GARMIN

GTN 725/750
TSO Installation Manual

GTN 725 and GTN 750

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RECORD OF REVISIONS

Revision	Revision Date	Description
A		Initial Release

DOCUMENT PAGINATION

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This manual is applicable for units with main software version 2.00 or later.

INFORMATION SUBJECT TO EXPORT CONTROL LAWS

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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.

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

WARNING

This product contains a Lithium battery that must be recycled or disposed of properly. Battery replacement and removal must be performed by professional services.

LIST OF FIGURES

LIST OF TABLES

GTN 725/750 HARDWARE MOD LEVEL HISTORY

The following table identifies hardware modification (Mod) Levels for the GTN 725 and GTN 750. Mod Levels are listed with the associated service bulletin number, service bulletin date, and the purpose of the modification. The table is current at the time of publication of this manual (see date on front cover) and is subject to change without notice. Authorized Garmin Sales and Service Centers are encouraged to access the most up-to-date bulletin and advisory information on the Garmin Dealer Resource web site at www.garmin.com using their Garmin-provided user name and password.

MOD LEVEL	SERVICE BULLETIN NUMBER	SERVICE BULLETIN DATE	PURPOSE OF MODIFICATION

1. GENERAL DESCRIPTION

1.1 Introduction

This manual describes the physical, mechanical, and electrical characteristics, as well as instructions and other conditions and limitations for installation and approval of the GTN units. Refer to Section 6, Limitations, for additional information and other considerations.

NOTE

Except where specifically noted, references made to GTN will equally apply to the GTN 725 and GTN 750.

Table 1-1. GTN Units

MODEL	PART NUMBER	COLOR	NOTES
GTN 725	011-02281-00	BLACK	
GTN 750	011-02282-00	BLACK	10 WATT UNIT
	011-02282-10	GRAY	10 WATT UNIT

1.2 Equipment Description

The GTN 725 is a GPS/WAAS unit that meets the requirements of TSO-C146a (specified in Table 1-4) and may be approved for IFR en route, terminal, non-precision, and precision approach operations.

The GTN 750 includes all the features of the GTN 725 and includes an airborne VHF communications transceiver and airborne VOR/LOC and glideslope receivers. The GTN 750 meets the requirements of the TSOs specified in Table 1-4.

CAUTION

The GTN use lenses 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 lens using a clean, lint-free cloth and an eyeglass lens cleaner that is specified as safe for anti-reflective coatings.

CAUTION

The use of ground-based cellular telephones while aircraft are airborne is prohibited by FCC rules. Due to potential interference with onboard systems, the use of ground-based cell phones while the aircraft is on the ground is subject to FAA regulation 14 CFR §91.21.

FCC regulation 47 CFR §22.925 prohibits airborne operation of ground-based cellular telephones installed in or carried aboard aircraft. Ground-based cellular telephones must not be operated while aircraft are off the ground. When any aircraft leaves the ground, all ground-based cellular telephones on board that aircraft must be turned off. Ground-based cell phones that are on, even in a monitoring state, can disrupt GPS performance.

CAUTION

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.

1.3 Technical Specifications

1.3.1 Physical Characteristics

Bezel Height	6.00 in. (152 mm)
Bezel Width	6.25 in. (159 mm)
Rack Height (Dimple-to-Dimple)	6.025 in. (153 mm)
Rack Width	6.300 in (160 mm)
Depth Behind Panel with Connectors (Measured from face of aircraft panel to rear of connector backshells)	11.25 in. (286 mm)
GTN 725 Weight (Unit only)	TBD
GTN 725 Weight (With rack and back plate)	TBD
GTN 750 Weight (Unit only)	7.50 lbs (3.40 kg)
GTN 750 Weight (With rack and back plate)	9.16 lbs (4.15 kg)

1.3.2 General Specifications

Operating Temperature Range	-20°C to +55°C. For more details see Environmental Qualification Form on the Dealers Only page on www.garmin.com. See Appendix A for part numbers.
Humidity	95% non-condensing
Altitude Range	-1,500 ft to 50,000 ft
Input Power Requirements	
Input Voltage Range - All Units (Main Connector)	9 to 33 VDC
Input Voltage Range (COM Connector on GTN 750)	9 to 33 VDC
Input Voltage Range (NAV Connector on GTN 750)	9 to 33 VDC
GTN Current Draw	Refer to Table 1-2
Superflag Power Requirements	400 mA maximum per superflag output
Environmental Testing	See Environmental Qualification Form on the Dealers Only page on www.garmin.com. See Appendix A for part numbers.

The display on the GTN is a sunlight readable LCD display.

Display Size	6.9 inch diagonal
Active Area	4.46 inches (W) x 5.27 inches (H)
Resolution	600 x 708 pixels
Viewing Angle	Left/Right: 45° Up: 10° Down: 30°

1.3.3 GPS Specifications

Number Of Channels	15 (12 GPS and 3 GPS/WAAS/SBAS)
Frequency	1575.42 MHz L1, C/A code
Sensitivity (Acquisition, No Interference)	-134.5 dBm GPS -135.5 dBm WAAS
Sensitivity (Drop Lock)	-144 dBm
Dynamic Range	> 20 dB
Lat/Lon Position Accuracy	<1.25 meter RMS horizontal, <2 meter vertical, with WAAS
Velocity	1000 knots maximum (above 60,000 ft)
TTFF (Time To First Fix)	1:45 min. typical with current almanac, position, and time
Reacquisition	10 seconds typical
Position Update Interval	0.2 sec (5 Hz)
1 PPS (Pulse Per Second)	±275 Nsec of UTC second
Datum	WGS-84
SATCOM Compatibility	SATCOM compatibility is dependent upon antenna selection. See Section TBD for additional information.
Antenna Power Supply	35 mA typical, 40 mA max at 4.7 VDC

1.3.4 COM Specifications (GTN 750 Only)

1.3.4.1 COM Transmitter Specifications

Classes	3,4,5,6
Microphone Input	Two inputs, standard carbon or dynamic mic with integrated preamp providing minimum 70 mVRMS into 1000 load
Modulation Capability	85% with 100 to 1000 mVRMS microphone input at 1000 Hz
Modulation	AM Double sided, Emission Designator 6K00A3E
Frequency Range	118.000 to 136.975 MHz, 25 kHz and 8.33 kHz channel spacing
Frequency Tolerance	+/-2ppm from -40°C to +70°C
Output Power	10 Watt Mode: 10 watts minimum 16 Watt Mode: 16 watts minimum
Duty Cycle	10W: 100% 16W: Recommended 25% (15 seconds on/45 seconds off, 5 seconds on/15 seconds off, etc.)
Carrier Noise Level	At least 35 dB (SNR).
Stuck Mic Time-Out	35 seconds time-out, reverts to receive
Demodulated Audio Distortion	Less than 5% distortion when the transmitter is at 85% modulation at 350 to 2500 Hz
Sidetone	1.4 Vrms into a 500 load

1.3.4.2 COM Receiver Specifications

Classes	D and E
Frequency Range	118.000 to 136.975 MHz, 25 kHz and 8.33 kHz channel spacing
Headset Audio Output	110 mW minimum into a 500 load
Speaker Audio Output	12 watts minimum into a 4 load
Audio Response	Less than 6 dB of variation between 350 and 2500 Hz.
Audio Distortion	Less than 5% at rated output power
AGC Characteristics	Less than 3 dB of variation in the audio output from -93 to -13 dBm (power absorbed by a 50Ω load)
Sensitivity	SINAD on all channels is greater than 6 dB when the RF level is 2 uV (hard) or -107 dBm (power absorbed by a 50Ω load) modulated 30% at 1000 Hz at rated audio output power
Squelch	Automatic squelch with manual override
Selectivity	6 dB BW is greater than ± 7 kHz for 25 kHz channeling. 60 dB BW is less than ±22 kHz for 25 kHz channeling. 6 dB BW is greater than ±3.5 kHz for 8.33 kHz channeling. 60 dB BW is less than ±7.37 kHz for 8.33 kHz channeling.

1.3.5 VOR Specifications (GTN 750 Only)

Receiver Audio Sensitivity	At -103.5 dBm (S+N)/N is not less than 6 dB.
Course Deviation Sensitivity	-103.5 dBm or less for 60% of standard deflection.
Flag	The VOR Course Deviation Flag must be flagged: in the absence of an RF signal. in the absence of the 9960 Hz modulation. in the absence of either one of the two 30 Hz modulations. When the level of a standard VOR deviation test signal produces less than a 50% of standard deflection.
AGC Characteristics	From -99 dBm to -13 dBm input of a Standard VOR Audio Test Signal, audio output level does not vary more than 3 dB.
Spurious Response	Greater than 80 dB.
VOR OBS Bearing Accuracy	The bearing information as presented to the pilot does not have an error in excess of 2.7° as specified by RTCA DO-196 and EuroCAE ED-22B.
Audio Output	A minimum 100 mW into a 500Ω load.
Audio Response	Less than 6 dB of variation between 350 and 2500 Hz. Except the 1020 Hz Ident Tone is at least 20 dB down in voice mode.
Audio Distortion	The distortion in the receiver audio output does not exceed 10% at all levels up to 100 mW.

1.3.6 LOC Specifications (GTN 750 Only)

Receiver Audio Sensitivity	At -103.5 dBm (S+N)/N is not less than 6 dB.
Course Deviation Sensitivity	-103.5 dBm or less for 60% of standard deflection.
Flag	The VLOC Course Deviation Flag must be flagged: in the absence of an RF signal. in the absence of the 9960 Hz modulation. in the absence of either one of the two 30 Hz modulations. When the level of a standard VOR deviation test signal produces less than a 50% of standard deflection.
AGC Characteristics	From -99 dBm to -13 dBm input of a Standard VOR Audio Test Signal, audio output level does not vary more than 3 dB.
Spurious Response	Greater than 80 dB.
VOR OBS Bearing Accuracy	The bearing information as presented to the pilot does not have an error in excess of 2.7° as specified by RTCA DO-196 and EuroCAE ED-22B.
Audio Output	A minimum 100 mW into a 500Ω load.
Audio Response	Less than 6 dB of variation between 350 and 2500 Hz. Except the 1020 Hz Ident Tone is at least 20 dB down in voice mode.
Audio Distortion	The distortion in the receiver audio output does not exceed 10% at all levels up to 100 mW.

1.3.7 Glideslope Specifications (GTN 750 Only)

Sensitivity	-87 dBm or less for 60% of standard deflection.
Centering Accuracy	0 ±.0091 ddm or 0 ±7.8 mV.
Selectivity	The course deviation is 0 ddm ± .0091 ddm when using the Glideslope Centering Test Signal as the RF frequency is varied ±17 kHz from the assigned channel. At frequencies displaced by ±132 kHz or greater, the input signal is at least 60 dB down.
Standard Deflection	a) With a standard deflection 'FLY DOWN' condition (90 Hz dominant), the output is -78 mV ±7.8 mV. b) With a standard deflection 'FLY UP' condition (150 Hz dominant), the output is +78 mV ±7.8 mV.
Flag	The unit Flags: When the level of a standard deviation test signal produces 50% or less of standard deflection of the deviation indicator. In the absence of 150 Hz modulation. In the absence of 90 Hz modulation. In the absence of both 90 Hz and 150 Hz modulation. In the absence of RF.

Table 1-2. GTN Current Specifications

LRU	**14 Volt Current Draw**		**28 Volt Current Draw**	
	Typical	**Maximum**	**Typical**	**Maximum**
GTN 725				
Main Connector			1.123 A	
GTN 750				
Main Connector			1.123 A	
COM Connector	470 mA (RX) 5.16 A (TX:10W) 6.93 A (TX:16W)		220 mA (RX) 2.04 A (TX:10W) 2.73 A (TX:16W)	
NAV Connector			308 mA	

1.3.8 GPS Antenna Requirements

Antenna performance is critical to the GPS/WAAS operation. The antennas listed in Table 1-3 are approved for installation with the GTNs.

Table 1-3. Approved GPS Antennas

Model/Description	Conn Type	Mfr	Part Number	Garmin Order Number
GA 35, GPS/WAAS [1]	TNC	Garmin	013-00235-( )	013-00235-( )
		Aero Antenna	AT575-93G( )-TNCF-000-RG-27-NM	
GA 36, GPS/WAAS	TNC	Garmin	013-00244-( )	013-00244-( )
		Aero Antenna	AT575-126G( )-TNCF-000-RG-27-NM	
GA 37, GPS/WAAS/XM	TNC	Garmin	013-00245-( )	013-00245-( )
		Aero Antenna	AT2300-126G( )-TNCF-000-RG-27-NM	
A33W, WAAS Antenna [3]	TNC	Garmin	013-00261-( )	013-00261-( )
		Aero Antenna	AT575-332G( )- TNCF-000-RG-27-NM	
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/TNC/BNC [4]	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 Garmin GA Antenna AML STC SA01695SE.

[4] The GPS/WAAS connector is a TNC type. The XM connector is a TNC type. The VHF connector is a BNC type.

1.4 License Requirements

The Telecommunications Act of 1996, effective February 8, 1996, provides the FCC discretion to eliminate radio station license requirements for aircraft and ships. The GTN 725 and GTN 750 installations must comply with current transmitter licensing requirements. In the US, to find out the specific details on whether a particular installation is exempt from licensing, please visit the FCC web site http://wireless.fcc.gov/aviation. If an aircraft license is required, make application for a license on FCC form 404, Application for Aircraft Radio Station License. The FCC also has a fax-on-demand service to provide forms by fax. Outside the US, contact the responsible telecommunication authority. The GTN 725 and GTN 750 owner accepts all responsibility for obtaining the proper licensing before using the transceiver. The maximum transmitting power, modulation identification, and frequency band information may be required for licensing and are detailed in Section 1.4.4.

CAUTION

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

1.5 Regulatory Compliance

1.5.1 TSO Authorization and Advisory Circular References

The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those installing this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in an aircraft. The article may be installed only in compliance with 14 CFR part 43 or the applicable airworthiness requirements.

Table 1-4. TSO Authorization

GTN 725	GTN 750	Function	TSO	Environmental Standard	Minimum Operational Performance Standard	Class/Type	Applicable SW P/Ns
	•	ILS Glideslope Receiving Equipment	TSO-C34e	DO-160B	DO-192		TBD
	•	ILS Localizer Receiving Equipment	TSO-C36e	DO-160B	DO-195		TBD
	•	VOR Receiving Equipment	TSO-C40c	DO-160B	DO-196		TBD
•	•	Airborne Weather and Ground Mapping Pulsed Radars	TSO-C63c	DO-160A	DO-173		TBD
•	•	Airborne ATC Transponder Equipment	TSO-C74d	DO-160F	DO-144A		TBD
•	•	Optional Display Equipment for Weather and Ground Mapping Radar Indicators	TSO-C105	DO-160A	DO-174		TBD
•	•	Airborne Passive Thunderstorm Detection Equipment	TSO-C110a	DO-160B	DO-191		TBD
•	•	Air Traffic Control Radar Beacon System/Mode Select ATCRABS/Mode S	TSO-C112c	DO-160F	DO-181D		TBD
•	•	Multipurpose Electronic Displays	TSO-C113	DO-160A	AS 8034		TBD
•	•	TCAS Airborne Equipment	TSO-C118	DO-160B	DO-197		TBD
	•	Equipment that Prevents Blocked Channels in 2-way Radio Communications due to Unintentional Transmissions	TSO-C128a	DO-160E	DO-207		TBD
•	•	Aircraft Audio Systems and Equipment	TSO-C139	DO-160E	DO-214		TBD
•	•	Stand-Alone Airborne Navigation Equipment using the GPS Augmented by the Satellite Based Augmentation System	TSO-C146c	DO-160E	DO-229D		TBD
•	•	TAS Airborne Equipment	TSO-C147	DO-160D	DO-197A		TBD
•	•	TAWS	TSO-C151b	DO-160E	TSO-C151b		TBD

GTN 725	GTN 750	Function	TSO	Environmental Standard	Minimum Operational Performance Standard	Class/Type	Applicable SW P/Ns
•	•	Aircraft Flight Information Services – Broadcast (FIS-B) Datalink Systems and Equipment	TSO-C157	DO-160E	DO-267A		TBD
•	•	Electronic Map Display Equipment for Graphical Depiction of Aircraft Position	TSO-C165	DO-160E	DO-257A		TBD
	•	VHF Radio Communications Transceiver Equipment Operating with Radio Frequency Range 117.975 to 137.000 MHz	TSO-C169a	DO-160E	DO-186B		TBD

Table 1-5. Main Software Part Number and Version

Software Part Number	Software Version
TBD	TBD

Table 1-6. GPS/WAAS Software Part Number and Version

Software Part Number	Software Version
006-B0339-10	V4.0

NOTE

For main or GPS software versions previous to those listed Table 1-5 or Table 1-6, contact Garmin for assistance.

System Function	DO-178B Level
Operating System	B
GPS Navigation Information	B
VOR Information	C
LOC/Glideslope Information	C
VHF Communication	C
TAWS (Class B) Functionality	C
Display of altitude, heading, course, speed, and track	C
Display of other information - moving map, terrain, flight plan overlay and flight mode, TAS/TIS traffic information, XM Weather data, data from passive lightning detection equipment, checklist and timer	D
Terrain (Fixed Wing)	D
Terrain Prox (Helicopter)	D
HTAWS (Helicopter)	C

NOTE

Unauthorized changes or modifications to any GTN unit product may void the compliance to required regulations and authorization for continued equipment usage. All GTN unit functions are design approved under the TSO.

1.5.2 TSO Deviations

TSO	Deviation
TSO-C110	1. Garmin was granted a deviation from TSO-C110 not to mark the computer software level(s) on the unit.
	2. Garmin was granted a deviation from the TSO-C110 to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.
TSO-C113	1. Garmin was granted a deviation from TSO-C113 not to mark the computer software level(s) on the unit.
	2. Garmin was granted a deviation from TSO-C113 to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.
TSO-C118	1. Garmin was granted a deviation from TSO-C118 not to mark the computer software level(s) on the unit.
	2. Garmin was granted a deviation from TSO-C118 to use RTCA/DO-197A instead of RTCA/DO-197 as the Minimum Operational Performance Standards.
	3. Garmin was granted a deviation from TSO-C118 to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.
TSO-C139	1. Garmin was granted a deviation from TSO-C139 not to furnish each person receiving a GTN 725/750 copies of the data in Paragraph 5.l of the TSO.
	2. Garmin was granted a deviation from TSO-C139 not to furnish each person receiving a GTN 725/750 copies of the data in Paragraph 5.l, 5.m, 5.n of the TSO, if the equipment performs functions beyond those in paragraph 3 and paragraph 3.a.
	3. Garmin was granted a deviation from TSO-C139 to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.
TSO-C146c	1. Garmin was granted a deviation from RTCA/DO-229D to use a 10 degree vertical viewing angle below the lower display edge.
	2. Garmin was granted a deviation from RTCA/DO-229D to use GPS antennas that meet Garmin minimum performance specifications.
	3. Garmin was granted a deviation from TSO-C146c to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.
TSO-C147	1. Garmin was granted a deviation from TSO-C147 not to furnish each person receiving a GTN 725/750 copies of the data in paragraphs 3(a)(10) through (12) of the TSO.
	2. Garmin was granted a deviation from TSO-C147 to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.
TSO-C151b	1. Garmin was granted a deviation from TSO-C151b Section 5.c(2) not to furnish each person receiving a GTN 725/750 copies of the data in paragraphs 5.a(11) through (13) of the TSO.
	2. Garmin was granted a deviation from TSO-C151b to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.
TSO-C165	1. Garmin was granted a deviation from TSO-C165 Section 5.c(2) not to furnish each person receiving a GTN 725/750 copies of the data in paragraphs 5.a(11) through (13) of the TSO.
	2. Garmin was granted a deviation from TSO-C165 to mark product name, part number, serial number and a statement on the unit's nameplate label "TSO-C146c Class 3, See IM for Add'l Appliance Approvals ", instead of Product Type, TSO Numbers, Equipment Class, "Dev" (deviation), Environmental Categories, Date of Manufacture, weight and Software Part Number.

1.5.3 FCC Grant of Equipment Authorization

Model	FCC ID
GTN 750	IPH-01594

1.6 Database Options and Updates

1.6.1 Navigation Database

The navigation database resides on a database card that is inserted in the card slot on the unit front panel.

The database is generated on periodic cycles from current Jeppesen data and converted to the format used by the GTN products. The data conversion process is performed using software that is developed and maintained under Garmin document control processes according to RTCA/DO-200A, Standards for Processing Aeronautical Data.

The database can be updated by purchasing a database subscription from Jeppesen. The database updates include either replacing or re-programming the database card and inserting the updated card in the left card slot on the unit front panel. Contact Jeppesen at 800-621-5377 or www.jeppesen.com for more information and instructions.

Contact Garmin for more information on databases available for the GTN.

1.6.2 TAWS/Terrain Database

The TAWS/Terrain database resides on a database card that is inserted in the card slot on the unit front panel.

The TAWS/Terrain database which serves both functions of Terrain Awareness and Warning System (TAWS) and the standard configured GTN providing terrain functionality is available for updating on periodic cycles and is available from Garmin. TAWS/Terrain database updates can be accomplished by replacing or reprogramming the database card and inserting the updated card in the card slot on the unit front panel. The TAWS/Terrain database can be downloaded via the internet and the card programmed using a USB programmer available from Garmin. Contact Garmin at 800-800-1020 or www.garmin.com for more information or instructions.

1.7 Fault Detection and Exclusion (FDE)

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

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

1. The fault detection function detects a satellite failure that can affect navigation; and
2. 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. The FDE Prediction program must be used prior to oceanic or remote area flights for all operators using the GTN unit as primary means navigation under FAR parts 91, 121, 125, and 135.

1.8 Limited Warranty

All Garmin avionics products are warranted to be free from defects in materials or workmanship for: two years from the date of purchase for new Remote-Mount and Panel-Mount products; one year from the date of purchase for new portable products and any purchased newly-overhauled products; six months for newly-overhauled products exchanged through a Garmin Authorized Service Center; and 90 days for factory repaired or newly-overhauled products exchanged at Garmin in lieu of repair. Within the applicable period, Garmin will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts or labor, provided that the customer shall be responsible for any transportation cost. This warranty does not apply to: (i) cosmetic damage, such as scratches, nicks and dents; (ii) consumable parts, such as batteries, unless product damage has occurred due to a defect in materials or workmanship; (iii) damage caused by accident, abuse, misuse, water, flood, fire, or other acts of nature or external causes; (iv) damage caused by service performed by anyone who is not an authorized service provider of Garmin; or (v) damage to a product that has been modified or altered without the written permission of Garmin. In addition, Garmin reserves the right to refuse warranty claims against products or services that are obtained and/or used in contravention of the laws of any country.

