

Countdown Timer

Select the desired audio type for the Count Down Timer alert. The choices are Off, Tone, or Message.

TIS Alert

Select the desired audio type for TIS alerts. The choices are Off, Tone, or Message.

Voice Setting

Set the voice type to male or female.

Volume

Adjust the desired volume level for transponder audio. Volume is adjusted from 0 to +63 dB. Ensure the volume level is sufficient for all anticipated cockpit noise environments.

5.5.4.8 GMA 35 Audio Panel Configuration (GTN 7XX Only)

5.5.4.8.1 Audio Terminology

The following terms will be used throughout the audio panel configuration sections and are defined here.

ALERT - Unswitched inputs. These inputs are typically warnings, and there is no way for the user to de-select the audio.

COPILOT - The second crewmember is considered the COPILOT. The copilot is typically the front right-seat for airplanes.

CREW - Refers to aircraft occupants who can transmit on radios. i.e. PILOT and COPILOT. In certain installations, each crew member may be able to individually select radios.

ICS - Intercom Communication System **-** This refers to the distribution of microphone audio for each occupant in the aircraft.

PA - Passenger Address **-** This refers to a crewmember broadcasting audio to the Passengers either through headsets or speakers outside of the ICS distribution.

PASSENGERS - Occupants considered passengers are not able to transmit or select individual radios, and are treated as a group in that each PASSENGER hears the same audio.

PILOT - The first crewmember is considered the PILOT. The pilot is typically the front left-seat for airplanes. This crew position will always hear Selected Audio (SA).

PTT - Push-To-Talk - This refers to keyed microphone transmissions. An input must be activated before the microphone audio is transmitted.

PRIMARY RADIO - For a crewmember, the Primary Radio is the radio selected for transmission. A Push-to-talk (PTT) by a crewmember will transmit over the PRIMARY RADIO.

SA - Selected Audio - This refers to the combination of audio sources selected by the crewmember. Note that Alerts are separate from Selected Audio.

SECONDARY RADIOS - For a crewmember, any radio selected for monitoring that is not selected for transmission is considered a Secondary Radio.

SOFT MUTE - When music audio is muted due to an audio interruption such as ICS or alerts, Soft Mute feature allows music audio to fade in gradually to the original volume setting after muting.

SIDETONE - Side tone refers to the audio spoken into the microphone by an occupant. Many half-duplex radios provide side tone audio to the radio's received audio output. When transmitting on these radios, it is not desired for the Audio Panel to provide the side tone to the headset since this is usually provided by the transceiver. For PA and Telephone audio, side tone distribution may be adjusted.

5.5.4.8.2 GMA 35 Audio Panel Settings

NOTE

When configuring volumes and squelches, keys can be touched and held to scroll quickly through values.

To configure the audio panel, go to the External Systems page and touch the **Audio Panel** key to display the audio panel configuration page shown in Figure 5-36. On the main audio panel configuration page, there are two keys labeled **Configure** and **Connected Radios**. Touch the **Configure** key to access configuration settings for audio routing, volume, and miscellaneous options. The 'Connected Radios' menu allows the radios that are connected to the audio panel to be configured.

For GTN software version 2.00, under the configure page, touch the **Set to Default Config** key prior to configuring the GMA 35. This will command the audio panel settings to the factory default configuration. This key **must be touched** prior to GMA 35 configuration. Touch **OK** to acknowledge the prompt shown in Figure 5-36.

For GTN software version 3.00 or later, it is not necessary to set the GMA 35 settings to default prior to configuration.

Figure 5-36. Audio Panel Configuration Page

5.5.4.8.2.1 Configuration Settings

Mute PASS to CREW intercom during alerts

This option mutes the passenger ICS audio to the crew during system alerts. Select **True** to mute passenger audio during alerts or select **False** to allow passenger audio to be audible to the crew during alerts. **False** is the default selection.

Mute PASS to CREW intercom during selected audio

This option mutes the passenger ICS audio to the crew during selected audio. Select True to mute passenger audio during selected audio or select False to allow passenger audio to be audible to the crew during selected audio. False is the default selection.

Passengers hear selected audio

Select True to allow passengers to hear selected audio. Select False to disable selected audio routing to the passengers. False is the default selection.

Disable PA functionality

Selecting True will disable the passenger address function. Selecting False will enable the PA functionality. False is the default selection.

Mute PASS music during intercom

Select True if it is desired for passenger music to be muted while the passengers are hearing microphone audio from an occupant. Select False if it is desired for passenger music to continue playing during ICS audio. False is the default selection.

Passengers hear alerts

Select True to allow passengers to hear alert audio. Select False to disable alert audio routing to the passengers. False is the default selection.

Mute secondary radios on primary radio reception (Monitor Mute)

If True is selected, all secondary COM audio is muted upon receiving primary COM audio. If False is selected, secondary COM audio will be allowed to play simultaneously with primary COM audio reception. False is the default selection.

NOTE

It is recommended to set the internal side tone settings to true for better audio quality. For GMA 35 software prior to 2.20, if internal side tone is set to true, the COM radio Sidetone Volume must be set to zero (see Section 5.5.1.10).

Audio Processor generates COM1 internal side tone

Selecting **True** causes the audio panel to provide COM1 side tone. Selecting **False** allows the COM1 radio to generate its own side tone. **False** is the default selection.

Audio Processor generates COM2 internal side tone

Selecting **True** causes the audio panel to provide COM2 side tone. Selecting **False** allows the COM2 radio to generate its own side tone. **False** is the default selection.

Audio Processor generates COM3 internal side tone

Selecting **True** causes the audio panel to provide COM3 side tone. Selecting **False** allows the COM3 radio to generate its own side tone. **False** is the default selection.

COM 1 is connected as COM 2

Select **True** if COM 1 is connected as COM 2, select false if COM 1 is connected as COM 1. **False** is the default selection. This setting allows the GTN 7XX to be connected to the COM 2 port, but appear to the pilot as COM 1. Refer to Section 2.4.14 for more information and wiring instructions for this setting.

Ambient Noise Mic On

This setting enables or disables the ambient noise sensor that is built in to the GMA 35. The ambient noise sensor allows the GMA 35 to adjust the volume of the speaker based upon the ambient noise environment. The ambient noise sensor is mounted internal to the GMA 35, with no external wiring. Select either **True** or **False**. **False** is the default selection.

5.5.4.8.2.2 Volume Configuration Settings

Use the following procedure when adjusting volumes in the GMA 35 to provide the best audio results. This procedure allows the signal levels in the audio wires to be large so that they are more resistant to noise interference. When audio levels can be controlled at the audio source and the GMA 35 has an input gain control for the audio source, perform the following procedure:

1. Adjust the source audio level to the minimum and the audio panel input gain control to the minimum.
2. Adjust the volume settings on the audio panel for normal operation.
3. Increase the audio source level until the desired audio level is reached or the audio source is close to the maximum specified input level for the audio panel input.
4. If the audio from the audio source is not loud enough, increase the audio panel input gain until the desired audio level is reached. Repeat this setup for each audio source and audio panel input with adjustable gains.
5. If the audio source does not have adjustable gain then adjust the gain for the audio panel input until the desired audio level is reached. For volume adjustments on the GMA 35, increasing the gain to +96 will increase the volume, and decreasing the gain to -96 will decrease the volume.
6. If the audio panel input does not have adjustable gain then adjust the audio source gain until the desired audio level is reached. Refer to the audio source manufacture’s installation documentation for volume adjustment instructions.

NOTE

For the volume settings described below, higher gain values increase volume, and lower gain values decrease volume.

Alert 1 thru 4 input audio volume

These settings allow the unswitched alert input audio to the GMA 35 to be adjusted. This setting is configurable from -96 to +96. The default is 0.

Failsafe warn input audio volume

This setting allows the failsafe warn audio input to the GMA 35 to be adjusted. This setting is configurable from -96 to +96. The default is 0.

Marker volume

This adjusts the marker beacon volume output to the crew headsets. This setting is configurable from -96 to +96. The default is 0. This setting adjusts the maximum allowable volume range in GTN normal mode.

Music 1 and Music 2 Volume

This adjusts the volume of the 2 music inputs to the GMA 35. This setting is configurable from -96 to +96. The default is 0. This setting adjusts the maximum allowable volume range in GTN normal mode.

Figure 5-37. Audio Panel Configuration Page (Volume)

Telephone Volume

This adjusts the Telephone input volume. This setting is configurable from -96 to +96. The default is 0.

5.5.4.8.2.3 Speaker Volume Configuration

Pilot PA

This setting adjusts the pilot passenger address to cabin speaker volume. This setting is configurable from -96 to +96. The default is 0.

Copilot PA

This setting adjusts the copilot passenger address to cabin speaker volume. This setting is configurable from -96 to +96. The default is 0.

Crew Audio

This setting adjusts the crew audio to cabin speaker volume. This setting is configurable from -96 to +96. The default is 0.

Alert Audio Sum

This setting adjusts the alert audio to cabin speaker volume. This setting is configurable from -96 to +96. The default is 0.

5.5.4.8.2.4 Squelch Threshold Configuration Settings

COM 1-3 Squelch Threshold

These settings adjust the signal strength required to break squelch for each input. These are configurable from -96 dB to 0 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels. The default value is -48 dB.

Figure 5-38. Audio Panel Configuration Page (Squelch)

NAV 1 and NAV 2 Squelch Threshold

These settings adjust the signal strength required to break squelch on the NAV 1 and NAV 2 inputs. These are configurable from -96 dB to 0 dB. The default value is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

RCVR 3 Squelch Threshold

This setting adjusts the signal strength required to break squelch on the RCVR 3 input. This is configurable from -96 dB to 0dB. The default is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

RCVR 4 Squelch Threshold

This setting adjusts the signal strength required to break squelch on the RCVR 4 input. This is configurable from -96 dB to 0dB. The default is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

RCVR 5 Squelch Threshold

This setting adjusts the signal strength required to break squelch on the RCVR 5 input. This is configurable from -96 dB to 0dB. The default is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

WARN1 Squelch Threshold

This setting adjusts the signal strength required to break squelch on the WARN1 input. This is configurable from -96 dB to 0dB. The default is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

RING1 Squelch Threshold

This setting adjusts the signal strength required to break squelch on the RING1 input. This is configurable from -96 dB to 0dB. The default is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

ALERT 1-3 Squelch Threshold

These settings adjust the signal strength required to break squelch on the ALERT1-3 inputs. These are configurable from -96 dB to 0 dB. The default value is -48 dB. A value of 0 dB will require high signal levels to break squelch. Decreasing the value to -96 dB will allow squelch to be broken with low signal levels.

5.5.4.8.2.5 Other GMA 35 Configuration Settings

Marker Beacon high sense threshold

The marker high sensitivity threshold configures the marker beacon signal strength that is required to activate the marker beacon signal in marker high sense mode. This is adjustable from -31 to +31. A value of -31 will cause the marker beacon signal to activate at lower signal strength; therefore the beacon signal will remain active for a longer period of time while on approach. A value of +31 will require the marker beacon signal strength to be much stronger to activate, which results in the marker beacon activating for a very short duration while flying directly over the marker beacon. The default value is 0.

Marker Beacon low sense threshold

The marker low sensitivity threshold configures the marker beacon signal strength that is required to activate the marker beacon signal in marker low sense mode. This is adjustable from -31 to +31. A value of -31 will cause the marker beacon signal to activate at a lower signal strength, therefore the beacon signal will remain active for a longer period of time while on approach. A value of +31 will require the marker beacon signal strength to be much higher to activate, which results in the marker beacon activating for a very short duration while flying directly over the marker beacon. The default value is 0.

Marker external lamp lighting offset

When external marker lamps are connected to the GMA 35, this setting allows the lighting level to be adjusted up or down. It applies an offset to the lighting input that the marker lamps are tracking. If the lamps are too bright, adjust this number down; if the lamps are too dim, adjust this number up. This setting is configurable from -31 to +31. The default is 0.

5.5.4.8.2.6 Connected Radios to GMA 35 Configuration

From the main Audio Panel configuration page, touch the **Connected Radios** key to configure which radios or systems are connected to the GMA 35. Compare the interfaced radios in the aircraft to the GMA 35 Pin function list in Section 4.2 to determine which radios are connected to the applicable pins in the GMA 35. The following radios can be configured as **Present** or **Not Present**:

- COM 2
- COM 3
- NAV 1
- NAV 2
- RCVR 3
- RCVR 4
- RCVR 5
- TEL
- Music 1
- Music 2
- Marker Beacon

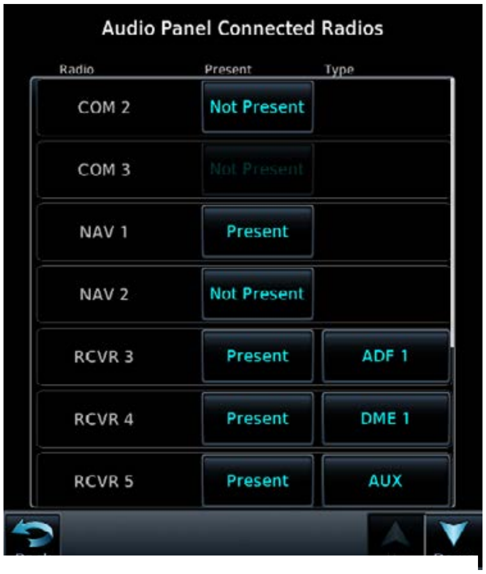


Figure 5-39. Connected Radios Configuration page

For RCVR 3, RCVR 4, and RCVR 5, the type of radio must also be configured. For each connected RCVR source, select the type of radio.

Selection	Description
ADF 1	An Automatic Direction Finder (ADF) is connected to the RCVR input.
ADF 2	A second Automatic Direction Finder (ADF) is connected to the RCVR input.
DME 1	Distance Measuring Equipment (DME) is connected to the RCVR input.
DME 2	A second Distance Measuring Equipment (DME) is connected to the RCVR input.
AUX	An Auxiliary radio is connected to the RCVR input.

5.5.4.9 GDL 88 Configuration

NOTE

This STC does not cover the installation of the GDL 88; refer to the GDL 88 Part 23 AML STC Installation Manual (P/N 190-01310-00). The following instructions are provided for reference only, and where the GDL 88 Part 23 AML STC Installation Manual and this manual, the GDL 88 Part 23 AML STC Installation Manual takes precedence.

The GDL 88 Install Tool is used to configure GDL 88 settings for a specific installation. Changes made in the Configuration pages are immediately committed to the GDL 88.

Before configuring the GDL 88, ensure the Configuration Mode status is PASS under the External Systems → GDL 88 → Diagnostics → Faults page as shown in Figure 5-40. If the Configuration Mode Fault is FAIL, refer to the GDL 88 Part 23 AML STC Installation Manual and resolve the issue before proceeding.

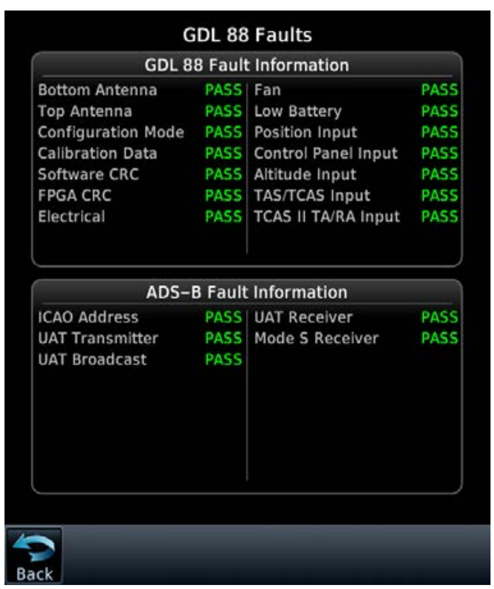


Figure 5-40. GDL 88 Faults Page

5.5.4.9.1 Aircraft Configuration Page

The aircraft page allows configuration of aircraft information and settings as shown in Figure 5-42. To access this page, touch **External Systems → GDL 88 → Configuration → Aircraft**.

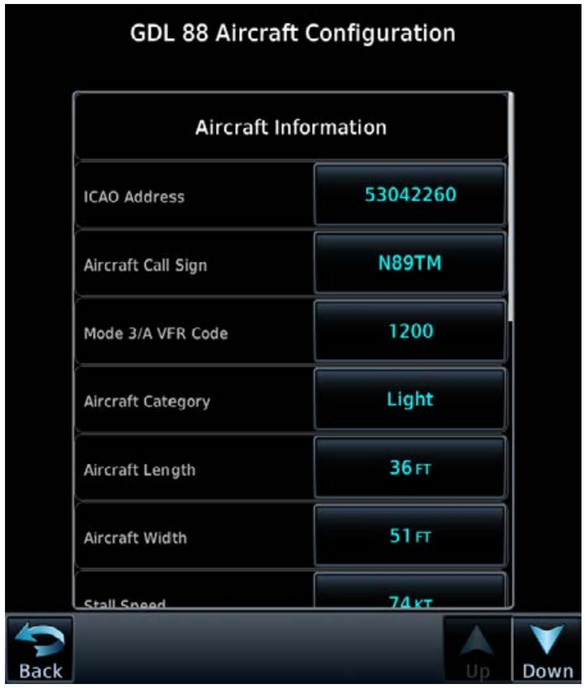


Figure 5-41. GDL 88 Aircraft Configuration Page

5.5.4.9.1.1 ICAO Address

Enter the aircraft assigned ICAO address code, eight octal digits. This code can be found in either of the following locations:

- The aircraft registration certificate
- The N-number inquiry page of http://registry.faa.gov/aircraftinquiry/.

NOTE

Correct entry of the assigned aircraft ICAO address in the GDL 88 is critical.

5.5.4.9.1.2 Aircraft Call Sign

Enter the US registration number (N-number). Valid characters are A-Z, 0-9, and trailing space.

5.5.4.9.1.3 Mode 3/A VFR Code

Enter the VFR transponder code. This field has a range of 0000-7777.

This setting is used for the UAT anonymous mode feature (if enabled), where the transponder must be tuned to this code before the GDL 88 is capable of transmitting a temporary address and a call sign of "VFR".

NOTE

Enter only valid VFR codes. The code must match the VFR code configured on the transponder. This is typically 1200 for US-registered aircraft.

5.5.4.9.1.4 Aircraft Category

This setting selects the aircraft emitter category for which the GDL 88 is installed. Select **Light** for aircraft with maximum gross weight less than 15,500.

5.5.4.9.1.5 Aircraft Length

Enter the length of the aircraft. This field has a range of 1 to 300 feet.

5.5.4.9.1.6 Aircraft Width

Enter the width (wingspan) of the aircraft. This field has a range of 1 to 300 feet.

5.5.4.9.1.7 Stall Speed

The stall speed setting is used in the GDL 88 air/ground determination for "Light" category aircraft (aircraft weight is less than 15,500 lbs).

Enter the aircraft stall speed. This field has a range of 30 to 100 knots. Use the aircraft landing configuration stall speed (Vs0) as specified in the aircraft pilot operating handbook (POH) or aircraft approved flight manual supplement (AFMS).

5.5.4.9.1.8 ADS-B Transmit

This setting enables or disables the GDL 88 UAT transmitter. If it is desired for the GDL 88 to transmit, select **Enable**, otherwise select **Disable** (default configuration).

NOTE

The GDL 88 is capable of transmitting ADS-B messages while in configuration mode. Ensure the aircraft assigned ICAO 24-bit address is entered prior to enabling the GDL 88 UAT transmitter.

5.5.4.9.1.9 FIS-B Processing

This setting enables or disables the processing of Flight Information Service Broadcast (FIS-B). If it is desired for the GDL 88 to process FIS-B, select **Enabled** (default configuration), otherwise select **Disabled**.

5.5.4.9.1.10 Internal GPS/SBAS

If the GDL 88 unit has an internal GPS/SBAS present, this setting enables or disables the internal GPS/SBAS receiver (GDL 88/D with internal GPS/SBAS only). If it is desired to utilize the internal GPS/SBAS receiver as a GPS source, select **Enabled** (default configuration), otherwise select **Disabled**.

5.5.4.9.1.11 Transponder Interrogation

This setting enables or disables the transponder interrogation control panel interface. If it is desired for the GDL 88 to communicate with the transponder wirelessly, select **Enabled** otherwise select **Disabled**. Refer to the GDL 88 Part 23 AML STC Installation Manual.

5.5.4.9.1.12 UAT Call Sign ID Logic

This setting configures whether the Mode 3/A Code (Squawk Code) is transmitted in the UAT ADS-B Out message. This setting must be set to **Enabled** (default configuration), allowing the GDL 88 to transmit the pilot-entered Mode 3/A Code (Squawk Code) to FAA ground stations.

5.5.4.9.1.13 Air/Ground Discrete

The GDL 88 AIR/GROUND discrete input is active-low, and can be configured to interpret whether the aircraft is airborne or on the ground based upon whether the input is grounded or open.

If the GDL 88 AIR/GROUND discrete is not connected, then select **Not Installed** (default configuration).

If the GDL 88 AIR/GROUND discrete connected, and the aircraft air/ground state is On-Ground when the input is grounded, the select **Active for Ground**. If the AIR/GROUND discrete is connected, and the aircraft air/ground state is airborne when the input is grounded, then select **Active for Airborne**.

Table 5-58. GDL 88 Air/Ground Discrete Configurations

AIR/GROUND Discrete	AIR/GROUND Discrete Input State	GDL 88 AIR/GROUND State
Not Installed	N/A	N/A
Active for Ground	Open	Airborne
	Grounded	On-Ground
Active for Airborne	Open	On-Ground
	Grounded	Airborne

5.5.4.9.1.14 Pressure Altitude Broadcast Inhibit Switch

This setting configures whether the GDL 88 is interfaced with an external switch for controlling pressure altitude reporting. If an altitude reporting selection switch is installed and interfaced to the PRESSURE ALT BROADCAST INHIBIT discrete select **Installed**, otherwise select **Not Installed**.

5.5.4.9.1.15 Anonymous Mode

NOTE

If a Mode S Transponder is installed with the GDL 88, the UAT anonymity feature must be disabled as to prevent two different aircraft addresses from being transmitted (Transponder Mode S address and the GDL 88 temporary address).

This setting controls whether the UAT anonymity feature is available. Consult the aircraft operator for guidance on whether this feature should be enabled. When enabled, and the flight crew selects the anonymous mode with the transponder tuned to the VFR Code, the GDL 88 transmits a temporary address instead of the aircraft assigned ICAO 24-bit address, and a call sign of “VFR.”

If it is desired to disable the UAT anonymity feature, select **Unavailable** (default configuration).

If it is desired to enable the UAT anonymity feature controlled by an interfaced display, select **Display Available**. If it is desired to enable the UAT anonymity feature controlled by an anonymous selection switch interfaced to the ANONYMOUS MODE discrete input, select **Switch Available**.

5.5.4.9.2 Antenna Configuration Page

The antenna page allows configuration of antenna settings as shown in Figure 5-42. To access this page, touch External Systems → GDL 88 → Configuration → Antenna.

Figure 5-42. GDL 88 Antenna Configuration Page

5.5.4.9.2.1 UAT/1090 Antenna

These settings control whether the GDL 88 antenna self tests are performed.

If the Top UAT/1090 Antenna (GDL 88D models only) is of the DC grounded type, select **Enabled**, otherwise select **Disabled**. If the Bottom UAT/1090 antenna is of the DC grounded type, select **Enabled**, otherwise select **Disabled**. Refer to the GDL 88 Part 23 AML STC Installation Manual for UAT/1090 antenna information.

5.5.4.9.2.2 GDL 88 GPS/WAAS Antenna (GDL 88/88D with GPS/SBAS Only)

These settings indicate the horizontal placement of the GDL 88 GPS/WAAS antenna on the aircraft.

Enter the GDL 88 GPS/WAAS antenna longitudinal offset distance rounded to the nearest foot from the nose of the aircraft, and the lateral offset as measured in feet (left or right, looking forward) from the centerline of the aircraft.

5.5.4.9.2.3 External GPS/SBAS Source Antenna

These settings indicate the horizontal placement of the external GPS source(s) GPS/WAAS antenna(s).

External GPS #1 is the GPS source connected to GDL 88 Time Mark 1

If external GPS #1 is connected to the GDL 88, enter the external source's GPS/WAAS antenna longitudinal offset distance rounded to the nearest foot from the nose of the aircraft, and the lateral offset as measured in feet (left or right, looking forward) from the centerline of the aircraft.

External GPS #2 is the GPS source connected to GDL 88 Time Mark 2

If external GPS #2 is connected to the GDL 88, enter the external source's GPS/WAAS antenna longitudinal offset as measured in feet from the nose of the aircraft, and the lateral offset as measured in feet (left or right, looking forward) from the centerline of the aircraft.

5.5.4.9.3 Audio Configuration Page

This page configures the GDL 88 analog audio output volume level and voice type as shown in Figure 5-43. To access this page, touch External Systems → GDL 88 → Configuration → Audio.

1. Select the desired voice gender as **Male** or **Female**. Set the audio volume to an acceptable level as described in the GDL 88 Part 23 AML STC Installation Manual.
2. Touch **Run Audio Test** to check the audio volume level.

Figure 5-43. GDL 88 Audio Configuration

5.5.4.9.4 ARINC 429 Configuration Page

This page allows configuration of the ARINC 429 input and output ports as shown in Figure 5-44. To access this page, touch External Systems → GDL 88 → Configuration → Ports and then select A429 at the top of the page.

Refer to the GDL 88 Part 23 AML STC Installation Manual for approved third-party equipment interfaces to the GDL 88. If the equipment and interface selections described below are not listed in the GDL 88 Part 23 AML STC Installation Manual, other FAA approval is required for that interface.

Figure 5-44. GDL 88 ARINC 429 Configuration Page

Select the correct Format and Speed settings for each port. The correct setting is dependent upon the interfaced equipment. The Data Format and Speed selections are described in Table 5-59, Table 5-60, and Table 5-61. Refer to the GDL 88 Part 23 AML STC Installation Manual for the correct selections for each piece of interfaced equipment.

Table 5-59. ARINC 429 RECEIVE Selections

Selection	Description
Off	No unit connected to the ARINC 429 input. Same as **Disabled** in the GDL 88 Install Tool.
Airdata #1	Select this format for the Air Data system, or the Air Data system #1 in a dual Air Data system installation. Provides altitude, airspeed, and altitude rate information.
Airdata #2	Select this format for the Air Data system #2 in a dual Air Data system installation. Provides altitude, airspeed, and altitude rate information.
Airdata/Heading No Alt	Airspeed, altitude rate, and heading information.
Airdata/Heading w/Alt	Pressure altitude, airspeed, altitude rate, and heading information.
Heading	Select this format for heading information.
Radio Altimeter	Select this format for radio altimeter information.
TCAS II TA/RA	Provides ARINC 429 labels 270 (Vertical RA) and 274 (Transponder Control) from ACAS or TCAS II systems complying with ARINC 735A. Used for determining "TCAS/ACAS Operational" and "TCAS/ACAS Resolution Advisory" flags in the UAT ADS-B Out message.
Traffic Format 1	Select this format for traffic information. [1]
Traffic Format 2	Select this format for traffic information. [2]
Traffic Format 3	Select this format for traffic information.
Traffic Format 5	Reserved for future use.

[1] Traffic Format 1 configures DISCRETE OUT 1* and DISCRETE OUT 2* to function as traffic system standby/operate and test control discretes.

[2] Traffic Format 2 configures DISCRETE OUT 1* and DISCRETE OUT 2* to function as traffic system standby/operate and test control discretes.

Table 5-60. ARINC 429 TRANSMIT Selections

Selection	Description
Disabled	No unit connected to this ARINC 429 output.
Traffic Out	Traffic and equipment status output.

Table 5-61. ARINC 429 SPEED Selections

Selection	Description
Low	Standard low-speed ARINC 429 (nominally 12.5 kb per second)
High	High-speed ARINC 429 (nominally 100 kb per second)

5.5.4.9.5 RS-232 Configuration Page

This page allows configuration of the RS-232 input ports and the RS-232 output ports as shown in Figure 5-45. To access this page, touch External Systems → GDL 88 → Configuration → Ports and then select RS232 at the top of the page.

Figure 5-45. GDL 88 RS-232 Port Configuration

Refer to the GDL 88 Part 23 AML STC Installation Manual for approved third-party equipment interfaces to the GDL 88. If the equipment and interface selections described below are not listed in the GDL 88 Part 23 AML STC Installation Manual, other FAA approval is required for that interface.

Change the inputs or outputs to match the equipment that is interfaced to each channel. Refer to Table 5-62 (inputs) and Table 5-63 (outputs). Refer to the GDL 88 Part 23 AML STC Installation Manual. Refer to the GDL 88 Part 23 AML STC Installation Manual for the correct selections for each piece of interfaced equipment.

Table 5-62. RS-232 INPUT Selections

Selection	Description
Disabled	No unit connected to this RS-232 input.
Airdata Format 1	Provides altitude, airspeed, and altitude rate information.
Altitude Format 1	Provides altitude information.
Altitude Format 2	Provides altitude information.
Altitude Format 3	Provides altitude information.
GNS 1	Provides GPS data and FIS-B requests. Same as **GNS Series #1** in the GDL 88 Install Tool.
GNS 2	Provides GPS data and FIS-B requests. Same as **GNS Series #2** in the GDL 88 Install Tool.
GTX Mode C #1	Provides Mode 3/A Code (Squawk Code), Ident Status, Transponder Mode, and Parallel Gray Code Altitude.
GTX Mode C #2	Provides Mode 3/A Code (Squawk Code), Ident Status, Transponder Mode, and Parallel Gray Code Altitude.
GTX Mode S #1	Provides Mode 3/A Code (Squawk Code), Ident Status, Transponder Mode, Flight ID and Parallel Gray Code Altitude.
GTX Mode S #2	Provides Mode 3/A Code (Squawk Code), Ident Status, Transponder Mode, Flight ID and Parallel Gray Code Altitude.
SL Mode C Format 1 #1	Provides Mode 3/A Code (Squawk Code), Ident Status, Transponder Mode, and Altitude.
SL Mode C Format 2 #1	Provides Mode 3/A Code (Squawk Code), Ident Status, Transponder Mode, and Altitude.
SL Mode C Format 2 #2	Provides Mode 3/A Code (Squawk Code), Ident Status, Transponder Mode, and Altitude.
Traffic Format 4	Provides traffic system status information.

Table 5-63. RS-232 OUTPUT Selections

Selection	Description
Disabled	No unit connected to this RS-232 output.
GNS 1	Provides FIS-B and GDL 88 product information. Same as **GNS Series #1** in the GDL 88 Install Tool.
GNS 2	Provides FIS-B and GDL 88 product information. Same as **GNS Series #2** in the GDL 88 Install Tool.
GTX Mode C #1	Provides transponder #1 control commands.
GTX Mode C #2	Provides transponder #2 control commands.
GTX Mode S #1	Provides transponder #1 control commands.
GTX Mode S #2	Provides transponder #2 control commands.
Traffic Format 4	Traffic system control commands.

5.5.4.9.6 Ethernet Configuration Page

This page configures which LRUs are installed on the GDL 88 Ethernet (HSDB) network. To access this page, touch External Systems → GDL 88 → Configuration → Ports and then select HSDB (Ethernet) at the top of the page. From the available list of LRUs, select either **Enabled** or **Disabled** as shown in Figure 5-46.

Figure 5-46. GDL 88 Ethernet Configuration Page

Refer to the GDL 88 Part 23 AML STC Installation Manual for approved third-party equipment interfaces to the GDL 88. If the equipment and interface selections described below are not listed in the GDL 88 Part 23 AML STC Installation Manual, other FAA approval is required for that interface.

Change the configuration status to **Enabled** or **Disabled** to match the equipment that is interfaced on the Ethernet (HSDB) network.

5.5.4.9.6.1 GTN 6XX/7XX

Select **Enabled** if a single GTN or dual GTNs are installed.

5.5.4.9.6.2 GTS 8XX

Select **Disabled** if no GTS 8XX is installed, or if a GTS 8XX is installed but the installation is not using the GTS 8XX Ethernet (HSDB) interface for traffic correlation. Select **Enabled** if a GTS 8XX is installed and the GTS 8XX Ethernet (HSDB) interface is being used for traffic correlation.

NOTE

GTS 8XX selection of **Enabled** configures DISCRETE OUT 1* and DISCRETE OUT 2* to function as traffic system standby/operate and test control discretes.

NOTE

This setting should only be set to **Enabled** if the GTS 8XX is interfaced to the GDL 88 via Ethernet (HSDB) instead of ARINC 429 for traffic correlation. If the GTX 8XX is interfaced to the GDL 88 using ARINC 429, select **Disabled**.

5.5.4.9.7 GDL 88 Diagnostics

The GDL 88 Diagnostics page is a useful tool for diagnosing issues and troubleshooting problems that arise during installation. These pages are also used for the GDL 88 checkout procedures in the GDL 88 Part 23 AML STC Installation Manual which must be followed.

5.5.4.9.7.1 System Status

This page is the same as the Unit Information page in the GDL 88 Install Tool. The System Status page displays device information including the serial number and software versions along with system statistics. To access this page, touch External Systems → GDL 88 → Diagnostics → System Status.

5.5.4.9.7.2 Error Log

This page is the same as the Unit Assert Log page in the GDL 88 Install Tool. The Error Log page allows the GDL 88 assert log to be saved to an SD card or cleared. To access this page, touch External Systems → GDL 88 → Diagnostics → Error Log.

5.5.4.9.7.3 Faults

This page contains a list of GDL 88 system faults and ADS-B faults. To access this page, touch External Systems → GDL 88 → Diagnostics → Faults. A description of each fault and troubleshooting procedures can be found in the GDL 88 STC Installation Manual, P/N 190-01310-00.

5.5.4.9.7.4 Discrete Inputs

The Discrete Inputs diagnostics page displays the state of each of the discrete input pins on the GDL 88. To access this page, touch External Systems → GDL 88 → Diagnostics → Discrete Inputs.

5.5.4.9.7.5 Discrete Outputs

The Discrete Outputs diagnostics page allows the state of each of the discrete outputs to be toggled between active and inactive. To access this page, touch External Systems → GDL 88 → Diagnostics → Discrete Outputs.

5.5.4.9.7.6 GPS/SBAS Data

The GPS/SBAS Data page displays the WAAS engine information and PPS status information. For GDL 88 units with an internal WAAS engine, this page allows the GDL 88 internal WAAS engine to be reset. To access this page, touch External Systems → GDL 88 → Diagnostics → GPS/SBAS Data.

5.5.4.9.7.7 External Data

This page is the same as the Data Inputs page in the GDL 88 Install Tool. The External Data page displays the data received on the GDL 88 from the other connected avionics. To access this page, touch External Systems → GDL 88 → Diagnostics → External Data.

5.5.4.9.7.8 RS-232 Inputs

The RS-232 Inputs diagnostics page allows the display of serial data that is being received and is useful for determining if the GDL 88 is receiving data on each connected port. To access this page, touch External Systems → GDL 88 → Diagnostics → RS232 Inputs. Select the desired port by touching the **Port** key and selecting the RS-232 channel from the list. The data log can be paused by toggling the **Pause** key. Clear the data log by touching **Clear Log**.

5.5.4.9.7.9 ARINC Inputs

The ARINC Inputs diagnostics page allows the display of ARINC 429 data that is being received over each GDL 88 ARINC 429 port. To access this page, touch External Systems → GDL 88 → Diagnostics → ARINC inputs. Each port can be chosen for display by touching the **Port** key and toggling between the input ports. Select a port to display. The GTN will then display the label, SSM, Data, and SDI for each GDL 88 ARINC 429 input port. This is useful for determining if the expected labels are being received and also for troubleshooting incorrect or swapped wiring to the input ports. The data log can be paused by toggling the **Pause** key. Clear the data log by touching **Clear Log**.

5.5.4.9.7.10 HSDB (Ethernet)

The HSDB (Ethernet) diagnostics page allows the status of each HSDB port to be displayed. To access this page, touch External Systems → GDL 88 → Diagnostics → HSDB (Ethernet). This page displays whether or not each port is receiving data and displays whether the port is connected or not connected. The configuration status of each installed HSDB LRU is also displayed.

5.5.4.10 GSR 56 Configuration

If the GSR 56 Iridium transceiver is installed and connected to the GTN, the GSR 56 features that will be used must be enabled.

1. Go to the GSR 56 page in the External Systems page group.
2. Touch on the desired features to be activated. When active, the key for the feature will be lit green.
3. Ensure that the RUDICS Number setting is 0088160000576. If the RUDICS Number setting is incorrect, touch **Restore Defaults**.
4. Ensure that the SMS SCA setting is 881662900005. If the SMS SCA setting is incorrect, touch **Restore Defaults**.

5.5.4.11 Weather Radar Configuration (GTN 7XX Only)

5.5.4.11.1 GWX 68/70 Configuration

To configure the GWX 68/70, it must first be selected as present and the model of GWX installed must be specified. To do this, see Section 5.5.1.4. Next, go to the External Systems page and touch the **Weather Radar** key.

5.5.4.11.1.1 GWX Configuration Settings

Pitch Trim

This setting specifies the offset angle being used by the GWX for the pitch axis. Selections: -4.00° to +4.00° in 0.01° increments.

Roll Trim

This setting specifies the offset angle being used by the GWX for the roll axis. Selections: -4.00° to +4.00° in 0.01° increments.

Return Bins

This setting specifies the number of range bins used to encode the data for one radar spoke. The default for this value is 600.

5.5.4.11.2 Roll Trim Configuration in Normal Mode

Figure 5-47. Roll Trim Configuration in Normal Mode

Use the following procedure to configure weather radar roll trim while flying (in normal mode).

1. Start the GTN in Normal Mode.
2. Touch Radar on the Weather page to bring up the radar display.
3. Touch the distance labels on the radar display, one at a time in ascending order (see Figure 5-47) (1-2-3-4), to bring up the roll trim setting.
4. Once the proper roll trim is set, touch the **Enter** key to save the setting.

5.5.4.11.3 ARINC 708 Weather Radar Configuration

NOTE

If a GWX weather radar is already configured, the key to configure an ARINC 708 weather radar will be disabled because the radar types are mutually exclusive.

NOTE

The Digital Radar option must be enabled before ARINC 708 weather radar can be configured, Refer to Section 5.5.2.4.

As part of the wiring installation the GTN 7XX will be connected to the weather radar as display #1 or #2, and the GTN 7XX must be configured accordingly. Follow the steps below to perform ARINC 708 weather radar configuration.

1. Enter configuration mode on the GTN by applying power to the GTN (closing the circuit breaker) while holding the HOME key.
2. Go to the ARINC 708 page in the GTN Setup page group.
3. For External Weather Radar choose the appropriate ARINC 708 weather radar type by touching **Off** and selecting the correct type from the list.

NOTE

When an ARINC 708 weather radar is configured, the ARINC 429 Out 3 format will automatically be set to Radar Format 1, which is the format used to control the weather radar.

4. Go to the Weather Radar page in the External Systems group.
5. Choose the appropriate Display number, to match the connections to the weather radar.
6. The ARINC 708 weather radar system may also require additional calibration. Refer to the following sections.

5.5.4.11.3.1 Honeywell (Bendix/King) 2XXX Series Radars

This section describes Post-Installation System Configuration and Calibration of the Bendix/King RDR-2000 and RDR-2100 Radar Systems using the GTN 7XX. The CM 2000 Configuration Module for the WXR must be configured using the Honeywell (Bendix/King) KPA 900 Configuration Module Programmer Kit (P/N 050-03311-0000) in conjunction with a personal computer. Refer to the configuration module programmer operator's guide for detailed setup instructions. Follow the instructions for the programmer, and any required weather radar settings contained in Section C.17.

Weather Radar Calibration Mode

Place the WXR in calibration mode as follows:

1. Go to the Weather Radar page in the External Systems page group.
2. Set the Radar Mode to Test.
3. Touch the **Calibration** key and wait for the WXR to enter calibration mode – all status indicators will flash briefly to indicate that the radar is in calibration mode.

Antenna Clearance Check

Perform the antenna clearance check as follows:

1. Ensure that the WXR is in calibration mode.
2. Adjust the Gain field to a value of -26.5 to -28.0, and set the Tilt Settings field to 14.75°U. This will initiate the antenna clearance scan. The antenna will move to each of the extreme positions to determine that there is no interference with antenna movement and all scan motors are working properly.

Stabilization Calibration

Perform the WXR stabilization calibration as follows:

1. Ensure that the radar is in calibration mode.
2. Note the Roll Trim value for re-entry following the stabilization calibration procedure. Adjust the Roll Trim field to 0.000.
3. Beginning with the 400 Hz REF GAIN procedure in Section 2.4.4.1, follow the instructions in Section 2.4.4.1 of the RDR 2000 Installation Manual (Honeywell P/N 006-00643-0007) or the RDR 2100 Installation Manual (Honeywell P/N 006-00648-0002).
4. If the roll trim value was recorded from the previous WXR indicator or noted in step 2, set the Roll Trim field on the GTN 7XX to this value.

5.5.4.11.3.2 Honeywell (Bendix/King) RDS 8X Series Radars

This section describes Post-Installation System Configuration and Calibration of the Bendix/King RDS-81 (RS 811A) and RDS-82 (RS 181A) Systems using the GTN 7XX.

Weather Radar Calibration Mode

Place the WXR in calibration mode as follows:

1. Go to the Weather Radar page in the WXR page group.
2. Set the Radar Mode to Test.
3. Touch the Calibration key and wait for the WXR to enter calibration mode – the RX TX box will turn red when the radar enters calibration mode.

Stabilization Calibration

Perform the WXR stabilization calibration as follows:

1. Ensure that the radar is in calibration mode.
2. Note the Roll Trim value for re-entry following the stabilization calibration procedure. Adjust the Roll Trim field to 0.000.
3. Beginning with the step C in Section 2.3.6.3 of the RDS 81 Installation Manual (Honeywell P/N 006-00954-0001) or the RDS 82 Installation Manual (Honeywell P/N 006-00955-0006), perform the stabilization alignment in the aircraft.
4. If the roll trim value was recorded from the previous WXR indicator or noted in step 2, set the Roll Trim field on the GTN 7XX to this value.

5.6 Ground Checks (Configuration Mode)

The following checks are done in Configuration Mode. For instructions on entering Configuration Mode, see Section 5.5.

5.6.1 Main Indicator Check (Analog Only)

NOTE

If the GTN is interfaced to an electronic HSI/EFIS and the main indicator analog output is not used, this check is not required.

If the GTN is interfaced to an analog indicator on the main CDI/OBS (P1001), perform the following steps:

1. Go to the GTN Diagnostics page. See Section 5.5.3.
2. Go to the Main Indicator (Analog) page.
3. Verify correct operation of the lateral deviation, flag and TO/FROM flag using the corresponding selections.
4. Verify correct operation of the vertical deviation and flag using the corresponding selections.
5. Verify correct operation of the OBS knob using the OBS Resolver Setting display. At 30° increments around the OBS card, ensure that the indicated value is within 2° of the value set on the indicator. If the resolver is not within 2°, calibrate the resolver as described in Section 5.5.1.5.

5.6.2 VOR/LOC/GS Indicator (GTN 650/750 Only)

If the GTN is interfaced to an analog indicator on the VOR/ILS Indicator output (P1004), perform the following steps:

1. Go to the GTN Diagnostics page.
2. Go to the VOR/ILS Indicator diagnostics page.
3. Verify correct operation of the lateral deviation, flag and TO/FROM flag using the corresponding selections.
4. Verify correct operation of the vertical deviation and flag using the corresponding selections.
5. Verify correct operation of the OBS knob using the Selected Course display. At 30° increments around the OBS card, ensure that the indicated value is within 2° of the value set on the indicator. If the resolver is not within 2°, calibrate the resolver as described in Section 5.5.1.11.

4.

5.6.3 Discrete Inputs Checkout

If the GTN is connected to any external switches, perform the following steps:

1. Go to the GTN Diagnostics page.
2. Go to the Discrete Inputs page, shown in Figure 5-48..
3. For each external switch that is connected, exercise the switch source and check the ‘ACTIVE’ or ‘INACTIVE’ indication on the screen correlating to the appropriate input, and ensure it is displayed correctly.
4. If the state of the switch/LRU is not displayed correctly, check the wiring to the discrete input and ensure it is not shorted to ground. Also ensure the correct type of switch/discrete is connected to the GTN.

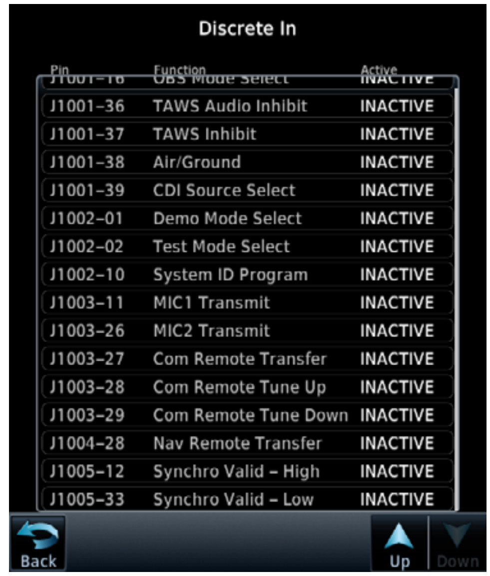


Figure 5-48. Discrete Inputs Page

5.6.4 Discrete Outputs Checkout

If the GTN is connected to any external annunciators/systems, perform the following steps:

1. Go to the GTN Diagnostics page.
2. Go to the Discrete Outputs page, shown in Figure 5-49.

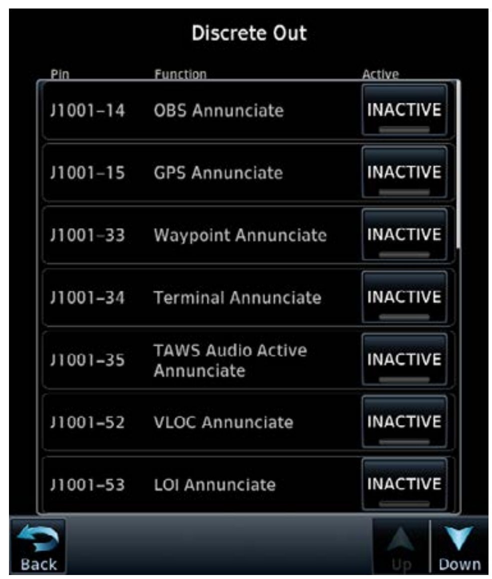


Figure 5-49. Discrete Outputs Page

3. For each annunciator output that is connected to an external system or annunciator, toggle the output **ACTIVE** (corresponding box is filled green and displays ‘ACTIVE’) and **INACTIVE** (corresponding box is not filled green and displays ‘INACTIVE’) by touching the key corresponding to the output. Verify that the appropriate external annunciator illuminates when the output is set to **ACTIVE** and extinguishes when the output is set to **INACTIVE**. If the output is not connected to an annunciator but provides an input to another system, verify that the other system receives the signal.
4. If the annunciator and/or other system does not receive the signal, verify the wiring and ensure it is connected properly and not shorted to ground.

5.6.5 HSDB Wiring Checkout

If HSDB wiring has been installed for other Garmin LRUs that interface via HSDB, follow the procedure below to ensure it has been installed and configured correctly.

1. Access the GTN Diagnostics page from the main Configuration Mode home page.
2. Touch the **HSDB (Ethernet)** key. The HSDB Diagnostics page, shown in Figure 5-50., will be displayed.
3. Ensure any LRUs connected via HSDB are powered on and properly configured.
4. For each Ethernet port that has HSDB wiring connected to it, ensure that the port status displays ‘Connected’ and ‘Receiving’.
5. If the previous step did not perform correctly, check the electrical connections and configuration setup.

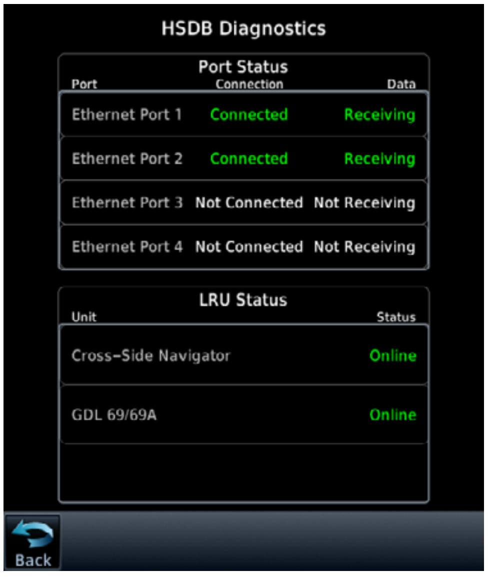


Figure 5-50. HSDB Diagnostics Page

5.6.6 Crossfill Check (If Dual GTNs Installed)

1. Turn on both GTN units in the aircraft.
2. For each GTN unit, go to the HSDB Ethernet Diagnostics page shown in Figure 5-50.. For the port connecting the cross-side GTN, check the Ethernet Port Status and ensure that ‘Connected’ is displayed under ‘Connection’ and ‘Receiving’ is displayed under ‘Data’. If the previous steps do not perform correctly, check the electrical connections and configuration setup. The ports to which the GTNs are connected must be configured as ‘Connected’ for each GTN. Also, under the Interfaced Equipment page, the cross-side navigator must be set to ‘Present’.

5.6.7 TAWS Audio Check (For Units with TAWS Only)

NOTE

The audio panel must also be powered on for the TAWS audio check

The TAWS audio volume has an initial default of 80% of the maximum value. The TAWS volume needs to be set to ensure that aural alerts are audible under all anticipated noise environmental conditions.

1. Touch the Audio configuration page from the Main GTN Setup page.
2. Under 'Alert Volume', increase or decrease the volume by touching the + or - keys.
3. Evaluate the TAWS audio messages for acceptable volume and intelligibility during both low and high cockpit noise levels (idle descent at low speed and high power at Vmo). See Section 5.8.6 for the flight check procedure.
4. Readjust the Volume as needed to ensure the TAWS audio messages will be heard in all anticipated cockpit noise conditions.

Figure 5-51. Audio Configuration Page

5.6.8 GAD 42 Interface Check

This check verifies the interface between the GTN and the GAD 42.

1. Go to the GAD 42 Configuration Page from the External Systems page. Touch External Systems, then touch GAD 42.
2. Verify that Status is ACTIVE.
3. Change any of the options to a different number.
4. Verify that after changing one of the options the STATUS field changes to SENDING then changes back to ACTIVE. If the entry reverts to the previous number when ACTIVE is displayed, then check the wiring connections to the GAD 42. Refer to the GAD 42 Installation Manual for details on how to configure the GAD 42.

Figure 5-52. GAD 42 Configuration Page

5.6.9 Lighting Bus Interface Check

The display and key backlighting on the GTN can track an external lighting/dimmer bus input and use it to vary the display and key backlight levels accordingly. This check verifies that the interface is connected correctly.

CAUTION

When 14 VDC or 28 VDC lighting buses are connected to the GTN, connection of the aircraft lighting bus to the incorrect input pins can cause damage to the GTN. Always start this test with the dimming bus at the lowest setting, and slowly increase the brightness. If the LIGHTING level displayed on the GTN does not increase as the lighting is increased in brightness, verify that the wiring is correct before proceeding.

1. Ensure the lighting bus is set to its minimum setting.
2. Go to the Lighting Bus Configuration page.
3. Slowly vary the lighting bus level that is connected to the GTN. Verify that the Source Input Level value displayed on the configuration screen tracks the lighting bus setting. Continue to maximum brightness and verify proper operation.

Figure 5-53. Lighting Bus Configuration Page

5.6.10 Air/Fuel Data Interface Check

The GTN can receive fuel and altitude data from an external source. This check verifies that the GTN is receiving data from these sources. Ensure that the GTN is powered on and in configuration mode. If the following steps do not perform correctly, check the electrical connections (Appendix E) and configuration setup (Section 5.5.1.2) for the interfaced data source.

1. Go to the GTN Diagnostics page from the Configuration Mode Home page.
2. Touch the Main Data Inputs key.
3. If there are multiple sources providing data to the GTN, remove power from all but one source.
4. Verify that the appropriate data is displayed and agrees with the active source.

NOTE

After applying power to an altitude source it may take several minutes to warm up. During the warm-up period the Pressure Altitude display on the GTN will be dashed out.

5. If there are multiple sources, remove power from the currently active source and apply power to another source that has not been checked.
6. Repeat steps 4 and 5 until all available sources have been checked.

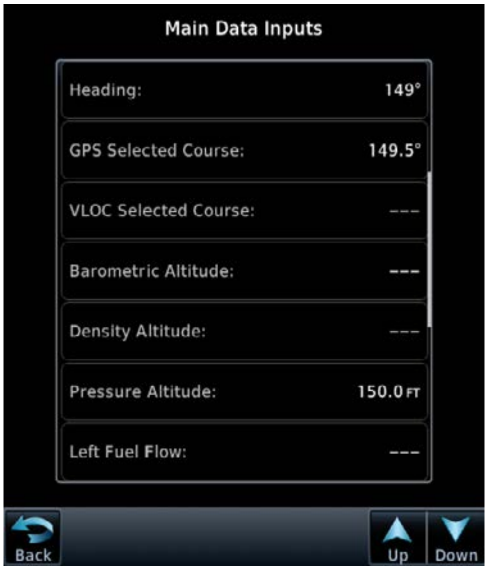


Figure 5-54. Main Data Inputs Page

5.6.11 AHRS/IRU Interface Check

The GTN can receive heading data from an external source. This check verifies that the GTN is receiving data from these units. Ensure the GTN is powered on and in configuration mode. If the following steps do not perform correctly, check the electrical connections and configuration setup for the interfaced AHRS/IRU.

1. Go to the GTN Diagnostics page from the Configuration Mode Home page.
2. Touch the Main Data Inputs key.
3. Scroll to the Heading data display.

NOTE

If a Sandel EHSI or an ARINC 429 EFIS is also installed, ensure that it is turned off so that it does not supply heading to the GTN. Verify that the HDG field displays valid heading data.

4. Remove power from the heading source and verify that the magnetic heading field is dashed out.

5.7 Ground Checks (Normal Mode)

For the following checks, cycle power on the GTN and power it up in normal mode.

5.7.1 Display of Self Test Data

Following normal power-up, the Database pages are displayed, followed by the Instrument Panel Self-Test page. Touching **Continue** displays the Instrument Panel Self-Test page. During this time, the electrical outputs are activated and set to the values listed below. Touch ‘Continue’ to acknowledge the Instrument Panel Self-Test page. This is not a required check, although this page can be useful for troubleshooting installation problems.

Table 5-64. Self Test Values

Parameter	Self-Test Value
Course Deviation	Half-scale left deviation, TO indication, flag pulled
Glideslope/Vert. Deviation	Half-scale up deviation, flag pulled
Annunciators	All On
Selected Course (OBS)	The GTN displays the OBS value (149.5° if interfaced to an HSI with driven course pointer).
Desired Track	149.5° (Displayed as 150°)
ITEMS BELOW ARE NOT DISPLAYED ON THE INSTRUMENT PANEL SELF-TEST PAGE	
Distance to Go	10.0 nautical miles
Time to Go	4 minutes
Bearing to Waypoint (RMI)	135°
Active Waypoint	“GARMN”
Groundspeed	150 knots
Present Position	N 39°04.05’, W 94°53.86’
Waypoint Alert	Active
Phase of Flight	En Route
Message Alert	Active
Leg/OBS Mode	Leg Mode
GPS Integrity	Invalid
Roll Steering (if applicable)	Flight Director commands 0° bank (level flight) for 5 seconds; commands increasing right bank at 1°/second for 5 seconds; commands 5° right bank for 5 seconds; commands decreasing right bank at 1°/second for 5 seconds, until command is 0° bank again. This cycle repeats continuously.

5.7.2 Signal Acquisition Check

NOTE

All other avionics should be turned off at the start of this test, with the GTN powered on.

Ensure the GTN is able to acquire sufficient satellites to compute a GPS position. From the Home page, touch the **System** key and then touch the **GPS Status** key. Under ‘GPS Solution’, ensure that a ‘3D Fix’ or ‘3D Diff Fix’ is obtained. If the unit is unable to acquire satellites, move the aircraft away from obstructions which might be shading GPS reception. If the GPS solution does not improve, check the GPS antenna installation.

NOTE

After installation, the initial acquisition of position can take up to 20 minutes. Subsequent acquisitions will not take as long.

Once GPS position information is available, perform the following steps:

1. On the GPS Status Page, verify that the LAT/LON agree with a known reference position.
2. While monitoring the GPS Status page, turn on other avionics one at a time and check the GPS signal reception to make sure it is not affected (no significant signal degradation).
3. Before proceeding with the VHF COM interference check, ensure that any connected equipment is transmitting and/or receiving data from the GTN and is functioning properly.

5.7.3 VHF COM Interference Check

NOTE

Interference checks must be completed on all IFR installations.

Certain non-aviation radios, including marine transceivers, can interfere with civil aviation navigation and surveillance equipment including the Garmin GTN. When installing GTN equipment, it is the responsibility of the installer to ensure that the GTN modification is compatible with all previous aircraft modifications. Garmin recommends that whenever a GTN is installed in an aircraft that has been modified with non-aviation radios, particular care should be exercised to verify that these do not interfere with proper function of the GTN.

Special care should also be taken to ensure that there is no interference with the GTN if non-aviation radios are installed in an aircraft after a GTN has been installed. If interference is found, it can be addressed by relocating antennas, rerouting cables, using filters to attenuate unintentional harmonic frequency transmissions, or using various other techniques for elimination of the interference. It may be necessary to remove or replace the interfering radio with a model that does not interfere with the proper functioning of the GTN.

If you are testing a transmitter from a non-aviation device, each frequency must be verified by transmitting for at least 30 seconds on each channel.

Once the Signal Acquisition Test has been completed successfully, perform the following steps:

1. View the Satellite Status Page and verify that at least 7 satellites have been acquired by the GTN.
2. Verify that the GPS ‘LOI’ flag is out of view.
3. Select 121.150 MHz on the COM transceiver to be tested.
4. Transmit for a period of 35 seconds.
5. Verify that the GPS ‘LOI’ flag does not come into view.
6. Repeat steps 4 and 5 for the following frequencies:
   a. 25 kHz COM Channel Spacing:

121.15 MHz	131.22 MHz
121.17 MHz	131.25 MHz
121.20 MHz	131.27 MHz
121.22 MHz	131.30 MHz
121.25 MHz	131.32 MHz
131.20 MHz	131.35 MHz

   b. For VHF radios with 8.33 kHz channel spacing, include the following frequencies in addition to those listed above:

121.185 MHz	130.285 MHz
121.190 MHz	131.290 MHz

7. Repeat steps 3 through 6 for all remaining COM transceivers installed in the aircraft.
8. If the aircraft is TCAS-equipped, turn on the TCAS system and verify that GPS position remains valid (if position is lost, the status on the GPS Status page will change to “ACQUIRING”).
9. If aircraft is SATCOM-equipped, use the SATCOM system and verify that GPS position remains valid (if position is lost, the status on the GPS Status page will change to “ACQUIRING”).
10. If the GPS “LOI” flag comes into view, see Section 2.4.4.5 for options to improve performance.

5.7.4 VHF NAV Checkout (GTN 650/750 Only)

Touch the CDI key to select VLOC mode, which is indicated by a green 'VLOC' annunciation on the bottom center of the display. Check the VOR reception with ground equipment, operating VOT or VOR, and verify audio and Morse code ID functions (if possible). Tune a Localizer frequency and verify the CDI needle and NAV flag, and VDI needle and GS flag operation.

5.7.4.1 NAV Audio Check (For non-GMA 35 Installations)

1. Ensure the audio panel is powered on.
2. Plug in a headset at pilot and copilot position.
3. Tune the GTN NAV receiver to a local VOR station.
4. Ensure the Morse code identifier is being received over the crew headsets.
5. If the audio is not heard, verify the wiring connections to the audio panel.
6. Ensure the audio volume is sufficient for all anticipated cockpit noise conditions.
7. Repeat steps 2 through 5 for each installed GTN NAV receiver.

5.7.5 VHF COM Checkout (GTN 635/650/750 Only)

5.7.5.1 Antenna Check

If desired, the antenna VSWR can be checked using an inline wattmeter in the antenna coaxial using frequencies near both ends of the band. The VSWR should be < 2:1. A VSWR of 2:1 will cause a drop in output power of approximately 12%.

5.7.5.2 Receiver/Transmitter Operation

Tune the unit to a local VHF frequency and verify the receiver output produces a clear and understandable audio output. Verify the transmitter functions properly by contacting another station and getting a report of reliable communications.

5.7.6 GMA 35 Audio Panel Checkout (GTN 7XX Only)

5.7.6.1 GMA 35 Interface Check (GTN 7XX Only)

1. With the GTN running and the GMA 35 audio panel powered on, go to the Home page and touch the Audio Panel key.
2. Ensure that a red 'X' is not displayed over the Audio Panel key.

After configuring the audio panel, an in-aircraft checkout may be performed with a good microphone, headset, speaker, and avionics receivers. For testing the marker beacon, use a ramp tester that transmits a 75 MHz marker beacon test signal, or perform the flight check outlined in Section 5.8.7.

For instructions on how to operate the GMA 35 in normal mode during the installation checkout procedures, refer to the GTN 7XX/GMA 35 Pilot's Guide, P/N 190-01007-03. Verify that every function of the GMA 35 operates correctly. Ensure that the GMA 35 circuit breaker is pressed in and is receiving power.

NOTE

In the following procedural steps outlined below, allow for variation in the configuration settings for the particular installation under test.

5.7.6.2 Failsafe Operation Check

1. Power the GMA 35 off by pulling the GMA 35 circuit breaker.
2. Check the failsafe operation by exercising the COM1 microphone, microphone key and audio over the pilot's headphones.

NOTE

Use of a true mono headset is required for this test to ensure proper wiring even if a stereo jack is provided in the installation. Wiring left channel (tip contact) and right channel (ring contact) backwards will cause failsafe mode not to function with mono headsets. Use of a true mono headset is required for this test (not a stereo headset with a mono/stereo switch because headset manufactures differ on how they accomplish this switching). This will guarantee the condition of the right channel (ring terminal) being shorted to the return (sleeve terminal) by the mono headset's plug. During power-on operation, this short will not damage the audio panel.

3. Verify that COM1 can key and transmit the pilot's mic audio by verifying received sidetone or checking reception of the transmission with another radio tuned to receive this transmission (verify Pilot PTT and mic operation is delivered to this transceiver).
4. Turn the unit back on to continue testing.

NOTE

If the configuration setting 'COM 1 is connected as COM 2' is set to True (described in Section 5.5.4.8.2.1), then the COM 2 microphone should be exercised rather than COM 1.

5.7.6.3 COM Transceiver Operational Check

1. Connect a headset to the pilot's headset output and mic input jack.
2. Verify that each installed transceiver (COM) can be heard when selected.

NOTE

Depending on configuration settings, the mic selected COM may mute audio from other COMs.

3. Verify that each installed transceiver keys for transmission and transmits clear audio from the pilot's mic when selected for transmission and the Pilot PTT key is pressed. (Because the audio panel can be configured to simulate received sidetone internally, verifying transmission with a separate radio not in the system is recommended.)

NOTE

Depending on configuration settings, other transceivers may be muted during transmit. Also, the audio panel may mute the speaker during PTT.

4. Move the headset to the copilot's headset jacks and verify that any one of the installed transceivers (testing each is not necessary) receives and transmits copilot mic properly as above.

5.7.6.4 NAV Audio Check

Ensure the GMA 35 and each installed NAV receiver is powered on.

1. Tune the NAV receiver to a local VOR station.
2. Ensure the Morse code identifier is being received over the crew headsets.
3. If the audio is not heard, verify the wiring to the audio panel.
4. Ensure the audio volume is sufficient for all anticipated cockpit noise conditions.
5. Repeat steps 1 through 4 for each installed NAV receiver.

5.7.6.5 Alert Audio Check

If there is an alert audio Source connected to the GMA 35, the interface should be verified as described below.

1. Cause the alert audio source to produce audio. (e.g., if a traffic system is installed, command the traffic system into self-test mode; if a TAWS system is installed, command the TAWS system into self-test mode.)
2. Verify that the alert audio source is heard in the pilot and copilot headsets and that the audio volume is sufficient for all anticipated cockpit noise conditions. Adjust the audio volume level as needed, following the instructions in Section 5.5.4.8.2.2.
3. If the alert audio source is not heard in the crew headsets, check the wiring from the source to the GMA 35 alert audio inputs.
4. Repeat this procedure for each alert audio source connected to the GMA 35.

5.7.6.6 Receiver Audio Check

If there are receiver audio sources connected to the GMA 35, the interface should be verified as described below. Ensure the GMA 35 as well as each interfaced receiver (DME, ADF, etc) is powered on.

1. Plug in a headset at pilot and copilot position.
2. Tune the installed receiver to a valid station.
3. Ensure audio is being received over the crew headsets.
4. Ensure the audio volume is sufficient for all anticipated cockpit noise conditions. Adjust the audio output level as needed at the receiver.
5. Repeat steps 2 through 4 for each installed receiver.

5.7.6.7 Intercom System (ICS) Check

NOTE

If a monaural headset is plugged into any stereo phone jack position, no damage will occur to the GMA 35. In the case of plugging a monaural headset into any passenger position, any stereo listener will lose one channel when another passenger plugs in a monaural headset.

1. Place the audio panel into ALL ICS mode (refer to the GTN Pilot's guide) so that all ICS positions hear all others.
2. Deselect or turn off other audio sources (MKR, transceivers, receivers, alerts). Some configurations may mute passenger intercom audio to crew when aircraft audio is present.
3. From the pilot headset position, verify the pilot, copilot, and all passenger mic inputs can be heard in the pilot's headset when speaking into the mic input under test (adjust pilot ICS volume if necessary).
4. Speak into the pilot's mic and verify that pilot mic audio is heard in the copilot headset (adjust copilot ICS volume if necessary) and in each passenger headset (adjust passenger ICS volume if necessary).

5.7.6.8 Aircraft Receivers Check

1. Select the audio source for each avionics unit installed in the aircraft and check for audio over the headsets.
2. Touch the Cabin Speaker key and verify that any selected audio is heard over the speaker.

5.7.6.9 Music System Check (if installed)

1. Set the intercom to the ALL mode.
2. Connect a stereo audio source to MUSIC 1 or MUSIC 2. Verify that stereo audio is heard over the Pilot headset position.
3. Tune a station on COM 1 and verify that the sound is muted by active COM 1 audio (break squelch on COM 1 if necessary).
4. Verify that stereo audio is also heard in the passenger headsets.

5.7.7 TAWS System Check (For Units with TAWS Only)

While on the ground, turn on the GTN following normal power-up procedures. Also turn on the audio panel.

NOTE

A 3D GPS position fix is required to conduct this check.

1. Select the Terrain page from the normal mode Home page.
2. Touch the MENU key.
3. Touch the Test TAWS key.
4. Wait until the TAWS self-test completes (10-15 seconds) to hear the TAWS system status aural message.
   - The aural message "TAWS System Test OK" will be annunciated if the TAWS system is functioning properly.
   - The aural message "TAWS System Failure" will be annunciated if the TAWS system is NOT functioning properly. Also, 'TAWS FAIL' will appear in amber on the screen.

If no audio message is heard, then a fault exists within the audio system or associated wiring and the TAWS capability must be considered non-functional. Verify the TAWS audio wiring to the audio panel.