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

Garmin retains the exclusive right to repair or replace (with a new or newly-overhauled replacement product) the product or software or offer a full refund of the purchase price at its sole discretion. SUCH REMEDY SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.

Online Auction Purchases: Products purchased through online auctions are not eligible for warranty coverage. Online auction confirmations are not accepted for warranty verification. To obtain warranty service, an original or copy of the sales receipt from the original retailer is required. Garmin will not replace missing components from any package purchased through an online auction.

International Purchases: A separate warranty may be provided by international distributors for devices purchased outside the United States depending on the country. If applicable, this warranty is provided by the local in-country distributor and this distributor provides local service for your device. Distributor warranties are only valid in the area of intended distribution. Devices purchased in the United States or Canada must be returned to the Garmin service center in the United Kingdom, the United States, Canada, or Taiwan for service.

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2. INSTALLATION OVERVIEW

2.1 Introduction

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/WAAS 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".

2.2 Minimum System Configuration

2.2.1 VFR Installation

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

- GTN (installed in the aircraft manufacturer approved location for 6.25" wide avionics equipment)
- GPS antenna is required for GPS navigation functions.
- An external CDI is required for installations using the VOR navigation and glideslope information.
- A NAV antenna is required for VHF NAV functions.
- A COM antenna is required for COM functions.

VFR installations must be placarded "GPS LIMITED TO VFR USE ONLY" in clear view of the pilot.

2.2.2 IFR GPS Installation

In order for the GTN to be utilized for IFR GPS Navigation, the criteria in Section 2.2.1 must be met in addition to the following:

- An External CDI/HSI indicator must be 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 (glideslope) in order to perform VNAV operations/approaches.
- Any annunciation required for Source Selection or IFR GPS Navigation must meet the acceptable field-of-view requirements.

NOTE

To take full advantage of the GTN capabilities, an optional barometric altitude source is recommended for automatic sequencing of fix-to-altitude (FA) and hold-to-altitude (HA) leg types. If no barometric altitude data is provided to the GTN, FA and HA legs must be manually sequenced.

2.2.3 IFR VOR/LOC/GLIDESLOPE Installation

The minimum GTN unit installation requires the following items for an IFR VOR/LOC/GLIDESLOPE installation:

- GTN (installed in the aircraft manufacturer approved location)
- GPS antenna, NAV antenna, and COM antenna.
- An External CDI/HSI indicator must be 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 for glideslope and VNAV operations/approaches.
- Any annunciation required for Source Selection or IFR GPS Navigation must meet the acceptable field-of-view requirements.
- A second GPS navigator, COM radio, or NAV radio must be installed.

2.3 External Sensors

When GTN is installed with external sensors, these sensors must be installed in accordance with the manufacturer's data. This manual does not provide information for the installation of specific external sensors.

The GTN can accept data from multiple altitude, heading, and baro correction sources. If multiple sources are used, the GTN will accept data as described below.

NOTE

Barometric altitude is not required by the GTN to meet the requirements of TSO C146a.

2.3.1 Multiple Uncorrected Pressure Altitude Sources

The GTN can accept altitude from a RS-232 altitude encoder, fuel/air data computer (FADC), ARINC 429 air data computer (ADC), ARINC 429 EFIS, and ARINC 429 traffic advisory system. If multiple sources of altitude data are supplied to the GTN, only valid data from the highest priority source is used (input priority cannot be configured). 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 ADC
2. ARINC 429 ADC/AHRS
3. ARINC 429 GDU
4. ARINC 429 EFIS/ADC
5. ARINC 429 Data Concentrator
6. ARINC 429 Traffic Advisory System
7. RS-232 Shadin Fuel and ADC
8. RS-232 Shadin Altitude or Icarus Altitude

2.3.2 Multiple Baro-Corrected Altitude Sources

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 Garmin GDU
3. ARINC 429 label 204 from EFIS/Airdata
4. ARINC 429 label 204 from Data Concentrator
5. RS-232 bus from Shadin Fuel and Air Data Computer

2.3.3 Multiple Heading Sources

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 or Honeywell EFIS
2. ARINC 429 label 320 from EFIS or Honeywell EFIS, corrected for local magnetic variation
3. ARINC 429 label 320 from EFIS/Airdata, corrected for local magnetic variation
4. ARINC 429 label 320 from Garmin GDU, corrected for local magnetic variation
5. ARINC 429 label 314 from INS/IRU
6. ARINC 429 label 314 from Data Concentrator
7. ARINC 429 label 320 from INS/IRU, corrected for local magnetic variation
8. ARINC 429 label 320 from Airdata/AHRS, corrected for local magnetic variation
9. ARINC 429 label 320 from Garmin GAD 42, corrected for local magnetic variation
10. ARINC 429 label 320 from Sandel EHSI, corrected for local magnetic variation
11. ARINC 429 label 314 from GAD 42
12. XYZ Synchro
13. ARINC 429 label 320 from Data Concentrator
14. ARINC 429 label 320 from Traffic Advisory, corrected for local magnetic variation
15. RS-232 bus from Shadin Fuel and Air Data Computer
16. RS-232 bus from WX-500

2.3.4 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 Garmin GDU
2. ARINC 429 label 206 from Airdata/AHRS
3. ARINC 429 label 206 from Data Concentrator
4. RS-232 bus from Shadin Fuel and Air Data Computer

2.3.5 Multiple True Airspeed Sources

The GTN unit can accept heading 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 Garmin GDU
4. ARINC 429 label 210 from EFIS/Airdata
5. ARINC 429 label 210 from Garmin GAD 42
6. ARINC 429 label 210 from Data Concentrator
7. RS-232 bus from Shadin Fuel and Air Data Computer

2.3.6 Multiple VLOC Course Select Sources

The GTN unit can accept VLOC course select data from the sources list below. If multiple sources of VLOC course select 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 course select sources are as follows from highest to lowest:

1. ARINC 429 label 100 from Sandel EHSI
2. ARINC 429 label 110 from Garmin GAD 42
3. TO/FROM course from the appliance's Omni-Bearing Selector (OBS) control

2.3.7 GPS Course Select Sources

The GTN unit can accept GPS course select data from multiple ARINC 429 sources. If multiple sources of GPS course select 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 course select sources are as follows from highest to lowest:

1. ARINC 429 label 100 from EFIS or Honeywell EFIS
2. ARINC 429 label 100 from Garmin GDU
3. ARINC 429 label 100 from EFIS/Airdata
4. ARINC 429 label 100 from Sandel EHSI
5. ARINC 429 label 100 from Garmin GAD 42
6. ARINC 429 label 100 from Data Concentrator
7. TO/FROM course from the appliance's Omni-Bearing Selector (OBS) control

2.3.8 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 Garmin GDU
3. ARINC 429 label 211 from EFIS/Airdata
4. ARINC 429 label 211 from Data Concentrator
5. RS-232 bus from Shadin Fuel and Air Data Computer

2.3.9 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 Garmin GDU
3. ARINC 429 label 213 from EFIS/Airdata
4. ARINC 429 label 213 from Data Concentrator

2.3.10 Joystick Waypoint Data

The GTN unit can accept joystick waypoint data from multiple ARINC 429 sources. If multiple sources of joystick waypoint 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 joystick waypoint data sources are as follows from highest to lowest:

1. ARINC 429 labels 306 and 307 from EFIS or Honeywell EFIS
2. ARINC 429 labels 306 and 307 from Garmin GDU
3. ARINC 429 labels 306 and 307 from EFIS/Airdata
4. ARINC 429 labels 306 and 307 from Radar Graphics
5. ARINC 429 labels 306 and 307 from Garmin GAD 42
6. ARINC 429 labels 306 and 307 from Data Concentrator

2.4 Antenna Considerations

This section contains mounting location considerations for the antennas required for the GTN units. Structural substantiation for mounting of antennas is beyond the scope of the GTN AML STC. For mounting the GA GPS/WAAS antenna, refer to Garmin GA Antenna AML STC SA01695SE or other FAA approved data. For mounting the COM and NAV antennas, refer to the aircraft manufacturer's data.

2.4.1 GPS Antenna Location

The GPS antenna is a key element in the overall system performance and integrity for a GPS/WAAS navigation 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 AC 20-138A section 16. The greater the variance from these guidelines, the greater the chance of decreased availability. Approach procedures with vertical guidance are the most sensitive to these effects. LNAV only approaches, terminal operations, and enroute operations may also be affected. Because meeting all of these installations guidelines may not be possible on all aircraft, these guidelines are listed in order of importance to achieve optimum performance. Items 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.

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 the waterline, which is typically referenced as level while performing a weight and balance check.
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.

3a. The GPS antenna should be mounted 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 (reference VHF COM interference check in Post Installation Checkout procedures) can verify the degradation of GPS in the presence of interference signals. If an EMC check reveals unacceptable interference, insert a GPS notch filter in line with the offending VHF COM or the (re-radiating) ELT transmitter.

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

3b. The GPS antenna should be mounted 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.

3c. To minimize the effects of shadowing at 5° elevation angles, the GPS antenna should be mounted no closer than 6" (edge to edge) from other antennas, including passive antennas such as another GPS antenna or XM antenna.

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. 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).

Figure 2-1 shows the recommended placement of antennas.

2.4.2 COM Antenna Location

The GTN COM antenna should be well removed from all projections, engines and propellers. The ground plane surface directly below the antenna should be a flat plane over as large an area as possible (18" square, minimum). The antenna should be mounted a minimum of six feet from any DME or other COM antennas, four feet from any ADF sense antennas, and two feet from the GTN and its GPS 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 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 coax.

If simultaneous use of two COM transceivers is desired (split-COM or simul-comm), use of the TX interlock function is mandatory. In addition, the COM antennas should be spaced for maximum isolation. A configuration of one topside antenna and one bottom side antenna is recommended.

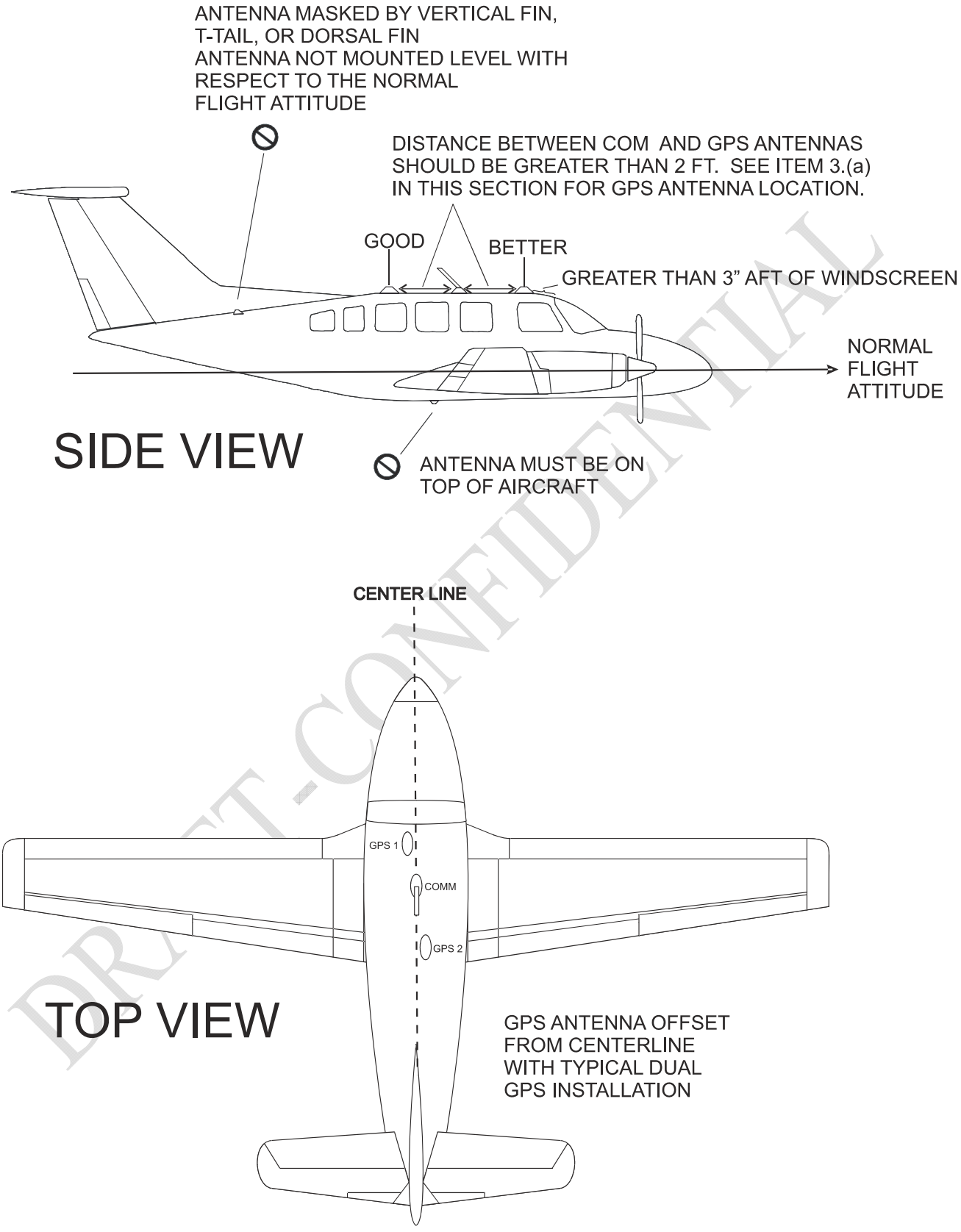

Figure 2-1. GPS Antenna Installation Considerations

2.4.3 VOR/LOC Antenna Location

The GTN VOR/LOC antenna should be well removed 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 Glideslope Antenna Location

The GTN Glideslope antenna should be well removed from all projections, engines and propellers. It should have a clear line of sight if possible.

2.4.5 Electrical Bonding

No special precautions need to be taken to provide a bonding path between the GPS antenna and the aircraft structure. Follow the manufacturers' instructions for the COM, VOR/LOC and Glideslope antennas.

2.4.6 Interference of GPS

On some installations, VHF COM transceivers, Emergency Locator Transmitter (ELT) antennas, and Direction Finder (DF) receiver antennas can re-radiate through the GPS antenna. The GTN 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 COM antenna), ELT antenna, and DF receiver antenna is critical.

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

- GPS Antenna—Locate as far as possible from all COM antennas and all COM transceivers (including the GTN COM), ELT antennas, and DF receiver antennas. The GPS 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 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 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 coax ground.
2. Place a grounding brace between the GTN, VHF COM and ground.
3. Shield the VHF COM wiring harness.

COM, VOR/LOC, and Glideslope Antenna Installation Instructions

Install the COM, VOR/LOC, and Glideslope antennas according to the manufacturer's recommendations. Avoid running other wires and coaxial cables near the VOR/LOC antenna cable.

2.5 Mounting Considerations

The GTN 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/operating the GTN. The location should be such that the GTN unit is not blocked by the glare shield on top, or by the throttles, control yoke, etc. on the bottom. If aircraft has a throw-over yoke, be sure the yoke does not interfere with the GTN.

2.6 Cabling and Wiring Considerations

Wiring should be installed in accordance with AC 43.13-1B Chapter 11. 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. When wire separation cannot be achieved, the following issues should be addressed:

- 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 and controls, high electrical capacity lines or fuel lines;
- The cable harness should be located in a protected area of the aircraft (e.g., isolated from engine rotor burst); and
- Do not route cable near high-energy sources.

NOTE

Wiring which is required to be shielded must be shielded per Section 2.6. Pigtail lengths must be less than 3.0 inches.

Refer to Section 3.7 and Section 3.8 for connector and tooling information.

Refer to Section 3.10 for recommended coax cable.

Refer to Appendix D for the appropriate wiring connections to assemble the wiring connector.

Once the cable assemblies have been made, attach the cable connectors to the rear connector plate. After installing the mounting tube, attach the assembled connector plate. Route the wiring bundle as appropriate. Use 22 to 24 AWG wire for all connections except for power. Use 20 AWG for power and ground. Avoid sharp bends.

2.7 Air Circulation and Cooling

The GTN unit meets all TSO requirements without external cooling. However, as with all electronic equipment, lower operating temperatures extend equipment life. On the average, reducing the operating temperature by 15° to 20°C (27° to 36°F) reduces 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. Air should be able to freely flow from the bezel inlets to the backplate fan outlet on the rear of the unit.

2.8 Compass Safe Distance

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.

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3. INSTALLATION PROCEDURES

3.1 Unit and Accessories

For description of units see Table 1-1.

Table 3-1. Catalog Part Numbers

Model	Unit Only Kit	Standard Kit	Unit P/N	Color	COM
GTN 725	010-00819-00	010-00819-50	011-02281-00	BLK	
GTN 750	010-00820-00	010-00820-50	011-02282-00	BLK	10W [1]
	010-00890-00	010-00890-50	011-02282-50	GRY	

[1] Unit is available with COM and is calibrated for both 10W and 16W COM; 16W COM is a software enablement feature using an enablement card.

Table 3-2. Standard Kit Accessories

Model	Item	Part Number
GTN 725	Mounting Rack	115-01294-00
	Connector Kit	011-02326-00
	Back Plate Assembly	011-02246-00
	Product Information Kit	K00-00488-00
GTN 750	Mounting Rack	115-01294-00
	Connector Kit	011-02326-02
	Back Plate Assembly	011-02246-02
	Product Information Kit	K00-00488-00

3.2 Optional Accessories

3.2.1 GPS Antenna Options

For details regarding antenna selection, refer to Section 1.3.8. Once the antenna type is decided upon, refer to the information below for detailed parts information for antennas available directly from Garmin. Contact manufacturer directly for information on other antennas.

GA 35 Antenna:

GA 35 Antenna Garmin P/N 013-00235-00 contains the following items:

ITEM	PART NUMBER	QTY
GA 35 GPS/WAAS Antenna [1]	013-00235-00 (Garmin) AT575-93G (Aero Antenna)	1

[1] Antenna includes 8-32 UNC-2A x 1.00" SS 303 mounting screws (qty 4) and O-ring (qty 1).

An antenna doubler may also be required. Refer to the appropriate antenna installation data.

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.

GA 36 Antenna:

GA 36 Antenna Garmin P/N 013-00244-00 contains the following items:

ITEM	PART NUMBER	QTY
GA 36 GPS/WAAS Antenna [1]	013-00244-00 (Garmin) AT575-126G (Aero Antenna)	1

[1] Antenna includes 8-32 UNC-2A x 1.00" SS 303 mounting screws (qty 4) and O-ring (qty 1).

An antenna doubler may also be required. Refer to the appropriate antenna installation data.

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.

GA 37 Antenna:

GA 37 Antenna Garmin P/N 013-00245-00 contains the following items:

ITEM	PART NUMBER	QTY
GA 37 GPS/WAAS + XM Antenna [1]	013-00245-00 (Garmin) AT2300-126G (Aero Antenna)	1

[1] Antenna includes 8-32 UNC-2A x 1.00" SS 303 mounting screws (qty 4) and O-ring (qty 1).

An antenna doubler may also be required. Refer to the appropriate antenna installation data.

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.

A33W Antenna:

ITEM	PART NUMBER	QTY
A33W, WAAS [1]	013-00261-00 (Garmin)	1

[1] Antenna includes 6-32 UNC-2A x 1.00" SS 303 mounting screws (qty 4) and O-ring (qty 1).

An antenna doubler may also be required. To secure the antenna, #6 washers (qty 4) and #6 (qty 4) self-locking nuts are required in addition to the antenna, or suitable nutplates may be installed on the doubler that is used.

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

3.3 Database Options

ITEM	GARMIN P/N
Data Card, World Wide (Aviation Database)	010-10546-00
Data Card, Americas (Aviation Database)	010-10546-01
Data Card, International (Aviation Database)	010-10546-02
Data Card, TAWS/Terrain (128 MB) (Note 1)	010-xxxxx-xx
Data Card, TAWS/Terrain (256 MB) (Note 1)	010-xxxxx-xx

Note 1: Data cards 010-xxxxx-xx and 010-xxxxx-xx are functionally equivalent.

3.4 Miscellaneous Options

ITEM	GARMIN P/N
Connector, BNC, Male, Clamp	330-00087-00
GPS 1.57542 GHz Notch Filter	330-00067-00

3.5 Optional Reference Material

ITEM	GARMIN P/N
GTN 725/750 Pilot's Guide	190-01007-03
GTN 725/750 Cockpit Reference Guide	190-01007-04
GTN 725/750 Training CD	TBD

3.6 Installation Materials Required but Not Provided

3.6.1 Optional Accessories Not Supplied

The following installation accessories are required but not provided.

ITEM	REQUIREMENTS
COM Antenna	Shall meet TSO C37( ) and C38( ). Broad band, 50Ω, vertically polarized with coaxial cable
VOR/LOC Antenna	Shall meet TSO C40( ) and C36( ). Broad band, 50Ω, horizontally polarized with coaxial cable
Glideslope Antenna	Shall meet TSO C34( ). Broad band, 50Ω, 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

3.6.2 Materials Required But Not Supplied (New Installations Only)

The GTN is intended for use with the standard aviation accessories. The following items are required for installation, but not supplied:

- Wire (MIL-W-22759/16 or equivalent)
- Shielded Wire (MIL-C-27500 or equivalent)
- Mounting Screws (8 minimum – AN577 6-32 screw with 100° countersink)
- Circuit Breakers
- Tie Wraps or Lacing Cord
- Ring Terminals (for grounding)
- Coaxial Cable (RG-400, RG-142B or equivalent – Refer to Section 3.10 for additional information).

3.7 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.

Table 3-3. Recommended Crimp Tools (or Equivalent)

Manufacturer	Hand Crimping Tool	22 – 28 AWG (P1001 – P1005)	
		Positioner	Insertion/ Extraction Tool
Military P/N	M22520/2-01	M22520/2-09	M81969/14-01 M81969/1-04
Positronic	9507	9502-3	M81969/1-04
ITT Cannon	995-0001-584	995-0001-739	N/A
AMP	601966-1	601966-6	91067-1
Daniels	AFM8	K42	N/A
Astro	615717	615725	N/A

NOTE

Insertion/extraction tools from ITT Cannon are all plastic; others are plastic with metal tip.

3.8 Cable Installation

Follow the steps below for installation of the coax cables:

1. Route the coaxial cable to the rack location keeping in mind the recommendations of Section 2.6. Secure the cable in accordance with good aviation practice.
2. Trim the coaxial cable to the desired length and install the BNC connector (330-00087-00) per the cabling instructions on Figure 3-1.. If the connector is provided by the installer, follow the connector manufacturer's instructions for cable preparation.

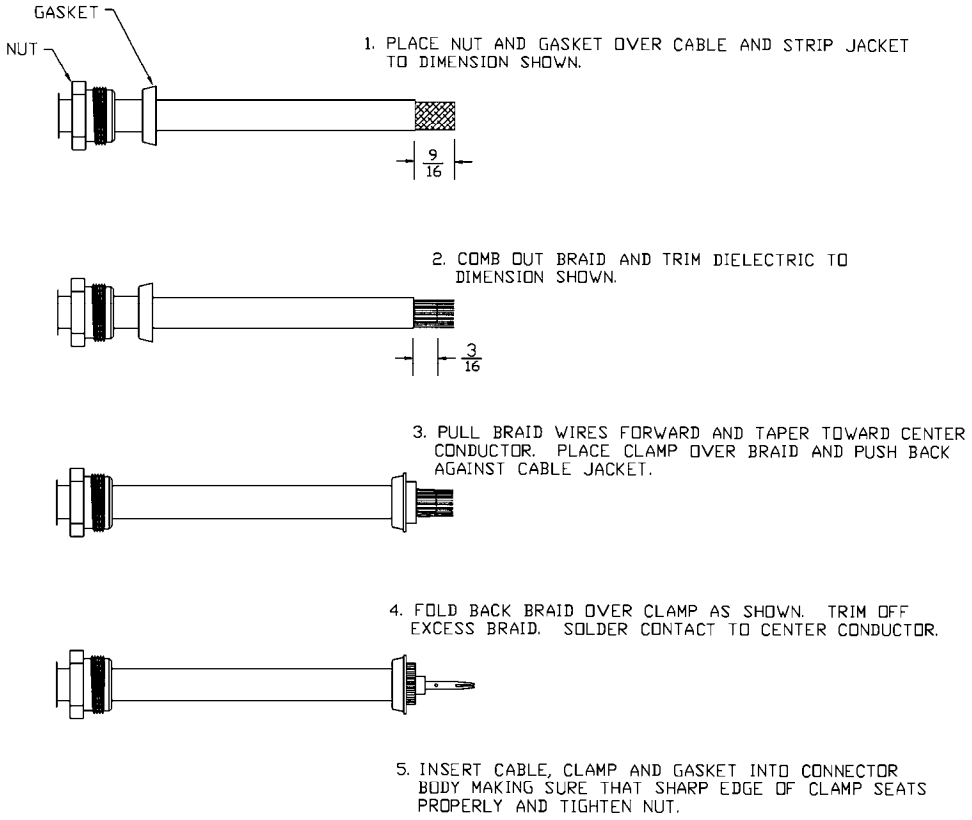

Figure 3-1. Coaxial Cable Installation

The card-edge connector may be used to terminate shield grounds to the GTN unit back plate.

Feed wires through the connector backshells before insertion into the 25-, 44-, and 78-pin connectors. Contacts for the 25-, 44-, and 78-pin connectors must be crimped onto the individual wires of the aircraft wiring harness. The following table lists contact part numbers (for reference). See Table 3-3 for recommended crimp tools.

Table 3-4. Socket Contact Part Numbers

Wire Gauge	Configuration Module 78-pin Connector (P1001)	P1001-P1005
	28 AWG [1]	22-28 AWG [2]
Garmin P/N	336-00021-00	336-00021-00
Military P/N	N/A	M39029/58-360
AMP	N/A	204370-2
Positronic	N/A	MC8522D
ITT Cannon	N/A	010-2042-000

Notes:

[1] For configuration module pins, ensure that the crimp tool is set to crimp 28 AWG wire (indenter setting of '4').

[2] Contacts listed are not to be used for configuration module wiring. Use the contacts supplied with the configuration module when installing configuration module wires in P1001.

3.9 Equipment Mounting

3.9.1 Rack Installation

Use the dimensions shown in TBD to prepare the mounting holes for the GTN unit. You may also use the GTN unit mounting rack itself as a template for drilling the mounting holes.

1. The back plate 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 back plate away from the tray, and then slide the back plate to the side.
2. TBD 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 TBD). The lower-front lip of the rack should be flush with, or extend slightly beyond, the finished aircraft 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.

Make sure that no screw heads or other obstructions prevent the unit from fully engaging in the rack (see the "Connector Engagement Test," Section 5.3). Exercise caution when installing the rack into the instrument panel. The rack is designed to facilitate removal of the GTN unit for use in Demo Mode outside the aircraft. Deformation of the rack may make it difficult to install and remove the GTN unit.

3. 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.
4. If the back plate was previously removed (see Step 1), replace the back plate by positioning the tabs on the back plate 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.

3.9.2 GTN Unit Insertion and Removal

It may be necessary to insert the hex drive tool into the access hole and rotate the mechanism 90° counterclockwise to insure correct position prior to placing the unit in the rack. The GTN unit 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.

3.9.3 Unit Replacement

Whenever the GTN unit is removed or reinstalled, verify that the unit power-up self-test sequence is successfully completed and no failure messages are annunciated. Section TBD outlines the power-up self-test sequence.

3.10 Antenna Installation and Connections

3.10.1 GPS Antenna

This section provides information on the antenna cable installation. Refer to 0 herein for 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.

SUGGESTION*:* Temporarily locate the GPS antenna with coax connected to the GTN unit and check the GPS performance as described in Section TBD and Section TBD. Once a suitable location has been verified, then permanently mount the antenna.

Once the antenna mounting position has been prepared, route the coax cable from the antenna to the GTN unit. Proper selection of coax cable and assembly of connectors is critical to GPS signal performance. **The cable loss from the GPS antenna shall be between 1.5 dB and 6.5 dB in order to maintain proper rejection to interference signals.**

The coaxial connectors and adapters, such as TNC to BNC, add additional loss to the cable and should be considered when computing the 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

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 coax.

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 to 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, then 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 coax 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 coax at the ELT unit. If the ELT is found to cause the problem, then contact the ELT manufacturer or replace the ELT.

3.10.2 COM Antenna

The GTN unit requires a standard 50Ω vertically polarized antenna. Follow the antenna manufacturer's installation instructions for mounting the antenna.

The antenna should be mounted on a metal surface or a ground plane with a minimum area of 18 inches x 18 inches. Refer to Section 2.4.2 for installation location considerations.

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

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 should be inserted as close to the transceiver as possible. When rack and harness buildup is performed in the shop, the coax 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.

3.10.3 NAV Antenna

The NAV antenna is a standard 50Ω horizontally polarized NAV/VOR/Localizer/Glideslope antenna (the glideslope may be a separate antenna in some aircraft) that receives VOR frequencies between 108 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. It is recommended that the installer use RG-142B, RG-400 or equivalent 50Ω coax for the NAV antenna(s).

The GTN has a single VOR/LOC/Glideslope input requiring some installations to use a standard external diplexer or triplexer. See Section TBD.

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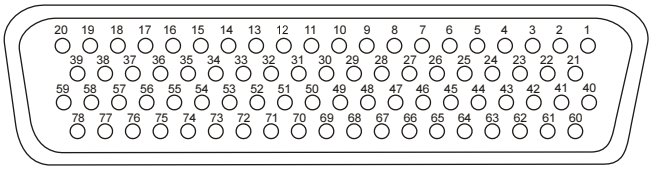
4. SYSTEM INTERCONNECTS

4.1 Pin Function List

4.1.1 P1001 Main Connector – Main Board

(View looking at rear of unit, Pin 1 is top right)

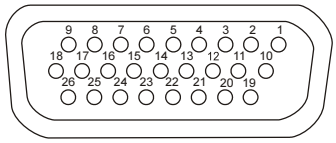


Pin	Pin Name	I/O
1	MAIN OBS ROTOR H (GND)	--
2	MAIN OBS ROTOR C	Out
3	TIME MARK OUT A	Out
4	AUDIO OUT HI	Out
5	RS-232 OUT 4	Out
6	RS-232 OUT 3	Out
7	RS-232 OUT 2	Out
8	RS-232 OUT 1	Out
9	ARINC 429 OUT 2A	Out
10	ARINC 429 OUT 1A	Out
11	MAIN +TO OUT	Out
12	MAIN VERTICAL +UP OUT	Out
13	MAIN LATERAL SUPERFLAG OUT	Out
14	OBS ANNUNCIATE*	Out
15	GPS ANNUNCIATE*	Out
16	OBS 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*	--
39	CDI SOURCE SELECT*	In
40	MAIN OBS STATOR E (GND)	--
41	MAIN OBS STATOR F	In

P1001 Connector Cont'd		
Pin	**Pin Name**	**I/O**
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	TERRAIN WARNING ANNUNCIATE*	Out
72	TERRAIN NOT AVAILABLE ANNUNCIATE*	Out
73	TERRAIN CAUTION ANNUNCIATE*	Out
74	GPS SELECT*	Out
75	TRAFFIC TEST*	Out
76	TRAFFIC STANDBY*	Out
77	AIRCRAFT GND	--
78	AIRCRAFT GND	--

4.1.2 P1002 Connector

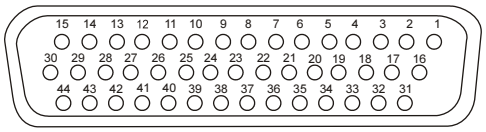
(View looking at rear of unit, Pin 1 is top right)



Pin	Pin Name	I/O
1	DEMO MODE SELECT*	In
2	RESERVED	In
3	SPARE DISC OUT A*	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	SPARE DISC IN D*	In
12	SPARE DISC OUT B*	Out
13	ETHERNET IN 4A	In
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

4.1.3 P1003 COM Connector

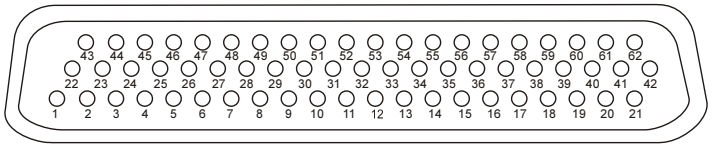
(View looking at rear of unit, Pin 1 is top right)



Pin	Pin Name	I/O
1	RESERVED	Out
2	RESERVED	In
3	AUX AUDIO LINE LEVEL HI *(function not currently implemented)*	In
4	AUX AUDIO SIGNAL LEVEL HI *(function not currently implemented)*	In
5	COM MIC 1 AUDIO IN HI	In
6	COM MIC 2 AUDIO IN HI *(function not currently implemented)*	In
7	500 Ω COM AUDIO HI	Out
8	RESERVED	In
9	RESERVED	In
10	RESERVED	In
11	COM MIC 1 KEY*	In
12	INTERCOM ENABLE* *(function not currently implemented)*	In
13	SPEAKER OUT *(function not currently implemented)*	Out
14	RESERVED	In
15	RESERVED	Out
16	RESERVED	In
17	RESERVED	In
18	500 Ω COM AUDIO LO	--
19	AUX AUDIO LINE LEVEL GND *(function not currently implemented)*	--
20	MIC AUDIO IN LO	In
21	AUX AUDIO SIGNAL LEVEL GND *(function not currently implemented)*	--
22	RESERVED	In
23	RESERVED	Out
24	RESERVED	Out
25	RESERVED	Out
26	COM MIC 2 KEY* *(function not currently implemented)*	In
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	In
33	RESERVED	Out
34	RESERVED	--
35	RESERVED	Out
36	RESERVED	--
37	AIRCRAFT GND	--
38	AIRCRAFT GND	--
39	SPEAKER GND *(function not currently implemented)*	--
40	AIRCRAFT GND	--
41	RESERVED	In
42	RESERVED	In
43	AIRCRAFT POWER	In
44	AIRCRAFT POWER	In

4.1.4 P1004 NAV Connector

(View looking at rear of unit, Pin 1 is on bottom left)



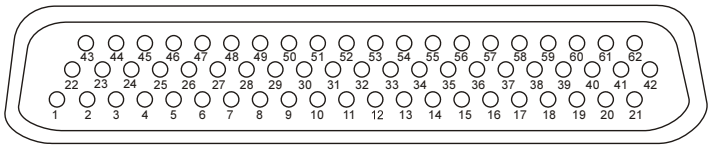
Pin	Pin Name	I/O
1	VOR/LOC +TO	Out
2	VOR/LOC +FROM	Out
3	VOR/LOC +FLAG	Out
4	VOR/LOC -FLAG	Out
5	VOR/LOC +LEFT	Out
6	VOR/LOC +RIGHT	Out
7	RESERVED	Out
8	VOR/LOC COMPOSITE OUT	Out
9	VOR OBS ROTOR C	Out
10	VOR OBS ROTOR H (GND)	Out
11	VOR OBS STATOR E (GND)	Out
12	VOR OBS STATOR F	In
13	VOR OBS STATOR D	In
14	VOR OBS STATOR G (GND)	Out
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
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

P1004 Connector Cont'd		
Pin	**Pin Name**	**I/O**
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	--

4.2 I/O Board

4.2.1 P1005 Connector

(View looking at rear of unit, Pin 1 is on bottom left)



Pin	Pin Name	I/O
1	VIDEO INPUT 2 *(function not currently implemented)*	In
2	VIDEO INPUT 1 *(function not currently implemented)*	In
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	RS-485 2A/422 OUT 1 *(function not currently implemented)*	Out
11	RS-485 2B/422 OUT 2 *(function not currently implemented)*	Out
12	RESERVED	--
13	WX RADAR ON* *(function not currently implemented)*	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 *(function not currently implemented)*	In
19	ARINC 453/708 TERM 1B *(function not currently implemented)*	In
20	ARINC 453/708 IN 2A *(function not currently implemented)*	In
21	ARINC 453/708 TERM 2B *(function not currently implemented)*	In
22	VIDEO INPUT 2 GND *(function not currently implemented)*	In
23	VIDEO INPUT 1 GND *(function not currently implemented)*	In
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	RS-485 1A/422 IN 1 *(function not currently implemented)*	In
32	RS-485 1B/422 IN 2 *(function not currently implemented)*	In
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 *(function not currently implemented)*	In
41	RESERVED	--
42	ARINC 453/708 TERM 2A *(function not currently implemented)*	In
43	RESERVED	--
44	RESERVED	--

P1005 Connector Cont'd		
Pin	**Pin Name**	**I/O**
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	In
54	SYNCHRO VALID INPUT (ACTIVE HI)	--
55	RESERVED	--
56	SYNCHRO Z	In
57	RESERVED	--
58	RESERVED	--
59	RESERVED	--
60	ARINC 453/708 IN 1B *(function not currently implemented)*	In
61	RESERVED	--
62	ARINC 453/708 IN 2B *(function not currently implemented)*	In

4.3 Power, Lighting, And Antennas

This section covers the power input requirements, lighting bus input, and antenna connections. See Figure TBD for interconnect information.

4.3.1 Power

Pin Name	Connector	Pin	I/O
AIRCRAFT POWER (MAIN)	P1001	19	In
AIRCRAFT POWER (MAIN)	P1001	20	In
AIRCRAFT POWER (COM)	P1003	30	In
AIRCRAFT POWER (COM)	P1003	43	In
AIRCRAFT POWER (COM)	P1003	44	In
AIRCRAFT POWER (NAV)	P1004	51	In
AIRCRAFT POWER (NAV)	P1004	52	In
AIRCRAFT GROUND (MAIN)	P1001	77	--
AIRCRAFT GROUND (MAIN)	P1001	78	--
AIRCRAFT GROUND (COM)	P1003	37	--
AIRCRAFT GROUND (COM)	P1003	38	--
AIRCRAFT GROUND (COM)	P1003	40	--
AIRCRAFT GROUND (NAV)	P1004	61	--
AIRCRAFT GROUND (NAV)	P1004	62	--

The power inputs P1001-19 and P1001-20 provide power for everything except for the COM radio and NAV radio. Both pins must be connected.

The power inputs P1003-30, P1003-43, and P1003-44 provide power for the COM radio. All three pins must be connected.

The power inputs P1004-51 and P1004-52 provide power for the NAV radio. Both pins must be connected.

4.3.2 Lighting Bus

Pin Name	Connector	Pin	I/O
LIGHTING BUS 1 HI	P1001	18	In
LIGHTING BUS 1 LO	P1001	17	In
LIGHTING BUS 2 HI	P1001	42	In
LIGHTING BUS 2 LO	P1001	61	In

The GTN can be configured to track 28 VDC, 14 VDC, 5 VDC or 5 VAC lighting buses using these inputs. Two lighting buses allow for independent control of display and bezel lighting. Alternatively, the GTN can automatically adjust for ambient lighting conditions based on the photocell. Refer to Section TBD for instructions on configuring the lighting inputs.

4.3.3 Antennas

Pin Name	Connector	I/O
GPS/WAAS ANTENNA	P1006	In
COM ANTENNA	P1007	I/O
NAV ANTENNA	P1008	In

The GPS/WAAS, COM, and NAV antennas use BNC coaxial connectors on the connector backplate. Reference Figure TBD for splitter/diplexer block diagrams.

4.3.4 Serial Data

4.3.4.1 Serial Data Function

4.3.4.1.1 RS-232

The GTN is capable of interfacing with other aviation instruments by transmitting RS-232 Type 1 (often known as ARNAV format) and Type 2 (often known as Northstar format) data on any RS-232 OUT port. The data consists of the following (refer to Section B.1 for a detailed data format description):

- Current latitude, longitude, and GPS altitude in feet (see Note below)
- Current velocity vector (ground speed and direction of velocity vector over the ground)
- Distance to waypoint
- Cross track error
- Desired track
- Destination waypoint identifier
- Bearing to destination waypoint
- Magnetic variation
- Navigation and warning status
- Waypoint sequence in route
- Waypoint position (latitude and longitude) and magnetic variation

NOTE

Aviation RS-232 data may be transmitted with or without the current GPS altitude in feet. Refer to Appendix B.

The GTN can receive pressure altitude, air data, and fuel data from certain systems on any RS-232 IN port.

If a GTN is installed with a 400W or 500W Series in an aircraft, any of the RS-232 ports on the GTN may be cross-connected to RS-232 Port 3 on the GTN to manually transfer user-defined waypoints between the two units.

4.3.4.1.2 ARINC 429

The data output on the ARINC 429 OUT ports depends on the configuration (see Section TBD). Below is a list of the configurations and the labels output for each one:

- ARINC 429
- GAMA 429
- GAMA 429 Graphics
- GAMA 429 Graphics w/Int
- GAMA 429 Pro Line 21
- GAMA 429 Sextant
- GAMA 429 Bendix King

Label #	Parameter Name	1	2	3	4	5	6	7
001	Distance to Go (BCD)	●	●	●	●	●	●	●
002	Time to Go (BCD)	●	●	●	●	●	●	●
012	Ground Speed (BCD)	●	●	●	●	●	●	●
074G	Data Record Header		●	●	●	●	●	●
075G	Active Wpt From/To Data		●	●	●	●	●	●
100	Selected Course 1	●						
100P	Selected Course 1		●	●	●	●	●	●
113G	Message Checksum		●	●	●	●	●	●
114	Desired Track (True)	●	●	●	●	●	●	●
115	Waypoint Bearing (True)	●	●	●	●	●	●	●
116	Cross Track Distance	●						
116G [1]	Cross Track Distance		●	●	●	●	●	●
117G	Vertical Deviation		●	●	●	●	●	
117P	Vertical Deviation							●
121	Horizontal Command (to Autopilot)	●	●	●	●	●	●	●
125	Greenwich Mean Time (BCD)	●	●	●	●	●	●	●
147G	Magnetic Variation		●	●	●	●	●	●
251	Distance to Go	●						
251G	Distance to Go		●	●	●	●	●	●
252	Time to Go	●	●	●	●	●	●	●
260G	Date (BCD)		●	●	●	●	●	●
261G	GPS Discrete Word 1		●	●	●	●	●	●
275G	LRN Status Word		●	●	●	●	●	●
300G	Station Declination, Type, and Class		●	●	●	●	●	●
303	Message Length/Type/Number		●	●	●	●	●	●
304G	Message Characters 1-3		●	●	●	●	●	●
305G	Message Characters 4-6		●	●	●	●	●	●
306G	NAV/Waypoint/Airport Latitude		●	●	●	●	●	●
307G	NAV/Waypoint/Airport Longitude		●	●	●	●	●	●
310	Present Position Latitude	●	●	●	●	●	●	●
311	Present Position Longitude	●	●	●	●	●	●	●
312	Ground Speed	●	●	●	●	●	●	●
313	Track Angle (True)	●	●	●	●	●	●	●
314	True Heading	●	●	●	●	●	●	●
315	Wind Speed	●	●	●	●	●	●	●
316	Wind Angle (True)	●	●	●	●	●	●	●
320	Magnetic Heading	●	●	●	●	●	●	●

Label #	Parameter Name	1	2	3	4	5	6	7
321	Drift Angle	●	●	●	●	●	●	●
326G [1]	Lateral Scale Factor		●	●	●	●	●	●
327G	Vertical Scale Factor		●	●	●	●	●	
330	Conic Arc Inbound Course			●	●			
331	Conic Arc Radius			●	●			
332	Conic Arc Course Change Angle			●	●			
333	Airport Runway Azimuth			●	●			
334	Airport Runway Length in Feet			●	●			
335	Left/Right Hand Holding Pattern Azimuth			●	●			
340	Left/Right Hand Procedure Turn Azimuth			●	●			
351G	Distance to Destination (Via Flight Plan)		●	●	●	●	●	●
352G	Estimated Time to Destination (Via Flight Plan)		●	●	●	●	●	●
371G	Specific Equipment ID		●	●	●	●	●	●
377	Equipment Hex ID Code	●	●	●	●	●	●	●

[1] Label 116G and 326G utilize the optional resolution extension bits (bits 11-13).