5.7.8 Interface Checks

5.7.8.1 Weather Radar Interface Check

5.7.8.1.1 GWX 68/70 Weather Radar Interface Check

This section verifies that the heading interface between the GTN 7XX and the GWX 68/70 weather radar is functional.

1. Start the GTN in normal mode.
2. On the Home page, touch **Weather** and then **Radar**.
3. Touch the **Mode** key and select Standby mode and wait for the Warm-Up to complete.
4. Touch the **Mode** key again and select Test mode.
5. Verify that the GWX 68 begins sweeping and the test pattern is shown.
6. If supported by the installation, verify that stabilization is on (STAB On is displayed in the upper right corner of the radar display).
7. Using the **Mode** key, set the mode to Off
8. Repeat steps 2 through 7 for the second GTN 7XX (if installed).

5.7.8.1.2 ARINC 708 Weather Radar Interface Check

This section verifies that the interface between the GTN 7XX and ARINC 708 weather radar is functional.

1. Start the GTN in normal mode. If there are dual GTN 7XXs, start both in normal mode.
2. On each GTN 7XX, go to the Home page, touch **Weather** and then **Radar**.
3. On one GTN, touch the **Mode** key and select Standby mode and wait for the warmup to complete.
4. Touch the **Mode** key again and select Test mode.

5. Verify that the radar begins sweeping and the test pattern is shown.

WARNING

Aircraft should be outdoors and personnel should not be in front of the weather radar when it is radiating (i.e., when Weather or Ground mode is selected on the GTN).

6. If stabilization is supplied to the radar, turn the radar to Weather mode and turn stabilization on in the weather menu. Verify that STAB On is displayed in the upper right corner or the radar display. If STAB INOP is displayed, verify that stabilization is being supplied to the weather radar R/T.
7. Using the **Mode** key, set the mode to **Off**.

NOTE

If only one GTN 7XX is installed, the following steps do not have to be carried out.

8. Repeat steps 3 through 7 for the second GTN 7XX.
9. On each GTN 7XX, touch the **Mode** key and select **Standby** and wait for the warm-up to complete.
10. On each GTN 7XX, touch the **Mode** key again and select **Test** mode.
11. On GTN #1, touch the **Zoom Out** key to increase the range of the radar display. Verify that the range on GTN #1 changes and the range on GTN #2 does not change.
12. On GTN #2, touch the **Zoom Out** key to increase the range of the radar display – select a different zoom level than GTN #1. Verify that the range on GTN #2 changes and the range on GTN #1 does not change.
13. On each GTN 7XX, using the **Mode** key, set the mode to **Off**.

5.7.8.2 GSR 56 Iridium® Check

NOTE

When testing the GSR 56, the aircraft must be located outside and have an unobstructed view of the sky.

NOTE

For additional information on using the GSR 56 features refer to the GTN 725/750 Pilot's Guide, P/N 190-01007-03, or the GTN 625/635/650 Pilot's Guide, P/N 190-01004-03.

NOTE

To use the position reporting feature of the GSR 56, a short burst data (SBD) Iridium account is required. To use the phone feature of the GSR 56, an Iridium voice account is required. To use the SMS feature of the GSR 56, an Iridium SMS account is required. To use the weather feature of the GSR 56, an Iridium RUDICS account is required. For more information on how to subscribe to the services offered by the GSR 56, refer to the GSR 56 Installation Manual, P/N 190-00836-00.

If the GSR 56 Iridium transceiver is installed and connected to the GTN, check the operation as follows:

1. Ensure that the GTN is in normal mode.
2. If position reporting is enabled, go to the Iridium page in the Utilities page group and touch Position Reporting. Verify that the Reporting Status is not "Unavailable".
3. If the Iridium phone is enabled, go to the Iridium Phone page in the Iridium page group. Verify that the Phone Status is not "Unavailable".
4. Verify that a phone call can be placed.

NOTE

The following steps should only be completed if CONNEXT Weather is enabled. In order to receive weather updates, the GSR 56 being tested must be registered and the registration access code must be entered into the GSR 56 using the GTN.

5. Go to the Connext page in the Weather page group.
6. Verify that the Connext settings can be found by touching Menu.
7. If the GSR 56 is registered, touch the Menu key and select the "CONNEXT Data Request" option under CONNEXT Settings. Verify that weather is displayed on the map. Refer to the GTN 725/750 Pilot's Guide, P/N 190-01007-03, or the GTN 625/635/650 Pilot's Guide, P/N 190-01004-03, for information on requesting CONNEXT data.

5.7.8.3 Honeywell (Bendix/King) EFS 40/50 Interface Check

If a Honeywell EFS40/50 has been connected to the GTN, the interface should be verified as described in this section.

1. Cycle power to the first GTN and acknowledge the prompts until it gets to the Instrument Panel Self-Test page (see Section 5.7.1)
2. Ensure that GPS1 data is displayed by pressing the 1-2 key on the EFS40/50 control panel.
3. While the GTN is displaying the Instrument Panel Self-Test page, verify that the EFS40/50 is displaying data from the GPS source. Refer to Section 5.5.1.1 for configuration information.
    - Course Deviation: Half-scale left deviation, TO indication, flag pulled
    - Active Waypoint: GARMN
    - Vertical Deviation: Half-scale up deviation (only if installation is setup to display GPS vertical deviation)
4. On the GTN verify that an OBS value is displayed (and not dashed out).
5. Using a VOR test set verify that the CDI deviation on the EFS40/50 is displayed correctly.
6. Cycle power to the second GTN and acknowledge the prompts until it gets to the Instrument Panel Self-Test page.
7. Switch to GPS2 data by pressing the 1-2 key on the EFS40/50 control panel and repeat steps 3 through 5 with the second GTN.

5.7.8.4 Sandel SN 3308 Interface Check

If a Sandel EHSI has been connected to the GTN, the interface should be verified as described in one of the following sections, as appropriate for the installation.

5.7.8.4.1 One GTN/One SN 3308

1. Cycle power to the GTN and acknowledge the prompts until it gets to the Instrument Panel Self-Test page (see Section 5.7.1).
2. Ensure that the SN3308 is receiving valid heading.

NOTE

The Vertical Deviation Indication will not be displayed unless the SN3308 is receiving valid heading.

3. While the GTN is displaying the Instrument Panel Self-Test page, verify that the SN3308 is displaying the following data from the GPS source.
    - Course Deviation: Half-scale left deviation, TO indication, flag pulled
    - Vertical Deviation: Half-scale up deviation, flag pulled
    - Active Waypoint: GARMN
4. On the GTN verify that an OBS value is displayed (and not dashed out).
5. Acknowledge the self-test on the GTN by touching the ‘Continue’ key.
6. Select VLOC on the GTN and verify that the SN3308 displays NAV 1 or NAV 2 (depending on the GTN navigation source configuration).
7. Using a VOR test set verify that the CDI deviation on the SN3308 is displayed correctly.

5.7.8.4.2 Two GTNs/One SN3308

1. Remove power from GTN #2.
2. Cycle power to GTN #1 and acknowledge the prompts until it gets to the Instrument Panel Self-Test page (see Section 5.7.1).
3. Select GPS1 as the navigation source by pressing the NAV key on the SN3308. Verify that GPS1 is displayed on the SN3308.
4. Ensure that the SN3308 is receiving valid heading.

NOTE

The Vertical Deviation Indication will not be displayed unless the SN3308 is receiving valid heading.

5. While GTN #1 is displaying the Instrument Panel Self-Test page, verify that the SN3308 is displaying the following data from GPS1.
   - Course Deviation: Half-scale left deviation, TO indication, flag pulled
   - Vertical Deviation: Half-scale up deviation, flag pulled
   - Active Waypoint: GARMN
6. On GTN #1 verify that an OBS value is displayed (and not dashed out).
7. Acknowledge the self test on GTN #1 by touching the 'Continue' key.
8. Select VLOC on GTN #1 and verify that the SN3308 displays NAV 1 or NAV 2 (depending on which navigation source the GTN is).
9. Using a VOR test set verify that the CDI deviation on the SN3308 is displayed correctly.
10. Remove power from GTN #1 and apply power to GTN #2. Acknowledge the prompts until the Instrument Panel Self-Test page is displayed. See Section 5.7.1. Select GPS2 by pressing the NAV key on the SN3308.
11. Repeat steps 4-9 with the second GTN.

5.7.8.4.3 Two GTNs/Two SN3308s

1. Remove power from GTN #2.
2. Cycle power to GTN #1 and acknowledge the prompts until it gets to the Instrument Panel Self-Test page (see Section 5.7.1). Select GPS1 as the navigation source by pressing the NAV key on the SN3308. Verify that GPS1 is displayed on the SN3308.
3. Ensure that the SN3308 is receiving valid heading.

NOTE

The Vertical Deviation Indication will not be displayed unless the SN3308 is receiving valid heading.

4. While GTN #1 is displaying the Instrument Panel Self-Test page, verify that the SN3308 is displaying the following data from GPS1.
   - Course Deviation: Half-scale left deviation, TO indication, flag pulled

- Vertical Deviation: Half-scale up deviation, flag pulled
- Active Waypoint: GARMN

5. On GTN #1 verify that an OBS value is displayed (and not dashed out).
6. Acknowledge the self test on GTN #1 by touching the ‘Continue’ key.
7. Select VLOC on GTN #1 and verify that the SN3308 displays NAV 1 or NAV 2 (depending on which navigation source the GTN is).
8. Using a VOR test set verify that the CDI deviation on the SN3308 is displayed correctly.
9. Remove power from GTN #1 and apply power to GTN #2. Acknowledge the prompts until the Instrument Panel Self-Test page is displayed (see Section 5.7.1).
10. Select GPS2 by pressing the NAV key on the SN3308.
11. Repeat steps 4-9 with the second GTN.
12. Perform the same procedure for the second SN3308. Ensure that SN3308 #2 is receiving valid heading by ensuring the vertical deviation indication is being displayed.
13. Repeat steps 5-12 for SN3308 #2.

5.7.8.5 Sandel SN3500/4500 Interface Check

If a Sandel SN3500/4500 EHSI has been connected to the GTN, the interface should be verified as described in this section.

1. Cycle power to the GTN and acknowledge the prompts until it gets to the Instrument Panel Self-Test page (see Section 5.7.1).
2. Ensure that the SN3500/4500 is receiving valid heading.

NOTE

The Vertical Deviation Indication will not be displayed unless the SN 3500/4500 is receiving valid heading.

3. While the GTN is displaying the Instrument Panel Self-Test page, verify that the SN3500/4500 is displaying data from the GPS source.
   - Course Deviation: Half-scale left deviation, TO indication, flag pulled
   - Vertical Deviation: Half-scale up deviation, flag pulled
   - Active Waypoint: GARMN
4. On the GTN verify that an OBS value is displayed (and not dashed out).
5. Acknowledge the self test on the GTN by touching the ‘Continue’ key.
6. Select VLOC on the GTN and verify that the SN3500/4500 displays NAV 1 or NAV 2 (depending on what navigation source the GTN is).
7. Ensure that the NAV1 (or NAV2) indication does not have a red line through it.
8. Repeat steps 3-7 for the second GTN, if installed.

5.7.8.6 Ryan TCAD Traffic System Interface Check

If a Ryan TCAD has been connected to the GTN 6XX/7XX unit, the traffic interface should be verified as described in this section.

1. Go the Traffic page on the GTN (on the HOME page group).
2. Verify that NO DATA is not displayed in yellow on the center of the traffic page.
3. Using the SHIELD SETUP under the Traffic Menu, verify that the shield mode can be changed.

5.7.8.7 EHSI Deviation Scaling for HSI/CDI Driven by GTN via ARINC 429 Data

If the GTN has a serial connection to an EFIS display, proper scaling of the EFIS CDI and VDI must be verified.

1. Cycle power to the GTN and acknowledge the prompts until it gets to the Instrument Panel Self-Test page (see Section 5.7.1).
2. With the Instrument Panel Self-Test page displayed on the GTN, look on the EHSI/EFIS and verify that the lateral deviation is half-scale left and not flagged.
3. With the Instrument Panel Self-Test page displayed on the GTN, look on the EHSI/EFIS and verify that the vertical deviation is half-scale up and not flagged.

NOTE

If the deviations are not as described, the EHSI/EFIS does not scale the GTN deviations properly and this installation cannot be certified for GPS-based guidance. Contact Garmin for further assistance

5.7.8.8 ARINC 429 Traffic System Interface Check

If a Garmin GTS 8XX Traffic system, L-3 Communications SKY497/SKY899 Skywatch sensor or a Honeywell (Bendix/King) KTA 810 TAS/KMH 820 IHAS has been connected to the GTN via ARINC 429, the traffic interface should be verified as described in this section.

1. Go to the Traffic page on the GTN from the home page.
2. Verify that NO DATA is not displayed in yellow on the center of the traffic page.
3. If the GTN is configured to control the traffic system (Section 5.5.1.8), verify that the traffic system mode can be changed from STBY to OPER.
4. Switch the traffic system mode to STBY, and then run the traffic self test from the Menu.
5. Verify that the traffic system executes a self test and that a self-test pattern is displayed on the GTN traffic display.
6. Restart the GTN in Configuration Mode.
7. On the Traffic page in the External Systems page group, verify that there is data displayed in the Altitude field.

5.7.8.9 Stormscope Interface Check

If an L-3 Communications WX-500 Stormscope has been connected to the GTN, the Stormscope interface should be verified as described in this section.

1. Go to the Lightning page on the GTN.
2. Verify that ‘STORMSCOPE FAILED’ is not displayed in yellow on the center of the Lightning page.
3. Verify that the Stormscope mode can be changed from **Strike** to **Cell**, and vice versa.

5.7.8.10 GMX 200/MX20 Interface Check

If a Garmin GMX 200 or MX20 has been connected to the GTN, the interface should be verified as described in this section.

1. Ensure that the GTN has a 3-D position fix.
2. Create and activate a flight plan on the GTN by touching the Direct-To key and entering a waypoint.
3. Verify that the RTE and POS data flags are not displayed on the GMX 200/MX20.
4. Verify that the flight plan is displayed on the GMX 200/MX20 using the flight plan (FPL) function.

5.7.8.11 GDL 69/69A Interface Check

If a Garmin GDL 69 has been connected to the GTN, the interface should be verified as described in Section 5.7.8.11.1. If a Garmin GDL 69A has been connected to the GTN, the interface should be verified as described Sections 5.7.8.11.1 and 5.7.8.11.2. Each of these procedures involves verifying that the satellite signal is acquired and tracked. Locate the aircraft where there is a clear view of the southeastern or southwestern sky. XM Satellite Radio satellites are located above the equator over the eastern and western coasts of the continental United States.

NOTE

The following sections only verify the correct interface of GDL 69/69A to the GTN. It does not activate the GDL 69 Sirius XM data link radio. Complete instructions for activating the Sirius XM data link radio can be found in the GDL 69/69A XM Satellite Radio Activation Instructions, P/N 190-00355-04.

5.7.8.11.1 SiriusXM® Satellite Radio Weather Checkout Procedure

1. With the GTN running in the normal mode, go to the External LRUs page (in the System page group) then touch the More Info key next to ‘GDL69’.
2. Verify that the Data Radio ID field has a valid ID. For a GDL 69A, the Audio Radio ID field should also display a valid ID.
3. Verify that at least one subscribed weather product turns green on the GDL 69 status page. This may take several minutes. This will indicate that the weather products are being received.
4. During SiriusXM activation, “Detecting Activation” will be displayed in the Subscription Level field on the SiriusXM Information page, and ‘Aviator’ or ‘Aviator Pro’ will be displayed once the SiriusXM signal is detected.

5.7.8.11.2 SiriusXM® Satellite Radio Audio Checkout Procedure

The following steps only need to be completed for GDL 69A installations.

1. Go to the Music page from the Home page.

NOTE

If the SiriusXM Satellite Radio audio subscription has not been activated, audio is available only on Channel 1. If the audio subscription has been activated, audio should be available on multiple channels.

2. Ensure the GDL 69A audio is not muted.
3. Verify that audio can be heard over the headsets. Adjust the volume to verify that the data path is working correctly and to ensure the volume is at an appropriate level.

5.7.8.12 External RMI/OBI Interface Check (GTN 650/750 Only)

The GTN VOR RMI/OBI output can be used to drive an RMI (or OBI) navigation indicator. This check verifies that the RMI/OBI is receiving data from the GTN. If the following steps do not perform correctly, check the electrical connections and configuration setup.

NOTE

The aircraft heading system must be operating properly in order for the RMI needle to point correctly.

5.7.8.12.1 VOR OBI Output

If the VOR OBI output from the GTN 650/750 is connected to an RMI navigation indicator verify the interface as described in this section.

1. Apply power to the equipment.
2. If installed, set the RMI select switch to the VLOC position.
3. Tune a local VOR station, or use a simulated signal from an approved VOR Test System.
4. Verify that the RMI needle swings and points toward the VOR station.

5.7.8.13 DME Tuning Check (GTN 650/750 Only)

If the GTN is set up to remotely channel a DME, verify the interface as described in this section.

1. Select a VOR/ILS channel that corresponds to (1) a DME station within a 40 nautical mile range, or (2) the frequency of a DME ground tester.
2. Verify that the DME locks on to the signal and a valid distance is displayed.
3. Tune an invalid VOR station. Verify that the DME data is flagged.
4. If two GTNs are set up to remotely channel a DME, repeat steps 1-3 using the other GTN.

5.7.8.14 TIS (Garmin GTX 33/330) Interface Test

If a Garmin GTX 33/330 sensor has been connected to the GTN, the traffic interface should be verified as described in this section.

1. Select the Traffic Map on the GTN.
2. Verify that TIS FAIL is not displayed in the upper left corner under Traffic Status, and that NO DATA (yellow) is not displayed over the ownship symbol.
3. On the upper left corner of the Traffic Map page, verify that the status of the traffic system is either TIS Standby or TIS Operating/Unavailable (i.e. TAS should not be displayed).

The following additional steps should only be completed if the GTN is controlling the traffic system.

4. Pull the transponder circuit breaker and verify the air data fields are red ‘X’d.
5. If a squat switch (or airspeed switch) is connected to the GTX 33/330, ensure that it is in AIR mode.
6. Alternately touch the STANDBY key and OPERATE key to change the mode of the traffic system. It may take several seconds for the traffic system to change modes.
7. Verify that the mode of the traffic system can be changed.

5.7.8.15 Transponder Interface Check

If the GTN is interfaced to a GTX 32/33 remote transponder or a GTX 327/328/330 configured as a remote transponder, the following checks must be completed.

1. With the GTN unit running in normal mode and the transponder powered on, go to the Home page and ensure there is no red ‘X’ over the transponder data field on the top right of the screen.
2. Ensure that a code can be entered into the code field. Enter a code using the keypad and then touch Enter. Ensure the code that was entered is displayed in the transponder data field.
3. If dual transponders are installed, select transponder 2 and perform steps 1 and 2 for the second transponder as well. Also pull the transponder 1 circuit breaker and ensure the transponder 1 data field is red ‘X’d rather than the transponder 2 data field to verify that the wiring is not crossed. (i.e. transponder 1 is incorrectly connected to transponder 2 circuit breaker.)
4. Repeat the preceding steps for the second GTN.

5.7.8.16 Fan Interface Check

The fan that is mounted to the GTN backplate must be checked. With the GTN unit running in normal mode and the fan powered on and running, go to the Home page and touch the **Message Queue** key. Ensure that the ‘COOLING FAN- the cooling fan has failed.’ message is **not** displayed. Note that the fan may take a few minutes to power on if the unit is below normal operating temperature.

5.7.9 GDL 88 Interface Check

When testing the GDL 88, the aircraft must be located outside and have an unobstructed view of the sky. If the GDL 88 is installed and connected to the GTN, check the operation as follows:

1. Start all GTNs in Configuration Mode. See Section 5.5.
2. Go to the GDL 88 page in the External Systems page group.
3. Touch Diagnostics and then GPS/SBAS Data.
4. Verify that the GDL 88 is receiving valid position source data.
5. Verify that the status of the External PPS connection(s) is valid.

If a TAWS system is installed in addition to the GDL 88, check the operation as follows:

6. Go to the GDL 88 Discrete Input page under GDL 88 Diagnostics.
7. Verify the Audio Inhibit #1* discrete input indicates Active when the TAWS system is playing audio, and Inactive otherwise. See Section 5.6.7.

5.7.10 Magnetic Compass Check

A compass swing should be carried out at completion of installation in accordance with AC 43.13-1B, Chapter 12, Section 3, paragraph 12-37.

5.7.11 EMI/RFI Check

After installing the GTN and verifying that all interfaces to external equipment are working correctly, a brief EMI/RFI check must be conducted. This check will verify that the GTN does not produce unacceptable interference in other avionics systems, and other avionics systems do not produce unacceptable interference in the GTN.

1. Start the aircraft engines and switch to aircraft power.
2. Turn on all avionics except the GTN.
3. With the GTN switched off, verify that all existing avionics systems are functioning properly.
4. Turn the GTN on and verify that all existing avionics systems continue to function properly.
5. Keep the GTN switched on and remove power from all other avionics systems.

NOTE

Removing power from systems interfaced to the GTN will cause the associated system flags on the GTN to be displayed. This is normal behavior and does not constitute a test failure.

6. Turn the display brightness level up to 100%.
7. Apply power to the other avionics systems one at a time and verify that the system functions properly without any unacceptable interference caused by the GTN.
8. Wait for the system to begin functioning normally before applying power to the next system.
9. Once all of the systems are powered up, transmit on the COM over several different frequencies.
10. While transmitting, verify that the other aircraft systems function normally. If there is interference, see Section 2.4.4.5 for ways to improve the situation.

5.8 Flight Checks

All GTN functions that cannot be adequately tested on the ground will require a flight check. Even if all functions can be verified on the ground, a flight check is required as final installation verification. Verify system operation as described in the following sections.

The analog deviation (LEFT/RIGHT and UP/DOWN), TO/FROM, and FLAG (lateral and vertical) outputs to a CDI or HSI should be verified in flight with potential sources of electrical noise such as autopilot, flaps, gear, heater blowers, etc. operating. Lateral deviation and flags may be checked with either GPS or VOR/ILS, and vertical deviation and flags must be checked with glideslope. Verify that the flags are hidden at the correct times, and that the flag is in view at the correct times. Also verify during flight that any placards and labels added as part of the GTN installation are readable in all anticipated cockpit lighting conditions.

5.8.1 GPS Flight Check

1. Verify that GPS position is not lost during normal aircraft maneuvering (e.g. bank angles up to 30 degrees and pitch angles associated with take-off, departures, approaches, landings, and missed approaches as applicable). If GPS position is lost, a "Loss of GPS Navigation" message will be displayed.
2. Enter and activate a flight plan on the GTN by touching the Direct-To key and entering a waypoint. Fly the flight plan and verify that the display of flight plan data is consistent with the CDI indication (deviation, TO/FROM…) in the pilot's primary field of view.

5.8.2 VHF COM Flight Check (GTN 635/650/750)

After the installation is complete, a flight check is required to ensure satisfactory performance. To check the communications transceiver, maintain an appropriate altitude and contact a ground station facility at a range of at least 50 nautical miles. Contact a ground station in close proximity. Press the COM volume knob to select manual squelch and listen for any unusual electrical noise, which would increase the squelch threshold. If possible, verify the communications capability on both the high, low, and mid bands of the VHF COM band. It may be required by the governing regulatory agency to verify operation of the COM transmitter and receiver at the extents of a ground facility's service volume (e.g., FAA AC 23-8A).

5.8.3 VOR Flight Check (GTN 650/750)

1. Tune a local VOR station within 50 miles.
2. Verify the audio IDENT and voice quality and verify that no objectionable electrical interference such as magneto noise is present.
3. Verify the Morse code decoder IDs the station (95% probability).
4. Fly to and from the station.
5. Verify NAV flag, TO/FROM flag, and CDI are operational.

It may be required by the governing regulatory agency to verify operation of the VOR receiver at the extents of a ground facility's service volume (e.g., FAA AC 23-8A).

5.8.4 ILS Flight Check (GTN 650/750)

1. Tune an ILS at a local airport.
2. Verify the audio IDENT and audio quality and verify that no objectionable electrical interference such as magneto noise is present.
3. Verify the Morse code decoder IDs the station (95% probability).
4. Fly the approach.
5. Verify NAV flag, GS flag, and CDI and VDI are operational.

5.8.5 Autopilot Flight Check

1. Enter and activate a flight plan on the GTN. For the GTN 650/750, ensure that GPS is selected on the CDI. Engage the autopilot in the GPSS mode, if available. Verify that the autopilot flies the course.
2. Disengage the autopilot and fly off course. Re-engage the autopilot (in GPSS mode) and verify that it correctly intercepts the course and continues to fly it.
3. Turn off the autopilot GPSS but leave the autopilot engaged in NAV mode. Verify that it maintains the current course.
4. (GTN 650/750 Only): Reselect the GPSS mode on the autopilot. Touch the CDI key to select VLOC on the GTN 650/750. Verify that the GPSS mode disengages.
5. For autopilots that provide vertical guidance, fly a vertically coupled LPV approach. Ensure the autopilot correctly flies the approach.
6. Deviate from the glideslope by using control wheel steering, or by disengaging the autopilot. Ensure the autopilot correctly follows the approach guidance once re-engaged.

5.8.6 TAWS Audio Flight Check (TAWS-equipped Units Only)

NOTE

The TAWS volume should be loud enough to ensure that aural alerts are audible under all anticipated noise environmental conditions. This check verifies that TAWS aurals can be heard during flight.

1. Take-off and ascend to altitude. During the ascent, in a high ambient noise condition with full power, eject the SD card from the slot. A TAWS fail audio message should be generated.
2. Evaluate the volume of the audio message. Ensure the TAWS audio can be heard clearly and intelligibly during high power, high noise flight. If the volume is too low, adjust as described in Section 5.6.7.
3. After re-inserting the SD card into the slot, reboot the GTN by pulling the GTN circuit breaker and pushing it back in.
4. After this test, during the approach, at approximately 500 ft AGL, the “Five Hundred” callout will occur. Verify that “Five Hundred” can be easily heard and understood.

5.8.7 Marker Beacon Receiver Flight Check (GMA 35)

1. Set up for an approach to the airport, with the marker beacon set to low sensitivity.
2. During the approach, verify that the marker beacon annunciator light is illuminated for a ground distance of 2000 to 3000 feet when flying at an altitude of 1000 ft AGL on the localizer centerline in all flap and gear configurations.

An acceptable means to determine ground distances of 2000 to 3000 feet is to fly at a specified groundspeed and time the duration that the marker beacon light is illuminated. The values listed in Table 5-65 can be used.

Table 5-65. Marker Beacon Annunciator Light Duration

Groundspeed (Knots)	Light Time (seconds)	
	2000 ft	3000 ft
90	13	20
110	11	16
130	9	14
150	8	12

If the marker beacon annunciator lights do not remain illuminated for the required time, adjust the marker beacon low sensitivity threshold as described in Section 5.5.4.8.2.5, and then repeat steps 1 and 2.

5.9 Database Check

Check the navigation database to ensure it is current. The database information is displayed during the unit display start-up sequence. To check the database:

1. Cycle power on the GTN. The GTN will go through its normal start-up sequence.
2. Wait for the Database Verification page to be displayed.
3. Verify that the expiration dates displayed have not passed for each database.
4. The database expiration date can also be viewed in the System Status page which is accessed from the System page in normal mode. If the database has expired, then remove and replace the navigation database card and see Section 1.8.

5.10 Documentation Checks

5.10.1 Airplane Flight Manual Supplement

Ensure that the Airplane Flight Manual Supplement (AFMS) is completed and inserted in the Airplane Flight Manual (AFM) or Pilot's Operating Handbook (POH). See Section 3.8 for information about completing the AFMS.

1. Fill in the required airplane information in the AFMS.
2. Fill in the appropriate checkbox in the Limitations Section of the AFMS corresponding to the autopilot coupling limitations.

NOTE

The GPS SELECT setting will determine if the transition into approach mode is automatic or requires pilot acknowledgement of a message prompt. See Section 5.5.1.9 for more information about this configuration setting.

3. Fill in the appropriate checkbox in the Normal Procedures Section of the AFMS corresponding to the autopilot mode transitions.
4. Fill in the appropriate checkboxes in the System Descriptions Section of the AFMS corresponding to leg sequencing and Terrain Proximity/TAWS.
5. Fill in the appropriate checkboxes in the System Capability Section of the AFMS corresponding to the capabilities of the installed GTN system.
6. Insert the completed AFMS into the AFM or POH.

5.10.2 Instructions for Continued Airworthiness (ICA)

1. Ensure that the appropriate aircraft information is filled in on the Instructions for Continued Airworthiness (ICA) in the System Maintenance Manual, GTN 6XX/7XX Part 23 AML STC (P/N 190-01007-A1) and ensure it is completed and inserted in the aircraft permanent records.
2. Fill in the aircraft make, model, registration number, and serial number information on the cover of the System Maintenance Manual, GTN 6XX/7XX Part 23 AML STC.
3. Fill in the appropriate wire routing and installed unit information in Appendix A of the GTN 6XX/7XX System Maintenance Manual.
4. Insert the completed System Maintenance Manual, GTN 6XX/7XX Part 23 AML STC and ICA in the aircraft permanent records.

5.10.3 Checkout Log

The following completed checkout log sheet should be maintained with the aircraft permanent records.

NOTE

If a dual GTN installation is being performed, a checkout log for each unit must be completed.

Table 5-66. GTN Post-Installation Checkout Log
Sheet 1 of 4

GTN Post-Installation Checkout Log

Date: ____ /____ /____

By: ________________

INSTALLATION INFORMATION:

Aircraft Model:	____________	Aircraft Serial #:	____________
Unit P/N:	____________	Mod Level:	____________
Unit Model:	____________	Serial #:	____________
GPS Antenna P/N:	____________	GPS Ant Model:	____________

CONNECTOR ENGAGEMENT *(See Section 5.3)*

CONNECTOR ENGAGEMENT CHECK

❑ Connector engagement checked

EXTERNAL BONDING REQUIREMENT *(See Section 2.4.5)*

❑ ***Metal/Tube and Fabric:*** Resistance less than or equal to 2.5 milliohms.
❑ ***Composite:*** Resistance less than or equal to 5.0 milliohms.

NOTES/COMMENTS:

Table 5-66. GTN Post-Installation Checkout Log
Sheet 2 of 4

SYSTEM CHECKOUT

Ground Checks (Configuration Mode)

DISCRETE OUTPUTS

❑ [❑ N/A] OBS Annunciate
❑ [❑ N/A] GPS Annunciate
❑ [❑ N/A] Waypoint Annunciate
❑ [❑ N/A] Terminal Annunciate
❑ [❑ N/A] TAWS Audio Active Annunciate
❑ [❑ N/A] VLOC Annunciate
❑ [❑ N/A] LOI Annunciate
❑ [❑ N/A] Message Annunciate
❑ [❑ N/A] Approach Annunciate
❑ [❑ N/A] ILS/GPS Approach Annunciate
❑ [❑ N/A] TAWS/Terrain Inhibit Annunciate
❑ [❑ N/A] TAWS Warning Annunciate
❑ [❑ N/A] Terrain Not Available Annunciate
❑ [❑ N/A] TAWS Caution Annunciate
❑ [❑ N/A] GPS Select Annunciate
❑ [❑ N/A] Traffic Test Annunciate
❑ [❑ N/A] Traffic Standby/Operate Annunciate
❑ [❑ N/A] Suspend Annunciate
❑ [❑ N/A] GSR Remote Power
❑ [❑ N/A] Radar On
❑ [❑ N/A] NAV ILS Energize

MAIN ANALOG INDICATOR: [❑ N/A]

❑CDI (left, centered, right)
❑VDI (down, centered, up)
❑TO/FROM flag (OFF, TO, FROM)
❑Valid flags
❑OBS (Selected Course)

LIGHTING BUS:

❑ [❑ N/A] Aircraft Lighting Bus

HSDB WIRING: [❑ N/A]

❑ HSDB checked in accordance with Section 5.6.5

GTN CROSSFILL: [❑ N/A]

❑ Crossfill checked in accordance with Section 5.6.6

DISCRETE INPUTS

❑ [❑ N/A] OBS Mode Select
❑ [❑ N/A] TAWS Audio Inhibit
❑ [❑ N/A] TAWS Inhibit
❑ [❑ N/A] Air/Ground
❑ [❑ N/A] CDI Source Select
❑ [❑ N/A] System ID Program
❑ [❑ N/A] MIC1 Transmit
❑ [❑ N/A] COM Remote Transfer
❑ [❑ N/A] COM Remote Tune Up
❑ [❑ N/A] COM Remote Tune Down
❑ [❑ N/A] NAV Remote Transfer
❑ [❑ N/A] Synchro Valid-High (GTN 7XX)
❑ [❑ N/A] Synchro Valid-Low (GTN 7XX)
❑ [❑ N/A] GSR Status

VOR/ILS INDICATOR: [❑ N/A]

❑CDI (left, centered, right)
❑VDI (down, centered, up)
❑TO/FROM flag (OFF, TO, FROM)
❑Valid flags

AHRS/IRU/ADC:

❑ [❑ N/A] Air Data Computer
❑ [❑ N/A] AHRS/IRU

TAWS AUDIO: [❑ N/A]

❑ Audio checked
❑ Audio level adjusted

GAD 42:

❑ [❑ N/A] GAD 42 Interface Adapter

ADC / ENCODER / FUEL / F/ADC:

❑ [❑ N/A] Air Data Computer
❑ [❑ N/A] Altitude Encoder (serial)
❑ [❑ N/A] Fuel Sensor
❑ [❑ N/A] Fuel / Air Data Computer

Table 5-66. GTN Post-Installation Checkout Log
Sheet 3 of 4

SYSTEM CHECKOUT (Continued)

GROUND CHECKS (NORMAL MODE)

SIGNAL ACQUISITION CHECK:

❑ Position checked
❑ Signal reception checked
❑ Interference from other avionics checked

VHF COM INTERFERENCE [❑ N/A]

❑ VHF COM interference checked

VHF NAV CHECKOUT (GTN 650/750) [❑ N/A]

❑ VOR reception checked
❑ Localizer reception checked
❑ Deviation needle and flag checked

GMA 35 CHECKOUT (GTN 7XX ONLY) [❑ N/A]

❑ COM Transceiver check
❑ Alert audio check
❑ Intercom system check
❑ Music system check
❑ Failsafe operation check
❑ NAV audio check
❑ Receiver audio check
❑ Aircraft receivers check

ICA CHECKS

❑ Aircraft Make, Model, Reg # & Serial # filled in
❑ Completed ICA in aircraft permanent records
❑ Wire routing information filled in

INTERFACE CHECKS

❑ [❑ N/A] Honeywell EFS 40/50
❑ [❑ N/A] Sandel SN3308
❑ [❑ N/A] Sandel SN3500/4500

❑ [❑ N/A] Ryan TCAD
❑ [❑ N/A] EHSI Deviation Scaling
❑ [❑ N/A] ARINC 429 Traffic System
❑ [❑ N/A] L-3 Communications Stormscope
❑ [❑ N/A] Garmin GMX 200 / MX20

❑ [❑ N/A] Garmin GDL 69/69A
❑ [❑ N/A] External RMI/OBI
❑ [❑ N/A] DME Tuning
❑ [❑ N/A] TIS (GTX 33/330)
❑ [❑ N/A] Transponder
❑ [❑ N/A] Fan wiring
❑ [❑ N/A] Weather Radar
❑ [❑ N/A] Garmin GSR 56
❑ [❑ N/A] Garmin GDL 88

TVS ASSEMBLY CHECKS [❑ N/A]

❑ TVSs checked in accordance with Section 3.6.5.

DATABASE CHECKS

❑ Databases checked

AFMS CHECKS

❑ [❑ N/A] Autopilot Mode transitions checked

❑ Completed AFMS inserted in AFM/POH
❑ [❑ N/A] Autopilot coupling limitations checked
❑ Leg Sequencing checked
❑ Terrain Proximity/TAWS checked

VHF COM CHECKOUT (GTN 635/650/750) [❑ N/A]

❑ Receiver / Transmitter operation checked
❑ Antenna checked VSWR __________

MAGNETIC COMPASS CHECK

❑ Compass swing performed

TAWS SYSTEM: [❑ N/A]

❑ TAWS System Test OK

SOFTWARE CHECKS

❑ Software versions verified to match GTN STC Equipment List, 005-00533-C1

FLIGHT CHECKS

❑ GPS checked
❑ [❑ N/A] COM checked (GTN 635/650/750 Only)
❑ [❑ N/A] VOR checked (GTN 650/750 Only)
❑ [❑ N/A] ILS checked (GTN 650/750 Only)

❑ [❑ N/A] Autopilot checked
❑ [❑ N/A] TAWS audio level checked
❑ [❑ N/A] Marker beacon receiver checked

Table 5-66. GTN Post-Installation Checkout Log
Sheet 4 of 4

COMMENTS:

6 TROUBLESHOOTING

Refer to System Maintenance Manual, GTN 6XX/7XX Part 23 AML STC, P/N 190-01007-A1, for troubleshooting information.

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7 LIMITATIONS

Limitations for specific aircraft models can be found in Appendix H.

7.1 Operational Limitations

7.1.1 Operations

There are no Part 23 aircraft type limitations. All functions of the GTN unit meet the appropriate primary or secondary design assurance qualifications for airplane Class I, Class II, Class III, and Class IV in accordance with AC 23.1309-1E Figure 2. The TSO authorizations with the RTCA/DO-178B software levels by function are listed in GTN 725/750 TSO Installation Manual, P/N 190-01007-02, and GTN 625/635/650 TSO Installation Manual, P/N 190-01004-02, as well as the GMA 35 Installation Manual, P/N 190-00858-11.

Data for some aircraft models listed on the AML is currently insufficient to substantiate IFR operations with the GTN. Consequently, these aircraft models are limited to VFR operation only and must be placarded in accordance with Section 2.4.1.1. Refer to Table G-1 in Appendix G to determine if a particular aircraft model is limited to VFR when modified with the installation of the GTN.

7.1.2 Previous Operational Approvals

The installation of a GTN unit or GMA 35 Audio Panel into an aircraft does not alter the operational approvals previously granted to that aircraft. Additional operational approvals may require FAA evaluation of all the systems installed in a particular aircraft and is outside the scope of the GTN AML STC.

7.2 Installation Limitations

7.2.1 Equipment Interfaced to the GTN/GMA 35 Unit

GTN 6XX/7XX or GMA 35 interfaces to aircraft systems other than those identified in this installation manual are outside the scope of this manual and may require further evaluation for certification and/or other FAA airworthiness approval.

7.2.2 Preservation of Previous Systems

It is the installer’s responsibility using data provided in this manual and data identified in the GTN AML STC to preserve the essential characteristics of the aircraft in accordance with the aircraft manufacturer’s original design and the requirements of 14 CFR part 23. This includes the preservation of multiple power buses, which reduce the probability of interrupting power to essential instruments and avionics. For aircraft certified under 14 CFR part 23, post amendment 41, use of the GTN unit for IFR operations requires a functional redundant electrical power system for the primary navigation unit.

7.2.3 Traffic Sensor Interfaced to the GTN

The GTN is certified to interface to no more than one traffic sensor in an aircraft. The unit supports multiple types (GDL 88, TCAD, TAS, TCAS I, TIS) of traffic systems, but only one system may be configured for use. Use of the GDL 88 to correlate traffic from another traffic sensor is acceptable and does not violate this limitation. For installations with dual GTNs installed, this STC does not approve interfacing a different traffic sensor to each GTN.

7.2.4 Major Alterations

The installation of the GTN and GMA 35 is a major alteration to the aircraft type design. Following a major alteration, the aircraft must be returned to service in a means acceptable to the cognizant aviation authority. An example would be an FAA Form 337 "Major Repair and Alteration Airframe, Powerplant, Propeller, or Appliance" properly executed to describe the major alteration including the equipment and systems to which the GTN and GMA 35 is interfaced, and submitted to the appropriate FAA office.

7.2.5 Rotorcraft Installation

The installation and operational approval for use of a GTN and GMA 35 in rotorcraft is not authorized by the GTN AML STC SA02019SE-D; however, instructions and data provided in this manual may be applicable to the alteration. Installation of GTN and GMA 35 equipment in rotorcraft requires separate approval from the cognizant aviation authority.

The GTN unit TAWS functionality is not approved for use in rotorcraft.

7.2.6 Aircraft Radio Station License

An aircraft radio station license is not required when operating the GTN in U.S. airspace, but may be required when operating internationally.

7.2.7 GPS/WAAS Antenna Limitations

The GTN GPS/SBAS receivers are limited to using one of the GPS/WAAS antennas listed in Table 1-10. For multiple GPS installations in non-metallic aircraft, the GPS antennas must not be mounted in a straight line from the front to the rear of the fuselage, to prevent a single lightning strike causing damage to all GPS systems.

8 PERIODIC MAINTENANCE

For periodic maintenance refer to the GTN STC Maintenance Manual, P/N 190-01007-A1.

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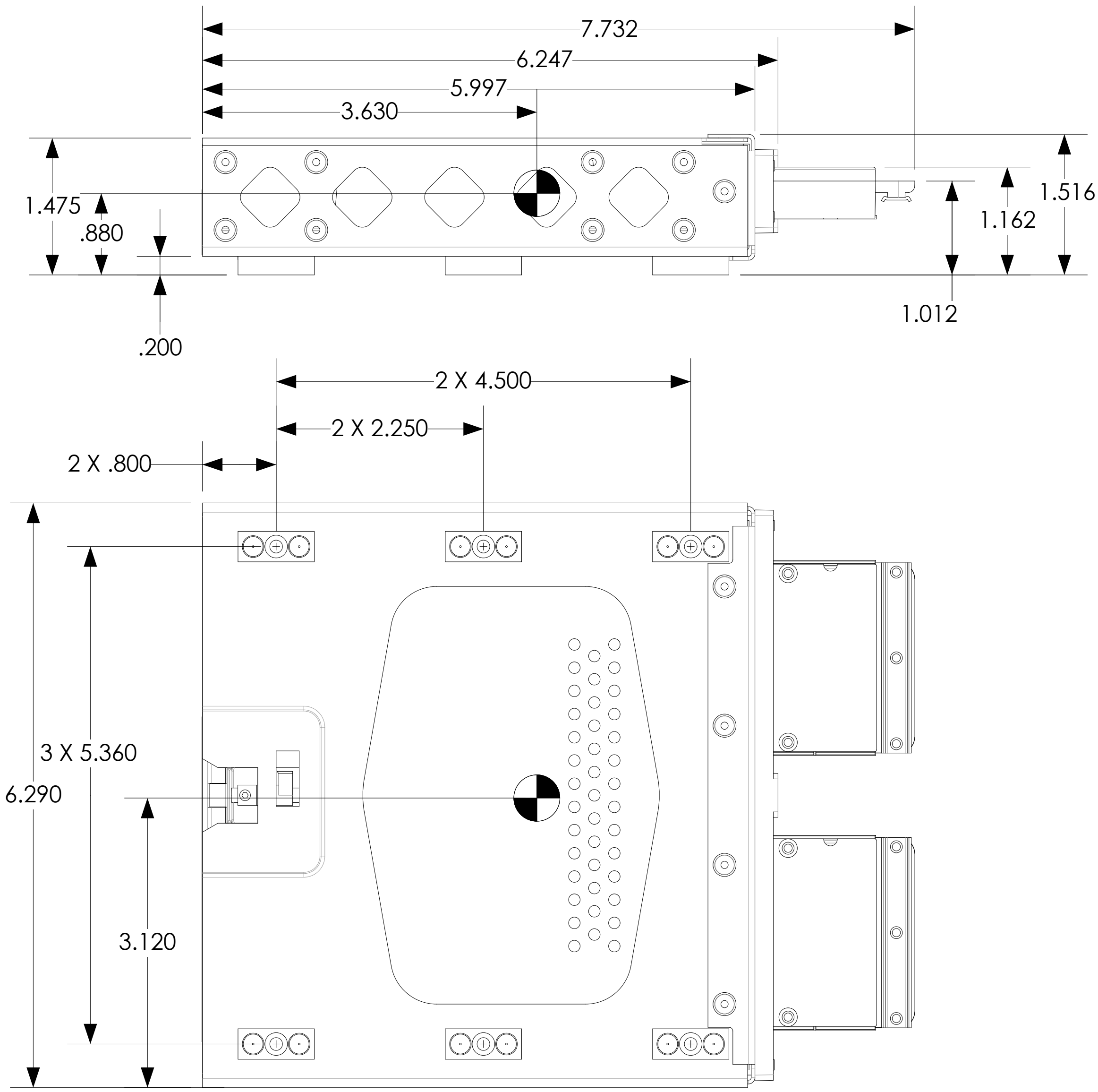
Appendix A Outline and Installation Drawings

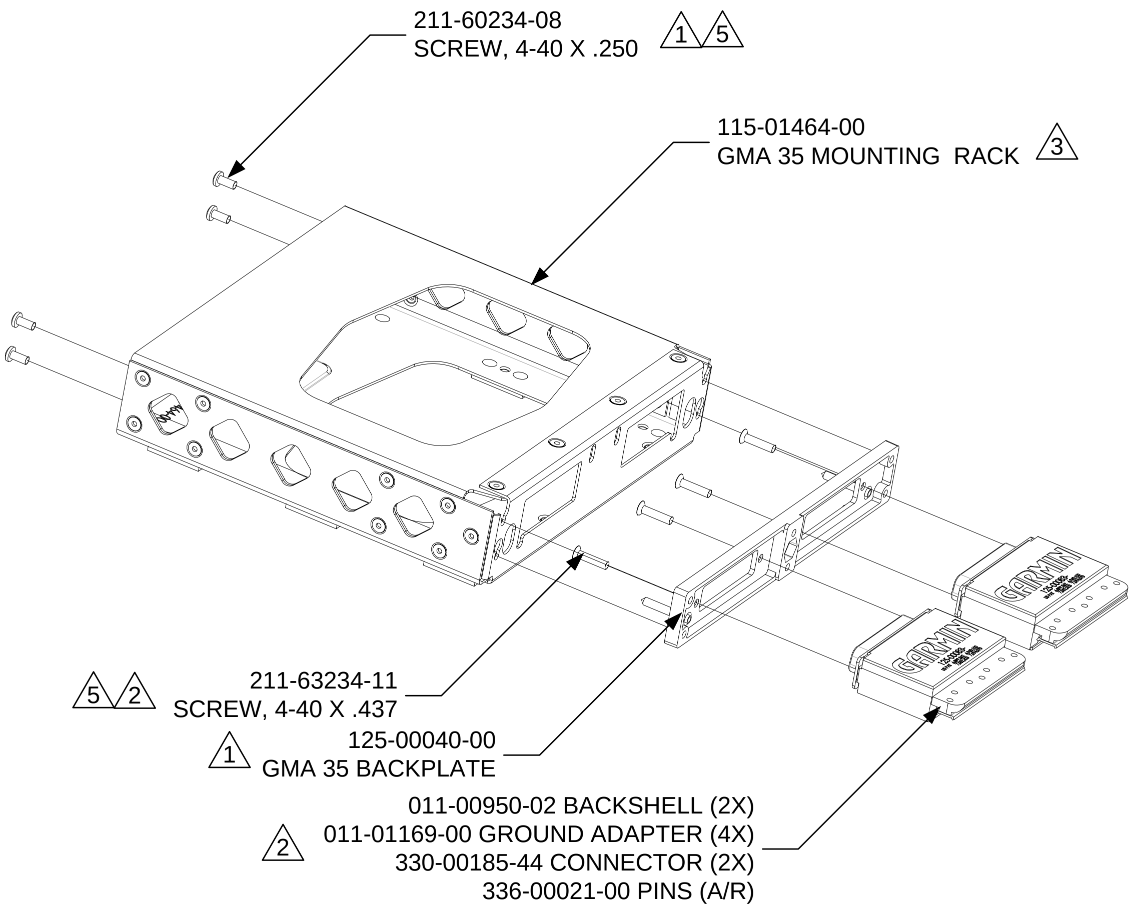


NOTES:

1. CG MEASURED WITH UNIT, RACK, BACKPLATE, AND CONNECTORS

	WEIGHT	
MODEL	UNIT	UNIT, RACK, BACKPLATE & CONNECTOR KIT
GMA 35	1.4 lb [.64 kg]	2.2 lb [1.00 kg]

Figure A-1. GMA 35 Dimensions and Center of Gravity



1 PART OF 011-02300-00 BACKPLATE KIT

2 PART OF 011-02302-00 CONNECTOR KIT

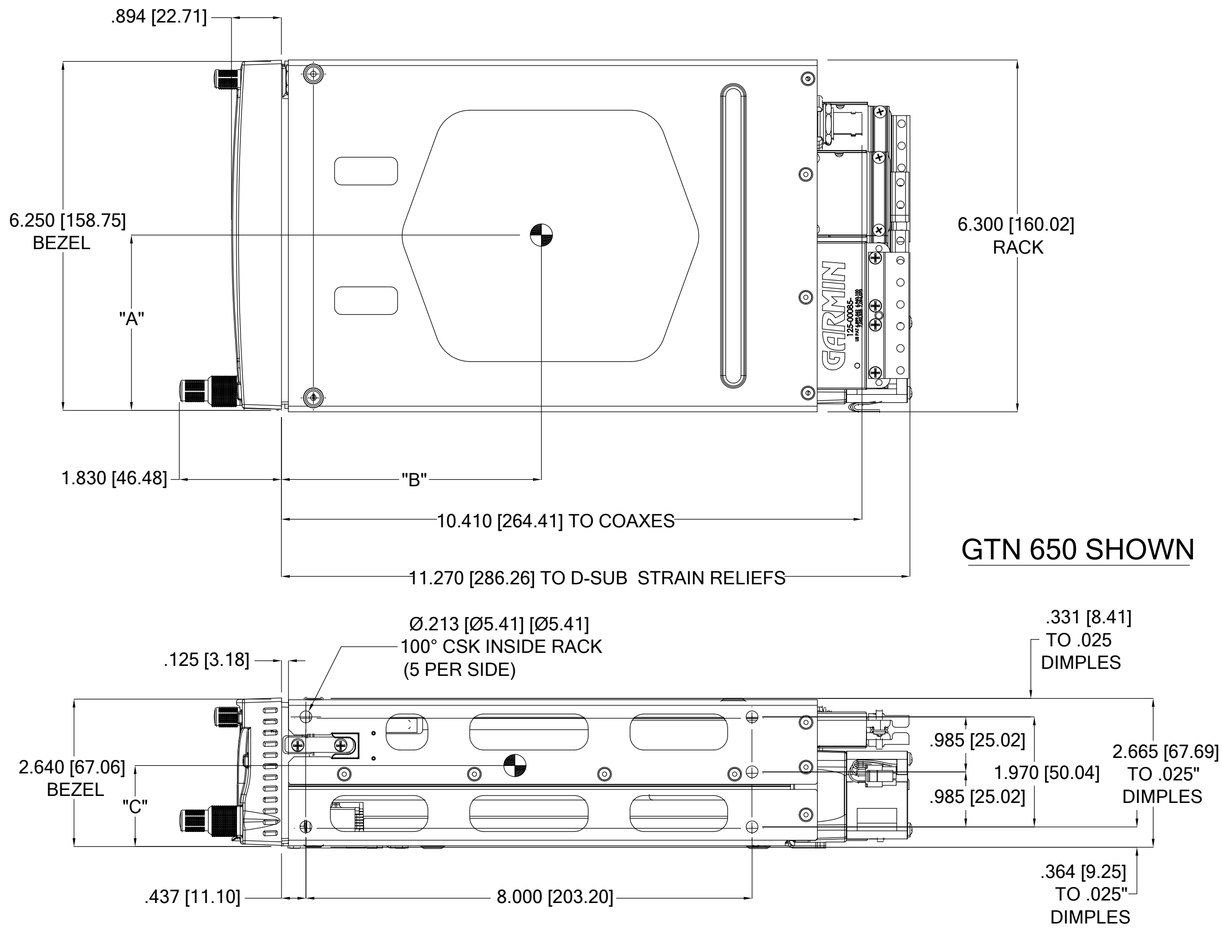
3 PART OF 010-00831-01 INSTALLATION KIT

4 SEE TABLE FOR KIT REFERENCE INFORMATION

5 TORQUE 4.5 – 5.2 IN-LBS

UNIT DESCRIPTION	INSTALLATION KIT	CONNECTOR KIT 3	BACKPLATE KIT 3
GMA 35	010-00831-01	011-02302-00	011-02300-00

Figure A-2. GMA 35 Mounting Rack Assembly Overview

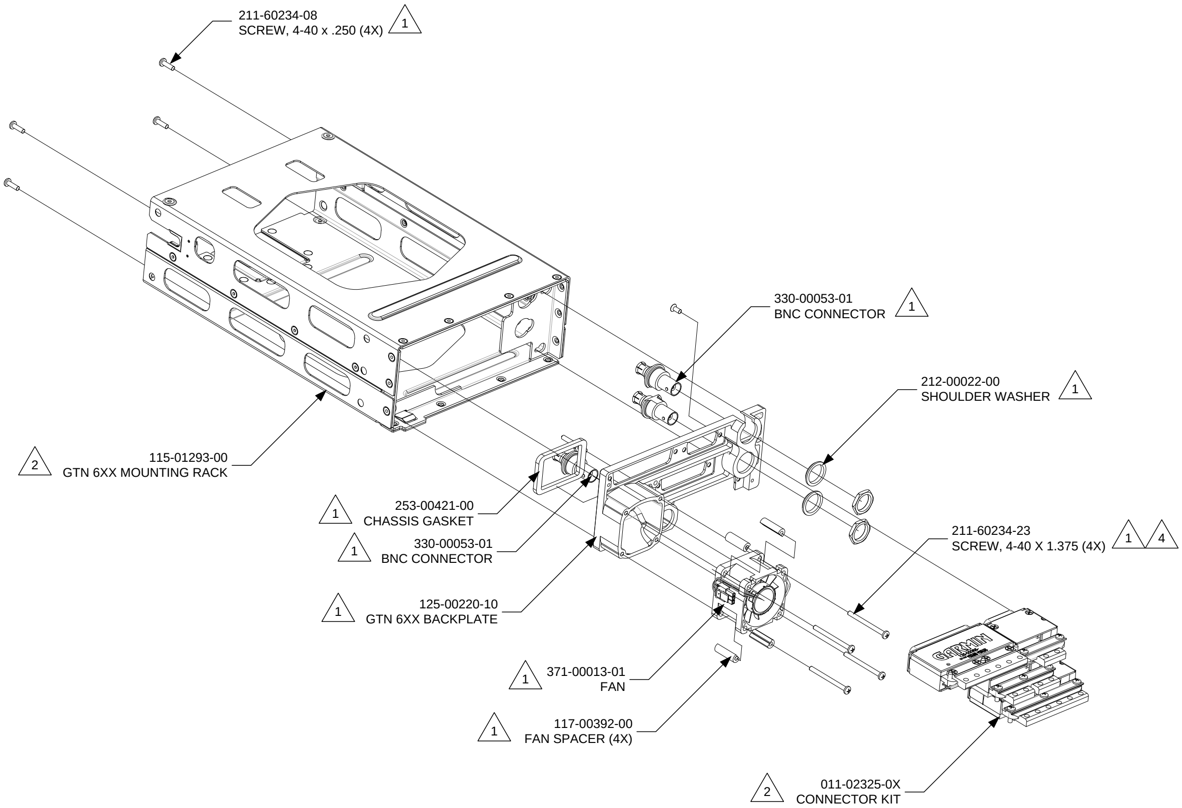


	DIMENSIONS			WEIGHT	
MODEL	A	B	C	UNIT	UNIT & CONN KIT
GTN 625	3.14 [79.8]	4.59 [116.6]	1.38 [35.1]	4.2 lb [1.90 kg]	5.4 lb [2.48 kg]
GTN 635	3.14 [79.8]	4.78 [121.4]	1.36 [34.5]	4.8 lb [2.18 kg]	6.2 lb [2.82 kg]
GTN 650	3.12 [79.2]	4.9 [124.5]	1.22 [31.0]	5.5 lb [2.48 kg]	7.0 lb [3.20 kg]

NOTES:

1. DIMENSIONS: INCH [mm].
2. CG MEASURED WITH UNIT, RACK BACKPLATE, AND CONNECTORS.

Figure A-3. GTN 6XX Dimensions and Center of Gravity

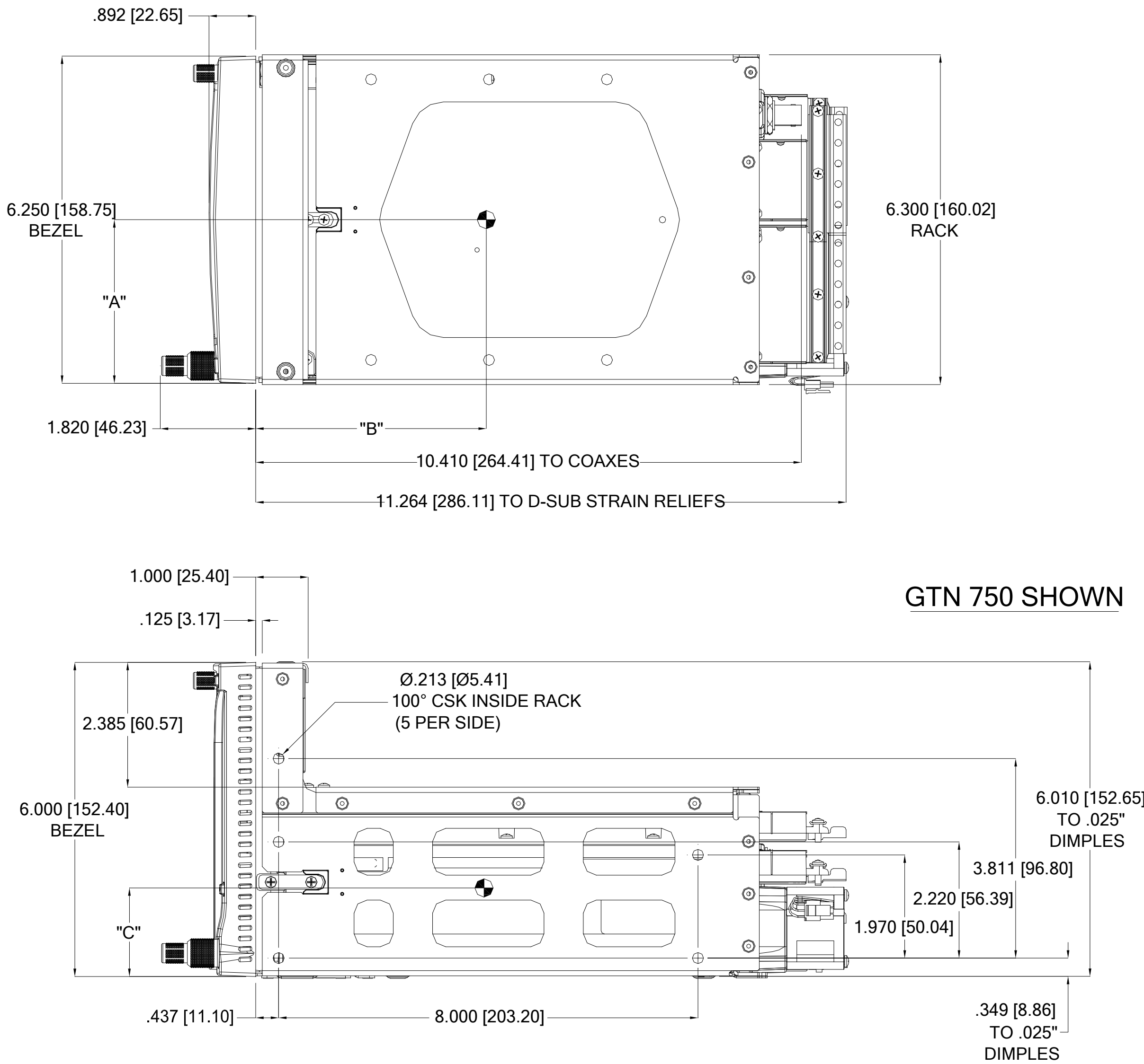


NOTES:

1. PART OF 011-02245-00 (GTN 625, BLACK), 011-02245-01 (GTN 635, BLACK), AND 011-02245-02 (GTN 650, BLACK AND GRAY) KITS. SEE TABLE FOR KIT CONTENT DIFFERENCES.
2. REFERENCE 010-00811-50 (GTN 625, BLACK), 010-00812-50 (GTN 635, BLACK), 010-00813-50 (GTN 650, BLACK), AND 010-00889-50 (GTN 650, GRAY) KITS
3. SEE TABLE FOR KIT REFERENCE INFORMATION
4. TORQUE 4.5 – 5.2 IN-LBS

				BACKPLATE KIT CONTENT DIFFERENCES			
UNIT DESCRIPTION	INSTALLATION KIT	CONNECTOR KIT 2	BACKPLATE KIT 2	WASHER	QTY (EACH)	BNC CONNECTOR	QTY (EACH)
GTN 625	010-00811-50	011-02325-00	011-02245-00	212-00022-00	1	330-00053-01	0
GTN 635	010-00812-50	011-02325-01	011-02245-01		2		1
GTN 650 (BLACK)	010-00813-50	011-02325-02	011-02245-02		3		2
GTN 650 (GRAY)	010-00889-50	011-02325-02	011-02245-02		3		2

Figure A-4. GTN 650 Mounting Rack Assembly

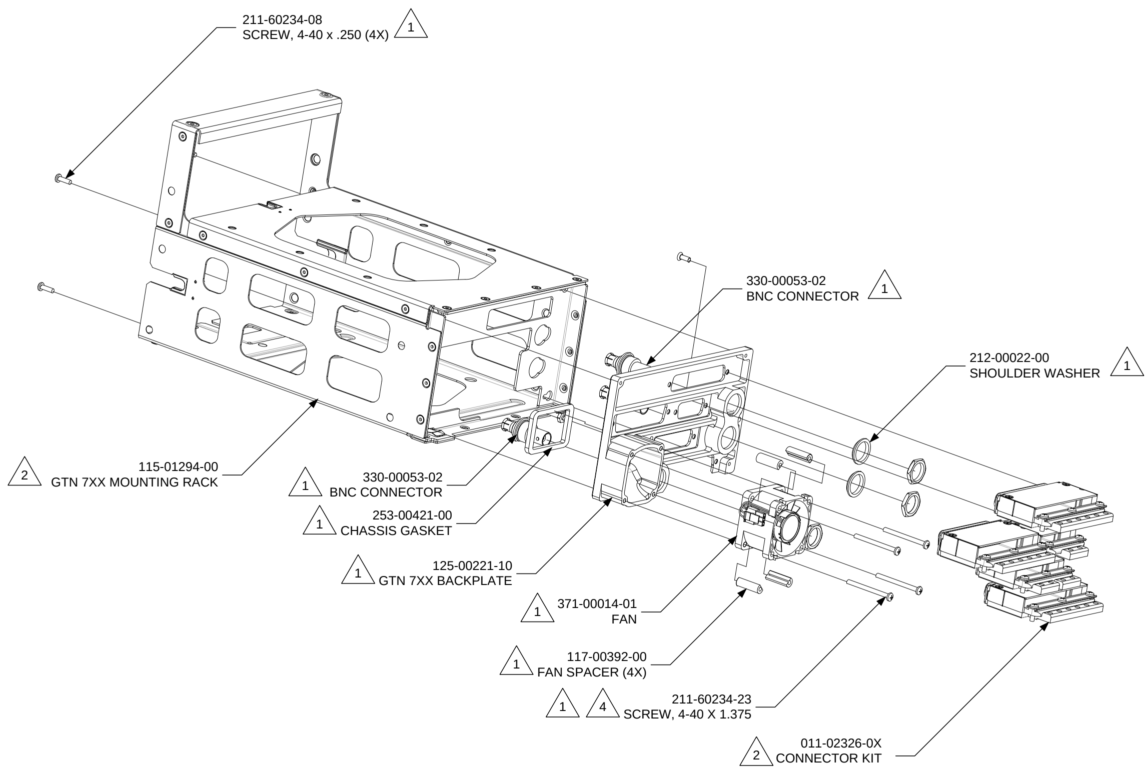


	DIMENSIONS			WEIGHT	
MODEL	A	B	C	UNIT	UNIT & CONN KIT
GTN 725	3.16 [80.3]	4.05 [102.9]	2.20 [55.9]	6.1 lb [2.80 kg]	7.7 lb [3.52 kg]
GTN 750	3.17 [80.5]	4.40 [111.8]	1.86 [47.2]	7.4 lb [3.38 kg]	9.3 lb [4.24 kg]

NOTES:

1. DIMENSIONS: INCH [mm].
2. CG MEASURED WITH UNIT, RACK, BACKPLATE, AND CONNECTORS.

Figure A-5. GTN 7XX Dimensions and Center of Gravity



1 PART OF 011-02246-00 (GTN 725, BLACK) AND 011-02246-02 (GTN 750, BLACK AND GRAY) KITS. SEE TABLE FOR KIT CONTENT DIFFERENCES.