The following labels are output on the VOR/ILS ARINC 429 OUT port:

Label #	Parameter Name
034G	VOR/ILS Frequency (BCD)
035G	DME Frequency (BCD)
100G	Selected Course #1
173	Localizer Deviation
174	Glideslope Deviation
222	VOR Omnibearing
371G	Specific Equipment ID
377	Equipment Hex ID Code

The labels recognized on the ARINC 429 IN ports depend on the configuration (see Section TBD).

4.3.4.1.3 ARINC 453/708

The GTN can receive ARINC 453/708 weather radar data from specific weather radars. For more information, refer to Section TBD.

4.3.4.2 Serial Data Electrical Characteristics

4.3.4.2.1 RS-232

Pin Name	Connector	Pin	I/O
RS-232 OUT 1	P1001	8	Out
RS-232 IN 1	P1001	27	In
RS-232 GND 1	P1001	46	--
RS-232 OUT 2	P1001	7	Out
RS-232 IN 2	P1001	26	In
RS-232 GND 2	P1001	45	--
RS-232 OUT 3	P1001	6	Out
RS-232 IN 3	P1001	25	In
RS-232 GND 3	P1001	44	--
RS-232 OUT 4	P1001	5	Out
RS-232 IN 4	P1001	24	In
RS-232 GND 4	P1001	43	--
RS-232 OUT 5	P1005	8	Out
RS-232 IN 5	P1005	29	In
RS-232 GND 5	P1005	49	--
RS-232 OUT 6	P1005	9	Out
RS-232 IN 6	P1005	30	In
RS-232 GND 6	P1005	50	--

The RS-232 outputs are compatible with EIA Standard RS-232C with an output voltage swing of at least ±5 V when driving a standard RS-232 load.

4.3.4.2.2 ARINC 429

Pin Name	Connector	Pin	I/O
ARINC 429 OUT 1A	P1001	10	Out
ARINC 429 OUT 1B	P1001	29	Out
ARINC 429 OUT 2A	P1001	9	Out
ARINC 429 OUT 2B	P1001	28	Out
ARINC 429 IN 1A	P1001	48	In
ARINC 429 IN 1B	P1001	67	In
ARINC 429 IN 2A	P1001	47	In
ARINC 429 IN 2B	P1001	66	In
VOR/ILS ARINC 429 OUT A	P1004	24	Out
VOR/ILS ARINC 429 OUT B	P1004	23	Out
VOR/ILS ARINC 429 IN A	P1004	36	In
VOR/ILS ARINC 429 IN B	P1004	35	In
ARINC 429 OUT 3A	P1005	28	Out
ARINC 429 OUT 3B	P1005	7	Out
ARINC 429 IN 3A	P1005	37	In
ARINC 429 IN 3B	P1005	16	In
ARINC 429 IN 4A	P1005	38	In
ARINC 429 IN 4B	P1005	17	In

The ARINC 429 outputs conform to ARINC 429 electrical specifications when loaded with up to five standard ARINC 429 receivers.

4.3.4.2.3 RS-422

The RS-422 port is provisional; no RS-422 interfaces are currently supported.

Pin Name	Connector	Pin	I/O
RS-422 IN A	P1002	19	In
RS-422 IN B	P1002	20	In
RS-422 OUT A	P1002	21	Out
RS-422 OUT B	P1002	22	Out

The RS-422 ports are compatible with EIA Standard RS-422 with a differential output voltage swing of at least ±1.5V when driving a standard RS-422 load.

4.3.4.2.4 RS-422/RS-485

The RS-422/RS-485 ports are provisional; no RS-422 or RS-485 interfaces are currently supported.

Pin Name	Connector	Pin	I/O
RS-485 1A/422 IN 1	P1005	31	I/O
RS-485 1B/422 IN 2	P1005	32	I/O
RS-485 2A/422 OUT 1	P1005	10	I/O
RS-485 2B/422 OUT 2	P1005	11	I/O

The RS-422/485 ports are compatible with EIA Standard RS-485 (RS-422 when configured as RS-422) with a differential output voltage swing of at least ±1.5V when driving a standard RS-422/485 load.

4.3.4.2.5 ARINC 453/708

Pin Name	Connector	Pin	I/O
ARINC 453/708 IN 1A	P1005	18	In
ARINC 453/708 IN 1B	P1005	60	In
ARINC 453/708 TERM 1A	P1005	40	--
ARINC 453/708 TERM 1B	P1005	19	--
ARINC 453/708 IN 2A	P1005	20	In
ARINC 453/708 IN 2B	P1005	62	In
ARINC 453/708 TERM 2A	P1005	42	--
ARINC 453/708 TERM 2B	P1005	21	--

The ARINC 453/708 port 1 is compatible with specific weather radar units. If the GTN is the only receiver or if it is the last receiver in a chain of receivers, a jumper should be installed between P1005-40 and P1005-19 for port 1. This jumper adds resistance of approximately 75Ω between P1005-18 and P1005-60.

4.3.5 Ethernet (HSDB)

Pin Name	Connector	Pin	I/O
ETHERNET OUT 1 A	P1002	8	Out
ETHERNET OUT 1 B	P1002	9	Out
ETHERNET IN 1 A	P1002	6	In
ETHERNET IN 1 B	P1002	7	In
ETHERNET OUT 2 A	P1002	17	Out
ETHERNET OUT 2 B	P1002	18	Out
ETHERNET IN 2 A	P1002	15	In
ETHERNET IN 2 B	P1002	16	In
ETHERNET OUT 3 A	P1002	25	Out
ETHERNET OUT 3 B	P1002	26	Out
ETHERNET IN 3 A	P1002	23	In
ETHERNET IN 3 B	P1002	24	In
ETHERNET OUT 4 A	P1002	4	Out
ETHERNET OUT 4 B	P1002	5	Out
ETHERNET IN 4 A	P1002	13	In
ETHERNET IN 4 B	P1002	14	In

The Ethernet-based HSDB (High Speed Data Bus) meets the hardware aspects of IEEE standard 802.3 for 10 base T Ethernet communications.

4.3.6 Main Audio Output

The main audio output is used to play the 'clicks' associated with the touch screen, as well as TAWS alerts on GTN units that are equipped with TAWS.

Pin Name	Connector	Pin	I/O
AUDIO OUT HI	P1001	4	Out
AUDIO OUT LO	P1001	23	Out

The audio output will be 80 mW across a 500Ω load.

4.3.7 Main Indicator

4.3.7.1 Main Indicator Function

The Main Indicator displays both lateral and vertical deviation from selected course, To/From indications, lateral and vertical flags and superflags.

The "CDI" button on the screen of the GTN takes the place of remote "NAV/GPS" switches, and is used to toggle between display of GPS and VOR/ILS navigation on a remote indicator. The navigation source is annunciated on the display below the 'CDI' button. The navigation method is optionally annunciated externally by connecting to the VLOC ANNUNCIATE output (P1001-52) and GPS ANNUNCIATE output (P1001-15). GPS and VOR/ILS navigation may be toggled externally when the CDI SOURCE SELECT input (P1001-39) is momentarily grounded. See Section TBD and TBD for more information on the discrete inputs and outputs.

An OBS resolver connection to the GPS is preferred, but not required. For the GTN 650 and GTN 750, an OBS resolver typically is connected to the MAIN OBS inputs for use with the VOR receiver.

4.3.7.2 Main Indicator Electrical Characteristics

4.3.7.2.1 Deviation

Pin Name	Connector	Pin	I/O
MAIN LATERAL +LEFT OUT	P1001	49	Out
MAIN LATERAL +RIGHT OUT	P1001	68	Out
MAIN VERTICAL +UP OUT	P1001	12	Out
MAIN VERTICAL +DOWN OUT	P1001	31	Out

The deviation output is capable of driving up to three 1000Ω meter loads with ±150 mVDC ±10% for full-scale deflection. The drive circuit provides for more than full-scale deflection with a maximum course deviation output voltage of ±300 mVDC ±10%.

4.3.7.2.2 TO/FROM

Pin Name	Connector	Pin	I/O
MAIN +TO OUT	P1001	11	Out
MAIN +FROM OUT	P1001	30	Out

The output is capable of driving up to three 200Ω meter loads. When indicating TO, MAIN +TO OUT is +225 ±75 mV DC with respect to MAIN +FROM OUT. When indicating FROM, MAIN +TO OUT is -225 ±75 mV DC with respect to MAIN +FROM OUT. When invalid information is present (Flag IN VIEW) the TO/FROM output is 0 ±20 mV DC.

4.3.7.2.3 Flags

Pin Name	Connector	Pin	I/O
MAIN LATERAL +FLAG OUT	P1001	50	Out
MAIN LATERAL -FLAG OUT	P1001	69	Out
MAIN VERTICAL +FLAG OUT	P1001	51	Out
MAIN VERTICAL -FLAG OUT	P1001	70	Out

The Flag outputs are capable of driving up to three 1000Ω meter loads. When valid information is present (Flag OUT OF VIEW) the Flag output is 375 ±80 mV DC. When invalid information is present (Flag IN VIEW) the Flag output is 0 ±25 mV DC.

4.3.7.2.4 Superflags

Pin Name	Connector	Pin	I/O
LATERAL SUPERFLAG OUT	P1001	13	Out
MAIN VERTICAL SUPERFLAG OUT	P1001	32	Out

The output supplies not less than 400 mA with the output voltage not less than (AIRCRAFT POWER – 2.0 VDC) when the flag is to be OUT OF VIEW. The output is electrically open when the flag is to be IN VIEW.

4.3.8 OBS

Pin Name	Connector	Pin	I/O
MAIN OBS ROTOR C	P1001	2	Out
MAIN OBS ROTOR H (GND)	P1001	1	--
MAIN OBS STATOR D	P1001	21	In
MAIN OBS STATOR E (GND)	P1001	40	--
MAIN OBS STATOR F	P1001	41	In
MAIN OBS STATOR G (GND)	P1001	60	--

MAIN OBS ROTOR C and H (GND) are a buffered output that is intended to drive the OBS rotors. MAIN OBS STATOR D and MAIN OBS STATOR F are each phase and amplitude shifted version of the MAIN ROTOR C output. Each pair is intended to read one of the two windings of the indicator's OBS stator.

4.3.9 Discrete Inputs

Pin Name	Connector	Pin	I/O
OBS MODE SELECT*	P1001	16	In
AUDIO INHIBIT IN*	P1001	36	In
TAWS INHIBIT IN*	P1001	37	In
AIR/GROUND*	P1001	38	In
CDI SOURCE SELECT*	P1001	39	In
DEMO MODE SELECT*	P1002	1	In
SYSTEM ID PROGRAM*	P1002	10	In
SPARE DISC IN D*	P1002	11	In
RESERVED	P1005	12	In
SYNCHRO VALID INPUT (ACTIVE LO)	P1005	33	In

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

Active-low discrete inputs are considered active if either the voltage to ground is ≤3.5 VDC or the resistance to ground is ≤375Ω. These inputs are considered inactive if the voltage to ground is 6.5-33 VDC or the resistance to ground is >100 kΩ.

Active-high discrete inputs are considered active if either the voltage to ground is >6.5 VDC. These inputs are considered inactive if the voltage to ground is ≤3.5 VDC or the resistance to ground is ≤375Ω.

4.3.9.1 OBS MODE SELECT*

The OBS MODE SELECT discrete input may be used to toggle between GPS OBS and GPS AUTO modes of operation. A momentary low on this pin performs the same function as pressing the 'OBS' button on the GTN display.

4.3.9.2 AUDIO INHIBIT IN*

The AUDIO INHIBIT IN discrete input may be used to suppress TAWS and touch screen feedback audio from the GTN.

4.3.9.3 TAWS INHIBIT IN*

The TAWS INHIBIT IN discrete input, when toggled momentarily low, may be used to inhibit TAWS alerts from the GTN.

4.3.9.4 AIR/GROUND*

The AIR/GROUND discrete input may be used to control the air/ground status of the GTN.

4.3.9.5 CDI SOURCE SELECT* (GTN 750 only)

The CDI SOURCE SELECT discrete input may be used to toggle between display of GPS and VOR/LOC/Glideslope information on the MAIN external CDI/HSI. A momentary low on this pin performs the same function as pressing the 'CDI' button on the GTN display.

4.3.9.6 DEMO MODE SELECT*

The DEMO MODE SELECT discrete input may be used to select Demo Mode on the GTN. When this pin is connected to ground during power up, the GTN starts up in Demo Mode. Demo Mode allows the GTN to simulate reception of GPS satellite signals.

CAUTION

Do not connect DEMO MODE SELECT in an aircraft installation.

NOTE

Demo Mode can also be accessed by holding down the D→ button during power-up.

4.3.9.7 SYSTEM ID PROGRAM*

The System ID PROGRAM discrete input is used to identify the #2 unit in an installation with more than one GTN. This input must be strapped to ground on the second GTN.

SYSTEM ID PROGRAM*	GTN Installation
Open	GTN #1 or single-GTN installation
Ground	GTN #2

4.3.9.8 SYNCHRO VALID INPUT

There are two SYNCHRO VALID INPUTs; one is active-high and the other is active-low. Unless one of the two input is active, the GTN considers the synchro heading input to be invalid.

4.3.10 Discrete Outputs

Pin Name	Connector	Pin	I/O
OBS ANNUNCIATE*	P1001	14	Out
GPS ANNUNCIATE*	P1001	15	Out
WAYPOINT ANNUNCIATE*	P1001	33	Out
TERMINAL ANNUNCIATE*	P1001	34	Out
TAWS AUDIO ACTIVE OUT	P1001	35	Out
VLOC ANNUNCIATE*	P1001	52	Out
LOI ANNUNCIATE*	P1001	53	Out
MESSAGE ANNUNCIATE*	P1001	54	Out
APPROACH ANNUNCIATE*	P1001	55	Out
ILS/GPS APPROACH*	P1001	56	Out
TAWS INHIBIT ANNUNCIATE*	P1001	57	Out
TERRAIN WARNING ANNUNCIATE*	P1001	71	Out
TERRAIN NOT AVAILABLE ANNUNCIATE*	P1001	72	Out
TERRAIN CAUTION ANNUNCIATE*	P1001	73	Out
GPS SELECT* [1]	P1001	74	Out
TRAFFIC TEST*	P1001	75	Out
TRAFFIC STANDBY*	P1001	76	Out
SPARE DISC OUT A*	P1002	3	Out
SPARE DISC OUT B*	P1002	12	Out
WX RADAR ON* (function not currently implemented)	P1005	13	Out
SPARE OUTPUT C*	P1005	34	Out

[1] The operation of the GPS SELECT can be configured.

An asterisk (*) following a signal name denotes that the signal is Active-Low, producing a low (ground) on the output when active.

All discrete outputs from the GTN are Active-Low. Each is an “open drain” output capable of sinking 500 mA when active.

4.3.10.1 OBS ANNUNCIATE*

The OBS ANNUNCIATE output is driven to indicate GPS OBS mode of operation. This output is active when the OBS or SUSP annunciation is on the display.

4.3.10.2 GPS ANNUNCIATE* (GTN 750 Only)

The GPS ANNUNCIATE output is driven when the unit is configured with a single CDI/HSI and the GPS data is being displayed on the CDI/HSI. This output parallels the GPS annunciation on the display.

4.3.10.3 WAYPOINT ANNUNCIATE*

The WAYPOINT ANNUNCIATE output is driven in the following manner:

1. When the aircraft is within 10 seconds of reaching the turning point for a course change, the waypoint annunciator flashes.
2. When the aircraft is in a turn, the waypoint annunciator illuminates and remains illuminated until the turn is completed.
3. When a user arrival alarm is set and the aircraft is within the circle defined by the arrival alarm radius at the arrival waypoint, the waypoint annunciator flashes for 10 seconds.
4. When a user arrival alarm is not set and the aircraft is within 10 seconds of reaching the arrival waypoint, the waypoint annunciator flashes.

4.3.10.4 TERMINAL ANNUNCIATE*

When performing approach navigation, the TERMINAL ANNUNCIATE output is active when operating within 30 nautical miles of the departure or arrival airport and the CDI scale is the equivalent or 1.0 nm or less.

4.3.10.5 TAWS AUDIO ACTIVE OUT*

The TAWS AUDIO ACTIVE OUT is active when the GTN is playing a TAWS alert. This output can be connected to the Audio Inhibit input of other units with audio that is lower priority than TAWS.

4.3.10.6 VLOC ANNUNCIATE* (GTN 750 Only)

The VLOC ANNUNCIATE output is driven when the unit is configured with a single CDI/HSI and the VOR/ILS data is being displayed on the CDI/HSI. This output parallels the VLOC annunciator on the display.

4.3.10.7 LOI ANNUNCIATE*

The LOI ANNUNCIATE output is active when the GPS receiver detects a position error, or is unable to calculate the integrity of the position. On the 400W/500W Series navigators, this output was called 'Integrity Annunciate'.

4.3.10.8 MESSAGE ANNUNCIATE*

When a new status message is available, the MESSAGE ANNUNCIATE output is active and the message annunciator flashes. When status messages remain effective, the message annunciator illuminates continuously.

4.3.10.9 APPROACH ANNUNCIATE*

When performing approach navigation, the APPROACH ANNUNCIATE output is active while an approach is active.

4.3.10.10 ILS/GPS APPROACH*

The ILS/GPS APPROACH output is active when:

- GPS navigation is selected and either a GPS approach mode is active or 0.3 nm is selected for the CDI full scale deflection; or
- VLOC navigation is selected and an ILS channel has been selected.

This output may be connected to the ILS Engage input of an autopilot or flight director to provide higher autopilot gain while the GTN is operating in the ILS or GPS Approach modes of operation.

4.3.10.11 TAWS INHIBIT ANNUNCIATE*

The TAWS INHIBIT ANNUNCIATE is active when TAWS is inhibited on the GTN.

4.3.10.12 TERRAIN WARNING ANNUNCIATE*

The TERRAIN WARNING ANNUNCIATE is active when a TAWS warning is active on the GTN.

4.3.10.13 TERRAIN NOT AVAILABLE ANNUNCIATE*

The TERRAIN NOT AVAILABLE ANNUNCIATE is active when TAWS on the GTN is enabled but not available.

4.3.10.14 TERRAIN CAUTION ANNUNCIATE*

The TERRAIN CAUTION ANNUNCIATE is active when a TAWS caution is active on the GTN.

4.3.10.15 GPS SELECT*

The GPS SELECT discrete output is active when GPS data is being displayed on the CDI/HSI and the ILS/GPS Approach Output is not active. It is intended for use with autopilots having a GPS SELECT input (such as the Bendix/King KAP 140 and KFC 225), so that the autopilot can capture vertical guidance while GPS data is being displayed on the CDI/HSI.

4.3.10.16 TRAFFIC TEST*

The TRAFFIC TEST discrete output is used to command compatible traffic systems into test mode.

4.3.10.17 TRAFFIC STANDBY*

The TRAFFIC STANDBY discrete output is used to command compatible traffic systems into standby or operate mode.

4.3.10.18 WX RADAR ON*

The WX RADAR ON discrete output is used to command an ARINC 453/708 weather radar into ON mode.

4.3.10.19 TIME MARK OUT

Pin Name	Connector	Pin	I/O
TIME MARK OUT A	P1001	3	Out
TIME MARK OUT B	P1001	22	Out

TIME MARK OUT outputs a differential 1 ms ± 1 µs wide pulse once every second. TIME MARK OUT is a logic level output, capable of sourcing 1 mA at greater than 3.8 V and sinking 1 mA at less than 0.4 V.

4.3.11 Heading Synchro

The GTN accepts heading information using either a synchro input or serially, using either RS-232 or ARINC 429 inputs. If synchro heading is provided, refer to the paragraphs below.

4.3.11.1 Heading Synchro

Pin Name	Connector	Pin	I/O
SYNCHRO X	P1005	35	In
SYNCHRO Y	P1005	14	In
SYNCHRO Z	P1005	56	In

Connect these pins to an XYZ type directional gyro.

4.3.11.2 Heading Synchro Reference Voltage

Pin Name	Connector	Pin	I/O
SYNCHRO REF HIGH	P1005	36	In
SYNCHRO REF LO	P1005	15	In

A reference voltage must be provided if the synchro heading input is used. This input should be 26 VAC 400 Hz (nominal) and provided by the same source that provides the excitation voltage to the synchro heading source.

4.3.11.3 Heading Synchro Valid Input

Pin Name	Connector	Pin	I/O
SYNCHRO VALID INPUT (ACTIVE HI)	P1005	12	In
SYNCHRO VALID INPUT*	P1005	33	In

P1005-12 is considered active if the voltage on this input is 6.5-33 VDC. If the voltage is ≤3.5 VDC, the input is considered inactive.

P1005-33 is considered active if either the voltage to ground is <1.9 V or the resistance to ground is <375Ω. This input is considered inactive if the voltage to ground is 11-33 VDC.

Unless P1005-12 or P1005-33 is active, the GTN will consider the synchro heading input to be invalid.

4.3.12 Composite Video (function not currently implemented)

Pin Name	Connector	Pin	I/O
VIDEO INPUT 1	P1005	2	In
VIDEO INPUT 1 GND	P1005	23	In
VIDEO INPUT 2	P1005	1	In
VIDEO INPUT 2 GND	P1005	22	In

The GTN supports the following composite video input formats:

- NTSC "National Television Standards Committee" (J,M,4.43)
- PAL "Phase Alternating Line" (B,D,G,H,I,M,N,Nc,60)
- SECAM "Sequential Color with Memory" (B,D,G,K,K1,L)

Composite video is a one-wire format with intensity, color, and timing information transferred together. Video signals are transferred using a 75Ω coaxial cable. Reference TBD for approved types of coaxial cable.

NOTE

Particular attention must be taken in routing the coaxial cable through the aircraft to avoid potential radiated interference sources in addition to minimizing the cable bend radii. Concerns about interference sources may necessitate the use of coaxial cable with a higher noise rejection rating.