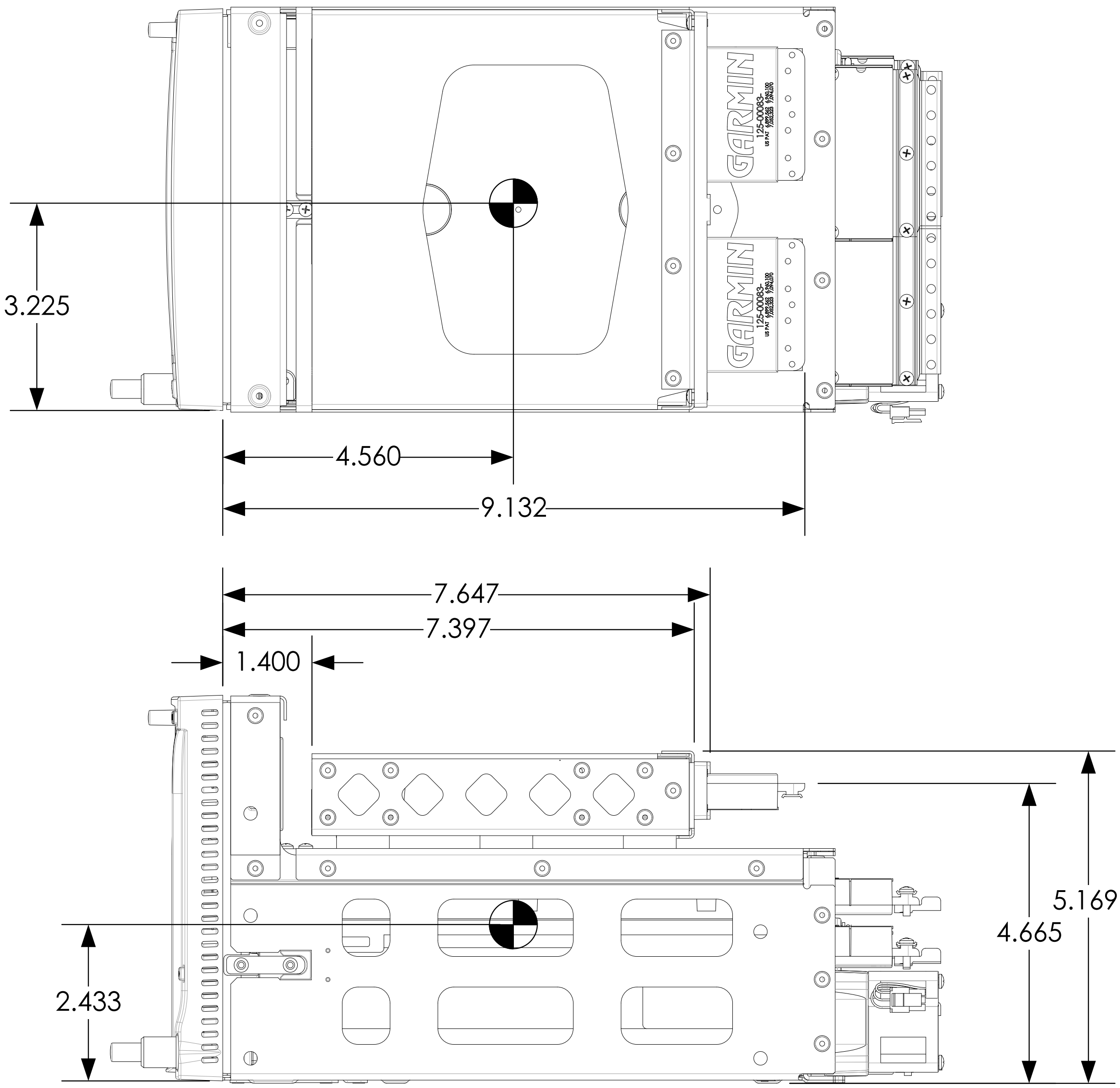
2 REFERENCE 011-00819-50 (GTN 725, BLACK), 011-00820-50 (GTN 750, BLACK), AND 011-00890-50 (GTN 750, GRAY) KITS

3 SEE TABLE FOR KIT REFERENCE INFORMATION

4 TORQUE 4.5 – 5.2 IN-LBS

				BACKPLATE KIT CONTENT DIFFERENCES			
UNIT DESCRIPTION	INSTALLATION KIT	CONNECTOR KIT 2	BACKPLATE KIT 2	WASHER	QTY (EACH)	BNC CONNECTOR	QTY (EACH)
GTN 725	011-00819-50	011-02326-00	011-02246-00	212-00022-00	1	330-00053-02	0
GTN 750 (BLACK)	011-00820-50	011-02326-02	011-02246-02		3		2
GTN 750 (GRAY)	011-00890-50	011-02326-02	011-02246-02		3		2

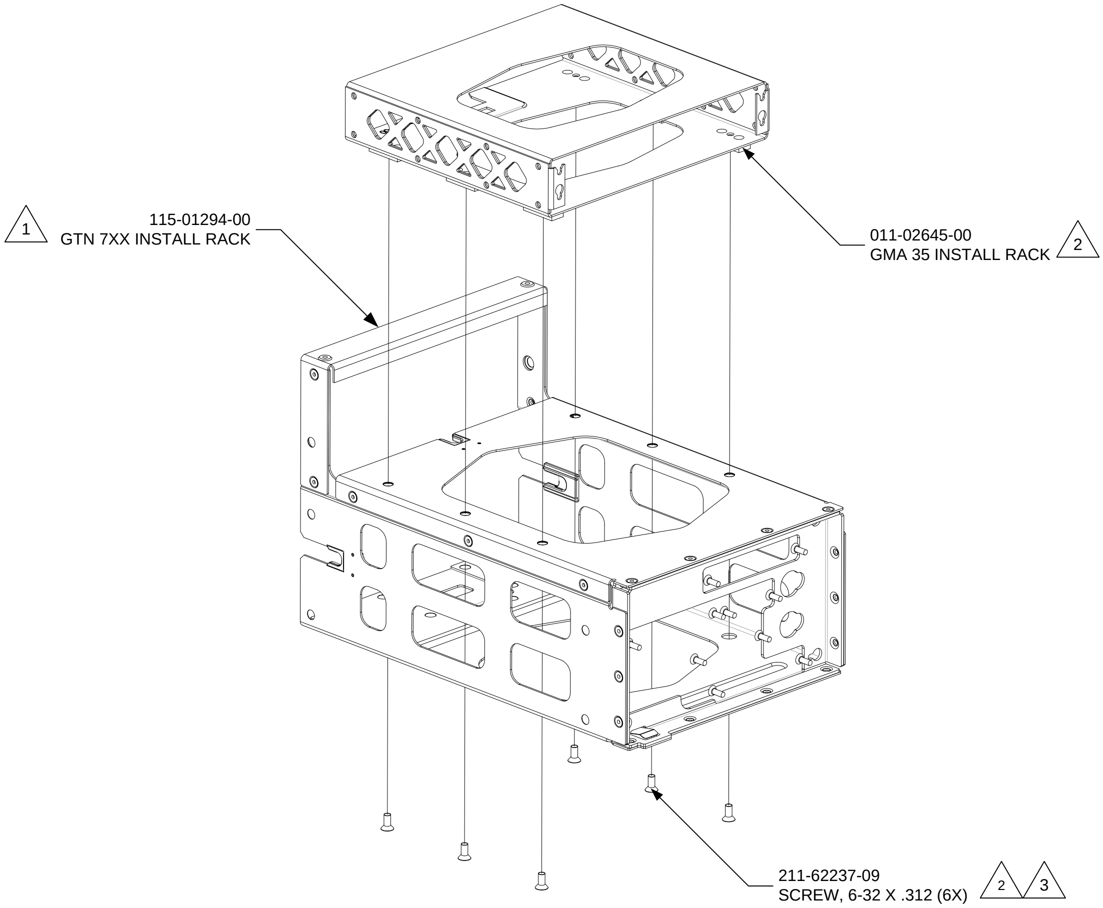
Figure A-6. GTN 750 Mounting Rack Assembly



NOTES:

1. CG MEASURED WITH UNIT, RACK, BACKPLATE, AND CONNECTORS

Figure A-7. GTN 750 with GMA 35 Installation Dimensions and Center of Gravity

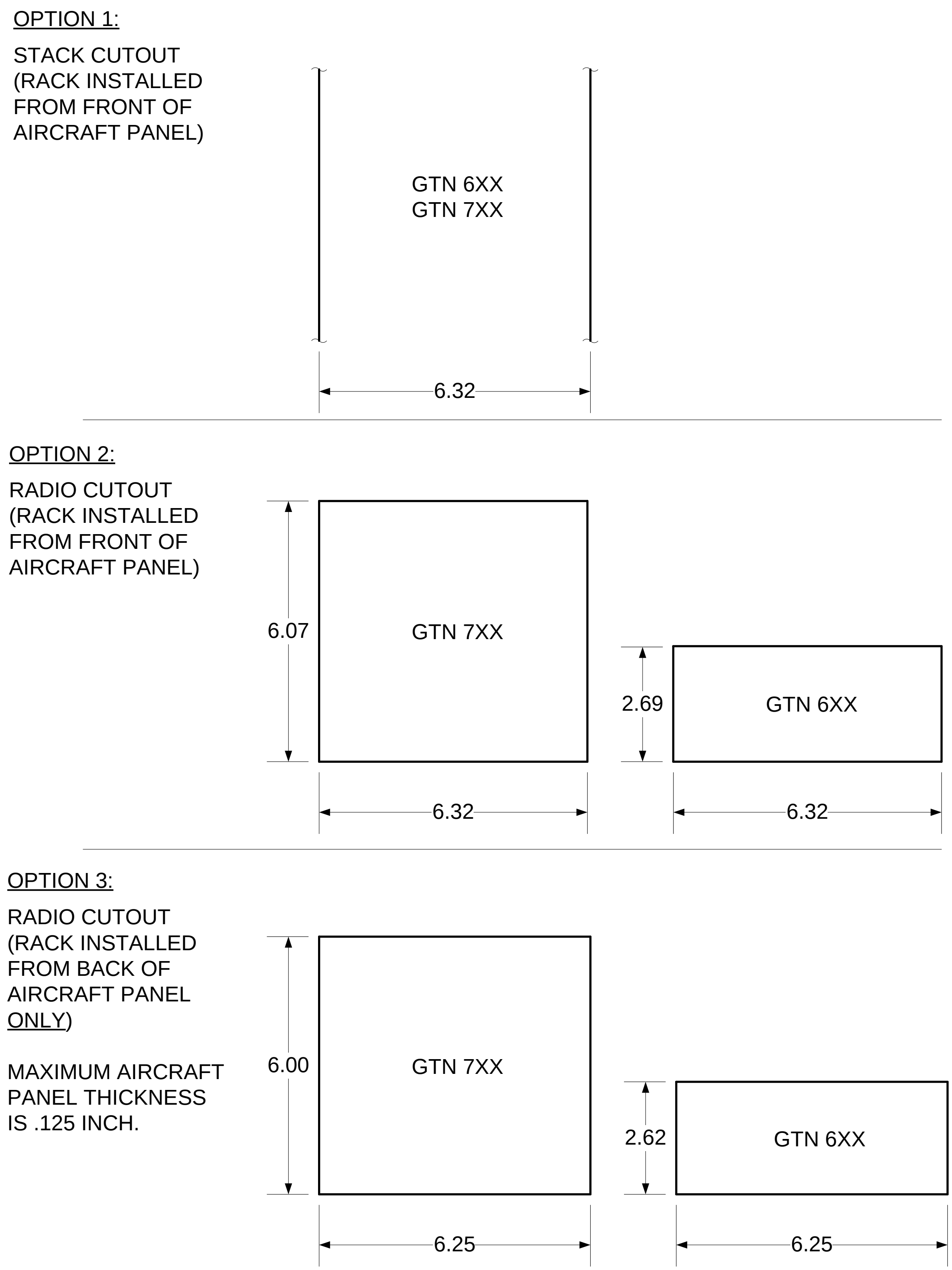


1 PART OF 011-00819-50 (GTN 725, BLACK), 011-00820-50 (GTN 750, BLACK), AND 011-00890-50 (GTN 750, GRAY) KITS

2 PART OF 011-02645-00 (GMA 35) KIT

3 TORQUE 8.5 – 9.5 IN-LBS

Figure A-8. GTN 750 with GMA 35 Mounting Rack Assembly



NOTES, ALL OPTIONS:
1. DIMENSIONS ARE IN INCHES
2. IF THE FRONT LIP OF THE MOUNTING RACK IS BEHIND THE SURFACE OF THE AIRCRAFT INSTRUMENT PANEL, THE UNIT CONNECTORS MAY NOT FULLY ENGAGE.
3. TOLERANCE: ±0.03 INCHES.

Figure A-9. Panel Cutout Detail

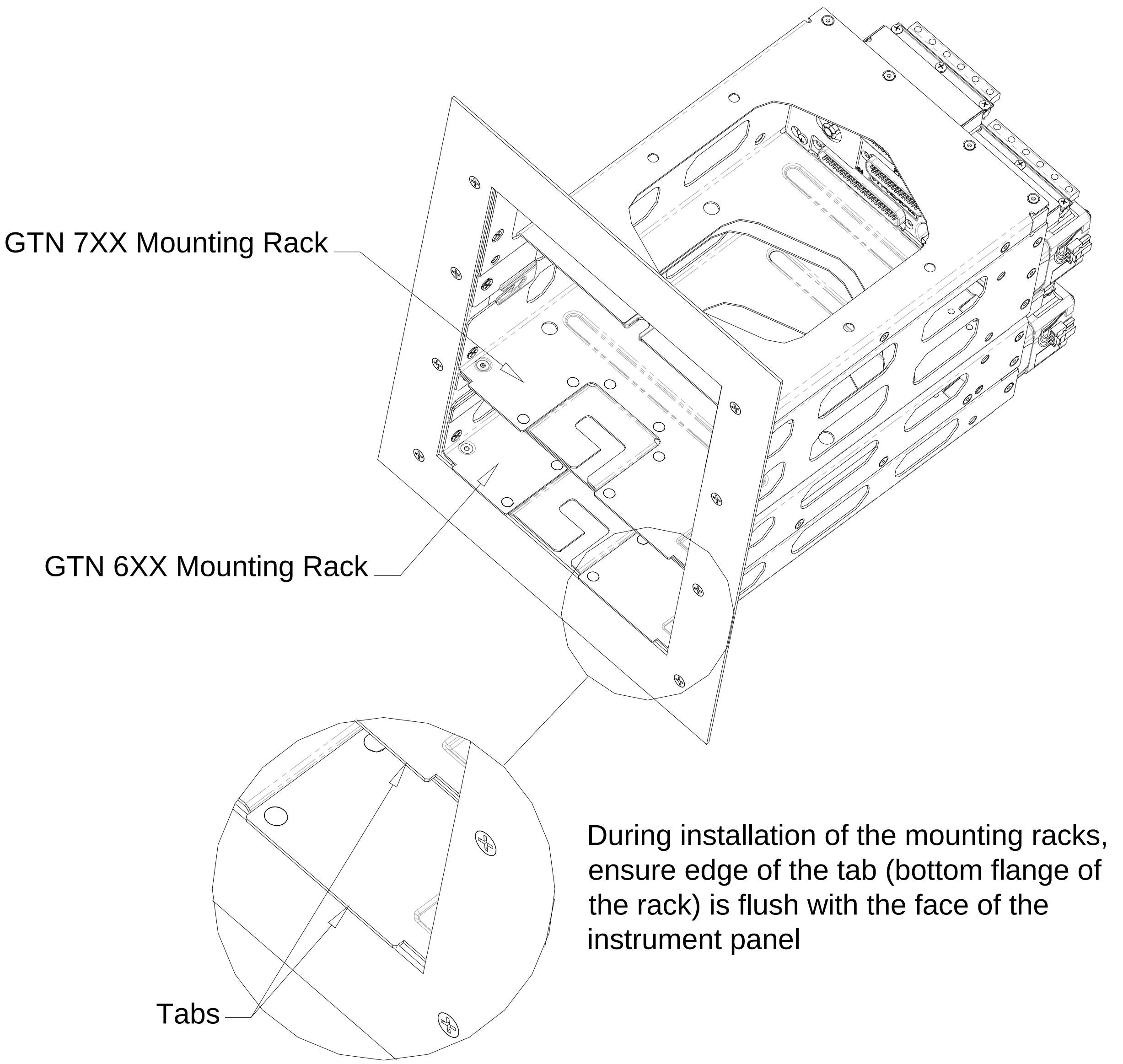


Figure A-10. GTN 6XX/7XX Mounting Rack Tab Alignment Detail

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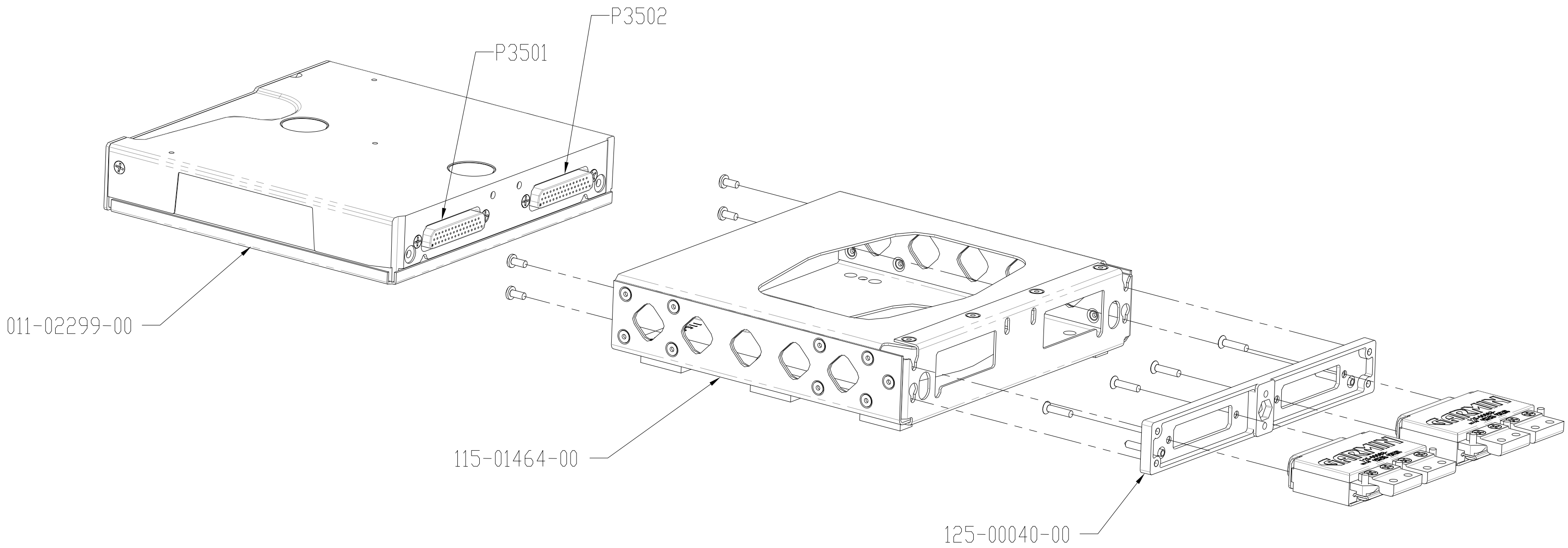

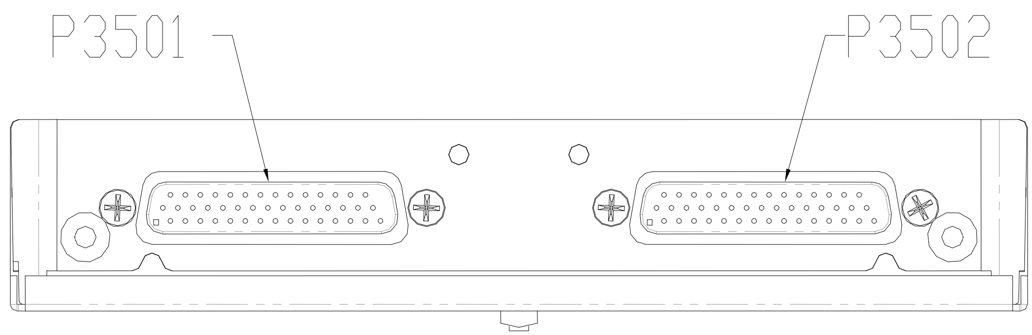

VIEW LOOKING AT REAR OF GMA 35

Figure A-11. GMA 35 Connector Layout Detail

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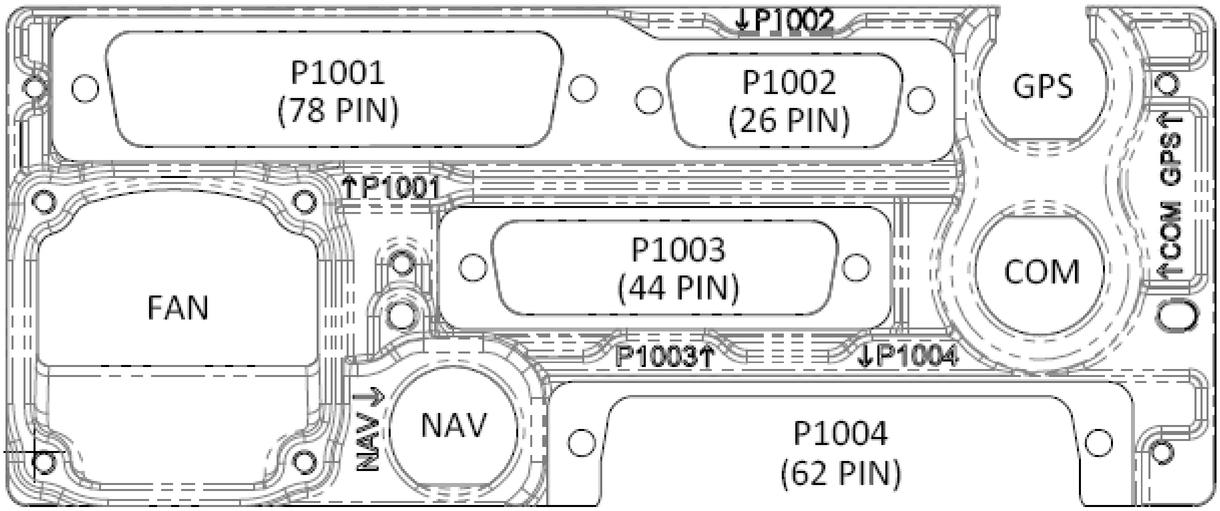

Figure A-12. GTN 6XX Connector Layout Detail—Rear View

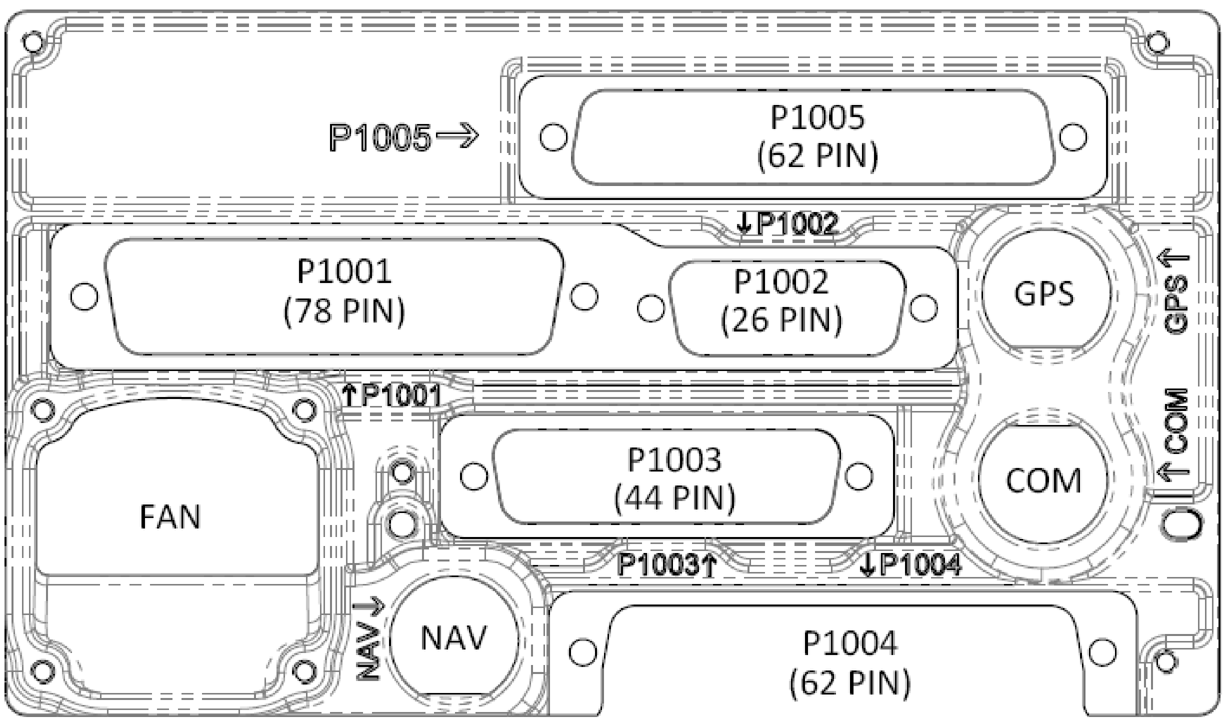

Figure A-13. GTN 7XX Connector Layout Detail—Rear View

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Appendix B Installation Guidance and Sample Installations

B.1 Requirements for GTN 6XX/7XX Installations

The GTN 6XX/7XX Navigators are designed to be installed in the mounting rack attached to the back of the instrument panel. In many cases, the existing “brackets” or “rails” fastened to the face of an instrument panel can provide adequate means to attach the GTN 6XX/7XX mounting racks and may be re-used requiring no modifications to the instrument panel.

Use the decision tree presented in Figure B-1 to determine the installation path (including sections to reference) and requirements for each installation.

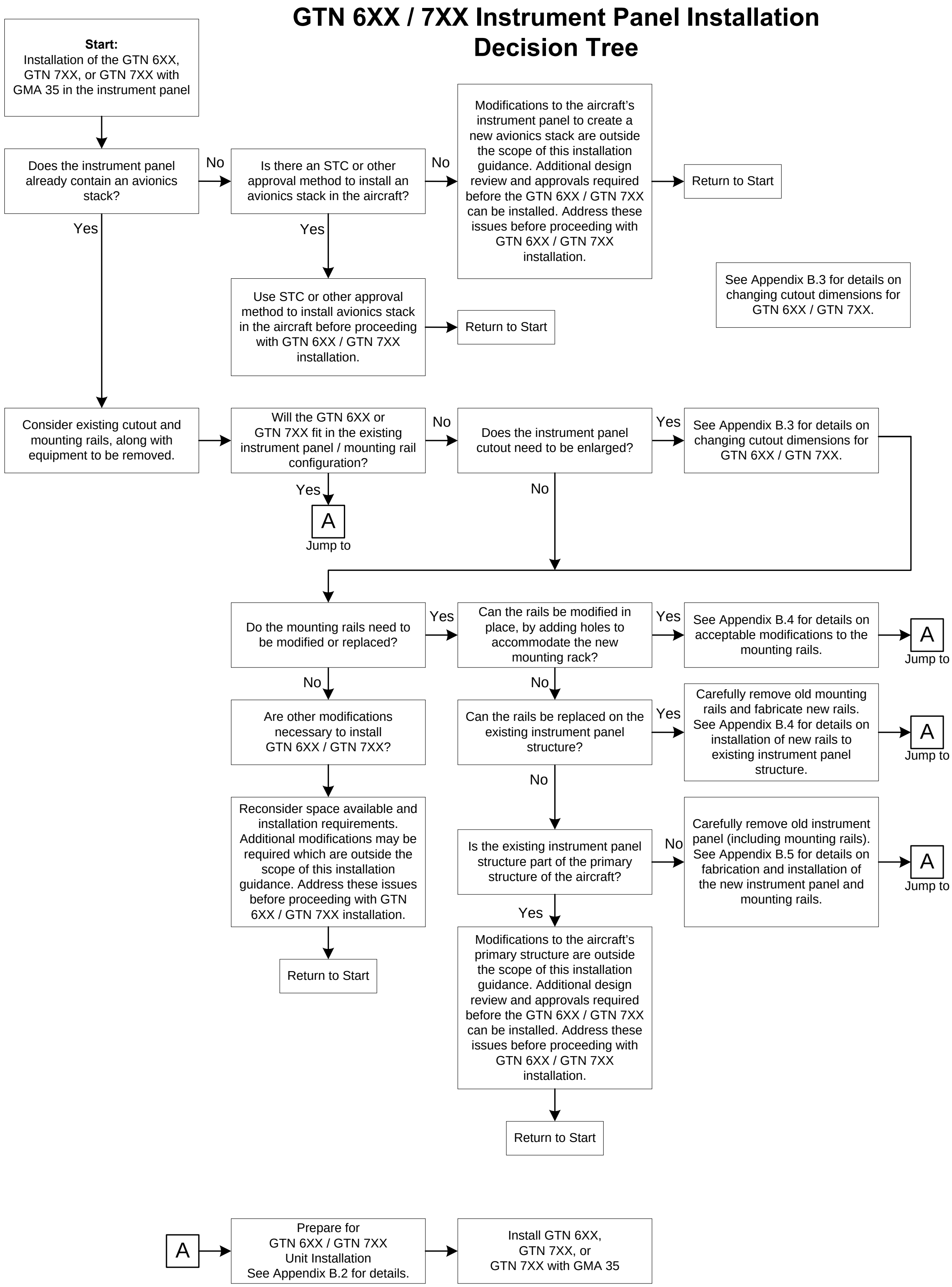

Figure B-1. GTN 6XX/7XX Instrument Panel Installation Decision Tree

B.2 General Requirements for GTN 6XX/7XX Installations

Figure B-2 illustrates the avionics rack mounting rails and forward rack support required in all GTN 6XX/7XX installations.

In order to satisfy the structural requirements for the GTN 6XX/7XX the following conditions must be met:

1. If existing structure is to be used for mounting the GTN 6XX/7XX, it must meet the following requirements:
   a. Sheet aluminum instrument panel structure must be at least 0.062” thick
   b. Avionics stack “brackets” or “rails” must be at least 0.032” thick
2. It is acceptable to reuse existing support brackets or plates. Minor modifications can be made to adjust for the GTN 6XX/7XX mounting rack hole patterns.
   a. Maintain an edge distance of at least 2*D (center of hole to edge of part) for all new holes.
   b. Maintain a minimum of 3*D (center to center) for all new holes.
3. If support brackets or plates do not exist, cannot be modified to fit, or otherwise need to be fabricated for this installation, they should be fabricated and attached to the aircraft instrument panel structure in accordance with the methods outlined in AC 43.13-2B Chapter 2, AC 43.13-1B Chapter 4, and the following requirements:
   a. Material shall be 2024-T3 sheet aluminum (bare or Clad), minimum of 0.032” thick
   b. Use sheet metal techniques (bend radius, fillets, etc.) appropriate to material type and thickness.
   c. Bracket or plate must have a minimum of two fastener holes (6-32 screws) for each GTN 6XX/7XX mounting rack. Nutplates may be installed on the bracket or plate to secure the 6-32 screws.
   d. Fabricated parts shall be corrosion protected. Apply zinc chromate primer that meets FED STD TT-P-1757, or epoxy primer that meets MIL-P-23377, or other corrosion protection methods listed in the aircraft’s maintenance manual.
   e. If possible, fabricate and install a support between the mounting tray and a nearby structural member of the aircraft, as recommended in AC 43.13-2B, Chapter 2.

See Section B.6 for example layouts.

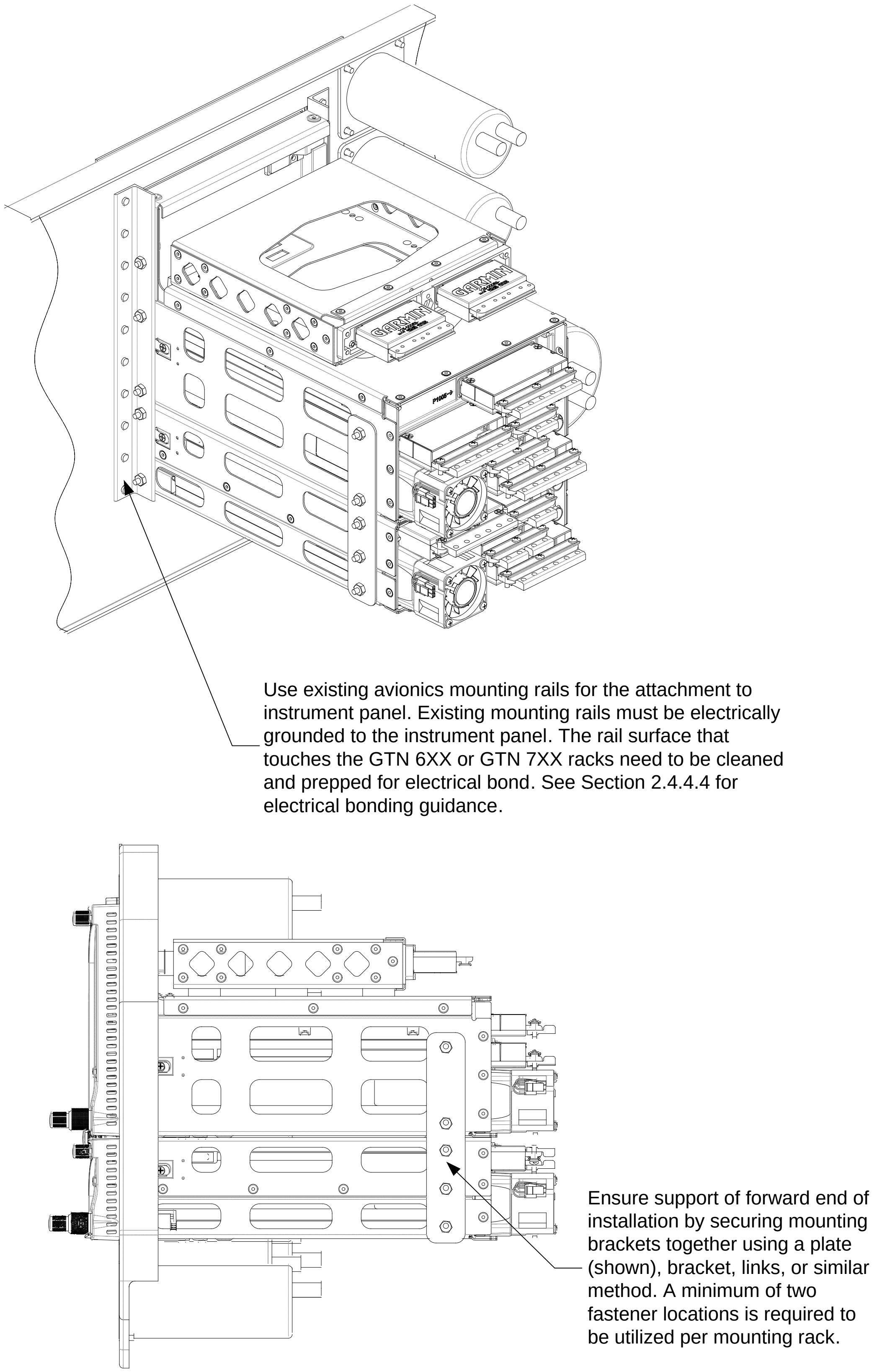

Figure B-2. GTN 6XX/7XX Mounting Rack Plate Support

B.3 Avionics Stack Cutout

Some instrument panels may require minor modification to increase width or height of the avionics stack cutout to accommodate installation of the GTN 6XX, GTN 7XX, or both.

In order to satisfy the structural requirements for the installation of the GTN 6XX/7XX the following conditions must be met:

1. A cutout cannot be made into aircraft primary structure.
2. Cutout area must not affect any subpanel structure.
3. Some stationary instrument panels are considered primary structure. Modification of such panels is not covered by this STC and requires additional approval.
4. Refer to Figure A-9 for dimensions of GTN 6XX/7XX cutouts.
5. Radius corners and remove burrs from cut edges. Finish paint the cut edge or apply corrosion protection as specified in Section B.2.

B.4 Modification of Avionics Stack Mounting Rails

Existing mounting rails may contain holes from previously installed equipment. If existing rail holes do not match holes in GTN 6XX/7XX mounting racks, it may be acceptable to modify the rails by adding fastener holes to accept installation of GTN 6XX/7XX mounting racks.

In order to satisfy the structural requirements for the installation of the GTN 6XX/7XX the following conditions must be met:

1. Additional fastener holes shall maintain an edge distance at least 2*D.
2. Added and existing holes in the mounting rail shall maintain at least 3*D distance between hole centers.
3. If existing brackets or mounting rails are determined to be unsuitable for installation of the GTN 6XX/7XX, new parts need to be fabricated. In some cases, there may be too many holes from previous avionics mounting tray installations.

In order to satisfy the structural requirements for the installation of the GTN 6XX/7XX the following conditions must be met:

1. Carefully remove existing mounting rails from instrument panel. Avoid enlarging existing rivet holes.
2. Fabricate new parts as close to the original design as possible (e.g. “rails” that have had too many holes drilled to be functional for another installation should be replaced with new “rails” of the same material thickness and type with only the holes necessary for the planned avionics stack).
3. If material type of the original rails or brackets is unknown, replace with 2024-T3 (bare or Clad) of the same thickness as the original part. Use sheet metal techniques (bend radius, fillets, etc.) appropriate to material type and thickness.
4. Fabricated parts shall be corrosion protected. Apply zinc chromate primer that meets FED STD TT-P-1757, or epoxy primer that meets MIL-P-23377, or other corrosion protection methods listed in the aircraft’s maintenance manual. Area around the fastener holes on the side of the fabricated rail that attaches to the GTN mounting rack must be cleaned and prepared for electrical bond per Section 2.4.5 of this manual.
5. Install fabricated mounting rails to instrument panel. Use number and size of rivets appropriate to original rivets removed.

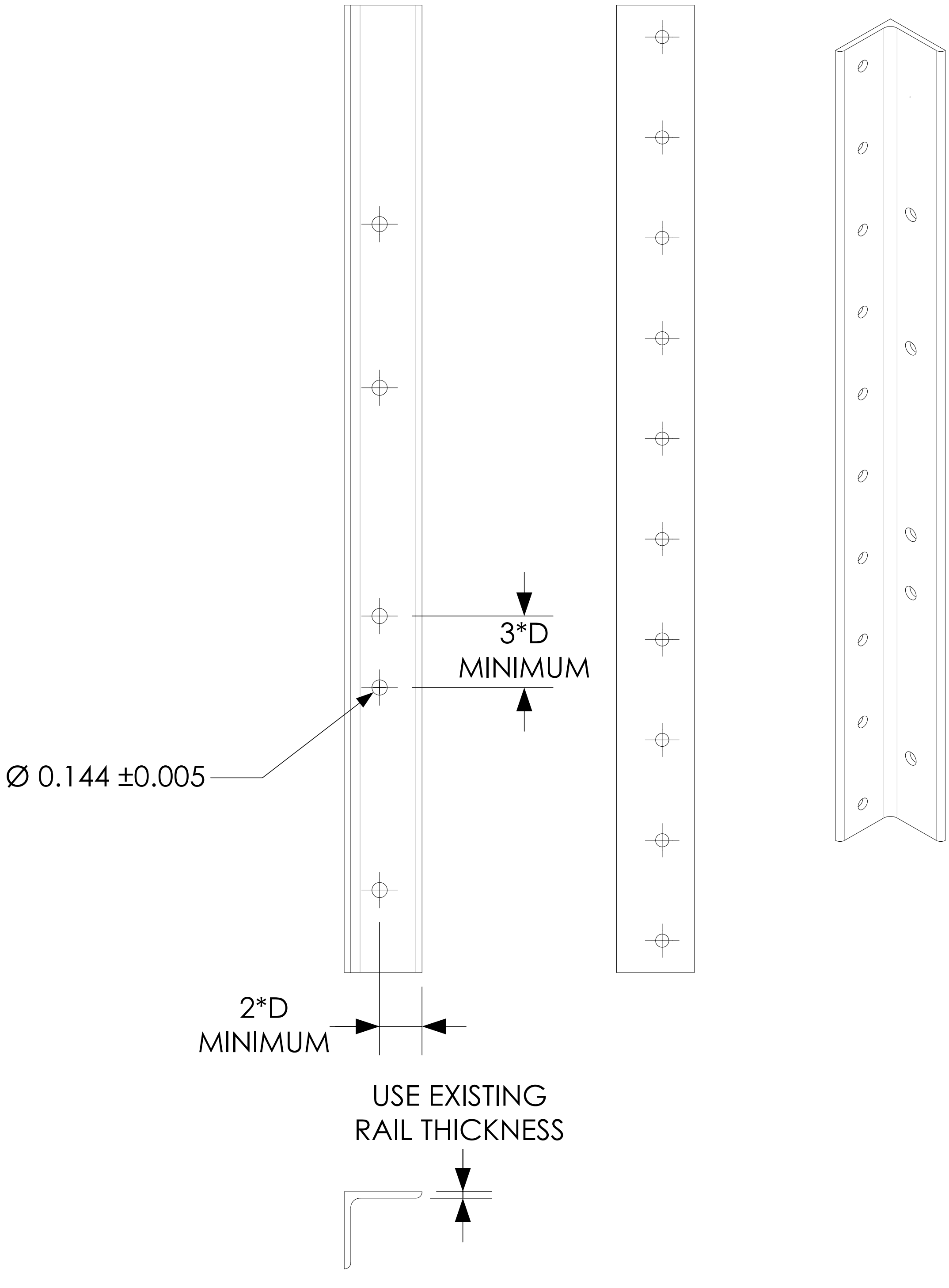

Figure B-3. Avionics Rack Mounting Rail Considerations

B.5 Fabrication of Instrument Panel

Given the age of the aircraft and the number and type of past avionics rack modifications, it may not be possible to reuse the existing instrument panel. For example, removal and replacement of the mounting rails may create a scenario where the rivet holes in the instrument panel have been enlarged too much to repair. Under certain conditions, it may be possible to fabricate an identical instrument panel to allow installation of the GTN 6XX/7XX.

Instrument panel must not be a part of aircraft primary structure to make modifications for this STC. Modifications that affect instrument panel structure are not approved through this STC and require separate review and approval.

If the existing instrument panel is replaced with a new instrument panel, the new panel must comply with the following requirements:

- Material must be the same thickness and type as the original instrument panel (with a minimum thickness of 0.062")
- Use sheet metal techniques (bend radius, fillets, etc.) appropriate to the material type and thickness – refer to AC 43.13-1B, Chapter 4, Section 4 (Metal Repair Procedures).
- The original mounting locations, shape, form, and/or bends shall not be modified from the original design.
- Bends in the material must not exceed the minimum bend radius specification of the material used.
- OEM processes may allow for tighter bends (e.g. a "soft" material is formed then heat treated to increase hardness."
- Panels shall not be combined (i.e. an original two-piece panel cannot be combined to create a single-piece panel). Likewise, panels shall not be split (e.g. creating a two-piece panel from a single-piece panel.
- Movement or consolidation of instruments, gauges, annunciators, placards, lighting, etc. is beyond the scope of this STC and will require separate approval.
- Instrument panels are often more than a single piece of aluminum: they are an assembly with other brackets and components permanently or semi-permanently attached to the main panel. For example, angles may have been riveted to create attach points for other pieces of equipment (e.g. "rails" for the radio rack) or they may be used to resist bending of the panel due to weight and center of gravity of the instruments; brackets or channels may exist to create additional attach points to the aircraft. The new instrument panel must not alter the design of the instrument panel assembly features from the original design. These features must be duplicated in the new panel structure.
- The only intended difference between the new and the old instrument panel assembly is the installation of the GTN 6XX/7XX which should occur in the location of the existing radio stack. Every other feature of the panel, including aspects of the structure invisible to the pilot, must be duplicated. Modification of the instrument panel that will not comply with these requirements is not approved under this STC. MIL-P-23377, or other corrosion protection method listed in the aircraft's maintenance manual. Consider the finish paint for the instrument panel when choosing corrosion protection to ensure compatibility.

B.6 Example Instrument Panel Layouts with GTN 6XX/7XX Navigator Installations

Figure B-4, Figure B-5, and Figure B-6 show various configurations utilizing the GTN 6XX and/or the GTN 7XX with other avionics.

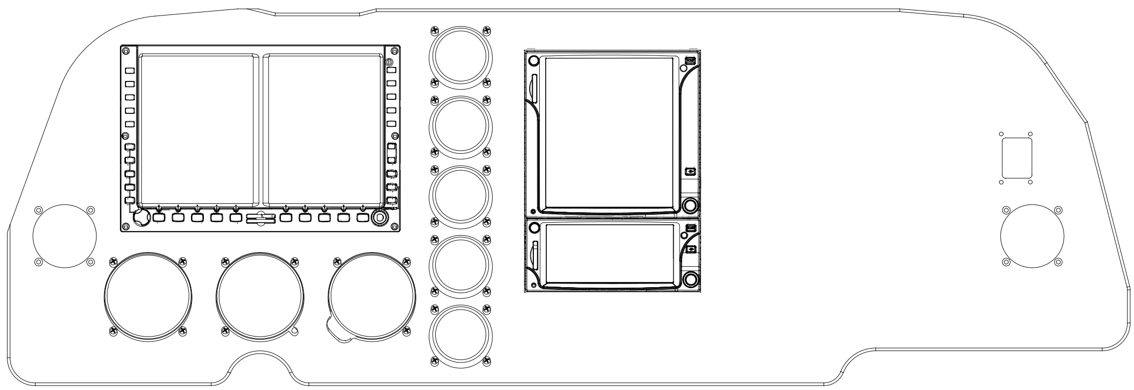

Figure B-4. GTN 6XX and GTN 7XX Example Installation

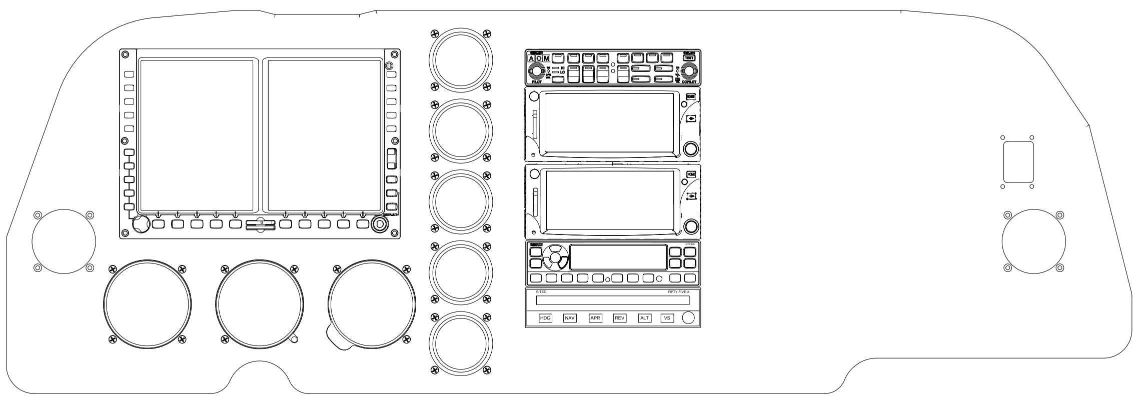

Figure B-5. GTN 6XX Example Installation

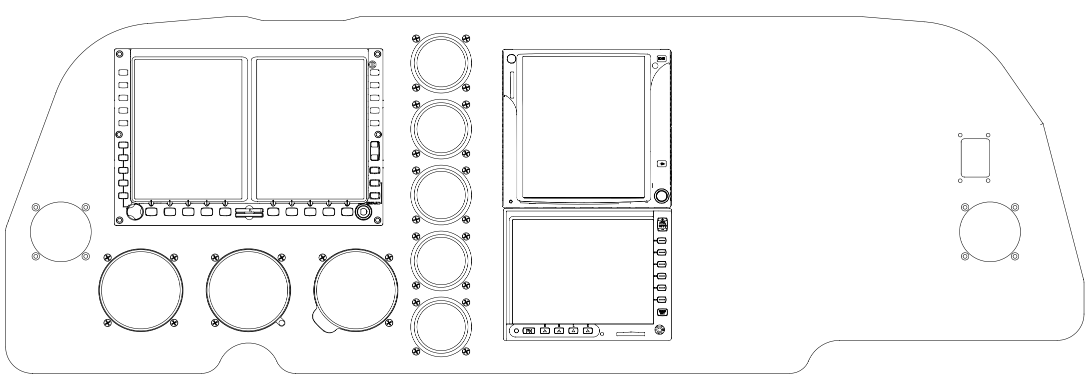

Figure B-6. GTN 7XX Example Installation

Appendix C GTN Equipment Compatibility and Configuration

The following equipment listed in this appendix is compatible with the GTN system when configured as described herein. For detailed configuration information refer to Section 5.

C.1 Audio Panel

Audio panels not listed below can still be approved under this GTN AML STC if **all** of the following conditions are met:

- The installation of the audio panel was previously FAA-approved;
- The VHF COM audio and VHF NAV audio (if applicable) must be verified as described in Section 5.7.4 and Section 5.7.4.1.
- The audio panel must have an unswitched audio input that is used for the GTN audio.

Table C-1. Compatible Audio Panel Models

Manufacturer	Model	Data Format	Notes
Garmin	SL10	Analog Audio	
	SL10MS	Analog Audio	
	SL10M	Analog Audio	
	SL10S	Analog Audio	
	SL15	Analog Audio	
	SL15M	Analog Audio	
	GMA 340	Analog Audio	
	GMA 347	Analog Audio	
	GMA 35	Analog Audio RS-232	GTN RS-232 format should be configured for 'GMA Format 1'. GMA software version 2.00 required for GTN software version. 2.00. GMA software version 2.20 or later required for GTN software version 3.00 or later.
	GMA 350/350H	Analog Audio RS-232	RS-232 connection is provisional for future use.
Honeywell (Bendix/King)	KMA 24	Analog Audio	
	KMA 24H-70/71	Analog Audio	
	KMA 26	Analog Audio	
	KMA 28	Analog Audio	
PS Engineering	PMA 6000	Analog Audio	
	PMA 7000 Series	Analog Audio	
	PMA 8000 Series	Analog Audio	

C.2 Air Data Computer

Air data computers not listed below can still be approved under this GTN AML STC if **all** of the following conditions are met:

The air data computer provides the following labels:

203 – Pressure Altitude

204 – Barometric-Corrected Altitude

210 – True Airspeed

- The interface check for the altitude encoder described in Section 5.6.10 must be successfully completed.
- The installation of the air data computer was previously FAA-approved.
- The air data computer is TSO approved.
- The connections to the GTN must utilize shielding wiring of the type specified in this manual. Shields must be terminated on the GTN side to connector shield block ground and on the Air Data Computer side in accordance with the Air Data Computer installation data. If the Air Data Computer installation data does not specify a shielding method then terminate the shield at the Air Data Computer using the guidelines provided in Section 2.4.11.4.

If these conditions are met the interface can be approved under this GTN AML STC.

Table C-2. Compatible Air Data Computer Models

Mfg	Model	Data Format	Configuration
B & D	90004-003	ARINC 429	Airdata, low speed
Honeywell (Bendix/King)	KDC 281	ARINC 429	Airdata, low speed
	KDC 481	ARINC 429	Airdata, low speed
Insight	TAS 1000	RS-232	FADC Format 1

C.3 Altitude Serializer or Fuel/Air Data

Altitude serializers/encoders not listed below can still be approved under this GTN AML STC if **all** of the following conditions are met:

- The altitude serializer/encoder is TSO approved;
- The installation of the altitude serializer/encoder was previously FAA-approved;
- The interface check for the altitude serializer/encoder described in Section 5.6.10 must be successfully completed.
- The connections to the GTN must utilize shielding wiring of the type specified in this manual. Shields must be terminated on the GTN side to connector shield block ground and on the Altitude Serializer or Fuel/Air Data installation data. If the Altitude Serializer or Fuel/Air Data installation data does not specify a shielding method then terminate the shield at the Altitude Serializer or Fuel/Air Data using the guidelines provided in Section 2.4.11.4.

Table C-3. Compatible Altitude Serializer or Fuel/Air Data Models

Mfg	Model	Data Format	Configuration
ACK Technologies	A-30 (Mod 8 and above)	RS-232	Altitude Format 1
ARNAV	FC-10	RS-232	Fuel Format 1
	FT-10	RS-232	Fuel Format 1
Electronics International	FP-5L	RS-232	Fuel Format 1
Garmin	GTX 327	RS-232	Altitude Format 1
Icarus Instruments	3000	RS-232	Altitude Format 1
JP Instruments	EDM-700	RS-232	Fuel Format 2
Sandia	SAE 5-35	RS-232	Altitude Format 1
Shadin	8800T	RS-232	Altitude Format 3
	9000T [1]	RS-232	Altitude Format 3
	9200T [1]	RS-232	Altitude Format 3
	F/ADC-200	RS-232	Airdata Format 1
	F/ADC-2000	RS-232	Airdata Format 1
	91204XT(38)D (Miniflo-L)	RS-232	Fuel Format 2
	91053XP (Digiflo-L)	RS-232	Fuel Format 2
	91053XT-D (Digiflo-L)	RS-232	Fuel Format 2
	912802-( ) (Digidata)	RS-232	Fuel Format 2
Trans-Cal Industries	IA-RS232-X	RS-232	Altitude Format 1
	SSD120	RS-232	Altitude Format 1

[1] This source must not be connected to the GTN if the GTN is the pressure altitude source for a Mode S transponder.

C.4 Autopilot

Autopilots that will be coupled to GPS *vertical* guidance for GPS approaches **must** be specifically listed in the table below, unless the interface to the autopilot is installed in accordance with the G500 (STC #SA02015SE-D) or G600 (STC #SA02153LA-D) AML STC.

Autopilots not listed below can still be approved under the GTN AML STC if **all** of the following conditions are met:

- The installation of the autopilot was previously FAA-approved;
- All interfaces between the GTN and the autopilot are analog;
- The installation must use existing navigation signals which interface the autopilot to a standard VHF navigation receiver (i.e. CDI/HSI L/R and Up/Dn)
- A successful in-air flight check must be completed prior to returning the aircraft to service.
- The AFMS is properly completed, limiting the GPS to lateral coupling only (LNAV) unless the autopilot is listed as an approved interface in the G500 or G600 AML STC.

If these conditions are met the interface can be approved under this GTN AML STC. These autopilots are limited to those operations for which they were previously FAA-approved when interfaced with the other TC'd or STC'd navigation units (e.g. if the previous unit was installed and approved for coupled VOR, ILS, LOC, BC and GPS LNAV approaches, this upgraded installation will also be approved for these operations; however, GPS and RNAV approaches with GPS/SBAS-based vertical guidance (LNAV+V, L/VNAV and LPV modes on the GTN) are not authorized when coupled to the autopilot), unless the autopilot is listed as an approved interface in the G500 or G600 AML STC.

If the GTN 6XX/7XX is connected to a GDU 620, the GTN 6XX/7XX STC does not impose any vertical coupling limitations on the interface between the GDU 620 and the autopilot.

Table C-4. Compatible Autopilot Models

Mfr.	Model	Data Format	Notes
Honeywell (Bendix/King)	KAP 100/140/150, KFC 150/200/250/300	Analog Deviation, Discrete	If an EFIS is installed, the GTN is connected to the EFIS using ARINC 429 and the EFIS interfaces to the autopilot. The GTN is not connected directly to the autopilot. [1] (KAP 140)
	KFC 225/275/325	Analog Deviation, Discrete, ARINC 429 GPSS	[1] (KFC 225) [2]
Century	I/II/III/IV, 21/31/41, 2000, Trident	Analog Deviation, Discrete	
	AK 1081	ARINC 429 GPSS	[2] [3]
S-TEC	System 20/30/40/50/55/60-1/60-2/60 PSS/65	Analog Deviation, Discrete	
	System 55X	Analog Deviation, Discrete, ARINC 429 GPSS	[2]
	ST-901	ARINC 429 GPSS	[2] [3]
Cessna	300B/400B/800B	Analog Deviation, Discrete	(CA550A/FD computer)
	300 IFCS/400, IFCS/800 IFCS		400A Nav-o-matic (CA530FD computer)
Bendix	M4C, M4D		
Collins	APS 65 ( )		
Sperry	SPZ 200A/500	Analog Deviation, Discrete	

[1] GPS Select configuration should be set to 'Prompt'.
[2] Configure output to any ARINC or GAMA format.
[3] GPSS Roll Steering Converter.

C.5 EFIS Displays

Manufacturer	Model	Data Format	Configuration	Notes
Avidyne	EXP5000 P/N 700-00006-( )	ARINC 429	IN: Low, EFIS Format 4 OUT: Low, GAMA Format 2	[1]
Honeywell (Bendix/King)	EFS 40/50 (SG 465)		IN: Low, EFIS Format 2 OUT: Low, GAMA Format 6	[2]
			IN: Low, EFIS Format 1 OUT: Low, GAMA Format 1	[3]
Garmin	GDU 620	ARINC 429, RS-232	ARINC 429 Setup • IN: Low, GDU Format 1 • OUT: High, GAMA Format 1 • SDI: LNAV1 (for GPS 1) LNAV2 (for GPS 2)	
			RS-232 Setup • OUT: MapMX • For single GDU 620 installations, **enable** the Main indicator (Analog) CDI key (i.e. Main CDI/VDI outputs can be GPS or VLOC). • For dual GDU 620 installations, **disable** the Main indicator (Analog) CDI key (i.e. Main CDI/VDI outputs can only be GPS).	
			VOR/LOC/GS Setup ARINC 429 Config Tx Speed: Low SDI: VOR/ILS 1 (for NAV 1) VOR/ILS 2 (for NAV 2)	

[1] PFD software P/N 530-00194-( ) or later is required.
[2] SG 465 software 1201 or later is required. Vertical guidance is provided for GPS approaches.
[3] SG 465 software 1501. Vertical guidance is provided for GPS approaches.

C.6 EHSI

Manufacturer	Model	Data Format	Configuration	Notes
Sandel	SN 3308	Analog/ARINC 429	GAMA Format 3, low speed	GPS lateral and vertical guidance is provided using the analog interface.
	SN3500/4500	ARINC 429	GAMA Format 3, low speed	Vertical guidance is provided for GPS approaches. Software version 3.06 or later is required for SN3500.

C.7 IRU/AHRS

Other IRU/AHRS sources can provide heading to the GTN via the following ARINC 429 labels:

- 314-True Heading
- 320-Magnetic Heading

IRU/AHRS not listed below can still be approved under the GTN AML STC if **all** of the following conditions are met:

- The IRU/AHRS provides ARINC 429 labels 314 and/or 320;
- The installation of the IRU/AHRS was previously FAA-approved;
- The checkout procedure described in Section 5.6.11 must be completed successfully before approving the aircraft for return to service;
- The connections to the GTN must utilize shielding wiring of the type specified in this manual. Shields must be terminated on the GTN side to connector shield block ground and on the IRU/AHRS side in accordance with the IRU/AHRS installation data. If the IRU/AHRS installation data does not specify a shielding method then terminate the shield at the IRU/AHRS using the guidelines provided in Section 2.4.11.4 Shield Termination Considerations.

If these conditions are met, the interface can be approved under this GTN AML STC.

Manufacturer	Model	Data Format	Notes/Configuration
Collins	AHS-85E	ARINC 429	INS/IRU, high speed

C.8 Transponder

Manufacturer	Model	Data Format	Configuration	Notes/Configuration
Garmin	GTX 32	RS-232	GTX Mode C #1 or #2	GTX software version 2.10 or later
	GTX 327		GTN Control of GTX 327: GTX Mode C #1 or #2 No GTN Control of GTX 327: Aviation Output 1(output) to send GPS groundspeed. Altitude Format 1 (input, optional) to receive pressure altitude	
	GTX 328		GTX Mode S #1 or #2	GTX software version 6.11 or later
	GTX 33/33D		GTX (Mode S or w/TIS) #1 or #2	
	GTX 33/33D with ES			
	GTX 330/330D		GTN Control of GTX 330: GTX (Mode S or w/TIS) #1 or #2 No GTN control of GTX 330: Panel GTX w/TIS #1 or #2 No GTN control of GTX 330 and no TIS: ADS-B	
	GTX 330/330D with ES			

NOTE

When the GTN is used with a GTX 32, GTX 33, or GTX 33D installed using STC SA01473SE, then the limitation in STC SA01473SE requiring use of the GNS 480 (CNX 80) is no longer applicable and all configuration and operation functions of the GNS 480 are replaced by the GTN.

C.9 NAV Indicator

Manufacturer	Model	Data Format	Notes/Configuration
Honeywell (Bendix/King)	KI 202A, KI 203, KI 204, KI 206, KI 208/A, KI 209/A, KI 525A, KPI 552/B, KPI 553/A/B	Analog	
Century	NSD 360A, NSD 1000		
Collins	331A-6P, 331A-9G, PN101 (331A-3F/3G), IND-351D		[1]
Garmin	GI 102/A, GI 106/A		
Mid Continent	MD222-402, MD222-406, MD200-302/303/306/307		
Sperry	RD 444, RD 550A, RD 650		
S-TEC	ST 180		

[1] Interfacing to the Collins IND-351D, P/N 622-2083-001 is not covered by this STC.

C.10 Weather, Traffic, and Terrain

Manufacturer	Model	Data Format	Configuration	Notes
Garmin	GDL 69/69A	Garmin HSDB		Minimum GDL 69/69A software level is 4.02.
	GTX 330/33/330D/33D (with or without ES)	RS-232	Refer to Section C.8.	
	GTS 800	ARINC 429	Traffic Format 1	High Speed
	GTS 820/850	ARINC 429	Traffic Format 2	High Speed
	GTS 800/820/850	ARINC 429	Any GAMA Format	High Speed
Honeywell (Bendix/King)	KGP 560	RS-232	External EGPWS	
	KTA 870 (KTA 810), KMH 880 (KMH 820), KTA 970 (KTA 910), KMH 980 (KMH 920)	ARINC 429	Traffic Format 4	High Speed
Avidyne (Ryan)	TAS 6XX (TCAD 9900BX)	ARINC 429	Traffic Format 5	High Speed
	TCAD 9900B	RS-232	Traffic Format 7	
	TCAD 9900BX		Traffic Format 8	
L-3 Communications	SKY497 (Skywatch)	ARINC 429	Traffic Format 6	High Speed, TRC 497 software version 1.8 or later.
	SKY899 (Skywatch HP)	ARINC 429	Traffic Format 3	High Speed
	WX-500	RS-232	Lightning Detector 1	

C.11 DME

Manufacturer	Model	Data Format	Notes
Collins	DME 40, DME 42	Parallel 2x5	
Honeywell (Bendix/King)	KN62/62A	Parallel 2x5 or King Serial	
	KN63/KDI 572/KDI 574	King Serial	
	KN64	King Serial	
	KDM 706/KDI 572/KDI 574	King Serial	
Narco	DME 890, IDME 891	Narco 890/891	

C.12 CDI/HSI Source Selection Annunciators

An external CDI/HSI Source Selection Annunciation or external GPS annunciations may be required for some installations – see Section 2.4.10.1 for additional information describing when external annunciation is required. The following indicators and indicator/switches are suitable for external annunciation:

Manufacturer	Part Number	Type	Notes
Mid-Continent	MD41-1510, MD41-1511, MD41-1512, MD41-1513, MD41-1514, MD41-1515, MD41-1408A, MD41-1404A, MD41-1418A, MD41-1414A, MD41-1468A, MD41-1478A, MD41-1464A, MD41-1474A, MD41-1470, MD41-1484W, MD41-1488W	Indicator/Switch/ GPS Annunciations	Both 14VDC and 28VDC indicators (refer to Mid-Continent documentation for availability of switch functions on each unit) The MD41-151X ACU is the preferred indicator, although the MD41-14XX ACU is acceptable. Refer to Section 2.4.9 for more information.
Staco Switch	992561-1241762200	Indicator	14VDC Indicator
Staco Switch	992561-1241862200	Indicator	28VDC Indicator
Vivisun	95-40-17-B6-AW724	Indicator	28VDC Indicator (can be converted to 14VDC operation by replacing four 28VDC lamps with 14VDC lamps P/N 14-113).
Vivisun	95-45-11-B6-AW724	Indicator/Switch	28VDC Indicator with momentary switch (can be converted to 14VDC operation by replacing qty 4 28VDC lamps with 14VDC lamps P/N 14-113).

Vendor Contact Information (provided for convenience only)

Staco Switch, 1139 Baker Street Costa Mesa, CA 92626
Phone: (877) STACO4U

Vivisun Aerospace Optics, 3201 Sandy Lane Fort Worth, Texas 76112
Phone: (888) VIVISUN

Mid-Continent Instrument Co Inc., 9400 E. 34th Street N., Wichita, KS 67226,
Phone: (316) 630-0101, www.mcico.com

C.13 TAWS Annunciator Panels

An external TAWS annunciator may be required for some installations. See Section 2.4.10.1 for additional information describing when a TAWS annunciator is required. The following indicators are suitable for external annunciation.

Manufacturer	Part Number	Type	Notes
Garmin	013-00079-XX	Indicator/switch	5VDC, 14VDC, and 28VDC indicators.
Mid-Continent	MD41-10XX	Indicator/Switch	Both 14VDC and 28VDC indicators (refer to Mid-Continent documentation for availability of switch functions on each unit)

Vendor Contact Information (provided for convenience only)

Mid-Continent Instrument Co Inc., 9400 E. 34th Street N., Wichita, KS 67226,
Phone: (316) 630-0101, www.mcico.com

C.14 Multifunction Displays

Manufacturer	Model	Data Format	Configuration/Notes
Garmin	MX20	RS-232	Aviation Output 2 format for MX20 version 5.5 and earlier. Aviation Output 1 format for MX20 version 5.6 and later. (MX20 will not accept GPS altitude even though it is part of Aviation Output 1 Format). MapMX format for MX20 version 5.6 or later.
	GMX 200		Aviation Output 1 format MapMX format (preferred)
Avidyne	EX500 (P/N 700-00007-( )), EX5000 (P/N 700-00004-( ) or P/N 700-00030-( ))	ARINC 429	Use GAMA Format 2, low speed MFD software P/N 530-00193-( ) or later is required
			Use GAMA Format 2, low speed MFD software P/N 530-00195-( ) or later is required

C.15 Interface Adapters

Manufacturer	Model	Data Format	Notes/Configuration
Garmin	GAD 42	ARINC 429	GAD Format 1, low speed Any ARINC 429 output format may be used to allow configuration of the GAD 42.

C.16 Synchro Heading Sources

Manufacturer	Model	Data Format	Notes/Configuration
Bendix/King	KI-525A	Analog	Synchro Heading Input = ‘Connected’. Refer to Section 5.5.1.9.

C.17 Weather Radar

Manufacturer	Model	Data Format	Configuration	Notes/Configuration
Garmin	GWX 68	HSDB	HSDB	Configured for Return Bins: 600. Within the radome, HSDB cabling to the weather radar transceiver must be protected with overbraid. Refer to Section 5.5.1.4. GWX 68 software version 2.12 or later.
Garmin	GWX 70	HSDB	HSDB	Configured for Return Bins: 600. Within the radome, HSDB cabling to the weather radar transceiver must be protected with overbraid. Refer to Section 5.5.1.4.
Bendix/King	RDS 81 (RS 811A), RDS 82 (RS 181A), RDR 2000 (ART 2000) RDR 2100 (ART 2100)	ARINC 429, ARINC 708, Discrete	ARINC 429 Setup: OUT: Low, Radar Format 1	Overbraiding not required. **RDR 2000:** Configured for: • Desired Antenna Sweep 100 • Map Gain Change Accepted • Target Alert Disabled **RDR 2100:** Configured for: • Desired Antenna Sweep 100 • Wx Gain Change Ignored • Map Gain Change Accepted • ARL Disabled • Auto Step Scan Disabled • Autotilt Disabled • Target Alert Disabled

C.18 Iridium Transceiver

Manufacturer	Model	Data Format	Configuration	Notes
Garmin	GSR 56	RS-232	GSR Format 1	

C.19 ADS-B Traffic and FIS-B Weather Sources

Manufacturer	Model	Data Format	Configuration	Notes
Garmin	GDL 88	HSDB	HSDB	Refer to Section 5.5.1.4.3.

Appendix D GMA 35 Equipment Compatibility

The following equipment listed in this appendix is compatible with the GMA 35 Audio Panel when configured as described herein. For detailed configuration information refer to Section 5.5.4.8.

D.1 COM Radios

COM radios not listed below can still be approved under this GTN AML STC if **all** of the following conditions are met:

- The COM radio is TSO approved;
- The installation of the COM radio was previously FAA-approved;
- The operational check for the COM radio described in Section 5.7.6.3 must be successfully completed.

Mfg	Model	Data Format	Notes
Garmin	GNS 430W	Analog Audio	
	GNS 530W		
	GTN 635/650/750		
	SL 30		
	SL 40		

D.2 NAV Radios

NAV radios not listed below can still be approved under this GTN AML STC if **all** of the following conditions are met:

- The NAV radio is TSO approved;
- The installation of the NAV radio was previously FAA-approved;
- The audio check for the NAV radio described in Section 5.7.6.4 must be successfully completed.

Mfg	Model	Data Format	Notes
Garmin	GNS 430W	Analog Audio	
	GNS 530W		
	GTN 650/750		
	SL 30		

D.3 Other Audio Sources

Audio sources listed in Appendix F may be interfaced to the GMA 35. Other analog audio sources may also be interfaced to the GMA 35 under this GTN AML STC if all of the following conditions are met:

- The installation of the audio source was previously FAA-approved.
- The audio source provides standard analog audio, designed to drive at least a 600 Ω load.
- The applicable audio check described in Section 5.7.6.5, 5.7.6.6, or 5.7.6.9 must be successfully completed.

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Appendix E GTN Interconnect Diagrams

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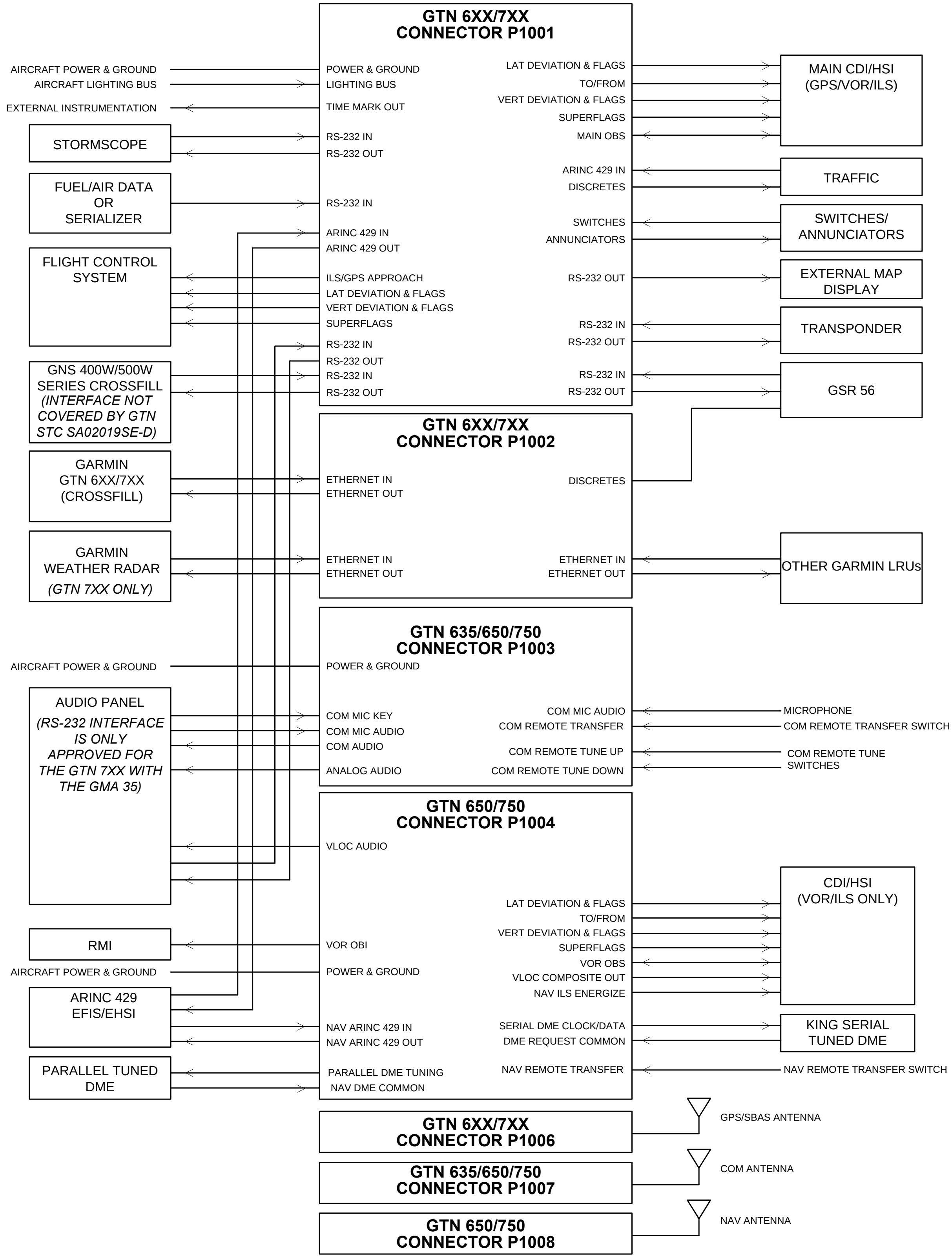


Figure E-1. GTN System Interface Diagram

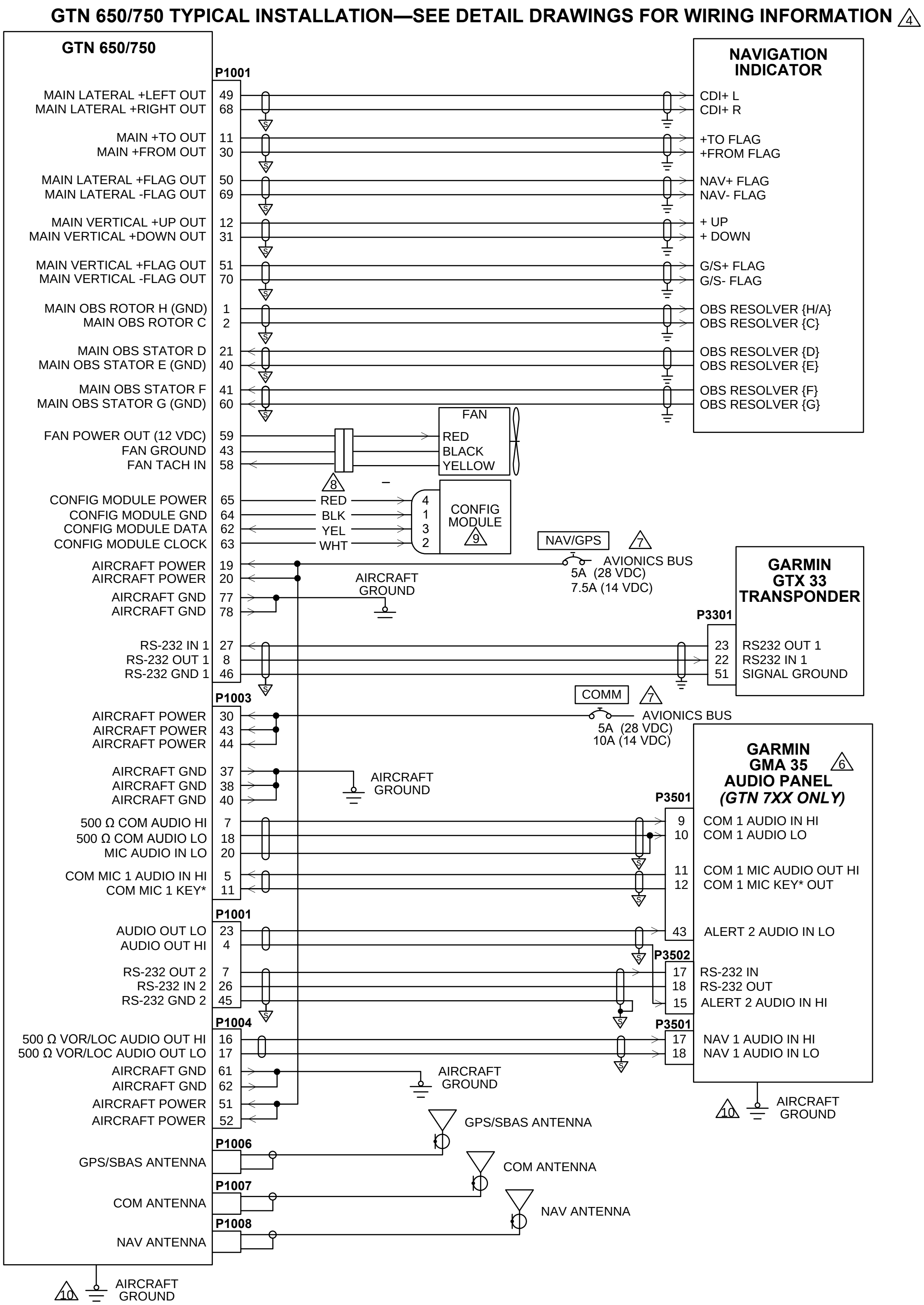


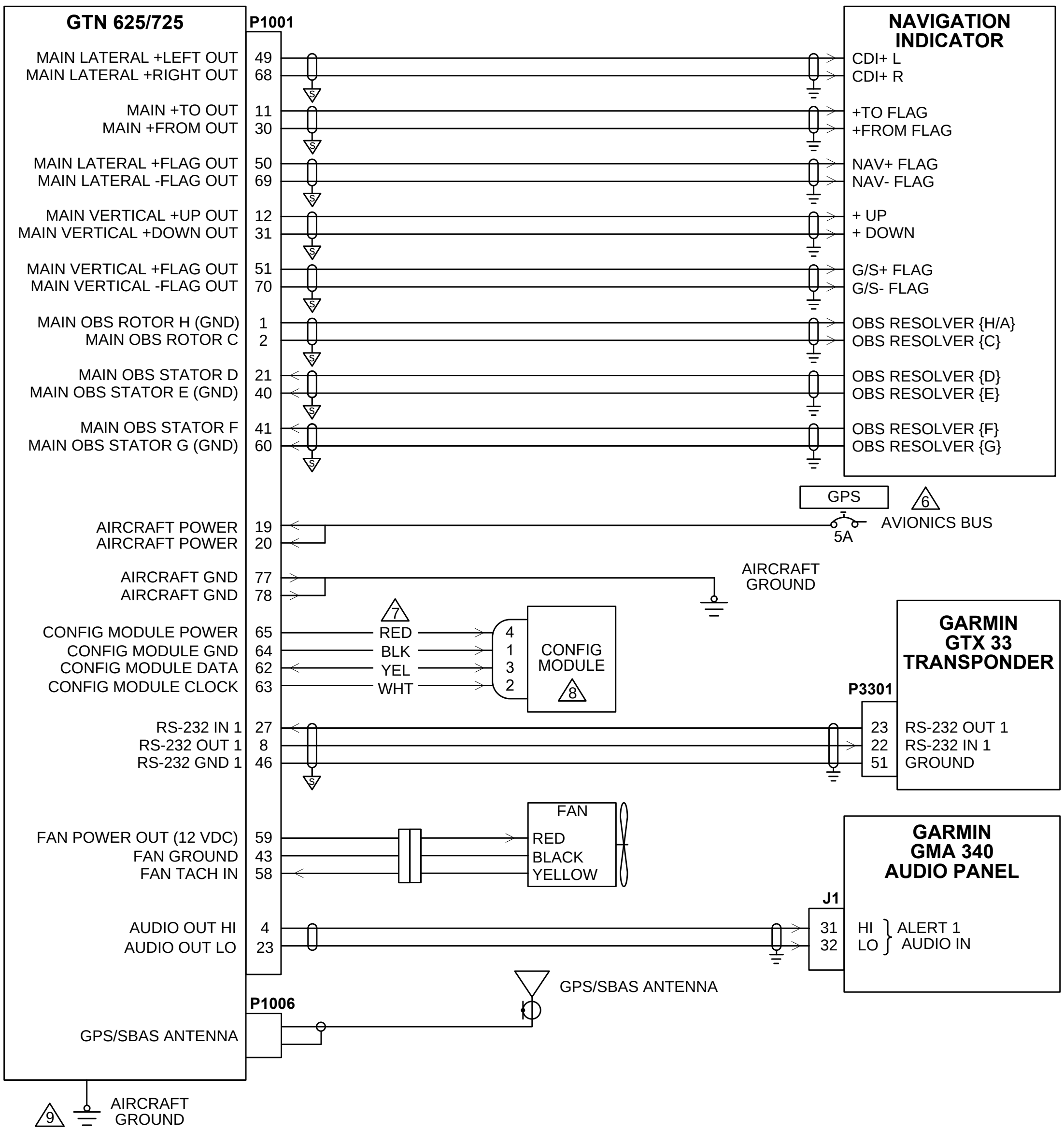
Figure E-2. GTN 650/750 Typical Installation Interconnect
Sheet 1 of 2

NOTES:

1. SEE DETAIL DRAWINGS FOR WIRE GAUGE INFO
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. THIS DIAGRAM PROVIDES AN OVERVIEW OF A TYPICAL GTN 6XX/7XX INSTALLATION. REFER TO APPROPRIATE INTERCONNECT DIAGRAMS FOR SPECIFIC EQUIPMENT.
5. AIRCRAFT POWER INPUT TO THE MAIN, COM, AND NAV BOARDS MUST BE 11-33 VDC.
6. THE GMA 35 CAN ONLY BE INTERFACED AND CONTROLLED WITH THE GTN 7XX. FOR GTN 6XX INSTALLATIONS, USE AN ALTERNATE AUDIO PANEL.
7. REFER TO FIGURE E-4 FOR POWER AND GROUND WIRING DETAILS.
8. CONFIGURATION MODULE HARNESS USES 28 AWG WIRES. CONTACTS SUPPLIED WITH CONFIGURATION MODULE MUST BE USED FOR CONNECTING CONFIGURATION MODULE HARNESS TO P1001.
9. CONFIGURATION MODULE IS MOUNTED IN THE BACKSHELL OF THE P1001 CONNECTOR.
10. VERIFY AIRCRAFT GROUND MEETS BONDING REQUIREMENTS IN SECTION 2.4.5.

Figure E-2. GTN 650-750 Typical Installation Interconnect
Sheet 2 of 2

GTN 625/725 TYPICAL INSTALLATION—SEE DETAIL DRAWINGS FOR WIRING INFORMATION 4



NOTES:

1. SEE DETAIL DRAWINGS FOR WIRE GAUGE INFO.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. THIS DIAGRAM PROVIDES AN OVERVIEW OF A TYPICAL GTN 625/725 INSTALLATION. REFER TO APPROPRIATE INTERCONNECT DIAGRAMS FOR SPECIFIC EQUIPMENT.
5. AIRCRAFT POWER INPUT TO THE GTN MUST BE 11-33 VDC.
6. REFER TO FIGURE E-4 FOR POWER AND GROUND WIRING DETAILS.
7. CONFIGURATION MODULE HARNESS USES 28 AWG WIRES. CONTACTS SUPPLIED WITH CONFIGURATION MODULE MUST BE USED FOR CONNECTING CONFIGURATION MODULE HARNESS TO P1001.
8. CONFIGURATION MODULE IS MOUNTED IN THE BACKSHELL OF THE P1001 CONNECTOR.
9. VERIFY AIRCRAFT GROUND MEETS BONDING REQUIREMENTS IN SECTION 2.4.5.

Figure E-3. GTN 625/725 Typical Installation Interconnect

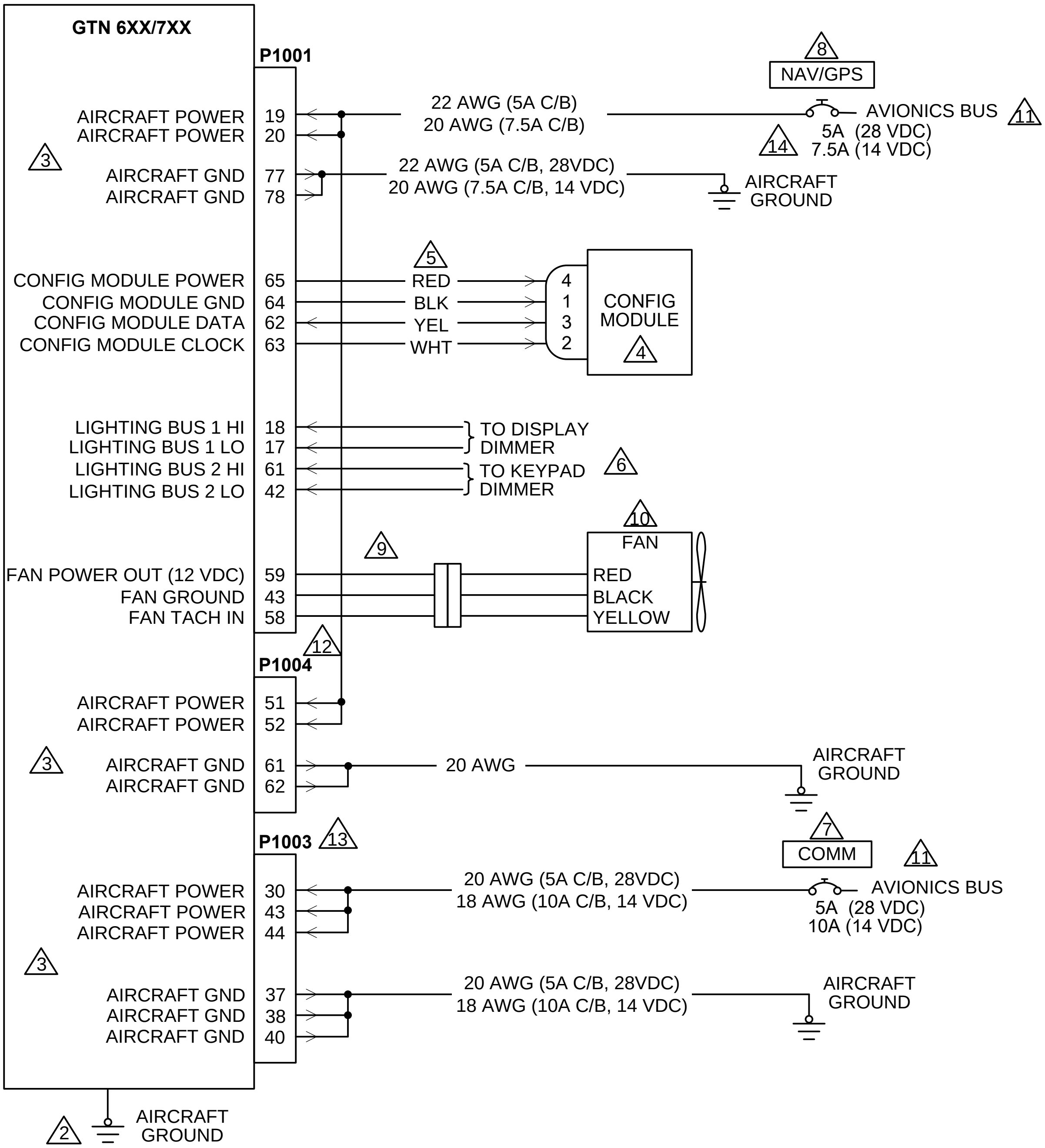


Figure E-4. GTN Power Lighting Configuration Interconnect
Sheet 1 of 3

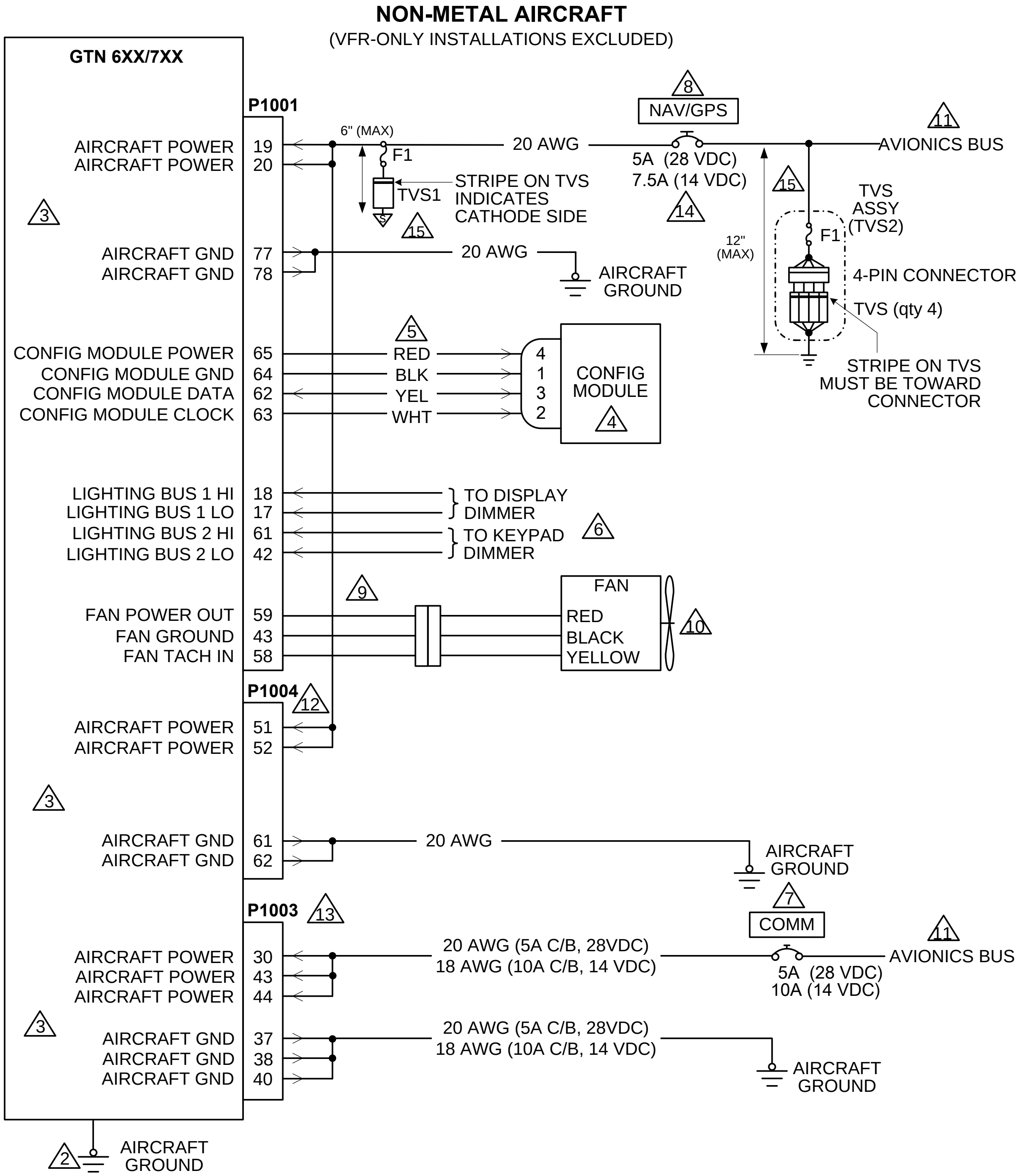


Figure E-4. GTN Power Lighting Configuration Interconnect
Sheet 2 of 3

NOTES:

1 ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.

2 GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
VERIFY AIRCRAFT GROUND MEETS BONDING REQUIREMENTS IN SECTION 2.4.5.

3 ALL POWER LEADS AND GROUND LEADS ARE REQUIRED. 22 AWG WIRE CAN BE USED FOR THE SPLICE. USE APPROPRIATE HEAT-SHRINK TUBING TO PROVIDE SUFFICIENT INSULATION FROM SURROUNDING CONTACTS.

4 CONFIGURATION MODULE IS MOUNTED IN THE BACKSHELL OF THE P1001 CONNECTOR.

5 CONFIGURATION MODULE HARNESS USES 28 AWG WIRES. CONTACTS SUPPLIED WITH CONFIGURATION MODULE MUST BE USED FOR CONNECTING CONFIGURATION MODULE HARNESS TO P1001.

6 OPTIONAL CONNECTION. LIGHTING CAN BE CONTROLLED BY THE INTEGRATED PHOTOCELL, A SINGLE LIGHTING BUS, OR DUAL LIGHTING BUSES. IF THE AIRCRAFT HAS A SINGLE LIGHTING BUS, ONLY LIGHTING BUS 1 NEEDS TO BE WIRED. REFER TO SECTION 5.5.1.6 FOR CONFIGURATION DETAILS.

7 CIRCUIT BREAKER SHOULD BE LABELED AS “COM”, “COM1”, OR “COM2” DIRECTLY ADJACENT TO THE CIRCUIT BREAKER. THE CIRCUIT BREAKER MUST BE READILY ACCESSIBLE TO THE PILOT. ALTERNATE SPELLINGS OF “COM” ARE ACCEPTABLE (E.G., “COMM”)

8 CIRCUIT BREAKER SHOULD BE LABELED AS: “GPS”, “GPS1”, OR “GPS 2” FOR THE GTN 625/635/725, AND “NAV/GPS”, “NAV/GPS1”, OR “NAV/GPS2” FOR THE GTN 650/750, DIRECTLY ADJACENT TO THE CIRCUIT BREAKER. THE CIRCUIT BREAKER MUST BE READILY ACCESSIBLE TO THE PILOT.

9 IF MODIFICATION OF THE HARNESS FROM THE FAN TO THE P1001 CONNECTOR IS NECESSARY, THE MODIFIED LENGTH MUST NOT BE LONGER THAN 8 INCHES. THE FAN HARNESS PART NUMBER IS 320-00600-00, AND IS SUPPLIED AS PART OF THE GTN 6XX OR 7XX CONNECTOR KIT.

10 FAN SUPPLIED AS PART OF BACKPLATE ASSEMBLY.

11 REFER TO SECTION 2.7 FOR SPECIFIC INSTRUCTIONS ON POWER DISTRIBUTION TO THE GTN FOR SINGLE AND DUAL INSTALLATIONS.

12 GTN 650 AND GTN 750 ONLY

13 GTN 635, GTN 650, AND GTN 750 ONLY

14 THE GTN 625 AND GTN 725 ONLY REQUIRE A 5 AMP C/B

15 TVS PROTECTION IS ONLY REQUIRED ON ONE GTN IN A DUAL NAV/COM, NON-METAL AIRCRAFT INSTALLATION. FOR VFR-ONLY INSTALLATIONS, WIRE AS SHOWN ON SHEET 1. REFER TO SECTION 2.3.2.4 FOR PART NUMBERS. REFER TO SECTION 3.6.5 FOR ASSEMBLY INSTRUCTIONS.

Figure E-4. GTN Power Lighting Configuration Interconnect
Sheet 3 of 3

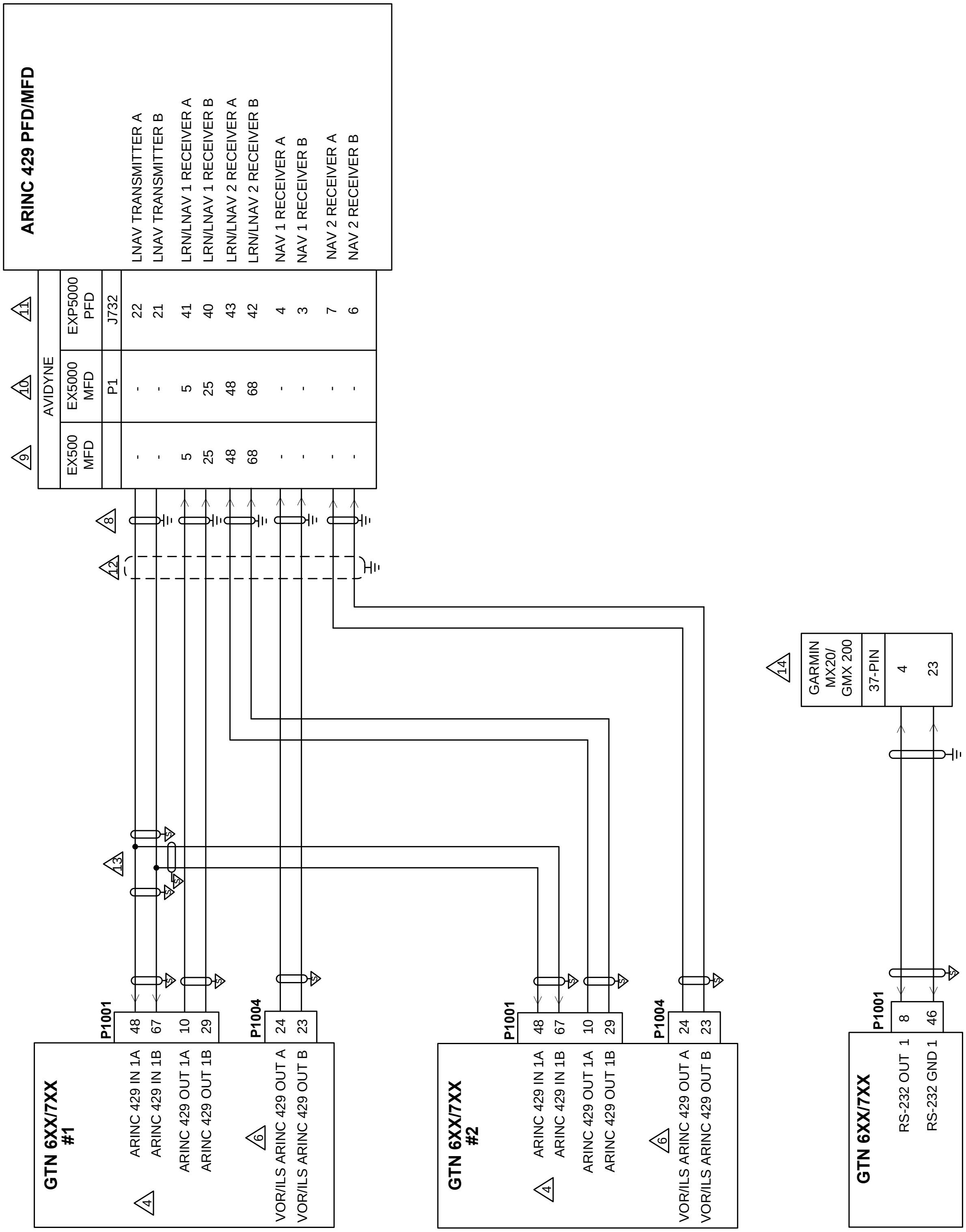


Figure E-5. GTN 6XX/7XX – PFD/MFD Interconnect
Sheet 1 of 2

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. IF THE ARINC 429 IN 1 PORT (P1001 PINS -48 AND -67) IS ALREADY IN USE FOR ANOTHER PURPOSE, ANY AVAILABLE ARINC 429 IN PORT MAY BE CONNECTED INSTEAD.
5. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
6. THESE OUTPUTS ARE USED ON THE GTN 650/750 ONLY.
7. REFER TO SECTION 5.5.1 FOR CONFIGURATION INFORMATION.
8. TERMINATE SHIELDS AT PFD/MFD IN ACCORDANCE WITH MANUFACTURER'S DOCUMENTATION.
9. DISPLAY P/N 700-00007-( ) WITH SOFTWARE P/N 530-00193-( ) OR LATER IS REQUIRED FOR PROPER OPERATION WITH THE GTN 6XX/7XX UNIT.

EX500 MFD GPS/FMS SETUP:	RECEIVER 1:	GAMA 429 FORMAT
	PORT:	ARINC 429 1 – GPS A DEFAULT
	SPEED:	LOW
	RECEIVER 2:	GAMA 429 FORMAT
	PORT:	ARINC 429 4
	SPEED:	LOW

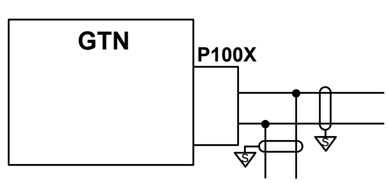
10. DISPLAY P/N 700-00004-( ) OR P/N 700-00030-( ) WITH SOFTWARE P/N 530-00195-( ) OR LATER IS REQUIRED FOR PROPER OPERATION WITH THE GTN 6XX/7XX UNIT.

EX5000 MFD GPS/FMS SETUP:	RECEIVER 1:	GAMA 429 FORMAT
	PORT:	ARINC 429 1
	SPEED:	LOW
	RECEIVER 2:	GAMA 429 FORMAT
	PORT:	ARINC 429 4
	SPEED:	LOW

11. DISPLAY P/N 700-00006-( ) WITH SOFTWARE P/N 530-00194-( ) OR LATER IS REQUIRED FOR PROPER OPERATION WITH THE GTN 6XX/7XX UNIT.

EXP5000 PFD SETUP:	GPS 1:	GARMIN 430/530 ON ARINC 1
	GPS 2:	GARMIN 430/530 ON ARINC 3
	VHF 1:	GARMIN 430/530 ON ARINC 2
	VHF 2:	GARMIN 430/530 ON ARINC 4

12. ALL CONNECTIONS TO THE AVIDYNE EXP 5000 PFD MUST BE OVERBRAIDED PER THE AVIDYNE EXP 5000 INSTALLATION MANUAL. USE OVERBRAID P/N AND METHOD OUTLINED IN THE AVIDYNE EXP 5000 INSTALLATION MANUAL. CONNECTIONS TO THE EX 500/5000 MFD DO NOT NEED TO BE OVERBRAIDED.
13. THE SPLICE MUST BE PERFORMED AT THE GTN CONNECTOR END OF THE WIRE. SPLICE AS SHOWN:



14. MAPMX IS THE PREFERRED COMMUNICATION PROTOCOL FOR THE MX20/GMX 200. OTHER INPUT PORTS ON THE MX20/GMX 200 MAY BE USED IN LIEU OF THE PORT SHOWN. REFER TO THE APPROPRIATE INSTALLATION MANUAL FOR ADDITIONAL DETAILS.

Figure E-5. GTN 6XX/7XX – PFD/MFD Interconnect
Sheet 2 of 2

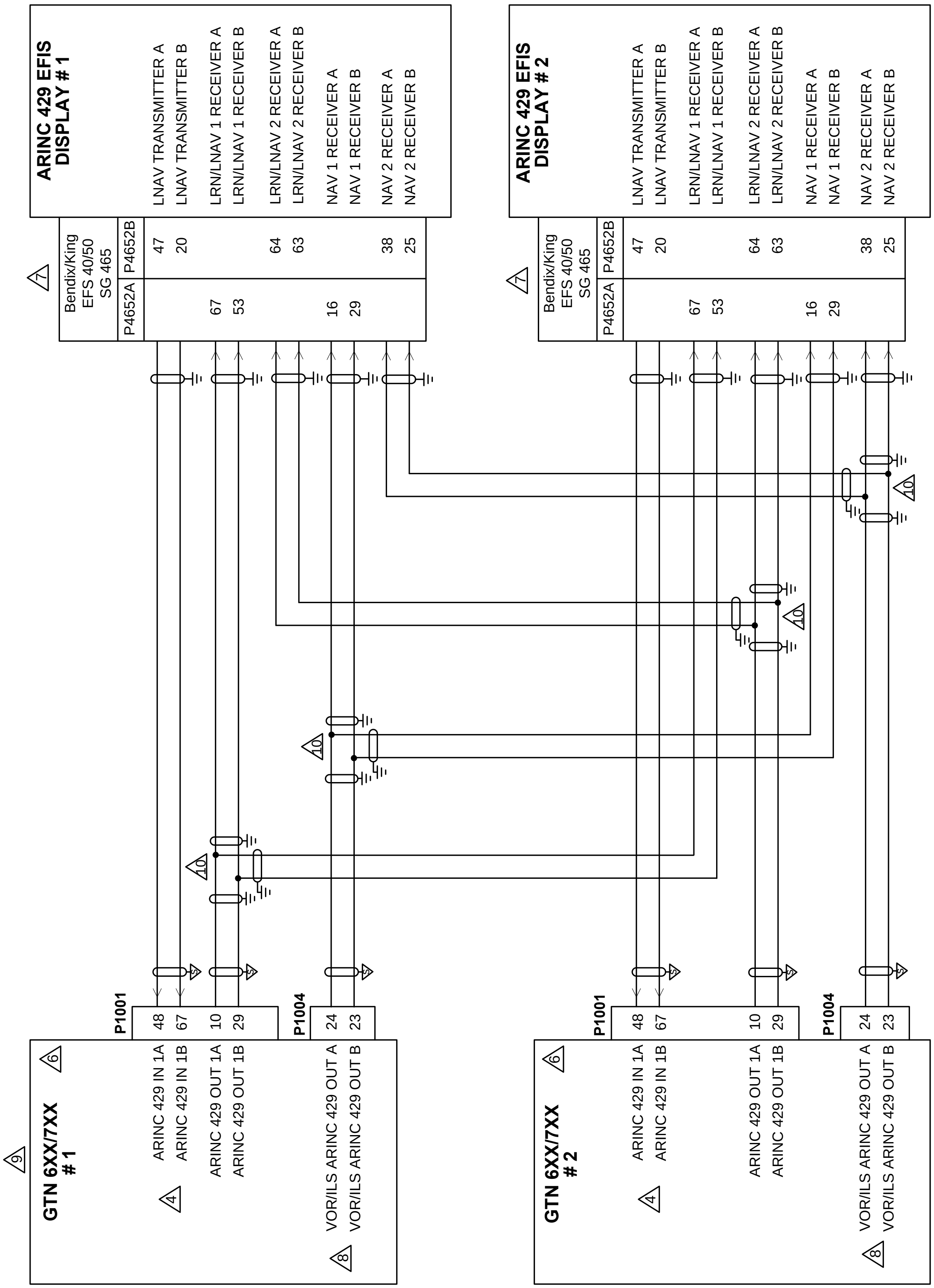


Figure E-6. GTN 6XX/7XX – ARINC 429 EFIS Interconnect
Sheet 1 of 3

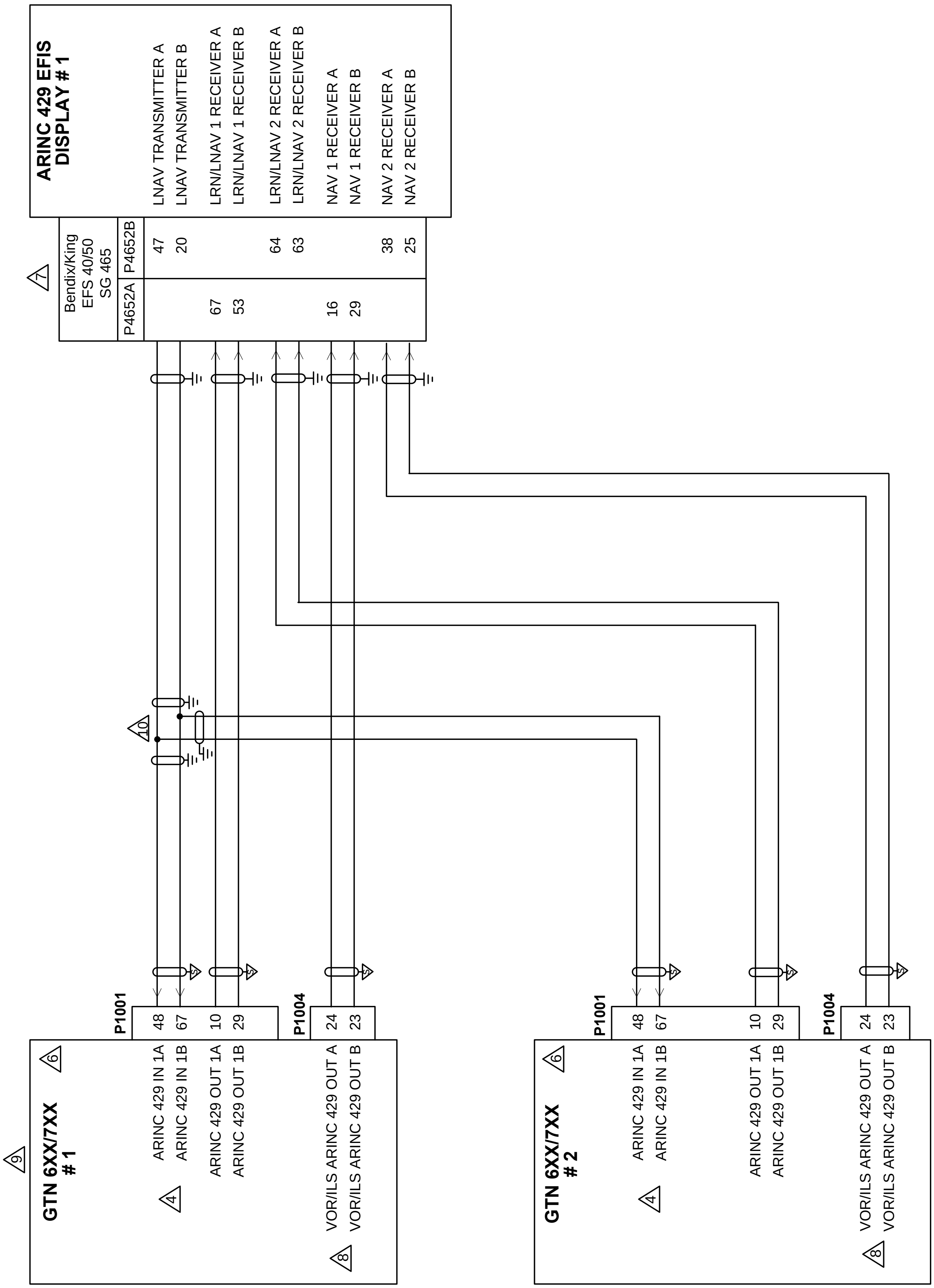


Figure E-6. GTN 6XX/7XX – ARINC 429 EFIS Interconnect
Sheet 2 of 3

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. IF THE ARINC 429 IN 1 PORT (P1001 PINS -48 AND -67) IS ALREADY USED FOR ANOTHER PURPOSE, ANY AVAILABLE ARINC 429 IN PORT MAY BE CONNECTED INSTEAD.
5. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
6. REFER TO SECTION 5.5.1.1 FOR GTN 6XX/7XX CONFIGURATION SETTINGS.
7. SG 465 SOFTWARE 1101 OR LATER IS REQUIRED FOR PROPER OPERATION WITH THE GTN 6XX/7XX UNIT.

   USE THE FOLLOWING SETTINGS FOR CONFIGURING THE EFIS 40/50 WITH SOFTWARE 1101 OR LATER:

FMS VNAV CONFIGURATION:	2: FEET OR ANGLE
VARIABLE LNAV CONFIGURATION:	LNAV 1/2:VAR
FMS #1/#2 CONFIGURATION:	5: KLN 90-GPS*

   *KLN 90-GPS SETTING **MUST** BE USED FOR VERTICAL GPS DEVIATION TO BE DISPLAYED CORRECTLY.

   USE THE FOLLOWING SETTINGS FOR CONFIGURING THE EFIS 40/50 WITH SOFTWARE 1501 OR LATER:

FMS VNAV CONFIGURATION:	2: FEET OR ANGLE
FMS #1/#2 CONFIGURATION:	7: GAMA 429-GPS
LNAV X-TRACK SCALE FACTOR:	LNAV 1/2:VAR (AS APPROPRIATE)
VNAV DEVIATION SCALE FACTOR:	LNAV 1/2:VAR (AS APPROPRIATE)
LNAV VERT APR COUPLING TO AFCS:	LNAV 1/2:YES (AS APPROPRIATE)
L/VNAV VERT APR COUPLING TO AFCS:	LNAV 1/2:YES (AS APPROPRIATE)
LP VERT APR COUPLING TO AFCS:	LNAV 1/2:YES (AS APPROPRIATE)
LPV VERT APR COUPLING TO AFCS:	LNAV 1/2:YES (AS APPROPRIATE)
LNAV SELECT OUT:	1: ENROUTE ONLY (SETTING DOES NOT MATTER IF THIS DISCRETE OUTPUT IS NOT USED IN THE INSTALLATION)

8. THESE OUTPUTS ARE USED ON THE GTN 650/750 ONLY.
9. WIRE AS SHOWN FOR GTN #1 IN A SINGLE GTN INSTALLATION.
10. THE SPLICE MUST BE PERFORMED AT THE REMOTE END CONNECTOR IN ACCORDANCE WITH THE MANUFACTURER'S EQUIPMENT INSTALLATION MANUAL. SPLICE AS SHOWN:

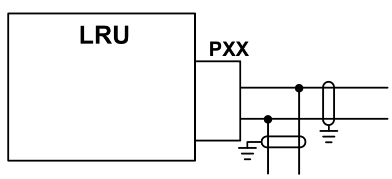


Figure E-6. GTN 6XX/7XX – ARINC 429 EFIS Interconnect
Sheet 3 of 3

EXTERNAL NAVIGATION SOURCE SELECTION ANNUNCIATORS

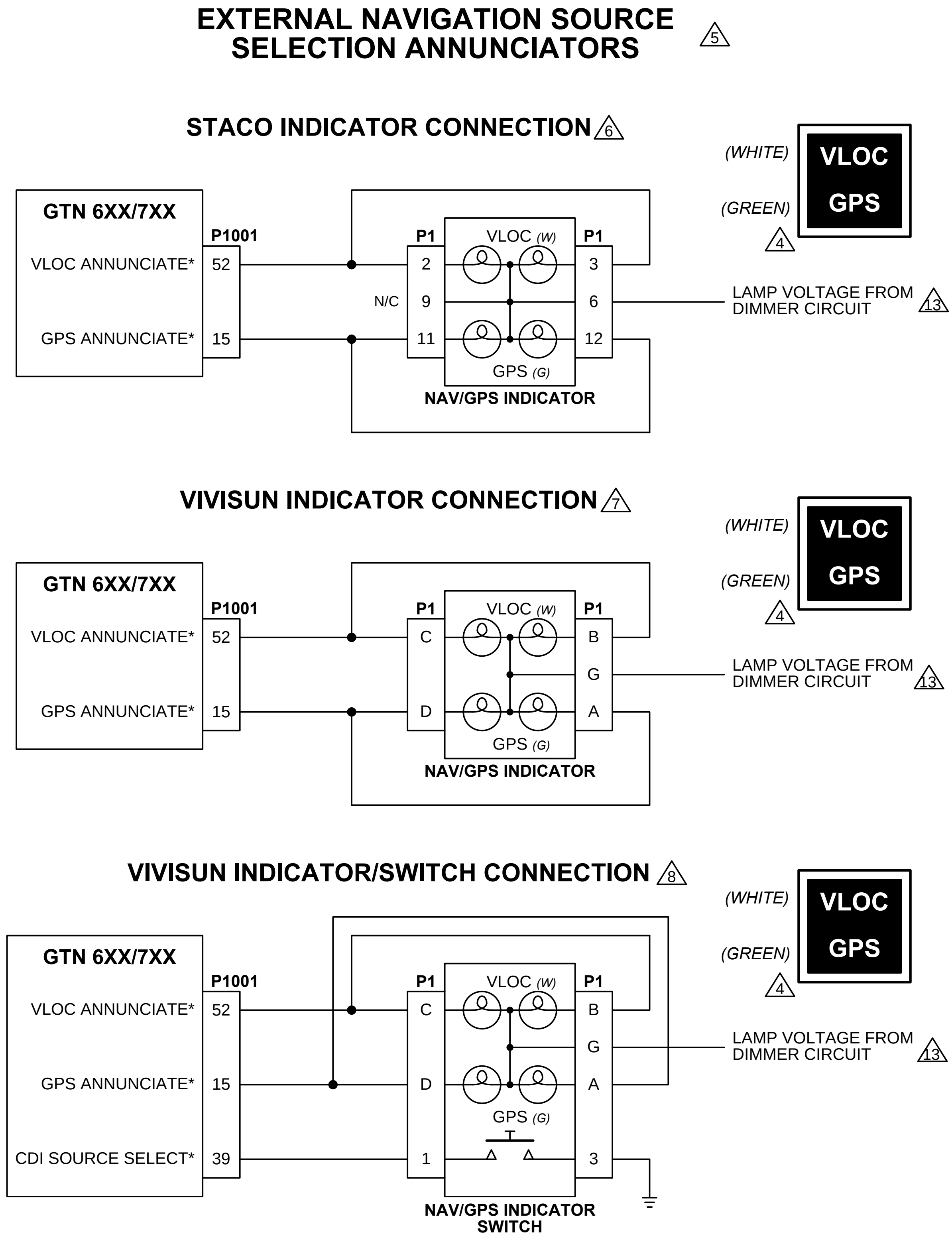
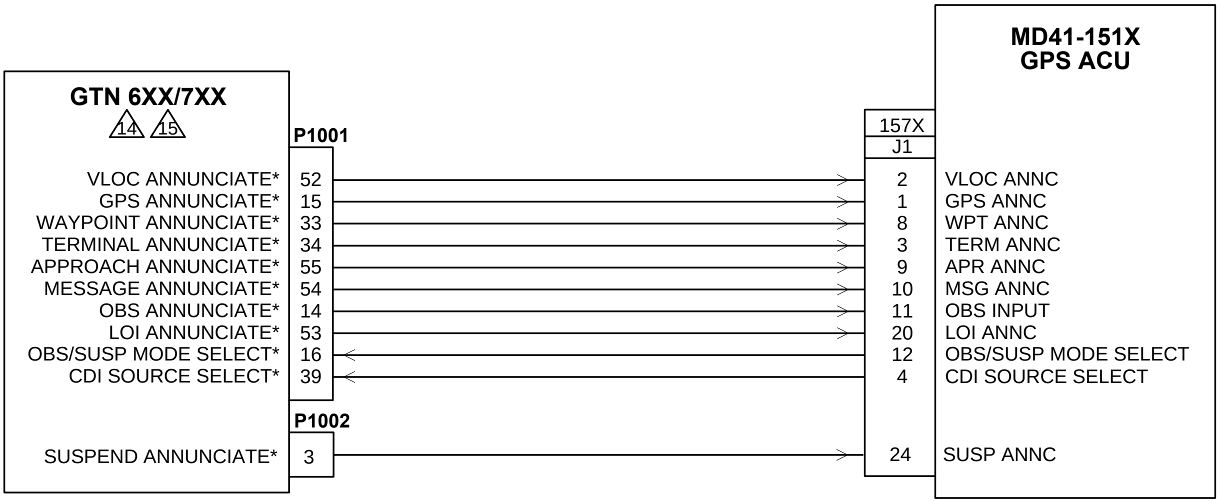


Figure E-7. External Navigation Source Selection Annunciator Interconnect Sheet 1 of 3

MID-CONTINENT PREFERRED SOURCE SELECTION ANNUNCIATOR



MID-CONTINENT ACU CONNECTIONS FOR PRE-EXISTING ACUs ONLY

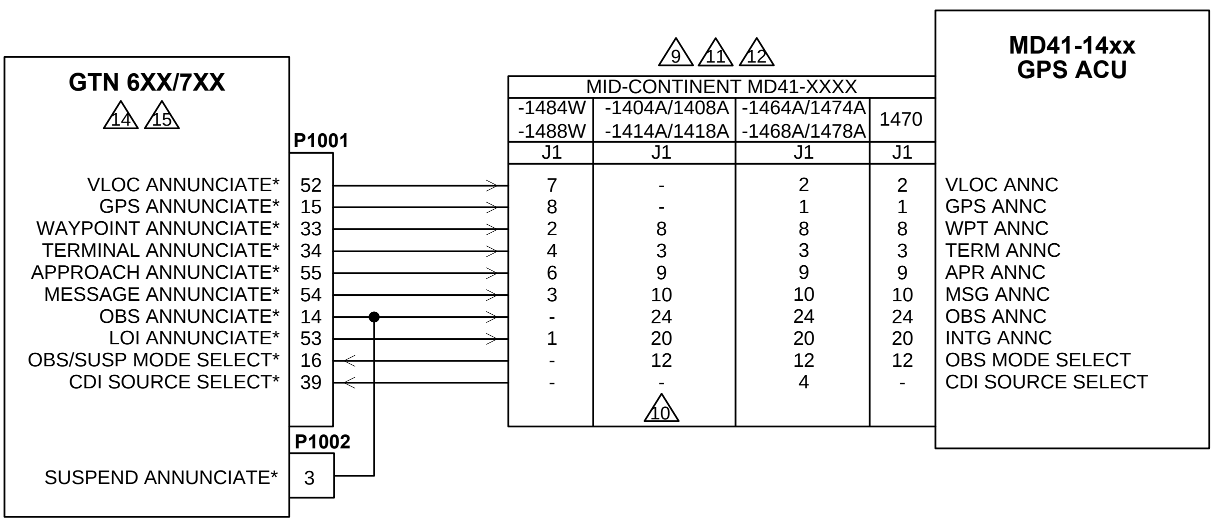


Figure E-7. External Navigation Source Selection Annunciator Interconnect
Sheet 2 of 3

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. IF A CDI/HSI SOURCE SELECTION ANNUNCIATOR IS REQUIRED, INDICATORS ON THIS PAGE ARE SUITABLE TO MEET THE ANNUNCIATION REQUIREMENT.
4. LEGENDS ARE HIDDEN (BLACK) WHEN NOT ILLUMINATED.
5. THE PREFERRED ANNUNCIATION IS VLOC/GPS ALTHOUGH NAV/GPS IS ACCEPTABLE.
6. STACO SWITCH INDICATOR P/N 992561-1241762200 (14V SYSTEMS) AND P/N 992561-1241862200 (28V SYSTEMS) SHOWN.
7. VIVISUN INDICATOR P/N 95-40-17-B6-AW724 (28V SYSTEMS) SHOWN. INDICATOR MAY BE CONVERTED TO 14V OPERATION BY REPLACING 28V LAMPS WITH 14V LAMPS P/N 14-113.
8. VIVISUN INDICATOR WITH MOMENTARY SWITCH P/N 95-45-11-B6-AW724 (28V SYSTEMS) SHOWN. INDICATOR MAY BE CONVERTED TO 14V OPERATION BY REPLACING 28V LAMPS WITH 14V LAMPS P/N 14-113.
9. THESE UNITS ALSO PROVIDE NAVIGATION SOURCE SELECTION ANNUNCIATION. MID-CONTINENT ANNUNCIATION CONTROL UNITS FOR BOTH 14V AND 28V SYSTEMS SHOWN. REFER TO MID-CONTINENT INSTALLATION MANUAL FOR ADDITIONAL DETAILS.
10. CDI SOURCE SELECTION AND ANNUNCIATION IS DONE WITH EXTERNAL RELAYS. REFER TO MID-CONTINENT INSTALLATION MANUAL FOR ADDITIONAL INSTALLATION INFORMATION.
11. THE MD41-14XX ANNUNCIATORS SHOWN DO NOT PROVIDE A ‘SUSP’ ANNUNCIATION, AND ARE ONLY TO BE USED IF THEY ARE PRE-EXISTING IN THE AIRCRAFT. IF PERFORMING A NEW INSTALLATION AND SOURCE SELECTION ANNUNCIATIONS ARE REQUIRED, USE THE MD41-151X SHOWN ON THIS PAGE. SEE SECTION 2.4.9 FOR ADDITIONAL INFORMATION.
12. SINCE MD41-14XX ANNUNCIATORS DO NOT PROVIDE A ‘SUSP’ ANUNCIATION, THEY MUST BE PLACARDED DIRECTLY ADJACENT TO THE ACU: “GREEN OBS INDICATES OBS OR SUSP MODE--GTN ANNUNCIATOR BAR INDICATES WHICH IS ACTIVE. PUSH OBS BUTTON TO CHANGE OBS OR SUSP MODE”. AS AN ALTERNATIVE, THE MD41-151X MAY BE INSTALLED, AS SHOWN ON THIS PAGE. SEE SECTION 2.4.9 FOR ADDITIONAL INFORMATION.
13. LAMPS SHOULD RECEIVE POWER FROM THE SAME POWER BUS TO WHICH THE GTN IS CONNECTED.
14. FOR GTN 625/635/725 INSTALLATIONS, IF THE ACU CONTAINS A CDI SOURCE SELECT SWITCH, THEN THE CDI SOURCE SELECT SWITCH (LABELED “CDI” OR “NAV GPS”) WILL NOT BE USED AND MUST BE PLACARDED DIRECTLY ADJACENT TO THE ACU: “CDI SWITCH UNUSED” OR “NAV GPS SWITCH UNUSED” (DEPENDING ON THE LABEL OF THE INSTALLED SWITCH).
15. FOR GTN 625/635/725 INSTALLATIONS, THE CONNECTIONS FROM THE ACU TO P1001-52, VLOC ANNUNCIATE*, AND P1001-39, CDI SOURCE SELECT*, ARE NOT NECESSARY.

Figure E-7. External Navigation Source Selection Annunciator Interconnect Sheet 3 of 3

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GTN 6XX/7XX △4	P1001	MID-CONTINENT MD200-306/307 P1	MID-CONTINENT MD200-302/303 P1	MID-CONTINENT MD222-402 P1	MID-CONTINENT MD222-406 P1	GARMIN GI 102 GI 102A P1	GARMIN GI 106 GI 106A P1	HONEYWELL (BENDIX/KING) KI 206 P2061	HONEYWELL (BENDIX/KING) KI 525A P1	HONEYWELL (BENDIX/KING) KI 525A P2	HONEYWELL (BENDIX/KING) KPI 552 KPI 552B KPI 553 KPI 553A KPI 553B P101	NAVIGATION INDICATOR △7
MAIN LATERAL +LEFT OUT	49	11	11	22	22	11	11	n	V	-	i	CDI+ L
MAIN LATERAL +RIGHT OUT	68	12	12	23	23	12	12	j	b	-	h	CDI+ R
MAIN +TO OUT	11	9	9	16	16	9	9	e	Z	-	j	+TO FLAG
MAIN +FROM OUT	30	10	10	17	17	10	10	S	T	-	k	+FROM FLAG
MAIN LATERAL +FLAG OUT	50	7	7	20	20	7	7	N	K	-	f	NAV+ FLAG
MAIN LATERAL -FLAG OUT	69	8	8	21	21	8	8	F	F	-	g	NAV- FLAG
MAIN VERTICAL +UP OUT	12	13	-	-	25	-	13	k	-	E	JJ	+ UP
MAIN VERTICAL +DOWN OUT	31	14	-	-	24	-	14	m	-	B	HH	+ DOWN
MAIN VERTICAL +FLAG OUT	51	15	-	-	18	-	15	H	-	J	FF	G/S+ FLAG
MAIN VERTICAL -FLAG OUT	70	16	-	-	19	-	16	J	W	-	GG	G/S- FLAG
MAIN OBS ROTOR H (GND)	1	1	1	1	1	1	1	c	-	X	W	OBS RESOLVER {H/A}
MAIN OBS ROTOR C	2	2	2	2	2	2	2	Z	-	a	N,V	OBS RESOLVER {C}
MAIN OBS STATOR D	21	3	3	3	3	3	3	L	-	V	Z	OBS RESOLVER {D}
MAIN OBS STATOR E (GND)	40	5	5	5	5	5	5	P	-	Y	a	OBS RESOLVER {E}
MAIN OBS STATOR F	41	4	4	6	6	4	4	T	-	b	Y	OBS RESOLVER {F}
MAIN OBS STATOR G (GND)	60	6	6	4	4	6	6	W	-	e	X	OBS RESOLVER {G}
GPS ANNUNCIATE*	15	17	17	15	15	-	17 △5	-	-	-	-	GPS ANNC
VLOC ANNUNCIATE*	52	24	24	8	8	-	18 △5	-	-	-	-	NAV ANNC

Figure E-8. GTN 6XX/7XX – CDI Interconnect
Sheet 1 of 3

GTN 6XX/7XX	P1001	S-TEC ST 180 P2	SPERRY RD 444 P1	SPERRY RD 444 P2	SPERRY RD 550A P1	SPERRY RD 550A P2	SPERRY RD 650 P1	SPERRY RD 650 P2	ROCKWELL COLLINS 331A-6P P1	ROCKWELL COLLINS 331A-9G P1	ROCKWELL COLLINS 331A-9G P2	ROCKWELL COLLINS PN-101 P1	ROCKWELL COLLINS IND 351D P1	CENTURY NSD 1000 NSD 360A CD132	NAVIGATION INDICATOR
MAIN LATERAL +LEFT OUT	49	27	-	F	-	F	-	4	29	-	4	j	11	17	CDI+ L
MAIN LATERAL +RIGHT OUT	68	43	-	E	-	E	-	3	28	-	3	i	12	18	CDI+ R
MAIN +TO OUT	11	26	-	A	-	A	-	1	26	-	1	n	9	33	+TO FLAG
MAIN +FROM OUT	30	42	-	B	-	B	-	2	27	-	2	p	10	34	+FROM FLAG
MAIN LATERAL +FLAG OUT	50	37	-	-	-	-	-	-	31	-	-	k	7	31	NAV+ FLAG
MAIN LATERAL -FLAG OUT	69	38	-	-	-	-	-	-	32	-	-	m	8	32	NAV- FLAG
MAIN LAT SUPERFLAG OUT	13	-	-	P	-	P	39	-	-	-	37	-	-	-	NAV SUPERFLAG
		-	-	S	-	S	-	36	-	-	38	-	-	-	NAV SUPERFLAG LO
MAIN VERTICAL + UP OUT	12	44	-	C	-	C	-	5	33	-	5	r	13	27	+ UP
MAIN VERT + DOWN OUT	31	28	-	D	-	D	-	6	34	-	6	q	14	28	+ DOWN
MAIN VERTICAL +FLAG OUT	51	36	-	-	-	-	-	-	35	-	-	s	15	30	GS+ FLAG
MAIN VERTICAL -FLAG OUT	70	35	-	-	-	-	-	-	36	-	-	t	16	29	GS- FLAG
MAIN VERTICAL SUPERFLAG OUT	32	-	-	U	-	U	38	-	-	-	7	-	-	-	GS SUPERFLAG
		-	-	W	-	W	-	8	-	-	-	-	-	-	GS SUPERFLAG LO
MAIN OBS ROTOR H (GND)	1	22	DD	-	DD	-	6	-	1	1	-	a	19	15	OBS RESOLVER {H/A}
MAIN OBS ROTOR C	2	24	FF	-	FF	-	8	-	3	3	-	c	2	16	OBS RESOLVER {C}
MAIN OBS STATOR D	21	25	z	-	z	-	9	-	4	4	-	d	3	24	OBS RESOLVER {D}
MAIN OBS STATOR E (GND)	40	39	AA	-	AA	-	10	-	5	5	-	e	5	23	OBS RESOLVER {E}
MAIN OBS STATOR F	41	40	BB	-	BB	-	11	-	6	6	-	f	4	26	OBS RESOLVER {F}
MAIN OBS STATOR G (GND)	60	41	CC	-	CC	-	12	-	7	7	-	g	6	25	OBS RESOLVER {G}
4 ILS/GPS APPROACH	56	-	a	-	-	-	-	47	-	-	-	-	-	-	ILS ENERGIZE

6

Figure E-8. GTN 6XX/7XX – CDI Interconnect
Sheet 2 of 3

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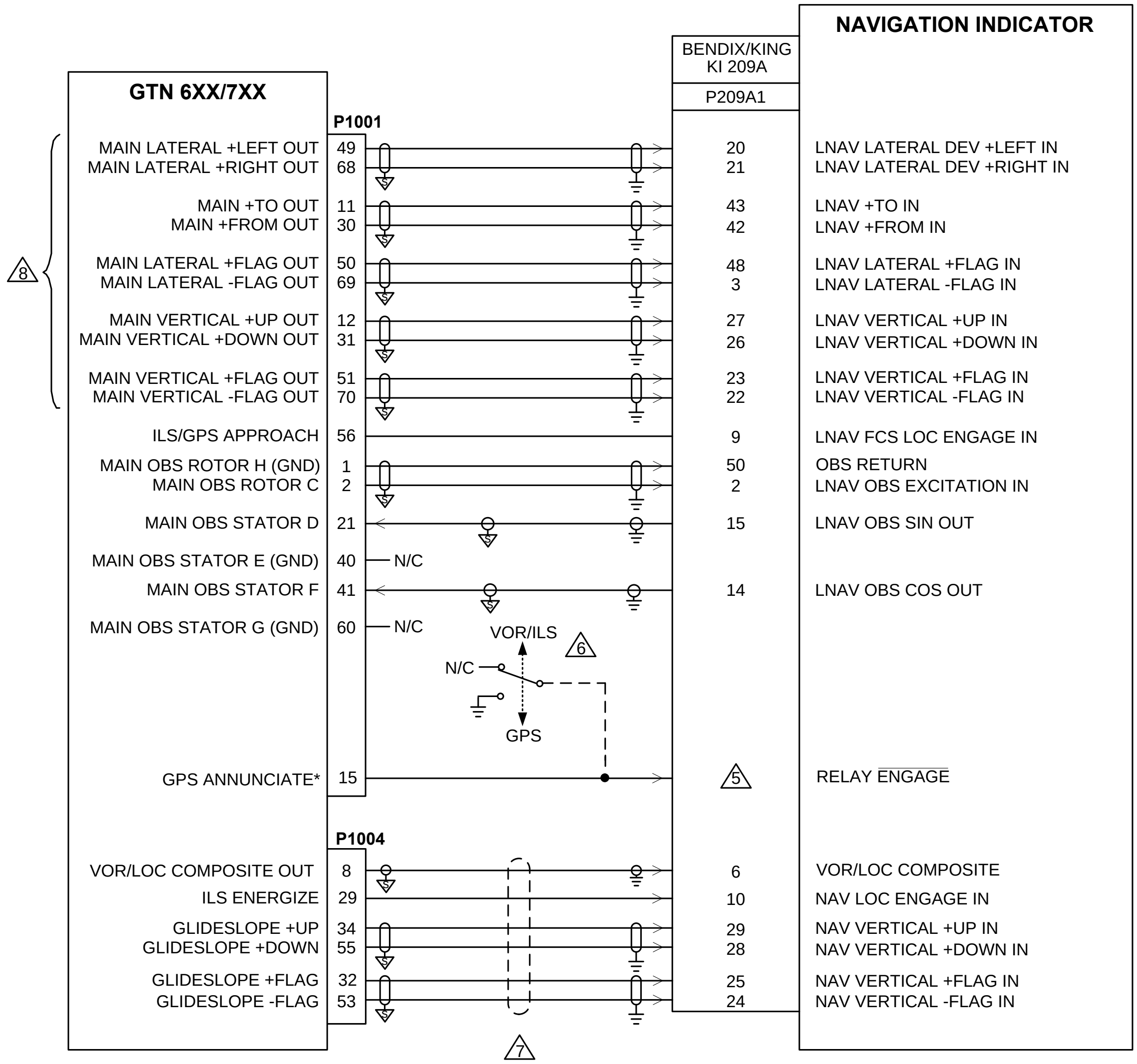
NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. THE ILS/GPS APPROACH DISCRETE IS REQUIRED BY SOME CDIs/ HSIs THAT ARE USED WITH THE M4C/D AUTOPILOTS. IF REQUIRED, ENSURE THAT THE SIGNAL SUPPLIED TO THE INDICATOR IS THE CORRECT POLARITY (ACTIVE-HIGH OR ACTIVE-LOW)
5. THESE INPUTS ARE NOT USED ON THE GI 106.
6. FOR IFR-CERTIFIED COMPOSITE AIRCRAFT ONLY (EACH AIRCRAFT IN APPENDIX G THAT REQUIRES OVERBRAID OVER THE GPS/WAAS CABLE): ANY LRU (I.E. CDI, AUTOPILOT) THAT CONNECTS TO THE GTN'S P1001 MAIN CDI/VDI OUTPUTS MUST BE MOUNTED TO THE INSTRUMENT PANEL OR COCKPIT CENTER CONSOLE WITH ELECTRICAL BONDING EQUAL TO OR LESS THAN 20 MILLIOHMS BETWEEN THE EQUIPMENT AND THE INSTRUMENT PANEL.
7. THE OBS INTERFACE TO THE GTN WORKS ONLY FOR KPI 552/553/553A UNITS THAT HAVE A COURSE KNOB

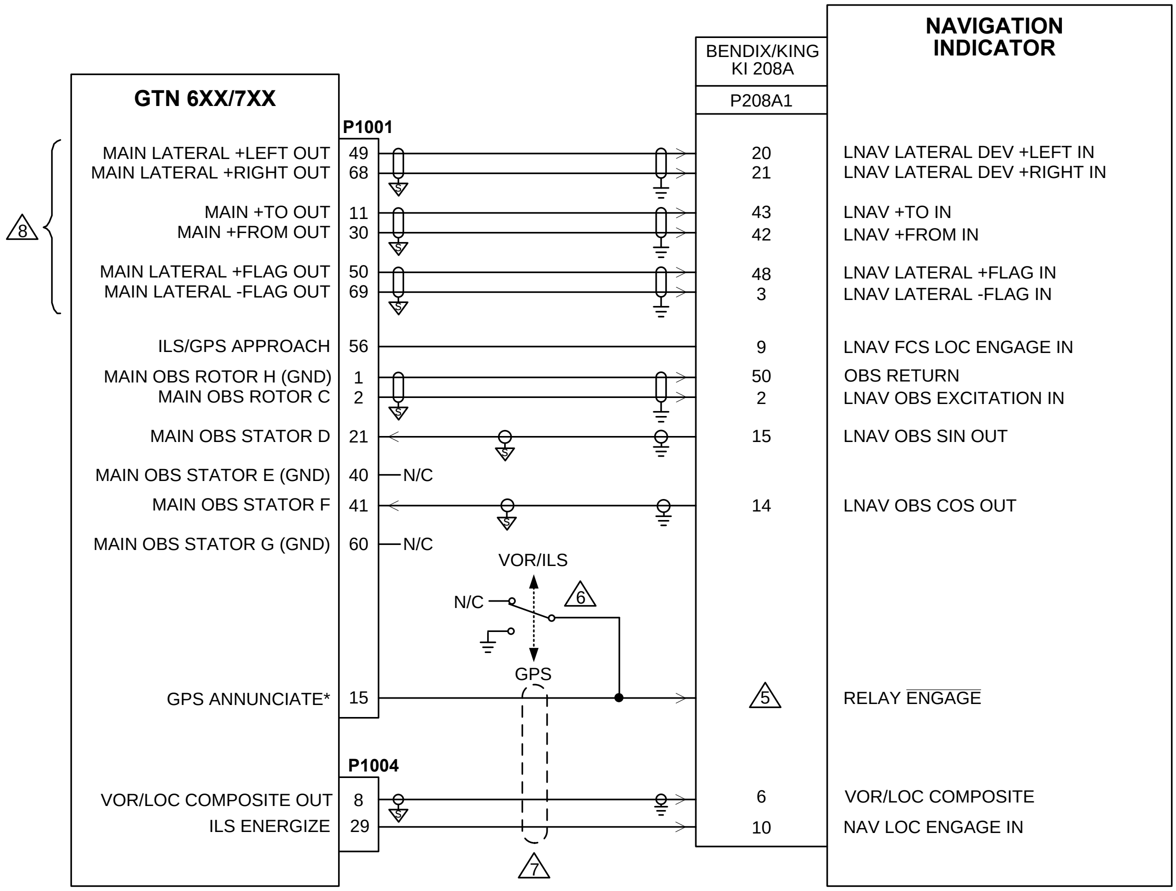
Figure E-8. GTN 6XX/7XX – CDI Interconnect
Sheet 3 of 3



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
5. PROPER CONNECTION OF THE RELAY ENGAGE INPUT OF THE KI 209A IS DEPENDENT ON THE POWER SUPPLY VOLTAGE. REFER TO KI 209A DOCUMENTATION FOR PROPER CONNECTION.
6. IF THE GTN 625/635/725 IS INSTALLED, AND ANOTHER VOR/ILS RECEIVER IS AVAILABLE TO DRIVE THE NAVIGATION INDICATOR, AN EXTERNAL SOURCE SELECTION SWITCH MUST BE USED IN LIEU OF THE GPS ANNUNCIATE OUTPUT. AN ACCEPTABLE SWITCH IS CARLINGSWITCH P/N 112-A-63. LABEL AS SHOWN. REFER TO SECTION 2.4.8 FOR ADDITIONAL SWITCH INSTALLATION REQUIREMENTS.
7. THESE CONNECTIONS ARE USED ON THE GTN 650/750 ONLY.
8. FOR IFR-CERTIFIED COMPOSITE AIRCRAFT ONLY (EACH AIRCRAFT IN APPENDIX G THAT REQUIRES OVERBRAID OVER THE GPS/WAAS CABLE): ANY LRU (I.E. CDI, AUTOPILOT) THAT CONNECTS TO THE GTN'S P1001 MAIN CDI/VDI OUTPUTS MUST BE MOUNTED TO THE INSTRUMENT PANEL OR COCKPIT CENTER CONSOLE WITH ELECTRICAL BONDING EQUAL TO OR LESS THAN 20 MILLIOHMS BETWEEN THE EQUIPMENT AND THE INSTRUMENT PANEL.