NTSC (M), also called RS-170A, is the most common video format supported by the GTN. NTSC has the following characteristics:

- 59.94 Hz vertical interlaced refresh rate
- 15.75 kHz horizontal line frequency
- 525 scan lines
- 29.97 frame per second update rate
- Luminance or luma (black and white) also called "monochrome NTSC" or RS-170, is the standard black and white format which contains both image and timing information.
- Chrominance or chroma (color) encoding system

4.3.13 COM Audio (GTN 750 only)

4.3.13.1 COM Audio Function

Activation of MIC 1 TRANSMIT enables MIC 1 AUDIO IN HI and causes the transceiver to transmit.

500Ω COM AUDIO is a 100 mW audio output that is intended to drive a headset or an audio panel.

4.3.13.2 COM Audio Electrical Characteristics

4.3.13.2.1 COM Mic Audio

Pin Name	Connector	Pin	I/O
COM MIC 1 AUDIO IN HI	P1003	5	In
COM MIC 2 AUDIO IN HI (function not currently implemented)	P1003	6	In
MIC AUDIO IN LO	P1003	20	In

COM MIC 1 AUDIO IN HI and COM MIC 2 AUDIO IN HI are standard carbon or dynamic mic inputs with integrated preamps providing minimum 70mVrms into a 1000Ω load.

COM MIC 1 AUDIO IN HI and MIC 2 AUDIO IN HI are set in the factory so that 100 mVrms modulates the transmitter to 85% nominally at 1000 Hz. The microphone gain adjustment is made through Configuration Mode

4.3.13.2.2 COM Audio

Pin Name	Connector	Pin	I/O
500Ω COM AUDIO HI	P1003	7	Out
500Ω COM AUDIO LO	P1003	18	Out

500Ω COM AUDIO supplies 100 mW into a 500Ω load. This is a balanced output and the LO output must be connected.

500Ω COM AUDIO is the summation of the COM receiver audio, COM sidetone audio, and intercom audio.

4.3.13.2.3 Aux Audio (function not currently implemented)

Pin Name	Connector	Pin	I/O
AUX AUDIO LINE LEVEL HI	P1003	3	In
AUX AUDIO LINE LEVEL GND	P1003	19	---
AUX AUDIO SIGNAL LEVEL HI	P1003	4	In
AUX AUDIO SIGNAL LEVEL GND	P1003	21	---

The AUX AUDIO inputs can be used to mix external audio into the COM Audio.

4.3.14 COM Discrete Inputs

Pin Name	Connector	Pin	I/O
COM MIC 1 KEY*	P1003	11	In
INTERCOM ENABLE* (function not currently implemented)	P1003	12	In
COM MIC 2 KEY* (function not currently implemented)	P1003	26	In
COM REMOTE TRANSFER*	P1003	27	In
COM REMOTE TUNE UP*	P1003	28	In
COM REMOTE TUNE DOWN*	P1003	29	In

An asterisk (*) following a signal name denotes that the signal is Active-Low, requiring a ground to activate.

These inputs are considered active if either the voltage to ground is ≤3.5 VDC or the resistance to ground is ≤375Ω. These inputs are considered inactive if the voltage to ground is 11-33 VDC or the resistance to ground is >100kΩ.

4.3.14.1 COM MIC 1 KEY* (GTN 750 only)

The COM MIC 1 KEY discrete input, when pulled low, allows the audio that is present on the COM MIC 1 AUDIO IN HI (P1003-5) to be transmitted over the radio.

4.3.14.2 COM MIC 2 KEY* (GTN 750 only)

The COM MIC 2 KEY discrete input can be used in installations in which no audio panel is present. When this input is pulled low, the audio that is present on the COM MIC 2 AUDIO IN HI (P1003-6) is transmitted over the radio.

4.3.14.3 COM REMOTE TRANSFER* (GTN 750 only)

The COM REMOTE TRANSFER discrete input may be used to flip-flop between the active and standby COM frequencies. A momentary low on this pin will load the standby COM frequency into the active COM frequency field.

The COM REMOTE TRANSFER input may be used for emergency operation of the COM transmitter. If the switch is depressed for two seconds, the active COM frequency changes to 121.500 MHz. Once the emergency frequency is activated through COM REMOTE TRANSFER, the GTN transceiver ignores inputs from the front panel controls for COM selections only. The pilot may exit this independent mode—restoring COM selection control to the front panel knobs and buttons—by again depressing the switch for two seconds.

4.3.14.4 COM REMOTE TUNE UP* (GTN 750 only)

The COM REMOTE TUNE UP discrete input may be used to scroll through a list of preset COM frequencies. A momentary low on this pin will load the next preset frequency in the list into the standby COM frequency field.

4.3.14.5 COM REMOTE TUNE DOWN* (GTN 750 only)

The COM REMOTE TUNE DOWN discrete input may be used to scroll through a list of preset COM frequencies. A momentary low on this pin will load the previous preset frequency in the list into the standby COM frequency field.

4.3.14.6 INTERCOM ENABLE* (GTN 750 only)

The INTERCOM ENABLE discrete input activates the intercom function in installations in which no intercom is present.

4.3.14.7 VOR/ILS Audio (GTN 750 only)

Pin Name	Connector	Pin	I/O
500Ω VOR/LOC AUDIO OUT HI	P1004	16	Out
500Ω VOR/LOC AUDIO OUT LO	P1004	17	Out

500Ω VOR/LOC AUDIO OUT HI supplies 100 mW into a 500Ω load. It is a balanced output and the 500Ω VOR/LOC AUDIO OUT LO output must be connected.

4.3.14.8 VOR/ILS Discrete Inputs (GTN 750 only)

Pin Name	Connector	Pin	I/O
VLOC REMOTE TRANSFER*	P1004	28	In

An asterisk (*) following a signal name denotes that the signal is Active-Low, requiring a ground to activate.

This input is considered active if either the voltage to ground is ≤3.5 VDC or the resistance to ground is ≤375Ω. This input is considered inactive if the voltage to ground is 11-33 VDC or the resistance to ground is >100kΩ.

4.3.14.9 VLOC REMOTE TRANSFER

The VLOC REMOTE TRANSFER discrete input may be used to flip-flop between the active and standby NAV frequencies. A momentary low on this pin will load the standby NAV frequency into the active NAV frequency field.

4.3.15 VOR/ILS Indicator (GTN 750 only)

4.3.15.1 VOR/ILS Indicator Function

NOTE

Because the GTN 750 includes a "CDI" button that performs switching between GPS and VOR/ILS on a remote indicator, it is seldom necessary to use these outputs to drive an indicator. It is only necessary when it is desired for a separate indicator to display VOR/ILS deviation full-time (regardless of the "CDI" button status).

The VOR/ILS indicator displays both lateral and vertical, To/From indications, lateral and vertical flags and superflags. GTN 750 connector P1004 always outputs the VOR/Localizer/Glideslope navigation information. The VOR/ILS pins on P1004 are used to drive an indicator that displays VOR/ILS information at all times, regardless of the CDI selection on the GTN 750.

VOR/LOC COMPOSITE OUT is a standard VOR/localizer composite output signal which may be used to drive the Left/Right, TO/FROM, and Flag indications of certain navigation indicators that contain an internal converter.

The ILS ENERGIZE output goes low when the VLOC frequency is channeled to a localizer channel.

4.3.15.2 VOR/ILS Indicator Electrical Characteristics

4.3.15.2.1 Superflags

Pin Name	Connector	Pin	I/O
VOR/LOC SUPERFLAG	P1004	15	Out
GLIDESLOPE SUPERFLAG	P1004	38	Out

The output supplies not less than 400 mA the output voltage not less than (AIRCRAFT POWER -2 VDC) when the flag is to be OUT OF VIEW. The output voltage with respect to ground is less than 3 VDC when the flag is to be IN VIEW.

4.3.15.2.2 Deviation

Pin Name	Connector	Pin	I/O
VOR/LOC +LEFT	P1004	5	Out
VOR/LOC +RIGHT	P1004	6	Out
GLIDESLOPE +UP	P1004	34	Out
GLIDESLOPE +DOWN	P1004	55	Out

The deviation outputs are each capable of driving up to three 1000Ω meter loads with ±150 mVDC ±10% for full-scale deflection. The drive circuit provides for more than full-scale deflection with a maximum course deviation output voltage of ±300 mVDC ±10%.

4.3.15.2.3 TO/FROM

Pin Name	Connector	Pin	I/O
VOR/LOC +TO	P1004	1	Out
VOR/LOC +FROM	P1004	2	Out

The output is capable of driving up to three 200Ω meter loads. When indicating TO, the output is +225 ±75 mVDC. When indicating FROM, output is -225 ±75 mVDC. When invalid information is present (Flag IN VIEW) the TO/FROM output is 0 ±10 mVDC.

4.3.15.2.4 Flag

Pin Name	Connector	Pin	I/O
VOR/LOC +FLAG	P1004	3	Out
VOR/LOC -FLAG	P1004	4	Out
GLIDESLOPE +FLAG	P1004	32	Out
GLIDESLOPE -FLAG	P1004	53	Out

The Flag output is capable of driving up to three 1000Ω meter loads. When valid information is present (Flag OUT OF VIEW) the Flag output is 375 ±80 mV DC. When invalid information is present (Flag IN VIEW) the Flag output is 0 ±25 mV DC.

4.3.15.2.5 OBS

Pin Name	Connector	Pin	I/O
VOR OBS ROTOR C	P1004	9	Out
VOR OBS ROTOR H (GND)	P1004	10	--
VOR OBS STATOR D	P1004	13	In
VOR OBS STATOR E (GND)	P1004	11	--
VOR OBS STATOR F	P1004	12	In
VOR OBS STATOR G (GND)	P1004	14	--

VOR OBS ROTOR C and H are a buffered 500 Hz output that is intended to drive the OBS rotors. VOR OBS STATOR D and VOR OBS STATOR F are each phase and amplitude shifted version of the VOR ROTOR C output. Each pair is intended to read one of the two windings of the indicator's OBS stator.

4.3.15.2.6 VLOC COMPOSITE

Pin Name	Connector	Pin	I/O
VOR/LOC COMPOSITE OUT	P1004	8	Out

With a standard VOR test signal applied, VOR/LOC COMPOSITE OUT is 0.5 ± 0.1 Vrms into a 10 kΩ load. With a standard Localizer centering test signal applied, VOR/LOC COMPOSITE OUT is 0.350 ±0.05 Vrms into a 10 kΩ load.

4.3.15.2.7 GLIDESLOPE COMPOSITE

Pin Name	Connector	Pin	I/O
GLIDESLOPE COMPOSITE OUT	P1004	58	Out

With a standard glideslope test signal applied, GLIDESLOPE COMPOSITE OUT is 0.350 ±0.05 Vrms into a 10 kΩ load.

4.3.15.2.8 NAV ILS ENERGIZE

Pin Name	Connector	Pin	I/O
ILS ENERGIZE	P1004	29	Out

The driver output voltage is not more than 1.0 V when sinking 20 mA. The maximum off state leakage current with respect to GND is less than 10 μA.

4.3.16 RMI/OBI (GTN 750 only)

4.3.16.1 RMI/OBI Function

The VOR OBI output provides bearing information from the currently tuned VOR station for Bendix/King Serial OBI devices based upon the GTN 750 VOR receiver. When a localizer channel is tuned on the VLOC window, there is a bit in the data stream set to indicate that a localizer frequency is tuned which stows the needle or drives it to the 3 o'clock position.

4.3.16.2 RMI/OBI Electrical Characteristics

Pin Name	Connector	Pin	I/O
VOR OBI CLOCK	P1004	25	Out
VOR OBI SYNC	P1004	26	Out
VOR OBI DATA	P1004	27	Out

The output driver is active low. The driver output voltage is not more than 1.0 V when sinking 20 mA. The maximum off state leakage current with respect to ground is less than 10 μA.

4.3.17 DME Tuning (GTN 750 only)

4.3.17.1 DME Tuning Function

The GTN 750 can channel a DME based on the tuned VLOC frequency. The GTN 750 outputs 2 of 5, BCD, or Slip parallel DME and King Serial DME channeling format. When DME COMMON is held low, the GTN 750 actively tunes the DME.

4.3.17.2 DME Tuning Electrical Characteristics

4.3.17.2.1 Parallel DME Tuning

Pin Name	Connector	Pin	I/O
PAR DME 100KHZ-A/NAV SERIAL DME HOLD	P1004	37	Out
PAR DME 100KHZ-B	P1004	39	Out
PAR DME 100KHZ-C	P1004	40	Out
PAR DME 100KHZ-D	P1004	42	Out
PAR DME 100KHZ-E	P1004	54	Out
PAR DME 50KHZ	P1004	43	Out
PAR DME 1MHZ-A	P1004	45	Out
PAR DME 1MHZ-B	P1004	46	Out
PAR DME 1MHZ-C	P1004	47	Out
PAR DME 1MHZ-D/NAV SERIAL DME ON	P1004	33	Out
PAR DME 1 MHZ-E	P1004	56	Out
DME COMMON	P1004	41	In

For each of the parallel DME tuning discrete outputs, the driver output voltage is not more than 1.0 V while sinking 20 mA. The maximum off state leakage current with respect to ground is less than 10 μA.

DME COMMON must be pulled low to indicate to the GTN 750 that it is the device channeling the DME.

DME COMMON is considered active if either the voltage to ground is <1.9 V or the resistance to ground is <375Ω. These inputs are considered inactive if the voltage to ground is 11-33 VDC.

4.3.17.2.2 King Serial DME Tuning

Pin Name	Connector	Pin	I/O
SERIAL DME – DATA	P1004	19	Out
SERIAL DME – CLOCK	P1004	18	Out
SERIAL DME- RNAV/CH REQ	P1004	20	In
SERIAL DME - RNAV MODE	P1004	21	In
DME COMMON	P1004	41	In
SERIAL DME – DME REQUEST	P1004	44	I/O

When SERIAL DME – DATA or SERIAL DME – CLOCK is asserted high and driving a 360Ω load, the driver output voltage is not less than 8 V, and when asserted low is not greater than 10 mV.

SERIAL DME – RNAV/CH REQ, SER DME – RNAV MODE, and DME COMMON are considered active if either the voltage to ground is <1.9 V or the resistance to ground is <375Ω. These inputs are considered inactive if the voltage to ground is 11-33 VDC.

DME COMMON must be pulled low to indicate to the GTN 650/750 that it is the device channeling the DME.

5. POST INSTALLATION CONFIGURATION AND CHECKOUT PROCEDURES

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 5-1 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 the installation checks
- Load software into the GTN
- Configure the GTN for the specific installation
- Perform ground checks to verify the interfaces to external sensors
- Perform the specified flight checks
- Update the aircraft documentation

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 as described in Section 2.6

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 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 TBD for guidance on checking each TVS.

After accomplishing a continuity check, perform power and ground checks to verify proper power distribution 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 TBD. The GTN must be connected to the wiring harness and antennas.

NOTE

Throughout the next section of this document, many screenshots and examples are used to illustrate the software and checkout loading process. Every effort has been made to ensure the accuracy of these examples; however, changes may occur which results in the examples being out of date. Always refer to the Master Drawing List (005-00533-C0) for the correct software versions and part numbers.

5.3 Connector Engagement Check

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

1. Turn on the GTN and turn on the avionics master switch (if installed).
2. Place the GTN in the rack and engage the cam mechanism.
3. Turn the Allen screw of the locking cam (located on the lower left side of the unit) slowly clockwise until the GTN just powers on. A T-handle can be used for this, but ensure that the screw is not over-tightened.
4. Count the number of complete revolutions the Allen screw can be turned until it cannot turn any more. Take care not to over-tighten. TBD turns is the minimum for proper installation. If fewer than TBD turns are possible, the mounting rack should be moved aft (toward the pilot) such that the aircraft panel does not obstruct the unit from properly engaging in the rack.

5.4 Configuration Mode Operations

Configuration mode is used to configure the GTN settings for each specific installation. To access configuration mode, apply power to the aviation rack. With the GTN turned off, press and hold the Home key and turn the unit on. Release the Home key when the display activates and 'Garmin' appears fully lit on the screen. The first page displayed is the configuration mode home page. See Figure 5-1. While in configuration mode, pages can be selected by touching the desired button on the display.

NOTE

The configuration pages shown here reflect main software version 2.00. Some differences in operation may be observed when comparing the information in this manual to later software versions.

The following sections describe pages that are accessed from the main GTN Setup page, as shown in Figure 5-3. To access the GTN Setup page, touch the 'GTN Setup' button from the Configuration Mode home page as shown in Figure 5-1.

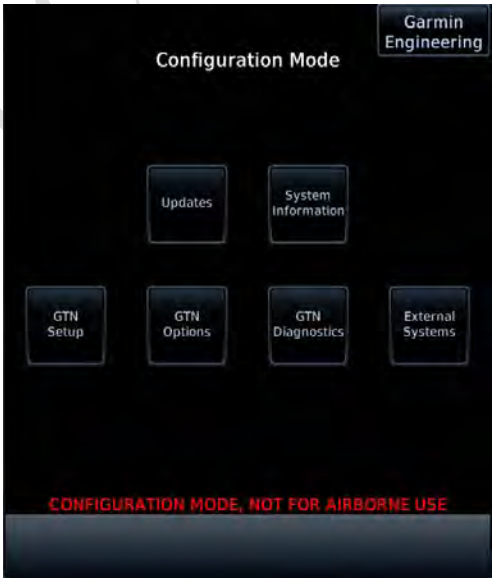


Figure 5-1. Configuration Mode Home Page

5.4.1 Main ARINC 429 Config Page

Access the GTN Setup page from the Configuration home page by touching the 'GTN Setup' button.

Figure 5-2. Main GTN Setup Page

To access the ARINC 429 Configuration page, touch the ARINC 429 button. This page configures the four ARINC 429 input ports and the three ARINC 429 output ports. Select the correct speed for each port depending upon the installed interfaced equipment by touching the speed button and toggling the high or low selection.

Select the correct Data In and Data Out settings for each port. Touch the UP or DOWN button to scroll through the ARINC selections. The data selections are described below.

Figure 5-3. Main ARINC 420 Configuration Page

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)

DATA IN SELECTIONS

Selection	Description
Off	No unit connected to this ARINC 429 input
Airdata	Altitude, temperature, and speed information from the following Air Data systems: B & D 2600, 2601, 2800, 90004-003 Bendix/King KAD 280/480, Shadin ADC 2000
Airdata/AHRS	Heading, altitude, temperature, and speed information from an Air Data/AHRS system.
Data Concentrator	Garmin and Garmin w/TIS This is a Garmin data concentration format. Only high speed ARINC 429 should be used. Garmin GTX 330
EFIS	Selected course, heading, and joystick waypoint information from the following EFIS systems: Bendix/King EFS 40/50 Certain versions of Collins EFIS may also be compatible with this format.
EFIS/Airdata	Selected course, heading, joystick waypoint, altitude, temperature, and speed information from the following systems: Collins Pro Line 21 Bendix/King EFS 40/50 (with SW 1201 or later)
Garmin GAD 42	Selected course, heading, and true airspeed data from the Garmin GAD 42.
Garmin GDU	Selected course, heading, altitude, temperature and speed information from the following systems: Garmin GDU 620 (G500/G600)
GTS 800	Traffic Information from the GTS 800.
GTS 820	Traffic Information from the GTS 820.
GTS 850	Traffic Information from the GTS 850.
Honeywell EFIS	Selected course, heading, and joystick waypoint information from the following EFIS systems: Honeywell Primus 1000
INS/IRU	Heading information from the following Inertial systems: Bendix/King KAH 460 Collins AHC 85 Honeywell Laseref Litef LTR 81 Litton LTN 90-100, LTN 91, LTN 92
RADAR Graphics	Joystick waypoint information from a RADAR graphics unit.
Sandel EHSI	Selected Course and Magnetic Heading from a Sandel EHSI.
Skywatch	Traffic Information from the SkyWatch system.
Skywatch HP	Traffic Information from the SkyWatch system.
KTA 870	Traffic Information from the KTA 870.
KTA 970	Traffic Information from the KTA 970.
Avidyne TAS	Traffic Information from the Avidyne TAS.

DATA OUT SELECTIONS

Selection [1]	Description
Off	No unit(s) connected to ARINC 429 output
ARINC 429	Standard ARINC 429 output data (non-GAMA).
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 (GPS vertical guidance provided on EFIS)
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: Garmin GAD 42 Interface Adapter Bendix/King EFS 40/50 (No GPS vertical guidance provided) Collins EFIS 84 Certain other versions of Collins EFIS may also be compatible with this format.
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: Honeywell Primus 1000
GAMA 429 Grph 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
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 to the following EFIS systems: Collins Pro Line 21
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 to the following EFIS systems: Sextant SMD 45

[1] Garmin GTX 330 will work with any output setting

SDI

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

5.4.2 Main RS-232 Config Page

Select the Main RS-232 Configuration page from the Main GTN Setup page by touching the RS-232 button. See Figure 5-3. Change the inputs or outputs to match the equipment that is installed in the aircraft. Touch the button corresponding to the RS-232 channel and select the applicable input or output setting. The input/output settings are described below. Touch the UP or DOWN button to scroll through the RS-232 selections.