Figure E-9. GTN 6XX/7XX – Bendix King KI 209A Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. REFER TO MANUFACTURERS DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
5. PROPER CONNECTION OF THE RELAY ENGAGE INPUT OF THE KI 208A IS DEPENDENT ON ITS POWER SUPPLY VOLTAGE. REFER TO KI 208A DOCUMENTATION FOR PROPER CONNECTION.
6. IF THE GTN 625/635/725 IS INSTALLED, AND ANOTHER VOR/ILS RECEIVER IS AVAILABLE TO DRIVE THE NAVIGATION INDICATOR, AN EXTERNAL SOURCE SELECTION SWITCH MUST BE USED IN LIEU OF THE GPS ANNUNCIATE OUTPUT. AN ACCEPTABLE SWITCH IS CARLINGSWITCH P/N 112-A-63. LABEL AS SHOWN. REFER TO SECTION 2.4.8 FOR ADDITIONAL SWITCH INSTALLATION REQUIREMENTS.
7. THESE CONNECTIONS ARE USED ON THE GTN 650/750 ONLY.
8. FOR IFR-CERTIFIED COMPOSITE AIRCRAFT ONLY (EACH AIRCRAFT IN APPENDIX G THAT REQUIRES OVERBRAID OVER THE GPS/WAAS CABLE): ANY LRU (I.E. CDI, AUTOPILOT) THAT CONNECTS TO THE GTN'S P1001 MAIN CDI/VDI OUTPUTS MUST BE MOUNTED TO THE INSTRUMENT PANEL OR COCKPIT CENTER CONSOLE WITH ELECTRICAL BONDING EQUAL TO OR LESS THAN 20 MILLIOHMS BETWEEN THE EQUIPMENT AND THE INSTRUMENT PANEL.

Figure E-10. GTN 6XX/7XX – Bendix King KI 208A Interconnect

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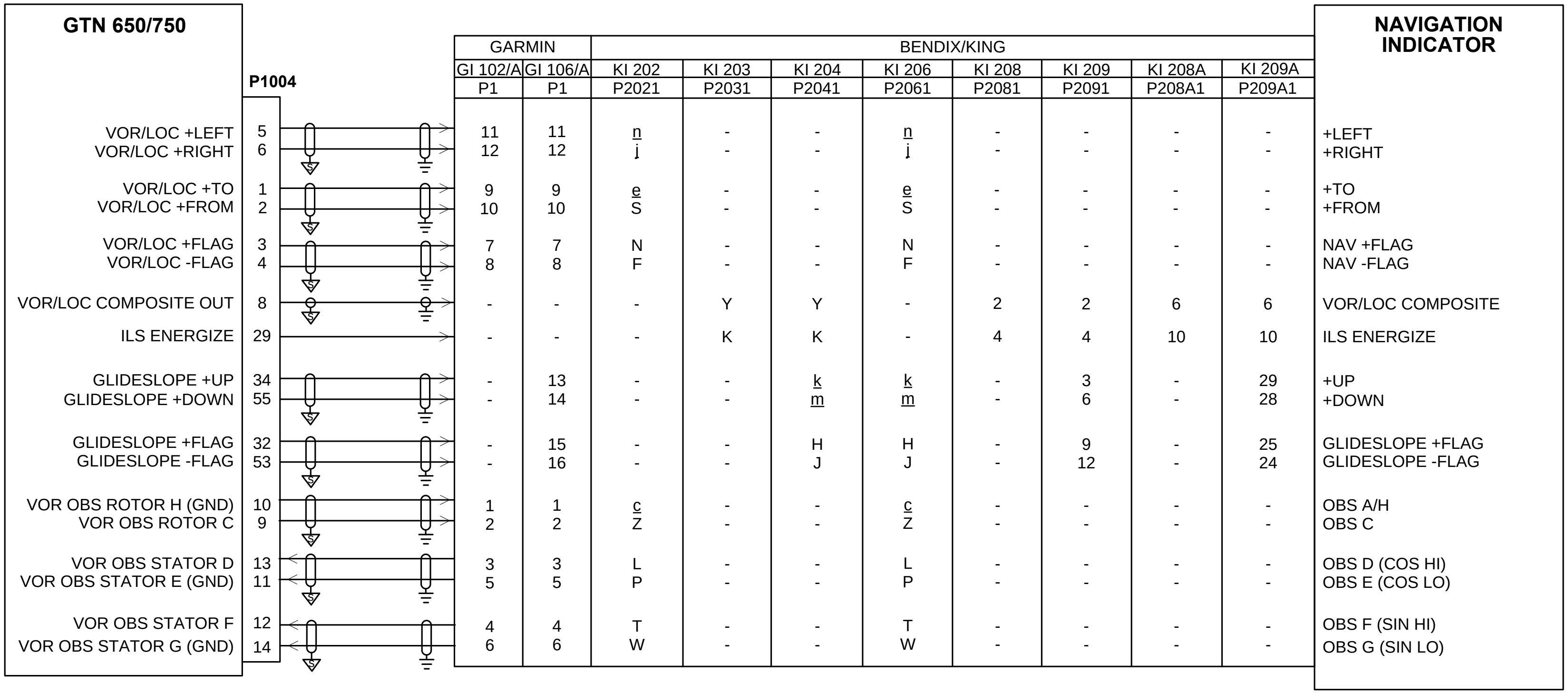

GTN 650/750	P1004	GARMIN GI 102/A P1	GARMIN GI 106/A P1	BENDIX/KING KI 202 P2021	KI 203 P2031	KI 204 P2041	KI 206 P2061	KI 208 P2081	KI 209 P2091	KI 208A P208A1	KI 209A P209A1	NAVIGATION INDICATOR
VOR/LOC +LEFT	5	11	11	n	-	-	n	-	-	-	-	+LEFT
VOR/LOC +RIGHT	6	12	12	j	-	-	j	-	-	-	-	+RIGHT
VOR/LOC +TO	1	9	9	e	-	-	e	-	-	-	-	+TO
VOR/LOC +FROM	2	10	10	S	-	-	S	-	-	-	-	+FROM
VOR/LOC +FLAG	3	7	7	N	-	-	N	-	-	-	-	NAV +FLAG
VOR/LOC -FLAG	4	8	8	F	-	-	F	-	-	-	-	NAV -FLAG
VOR/LOC COMPOSITE OUT	8	-	-	-	Y	Y	-	2	2	6	6	VOR/LOC COMPOSITE
ILS ENERGIZE	29	-	-	-	K	K	-	4	4	10	10	ILS ENERGIZE
GLIDESLOPE +UP	34	-	13	-	-	k	k	-	3	-	29	+UP
GLIDESLOPE +DOWN	55	-	14	-	-	m	m	-	6	-	28	+DOWN
GLIDESLOPE +FLAG	32	-	15	-	-	H	H	-	9	-	25	GLIDESLOPE +FLAG
GLIDESLOPE -FLAG	53	-	16	-	-	J	J	-	12	-	24	GLIDESLOPE -FLAG
VOR OBS ROTOR H (GND)	10	1	1	c	-	-	c	-	-	-	-	OBS A/H
VOR OBS ROTOR C	9	2	2	Z	-	-	Z	-	-	-	-	OBS C
VOR OBS STATOR D	13	3	3	L	-	-	L	-	-	-	-	OBS D (COS HI)
VOR OBS STATOR E (GND)	11	5	5	P	-	-	P	-	-	-	-	OBS E (COS LO)
VOR OBS STATOR F	12	4	4	T	-	-	T	-	-	-	-	OBS F (SIN HI)
VOR OBS STATOR G (GND)	14	6	6	W	-	-	W	-	-	-	-	OBS G (SIN LO)

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
5. THIS INTERCONNECT APPLIES ONLY WHEN IT IS DESIRED FOR A SEPARATE INDICATOR TO DISPLAY GTN 650/750 VOR/ILS INFORMATION REGARDLESS OF THE GTN'S CDI SELECTION (GPS OR VLOC).

Figure E-11. GTN 6XX/7XX – VOR-ILS Indicator Interconnect

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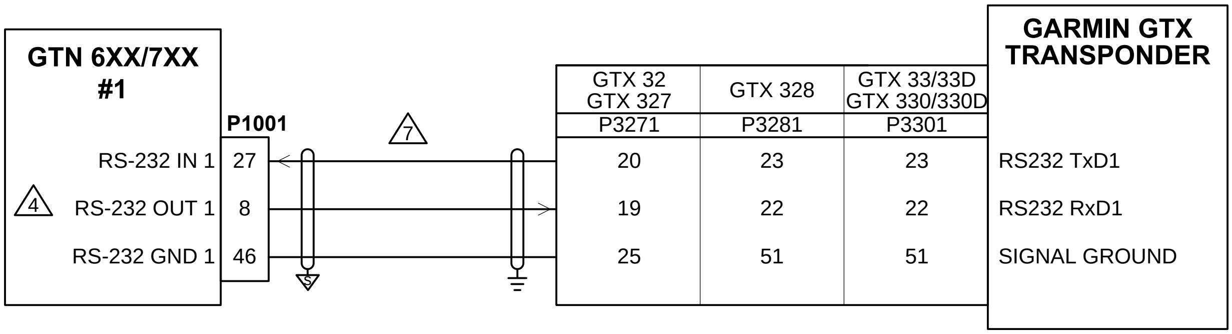
SINGLE GTN/SINGLE GTX WITH OR WITHOUT TIS



SINGLE GTN/DUAL GTXs WITH OR WITHOUT TIS

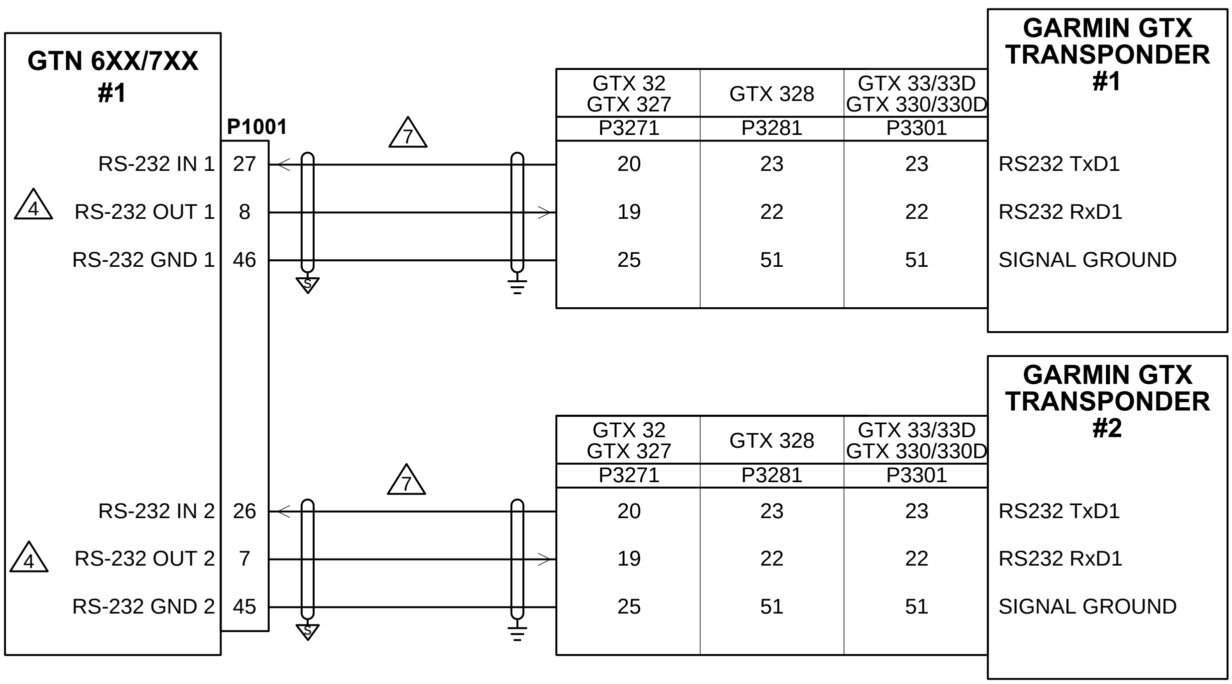
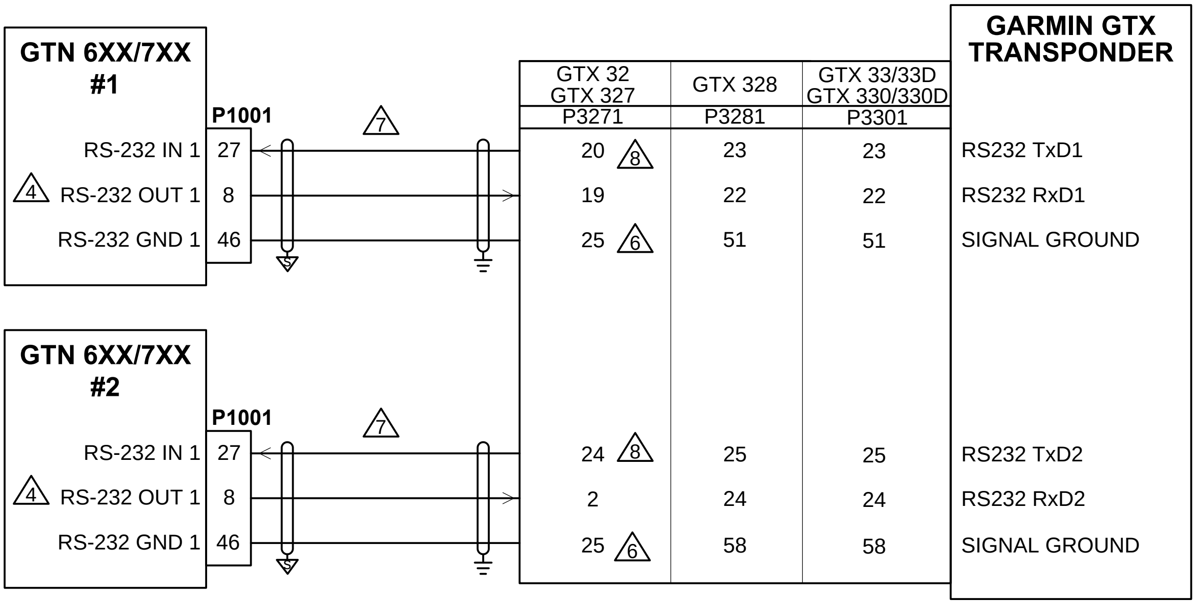


Figure E-12. GTN 6XX/7XX – Transponder Interconnect
Sheet 1 of 4

DUAL GTNs/SINGLE GTX WITH OR WITHOUT TIS



DUAL GTNs/DUAL GTXs WITHOUT TIS

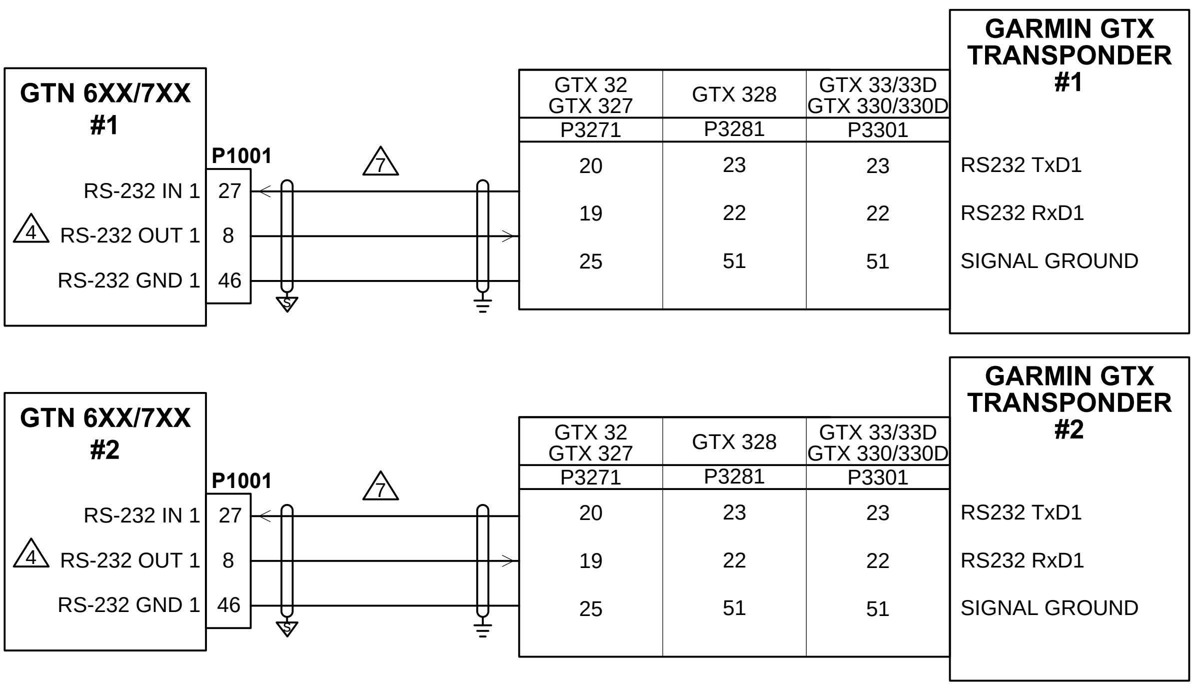


Figure E-12. GTN 6XX/7XX – Transponder Interconnect
Sheet 2 of 4

DUAL GTNs/DUAL GTXs WITH TIS

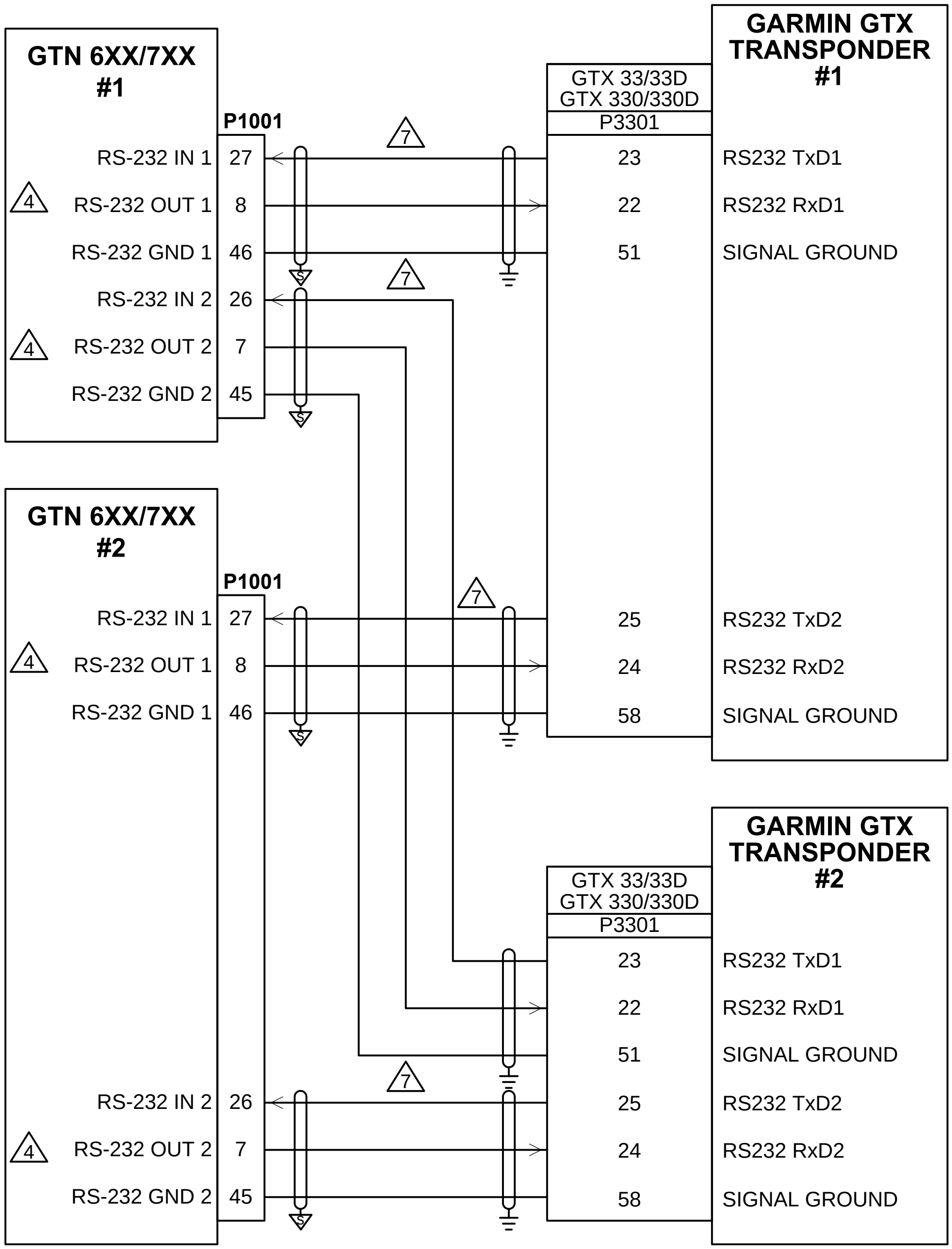


Figure E-12. GTN 6XX/7XX – Transponder Interconnect
Sheet 3 of 4

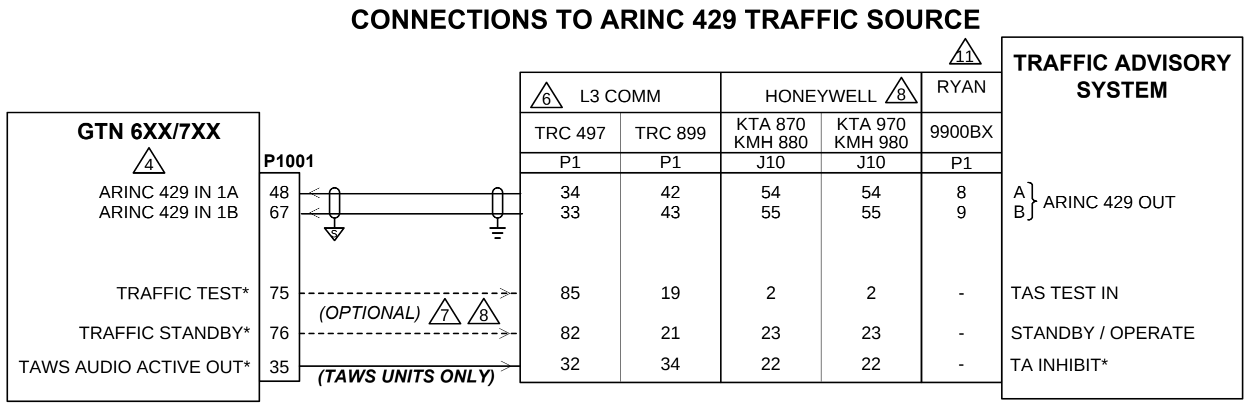
NOTES:

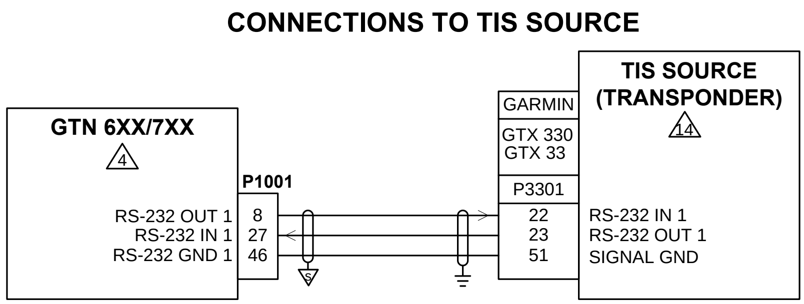
1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. IF THESE RS-232 PORTS ARE ALREADY USED FOR ANOTHER PURPOSE, ANY RS-232 PORT MAY BE CONNECTED IN LIEU OF THESE PORTS. REFER TO SECTION 5.5.1.2 FOR RS-232 SETTINGS.
5. WHEN TIS IS USED IN THE AIRCRAFT DO NOT CONNECT ANOTHER TRAFFIC SYSTEM TO THE SAME GTN 6XX/7XX UNIT.
6. SPLICE BOTH RS-232 SIGNAL GROUND WIRES TOGETHER AND TERMINATE INTO PIN 25.
7. IF THIS INSTALLATION IS REPLACING A GNS 400W/500W SERIES UNIT, THE RS-232 DATA PATH REPLACES THE ARINC 429 AND DISCRETE SIGNALS PREVIOUSLY USED TO INTERFACE THE TRANSPONDER TO THE GNS 400W/500W SERIES.
8. CONNECTOR P3271 PIN 24 IS APPLICABLE TO THE GTX 32 ONLY. FOR THE GTX 327, SPLICE CONNECTOR P3271 PIN 20 TO BOTH GTNs.
9. TIS TRAFFIC IS NOT AVAILABLE FROM THE GTX 32, 327, OR 328. SEE SECTION 1.9 FOR MORE INFORMATION.
10. TRANSPONDER RS-232 PORT SETTINGS:

TRANSPONDER	IN	OUT
GTX 32	REMOTE	REMOTE
GTX 33	REMOTE	REMOTE (FOR NON-TIS) OR REMOTE W/TIS (FOR TIS UNITS)
GTX 327 (GTN CONTROL)	REMOTE	REMOTE
GTX 327 (NO GTN CONTROL)	GPS	ICARUS ALT*
GTX 328	REMOTE	REMOTE
GTX 330	REMOTE	REMOTE (FOR NON-TIS) OR REMOTE W/TIS (FOR TIS UNITS)

*WHEN THE GTX 327 IS NOT BEING CONTROLLED BY THE GTN, CONNECT THE OUTPUT OF THE TRANSPONDER TO THE GTN AND USE ICARUS ALT AS THE OUTPUT FORMAT ONLY IF THE TRANSPONDER IS USED TO SUPPLY PRESSURE ALTITUDE TO THE GTN.

Figure E-12. GTN 6XX/7XX – Transponder Interconnect
Sheet 4 of 4





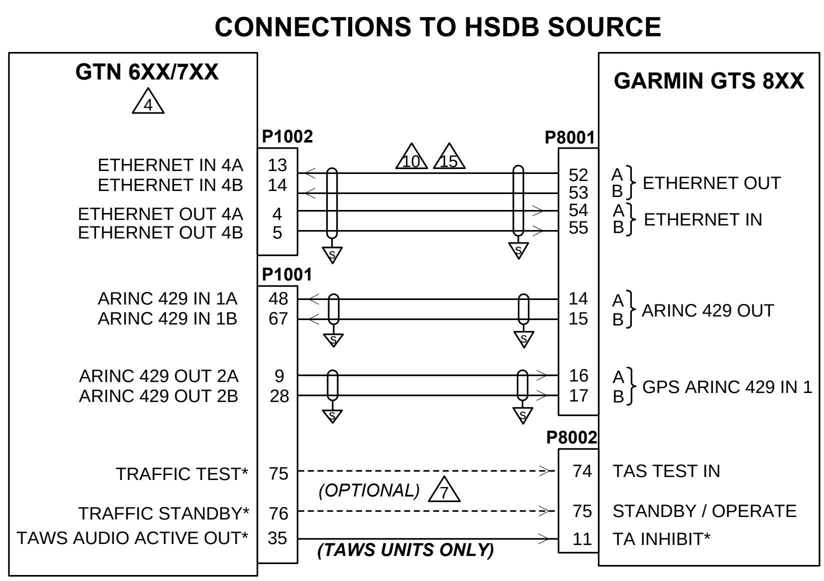
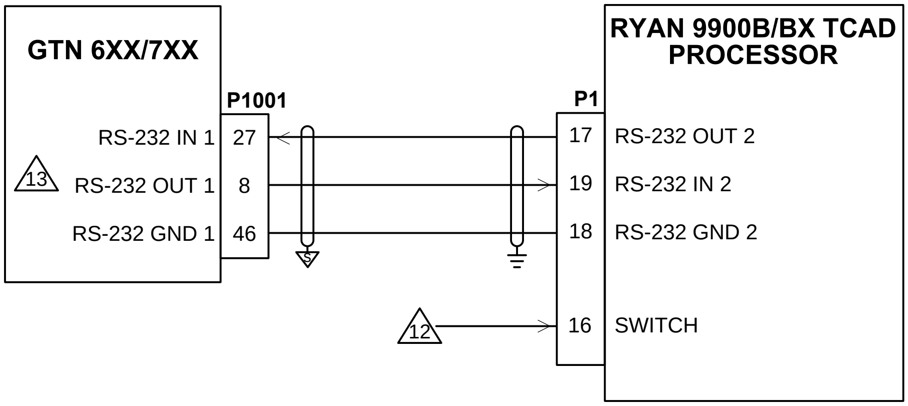


Figure E-13. GTN 6XX/7XX – Traffic Sources Interconnect
Sheet 1 of 3

CONNECTION TO RS-232 TRAFFIC SOURCE



DUAL GTN CONNECTION TO RS-232 TRAFFIC SOURCE

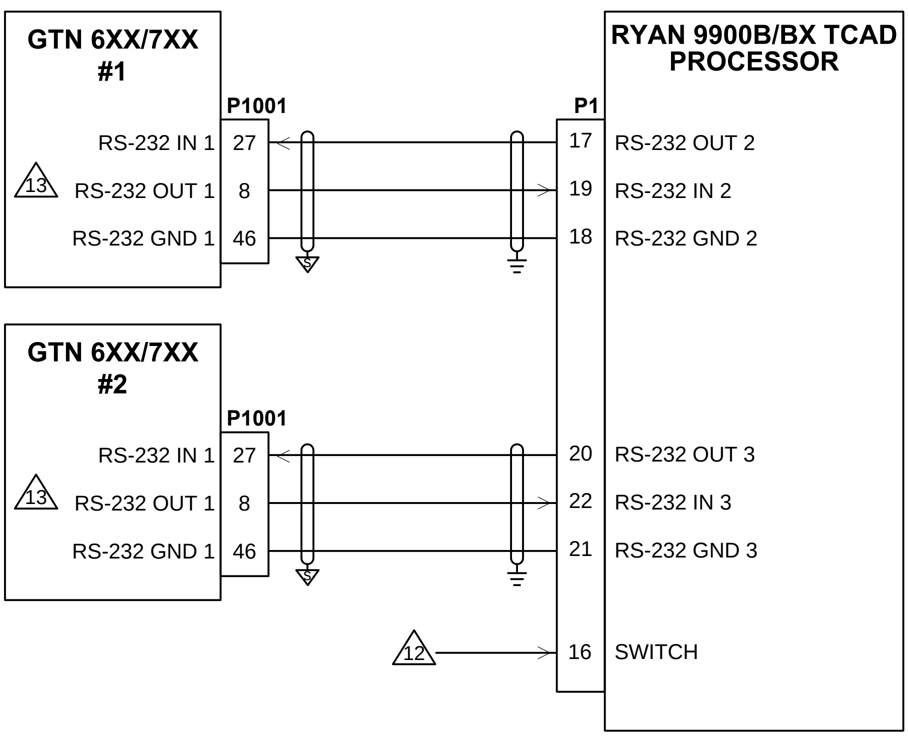


Figure E-13. GTN 6XX/7XX – Traffic Sources Interconnect
Sheet 2 of 3

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. ONLY ONE TRAFFIC SOURCE MAY BE CONNECTED TO THE GTN. IN DUAL GTN INSTALLATIONS, THE TRAFFIC SOURCE SHOULD BE CONNECTED TO EACH GTN ON WHICH TRAFFIC IS TO BE DISPLAYED.
5. REFER TO SECTION 5.5.1.1 AND 5.5.1.2 FOR GTN 6XX/7XX CONFIGURATION SETUP.
6. SOFTWARE VERSION 1.6 OR HIGHER REQUIRED FOR THE TRC 497.
7. THESE OPTIONAL DISCRETE CONNECTIONS ARE NOT REQUIRED IF THE GTN 6XX/7XX IS CONFIGURED FOR 'GTN CONTROL OF TRAFFIC SYSTEM=NO'. IN THIS CASE, THE GTN 6XX/7XX WILL ONLY BE A TRAFFIC DISPLAY AND WILL NOT CONTROL THE TRAFFIC ADVISORY SYSTEM OPERATION. SEE SECTION 5.5.1.8 FOR THIS SETTING.
8. FOR HONEYWELL TRAFFIC SYSTEMS THE "FUNCTIONAL TEST" AND "STBY/OPERATE" DISCRETE INPUTS TO THE TRAFFIC COMPUTER MUST BE CONNECTED TO **ONE** DISPLAY ONLY.
9. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
10. USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE. THIS INCLUDES THE FOLLOWING:

MANUFACTURER	P/N
PIC WIRE AND CABLE	10424 (24 AWG)
CARLISLEIT	392404 (24 AWG)

11. FOR NEW RYAN 9900BX INSTALLATIONS, IT IS RECOMMENDED TO USE THE RS-232 INTERFACE. WHEN INTERFACING THE GTN TO THE RYAN 9900BX VIA ARINC 429, THE 'GTN CONTROL OF TRAFFIC SYSTEM' CONFIGURATION SETTING MUST BE SET TO 'NO'. THE RYAN 9900BX DOES NOT INCLUDE THE NECESSARY DISCRETE INPUTS TO CONTROL THE TRAFFIC SYSTEM MODE.
12. THE RYAN TCAD PROCESSOR SWITCH PIN (P1-16) SHOULD BE GROUNDED TO TURN THE PROCESSOR UNIT ON, AND OPEN TO TURN THIS UNIT OFF. IF A RYAN TCAD DISPLAY UNIT IS NOT IN THE INSTALLATION, A DEDICATED SWITCH MAY BE REQUIRED TO TURN THE TCAD PROCESSOR UNIT ON AND OFF. REFER TO THE 9900BX INSTALLATION MANUAL P/N 32-2351 FOR ADDITIONAL INFORMATION.
13. IF THESE RS-232 PORTS ARE ALREADY USED FOR ANOTHER PURPOSE, ANY RS-232 PORT MAY BE CONNECTED IN LIEU OF THESE PORTS. REFER TO SECTION 5.5.1.2 FOR RS-232 SETTINGS.
14. REFER TO FIGURE E-12 FOR ADDITIONAL TRANSPONDER CONNECTION INFORMATION.
15. FOR GTN SOFTWARE VERSION 2.00, THESE HSDB WIRES SHOULD NOT BE CONNECTED TO THE GTN.

Figure E-13. GTN 6XX/7XX – Traffic Sources Interconnect Sheet 3 of 3

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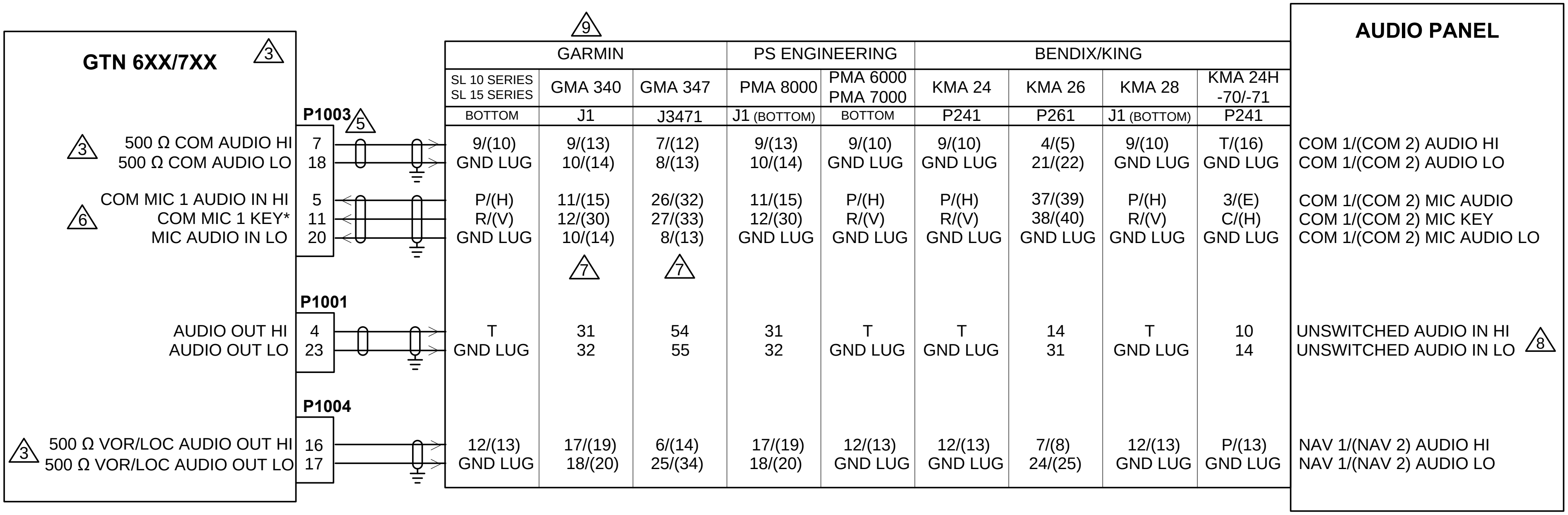
AUDIO PANEL INTERCONNECT



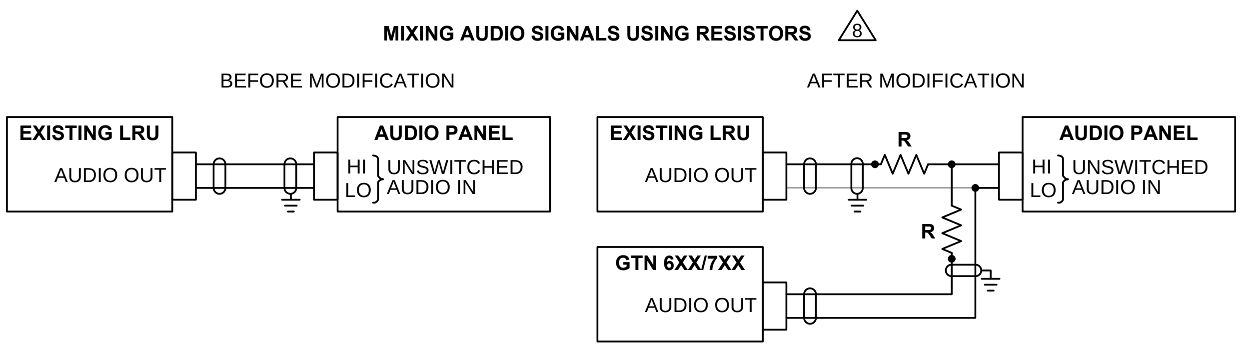


Figure E-14. GTN 6XX/7XX Audio Panel Interconnect
Sheet 1 of 3

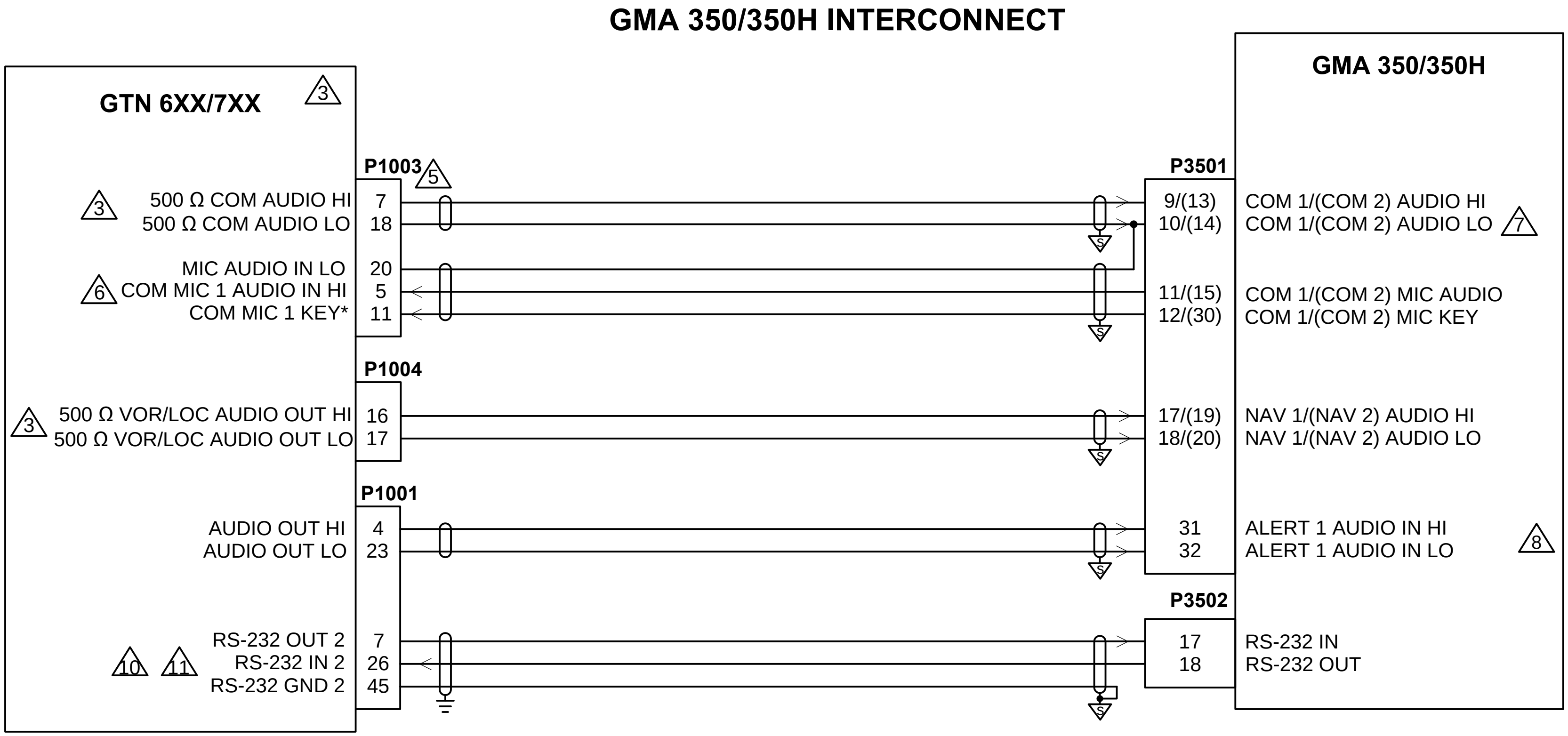


Figure E-14. GTN 6XX/7XX Audio Panel Interconnect
Sheet 2 of 3

NOTES:

1 ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.

2 GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND

3 THE 500 OHM AUDIO OUTPUTS ARE BALANCED OUTPUTS, AND THE LO OUTPUTS MUST BE CONNECTED. IF THE AUDIO PANEL DOES NOT HAVE A LO INPUT, THE LO OUTPUT SHOULD BE CONNECTED TO A GROUND LUG AT THE AUDIO PANEL.

4 REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

5 SHIELDS FOR AUDIO CABLES SHOULD BE GROUNDED AT ONE END (WITH LEADS LESS THAN 3.0 INCHES) AND LEFT FLOATING AT THE OTHER END. IF SHIELDED AUDIO CABLE IS CARRIED THROUGH A DISCONNECT, CARRY THE SHIELD GROUND THROUGH THE DISCONNECT ON A SEPARATE PIN.

6 CONNECTING TWO MICROPHONES TO MIC AUDIO HI/LO AT THE SAME TIME MAY RESULT IN WEAK OR DISTORTED AUDIO. MIC ISOLATION RELAYS ARE RECOMMENDED SO THAT ONLY ONE MIC IS ACTIVE AT A TIME.

7 SPLICE 500Ω COM AUDIO LO AND MIC AUDIO IN LO TOGETHER INTO THE SAME PIN ON AUDIO PANEL.

8 IT IS ACCEPTABLE TO USE OTHER AVAILABLE UNSWITCHED, UNMUTED INPUTS. IF AUDIO PANEL DOES NOT HAVE AN AVAILABLE UNSWITCHED INPUT, AUDIO FROM THE GTN 6XX/7XX MUST BE MIXED WITH AN EXISTING AUDIO SOURCE USING RESISTORS TO ISOLATE THE AUDIO OUTPUT FROM EACH LRU. A TYPICAL VALUE FOR MIXING RESISTORS IS 390Ω ¼ W. THE AUDIO LEVELS OF EXISTING AUDIO SOURCES WILL HAVE TO BE RE-EVALUATED AFTER MIXING RESISTORS ARE INSTALLED.

9 FOR GMA 35 INTERCONNECT WIRING SEE APPENDIX F.

10 THE RS-232 CONNECTION TO THE GMA 350/350H IS FOR FUTURE USE. THIS CONNECTION CAN ONLY BE MADE TO ONE GTN PER INSTALLATION. IT IS RECOMMENDED TO MAKE THIS CONNECTION TO THE #1 GTN.

11 ANY AVAILABLE RS-232 PORT MAY BE USED. REFER TO SECTION 5.5.1.2 FOR RS-232 CHANNEL SETTINGS.

Figure E-14. GTN 6XX/7XX Audio Panel Interconnect
Sheet 3 of 3

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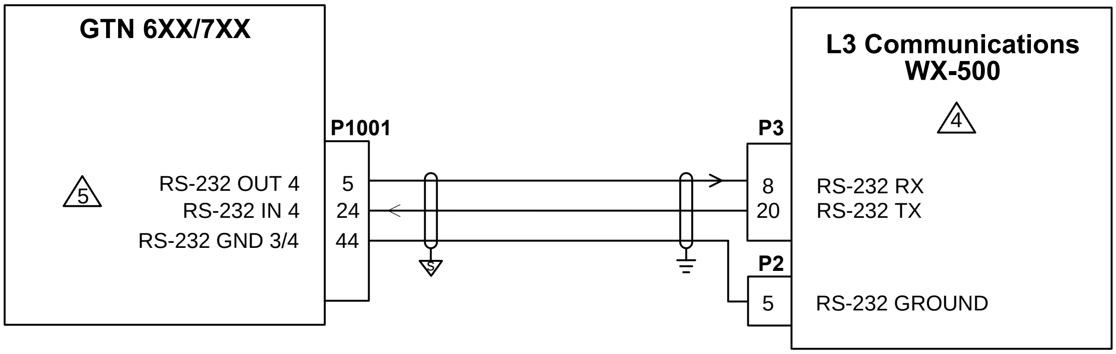
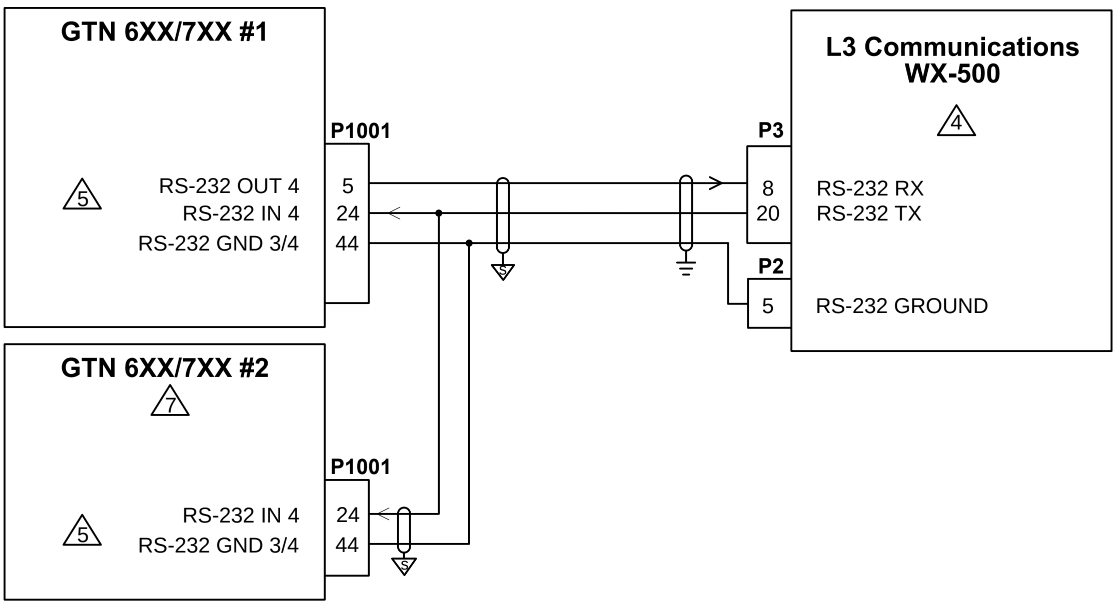
SINGLE GTN CONNECTION TO WX-500



DUAL GTN CONNECTIONS TO WX-500



GTN CONNECTION TO KGP 560

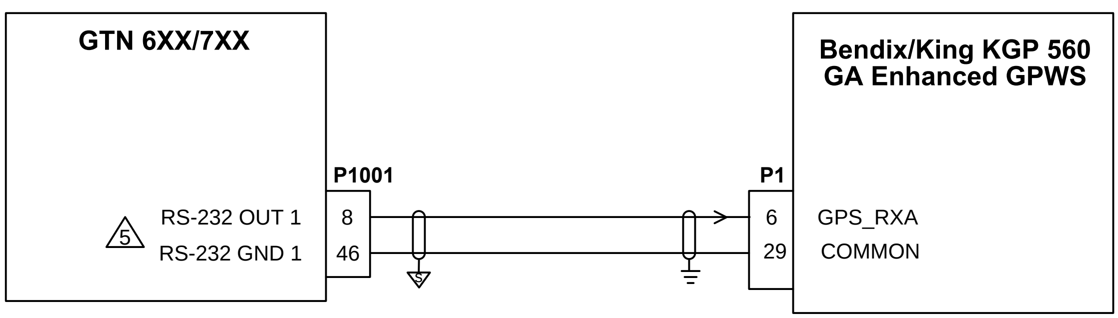


Figure E-15. GTN 6XX/7XX – Weather/Terrain Interconnect
Sheet 1 of 2

NOTES:

1 ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.

2 GROUND DESIGNATIONS: SHIELD BLOCK GROUND S AIRFRAME GROUND

3 AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.

4 FOR WX-500 DATA TO BE DISPLAYED ON THE GTN 6XX/7XX MAP PAGE THE GTN 6XX/7XX MUST HAVE A DIGITAL HEADING SOURCE, OR THE WX-500 MUST HAVE A SYNCHRO OR SERIAL HEADING SOURCE. A STEPPER HEADING SOURCE WILL NOT ALLOW WX-500 DATA TO BE DISPLAYED ON THE MAP PAGE.

5 ANY AVAILABLE RS-232 PORT MAY BE USED. REFER TO SECTION 5.5.1.2 FOR RS-232 CHANNEL SETTINGS.

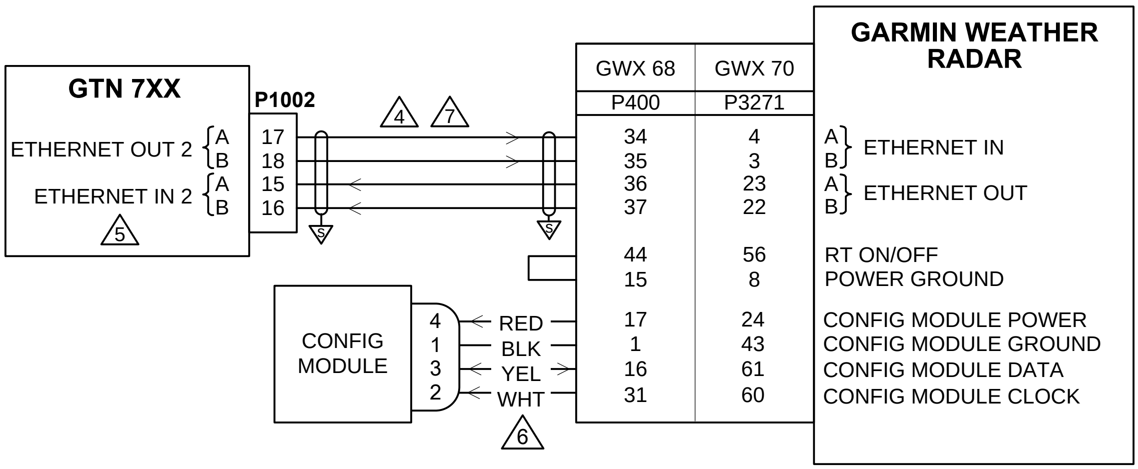
6 REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

7 WHEN CONNECTING TWO GTNS TO THE WX-500, CONFIGURE ONLY RS-232 TX/RX WHICH ARE ACTUALLY CONNECTED TO THE WX-500.

Figure E-15. GTN 6XX/7XX – Weather Terrain Interconnect
Sheet 2 of 2

METAL AIRCRAFT ONLY

SINGLE GTN INSTALLATIONS



DUAL GTN INSTALLATIONS

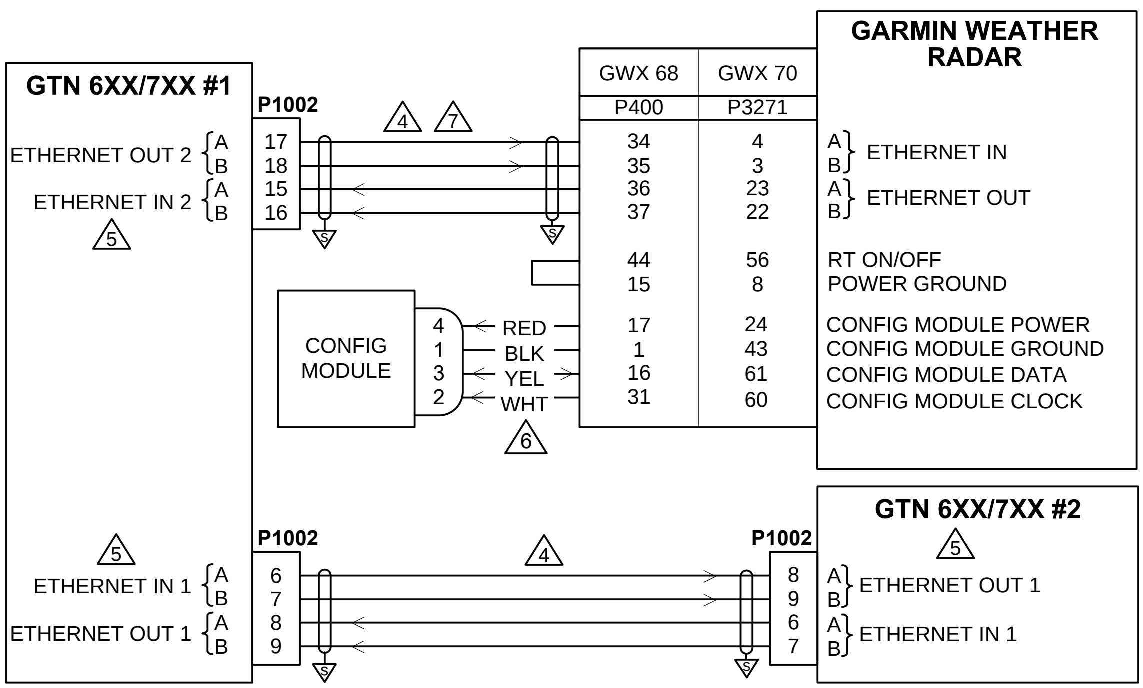
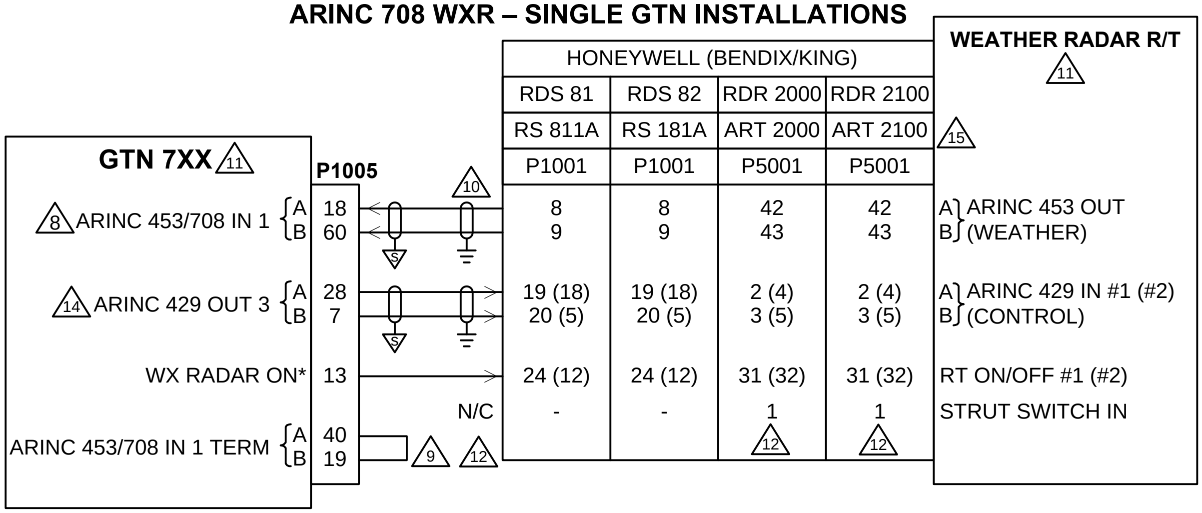


Figure E-16. GTN 6XX/7XX – Weather Radar Interconnect
Sheet 1 of 3

ARINC 708 WXR – SINGLE GTN INSTALLATIONS



ARINC 708 WXR – DUAL GTN INSTALLATIONS

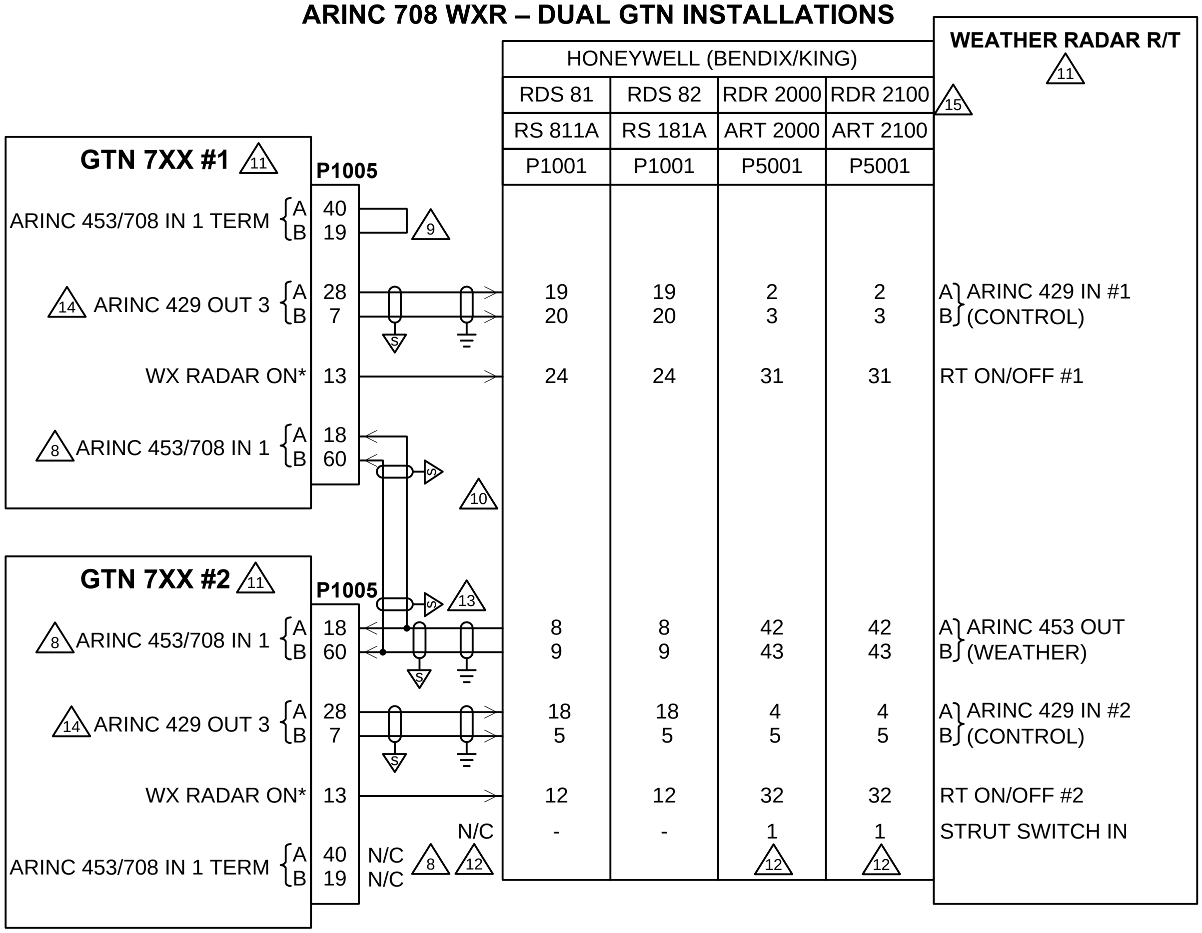


Figure E-16. GTN 6XX/7XX – Weather Radar Interconnect
Sheet 2 of 3

NOTES:

1 ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.

2 GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND

3 AT THE GTN, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT THE SHIELD GROUNDS AT THE GWX 68/70 TO ITS CONNECTOR BACKSHELL IN ACCORDANCE WITH THE GWX 68/70 INSTALLATION INSTRUCTIONS.

4 USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE. THESE INCLUDE THE FOLLOWING:

MANUFACTURER	P/N
PIC WIRE AND CABLE	10424 (24 AWG)
CarlisleIT	392404 (24 AWG)

5 IF ETHERNET PORT IS ALREADY USED FOR ANOTHER PURPOSE, ANY ETHERNET PORT MAY BE CONNECTED. REFER TO SECTION 4 FOR PINOUT INFORMATION. ONLY THE GTN 7XX IS CAPABLE OF DISPLAYING GWX 68/70 DATA. RECOMMEND CONNECTING THE GTN 725 OR GTN 750 DIRECTLY TO THE GWX 68/70. SEE SECTION 2.4.16 FOR MORE INFORMATION.

6 CONFIGURATION MODULE HARNESS USES 28 AWG WIRES. CONTACTS SUPPLIED WITH CONFIGURATION MODULE MUST BE USED FOR CONNECTING CONFIGURATION MODULE HARNESS TO P400/P3271.

7 THE WIRING TO THE HSDB WEATHER RADAR R/T MUST BE OVERBRAIDED IN THE RADOME AREA, PRIOR TO ENTERING THE FUSELAGE. SEE APPENDIX G FOR OVERBRAID PROCEDURE

8 THE WXR ARINC 453/708 INPUT IS UNTERMINATED.

9 IF THE GTN IS THE ONLY EQUIPMENT ON THE ARINC 453/708 OUTPUT BUS FROM THE WEATHER RADAR, OR IF IT IS DESIRED TO UTILIZE THE GTN INTERNAL TERMINATION RESISTOR, INSTALL THE TERMINATION JUMPER SHOWN. THIS LENGTH OF THIS JUMPER SHOULD NOT EXCEED 3". IF MULTIPLE PIECES OF EQUIPMENT ARE ON THE ARINC 453/708 BUS, ONLY ONE TERMINATION RESISTOR SHOULD BE UTILIZED, AT THE LAST LRU ON THE ARINC 453/708 BUS.

10 AT WEATHER RADAR UNIT, CONNECT SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

11 THE GTN MAY BE CONNECTED AS INDICATOR #1 OR INDICATOR #2. REFER TO SECTION 5.5.4.10 FOR DETAILS ON HOW TO CONFIGURE GTN DISPLAY HEAD #1 / #2.