Figure 5-4. Main RS-232 Configuration Page

CHANNEL INPUT SELECTIONS

Selection	Description
Off	No unit(s) connected to input of this channel.
Arnav ei-fuel	Serial fuel flow information from the following units: ARNAV FC-10, FT-10 Electronics International FP-5L
GMA 35	Audio panel status information.
GTX 32 # 1	Altitude data, flight ID, and GTX 32 status.
GTX 32 # 2	Altitude data, flight ID, and GTX 32 status.
GTX 33 # 1	GTX 33 status data, ICAO address, and Flight ID.
GTX 33 # 2	GTX 33 status data, ICAO address, and Flight ID.
GTX 33 # 1 with TIS	GTX 33 status data, TIS data, ICAO address, and Flight ID.
GTX 33 # 2 with TIS	GTX 33 status data, TIS data, ICAO address, and Flight ID.
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)
Shadin ADC	Serial air data information from the following units: Shadin ADC 200, 200+, 2000
Shadin ALT	Serial altitude data from the following units: Shadin 8800T, 9000T, 9200T
Shadin FADC	Serial air data and fuel flow information from the following units: Shadin 9628XX-X Fuel/Air Data Computer INSIGHT TAS 1000 Air Data Computer
Shadin Fuel	Serial fuel flow information from the following units: Shadin 91053XM Digital Fuel Management System Shadin 91204XM Digital Fuel Management System JP Instruments EDM-700 or EDM-760 Engine Monitor
WX-500	Lightning strike information from an L3 Communications WX-500 Stormscope.
GPS	

CHANNEL OUTPUT SELECTIONS

Selection	Description
Off	No unit(s) connected to output of this channel.
ADS-B	Serial communication to Garmin GTX 33/330 ES or 33D/330D ES Transponders.
Aviation Output	Serial position, altitude, velocity, and navigation data to the following units: Argus 3000, 5000, or 7000 Moving Map Electronics International FP-5L Fuel Flow Computer (non-TSO'd) Garmin MX20 (V5.6 or later), GMX 200 [1] Garmin GPSMAP 195, GPSMAP 295 or GPS III Pilot Garmin GPSMAP 196, GPSMAP 296, and GPSMAP 396 Garmin GTX 327 Transponder JP Instruments EDM-700 or EDM-760 Engine Monitor Shadin 91204XM Digital Fuel Management System Shadin 91053XM Digital Fuel Management System Shadin 9628XX-X Fuel/Air Data Computer Stormscope Series II (with NAVAID) Moving Map
Aviation (no Altitude)	Serial position, velocity, and navigation data to the following units: Garmin MX20 (V5.5 or earlier) Horizon DDMP INSIGHT TAS 1000 Air Data Computer
Honeywell EGPWS	Serial communication to a Bendix/King (Honeywell) KGP 560 EGPWS.
GMA 35	Control of GMA 35 Audio Panel functions.
GTX 32 # 1	Control of GTX 32 transponder functions, pressure altitude data, and groundspeed data.
GTX 32 # 2	Control of GTX 32 transponder functions, pressure altitude data, and groundspeed data.
GTX 33 # 1 with TIS	Control of GTX 33 transponder functions, pressure altitude data, and groundspeed data.
GTX 33 # 2 with TIS	Control of GTX 33 transponder functions, pressure altitude data, and groundspeed data.
MapMX	Serial position, altitude, velocity, and navigation data to the following units: Garmin MX20 (V5.7 or later), GMX 200
WX-500	Serial communication to an L3 Communications WX-500 Stormscope.
GPS	

5.4.3 HSDB (Ethernet) Configuration Page

The HSDB Ethernet page can be accessed from the GTN Setup page. Touch the button next to the port to configure it as 'Connected' or 'Not Connected'. See Figure 5-5. 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'.

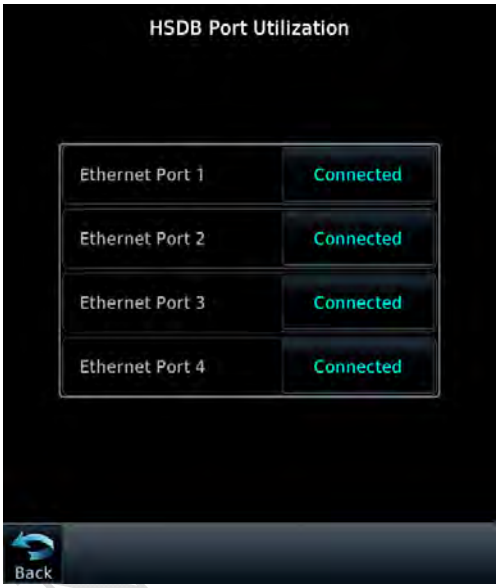


Figure 5-5. HSDB Ethernet Port Configuration Page

5.4.4 Interface Equipment Page

Touch the Interface Equipment button on the GTN Setup page. This page allows the configuration of the presence of a cross-side navigator, GDL 69/69A, Transponder #1 and Transponder #2.

Figure 5-6. Interfaced Equipment Page

5.4.5 Main CDI Indicator (Analog) Configuration Page

Touch the Main Indicator (Analog) button on the GTN Setup page. See Figure 5-3. This page allows you to calibrate the OBS resolver, enable the CDI key, selected course for GPS and/or VLOC, and configure the V-Flag state. The following fields can be configured, as shown in Figure 5-7.

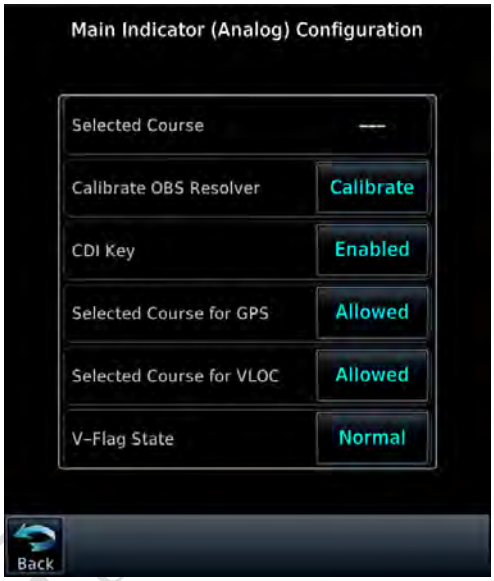


Figure 5-7. Main Indicator (Analog) Configuration Page

CALIBRATE OBS RESOLVER

To calibrate the OBS resolver, touch the 'Calibrate' button on the Main CDI Configuration page. See Figure 5-7. Next, select 150˚ on the OBS, then touch the OK button, 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 course displayed on the GTN is within 2° of the selected course. Do this at 30° intervals around the OBS card.

CDI KEY

If it is desired to disable the CDI key, touch the button 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 be displayed as GPS regardless of CDI button presses. This may be necessary for certain EFIS systems where navigation sensor selection must be accomplished on the EFIS or its control panel.

SELECTED COURSE FOR GPS

If it is desired to ignore a selected course input for GPS operation in OBS mode, touch the button to the right of 'Selected Course for GPS' until 'Ignored' is displayed on the button.

SELECTED COURSE FOR VLOC

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, touch the button to the right of 'Selected Course for VLOC' until 'Ignored' is displayed on the button.

V-FLAG STATE

Select either Normal or Declutter for the V-Flag State by touching the button until the desired selection is displayed on the button.

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	Whenever vertical deviation is invalid the vertical deviation bar parks in the centered position and the vertical flag is shown.

5.4.6 Lighting Configuration Page

Select the Lighting Page. See Figure 5-3. This page allows you to set display parameters that affect the display backlight and key lighting brightness. The Display and Key lighting characteristics are adjusted separately, each with the following fields:

Figure 5-8. Main Lighting Configuration Page

SOURCE

Selection	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.

Note that the display source can only be configured to track the photocell or lighting bus 1.

MINIMUM LEVEL

This sets the minimum brightness of the keys or display, whichever is applicable. Touch the 'Minimum Level' button 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%, with 100.00% being the highest brightness level. The minimum display and key brightness default level is set to 5.00% at the factory. Enter the desired minimum value on the keypad and then touch ENTER to store the settings.

5.4.6.1 Configure Photocell Page

Touching 'Configure Photocell' (See Figure 5-8) from the Lighting Configuration page allows the following parameters to be configured by touching the corresponding button. Each selection displays a numeric keypad where the numeric values can be entered.

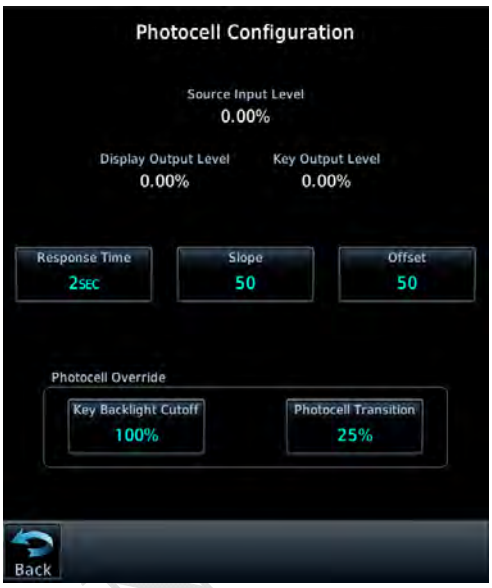


Figure 5-9. Photocell Configuration Page

RESPONSE TIME

Sets the speed with which the 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 2-7 seconds, and is set to 2 seconds as a default value.

SLOPE

Sets the sensitivity the brightness of the display has to changes in the input level. The higher the number, the brighter the display for a given increase in the input level. This field has a range of 0-100, 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.

KEY BACKLIGHT CUTOFF

This parameter configures the point at which key backlighting is switched off in bright light. For example, a value of 70% means that the key backlights will be 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 0 (zero) to 50, and is set to 25 as the default setting.

5.4.6.2 Configure Lighting Bus Page

The Lighting Bus Configuration page offers the same Response Time, Slope, and Offset adjustments as described in Section 5.4.6.1.

LIGHTING BUS SOURCE

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

Figure 5-10. Lighting Bus Configuration Page

5.4.7 Audio Configuration Page

The Audio Configuration page allows the adjustment of volume alerts. See Figure 5-11. Touch the Audio button on the GTN Setup page. To adjust the alert volume, press the ' – ' or the ' + ' sign to decrease or increase the volume accordingly. The volume is displayed as a percentage of maximum volume, with 0% being muted and 100% being max volume. The selected volume level can be checked by selecting 'Test Sound' and then touching the green triangle to the right of the button.

Figure 5-11. Audio Configuration Page

5.4.8 Traffic Configuration Page

Access the Traffic Configuration Page from the Main GTN Configuration home page. See Figure 5-3. The Traffic Configuration page allows the traffic intruder symbol color and external control to be configured for each specific installation.

To adjust the traffic intruder symbol color, touch the button to toggle between white or cyan, as shown in Figure 5-12. White is the default symbol color.

Configure the GTN control of the traffic system. If the GTN is used to control the traffic system, touch the button and select 'Yes'. If a separate display device is used to control the traffic system, select 'No'.

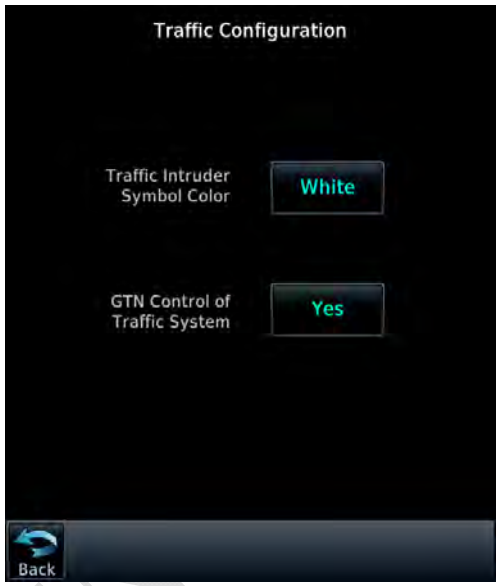


Figure 5-12. Traffic Configuration Page

5.4.9 Main System Configuration Page

Touch the Main System button from the GTN Setup page. See Figure 5-3. This page displays miscellaneous configuration options.

AIR/GROUND THRESHOLD

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

AIR/GROUND DISCRETE

The air/ground discrete is the ------. To adjust the air/ground threshold, touch the button to the left and enter a value. This field two options: Active for Airborne and Active for Ground.

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 5-13. Enter the measured value by touching the button and entering the measured value into the keypad on the display. This field has a range of 0.0 to 99.9 feet.

FUEL TYPE

This configures the type of fuel the aircraft uses. Options are AV Gas, Jet A, or Jet B.

GPS SELECT

????

Figure 5-13. Main System Configuration Page

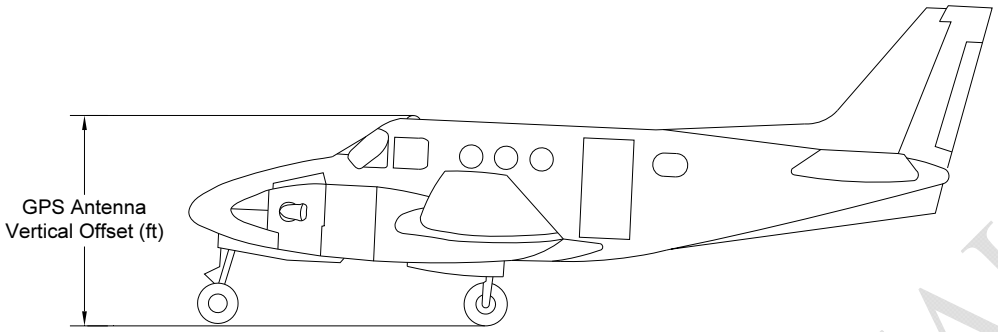


Figure 5-14. Measurement of GPS Antenna Vertical Offset

5.4.10 COM Configuration Page (GTN 750 Only)

Select the COM configuration page from the main GTN Setup page as shown in Figure 5-3. These values are set at the factory and rarely require calibration.

To enable or disable the COM radio, touch the button to toggle between 'Enabled' and 'Disabled'. The COM radio defaults to enabled state. See Figure 5-15.

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%.

MIC 1 GAIN

This can be adjusted to 12 dB, 18 dB, 24 dB, or 30 dB.

SIDETONE VOLUME

This parameter sets the audio sidetone output level. This value may be set to values between 0.0 dB and 63.0 dB in 0.5 dB increments. The default is TBD dB.

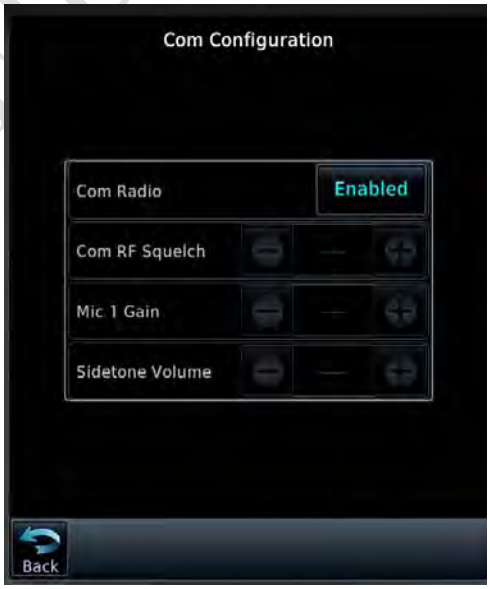


Figure 5-15. COM Configuration Page

5.4.11 VOR/LOC/GS Configuration Page

Select the VOR/LOC/GS from the GTN Setup page by touching the button on the display. See Figure 5-3. This page allows you to verify and calibrate 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.

Figure 5-16. VOR/LOC/GS Configuration Page

ENABLE/DISABLE NAV RADIO

Touch the button to disable or enable the NAV Radio.

CALIBRATE OBS RESOLVER

To calibrate the OBS resolver, touch the 'Calibrate' button from the VOR/LOC/GS Configuration page. See Figure 5-16. Next, select 150˚ on the OBS, then touch the OK button, 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 course displayed on the GTN is within 2° of the selected course. Do this at 30° intervals around the OBS card.

ARINC 429 CONFIGURATION SPEED (RX AND 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)

SDI

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

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.

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 ARC (Cessna) RTA-476A

5.5 Ground Checks (Configuration Mode)

The following checks are done in Configuration Mode. For instructions concerning entering Configuration Mode, see Section 5.4.

5.5.1 Main Indicator Check (Analog Only)

NOTE

If the GTN is interfaced to an electronic HSI 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, perform the following steps:

1. Go to the GTN Diagnostics page. See Figure 5-17.
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 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 5.4.4.

Figure 5-17. GTN Diagnostics Page

5.5.2 VOR/ILS Indicator (Analog)

If the GTN is interfaced to an analog indicator on the VOR/ILS Indicator output, perform the following steps:

1. Go to the GTN Diagnostics page. See Figure 5-17.
2. Go to the NAV 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.

5.5.3 Discrete Inputs Checkout

If the GTN is connected to external switches, perform the following steps:

1. Go to the GTN Diagnostics page. See Figure 5-17.
2. Go to the Discrete Inputs page.
3. For each external switch that is connected, exercise the switch and check the ‘active’ or ‘inactive’ indication on the screen correlating to the appropriate switch input, and ensure it is displayed correctly.

5.5.4 Discrete Outputs Checkout

If the GTN is connected to external annunciators/systems, perform the following steps:

1. Go to the GTN Diagnostics page. See Figure 5-17.
2. Go to the 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 button 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.

5.5.5 HSDB Provisional Wiring Checkout

If provisional wiring has been installed for the GTS 8XX, GDU 620, or other Garmin LRU to interface via HSDB, follow the procedure below to ensure it has been installed correctly.

1. Access the GTN Diagnostics page from the Configuration Mode home page. See Figure 5-17.
2. Touch the HSDB (Ethernet) button.
3. For each Ethernet port that has provisional wiring connected to it, ensure that the port status displays 'Connected'.

Figure 5-18. HSDB Diagnostics Page

5.5.6 TAWS Audio Check (For Units with TAWS Only)

NOTE

The audio panel should also be turned on for this test.

The TAWS audio volume has an initial default of 80% of the maximum volume value. The TAWS volume needs to be set so as to ensure that aural alerts are audible under all anticipated noise environmental conditions.

1. Touch the Audio configuration page from the GTN Setup page. See Figure 5-19.
2. Next to 'Alert Audio', increase or decrease the volume by touching the '+' or '-' button.
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).
4. Readjust the Volume as needed to ensure the TAWS audio messages will be heard in all anticipated cockpit noise conditions.

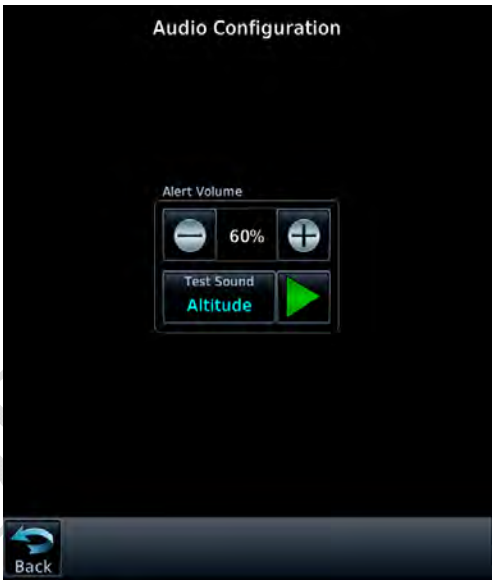


Figure 5-19. GTN Audio Configuration Page

5.5.7 GAD 42 Interface Check

This check verifies that the GTN is interfaced with the GAD 42.

Go to the GAD 42 Configuration Page from the External Systems page. Touch 'External Systems', then touch 'GAD 42'.

1. Verify that Status is ACTIVE.
2. Change any of the options to a different number.
3. 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 refer to the latest revision of the GAD 42 Installation Manual (P/N 190-00159-00).

Figure 5-20. GAD 42 Configuration Page

5.5.8 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 it is noticed that 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. Go to the Lighting Bus Configuration page from the GTN Setup page. See Figure 5-21.
2. Ensure the lighting bus is set to its minimum setting.
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 5-21. Lighting Bus Configuration Page

5.6 Ground Checks (Normal Mode)

For the following checks, cycle power on the GTN and power it up in normal mode.

5.6.1 Display of Self-Test Data

Following normal power-up, the Database pages are displayed, followed by the Instrument Panel Self-Test page. Pressing '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 self test page. This is not a required check, although this page can be useful for troubleshooting installation problems.

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
Bearing to Waypoint (RMI)	135°
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
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.

5.6.2 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 AUX button and then touch the GPS Status button. Under 'Status', 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 situation 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 that 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.

5.6.3 VHF COM Interference Check

NOTE

The interference check must be completed on all IFR installations.

NOTE

It is known that 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 "INTEG" 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 "INTEG" flag does not come into view.
6. Repeat steps 4 and 5 for the following frequencies:

25 kHz COM CHANNEL SPACING

121.150 MHz	131.225 MHz
121.175 MHz	131.250 MHz
121.200 MHz	131.275 MHz
121.225 MHz	131.300 MHz
121.250 MHz	131.325 MHz
131.200 MHz	131.350 MHz

NOTE

For VHF radios with 8.33 kHz channel spacing, include the following frequencies in addition to those listed above.

8.33 kHz COM CHANNEL SPACING

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 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").

If the GPS "INTEG" flag comes into view, see TBD for options to improve performance.

5.6.4 VHF NAV Checkout (GTN 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.

5.6.5 VHF COM Checkout (GTN 750 Only)

5.6.5.1 Antenna Check

If desired, the antenna VSWR can be checked using an inline wattmeter in the antenna coax 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%.

5.6.5.2 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.

5.6.6 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 TAWS page.
2. Touch the MENU button.
3. Select the Test Terrain? field and press the ENT 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.

If no audio message is heard, then a fault exists within the audio system and the TAWS capability must be considered non-functional.

5.6.7 Altitude Encoder or Air Data Computer Check

The GTN can receive 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 normal mode. If the following steps do not perform correctly, check the electrical connections and configuration setup.

1. Go to the map page from the home page in normal mode.
2. Touch the Menu button.
3. Under 'Map Data Fields' touch the Change Data Fields button. See Figure 5-22.
4. Touch one of the four data fields and configure it to display PRESS ALT—Pressure Altitude.
5. If there are multiple altitude sources providing data to the GTN, remove power from all but one source.
6. Verify that PRESS—ALT is being displayed and agrees with the active altitude source.

NOTE

After applying power to an altitude source it may take several minutes to warm up. During the warm-up period the altitude display on the GTN will be dashed out.

7. If there are multiple altitude sources, remove power from the currently active source and apply power to another source that has not been checked.
8. Repeat steps 5-7 until all available sources have been checked.

5.6.8 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 turned on and in normal mode. If the following steps do not perform correctly, check the electrical connections and configuration setup.

1. Go to the map page from the home page in normal mode.
2. Touch the Menu button.
3. Under 'Map Data Fields' touch the Change Data Fields button. See Figure 5-22.
4. Touch one of the four data fields and configure it to display BRG — Bearing to Current Waypoint.

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.

5. Remove power from the heading source and verify that the heading in the BRG field is dashed out.

Figure 5-22. Map Menu Page

5.6.9 Interface Checkout

This section describes the checks that must be carried out to verify that systems interfacing to the GTN are communicating properly. Only those interfaces that are connected to the GTN must be verified.

5.6.9.1 Honeywell (Bendix/King) EFS40/50 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 self test page (see Section 5.6.1).
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 self test page, verify that the EFS40/50 is displaying data from the GPS source. Note that vertical deviation will not be displayed.
    - 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 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.

5.6.9.2 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.

5.6.9.2.1 One GTN/One SN 3308

1. Cycle power to the GTN and acknowledge the prompts until it gets to the self test page (see Section 5.6.1).
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 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' button.
6. Select VLOC on the GTN and verify that the SN3308 displays NAV 1 or NAV 2 (depending on what navigation source the GTN is).
7. Using a VOR test set verify that the CDI deviation on the SN3308 is displayed correctly.

5.6.9.2.2 Two GTNs/One SN3308

The checkout for two GTNs also applies to one GTN 6XX and one GTN 7XX.

1. Remove power from GTN #2.
2. Cycle power to the 1st GTN and acknowledge the prompts until it gets to the self test page (see Section 5.6.1).
3. Select GPS1 as the navigation source by pressing the NAV key 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 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' button.
8. Select VLOC on GTN #1 and verify that the SN3308 displays NAV 1 or NAV 2 (depending on what 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 and acknowledge the prompts until it gets to the self test page (see Section 5.6.1).
11. Select GPS2 by pressing the NAV key on the SN3308.
12. Repeat steps 4-9 with the second GTN.

5.6.9.3 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 self test page (see Section 5.6.1).
2. Ensure that the SN3500/4500 is receiving valid heading.

NOTE

The Vertical Deviation Indication will not be displayed unless the SN3500 is receiving valid heading.

3. While the GTN is displaying the 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

NOTE

If the Vertical Deviation Indication is not displayed ensure that the Main ARINC 429 Config (See Section TBD) is set to Enable Labels for VNAV.

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' button.
6. Select VLOC on the GTN and verify that the SN3308 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.

5.6.9.4 EHSI Deviation Scaling (If HSI/CDI Is Driven by the GTN Via Serial 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 self test page (see Section 5.6.1).
2. With the self test page displayed on the GTN, look on the EHSI/EFIS and verify that the lateral deviation is not flagged and half-scale left.
3. With the self test page displayed on the GTN, look on the EHSI/EFIS and verify that the vertical deviation is not flagged and half-scale up.

NOTE

If the deviations are not as described, the EHSI/EFIS does not scale the GTN deviations properly and cannot be certified for GPS-based guidance. Contact Garmin for further assistance.

5.6.9.5 ARINC 429 Traffic System Interface Check

If a Garmin GTS 8XX Traffic system, L3 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. 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 a self-test pattern is displayed on the GTN traffic display.

5.6.9.6 Ryan TCAD Traffic System Interface Check

If a Ryan TCAD has been connected to the GTN, the traffic interface should be verified as described in this section.

1. Go to the Traffic page on the GTN which can be accessed from the Home page.
2. Verify that NO DATA is not displayed in yellow on the center of the traffic page.
3. Using the SETUP selection under the Traffic Menu, verify that the shield mode can be changed.

5.6.9.7 Stormscope Interface Check

If an L3 Communications WX-500W 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 LIGHTNING FAILED is not displayed in yellow on the center of the Lightning page.

Using the Self Test selection under the Lightning Menu, initiate a Stormscope self-test.

5.6.9.8 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 fix.
2. Create and activate a flight plan on the GTN.
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.

5.6.9.9 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 5.6.9.9.1. If a Garmin GDL 69A has been connected to the GTN, the interface should be verified as described Sections 5.6.9.9.1 and 5.6.9.9.2. 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 XM data link radio. Complete instructions for activating the XM data link radio can be found in document 190-00355-04, GDL 69/69A XM Satellite Radio Activation Instructions.

5.6.9.9.1 XM Satellite Radio Weather Checkout Procedure

1. With the GTN running in the normal mode, go to the System Status page (in the AUX page group) then touch the GDL69 button.
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. Go to the XM WX Timestamp page and verify that timestamp data is displayed. This may take several minutes. (Time stamp data will not be available if the XM subscription has not been activated.)

During XM activation, “Detecting Activation” will be displayed in the SERVICE CLASS field on the XM Information page, and “Aviator” will be displayed once the XM signal is detected.

5.6.9.9.2 XM Satellite Radio Audio Checkout Procedure

1. Go to the Music page from the Home page.

NOTE

If the XM 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 that the GDL 69A audio is not muted.
3. Verify that audio can be heard over the headsets. Adjustment of the volume may be required.

5.6.9.10 Crossfill Check (If Dual GTNs Installed)

Turn on both GTN units in the aircraft. For each GTN unit:

1. Go to the HSDB Ethernet Diagnostics page from the GTN Diagnostics page. This can be reached from the GTN Configuration home page.
2. For the port that the cross-side GTN is connected to, check the Ethernet Port Status and ensure that 'Connected' is displayed under 'Connection' and 'Receiving' is displayed under 'Data'.
3. If the previous steps do not perform correctly, check the electrical connections and configuration setup.

5.6.9.11 External RMI/OBI Interface Check

The GTN 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.

5.6.9.11.1 Main OBI Output

If the Main OBI output from the GTN is connected to an RMI navigation indicator verify the interface as described in this section.

1. Apply power to the equipment and wait for the GTN to acquire a position.
2. On the GTN, set a course to a destination waypoint and ensure GPS is selected for display on the CDI.
3. If installed, set the RMI select switch to the GPS position.
4. Verify that the RMI needle swings and points toward the GPS waypoint selected.
5. If the Main OBI Output is configured to "Track CDI," ensure that a valid VOR station is not tuned. Select VLOC on the CDI and verify that the RMI needle is parked at the invalid position.
6. If the Main OBI Output is configured to output "Always GPS," select VLOC on the CDI and verify that the RMI needle still points towards the GPS waypoint selected.

5.6.9.11.2 VOR OBI Output (GTN 750)

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.

5.6.9.12 DME Tuning Check (GTN 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, ground speed and time are displayed.
3. Tune an invalid VOR station. Verify that the DME changes to an invalid station.

5.6.9.13 GDU 620 (G500/G600) Interface Check

5.6.10 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 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 recommended as final installation verification. Verify system operation as described in the following sections.

NOTE

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.

5.7.1 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, landing 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. 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.

5.7.2 VHF COM Flight Check (GTN 750)

After the installation is complete, a flight check is recommended 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).

5.7.3 VOR Flight Check (GTN 750)

1. Tune a local VOR station within 50 miles.
2. Verify the AUDIO IDENT and VOICE QUALITY have no objectionable electrical interference such as magneto noise.
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.
6. Record accuracy in System Log (see manual).

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).

5.7.4 ILS Flight Check (GTN 750)

1. Tune an ILS at the local airport.
2. Verify the AUDIO IDENT and AUDIO QUALITY have no objectionable electrical interference such as magneto noise.
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.
6. Verify BC annunciator.

5.7.5 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. 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 750 Only): Reselect the GPSS mode on the autopilot. Press the CDI key to select VLOC on the GTN 750. Verify that the GPSS mode disengages.

5.7.6 TAWS Audio Flight Check (TAWS-equipped Units Only)

NOTE

The TAWS volume needs to 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, but the ambient noise conditions under which it is verified are not worst-case. Consequently, the "Five Hundred" callout should be louder than is required for the conditions under which it is verified.

1. Set up for an approach to the airport.
2. 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 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. Turn off the GTN and then turn it on. The GTN will go through its normal start-up sequence.
2. Wait for the Navigation Database page to be displayed.
3. Verify that the expiration date displayed has not passed.

If the database has expired, then remove and replace the navigation database card as described in the following section, and see Section 5.9.

5.9 Data Card Replacement

CAUTION

Handle the data cards carefully. Do not touch the connector edge of the data card.

To replace the data card do the following:

1. Ensure that the GTN is turned off.
2. Remove the data card by pressing the card until it disengages and then pull card to extract from the unit.
3. With the label facing right, insert the new data card by pushing the card straight into the slot and press until it is inserted fully.

5.10 Software Loading

5.11 System Setup

5.12 Documentation Checks

5.12.1 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).

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.

3. Fill in the appropriate checkbox in the Normal Procedures section of the AFMS corresponding to the autopilot mode transitions.
4. Insert the completed AFMS into the AFM or POH.

5.12.2 Instructions for Continued Airworthiness (ICAW)

Ensure that the appropriate aircraft information is filled in on the Instructions for Continued Airworthiness (ICAW) is completed and inserted in the aircraft permanent records. Fill in the Aircraft Make, Model, Reg. No. and S/N information on the cover of the ICAW (Garmin document TBD)

Insert the completed ICAW in the aircraft permanent records.

5.13 Configuration and Checkout Log

The completed checkout log sheet should be maintained with the aircraft permanent records. If a dual GTN installation is being done, a checkout log for each system must be completed.

Table 5-1. GTN Post-Installation Checkout Log

GTN Post-Installation Checkout Log		Date: ____ /____ /____ By: _____
INSTALLATION INFORMATION:	Aircraft Model: _____ Unit P/N: _____ Unit Model: _____ GPS Antenna P/N:_____	Aircraft S/N: _____ Mod Level: _____ S/N:_____ GPS Ant Model _____

EXTERNAL ANNUNCIATION REQUIREMENT

CDI/HSI SOURCE SELECTION ANNUNCIATION:	**GPS NAVIGATION ANNUNCIATION:**
Annunciation: ❑ Required ❑ Not Required ❑ [❑ N/A] Annunciator Installed	Annunciation: ❑ Required ❑ Not Required ❑ [❑ N/A] Annunciators Installed

CONNECTOR ENGAGEMENT CHECK

❑ Connector engagement checked

CONFIGURATION ITEMS

MAIN ARINC 429 CONFIGURATION

In 1: ❑ High ❑ Low _____
In 2: ❑ High ❑ Low _____
In 3: ❑ High ❑ Low _____
In 4: ❑ High ❑ Low _____
Out 1: ❑ High ❑ Low _____
Out 2: ❑ High ❑ Low _____
Out 3: ❑ High ❑ Low _____
SDI: ❑ Common ❑ LNAV 1 ❑ LNAV 2

MAIN RS-232 CONFIGURATION (RX/TX)

Chnl 1 _____ / _____
Chnl 2 _____ / _____
Chnl 3 _____ / _____
Chnl 4 _____ / _____
Chnl 5 _____ / _____
Chnl 6 _____ / _____

MAIN SYSTEM CONFIGURATION

Fuel Type: _____
Terrain Type: ❑ None ❑ TERRAIN ❑ TAWS

DISCRETES

GPS SELECT: ❑ Auto ❑ Prompt
COM PRESETS [❑ N/A]: ❑ Enabled ❑ Disabled

MAIN LIGHTING

	Display	Keys
Source:	_____	_____
Resp Time / Min:	____ / _____	____ / _____
Slope / Offset:	____ / _____	____ / _____
Photo Transition:	_____	[❑ N/A]
Photo Slp/Ofst:	____ / _____	[❑ N/A]

MAIN CDI/OBS CONFIG

OBI Source: ❑ Always GPS ❑ Track CDI [❑ N/A]
V-Flag State: ❑ Normal ❑ Declutter
SEL CRS for GPS: ❑ Allow ❑ Ignore
SEL CRS for VLOC: ❑ Allow ❑ Ignore
CDI Key: ❑ Allow ❑ Ignore

GPS VERTICAL OFFSET

GPS Antenna Height Above Ground: _____ ft

GAD 42 CONFIGURATION [❑ N/A]

Main RMI/OBI: _____ Roll Steering: _____
NAV RMI/OBI: _____ Remote Crs Sel: _____
Sel Crs Drive: _____ TAS Input: _____
Main RMI/OBI: _____ GPS/NAV 429 L/H: _____
Heading 429 L/H: _____
GAD SW Ver: _____

CONFIGURATION ITEMS (cont'd):

TAWS AUDIO CONFIG 1 [❑ N/A]
Voice: ❑ Female ❑ Male
Volume: _____%
PDA – Caution: **Too Low – Terrain**
EDR – Caution: **Sink Rate**
EDR – Warning: **Pull Up**
NCR – Caution: **Don't Sink**
VCO – Info **Five Hundred**

TAWS AUDIO CONFIG 2 [❑ N/A]
RTC – Caution: ❑ Caution Terrain (2x)
❑ Terrain Ahead (2x)
RTC – Warning: ❑ Terrain (2x); Pull Up (2x)
❑ Terrain Ahead, Pull Up (2x)
ROC – Caution: ❑Caution, Obstacle (2x)
❑ Obstacle Ahead (2x)
ROC – Warning: ❑ Obstacle (2x); Pull Up (2x)
❑ Obstacle Ahead, Pull Up (2x)
ITI – Caution: ❑ Caution, Terrain (2x)
❑ Terrain Ahead (2x)
ITI– Warning: ❑ Terrain (2x), Pull Up (2x)
❑ Terrain Ahead, Pull Up (2x)

TAWS AUDIO CONFIG 2 (CONT'D)
IOI – Caution: ❑ Caution, Obstacle (2x)
❑ Obstacle Ahead (2x)
IOI – Warning: ❑ Obstacle (2x); Pull Up (2x)
❑ Obstacle Ahead; Pull Up (2x)

VOR/LOC/GS CDI (GTN 750 only)
NAV Radio: ❑ Enabled ❑ Disabled

VOR/LOC/GS ARINC 429 CONFIGURATION
RX Speed: ❑ High ❑ Low
TX Speed: ❑ High ❑ Low
SDI: ❑ Common ❑ VOR/ILS 1 ❑ VOR/ILS 2

DME Mode: ❑ Directed freq 1 ❑ Directed freq 2
DME Channel Mode: _____

GDL Configuration [❑ N/A]
Attenuation: _____
Model: ❑ GDL 69A ❑ GDL 69

After completing configuration and prior to checkout, restart unit for changes to take effect

SYSTEM CHECKOUT

GROUND CHECKS (CONFIGURATION MODE)

MAIN ANALOG INDICATOR [❑ N/A]
❑CDI (left, centered, right)
❑VDI (down, centered, up)
❑TO/FROM flag (OFF, TO, FROM)
❑Valid flags
❑OBS (Selected Course)

VOR/ILS INDICATOR [❑ N/A]
❑CDI (left, centered, right)
❑VDI (down, centered, up)
❑TO/FROM flag (OFF, TO, FROM)
❑Valid flags

DISCRETE INPUTS
❑ [❑ N/A] Remote CDI Select
❑ [❑ N/A] Remote OBS Select
❑ [❑ N/A] Terrain Inhibit
❑ [❑ N/A] COM Remote Recall

ANNUNCIATOR OUTPUTS
❑ [❑ N/A] Approach (APR)
❑ [❑ N/A] GPS Indicator (GPS)
❑ [❑ N/A] Integrity (INTEG)
❑ [❑ N/A] Message (MSG)
❑ [❑ N/A] OBS Mode (OBS)
❑ [❑ N/A] Terminal Mode (TERM)
❑ [❑ N/A] VLOC Indicator (VLOC)
❑ [❑ N/A] Waypoint (WPT)
❑ [❑ N/A] ILS/GPS Approach (ILS/GPS APR)
❑ [❑ N/A] GPS Select (GPS SELECT)
❑ [❑ N/A] Terrain Caution (TER CAUT)
❑ [❑ N/A] Terrain Inhibit (TER INHB)
❑ [❑ N/A] Terrain Not Available (TER N/A)
❑ [❑ N/A] Terrain Test (TER TEST)
❑ [❑ N/A] Terrain Warning (TER WARN)

GROUND CHECKS (CONFIGURATION MODE) (CONT'D)	
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 **ALTITUDE ENCODER** ❑ [❑ N/A] Altitude Encoder (Gray code) ❑ [❑ N/A] Altitude Encoder (serial)	**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 **LIGHTING BUS** ❑ [❑ N/A] Aircraft Lighting Bus
GROUND CHECKS (NORMAL MODE)	
SIGNAL ACQUISITION CHECK ❑ Position checked ❑ Signal reception checked ❑ Interference from other avionics checked **VHF COM INTERFERENCE** ❑ VHF COM interference checked **VHF NAV CHECKOUT (GTN 750 ONLY)** ❑ VOR reception checked ❑ Localizer reception checked ❑ Deviation needle and flag checked **VHF COM CHECKOUT (GTN 750 ONLY)** ❑ Receiver / Transmitter operation checked ❑ Antenna checked VSWR _____	**TAWS SYSTEM** [❑ N/A] ❑ TAWS System Test OK **INTERFACE CHECKS** ❑ [❑ N/A] Honeywell EFS 40/50 ❑ [❑ N/A] Sandel SN3308 ❑ [❑ N/A] Sandel SN3500/4500 ❑ [❑ N/A] ARINC 429 Traffic System ❑ [❑ N/A] Ryan TCAD ❑ [❑ N/A] L-3 Communications Stormscope ❑ [❑ N/A] Garmin GMX 200 / MX20 ❑ [❑ N/A] Garmin GDL 69/69A ❑ [❑ N/A] Crossfill check ❑ [❑ N/A] External RMI ❑ [❑ N/A] DME Tuning ❑ [❑ N/A] G600 System **MAGNETIC COMPASS CHECK** ❑ [❑ N/A] Compass swing performed
FLIGHT CHECKS	
❑ GPS checked ❑ COM checked (GTN 750 Only) ❑ VOR checked (GTN 750 Only)	❑ ILS checked (GTN 750 Only) ❑ Autopilot checked ❑ TAWS aural level checked
DATABASE CHECKS	
❑ Database checked	
AFMS CHECKS	
❑ Antenna type checked ❑ Autopilot Mode transitions checked	❑ Autopilot coupling limitations checked ❑ Completed AFMS inserted in AFM/POH
COMMENTS:	

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6. LIMITATIONS

6.1 Operations

All functions of the GTN meet the appropriate design assurance qualifications for a primary system for aircraft in Class I, Class II, and Class III in accordance with AC 23.1309-1D, Figure 2.

6.2 Installation

The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those installing this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in an aircraft. The article may be installed only if performed under 14 CFR part 43 or the applicable airworthiness requirements.

The GTN GPS/WAAS receiver, when installed with an appropriate antenna listed in Section 1.3.8, is compatible with aircraft equipped with SATCOM when installed in accordance to this manual.

6.2.1 GPS Antenna

The GPS/WAAS receiver is compatible with the GPS antennas listed in Section 1.3.8.

6.3 Aircraft Radio Station License

An aircraft radio station license is not required when operating in U.S. airspace, but may be required when operating internationally.

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7. PERIODIC MAINTENANCE

7.1 Equipment Calibration

No scheduled servicing tasks are required on the GTN 725 or GTN 750.

7.2 VOR Checks

Refer to CFR 14 paragraph 91.171. Every 30 days verify the limits of the permissible indicated bearing error.

7.3 Cleaning

The front bezel, keypad, and display can be cleaned with a soft cotton cloth dampened with clean water. DO NOT use any chemical cleaning agents. Care should be taken to avoid scratching the surface of the display.

7.4 Battery Replacement

WARNING

This product contains a Lithium battery that must be recycled or disposed of properly. Battery replacement and removal must be performed by professional services.

The GTN includes an internal battery that will last 5 to 8 years. The battery is used for internal time clock and GPS system information. Regular planned replacement is not necessary. The GTN will display a "Low Battery" and "Unit Needs Service" message when replacement is required. Once the low battery message is displayed, the battery should be replaced within 1 to 2 months.

If the battery is not replaced and becomes totally discharged, the GTN will remain fully operational, but the GPS signal acquisition time will be increased. There is no loss of function or accuracy of the GTN with a dead battery.

The battery is not user replaceable. To replace the battery, contact the Garmin repair station or factory authorized repair station.

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Appendix A ENVIRONMENTAL QUALIFICATION FORM

For RTCA/DO-160F Environmental Qualification Forms (EQFs) visit the Dealers Only site on http://www.garmin.com. The GTN 725 and GTN 750 use the same EQF, part number 005-00533-13.

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Appendix B GTN DATA FORMAT

B.1 RS-232 Aviation Data Format

B.1.1 Electrical Interface

The output signals are compatible with RS-232C. Data is generated at 9600 baud with a word length of 8 bits, one stop bit, and no parity.

B.1.2 General Output Format

The GTN RS-232 data has the following general format:

STX - ASCII start-of-text character (02 hex)

t1s - Type 1 output sentences (see following paragraphs for description)

t2s - One or more type 2 output sentences (see following paragraphs for description)

ETX - ASCII end-of-text character (03 hex)

B.1.3 Output Sentence Type 1

The Type 1 output sentences have the following general format:

id - item designator (single ASCII alphabetic character)

dddd - item data (1 to 10 printable ASCII characters)

CR - ASCII carriage return character (0D hex)

LF - ASCII line feed character (0A hex)*

Each Type 1 sentence is output by the GTN approximately once every second.

The track, desired track, and bearing to waypoint angles, and the magnetic variation are output according to the current mode of the GTN (automatic magnetic heading, magnetic variation computed at last known position; true heading, magnetic variation of E00.0°; or user-defined magnetic heading, magnetic variation as entered by user).

Table B-1 describes the Type 1 output sentence item designator (id) and item data (dddd) fields. If data for these sentences is invalid or unavailable, dashes ("-") are used to fill in all non-blank character positions.

Table B-1. Type 1 Output Sentence Format

Ident (1 byte)	Data (10 bytes) 1 2 3 4 5 6 7 8 9 0	Description
z	a a a a a	Current GPS altitude in feet *
A	s d d m m h h	Current latitude, where: s - N (north) or S (south) dd - degrees mm - minutes hh - hundredths of minutes
B	s d d d m m h h	Current longitude, where: s - E (east) or W (west) ddd - degrees mm - minutes hh - hundredths of minutes
C	d d d	Track in whole degrees
D	s s s	Ground speed in knots
E	d d d d d	Distance to waypoint in tenths of nautical miles
G	s n n n n	Cross track error, where: s - L (left) or R (right) of course nnnn - error in hundredths of nautical miles
I	d d d d	Desired track in tenths of degrees
K	c c c c c	Destination waypoint identifier (will be blank filled on right if less than 5 characters in identifier)
L	d d d d	Bearing to destination waypoint in tenths of degrees
Q	s d d d	Magnetic variation, where: s - E (east) or W (west) ddd - tenths of degrees
S	- - - - f	NAV valid flag status, where: f - N (NAV flagged) or - (NAV valid)
T	- - - - - - - - - -	Warnings status, only data transmitted are dashes (-). Used to indicate end of Type 1 sentences.
l (lower case Lima)	d d d d d d	Distance to destination waypoint in tenths of nautical miles.