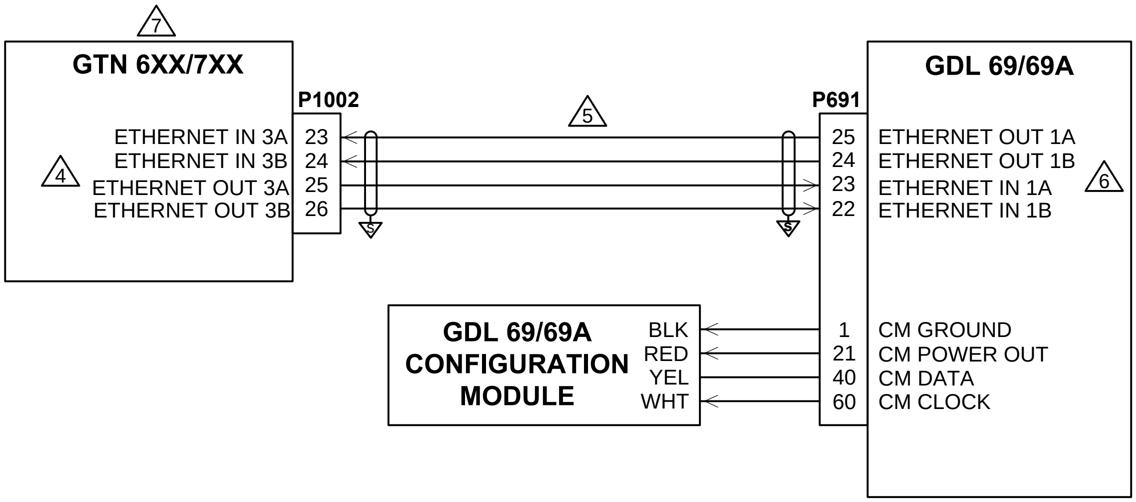
12 IF THE STRUT SWITCH INPUT IS CONNECTED TO THE WXR, DISCONNECT IT. THE GTN WILL AUTOMATICALLY COMMAND THE WXR TO STANDBY UPON LANDING. THIS ALSO ALLOWS THE PILOT TO TURN THE WXR ON PRIOR TO TAKEOFF.

13 SPLICE MUST BE MADE WITHIN 6" OF CONNECTOR BACKSHELL (WITHIN CONNECTOR BACKSHELL IS PREFERRED).

14 ARINC 429 OUTPUT PORT 3 MUST BE USED FOR CONTROLLING THE WEATHER RADAR.

15 THE ART 2100 IS SUPPORTED WHEN CONFIGURED TO EMULATE AN ART 2000. ONLY ART 2000 FUNCTIONS ARE AVAILABLE. SEE APPENDIX C FOR REQUIRED ART 2100 CONFIGURATION SETTINGS.

Figure E-16. GTN 6XX/7XX – Weather Radar Interconnect
Sheet 3 of 3



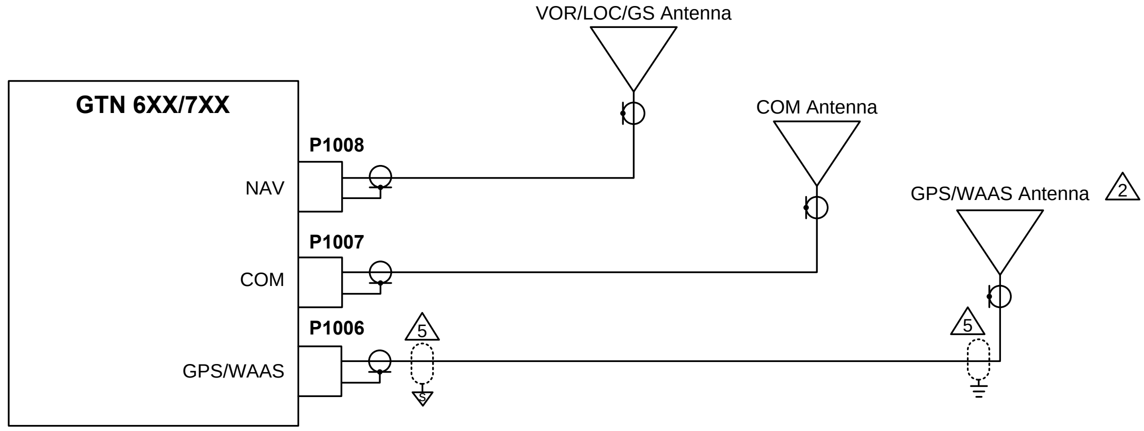
1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT THE SHIELD GROUNDS AT THE GDL 69/69A TO ITS CONNECTOR BACKSHELL IN ACCORDANCE WITH THE GDL 69/69A INSTALLATION INSTRUCTIONS.
4. ANY ETHERNET PORT MAY BE USED IN LIEU OF ETHERNET PORT 3. IF THERE ARE NO FREE PORTS ON THE GTN 6XX/7XX, THE OTHER LRU CAN BE DISCONNECTED FROM THE GTN 6XX/7XX AND THE GDL 69/69A CAN BE CONNECTED TO THE GTN 6XX/7XX IN ITS PLACE. THE DISCONNECTED LRU CAN BE CONNECTED TO ETHERNET PORT 2, 3, OR 4 ON THE GDL 69/69A.
5. USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE. THESE INCLUDE THE FOLLOWING:

MANUFACTURER	P/N
PIC WIRE AND CABLE	10424 (24 AWG)
CARLISLEIT	392404 (24 AWG)

6. ETHERNET PORTS 2, 3, OR 4 MAY BE USED LIEU OF PORT 1. THE PORT THAT IS USED MUST BE ENABLED IN CONFIGURATION MODE. REFER TO THE GDL 69/69A INSTALLATION MANUAL FOR ADDITIONAL DETAILS.
7. IN DUAL GTN INSTALLATIONS, GDL 69 DATA WILL BE FORWARDED TO THE OTHER GTN VIA HSDB.

Figure E-17. GTN 6XX/7XX – GDL 69/69A Interconnect

SINGLE GTN INSTALLATION 1



DUAL GTN INSTALLATION 1

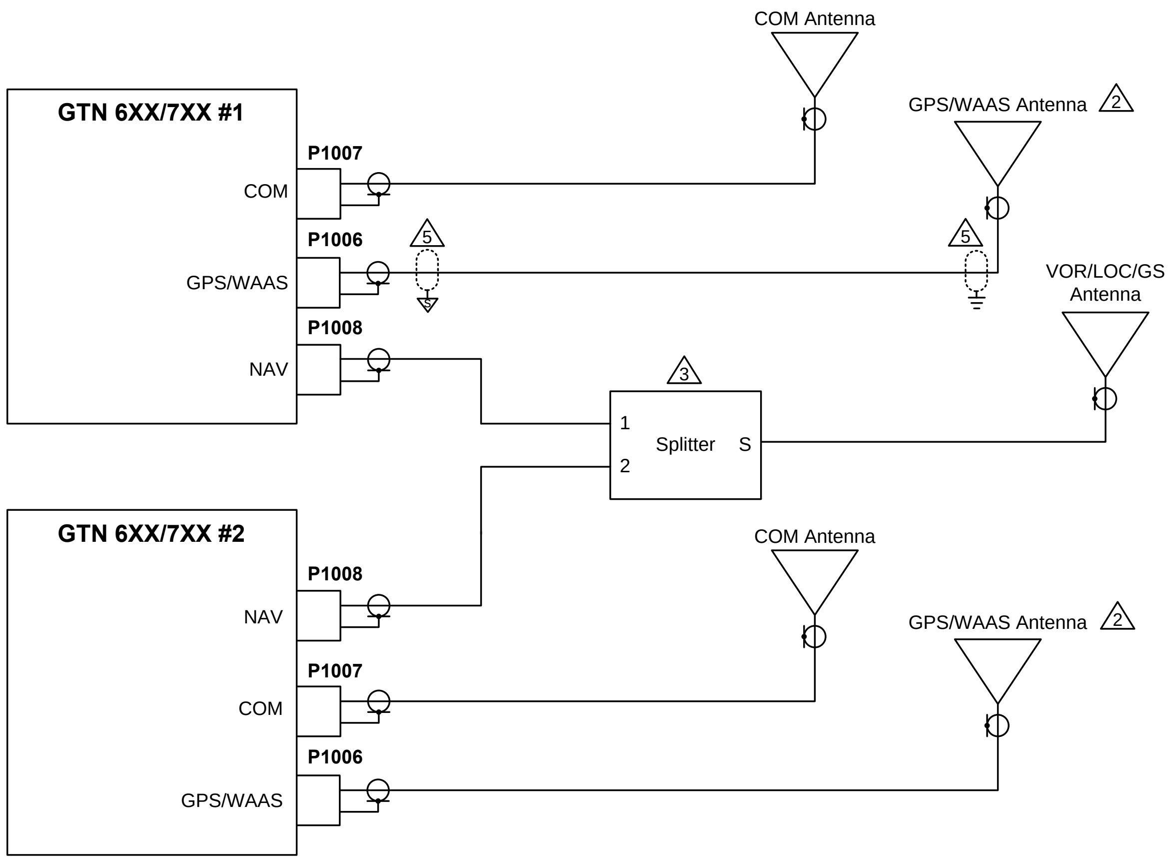
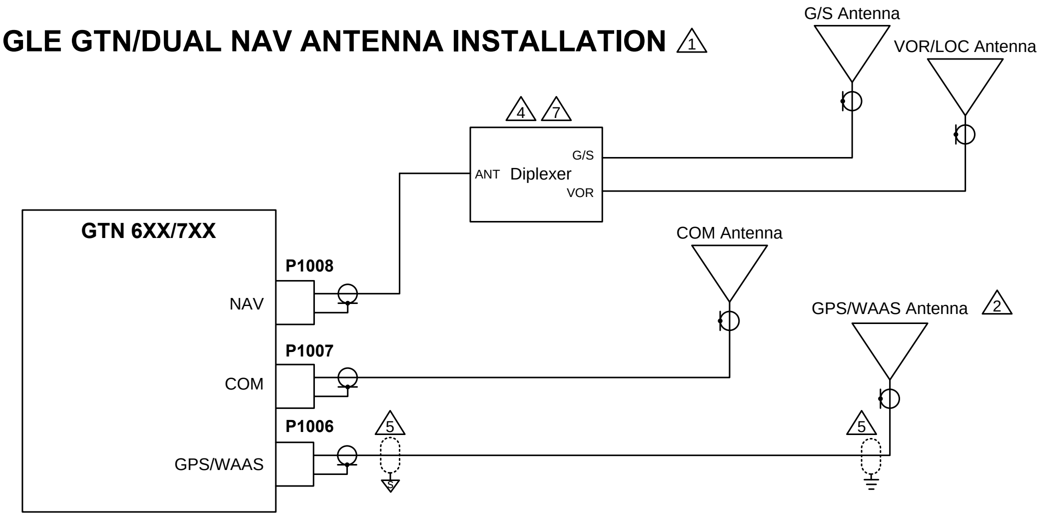


Figure E-18. GTN 6XX/7XX Antenna Interconnect
Sheet 1 of 5

SINGLE GTN/DUAL NAV ANTENNA INSTALLATION 1



DUAL GTN/DUAL NAV ANTENNA INSTALLATION 1

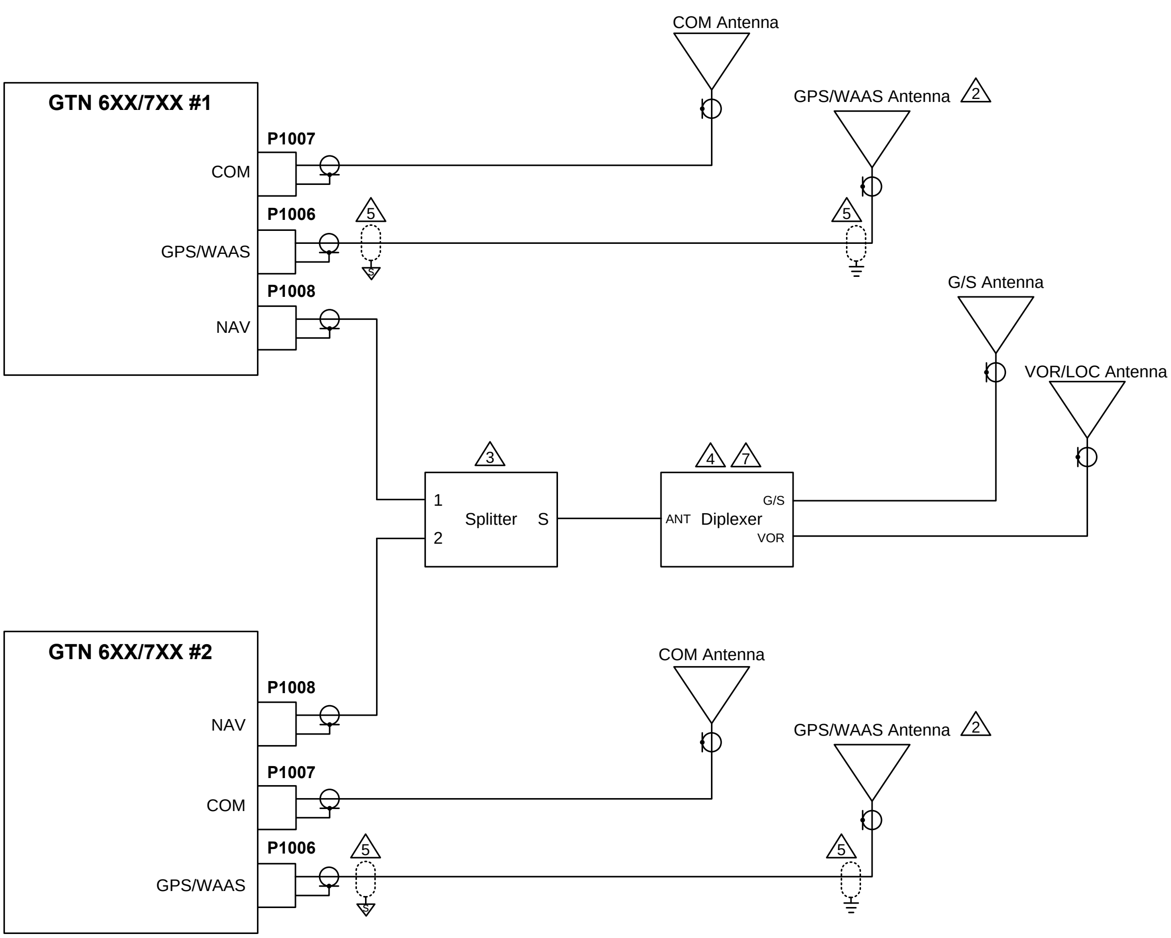
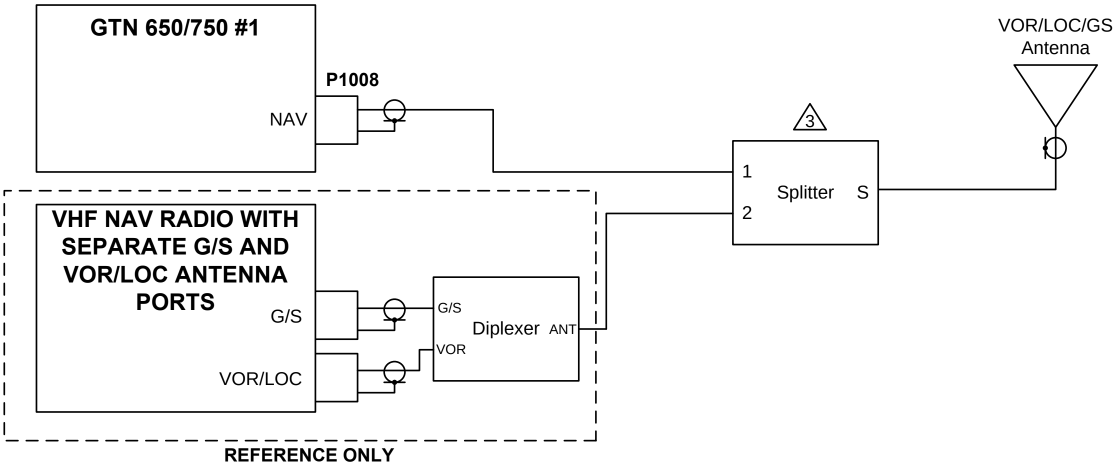


Figure E-18. GTN 6XX/7XX Antenna Interconnect
Sheet 2 of 5

SINGLE GTN, OTHER RADIO (SEPARATE G/S AND VOR/LOC ANTENNA PORTS), AND SINGLE ANTENNA



SINGLE GTN, OTHER RADIO (SEPARATE G/S AND VOR/LOC ANTENNA PORTS), AND DUAL ANTENNAS

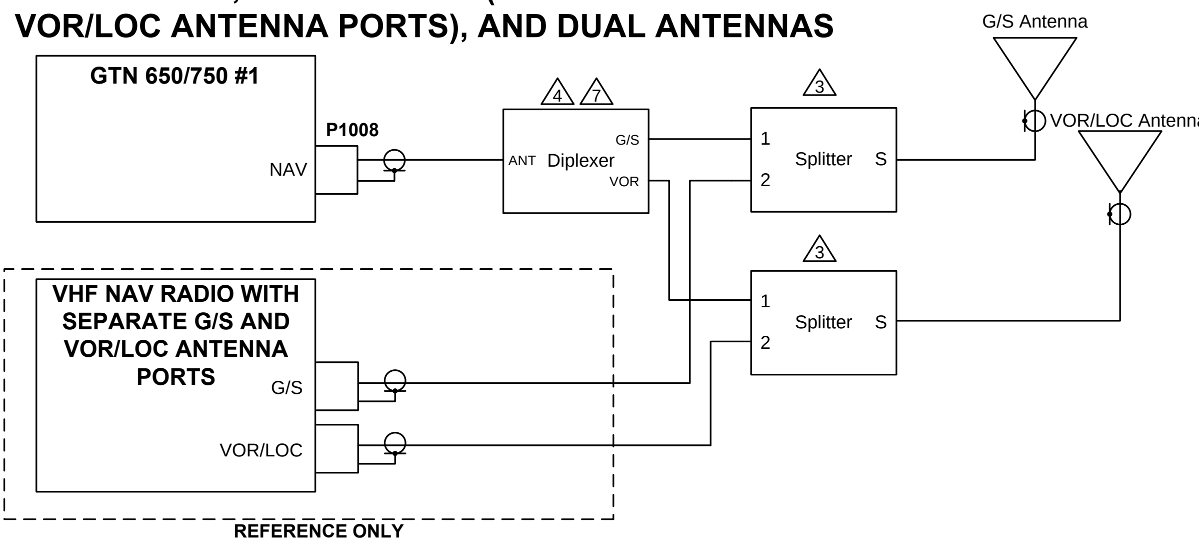
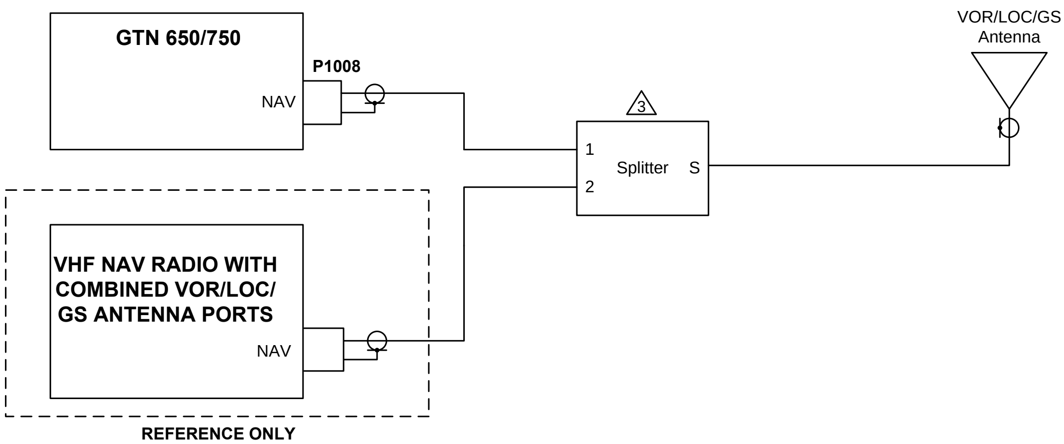


Figure E-18. GTN 6XX/7XX Antenna Interconnect
Sheet 3 of 5

SINGLE GTN, OTHER RADIO, AND SINGLE ANTENNA



SINGLE GTN, OTHER RADIO, AND DUAL ANTENNAS

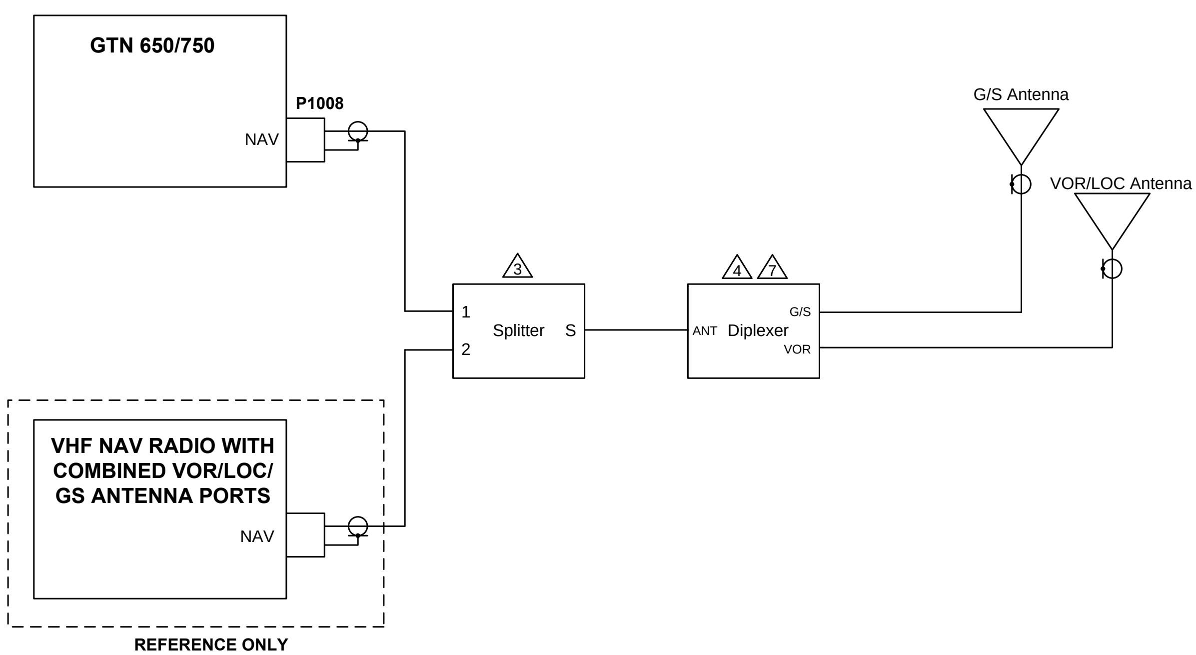


Figure E-18. GTN 6XX/7XX Antenna Interconnect
Sheet 4 of 5

NOTES:

1. REFER TO SECTION 3.3.1, 3.3.2, AND 3.3.3 FOR ANTENNA CABLE SPECIFICATIONS.
2. THE GPS ANTENNA COAXIAL CABLE MUST BE DOUBLE OR TRIPLE SHIELDED AND THE LOSS (INCLUDING CONNECTORS) MUST USUALLY BE GREATER THAN 1.5 dB AND LESS THAN 6.5 dB. REFER TO SECTION 3.3 FOR ADDITIONAL INFORMATION.
3. GARMIN P/N 013-00112-00 (MINI-CIRCUITS SPLITTER P/N ZFSC-2-1B+) MUST BE USED.
4. COMANT DIPLEXER P/N CI 507 MUST BE USED.
5. OVERBRAID REQUIRED ON THE GPS/WAAS ANTENNA CABLES FOR ALL IFR-CERTIFIED COMPOSITE AIRCRAFT. SEE APPENDIX G FOR A LIST OF AIRCRAFT REQUIRING OVERBRAID PROTECTION. SEE SECTION 3.3.1.1 FOR OVERBRAID PROCEDURE AND PART NUMBER SPECIFICATION. OVERBRAID IS NOT REQUIRED FOR METAL OR TUBE-AND-FABRIC AIRCRAFT.
6. REFER TO SECTION 3.3.3 FOR SPLITTER AND DIPLEXER INSTALLATION GUIDANCE.
7. THE DIPLEXER IS INSTALLED BACKWARDS FROM TRADITIONAL APPLICATIONS. WHEN A G/S AND VOR/LOC ANTENNA IS INSTALLED, IT IS REQUIRED TO JOIN THE SIGNALS OF BOTH ANTENNAS WITH THE CI-507 DIPLEXER.

Figure E-18. GTN 6XX/7XX Antenna Interconnect
Sheet 5 of 5

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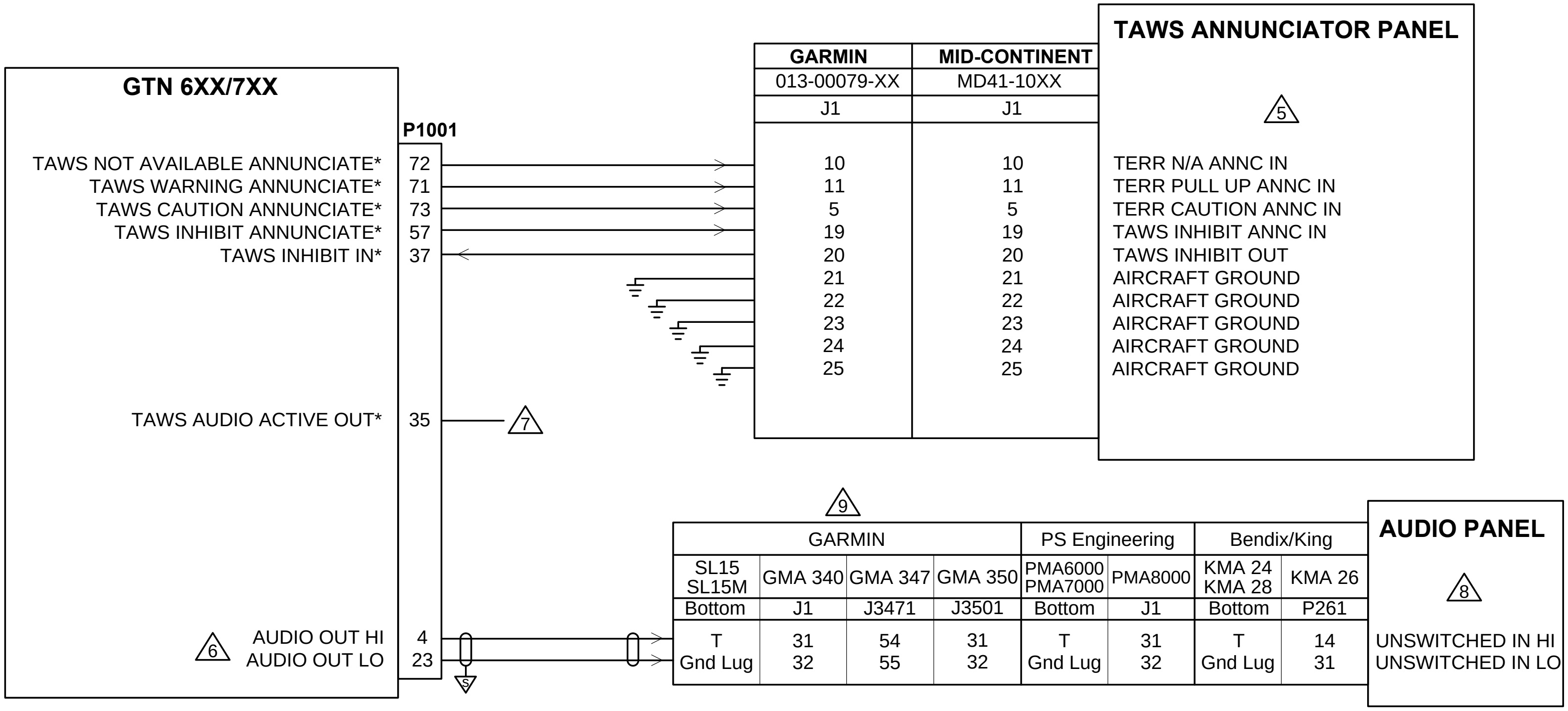

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

5. REFER TO SECTION 2.4.10.1.4 TO DETERMINE IF EXTERNAL TAWS ANNUNCIATION IS REQUIRED.

6. ONLY ONE GTN SHOULD HAVE TAWS ENABLED TO PREVENT CONFLICTING AUDIO MESSAGES.

7. CONNECT TO THE AUDIO INHIBIT INPUTS OF OTHER SYSTEMS WITH LOWER PRIORITY AURALS THAN TAWS, SUCH AS TRAFFIC. SEE TRAFFIC INTERCONNECT DRAWING FOR CONNECTIONS.

8. OTHER UNSWITCHED, UNMUTED INPUTS ON THE AUDIO PANEL MAY BE USED IN LIEU OF THOSE SHOWN.

9. FOR GMA 35 INTERCONNECT WIRING SEE APPENDIX F.

Figure E-19. GTN 6XX/7XX – TAWS Annunciators Interconnect

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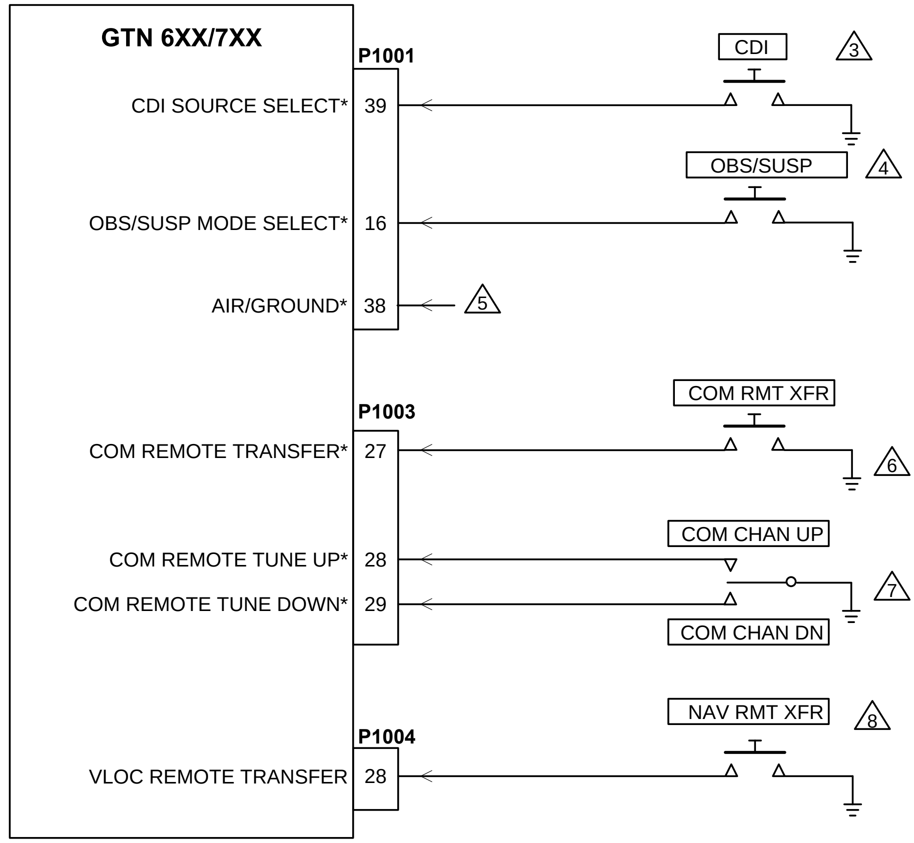

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND

3. THE CDI SOURCE SELECT INPUT MAY BE USED TO TOGGLE BETWEEN GPS AND VLOC COURSE DEVIATION SOURCES. USE GRAYHILL SWITCH P/N 30-3. THE SWITCH MUST BE LABELED AS SHOWN DIRECTLY ADJACENT TO THE SWITCH. REFER TO SECTION 2.4.8 FOR ADDITIONAL SWITCH INSTALLATION REQUIREMENTS. THIS SWITCH MUST NOT BE INSTALLED IF A REMOTE ANNUNCIATOR PANEL WITH A CDI SWITCHING FUNCTION IS CONNECTED TO THE GTN.

4. OBS/SUSP MODE SELECT* MAY BE USED TO REMOTELY TOGGLE BETWEEN GPS AUTO AND GPS OBS/SUSP MODE. USE GRAYHILL SWITCH P/N 30-3. THE SWITCH MUST BE LABELED AS SHOWN DIRECTLY ADJACENT TO THE SWITCH. REFER TO SECTION 2.4.8 FOR ADDITIONAL SWITCH INSTALLATION REQUIREMENTS. THIS SWITCH MUST NOT BE INSTALLED IF A REMOTE ANNUNCIATOR PANEL WITH AN OBS/SUSP SWITCHING FUNCTION IS CONNECTED TO THE GTN.

5. THE AIR/GROUND* INPUT IS USED TO CONTROL THE AIR/GROUND STATUS OF THE GTN. THIS INPUT MUST BE GROUNDED TO ACTIVATE. REFER TO SECTION 5.5.1.9 FOR CONFIGURATION INFORMATION.

6. COM REMOTE TRANSFER MAY BE USED TO TRANSFER THE STANDBY COM FREQUENCY TO THE ACTIVE COM FREQUENCY VIA REMOTE SWITCH. USE GRAYHILL SWITCH P/N 30-3. THE SWITCH MUST BE LABELED AS SHOWN DIRECTLY ADJACENT TO THE SWITCH. REFER TO SECTION 2.4.8 FOR ADDITIONAL SWITCH INSTALLATION REQUIREMENTS.

7. COM REMOTE TUNE UP AND COM REMOTE TUNE DOWN MAY BE USED TO SCROLL THROUGH A LIST OF PRESET COM FREQUENCIES. MAY USE TWO GRAYHILL SWITCHES P/N 30-3. THE SWITCHES MUST BE LABELED AS SHOWN DIRECTLY ADJACENT TO THE SWITCH. ADDITIONALLY, AN ON-OFF-ON SWITCH, CARLINGSWITCH P/N 62012481-0-0 CAN BE USED. REFER TO SECTION 2.4.8 FOR ADDITIONAL SWITCH INSTALLATION REQUIREMENTS.

8. VLOC REMOTE TRANSFER MAY BE USED TO TRANSFER THE STANDBY NAV FREQUENCY TO THE ACTIVE NAV FREQUENCY VIA REMOTE SWITCH. USE GRAYHILL SWITCH P/N 30-3. THE SWITCH MUST BE LABELED AS SHOWN DIRECTLY ADJACENT TO THE SWITCH. REFER TO SECTION 2.4.8 FOR ADDITIONAL SWITCH INSTALLATION REQUIREMENTS.

Figure E-20. GTN 6XX/7XX Switch Interconnect (Optional)

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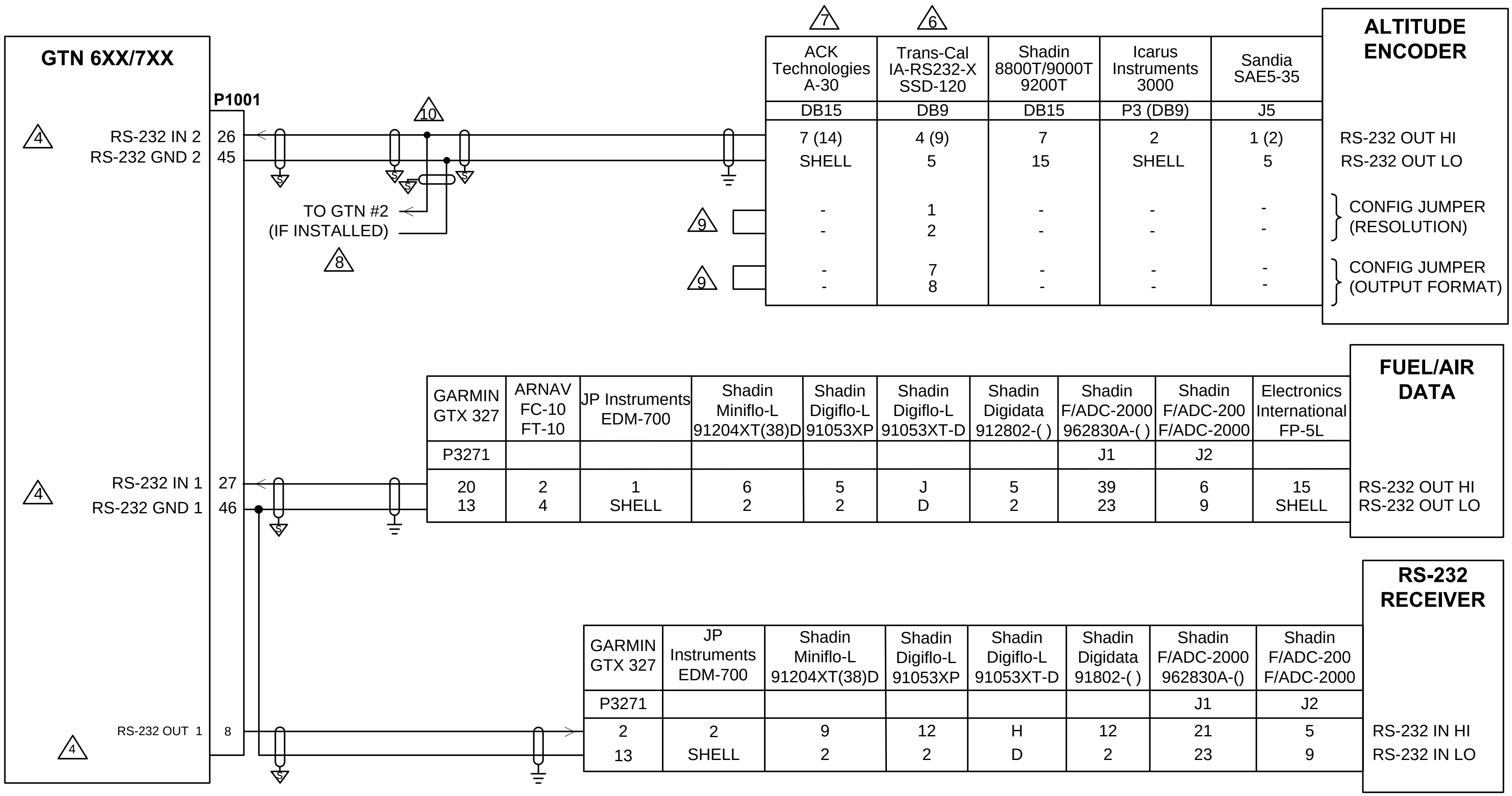


Figure E-21. GTN 6XX/7XX – RS-232 Interconnect
Sheet 1 of 2

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. RS-232 CHANNEL PORTS 1 TO 3 ARE SHOWN. ANY AVAILABLE RS-232 PORT MAY BE USED. REFER TO SECTION 5.5.1.2 FOR PORT CONFIGURATION INFORMATION.
5. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
6. IF USING THE SERIAL PORT SOFTWARE METHOD TO CONFIGURE THE OUTPUT OF THE ENCODER, ENSURE THAT THE "TRIMBLE/GARMIN 9600 BPS" FORMAT IS SELECTED.
7. MOD LEVEL 8 (OR HIGHER) IS REQUIRED TO SUPPORT RS-232 INTERFACE. ENSURE THAT JUMPERS ARE SET FOR "TRIMBLE/GARMIN 9600 BPS" AND "10 FOOT RESOLUTION".
8. IN A DUAL GTN INSTALLATION, CONNECT THE ALTITUDE SOURCE TO BOTH GTN #1 AND GTN #2. USE NEXT AVAILABLE RS-232 IN PORT. ENSURE BOTH PORTS ARE CONFIGURED TO THE CORRECT DATA FORMAT SETTING AS DESCRIBED IN SECTION 5.5.1.2.
9. THE LENGTH OF THE STRAPS MUST BE LIMITED TO THE LENGTH SPECIFIED IN THE MANUFACTURERS INSTALLATION MANUAL.
10. THE SPLICE MUST BE PERFORMED AT THE GTN CONNECTOR END OF THE WIRE. SPLICE AS SHOWN:

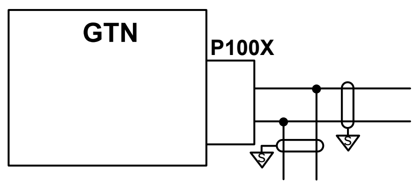
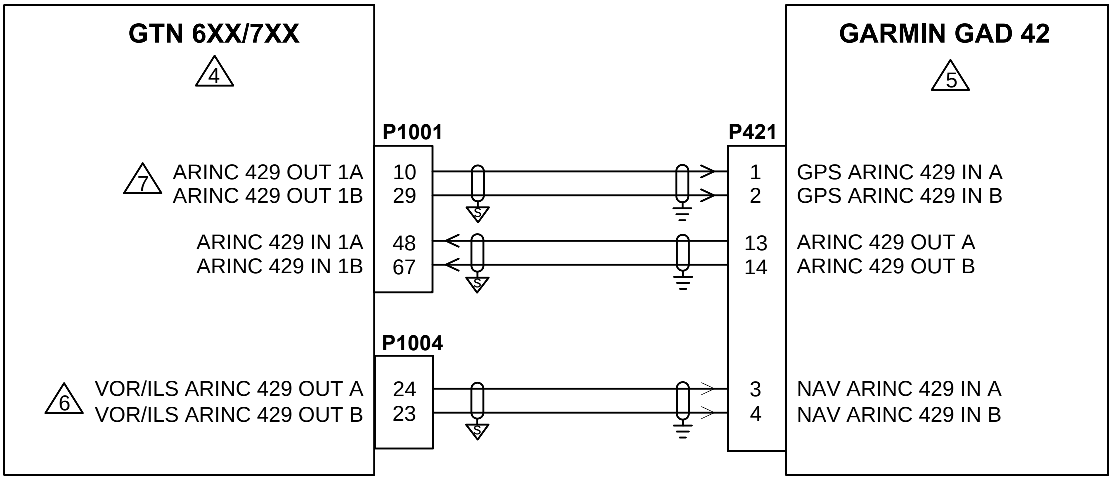


Figure E-21. GTN 6XX/7XX – RS-232 Interconnect
Sheet 2 of 2



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE GAD 42 INSTALLATION MANUAL.
4. FOR GTN 6XX/7XX CONFIGURATION SETTINGS, SEE SECTION 5.5.1.1.
5. SEE GARMIN GAD 42 INSTALLATION MANUAL FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. CONFIGURE THE ARINC 429 BUS SPEED TO MATCH THE GTN 650/750 OUTPUT SPEED.
6. THESE CONNECTIONS ARE ONLY USED ON THE GTN 650/750.
7. IF THE ARINC 429 OUT 1 PORT (P1001 PINS -10 AND -29) IS ALREADY USED FOR ANOTHER PURPOSE, ANY ARINC 429 OUT PORT MAY BE CONNECTED INSTEAD. REFER TO SECTION 5.5.1.1 FOR ARINC 429 CONFIGURATION SETTINGS, AND SECTION 4 FOR PINOUT.

Figure E-22. GTN 6XX/7XX – GAD 42 Interconnect

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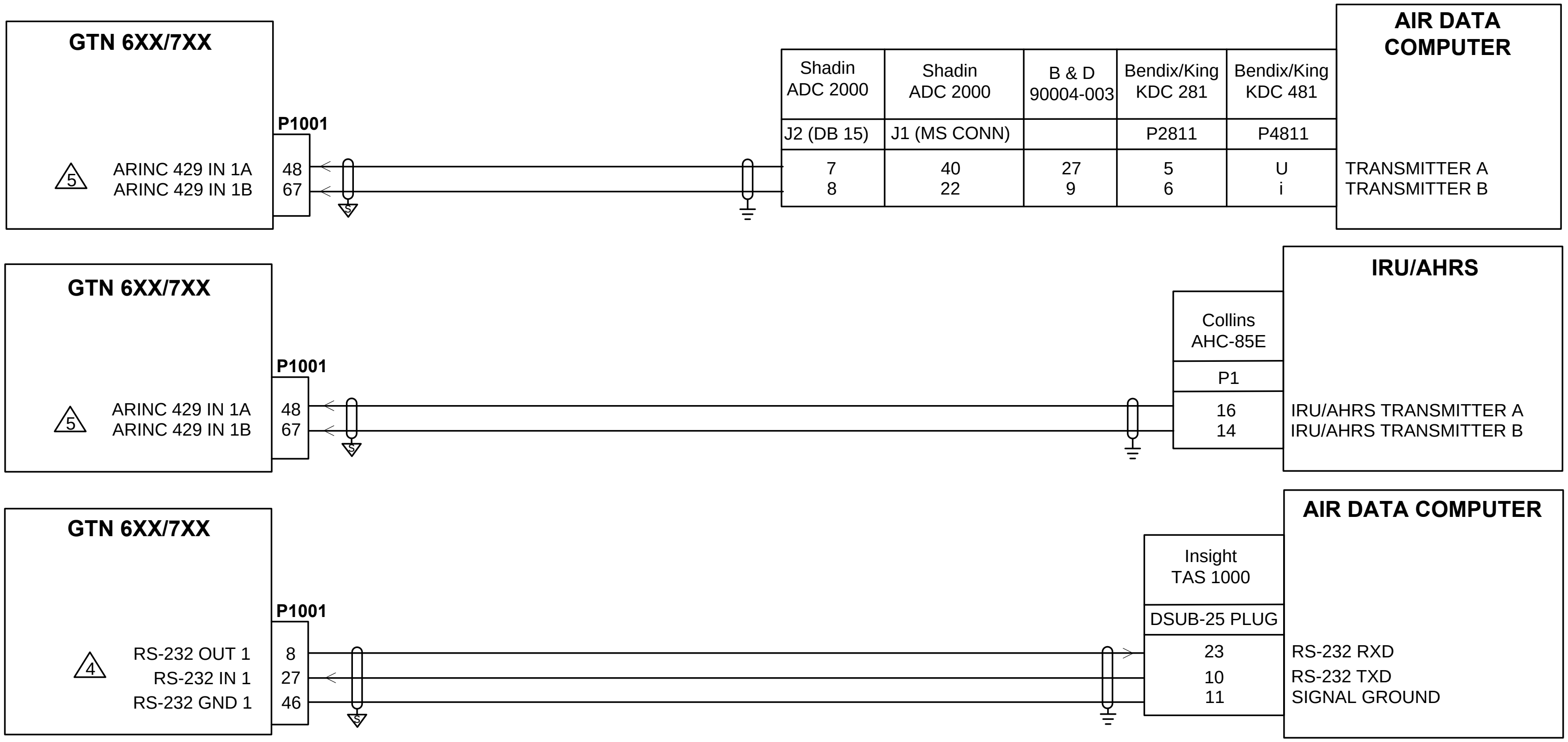

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. REFER TO SECTION 5.5.1.2 FOR RS-232 CHANNEL SETTINGS. RS-232 CHANNEL 1 PORT IS SHOWN. ANY AVAILABLE RS-232 PORT MAY BE USED.
5. REFER TO SECTION 5.5.1.1 FOR ARINC 429 CHANNEL SETTINGS. IF ARINC 429 IN 1 PORT IS BEING USED FOR ANOTHER PURPOSE, ANY AVAILABLE ARINC 429 IN PORT MAY BE CONNECTED INSTEAD.
6. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

Figure E-23. GTN 6XX/7XX – Air Data/AHRS Computer Interconnect

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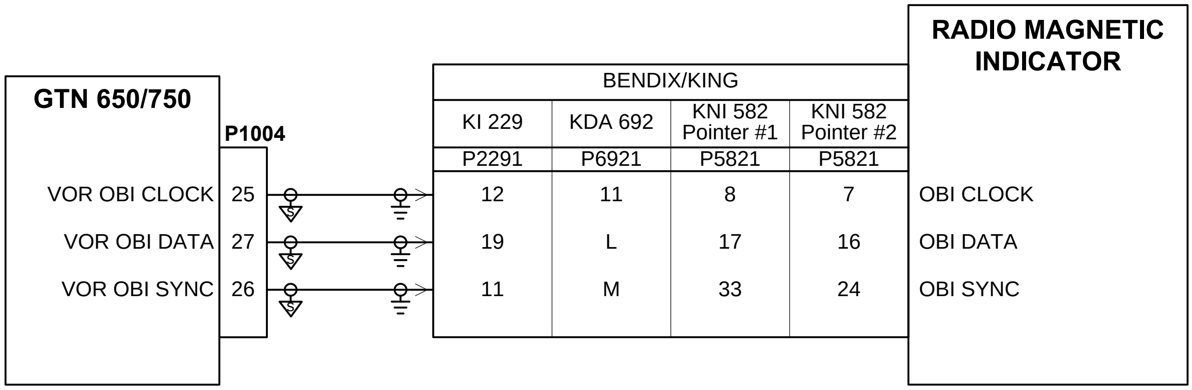
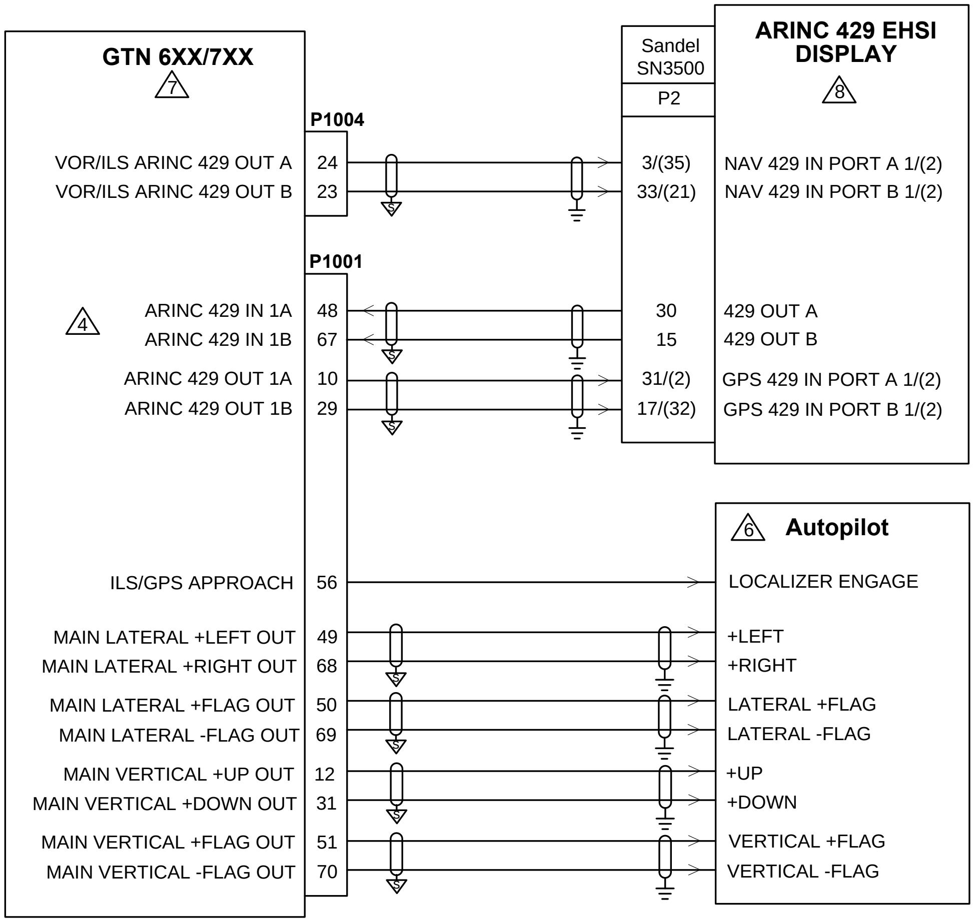
TYPICAL CONNECTIONS TO RMI



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT/CONFIGURATION INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

Figure E-24. GTN 650/750 – RMI Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.11.4.
4. IF THE ARINC 429 IN 1 PORT (P1001 -48 AND -67) IS ALREADY USED FOR ANOTHER PURPOSE, ANY AVAILABLE ARINC 429 IN PORT MAY BE CONNECTED INSTEAD. REFER TO SECTION 4 FOR PINOUT INFORMATION.
5. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
6. AUTOPILOT SHOWN FOR REFERENCE ONLY. REFER TO THE APPROPRIATE AUTOPILOT INTERCONNECT DIAGRAM.
7. REFER TO SECTION 5.5.1.1 FOR GTN 6XX/7XX CONFIGURATION SETTINGS.
8. SANDEL SN3500 SETUP ITEMS:

LNAV 1/2 SELECT: GNS 530 (ARINC)	ANNUN:	SERIAL
	LAT DV:	SERIAL
	VERT DV:	SERIAL
	VERT ENA:	SERIAL
NAV/ILS/DME-1/2:	NAV TYPE: 429 TO	

Figure E-25. GTN 6XX/7XX – Sandel SN3500 Interconnect

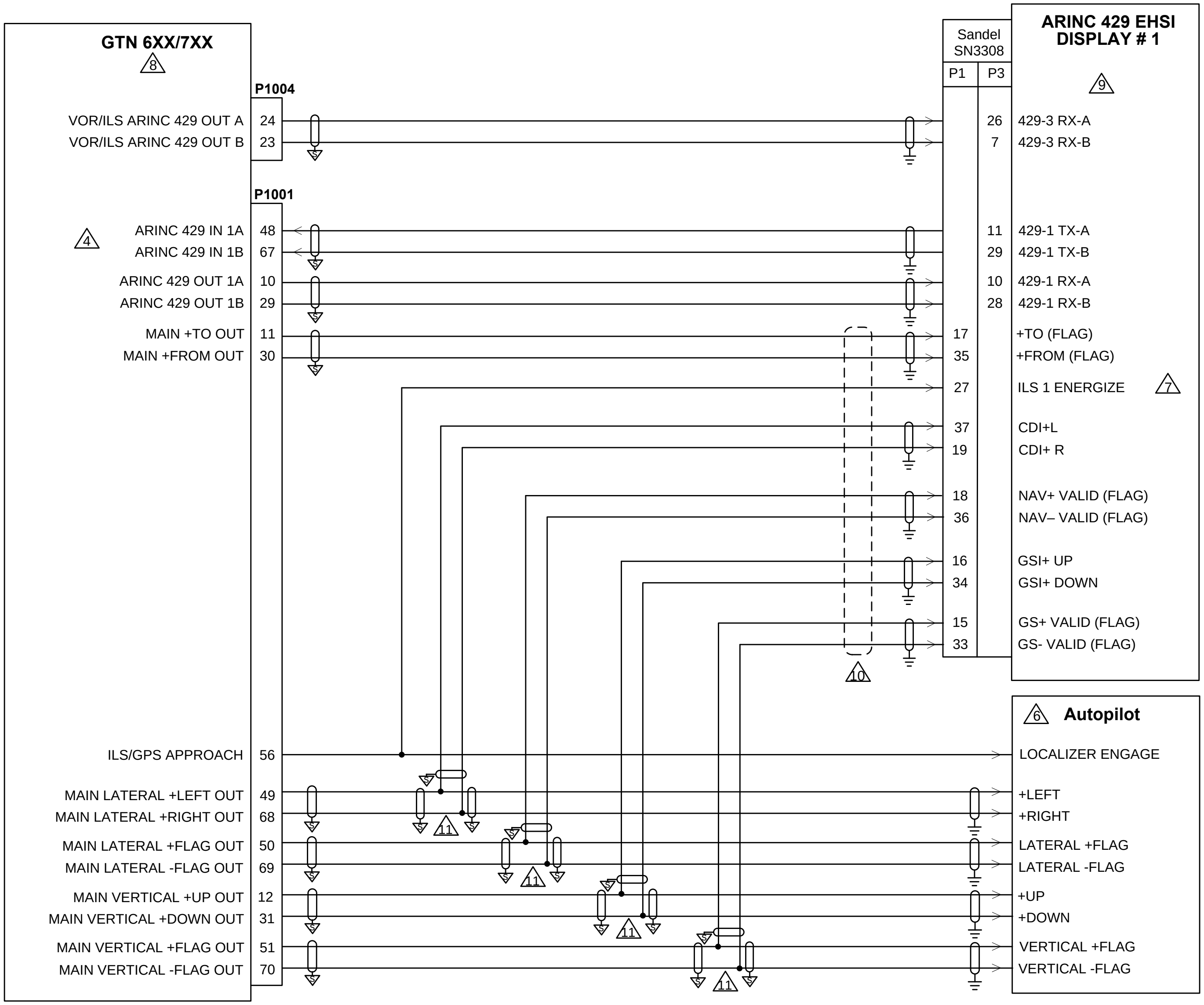


Figure E-26. GTN 6XX/7XX – Sandel SN3308 Interconnect Sheet 1 of 2

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. IF THE ARINC 429 IN 1 PORT IS ALREADY USED FOR ANOTHER PURPOSE, ANY AVAILABLE ARINC 429 IN PORT MAY BE CONNECTED INSTEAD.
5. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
6. AUTOPILOT SHOWN FOR REFERENCE ONLY. REFER TO THE APPROPRIATE AUTOPILOT INTERCONNECT DIAGRAM.
7. USE ILS ENERGIZE 2 (P1-8) IF GTN 6XX/7XX UNIT IS BEING CONNECTED AS GPS2/NAV2.
8. REFER TO SECTION 5.5.1.1 FOR ARINC 429 CONFIGURATION SETTINGS.
9. SANDEL SN3308 SETUP ITEMS:

LNAV 1/2 SELECT: GNS 430 (ARINC)	ANNUN:	SERIAL	RELAY SENSE:	NAV-2:	OFF
	COURSE:	OBS/LEG		GPS-1:	OFF
	DEVIATION:	SERIAL		GPS-2:	OFF
	OBS ROT:	NORMAL		CDI SRC SEL:	OFF
	OBS CAL:	000.0		RCVR 1/2:	OFF
NAV CHANGE: NAV 1/2 ENABLE:	YES				
PORT:	429 PORT-3*				

* FOR SOFTWARE VERSIONS PRIOR TO 2.30, NAV 1/2 MUST TEMPORARILY BE SET TO "ANALOG" AND "ILS" MUST BE SET TO "VALID LOW" FOR PROPER OPERATION OF THE VDI.

10. FOR SN3308 SOFTWARE VERSIONS PRIOR TO 2.30, ANALOG CONNECTIONS TO THE SN3308 ARE REQUIRED TO ALLOW VERTICAL GUIDANCE TO BE DISPLAYED FOR GPS APPROACHES. FOR SOFTWARE VERSION 2.30 AND LATER, THESE ANALOG CONNECTIONS ARE NOT REQUIRED.
11. THE SPLICE MUST BE PERFORMED AT THE GTN CONNECTOR END OF THE WIRE. SPLICE AS SHOWN:

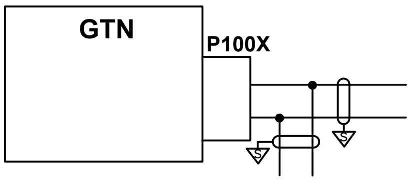


**Figure E-26. GTN 6XX/7XX – Sandel SN3308 Interconnect
Sheet 2 of 2**

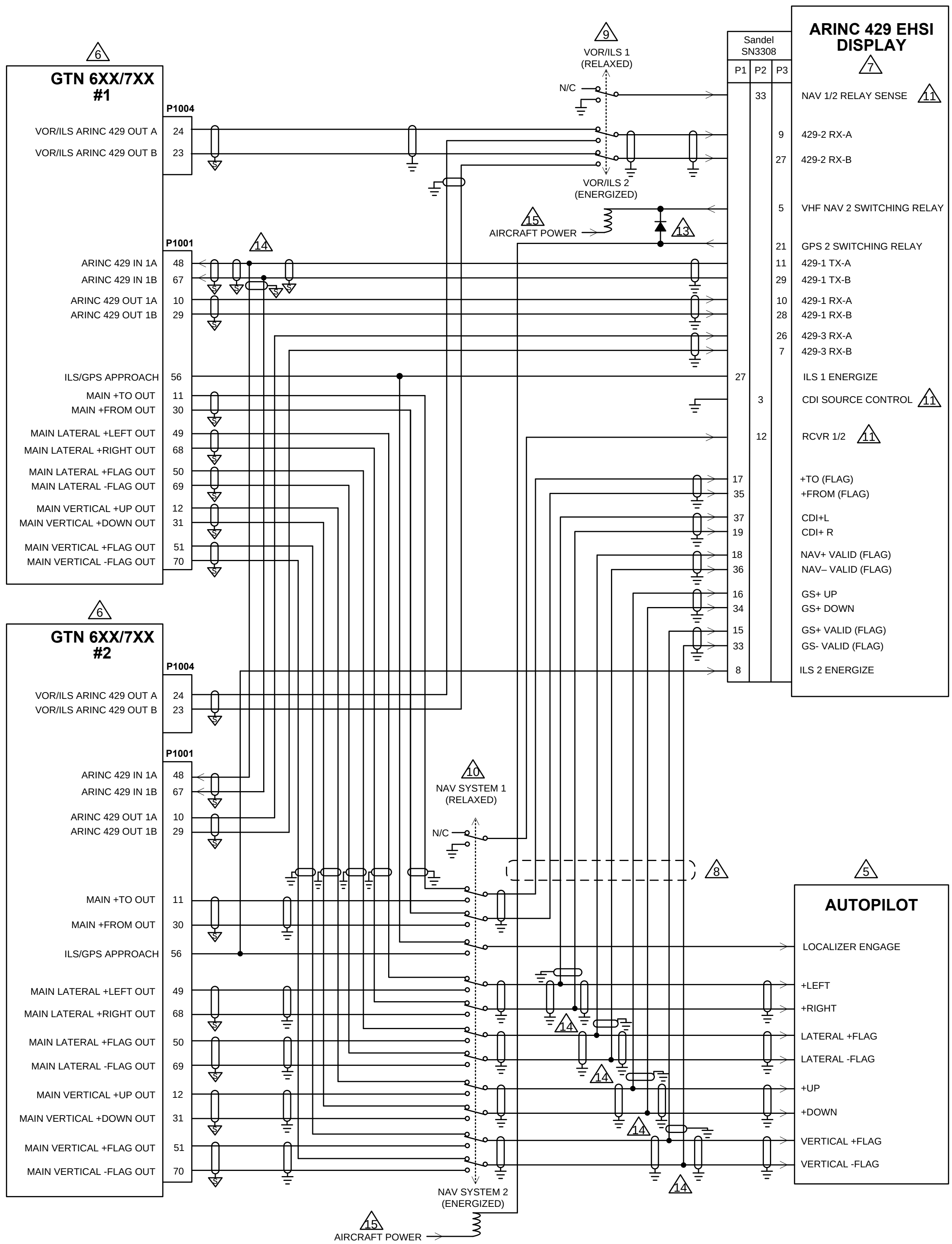


Figure E-27. GTN 6XX/7XX – SN3308 – Two GTNs Interconnect
Sheet 1 of 2

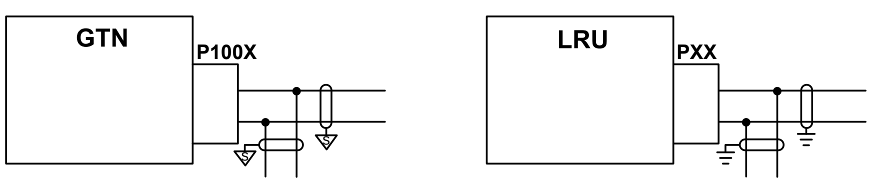
NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
5. AUTOPILOT SHOWN FOR REFERENCE ONLY. REFER TO THE APPROPRIATE INSTALLED A/P INTERCONNECT DIAGRAM.
6. REFER TO SECTION 5.5.1.1 FOR GTN 6XX/7XX #1 AND #2 ARINC 429 CONFIGURATION SETTINGS.
7. SANDEL SN3308 #1 SETUP ITEMS:

LNAV 1/2 SELECT: GNS 530 (ARINC)		NAV CHANGE:	NAV—1 ENABLE:	YES
			PORT:	429 PORT-2*
			NAV—2 ENABLE:	YES
			PORT:	429 PORT-2*
LNAV 1/2 CHANGE:	ANNUN: SERIAL	RELAY SENSE:	NAV—2:	P2—33
	COURSE: OBS/LEG		GPS—1:	OFF
	DEVIATION: ANALOG IN		GPS—2:	OFF
	OBS ROT: NORMAL		CDI SRC SEL:	P2—3
	OBS CAL: 000.0		RCVR 1/2:	P2—12

* FOR SOFTWARE VERSIONS PRIOR TO 2.30, NAV 1/2 MUST TEMPORARILY BE SET TO "ANALOG" AND "ILS" MUST BE SET TO "VALID LOW" FOR PROPER OPERATION OF THE VDI.

8. FOR SANDEL SOFTWARE VERSIONS PRIOR TO 2.30, ANALOG CONNECTIONS TO THE SN3308 ARE REQUIRED TO ALLOW VERTICAL GUIDANCE TO BE DISPLAYED FOR GPS APPROACHES. FOR SOFTWARE VERSION 2.30 OR LATER, THESE ANALOG CONNECTIONS ARE NOT REQUIRED.
9. USE RELAY LEACH P/N WN-460-( )( )( ).
10. USE RELAY AMERI-KING P/N AK-950-R12-( )V.
11. THESE PINS ON THE SN3308 ARE CONFIGURABLE AND CAN BE CHANGED TO SUIT THE PARTICULAR INSTALLATION.
12. IF IT IS DESIRED TO USE THE NAV RECEIVERS AS A SOURCE FOR THE SN3308 BEARING POINTERS, IT IS RECOMMENDED THAT THE GTN 6XX/7XX #1/#2 COMPOSITE OUTPUTS (P1004-8) BE CONNECTED TO THE SN3308 COMPOSITE INPUTS (P1-29 AND P1-10, #1 AND #2 RESPECTIVELY) AND THE SN3308 BRG NAV-1/NAV-2 BE SET TO "429+COMP".
13. USE DIODE P/N 1N4004 OR EQUIVALENT.
14. THE SPLICE MUST BE PERFORMED AT THE CONNECTOR END OF THE WIRE. SPLICE AS SHOWN:



15. CONNECT TO SANDEL 3308 EFIS CIRCUIT BREAKER FOR AIRCRAFT POWER.

Figure E-27. GTN 6XX/7XX – SN3308 – Two GTNs Interconnect
Sheet 2 of 2

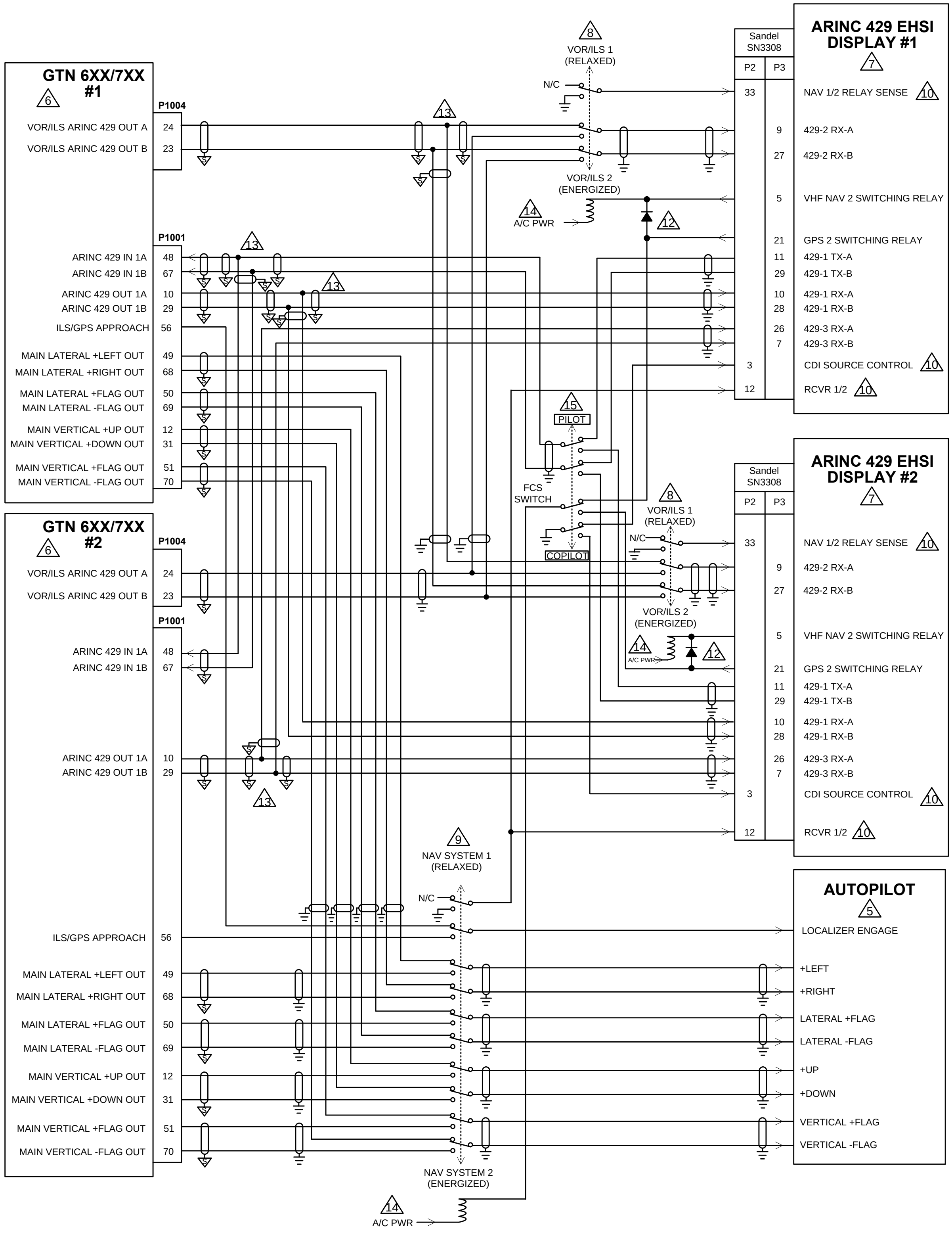


Figure E-28. GTN 6XX/7XX – SN3308 – Two GTNs and Two SN3308s Interconnect Sheet 1 of 2

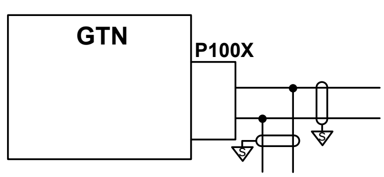
NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
5. AUTOPILOT SHOWN FOR REFERENCE ONLY. REFER TO THE APPROPRIATE AUTOPILOT INTERCONNECT DIAGRAM.
6. REFER TO SECTION 5.5.1.1 FOR GTN 6XX/7XX #1 AND #2 CONFIGURATION SETTINGS.
7. SANDEL SN3308 #1 AND #2 SETUP ITEMS:

LNAV 1/2 SELECT:	GNS 530 (ARINC)	NAV CHANGE:	NAV—1 ENABLE:	YES
			PORT:	429 PORT-2*
			NAV—2 ENABLE:	YES
			PORT:	429 PORT-2*
LNAV 1/2 CHANGE:	ANNUN: SERIAL	RELAY SENSE:	NAV—2:	P2—33
	COURSE: OBS/LEG		GPS—1:	OFF
	DEVIATION: ANALOG IN		GPS—2:	OFF
	OBS ROT: NORMAL		CDI SRC SEL:	P2—3
	OBS CAL: 000.0		RCVR 1/2:	P2—12

* FOR SOFTWARE VERSIONS PRIOR TO 2.30, NAV 1/2 MUST TEMPORARILY BE SET TO "ANALOG" AND "ILS" MUST BE SET TO "VALID LOW" FOR PROPER OPERATION OF THE VDI.

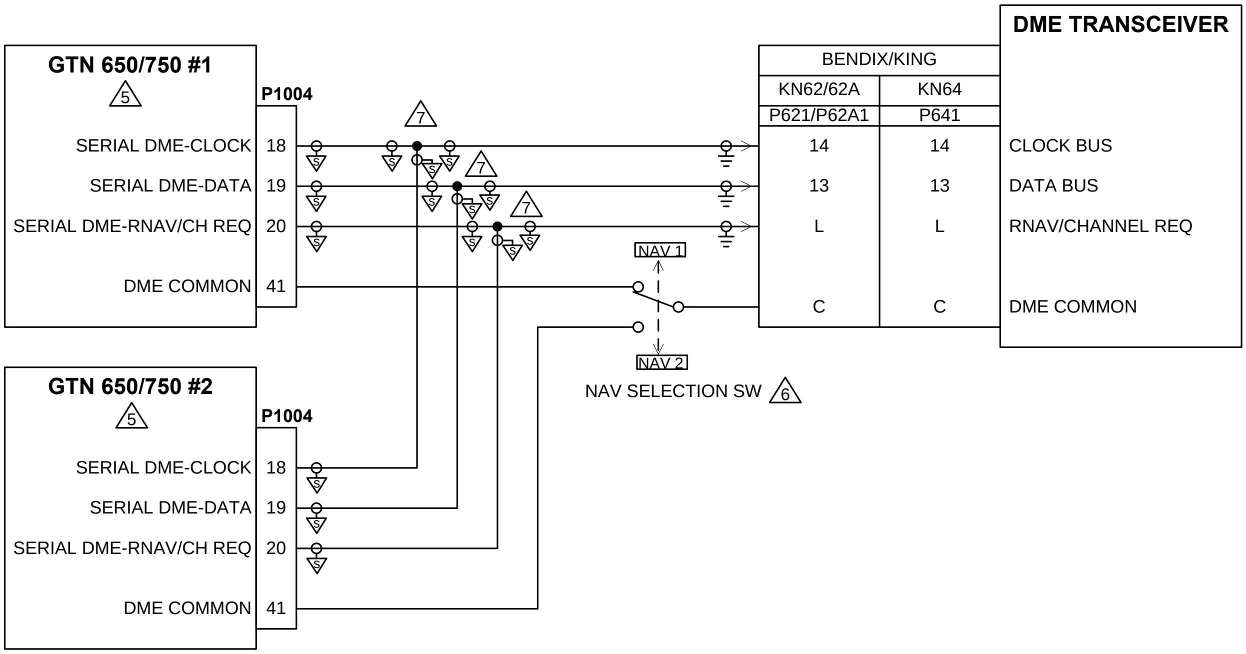
8. USE RELAY LEACH P/N WN-460-( )( )( ) OR EQUIVALENT.
9. USE RELAY AMERI-KING P/N AK-950-R12-()V OR EQUIVALENT.
10. THESE PINS ON THE SN3308 ARE CONFIGURABLE AND CAN BE CHANGED TO SUIT THE PARTICULAR INSTALLATION.
11. IF IT IS DESIRED TO USE THE NAV RECEIVERS AS A SOURCE FOR THE SN3308 BEARING POINTERS, IT IS RECOMMENDED THAT THE GTN 6XX/7XX #1/#2 COMPOSITE OUTPUTS (P1004-8) BE CONNECTED TO THE SN3308 COMPOSITE INPUTS (P1-29 AND P1-10, #1 AND #2 RESPECTIVELY) AND THE SN3308 BRG NAV-1/NAV-2 BE SET TO "429+COMP".
12. USE DIODE P/N 1N4004 OR EQUIVALENT.
13. THE SPLICE MUST BE PERFORMED AT THE GTN CONNECTOR END OF THE WIRE. SPLICE AS SHOWN:



14. CONNECT TO SANDEL 3308 EFIS CIRCUIT BREAKER FOR AIRCRAFT POWER.
15. USE GRAYHILL SWITCH SERIES 34A-4P1. LABEL AS SHOWN. SEE SECTION 2.8 FOR ADDITIONAL SWITCH INSTALLATION REQUIREMENTS.

Figure E-28. GTN 6XX/7XX – SN3308 – Two GTNs and Two SN3308s Interconnect Sheet 2 of 2

KING SERIAL DME (PANEL-MOUNTED DME)



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
5. THE GTN 650/750 MUST BE CONFIGURED AT INSTALLATION TO OUTPUT KING SERIAL DME TUNING DATA UNDER THE DME CHANNEL MODE. REFER TO SECTION 5.5.1.11 FOR CONFIGURATION SETTINGS.
6. THE NAV SELECTION SWITCH IS ONLY REQUIRED IF TWO GTN 650/750s ARE INSTALLED. FOR SINGLE GTN INSTALLATIONS, WIRE AS SHOWN FOR GTN #1. AN ACCEPTABLE SWITCH IS CARLINGSWITCH P/N 112-A-63. LABEL AS SHOWN. REFER TO SECTION 2.4.8 FOR ADDITIONAL SWITCH INSTALLATION REQUIREMENTS.
7. THE SPLICE MUST BE PERFORMED AT THE GTN CONNECTOR END OF THE WIRE. SPLICE AS SHOWN:

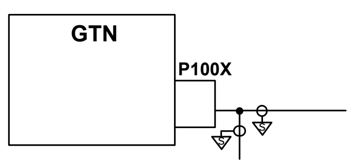
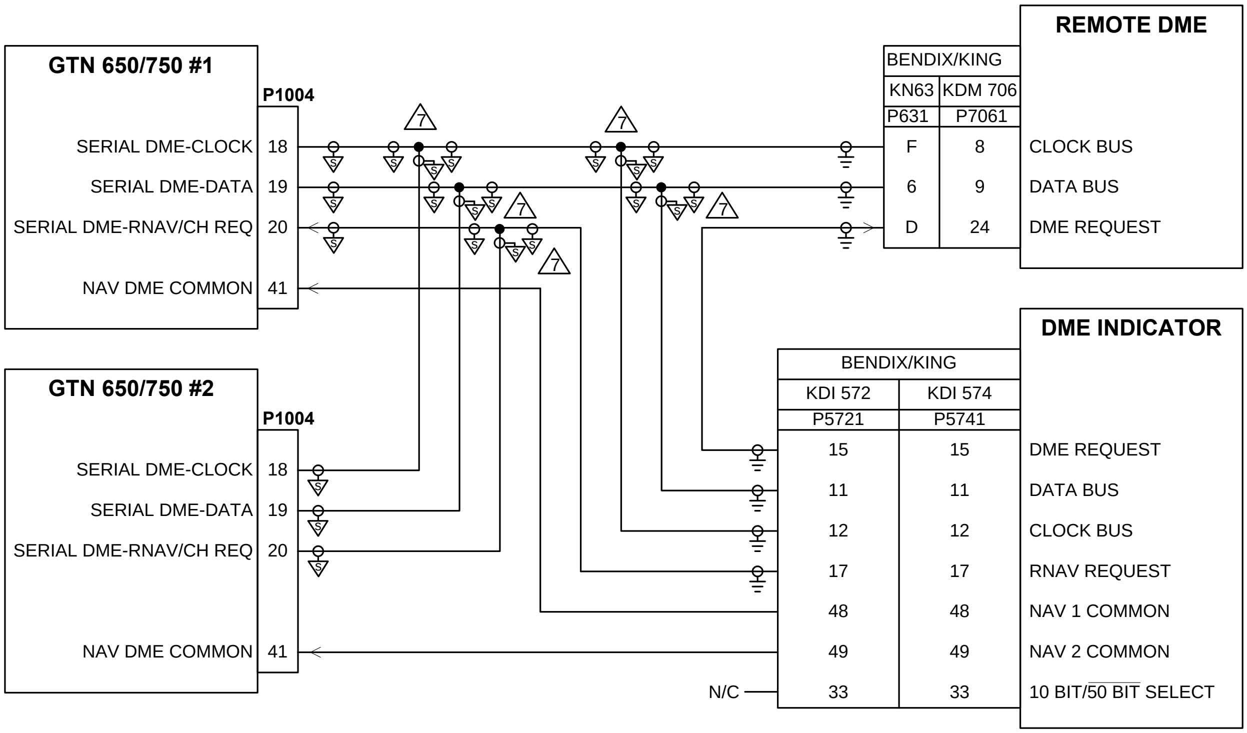


Figure E-29. GTN 650/750 – Bendix King DME Interconnect Sheet 1 of 2

KING SERIAL DME (REMOTE-MOUNTED)



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 650/750, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
5. THE GTN 650/750 MUST BE CONFIGURED AT INSTALLATION TO OUTPUT KING SERIAL DME TUNING DATA UNDER THE DME CHANNEL MODE. REFER TO SECTION 5.5.1.11 FOR CONFIGURATION SETTINGS.
6. FOR SINGLE GTN INSTALLATIONS, WIRE AS SHOWN FOR GTN #1.
7. THE SPLICE MUST BE PERFORMED AT THE GTN CONNECTOR END OF THE WIRE. SPLICE AS SHOWN:

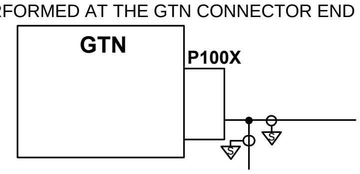
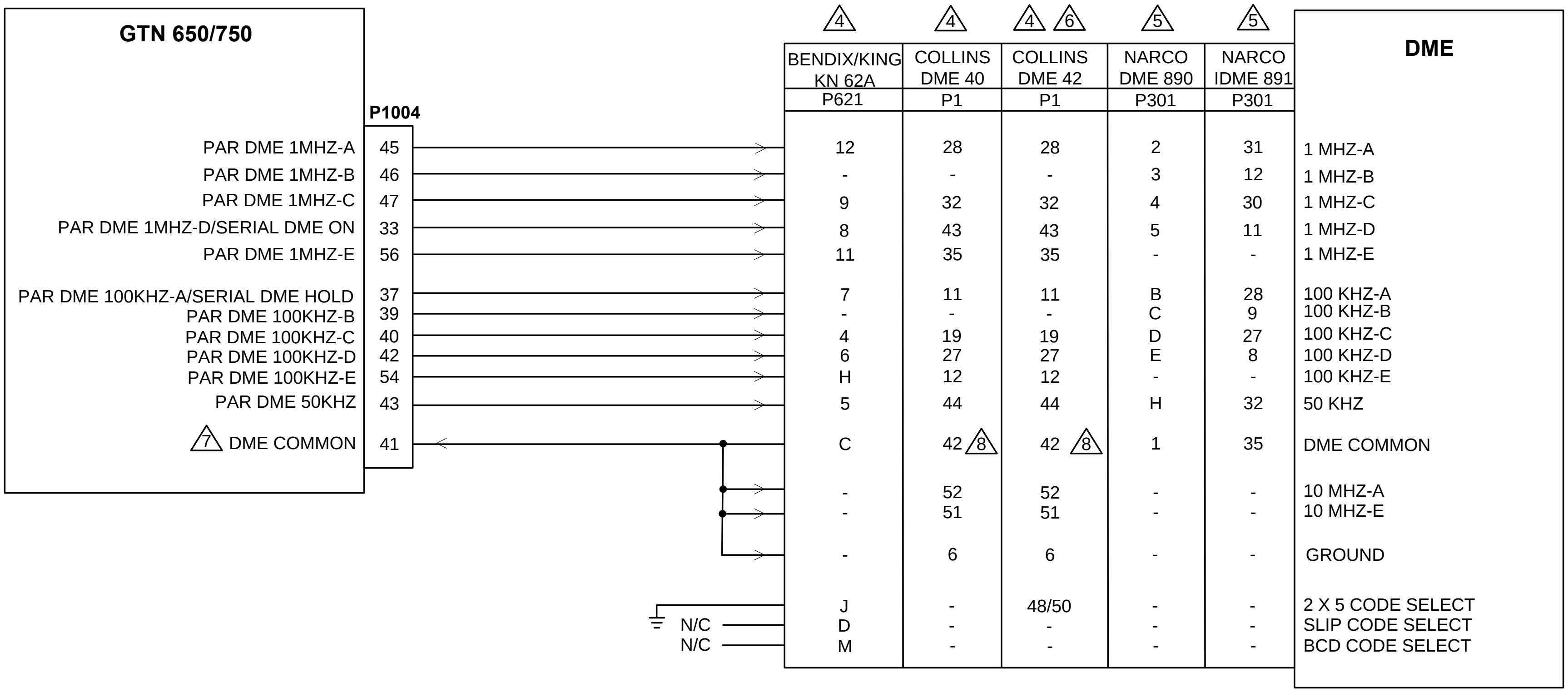


Figure E-29. Dual GTN 650/750 – Bendix King DME Interconnect Sheet 2 of 2



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY. REFER TO SECTION 5.5.1.11 FOR GTN CONFIGURATION SETTINGS.

4. THE GTN 650/750 MUST BE CONFIGURED FOR PARALLEL 2X5 DME CHANNELING MODE FOR PROPER OPERATION WITH THIS MODEL OF DME TRANSCEIVER.

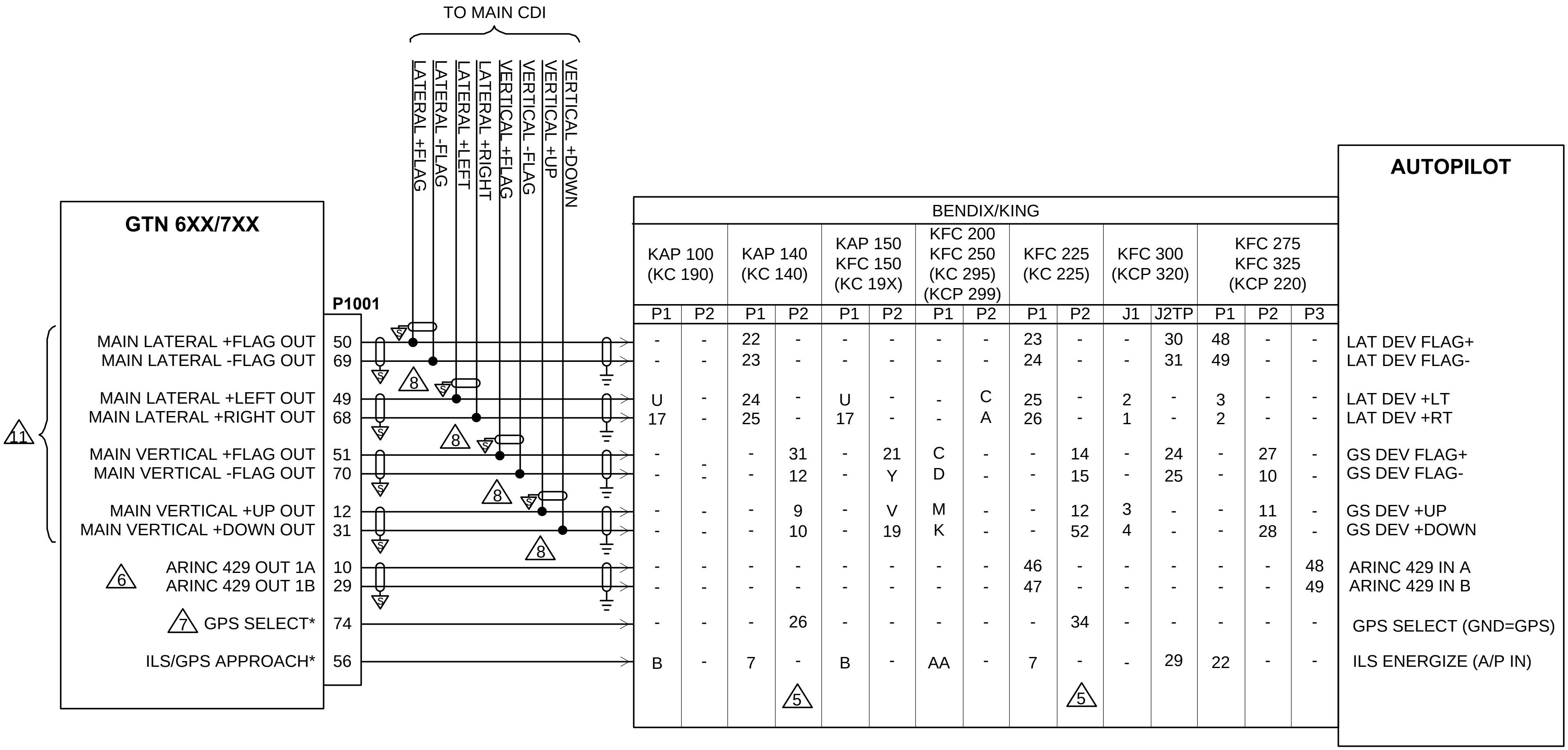
5. THE GTN 650/750 MUST BE CONFIGURED FOR NARCO 890/891 DME CHANNELING MODE FOR PROPER OPERATION WITH THIS MODEL OF DME TRANSCEIVER.

6. DME 42 MUST BE STRAPPED FOR 2X5 TUNING. REFER TO DME 42 INSTALLATION MANUAL FOR STRAPPING INFORMATION.

7. FOR DUAL GTN INTERFACES TO THE DME, IT MAY BE NECESSARY TO INSTALL A TOGGLE SWITCH FOR THE 'DME COMMON' INPUT. INSTALL SWITCH AS SHOWN FOR KING SERIAL PANEL DME INTERCONNECT.

8. P1-42 AND P3-46 ON THE HPU-74 NEED TO BE DISCONNECTED FROM GROUND IN ORDER TO ENTER DME HOLD MODE.

Figure E-30. GTN 650/750 – DME Interconnect



GTN 6XX/7XX	P1001	KAP 100 (KC 190) P1	KAP 100 (KC 190) P2	KAP 140 (KC 140) P1	KAP 140 (KC 140) P2	KAP 150 KFC 150 (KC 19X) P1	KAP 150 KFC 150 (KC 19X) P2	KFC 200 KFC 250 (KC 295) (KCP 299) P1	KFC 200 KFC 250 (KC 295) (KCP 299) P2	KFC 225 (KC 225) P1	KFC 225 (KC 225) P2	KFC 300 (KCP 320) J1	KFC 300 (KCP 320) J2TP	KFC 275 KFC 325 (KCP 220) P1	KFC 275 KFC 325 (KCP 220) P2	KFC 275 KFC 325 (KCP 220) P3	AUTOPILOT
MAIN LATERAL +FLAG OUT	50	-	-	22	-	-	-	-	-	23	-	-	30	48	-	-	LAT DEV FLAG+
MAIN LATERAL -FLAG OUT	69	-	-	23	-	-	-	-	-	24	-	-	31	49	-	-	LAT DEV FLAG-
MAIN LATERAL +LEFT OUT	49	U	-	24	-	U	-	-	C	25	-	2	-	3	-	-	LAT DEV +LT
MAIN LATERAL +RIGHT OUT	68	17	-	25	-	17	-	-	A	26	-	1	-	2	-	-	LAT DEV +RT
MAIN VERTICAL +FLAG OUT	51	-	-	-	31	-	21	C	-	-	14	-	24	-	27	-	GS DEV FLAG+
MAIN VERTICAL -FLAG OUT	70	-	-	-	12	-	Y	D	-	-	15	-	25	-	10	-	GS DEV FLAG-
MAIN VERTICAL +UP OUT	12	-	-	-	9	-	V	M	-	-	12	3	-	-	11	-	GS DEV +UP
MAIN VERTICAL +DOWN OUT	31	-	-	-	10	-	19	K	-	-	52	4	-	-	28	-	GS DEV +DOWN
ARINC 429 OUT 1A	10	-	-	-	-	-	-	-	-	46	-	-	-	-	-	48	ARINC 429 IN A
ARINC 429 OUT 1B	29	-	-	-	-	-	-	-	-	47	-	-	-	-	-	49	ARINC 429 IN B
GPS SELECT*	74	-	-	-	26	-	-	-	-	-	34	-	-	-	-	-	GPS SELECT (GND=GPS)
ILS/GPS APPROACH*	56	B	-	7	-	B	-	AA	-	7	-	-	29	22	-	-	ILS ENERGIZE (A/P IN)

Figure E-31. GTN 6XX/7XX – Bendix King Autopilot Interconnect
Sheet 1 of 3

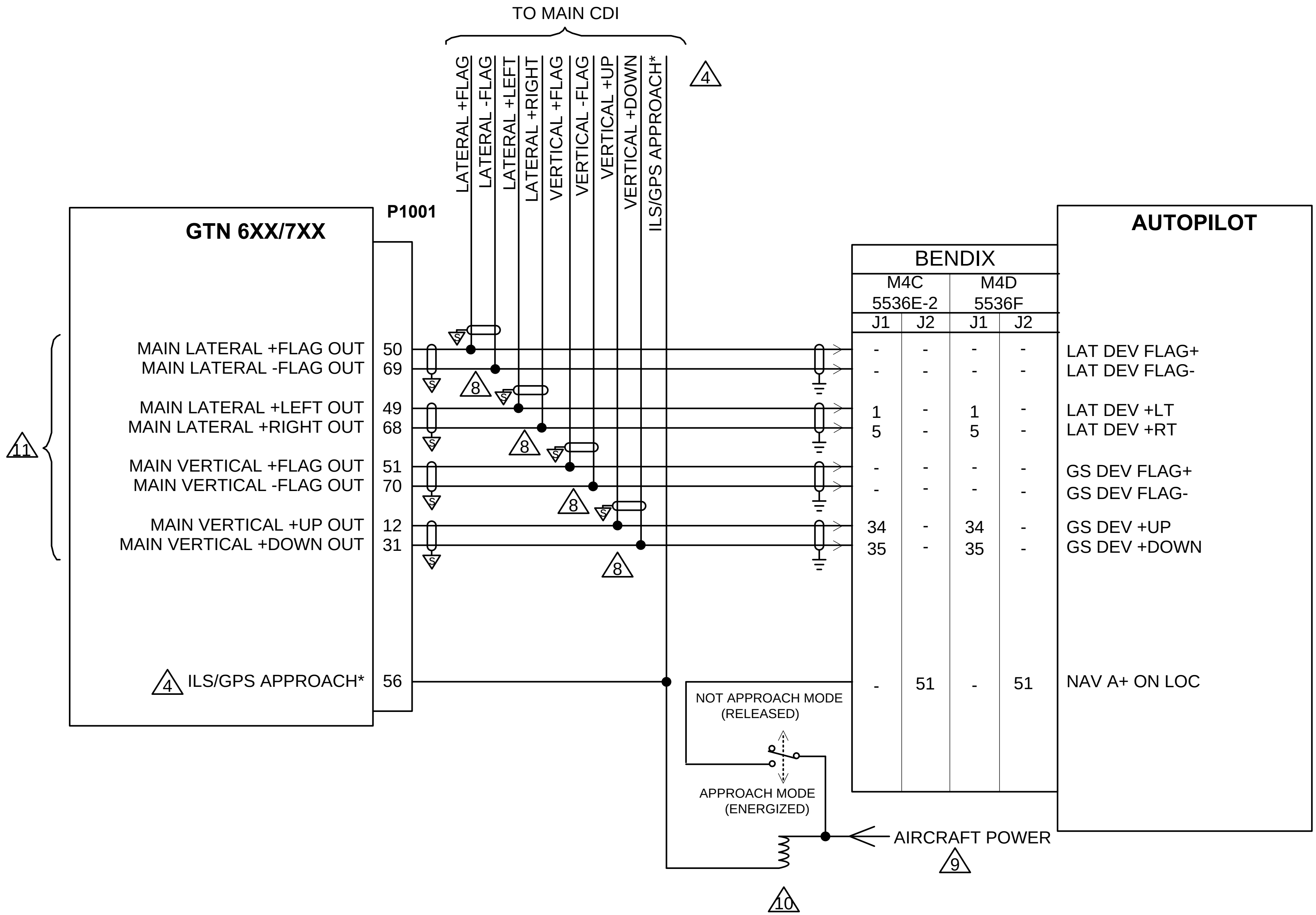
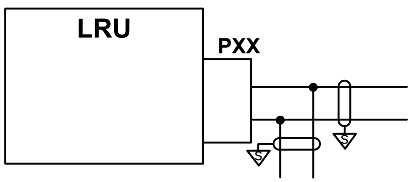


Figure E-31. GTN 6XX/7XX – Bendix Autopilot Interconnect
Sheet 2 of 3

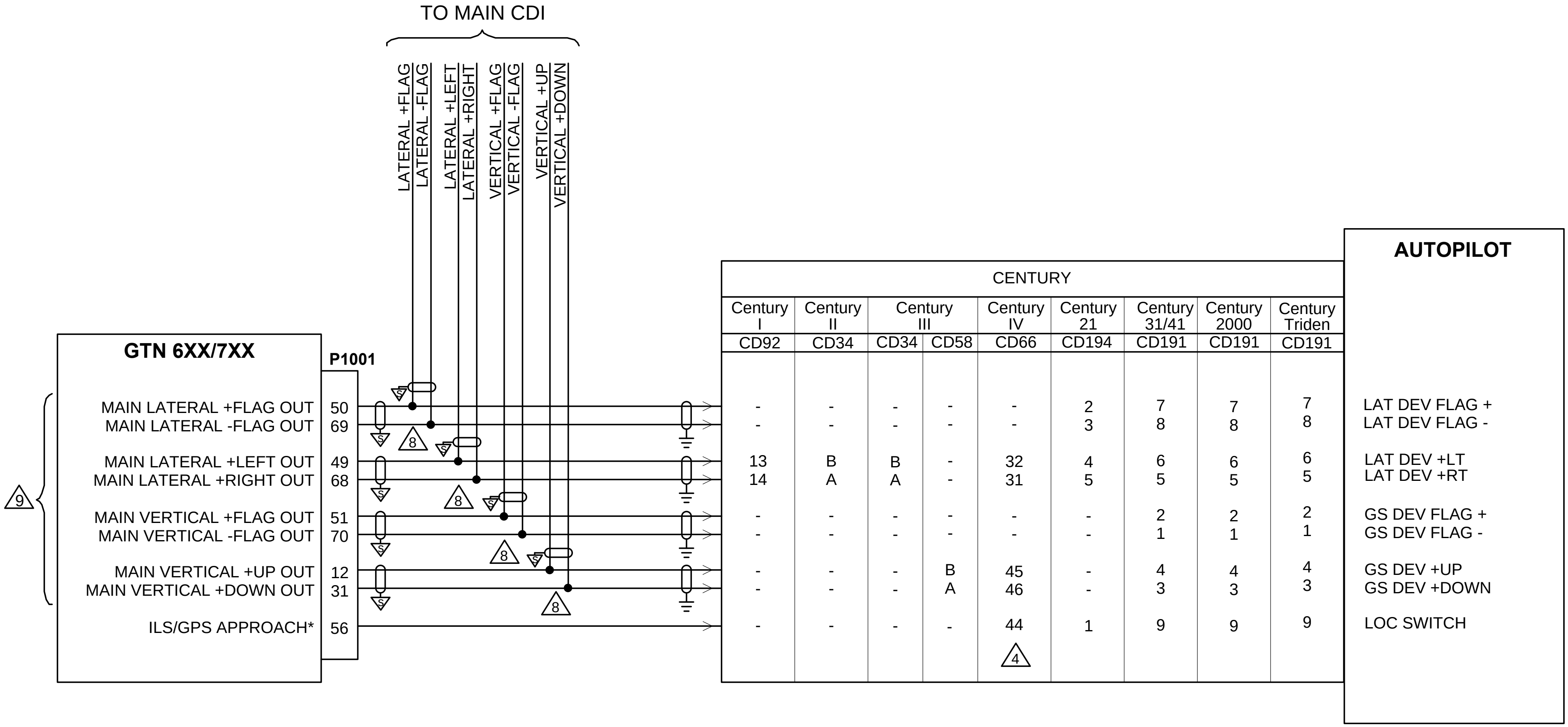
NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT GROUND WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. THE ILS/GPS APPROACH DISCRETE IS REQUIRED BY SOME CDIs/ HSIs THAT ARE USED WITH THE M4C/D AUTOPILOTS. IF REQUIRED, ENSURE THAT THE SIGNAL SUPPLIED TO THE INDICATOR IS THE CORRECT POLARITY (ACTIVE-HIGH OR ACTIVE-LOW).
5. THE GPS SELECT OUTPUT MUST BE CONNECTED TO THE GPS SELECT INPUT OF THE AUTOPILOT. THIS OUTPUT IS GROUNDED IN GPS MODE, UNLESS A GPS APPROACH IS ACTIVE AND THE PILOT HAS ENABLED THE A/P APPROACH OUTPUTS. THIS WILL ALLOW THE AUTOPILOT TO CAPTURE THE GPS GLIDEPATH WHILE THE CDI IS DISPLAYING GPS INFORMATION.
6. ALL GAMA 429 CONFIGURATIONS OF THE GPS ARINC 429 OUTPUT PROVIDE DATA REQUIRED BY THE AUTOPILOT FOR GPSS. THE ARINC 429 CONFIGURATION CANNOT BE USED.
7. REFER TO SECTION 5.5.1.9 FOR THE CORRECT GPS SELECT CONFIGURATION SETTINGS. FOR THE BENDIX/KING KFC 225 AND KAP 140 AUTOPILOTS, THE GPS SELECT CONFIGURATION SETTING MUST BE SET TO ‘PROMPT’.
8. THE SPLICE MUST BE PERFORMED AT THE CONNECTOR END OF THE WIRE. SPLICE AS SHOWN:



9. CONNECT TO BENDIX AUTOPILOT CIRCUIT BREAKER FOR AIRCRAFT POWER.
10. AN ACCEPTABLE RELAY IS LEACH P/N WN460-( )( )( ).
11. FOR IFR-CERTIFIED COMPOSITE AIRCRAFT ONLY (EACH AIRCRAFT IN APPENDIX G THAT REQUIRES OVERBRAID OVER THE GPS/WAAS CABLE): ANY LRU (I.E. CDI, AUTOPILOT) THAT CONNECTS TO THE GTN’S P1001 MAIN CDI/ VDI OUTPUTS MUST BE MOUNTED TO THE INSTRUMENT PANEL OR COCKPIT CENTER CONSOLE WITH ELECTRICAL BONDING EQUAL TO OR LESS THAN 20 MILLIOHMS BETWEEN THE EQUIPMENT AND THE INSTRUMENT PANEL.

Figure E-31. GTN 6XX/7XX – Bendix Autopilot Interconnect
Sheet 3 of 3

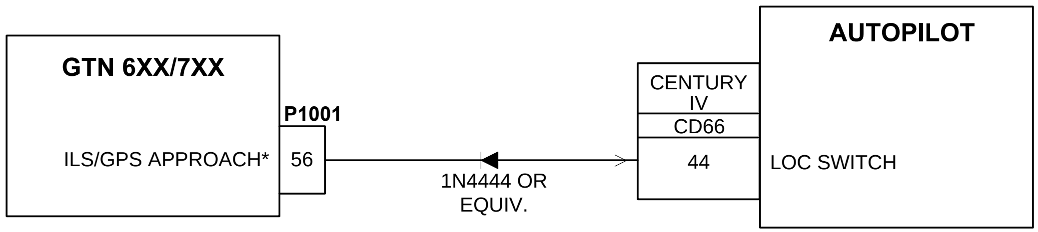


Century I	Century II	Century III		Century IV	Century 21	Century 31/41	Century 2000	Century Triden
CD92	CD34	CD34	CD58	CD66	CD194	CD191	CD191	CD191
-	-	-	-	-	2	7	7	7
-	-	-	-	-	3	8	8	8
13	B	B	-	32	4	6	6	6
14	A	A	-	31	5	5	5	5
-	-	-	-	-	-	2	2	2
-	-	-	-	-	-	1	1	1
-	-	-	B	45	-	4	4	4
-	-	-	A	46	-	3	3	3
-	-	-	-	44	1	9	9	9

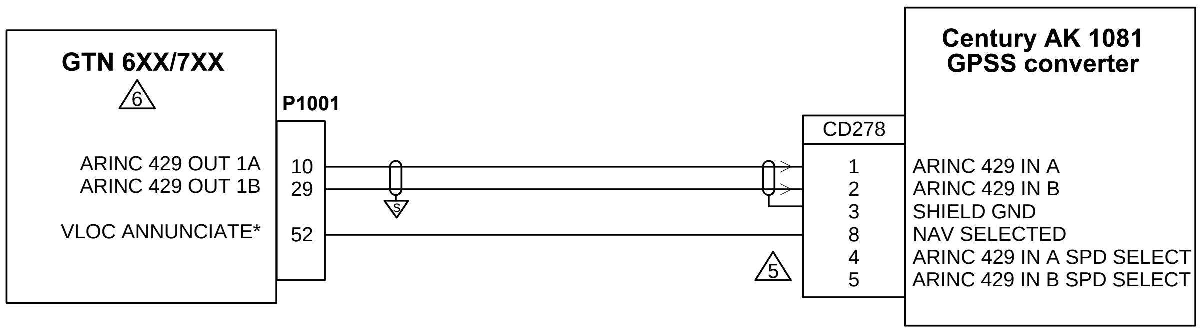
Figure E-32. GTN 6XX/7XX – Century Autopilot Interconnect
Sheet 1 of 2

NOTES:

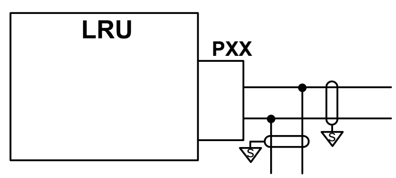
1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. THE CENTURY IV REQUIRES AN ISOLATION DIODE TO BE INSTALLED ON THE LOCALIZER SWITCHING INPUT AS SHOWN BELOW.



5. INSTALL JUMPER AS REQUIRED TO SET AK 1081 ARINC 429 SPEED TO MATCH THE GTN OUTPUT SETTING. REFER TO MANUFACTURER'S DOCUMENTATION FOR ADDITIONAL DETAILS.

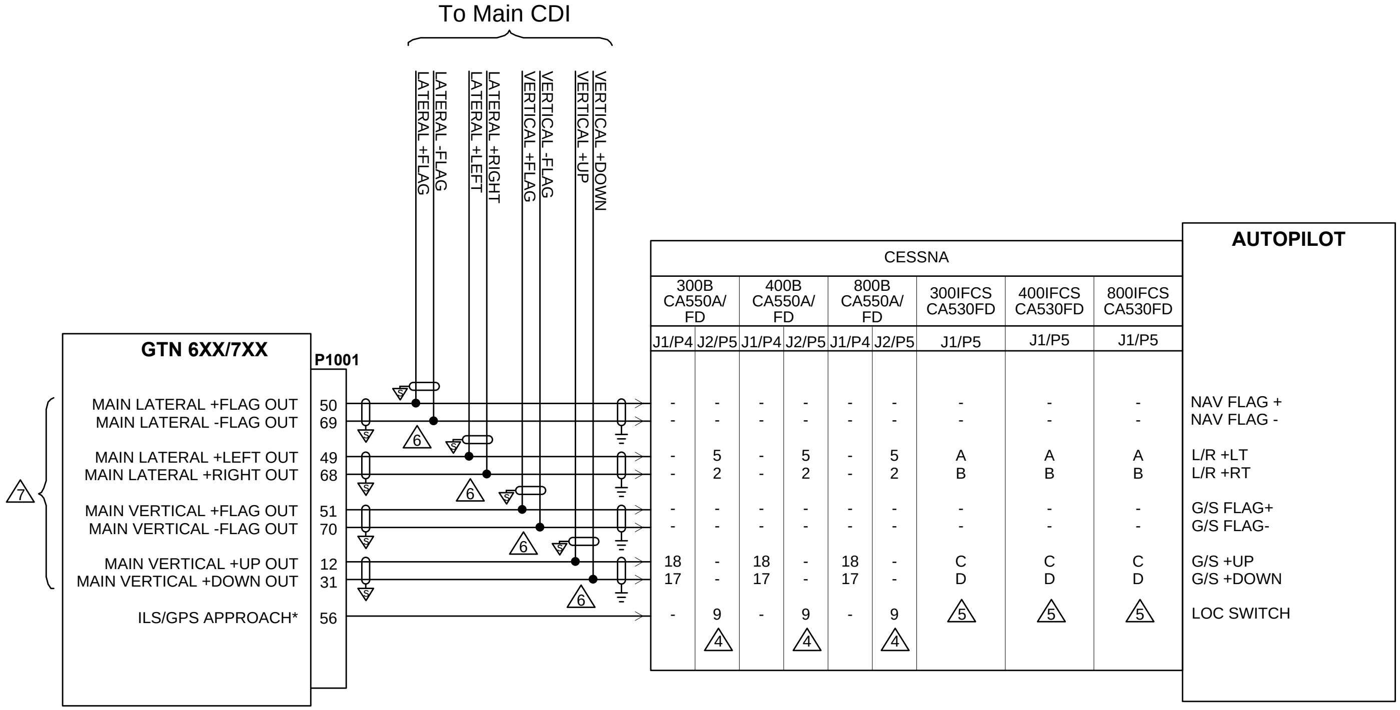


6. THE GTN CAN BE CONFIGURED TO ANY GPS ARINC 429 OUTPUT TO PROVIDE GPSS DATA. REFER TO SECTION 5.5.1.1 FOR CONFIGURATION SETTINGS.
7. REFER TO MANUFACTURERS DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
8. THE SPLICE MUST BE PERFORMED AT THE CONNECTOR END OF THE WIRE. SPLICE AS SHOWN:



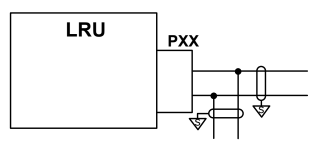
9. FOR IFR-CERTIFIED COMPOSITE AIRCRAFT ONLY (EACH AIRCRAFT IN APPENDIX G THAT REQUIRES OVERBRAID OVER THE GPS/WAAS CABLE): ANY LRU (I.E. CDI, AUTOPILOT) THAT CONNECTS TO THE GTN'S P1001 MAIN CDI/VDI OUTPUTS MUST BE MOUNTED TO THE INSTRUMENT PANEL OR COCKPIT CENTER CONSOLE WITH ELECTRICAL BONDING EQUAL TO OR LESS THAN 20 MILLIOHMS BETWEEN THE EQUIPMENT AND THE INSTRUMENT PANEL.

Figure E-32. GTN 6XX/7XX – Century Autopilot Interconnect
Sheet 2 of 2



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. THE ILS/GPS APPROACH DISCRETE OUTPUT MUST ALSO BE CONNECTED TO THE BACK COURSE RELAY – REFER TO MANUFACTURER'S DOCUMENTATION FOR ADDITIONAL DETAILS.
5. REFER TO MANUFACTURER'S DOCUMENTATION FOR CORRECT CONNECTION OF THE VOR/LOC RELAY USING AN ACTIVE LOW INPUT.
6. THE SPLICE MUST BE PERFORMED AT THE CONNECTOR END OF THE WIRE. SPLICE AS SHOWN:



7. FOR IFR-CERTIFIED COMPOSITE AIRCRAFT ONLY (EACH AIRCRAFT IN APPENDIX G THAT REQUIRES OVERBRAID OVER THE GPS/WAAS CABLE): ANY LRU (I.E. CDI, AUTOPILOT) THAT CONNECTS TO THE GTN'S P1001 MAIN CDI/VDI OUTPUTS MUST BE MOUNTED TO THE INSTRUMENT PANEL OR COCKPIT CENTER CONSOLE WITH ELECTRICAL BONDING EQUAL TO OR LESS THAN 20 MILLIOHMS BETWEEN THE EQUIPMENT AND THE INSTRUMENT PANEL.

Figure E-33. GTN 6XX/7XX – Cessna Autopilot Interconnect

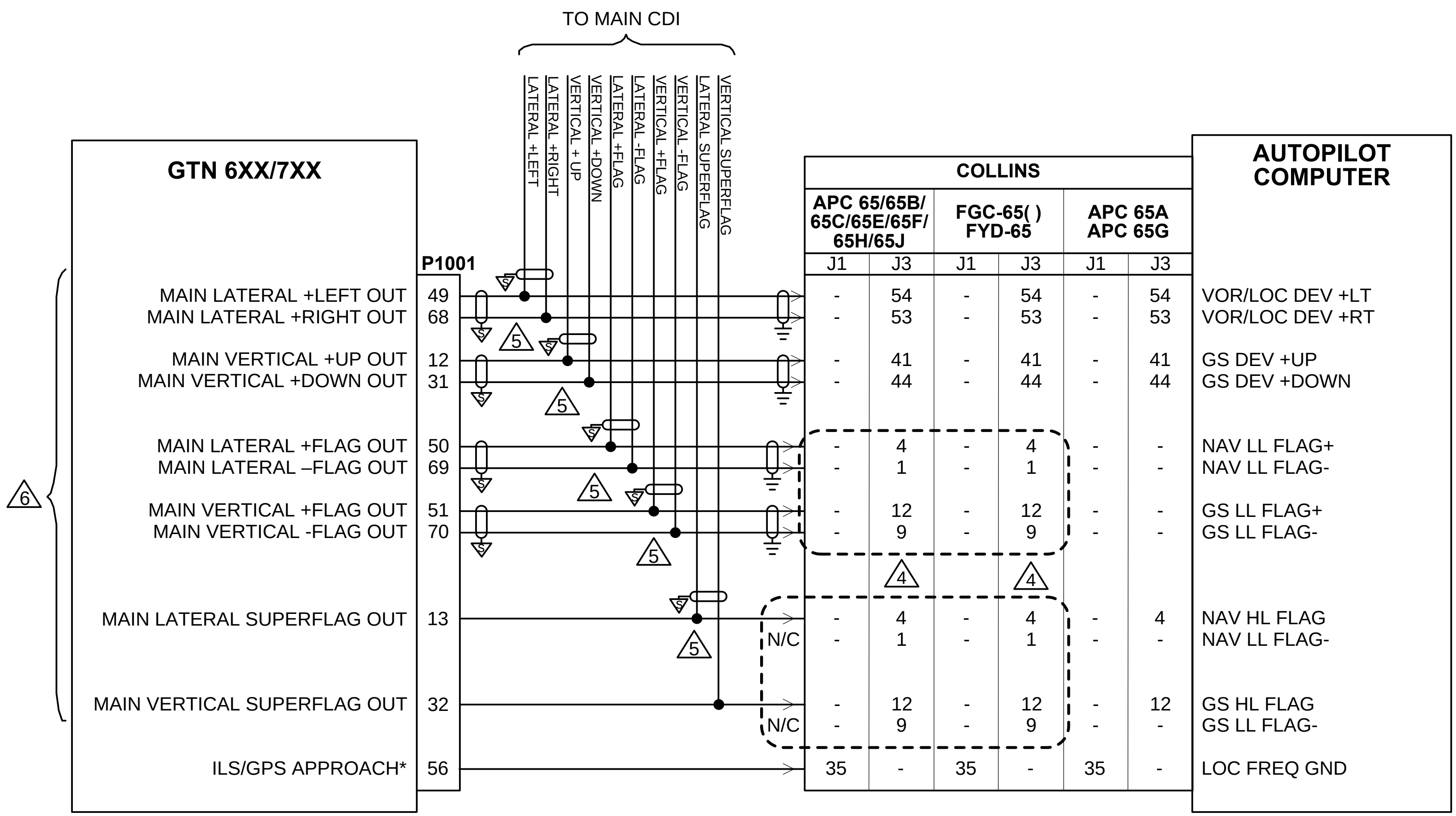
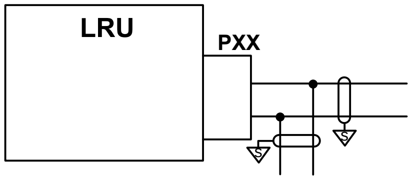


Figure E-34. GTN 6XX/7XX – Collins Autopilot Interconnect
Sheet 1 of 2

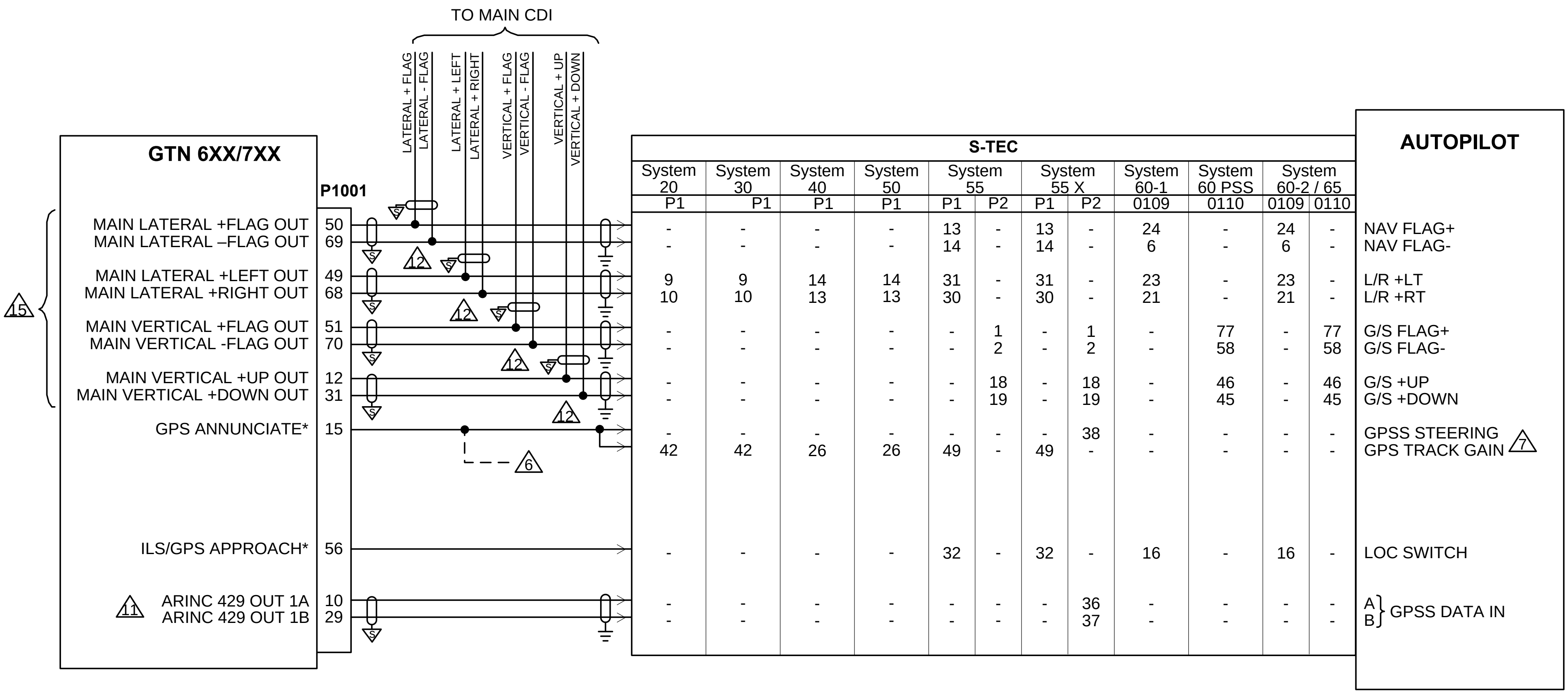
NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. CONNECT EITHER THE LOW-LEVEL FLAGS OR THE SUPERFLAGS. DO NOT CONNECT BOTH SETS OF FLAGS IN A PARTICULAR INSTALLATION. IF ONE SET OF FLAGS IS ALREADY WIRED, USE THE PRE-EXISTING FLAG WIRING TO THE GTN.
5. THE SPLICE MUST BE PERFORMED AT THE CONNECTOR END OF THE WIRE. SPLICE AS SHOWN:



6. FOR IFR-CERTIFIED COMPOSITE AIRCRAFT ONLY (EACH AIRCRAFT IN APPENDIX G THAT REQUIRES OVERBRAID OVER THE GPS/WAAS CABLE): ANY LRU (I.E. CDI, AUTOPILOT) THAT CONNECTS TO THE GTN'S P1001 MAIN CDI/VDI OUTPUTS MUST BE MOUNTED TO THE INSTRUMENT PANEL OR COCKPIT CENTER CONSOLE WITH ELECTRICAL BONDING EQUAL TO OR LESS THAN 20 MILLIOHMS BETWEEN THE EQUIPMENT AND THE INSTRUMENT PANEL.

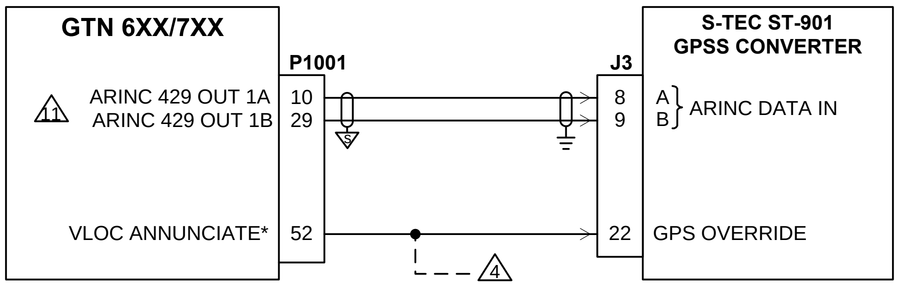
Figure E-34. GTN 6XX/7XX – Collins Autopilot Interconnect
Sheet 2 of 2



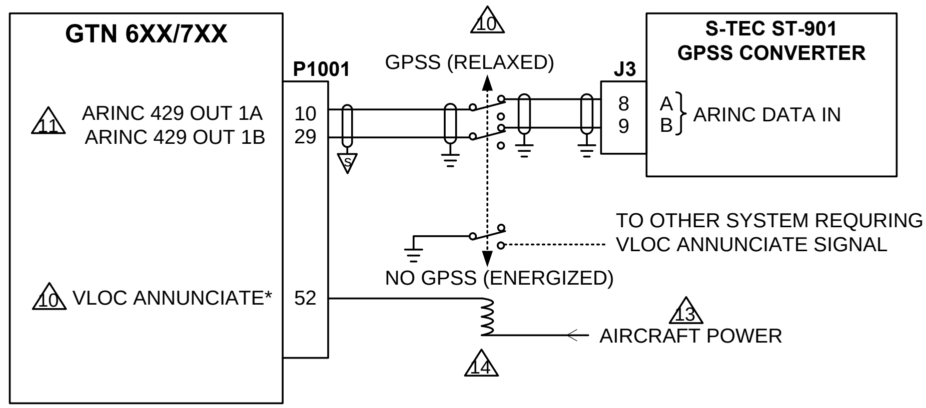
	System 20	System 30	System 40	System 50	System 55		System 55 X		System 60-1	System 60 PSS	System 60-2 / 65		
	P1	P1	P1	P1	P1	P2	P1	P2	0109	0110	0109	0110	
	-	-	-	-	13	-	13	-	24	-	24	-	NAV FLAG+
	-	-	-	-	14	-	14	-	6	-	6	-	NAV FLAG-
	9	9	14	14	31	-	31	-	23	-	23	-	L/R +LT
	10	10	13	13	30	-	30	-	21	-	21	-	L/R +RT
	-	-	-	-	-	1	-	1	-	77	-	77	G/S FLAG+
	-	-	-	-	-	2	-	2	-	58	-	58	G/S FLAG-
	-	-	-	-	-	18	-	18	-	46	-	46	G/S +UP
	-	-	-	-	-	19	-	19	-	45	-	45	G/S +DOWN
	-	-	-	-	-	-	-	38	-	-	-	-	GPSS STEERING
	42	42	26	26	49	-	49	-	-	-	-	-	GPS TRACK GAIN
	-	-	-	-	32	-	32	-	16	-	16	-	LOC SWITCH
	-	-	-	-	-	-	-	36	-	-	-	-	GPSS DATA IN A
	-	-	-	-	-	-	-	37	-	-	-	-	GPSS DATA IN B

Figure E-35. GTN 6XX/7XX – S-TEC Interconnect
Sheet 1 of 3

S-TEC ST-901 GPSS CONVERTER CONNECTION 8

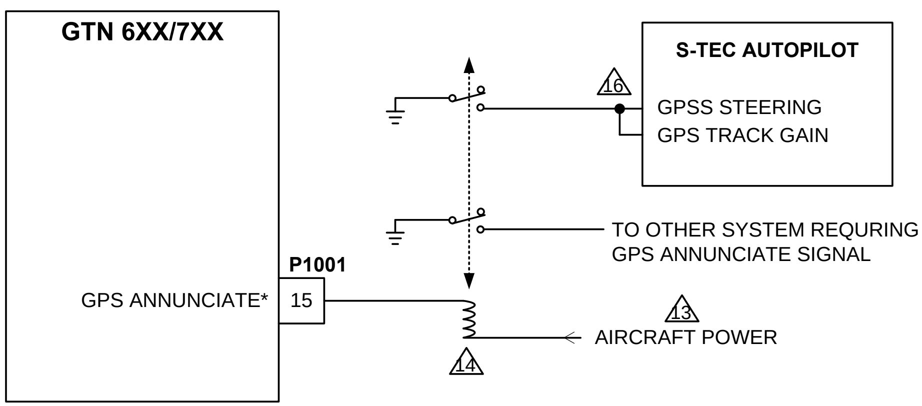


S-TEC ST-901 GPSS CONVERTER CONNECTION 9



CONNECTION TO OTHER SYSTEMS

GPS ANNUNCIATE



VLOC ANNUNCIATE

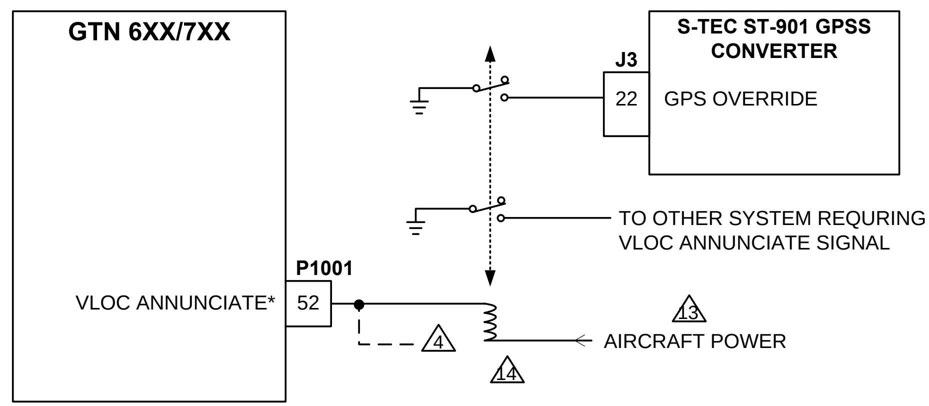
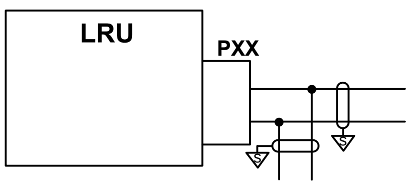


Figure E-35. GTN 6XX7XX – S-TEC Interconnect
Sheet 2 of 3

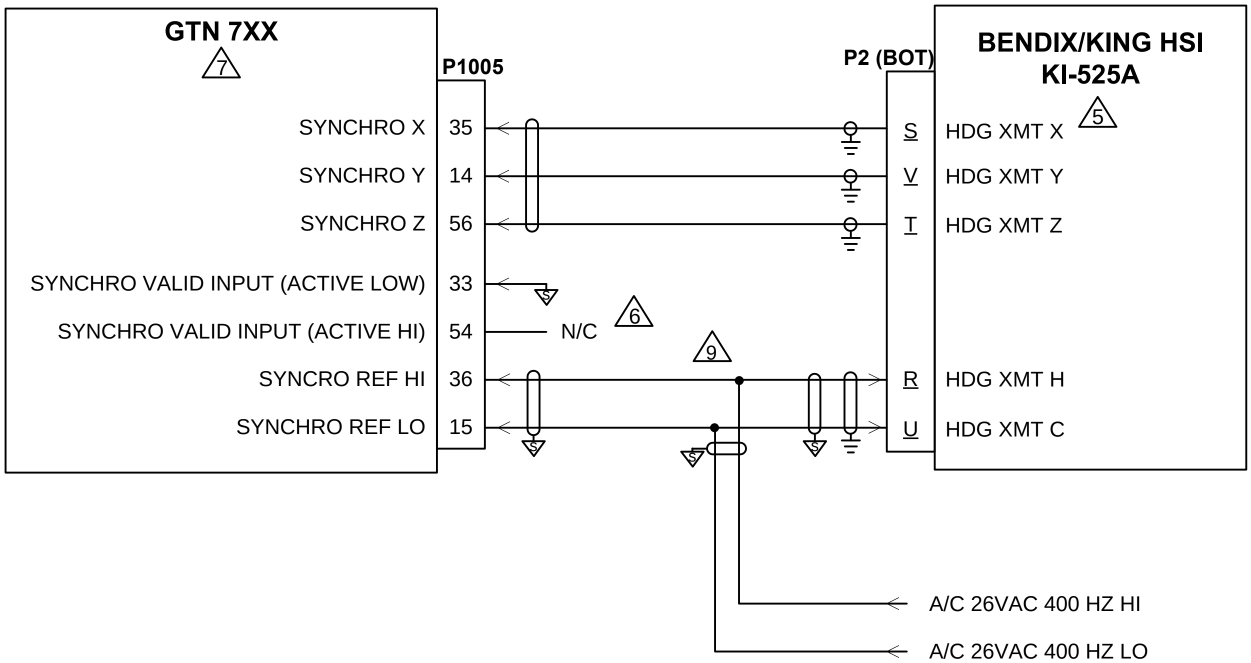
NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT GROUND WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. IF VLOC ANNUNCIATE SIGNAL IS USED ONLY BY AUTOPILOT, THIS MAY BE CONNNECTED DIRECTLY. IF VLOC ANNUNCIATE SIGNAL IS REQUIRED BY OTHER SYSTEMS, CONNECT AS SHOWN IN FIGURE LABELED "CONNECTION TO OTHER SYSTEMS".
5. CONNECT OTHER PINS THAT ARE NOT SHOWN IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
6. IF GPS ANNUNCIATE SIGNAL IS USED ONLY BY AUTOPILOT, THIS MAY BE CONNECTED DIRECTLY. IF GPS ANNUNCIATE SIGNAL IS REQUIRED BY OTHER SYSTEMS (I.E. CDI, REMOTE ANNUNCIATOR), CONNECT AS SHOWN IN FIGURE LABELED "CONNECTION TO OTHER SYSTEMS".
7. GPS TRACK GAIN IS USED TO IMPROVE TRACKING WHEN GPS IS SELECTED ON THE CDI AND THE AUTOPILOT IS IN ANALOG NAVIGATION MODE (AND ROLL STEERING IS NOT ENGAGED).
8. FOR CONVERTERS 01278-() S/N 600A AND ABOVE.
9. FOR CONVERTERS 01278-() S/N 599 AND BELOW.
10. ONLY REQUIRED FOR GTN 650/750.
11. ALL GAMA FORMAT CONFIGURATIONS OF THE GPS ARINC 429 OUTPUT PROVIDE DATA REQUIRED BY THE AUTOPILOT FOR GPSS. THE ARINC 429 CONFIGURATION CANNOT BE USED. REFER TO SECTION 5.5.1.1 FOR CONFIGURATION SETTINGS.
12. THE SPLICE MUST BE PERFORMED AT THE CONNECTOR END OF THE WIRE. SPLICE AS SHOWN:



13. CONNECT TO AUTOPILOT CIRCUIT BREAKER FOR AIRCRAFT POWER.
14. AN ACCEPTABLE RELAY IS LEACH P/N WN460-( )( )( ).
15. FOR IFR-CERTIFIED COMPOSITE AIRCRAFT ONLY (EACH AIRCRAFT IN APPENDIX G THAT REQUIRES OVERBRAID OVER THE GPS/WAAS CABLE): ANY LRU (I.E. CDI, AUTOPILOT) THAT CONNECTS TO THE GTN'S P1001 MAIN CDI/VDI OUTPUTS MUST BE MOUNTED TO THE INSTRUMENT PANEL OR COCKPIT CENTER CONSOLE WITH ELECTRICAL BONDING EQUAL TO OR LESS THAN 20 MILLIOHMS BETWEEN THE EQUIPMENT AND THE INSTRUMENT PANEL.
16. REFER TO SHEET 1 OF THIS FIGURE FOR PINOUT INFORMATION.

Figure E-35. GTN 6XX/7XX – S-TEC Interconnect
Sheet 3 of 3



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0". CONNECT OTHER END OF THE SHIELD PER THE REMOTE EQUIPMENT INSTALLATION REQUIREMENTS. IF NO SHIELD TERMINATION REQUIREMENT EXISTS FOR THE REMOTE EQUIPMENT, TERMINATE SHIELDS AS SHORT AS POSSIBLE, NOT TO EXCEED 3.0". SEE SECTION 2.4.11.4.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

5. A DIRECTIONAL GYRO OR HSI BOOTSTRAP OUTPUT MAY BE USED TO PROVIDE SYNCHRO HEADING TO THE GTN 7XX. IN A DUAL GTN INSTALLATION, THE GTN 7XX WILL CROSSFILL SYNCHRO HEADING TO THE OTHER GTN.

6. **EITHER** THE HDG VALID IN (ACTIVE HI) **OR** HDG VALID IN (ACTIVE LO) SHOULD BE CONNECTED. DO NOT CONNECT BOTH OF THESE INPUTS TO THE SYNCHRO.

7. REFER TO SECTION 5.5.1.9 FOR CONFIGURATION SETTINGS. THE SYNCHRO HEADING INPUT MUST BE CONFIGURED AS 'CONNECTED'.

8. LOWER CASE LETTERS ARE SHOWN AS UNDERLINED UPPERCASE LETTERS.

9. THE SPLICE MUST BE PERFORMED AT THE CONNECTOR END OF THE WIRE. SPLICE AS SHOWN:

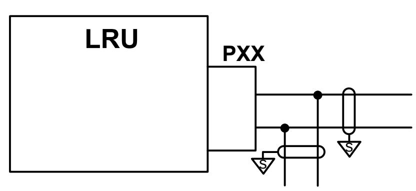
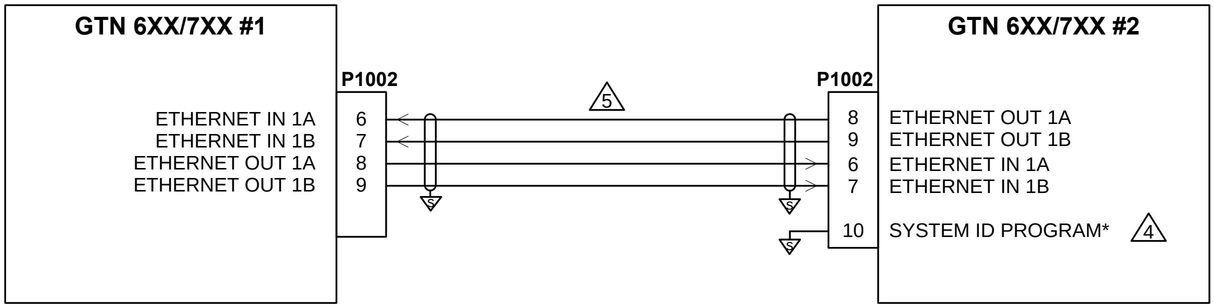


Figure E-36. GTN 7XX – Heading Synchro Interconnect



NOTES:

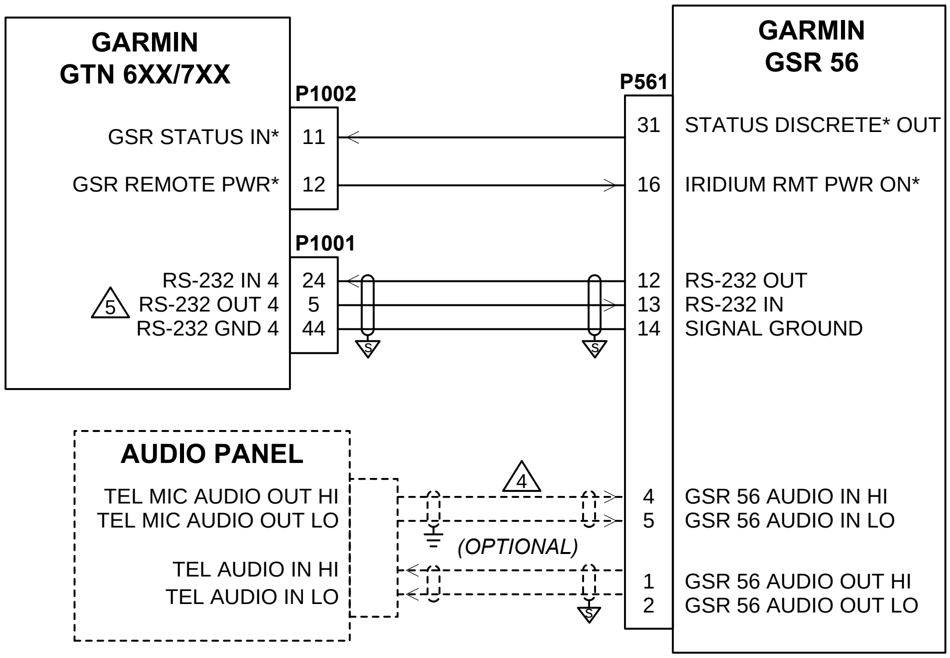
1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN 6XX/7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD TERMINATION LEADS MUST BE LESS THAN 3.0".

4. GROUNDING THIS PROGRAM PIN TO THE CONNECTOR BACKSHELL ALLOWS THE SYSTEM TO IDENTIFY ITSELF AS GTN #2.

5. USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE. THIS INCLUDES THE FOLLOWING:

MANUFACTURER	P/N
PIC WIRE AND CABLE	10424 (24 AWG)
CARLISLEIT	392404 (24 AWG)

Figure E-37. GTN – GTN Crossfill Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT GTN, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0 ". CONNECT THE SHIELD GROUNDS AT THE GSR 56 TO ITS CONNECTOR BACKSHELL IN ACCORDANCE WITH GSR 56 INSTALLATION INSTRUCTIONS.
4. OPTIONAL AUDIO CONNECTIONS ARE REQUIRED IF THE PHONE FEATURE OF THE GSR 56 IS UTILIZED.
5. IF THIS RS-232 PORT IS ALREADY USED FOR ANOTHER PURPOSE, ANY RS-232 PORT MAY BE CONNECTED IN LIEU OF THIS PORT. REFER TO SECTION 5.5.1.2 FOR RS-232 SETTINGS.

Figure E-38. GTN 6XX/7XX - GSR 56 Interconnect

DUAL GTN INTERCONNECT – SINGLE GDU

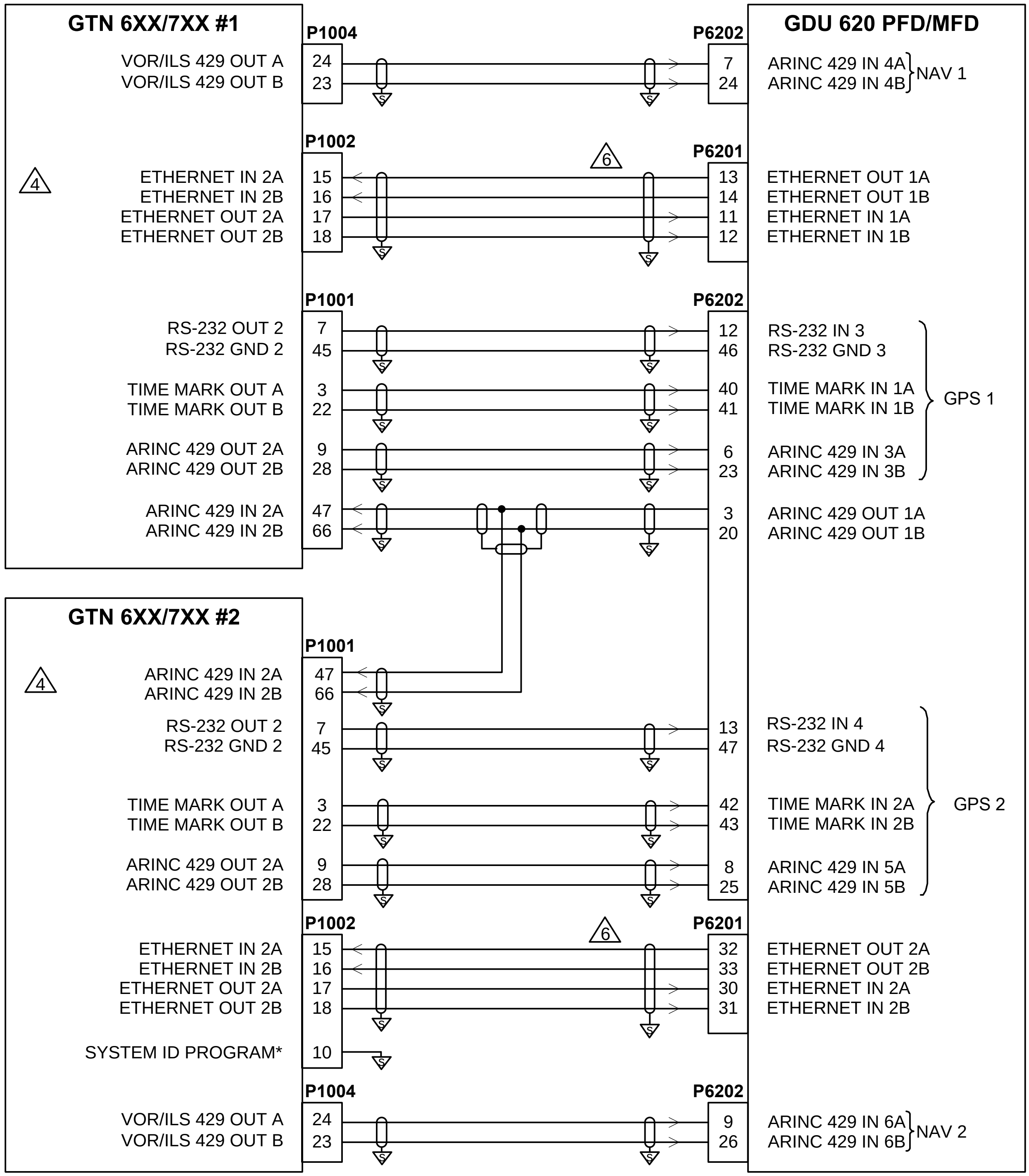


Figure E-39. GTN 6XX/7XX – GDU 620 Interconnect
Sheet 1 of 2

NOTES:

1 ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.

2 GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUD

3 IF ONLY ONE GTN 6XX/7XX IS INSTALLED, CONNECT AS SHOWN FOR GTN #1.

4 IF A TAWS-EQUIPPED GTN6XX/7XX UNIT IS INSTALLED, IT **MUST** BE CONNECTED AS GTN #1 – ONLY TAWS ANNUNCIATIONS FROM GTN #1 ARE DISPLAYED ON THE PFD.

5 REFER TO GDU 620 INSTALLATION MANUAL FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PIN-OUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

6 USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE. THIS INCLUDES THE FOLLOWING:

MANUFACTURER	P/N
PIC WIRE AND CABLE	10424 (24 AWG)
CARLISLEIT	392404 (24 AWG)

7 CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0".

Figure E-39. GTN 6XX/7XX – GDU 620 Interconnect
Sheet 2 of 2

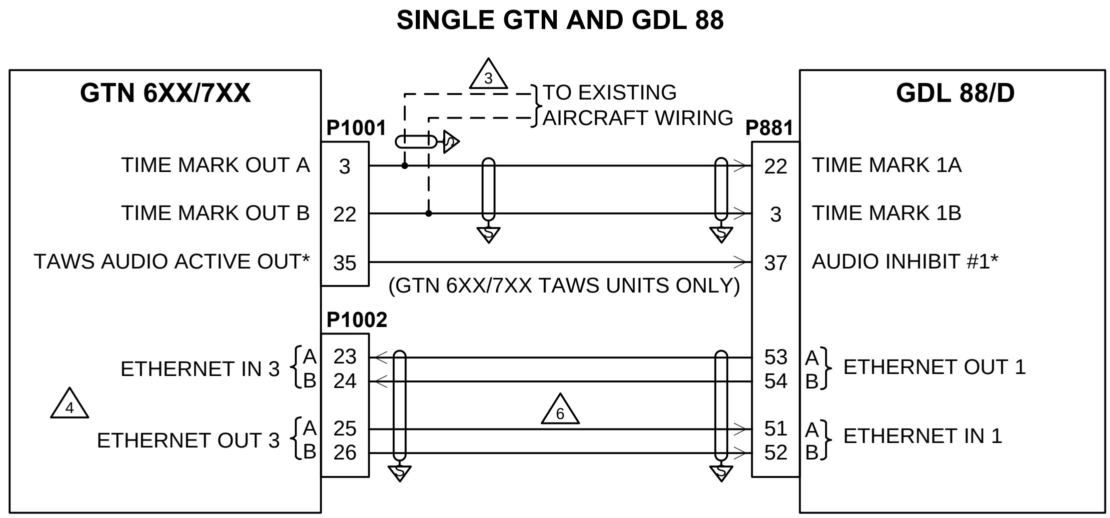
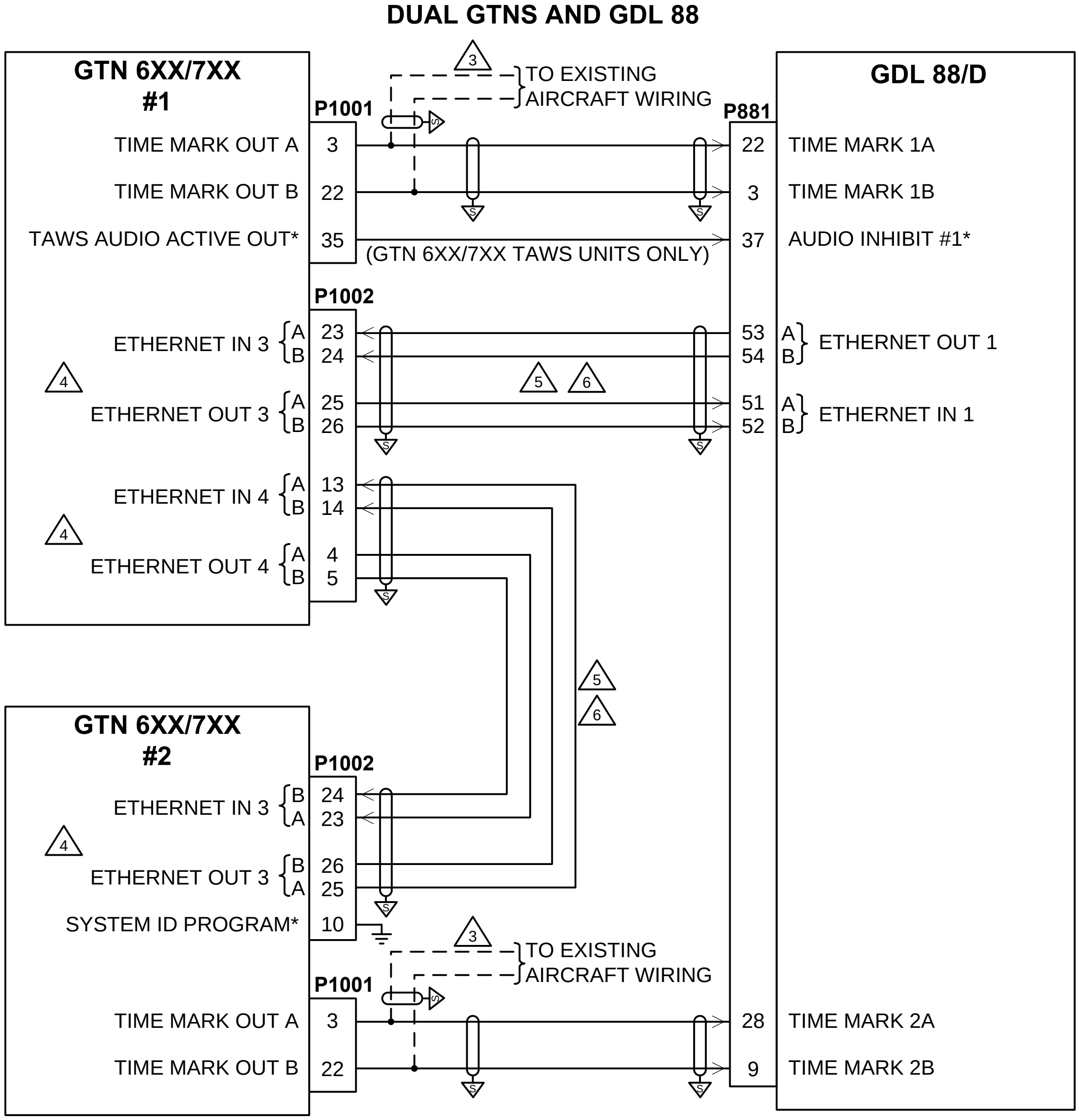


Figure E-40. GTN 6XX/7XX – GDL 88/88D Interconnect
Sheet 1 of 2



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND

3. IF GTN TIME MARK OUTPUT IS ALREADY CONNECTED TO AIRCRAFT WIRING, SPLICE INTO THIS WIRING FOR THE CONNECTION TO THE GDL 88.

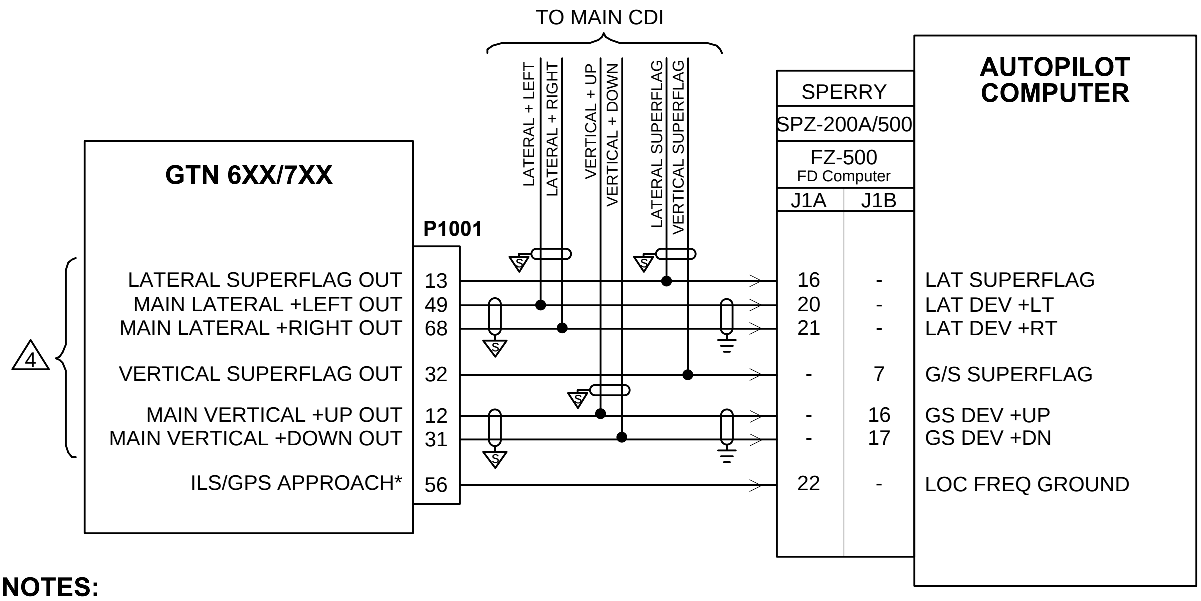
4. IF ETHERNET PORT IS ALREADY USED FOR ANOTHER PURPOSE, ANY ETHERNET PORT MAY BE CONNECTED. REFER TO SECTION 4 FOR PINOUT INFORMATION.

5. CONNECTION MAY BE MADE TO GTN 6XX/7XX #2 IN LIEU OF GTN 6XX/7XX #1.

6. USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE. THIS INCLUDES THE FOLLOWING:

MANUFACTURER	P/N
PIC WIRE AND CABLE	10424 (24 AWG)
CARLISLEIT	392404 (24 AWG)

Figure E-40. GTN 6XX/7XX – GDL 88/88D Interconnect Sheet 2 of 2



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT GROUND WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. FOR IFR-CERTIFIED COMPOSITE AIRCRAFT ONLY (EACH AIRCRAFT IN APPENDIX G THAT REQUIRES OVERBRAID OVER THE GPS/WAAS CABLE): ANY LRU (I.E. CDI, AUTOPILOT) THAT CONNECTS TO THE GTN'S P1001 MAIN CDI/VDI OUTPUTS MUST BE MOUNTED TO THE INSTRUMENT PANEL OR COCKPIT CENTER CONSOLE WITH ELECTRICAL BONDING EQUAL TO OR LESS THAN 20 MILLIOHMS BETWEEN THE EQUIPMENT AND THE INSTRUMENT PANEL.

Figure E-41. GTN 6XX/7XX – Sperry Autopilot Interconnect

Appendix F GMA 35 Interconnect Diagrams

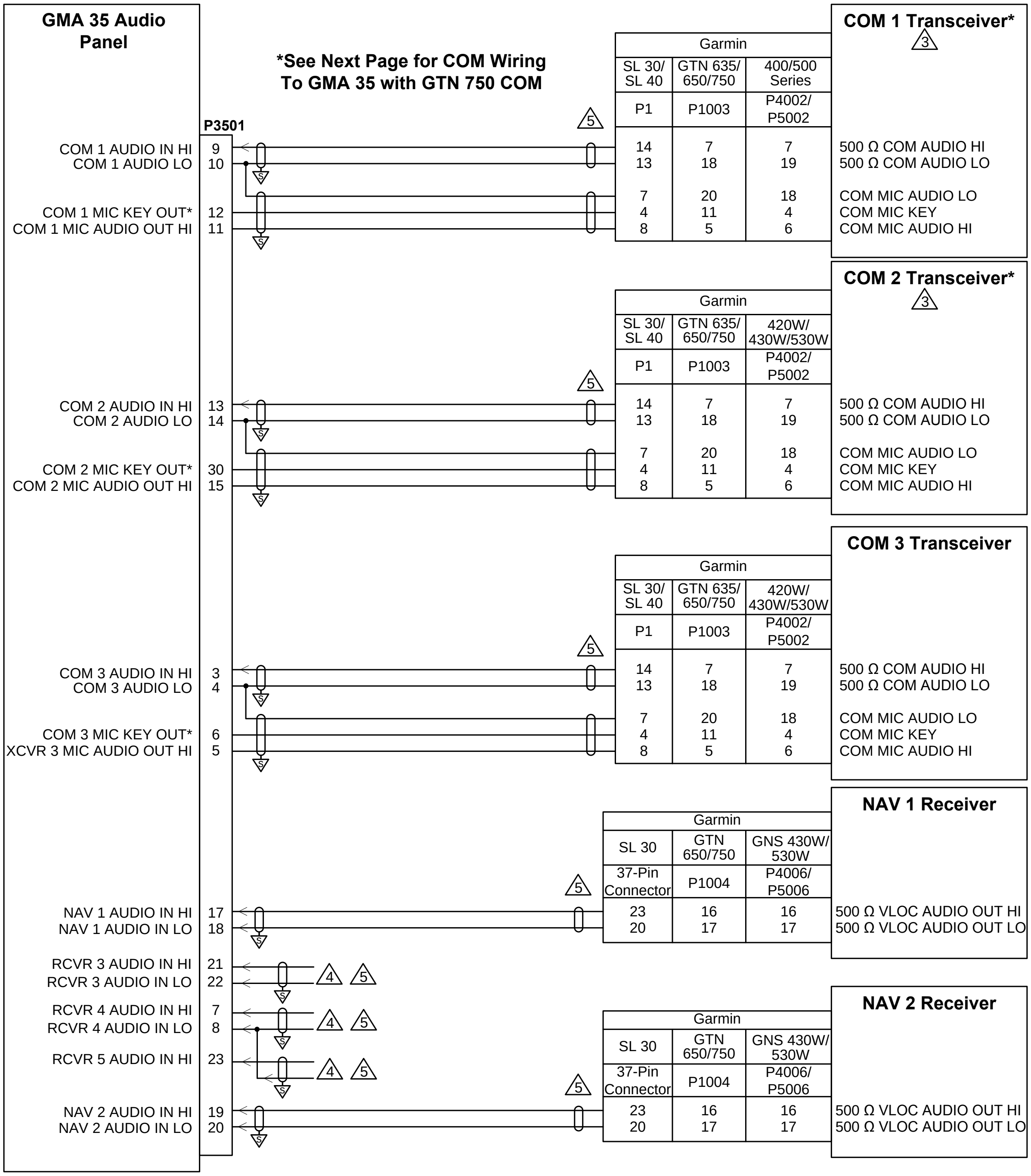
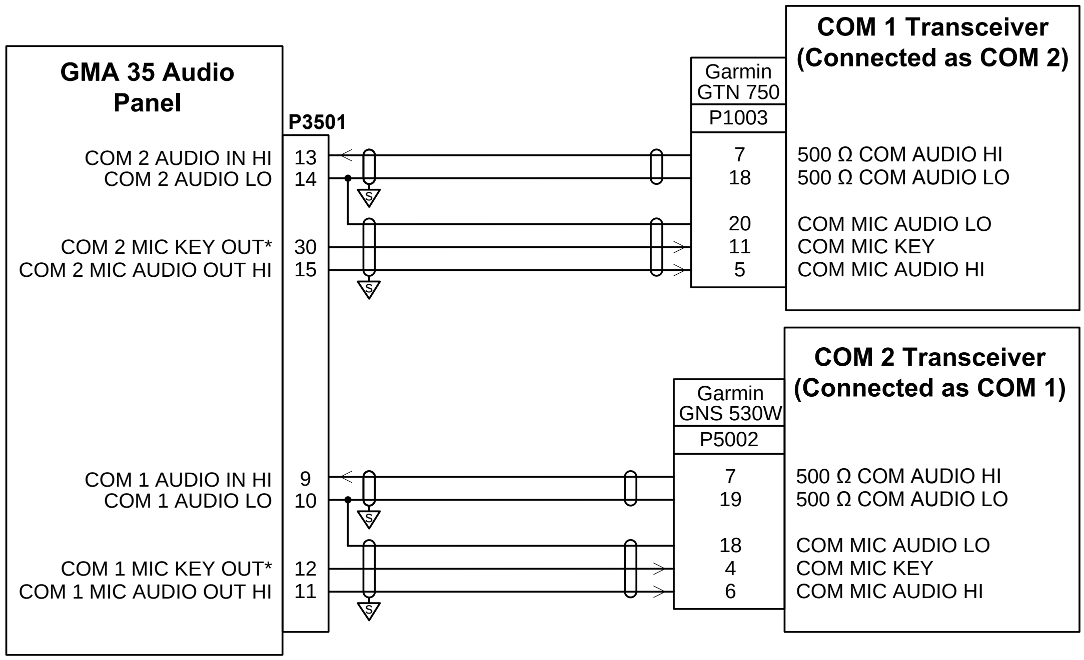


Figure F-1. GMA 35 – COM/NAV Interconnect
Sheet 1 of 2

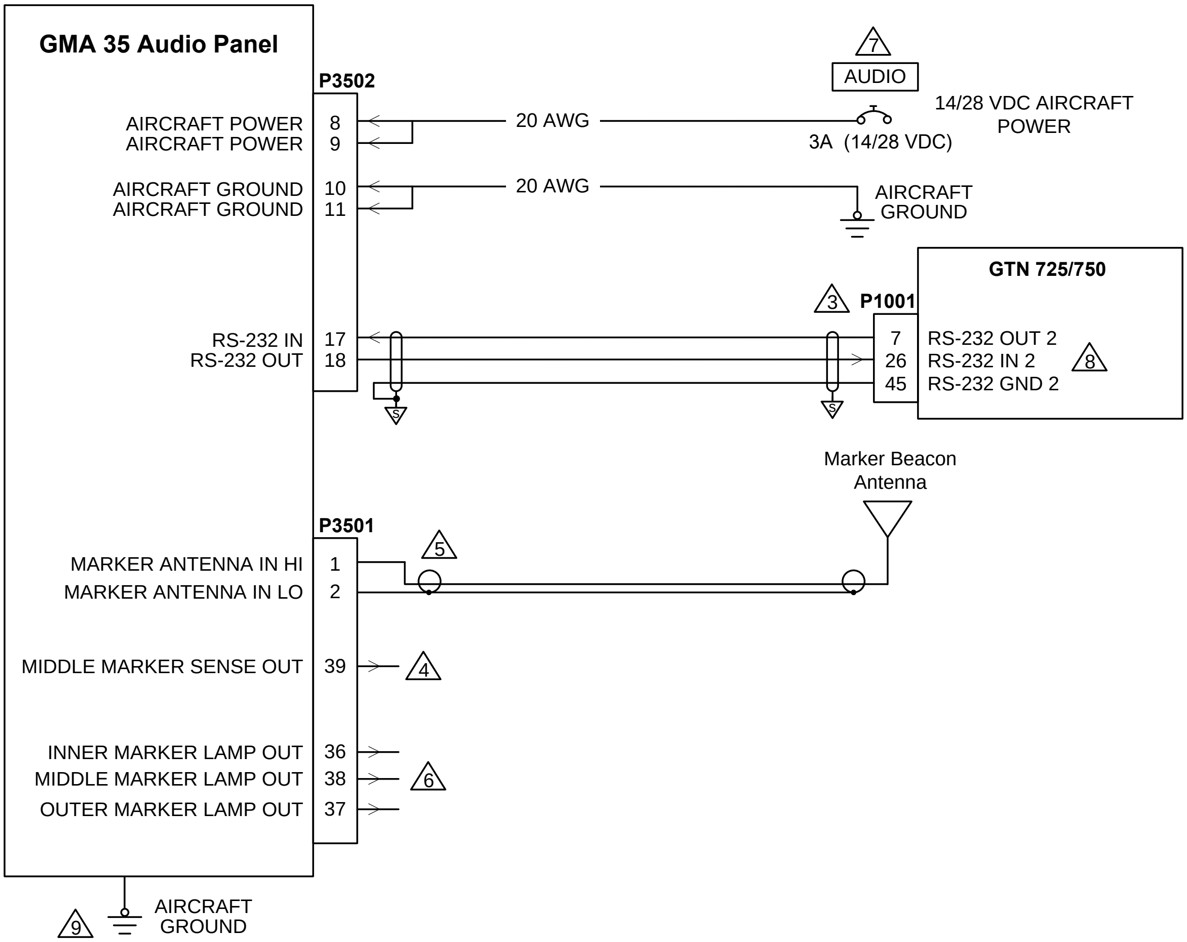
GTN 750 Installation with Second COM 3



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. WHEN A SECOND COM RADIO IS INSTALLED WITH THE GTN 750 AND GMA 35, THE GTN 750 SHOULD BE CONNECTED TO THE GMA 35 COM 2 PINS AND THE OTHER RADIO SHOULD BE CONNECTED TO COM 1 PINS. THIS WILL PREVENT LOSS OF BOTH COM RADIOS IN THE EVENT THE GTN 750 LOSES RS-232 COMMUNICATION WITH THE GMA 35. A FAILSAFE CIRCUIT IN THE GMA 35 CONNECTS THE PILOT'S HEADSET AND MICROPHONE DIRECTLY TO COM 1 IN CASE POWER TO THE GMA 35 OR RS-232 COMMUNICATION WITH THE GTN 750 IS LOST. REFER TO SECTION 5.5.4.8.2.1 FOR CONFIGURATION SETTINGS. REFER TO SECTION 2.4.14 FOR ADDITIONAL CONSIDERATIONS FOR FAILSAFE OPERATION.
4. THESE INPUTS CAN BE USED FOR ANALOG AUDIO SUCH AS ADF OR DME ANALOG AUDIO. THESE INPUTS ACCEPT UP TO 15 MW INTO A 600 OHM LOAD. REFER TO SECTION 5.5.4.8.2.6 TO CONFIGURE EACH RECEIVER INPUT. DO NOT USE THESE INPUTS FOR AUDIO SOURCES FOR WHICH LOSS WOULD BE CLASSIFIED AS MAJOR OR HIGHER IN AC 23.1309-1E, SUCH AS TAWS AUDIO OR AUTOPILOT DISCONNECT TONE.
5. TO PREVENT COUPLED INTERFERENCE AND GROUND LOOPS FROM BEING INJECTED INTO THE AUDIO INPUTS, GROUND THE SHIELDS AT ONLY ONE END.

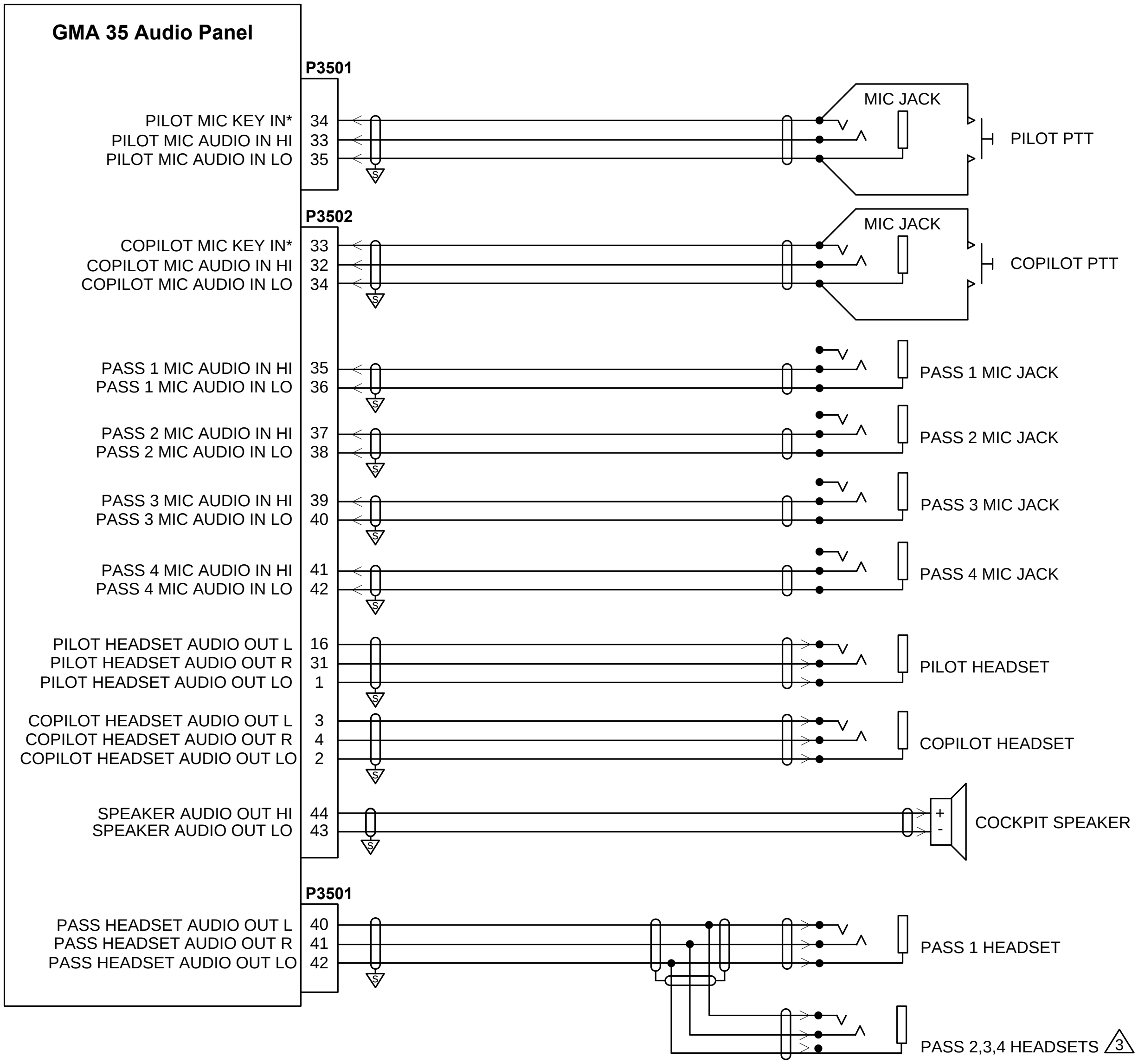
Figure F-1. GMA 35 – COM/NAV Interconnect
Sheet 2 of 2



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. THE RS-232 CONNECTION TO THE GTN 725/750 IS REQUIRED FOR COMMAND AND CONTROL OF THE GMA 35 AUDIO PANEL FUNCTIONS. THE GTN 7XX IS THE CONTROLLER FOR THE GMA 35.
4. THE MIDDLE MARKER SENSE OUTPUT IS AN ACTIVE-HIGH DISCRETE SIGNAL. IT CAN BE USED BY SOME FLIGHT CONTROL SYSTEMS TO INCREASE THE AUTOPILOT GAIN AFTER THE AIRCRAFT PASSES THE MIDDLE MARKER. REFER TO THE SPECIFIC AUTOPILOT INSTALLATION DATA FOR MORE DETAIL.
5. REFER TO SECTION 3.6.7 FOR INSTRUCTIONS ON WIRING THE ANTENNA CONNECTIONS TO THE GMA 35.
6. THESE OUTPUTS CAN BE USED TO DRIVE EXTERNAL MARKER LAMPS, IF DESIRED.
7. THE CIRCUIT BREAKER SHOULD BE LABELED AS SHOWN DIRECTLY ADJACENT TO THE CIRCUIT BREAKER. THE CIRCUIT BREAKER MUST BE READILY ACCESSIBLE TO THE PILOT.
8. IF THIS RS-232 PORT IS ALREADY USED FOR ANOTHER PURPOSE, ANY RS-232 PORT MAY BE CONNECTED IN LIEU OF THIS PORT. REFER TO SECTION 5.5.1.2 FOR RS-232 SETTINGS.
9. VERIFY AIRCRAFT GROUND MEETS BONDING REQUIREMENTS IN SECTION 2.4.5.

Figure F-2. GMA 35 Power/RS-232/Marker Beacon Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. UP TO 4 PASSENGER HEADSETS MAY BE WIRED IN PARALLEL.

Figure F-3. GMA 35 – Headset Interconnect

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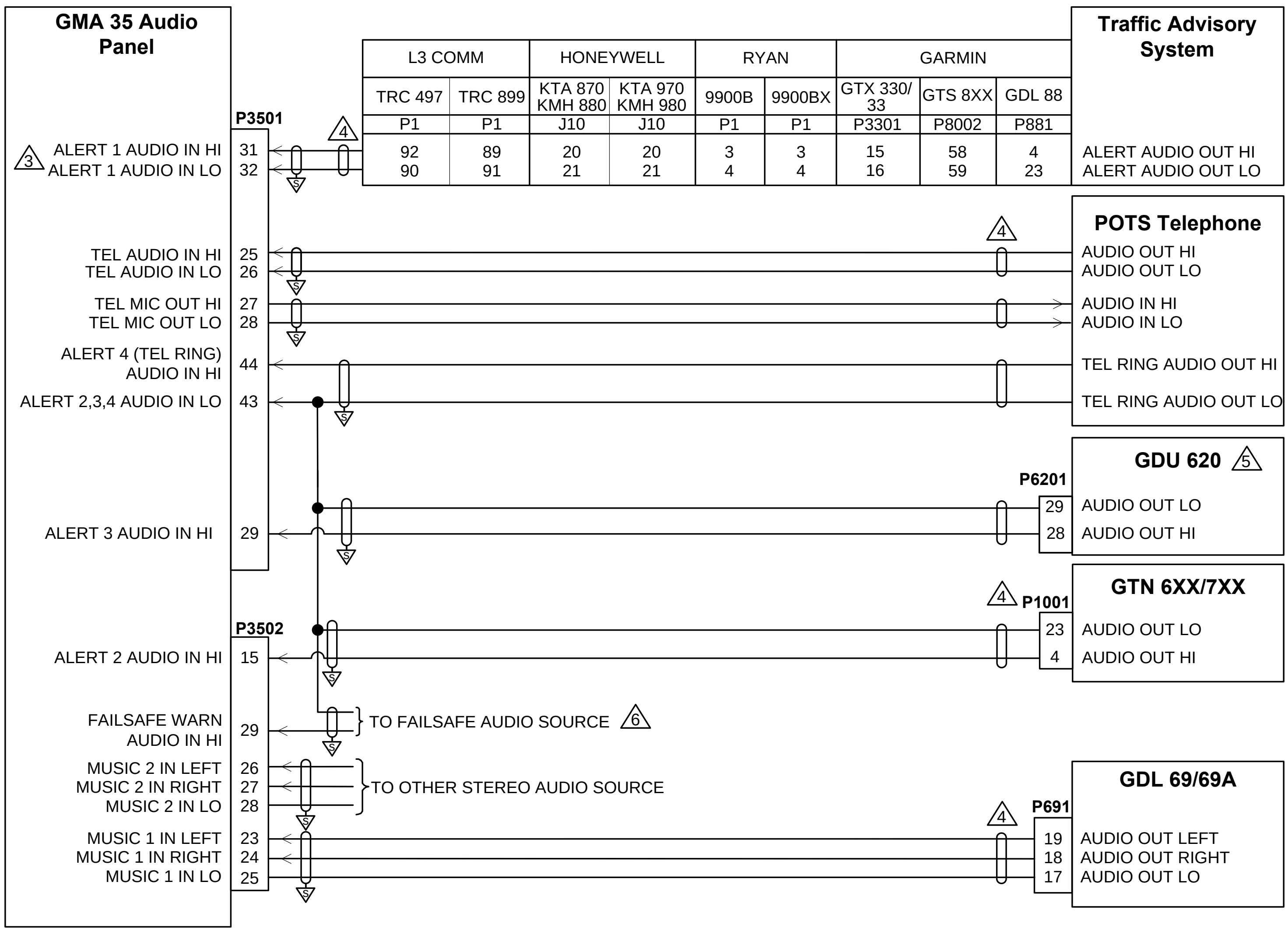


Figure F-4. GMA 35 – Other Audio Sources Interconnect
Sheet 1 of 2

NOTES:

1 ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.

2 GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND

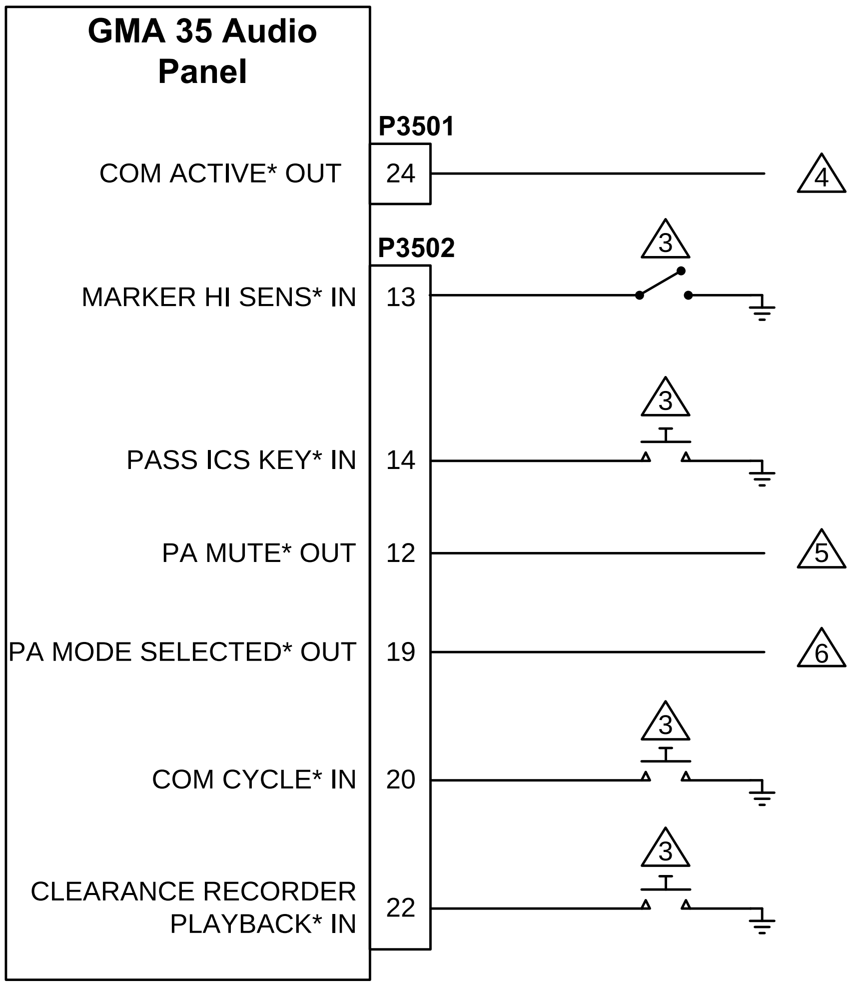
3 THE GMA 35 HAS 4 UNSWITCHED ALERT AUDIO INPUTS FOR ALERT AUDIO SOURCES SUCH AS TAWS OR TRAFFIC.

4 TO PREVENT COUPLED INTERFERENCE AND GROUND LOOPS FROM BEING INJECTED INTO THE AUDIO INPUTS, GROUND THE SHIELDS AT ONLY ONE END. EITHER END OF THE SHIELD MAY BE GROUNDED.

5 FOR REFERENCE ONLY. SEE THE G500 OR G600 STC INSTALLATION MANUAL FOR MORE DETAIL.

6 FAILSAFE WARN AUDIO IN HI IS HEARD DURING NORMAL OPERATION AS A FIFTH ALERT INPUT. DURING FAILSAFE MODE BOTH FAILSAFE WARN AUDIO IN HI AND COM 1 AUDIO INPUT ARE CONNECTED TO THE PILOT HEADSET LEFT OUTPUT. DURING THIS TIME THE OUTPUT OF THE COM 1 RADIO AND THE OUTPUT OF THE DEVICE CONNECTED TO FAILSAFE WARN AUDIO IN HI WILL BECOME SHORTED TOGETHER, POTENTIALLY CAUSING DAMAGE OR INTERFERENCE. IF THE FAILSAFE WARN AUDIO IN HI IS USED, INSTALL SUMMING RESISTORS IN SERIES BETWEEN THESE SOURCES AND THE INPUTS TO THE AUDIO PANEL TO PROTECT THE OUTPUTS FROM DAMAGE. A TYPICAL VALUE FOR MIXING RESISTORS IS 390Ω ¼ W. THE AUDIO LEVELS OF EXISTING AUDIO SOURCES WILL HAVE TO BE RE-EVALUATED AFTER MIXING RESISTORS ARE INSTALLED.

Figure F-4. GMA 35 – Other Audio Sources Interconnect
Sheet 2 of 2



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND

△3 THESE SWITCHES ARE SHOWN FOR REFERENCE ONLY. INSTALLATION OF THESE SWITCHES IS NOT COVERED BY THIS STC.

△4 THIS OUTPUT MAY BE USED BY OTHER SYSTEMS TO MUTE APPLICABLE AUDIO SOURCES WHEN COM RECEIVE IS ACTIVE. REFER TO THE MANUFACTURERS DOCUMENTATION FOR THESE SYSTEMS FOR MORE DETAIL.

△5 THIS OUTPUT MAY BE USED BY EXTERNAL PA SYSTEMS TO MUTE THE PA WHEN PA MODE IS ACTIVE AND THE PTT BUTTON IS PRESSED. REFER TO THE EXTERNAL PA SYSTEM DOCUMENTATION FOR MORE DETAIL.

△6 THIS OUTPUT MAY BE USED BY EXTERNAL PA SYSTEMS TO ENABLE THE EXTERNAL PA SYSTEM WHEN PA MODE IS ACTIVE. REFER TO THE EXTERNAL PA SYSTEM DOCUMENTATION FOR MORE DETAIL.

Figure F-5. GMA 35 – Discrete Interconnect

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Appendix G Lightning Protection

G.1 Lightning Protection in Metal Aircraft

G.1.1 HSDB Weather Radar Interface

When interfacing the GTN 6XX/7XX to an HSDB weather radar (WXR), overbraid is required over any HSDB cabling in the radome area prior to entering the metal fuselage (or metallic wing). Any wiring for weather radar configuration modules does not require overbraid as part of this STC. This section describes how to install the overbraid for the WXR cabling.

The GTN may be interfaced to a weather radar in metal aircraft only. Nonmetallic aircraft (see Table G-1) must not interface the GTN to a weather radar.

Refer to Appendix E for weather radar interconnect information.

NOTE

Refer to Table G-1 to determine if the aircraft is classified as metal or nonmetallic.

G.1.1.1 Materials Required but Not Supplied

The following materials (or equivalents) are required to install WXR cabling overbraid in the radome area:

- Tinned copper flat braid, 3/4", QQB575F36T0781 (recommended)
  OR
  Tinned copper tubular braid, 7/16", QQB575R30T0437
- Electrical tie-down strap, adjustable, MS3367-{1, 2, or 7}-X
- Terminal lug, 5/16", uninsulated, MS20659-131
- Terminal stud, 5/16" (or equivalent 5/16" bolt/nut)
- NAS970-516 (AN970-516) washer

G.1.1.2 Overbraid Installation Procedure

NOTE

The length of overbraid required is approximately equal to the length of the WXR cabling in the radome area (measured from the bulkhead or metallic wing entry area to the WXR R/T connector) plus six inches.

Refer to Figure G-1 and Figure G-2 while completing the following overbraid installation procedure:

1. Remove the backshell from the WXR R/T connector and save for reinstallation. This will allow the overbraid to slide over the cable without unpinning the connector.
2. Slide the overbraid onto the cable from the WXR R/T to the bulkhead (or grounding provisions at the metallic wing entry area).
3. Reinstall the WXR R/T connector backshell body.
4. At the WXR R/T end of the overbraid, fold one inch of overbraid back over itself. Position the overbraid so that the fold will lie under the backshell cover plate, while the overbraid ends will lie just outside the strain relief bar. Refer to Figure G-1.
5. Install the backshell cover plate and strain relief bar.

CAUTION

All overbraid ends must be secured **outside** the backshell by the strain relief bar. Failure to do so may allow overbraid ends to contact and short HSDB pins, resulting in weather radar malfunction or damage.

6. At the bulkhead end of the overbraid (or grounding provisions at the metallic wing entry area), comb out a maximum of two inches of braid, twist it, cut to length if necessary, and terminate it in a terminal lug. Refer to Figure G-1.
7. Secure the overbraid pigtail to a terminal stud.

G.1.1.3 Overbraid Terminal Bonding

Electrical bond preparation for all aluminum-to-aluminum interfaces must be done in accordance with SAE ARP1870 Sections 5.1 and 5.5. The overbraid terminal lug must be electrically bonded to a 5/16” stud installed in accordance with AC 43.13-1B Section 11-189, as well as the following restrictions:

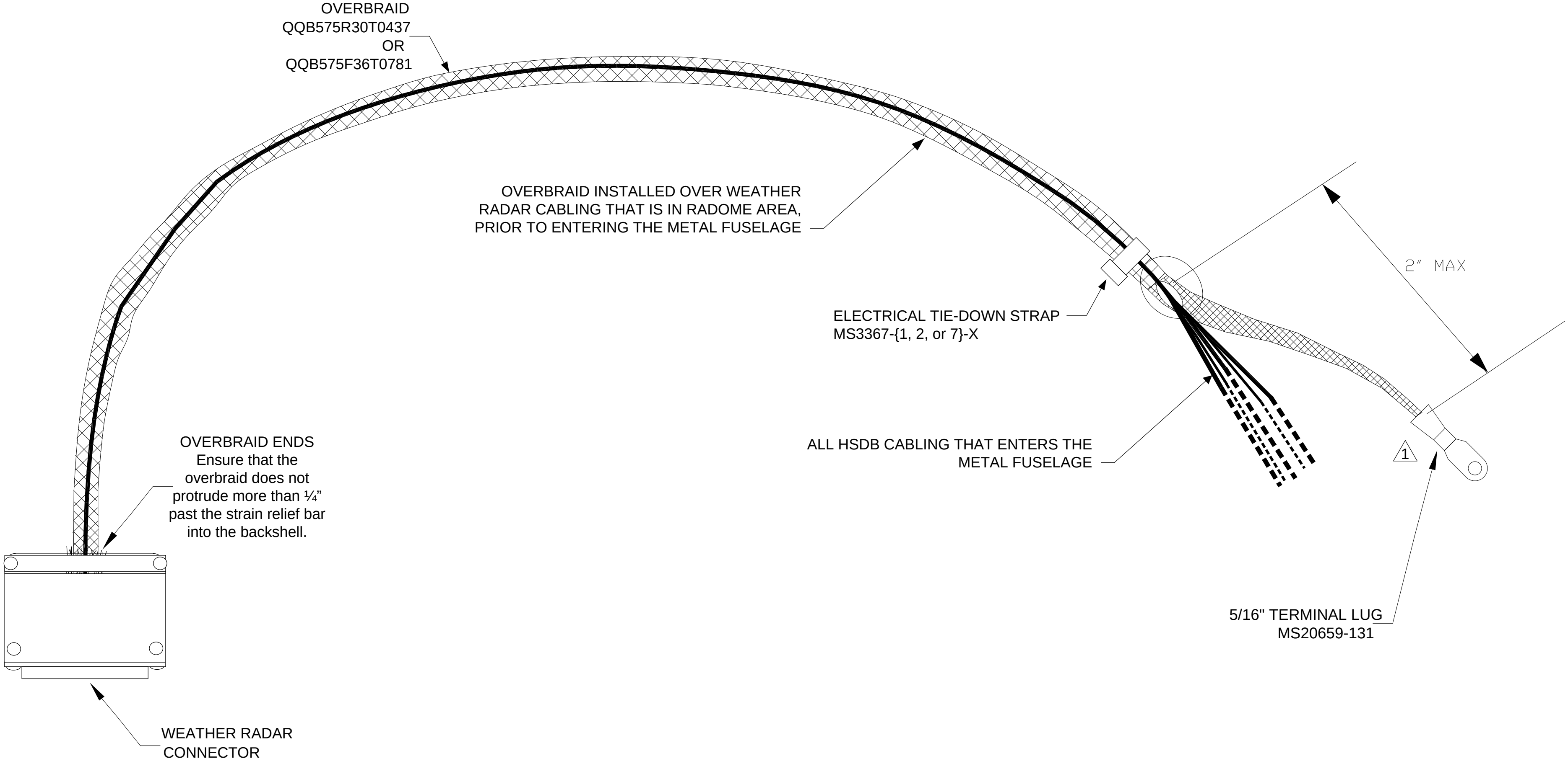
1. If possible, use an existing tooling hole to install the stud.
2. If no suitable tooling hole exists, use an existing fastener (5/16” or larger).

NOTE

Installation of a stud into a pressure bulkhead is not authorized under this STC. If a new stud must be installed into a pressure bulkhead, additional approval for installation of the stud will be required.

3. If there is no suitable fastener, install a new stud as follows:
   a) When adding a new stud hole to the bulkhead, the center of the hole must be located a minimum of one inch away from any existing, non-stiffened hole.
   b) The new stud hole must be located such that the terminal lug face, neck, or attaching hardware will not intrude into the flange bend radius of any edge or stiffened hole. Refer to MS20659 for terminal lug dimensions.

Verify overbraid terminal bonding by checking resistance between the overbraid and the bulkhead (or the metallic wing structure for a wing-mounted WXR). Resistance should be less than 2.5 mΩ.



NOTES:

1 THE OVERBRAID MUST BE INSERTED INTO THE GROUNDING LUG BY "COMBING" IT OUT INTO A FLAT CONFIGURATION AND THEN COMPRESS INTO A SMALL DIAMETER BUNDLE NEAR ITS END WHICH MAY BE INSERTED INTO THE GROUNDING LUG.

Figure G-1. WXR HSDB Cable Overbraid Installation

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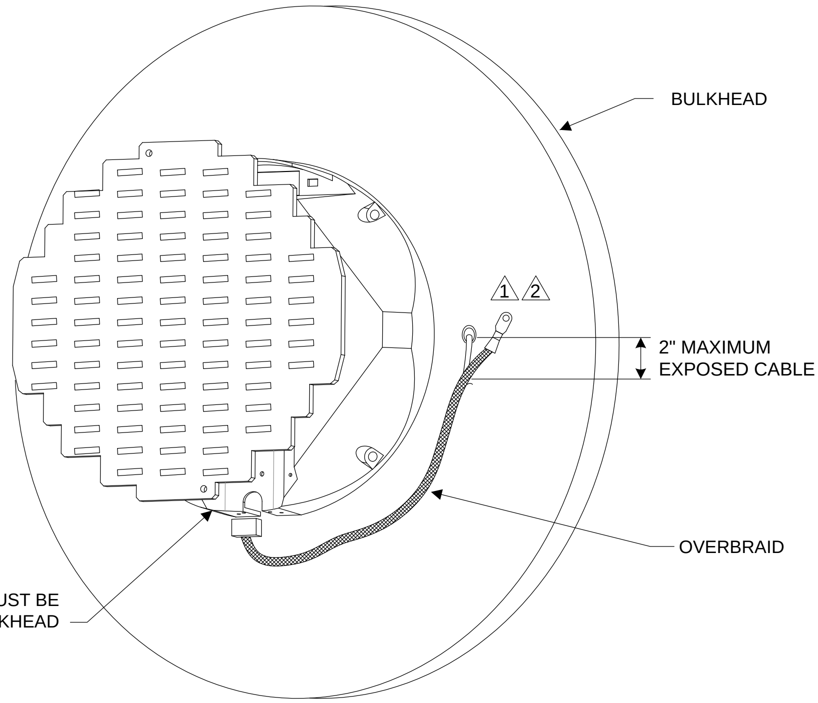

1. INSTALL 5/16" GROUNDING HARDWARE IN ACCORDANCE WITH AC 43.13-1B, SECTION 11-189. IF THERE IS AN EXISTING HOLE LOCATED IN AN APPROPRIATE AREA IT MAY BE UTILIZED FOR THE GROUNDING HARDWARE – OTHERWISE AN EXISTING FASTER (5/16" OR LARGER) MAY BE USED. IF THERE IS NO EXISTING HOLE OR SUITABLE FASTER USABLE FOR THIS PURPOSE THEN DRILL AND DE-BURR A 0.323"-0.332" HOLE.
2. MS20659-131 TERMINAL LUG (OR EQUIVALENT). ENSURE THAT CHAFE PROTECTION IS INSTALLED WHERE THE HSDB WIRES ENTER THE BULKHEAD.

Figure G-2. WXR Overbraid Termination

G.2 Lightning Protection for Nonmetallic Aircraft

Table G-1 provides detailed information about the lightning protection components that are required for a particular aircraft model. Only nonmetallic models are listed. A 'Y' in the LRU column indicates that a TVS and fuse combination is required for that LRU; a 'N' indicates that the TVS and fuse combination is not required. The interconnect diagrams showing how the TVS and fuse are connected for a particular LRU are found in Appendix E.

NOTE

Aircraft models that are limited to VFR operation only are not required to have TVSs and associated fuses installed. Consequently, these models do not appear in Table G-1.

Table G-1. Lightning Protection for Nonmetallic Aircraft

Aircraft Make (TCDS Holder) [common name or previous make]	Aircraft Model Designation	Protection Required?			Notes
		TVS1	TVS2	GPS Coaxial Cable Overbraid	
Alexandria Aircraft (Alexandria Aircraft LLC) [Bellanca, Inc.]	14-19, 14-19-2, 14-19-3, 14-19-3A, 17-30, 17-31, 17-31TC	Y	N	N	
Alexandria Aircraft (Alexandria Aircraft LLC) [Bellanca Aircraft Corp; Viking Aviation, Inc.; Bellanca, Inc.]	17-30A, 17-31A, 17-3A1TC	Y	N	N	
American Champion (American Champion Aircraft Corporation)	8KCAB, 8GCBC	Y	N	N	
American Champion (American Champion Aircraft Corporation)	7GCA, 7GCB, 7KC, 7GCBA, 7GCAA, 7GCBC, 7KCAB	Y	N	N	
Bellanca (Bellanca Aircraft Corporation)	14-13, 14-13-2, 14-13-3, 14-13-3W	Y	N	N	
Cessna (Cessna Aircraft Company) [Columbia Aircraft Manufacturing, The Lancair Company]	LC40-550FG, LC41-550FG, LC42-550FG	Y	Y	Y	
Cessna (Cessna Aircraft Company)	T-50 (Army AT-17, UC-78 Series, Navy JRC-1)	Y	N	N	
Cirrus Design Corporation (Cirrus Design Corporation)	SR20, SR22	Y	Y	Y	
Cub Crafters (Cub Crafters, Inc.)	CC18-180, CC18-180A	Y	N	N	
Diamond (Diamond Aircraft Industries GmbH)	DA 40	Y	Y	Y	
Extra (Extra Flugzeugproduktions- und Vertriebs- GmbH) [Extra Flugzeugbau GmbH]	EA-400	Y	Y	Y	
FS2003 Corp. (FS 2003 Corporation [New Piper Aircraft]	PA-12, PA-12S	Y	N	N	
GROB (GROB-WERKE)	G120A	Y	Y	Y	

Aircraft Make (TCDS Holder) [common name or previous make]	Aircraft Model Designation	Protection Required?			Notes
		TVS1	TVS2	GPS Coaxial Cable Overbraid	
Hawker Beechcraft (Hawker Beechcraft Corporation) [Beech Aircraft Company; Raytheon Aircraft Company]	D17S (UC43, UC43B, GB-1, GB-2), SD17S	Y	N	N	
Hawker Beechcraft (Hawker Beechcraft Corporation) [Beech Aircraft Company; Raytheon Aircraft Company]	G17S	Y	N	N	
Howard (Howard Aircraft Foundation) [Jobmaster Co]	DGA-15P (UC-70, GH-1, GH-2, GH-3, NH-1), DGA-15J (UC-70B), DGA15W	Y	N	N	
Liberty (Liberty Aerospace Incorporated)	XL-2	Y	Y	Y	
Maule (Maule Aerospace Technology, Inc.)	Bee Dee M-4, M-4, M-4C, M-4S, M-4T, M-4-180C, M-4-180S, M-4-180T, M-4-210, M-4-210C, M-4-210S, M-4-210T, M-4-220, M-4-220C, M-4-220S, M-4-220T, M-5-180C, M-5-200, M-5-210C, M-5-210TC, M-5-220C, M-5-235C, M-6-180, M-6-235, M-7-235, MX-7-235, MX-7-180, MX-7-420, MXT-7-180,MT-7-235, M-8-235, MX-7-160, MXT-7-160, MX-7-180A, MXT-7-180A, MX-7-180B, M-7-235B, M-7-235A, M-7-235C, MX-7-180C, M-7-260, MT-7-260, M-7-260C, M-7-420AC, MX-7-160C, MX-7-180AC, M-7-420A, MT-7-420, M-4-180V, M-9-235	Y	N	N	
Piper Aircraft, Inc. (Piper Aircraft, Inc.) [New Piper]	PA-18, PA-18S, PA-18 "105" (Special), PA-18S "105" (Special), PA-18A, PA-18 "125", PA-18S "125", PA-18AS "125", PA-18 "135", PA-18A "135", PA-18S "135", PA-18AS "135", PA-18 "150", PA-18A "150", PA-18S "150", PA-18AS "150", PA-19, PA-19S	Y	N	N	
Piper Aircraft, Inc. (Piper Aircraft, Inc.) [New Piper]	PA-20, PA-20S, PA-20 "115", PA-20S "115", PA-20 "135", PA-20S "135"	Y	N	N	
Piper Aircraft, Inc. (Piper Aircraft, Inc.) [New Piper]	PA-22, PA-22-108, PA-22-135, PA-22S-135, PA-22-150, PA-22S-150, PA-22-160, PA-22S-160	Y	N	N	
Sky International (Sky International, Inc.) [Christen Industries; Aviat, Inc.; White International, LTD.; Pitts]	A-1, A-1A, A-1B, A-1C-180, A-1C-200	Y	N	N	
Symphony Aircraft Industries Inc. (Symphony Aircraft Industries Inc.) [OMF]	OMF-100-160, SA 160	Y	N	N	
Triton Aerospace LLC (Triton Aerospace LLC) [Triton America LLC; AAI Acquisition, Inc.; Adam Aircraft]	A500	Y	Y	Y	
Univair (Univair Aircraft Corporation) [Stinson]	108, 108-1, 108-2, 108-3, 108-5	Y	N	N	
WACO (The WACO Aircraft Company)	YMF	Y	N	N	

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Appendix H Aircraft Model Specific Information

Table H-1 provides additional limitations that are placed on some aircraft as a part of this STC.

Table H-1. Aircraft Model Specific Information

Aircraft Make (TCDS Holder) [common name or previous make]	**Aircraft Model**	**Notes**
Air Tractor (Air Tractor, Inc.)	AT-502, AT-502A, AT-502B, AT-802, AT-802A	Must have optional radio box (P/N 60616-1) installed as a prerequisite for the installation of the GTN. [1]
Diamond (Diamond Aircraft Industries, Inc.)	DA20-A1, DA20-C1	[1]
Diamond (Diamond Aircraft Industries GmbH)	DA 40	Must have Diamond OSB 40-004/3 incorporated. Otherwise, [1]
Extra (Extra Flugzeugproduktions-undVertriebs GmbH)	EA-300/L	To install a GTN 6XX or 7XX unit in an EA-300/L aircraft, the aircraft must have one of the following sub panels installed: • EA-8D501.20 Sub Panel GTN 635/650 • EA-8D501.21 Sub Panel GTN 750 Alternately, EA-300/L aircraft with the following sub panels previously installed may be used with modifications to the subpanel side walls for the GTN installation rack mounting hole pattern. • EA-86501.4 • EA-86501.8 • EA-86501.10 For more information on these subpanels, contact Extra Aircraft (http://www.extraaircraft.com/contact.php). [1]
GROB [GROB-WERKE)	G115, G115A, G115B, G115C, G115C2, G115D, G115D2, G115EG	[1]
Vulcanair S.p.A. (Vulcanair S.p.A.) [Partenavia]	P68 Observer, P68TC Observer, P68 Observer 2	For installations in these aircraft, this STC only approves the installation of the GTN and GMA 35 in the console and not in the instrument panel.
WACO (WACO Classic Aircraft Corporation) [Great Lakes Aircraft Company] [John Duncan]	2T-1A, 2T-1A-1, 2T-1A-2	[1]

[1] Installation approved for VFR operation only.

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Appendix J Acceptable Hardware

Screws, Non-Structural

Type	Size	
	6-32	8-32
Pan Head, Low Carbon Steel	-	NASM35206 (MS35206) (AN515)
Pan Head, Brass	-	NASM35214 (MS25214) (AN515B)
Pan Head, Stainless	-	MS51957 (AN515C)
Pan Head, Alloy Steel	-	NAS602
100 Deg Countersunk	NASM24693 (MS24693) (AN507)	-
100 Deg Countersunk, Alloy Steel	NAS514P	-

Note: Part numbers in parentheses are inactive or cancelled part numbers; these numbers may still be available and/or referenced on packaging material.

Screws, Structural

Type	Size
	8-32
Pan Head	NASM27039 (MS27039) (NAS220)

Note: Part numbers in parentheses are inactive or cancelled part numbers; these numbers may still be available and/or referenced on packaging material.

Washers, Carbon Steel, Cad Plated

Nominal Inside Diameter	Size		
	.016 Thick	.032 Thick	.063 Thick
#6	NAS1149FN616P (AN960-6L)	NAS1149FN632P (AN960-6)	-
#8	NAS1149FN816P (AN960-8L)	NAS1149FN832P (AN960-8)	-

Note: Part numbers in parentheses are inactive or cancelled part numbers; these numbers may still be available and/or referenced on packaging material.

Washers, Stainless Steel

Nominal Inside Diameter	Size		
	.016 Thick	.032 Thick	.063 Thick
#6	NAS1149CN616R (AN960C-6L)	NAS1149CN632R (AN960C-6)	-
#8	NAS1149CN816R (AN960C-8L)	NAS1149CN832R (AN960C-8)	-

Note: Part numbers in parentheses are inactive or cancelled part numbers; these numbers may still be available and/or referenced on packaging material.

Nuts, Steel

Size	Type			
	Nut, Self-locking Metal, Hex, Thin	Nut, Self-locking Elastic, Hex, Thin	Nut, Self-locking Metal, Hex	Nut, Self-locking Elastic, Hex
6-32	NASM21042L06 NAS1291-06 (MS21042L06)	NASM21083N06 NAS1022N06 (MS21083N06) (MS20364-632A) (AN364-632A)	NASM21045L06 (MS21045L06) (AN363-632)	NASM21044N06 NAS1021N06 (MS21044N06) (MS20365-632A) (AN365-632A)
8-32	NASM21042L08 NAS1291-08 (MS21042L08)	NASM21083N08 NAS1022N08 (MS21083N08) (MS20364-832A) (AN364-832A)	NASM21045L08 (MS21045L08) (AN363-832)	NASM21044N08 NAS1021N08 (MS21044N08) (MS20365-832A) (AN365-832A)

Note: Part numbers in parentheses are inactive or cancelled part numbers; these numbers may still be available and/or referenced on packaging material.

Nuts, Stainless Steel

Size	Type			
	Nut, Self-locking Metal, Hex, Thin	**Nut, Self-locking Elastic, Hex, Thin**	**Nut, Self-locking Metal, Hex**	**Nut, Self-locking Elastic, Hex**
6-32	NASM21043-06 NAS1291C06 (MS21043-06)	NASM21083C06 (MS21083C06) (AN364C632A)	NASM21046C06 MS20365C632C NAS1021C06 (MS21046C06) (AN363C632)	MS20365C632A MS21044C06 (AN365C632A)
8-32	NASM21043-08 NAS1291C08 (MS21043-08)	NASM21083C08 (MS21083C08) (AN364C832A)	NASM21046C08 MS20365C832C NAS1021C08 (MS21046C08) (AN363C832)	MS20365C832A MS21044C08 (AN365C832A)

Note: Part numbers in parentheses are inactive or cancelled part numbers; these numbers may still be available and/or referenced on packaging material.

Nutplates, Steel

Size	Type					
	One Lug Fixed	**One Lug Floating**	**Two Lug Fixed**	**Two Lug Floating**	**Corner**	**Side-by-Side**
6-32	MS21051 MS21053 MS21071	MS21061	MS21047 MS21049 MS21069	MS21059 MS21075	MS21055 MS21057 MS21073	MS21086
8-32	MS21051 MS21053 MS21071	MS21061	MS21047 MS21049 MS21069	MS21059 MS21075	MS21055 MS21057 MS21073	MS21086

Nutplates, Stainless Steel

Size	Type					
	One Lug Fixed	One Lug Floating	Two Lug Fixed	Two Lug Floating	Corner	Side-by-Side
6-32	MS21052 MS21054 MS21072	MS21062	MS21048 MS21050 MS21070	MS21060 MS21076	MS21056 MS21058 MS21074	MS21087
8-32	MS21052 MS21054 MS21072	MS21062	MS21048 MS21050 MS21070	MS21060 MS21076	MS21056 MS21058 MS21074	MS21087

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