* The altitude is not output if the RS-232 port is configured as “Avtn no alt”.

* The line feed character is not output if the RS-232 port is configured as “Avtn no alt”.

B.1.4 Output Sentence Type 2

The GTN Type 2 output sentence has the following general format:

id - item designator (3 ASCII characters)

seq - sequence number (1 binary byte)

wpt - waypoint identifier (5 ASCII characters)

lat - waypoint latitude (3 binary bytes)

lon - waypoint longitude (4 binary bytes)

mvar - magnetic variation at waypoint (2 binary bytes)

CR - ASCII carriage return character (0D hex)

LF - ASCII line feed character (0A hex)

Each waypoint in the route being navigated by the GTN has a Type 2 sentence output by the GTN approximately once every second.

If no route is being navigated by the GTN (i.e., the active route is empty), the following Type 2 sentence is output approximately once every second:

id - item designator (3 ASCII characters; route sequence number is "01")

seq - sequence number (1 binary byte; last waypoint flag is set; route sequence number is 1)

CR - ASCII carriage return character (0D hex)

LF - ASCII line feed character (0A hex)

Table B-2 describes the Type 2 output sentence item designator (id), sequence number (seq), waypoint identifier (wpt), waypoint latitude (lat), waypoint longitude (lon), and magnetic variation at waypoint (mvar) fields.

Table B-2. Type 2 Output Sentence Format

Field	Byte	Format 7 6 5 4 3 2 1 0	Description
id	1 2-3		ASCII character 'w' (77 hex) Two ASCII numeric characters representing route sequence number of waypoint (01 to 31)
seq	1	x l a n n n n n	x - undefined l - 1 if last waypoint in route a - 1 if active to waypoint nnnnn - route sequence number of waypoint (unsigned binary)
wpt	1-5		Destination waypoint identifier (will be blank filled on right if less than 5 characters in identifier)
lat	1 2 3	s d d d d d d d x x m m m m m m x h h h h h h h	s - 0 (north) or 1 (south) ddddddd - latitude degrees (unsigned binary) xx - undefined mmmmmm - latitude minutes (unsigned binary) x - undefined hhhhhhh - hundredths of latitude minutes (unsigned binary)
lon	1 2 3 4	s x x x x x x x d d d d d d d d x x m m m m m m x h h h h h h h	s - 0 (east) or 1 (west) xxxxxxx - undefined ddddddd - longitude degrees (unsigned binary) xx - undefined mmmmmm - latitude minutes (unsigned binary) x - undefined hhhhhhh - hundredths of latitude minutes (unsigned binary)
mvar	1-2		Two's complement binary in 16ths of degrees. Easterly variation is positive. MSB output first.

B.2 GTN RS-232 Fuel/Air Data Input Format

B.2.1 Electrical Interface

The input signals are compatible with RS-232C. Data is input at 9600 baud with a word length of 8 bits, one stop bit, and no parity. One message is received per second.

B.2.2 Shadin Altitude Sentence

The Garmin GTN is capable of receiving the following 17-byte message from Shadin Altitude Encoders, Altitude Serializers, and Altitude Converters:

RMS<sp><+/->12345T<+/->12ul<CR>

Where:

RMS	ASCII characters
<sp>	space (0x20)
<+/->	sign indicator (0x2b["+"] or 0x2d["-"])
12345	altitude in feet
T	ASCII character
<+/->	sign indicator
12	sensor temperature
ul	checksum of bytes 1 through 14 in hex ASCII (i.e., "FA")
<CR>	carriage return (0x0d)

Note: Checksum is calculated by adding each byte in the message (1 through 14).

B.2.3 Icarus Altitude Sentence

The Garmin GTN is capable of receiving the following 10-byte message from the Icarus Altitude Serializer:

ALT<sp>12345<CR>

Where:

ALT	ASCII characters
<sp>	space (0x20)
12345	altitude in feet
<CR>	carriage return (0x0d)

B.2.4 Shadin Fuel Flow Sentence

The Garmin GTN is capable of receiving the following 55-byte message from the Shadin Fuel Flow Indicator:

<STX>K0543.2<sp>0100.0<sp>0040.0<sp>0060.0<sp>0123.4<sp>0045.4<sp>0078.0<sp>123<ETX>

Where:

<STX> start-transmit character (0x02)

K units designation (i.e., Gallons, Liters, Kilograms, B[pounds])

0543.2 total fuel remaining (i.e., ASCII-coded decimal format: 0x30, 0x35, 0x34, 0x33, 0x2e, 0x32)

<sp> space (0x20)

0100.0 fuel flow rate, total (formatted as for total fuel remaining)

0040.0 fuel flow rate, engine one (or asterisks["******"], in the case of single engine aircraft)

0060.0 fuel flow rate, engine two (asterisks, in the case of single engine aircraft)

0123.4 fuel used, total

0045.4 fuel used, engine one (asterisks, in the case of single engine aircraft)

0078.0 fuel used, engine two (asterisks, in the case of single engine aircraft)

123 checksum (of bytes 2 through 51)

<ETX> end-transmit character (0x03)

Note: Checksum is calculated by adding each byte in the message (2 through 51), such that carries are discarded to give a one byte result. The ASCII-coded decimal representation of that byte is given, ranging from 0 (0x30, 0x30, 0x30) to 255 (0x32, 0x35, 0x35).

B.2.5 ARNAV/EI Fuel Flow Sentence

The Garmin GTN is capable of receiving the following 13-byte message from the ARNAV or Electronics International (“EI”) Fuel Flow Indicators:

<STX>G0245100550<ETX>

Where:

<STX> start-transmit character (0x02 hex)

G units designation (i.e., Gallons, Imperial gallons, Liters, Kilograms, B[pounds])

0245 total fuel remaining in reverse order (i.e., ASCII-coded decimal format: 0x30, 0x32, 0x34, 0x35)

1 fuel remaining checksum (modulo 10 sum of four "total fuel remaining" digits)

0055 total fuel flow rate in reverse order

0 fuel flow checksum

<ETX> end-transmit character (0x03)

Note: Fuel remaining and fuel flow are [∗ 10] when units designation is gallons or imperial gallons. For example, 0245 gallons indicates 542 gallons; 0245 liters indicates 5420 liters. Checksum is the modulo 10 sum of the four fuel flow decimal digits, converted to an ASCII numerical character (e.g., checksum for "5678" would be ASCII "6").

B.2.6 Shadin Fuel/Air Data Computer Sentence

The Garmin GTN is capable of receiving the following message strings from the Shadin Fuel/Air Data or Air Data Computer:

SHADIN "z" FORMAT

<STX>

ZA012<CR><LF>	"ZA" (ASCII characters); "012" represents indicated Air Speed (knots)
ZB345<CR><LF>	"ZB" (ASCII characters); "345" represents true Air Speed (knots)
ZC678<CR><LF>	"ZC" (ASCII characters); "678" represents Mach Speed (thousandths)
ZD<+/->9012<CR><LF>	"ZD" (ASCII characters); sign; "9012" represents pressure altitude (tens of feet)
ZE<+/->3456<CR><LF>	"ZE" (ASCII characters); sign; "3456" represents density altitude (tens of feet)
ZF<+/->78<CR><LF>	"ZF" (ASCII characters); sign; "78" represents outside air temperature (Celsius)
ZG<+/->90<CR><LF>	"ZG" (ASCII characters); sign; "90" represents true air temperature (Celsius)
ZH123<CR><LF>	"ZH" (ASCII characters); "123" represents wind direction (degrees from north)
ZI456<CR><LF>	"ZI" (ASCII characters); "456" represents wind speed (knots)
ZJ<+/->78<CR><LF>	"ZJ" (ASCII characters); sign; "78" represents rate of turn (degrees per second)
ZK<+/->901<CR><LF>	"ZK" (ASCII characters); sign; "901" represents vertical speed (tens of ft/minute)
ZL234<CR><LF>	"ZL" (ASCII characters); "234" represents heading (degrees from north)
ZM5678<CR><LF>†	"ZM" (ASCII characters); "5678" represents fuel flow, right (tenths gallons/hour)
ZN90123<CR><LF>†	"ZN" (ASCII characters); "90123" represents fuel used, right (tenths gallons)
ZO4567<CR><LF>†	"ZO" (ASCII characters); "4567" represents fuel flow, left (tenths gallons/hour)
ZP89012<CR><LF>†	"ZP" (ASCII characters); "89012" represents fuel used, left (tenths gallons)
ZQ345<CR><LF>	"ZQ" (ASCII characters); "345" represents error log/reason indicator
ZR678<CR><LF>	"ZR" (ASCII characters); "678" represents checksum

<ETX>

Where:

<STX>	start-transmit character (0x02)
<CR>	carriage-return character (0x0d)
<LF>	line-feed character (0x0a)
<+/->	sign indicator (0x2b["+"] or 0x2d["-"])
<ETX>	end-transmit character (0x03)

† Not available from Air Data Computer

Note: Checksum is calculated by adding each byte in the message (including all characters from <STX> up to and including the error log/reason indicator), such that carries are discarded to give a one byte result. The ASCII-coded decimal representation of that byte is given, ranging from 0 (0x30, 0x30, 0x30) to 255 (0x32, 0x35, 0x35).

SHADIN "G" FORMAT

<STX>

GA012<CR><LF>	"GA" (ASCII characters); "012" represents indicated Air Speed (knots)
GB345<CR><LF>	"GB" (ASCII characters); "345" represents true Air Speed (knots)
GC678<CR><LF>	"GC" (ASCII characters); "678" represents Mach Speed (thousandths)
GD<+/->9012<CR><LF>	"GD" (ASCII characters); sign; "9012" represents pressure altitude (tens of feet)
GE<+/->3456<CR><LF>	"GE" (ASCII characters); sign; "3456" represents density altitude (tens of feet)
GF<+/->78<CR><LF>	"GF" (ASCII characters); sign; "78" represents outside air temperature (Celsius)
GG<+/->90<CR><LF>	"GG" (ASCII characters); sign; "90" represents true air temperature (Celsius)
GH123<CR><LF>	"GH" (ASCII characters); "123" represents wind direction (degrees from north)
GI456<CR><LF>	"GI" (ASCII characters); "456" represents wind speed (knots)
GJ<+/->78<CR><LF>	"GJ" (ASCII characters); sign; "78" represents rate of turn (degrees per second)
GK<+/->901<CR><LF>	"GK" (ASCII characters); sign; "901" represents vertical speed (tens of ft/minute)
GL234<CR><LF>	"GL" (ASCII characters); "234" represents heading (degrees from north)
GM5678<CR><LF>†	"GM" (ASCII characters); "5678" represents fuel flow, right (Twin only) (tenths gallons/hour)
GN90123<CR><LF>†	"GN" (ASCII characters); "90123" represents fuel used, right (Twin only) (tenths gallons)
GO4567<CR><LF>	"GO" (ASCII characters); "4567" represents fuel flow, left (or Single) (tenths gallons/hour)
GP89012<CR><LF>	"GP" (ASCII characters); "89012" represents fuel used, left (or Single) (tenths gallons)
GQ001<CR><LF>	"GQ" (ASCII characters); "001" represents error log/reason indicator (001 = temp. sensor error, 000 = no errors)
GR6789.0<CR><LF>†	"GR" (ASCII characters); "6789.0" represents fuel remaining (gallons)
Ga<+/->1234<CR><LF>	"Ga" (ASCII characters); sign; "12.34" represents barometric corrected altitude (tens of feet)
Gb56.78<CR><LF>	"Gb" (ASCII characters); "56.78" represents current barometric pressure setting (inches Hg)
G*901<CR><LF>	"G*" (ASCII characters); "901" represents checksum

<ETX>

Where:

<STX>	start-transmit character (0x02)
<CR>	carriage-return character (0x0d)
<LF>	line-feed character (0x0a)
<+/->	sign indicator (0x2b["+"] or 0x2d["-"])
<ETX>	end-transmit character (0x03)

† Not available from Airdata Computer

Note: Checksum is calculated by adding each byte in the message (including all characters from <STX> up to and including the error log/reason indicator), such that carries are discarded to give a one byte result. The ASCII-coded decimal representation of that byte is given, ranging from 0 (0x30, 0x30, 0x30) to 255 (0x32, 0x35, 0x35).

SHADIN "S" FORMAT

<STX>

SA012<CR><LF> "SA" (ASCII characters); "012" represents indicated Air Speed (knots)

SB345<CR><LF> "SB" (ASCII characters); "345" represents true Air Speed (knots)

SC678<CR><LF> "SC" (ASCII characters); "678" represents Mach Speed (thousandths)

SD<+/->9012<CR><LF> "SD" (ASCII characters); sign; "9012" represents pressure altitude (tens of feet)

SE<+/->3456<CR><LF> "SE" (ASCII characters); sign; "3456" represents density altitude (tens of feet)

SF<+/->78<CR><LF> "SF" (ASCII characters); sign; "78" represents outside air temperature (Celsius)

SG<+/->90<CR><LF> "SG" (ASCII characters); sign; "90" represents true air temperature (Celsius)

SH123<CR><LF> "SH" (ASCII characters); "123" represents wind direction (degrees from north)

SI456<CR><LF> "SI" (ASCII characters); "456" represents wind speed (knots)

SJ<+/->78<CR><LF> "SJ" (ASCII characters); sign; "78" represents rate of turn (degrees per second)

SK<+/->901<CR><LF> "SK" (ASCII characters); sign; "901" represents vertical speed (tens of ft/minute)

SL234<CR><LF> "SL" (ASCII characters); "234" represents heading (degrees from north)

SM5678<CR><LF> "SM" (ASCII characters); "5678" represents fuel flow, right (tenths gallons/hour)

SN90123<CR><LF> "SN" (ASCII characters); "90123" represents fuel used, right (tenths gallons)

SO4567<CR><LF> "SO" (ASCII characters); "4567" represents fuel flow, left (tenths gallons/hour)

SP89012<CR><LF> "SP" (ASCII characters); "89012" represents fuel used, left (tenths gallons)

SQ345<CR><LF> "SQ" (ASCII characters); "345" represents error log/reason indicator

SR67890<CR><LF> "SR" (ASCII characters); "67890" represents fuel remaining (tenths gallons)

SS123<CR><LF> "SS" (ASCII character); "123" represents ground speed (knots)

ST456<CR>LF> "ST" (ASCII character); "456" represents track (degrees)

SU789012<CR><LF> "SU" (ASCII character); "789012" represents distance to waypoint (hundredths nautical miles)

SV<E/W>345<CR><LF> "SV" (ASCII character); "E" represents East, "W" represents West; "345" represents magnetic variation (tenths degrees)

SW<N/S>67 8901<CR><LF>"SW" (ASCII character); "N" represents North, "S" represents South; "67 8910" represents current latitude (degrees, minutes, hundredths of minutes)

SX<E/W>234 5678<CR><LF>"SX" (ASCII character); "E" represents East, "W" represents West; "234 5678" represents current longitude (degrees, minutes, hundredths of minutes)

SY<L/R>90<CR><LF> "SY" (ASCII character); "L" represents Left, "R" represents Right; "90" represents drift angle (degrees)

Sa<+/->1234<CR><LF> "Sa" (ASCII character); sign; "1234" represents barometric corrected altitude (tens of feet)

Sb56.78<CR><LF> "Sb" (ASCII character); "56.78" represents current barometric pressure setting (inches Hg)

S*901<CR><LF> "S*" (ASCII character); "901" represents checksum

<ETX>

Where:

<STX> start-transmit character (0x02)

<CR> carriage-return character (0x0d)

<LF> line-feed character (0x0a)

<+/-> sign indicator (0x2b["+"] or 0x2d["-"])

<ETX> end-transmit character (0x03)

Note: Checksum is calculated by adding each byte in the message (including all characters from <STX> up to and including the error log/reason indicator), such that carries are discarded to give a one byte result. The ASCII-coded decimal representation of that byte is given, ranging from 0 (0x30, 0x30, 0x30) to 255 (0x32, 0x35, 0x35).

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Appendix C MECHANICAL DRAWINGS

C.1 Drawing List

The following drawings are included in this section.

- ❒ Figure C-1. GTN Mounting Rack Dimensions
- ❒ Figure C-2. GTN Mounting Rack Installation
- ❒ Figure C-3. GTN Mounting Rack Assembly
- ❒ Figure C-4. GTN Recommended Panel Cutout Dimensions

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Figure C-1. GTN Mounting Rack Dimensions

Figure C-2. GTN Mounting Rack Installation

Figure C-3. GTN Mounting Rack Assembly

Figure C-4. GTN Recommended Panel Cutout Dimensions

Appendix D INTERCONNECT DIAGRAMS

D.1 Drawing List

The following drawings are included in this section:

- ❒ Figure D-1. GTN System Interface Diagram
- ❒ Figure D-2. GTN 750 Typical Installation
- ❒ Figure D-3. GTN 725 Typical Installation
- ❒ Figure D-4. GTN Power Lighting Configuration Interconnect
- ❒ Figure D-5. GTN – Antenna Interconnect
- ❒ Figure D-6. GTN - Main Indicator Interconnect
- ❒ Figure D-7. GTN - Autopilot Interconnect
- ❒ Figure D-8. GTN - Traffic Interconnect
- ❒ Figure D-9. GTN - Transponder Interconnect
- ❒ Figure D-10. Dual GTN to Single GDU Interconnect
- ❒ Figure D-11. GTN - GDU/AHRS Interconnect
- ❒ Figure D-12. GTN - ARINC 429 EFIS Interconnect
- ❒ Figure D-13. GTN - GDL 69/69A Interconnect
- ❒ Figure D-14. Audio Panel Interconnect
- ❒ Figure D-15. Air Data/IRU/AHRS RS-232 Interconnect
- ❒ Figure D-16. Air Data/IRU/AHRS ARINC 429 Interconnect
- ❒ Figure D-17. GAD 42 Interconnect
- ❒ Figure D-18. VOR/ILS Indicator Interconnect
- ❒ Figure D-19. RMI OBI Interconnect
- ❒ Figure D-20. GTN – WX-500 Interconnect
- ❒ Figure D-21. GTN 750 - DME Interconnect
- ❒ Figure D-22. GTN 750 – Remote DME Interconnect
- ❒ Figure D-23. Parallel 2 of 5 DME Tuning
- ❒ Figure D-24. Parallel Slip Code DME Tuning Interconnect
- ❒ Figure D-25. Heading Synchro Interconnect
- ❒ Figure D-26. GPS Annunciator Interconnect
- ❒ Figure D-27. NAV Source Select Annunciator Interconnect
- ❒ Figure D-28. TAWS Interconnect
- ❒ Figure D-29. Switches Interconnect

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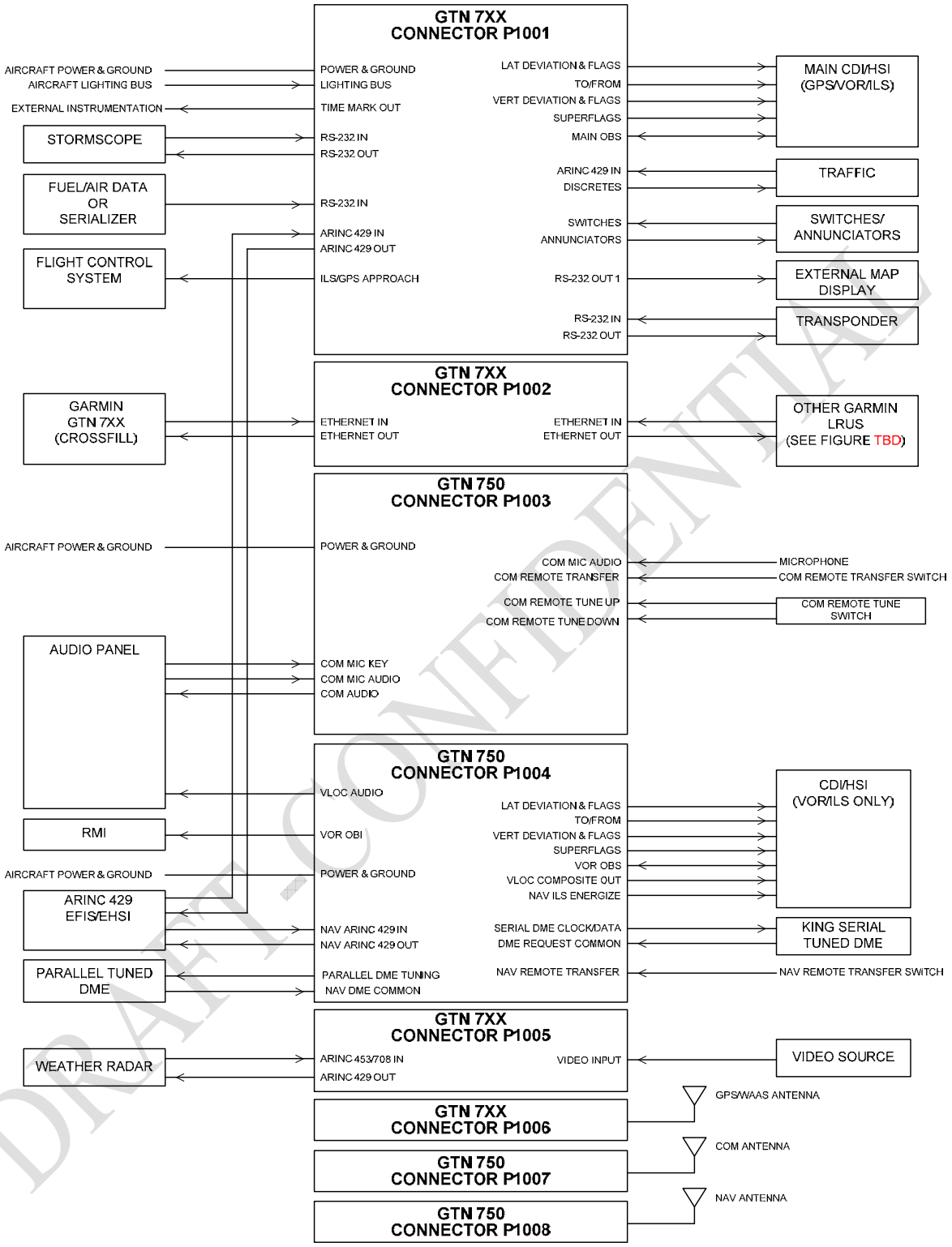


Figure D-1. GTN System Interface Diagram

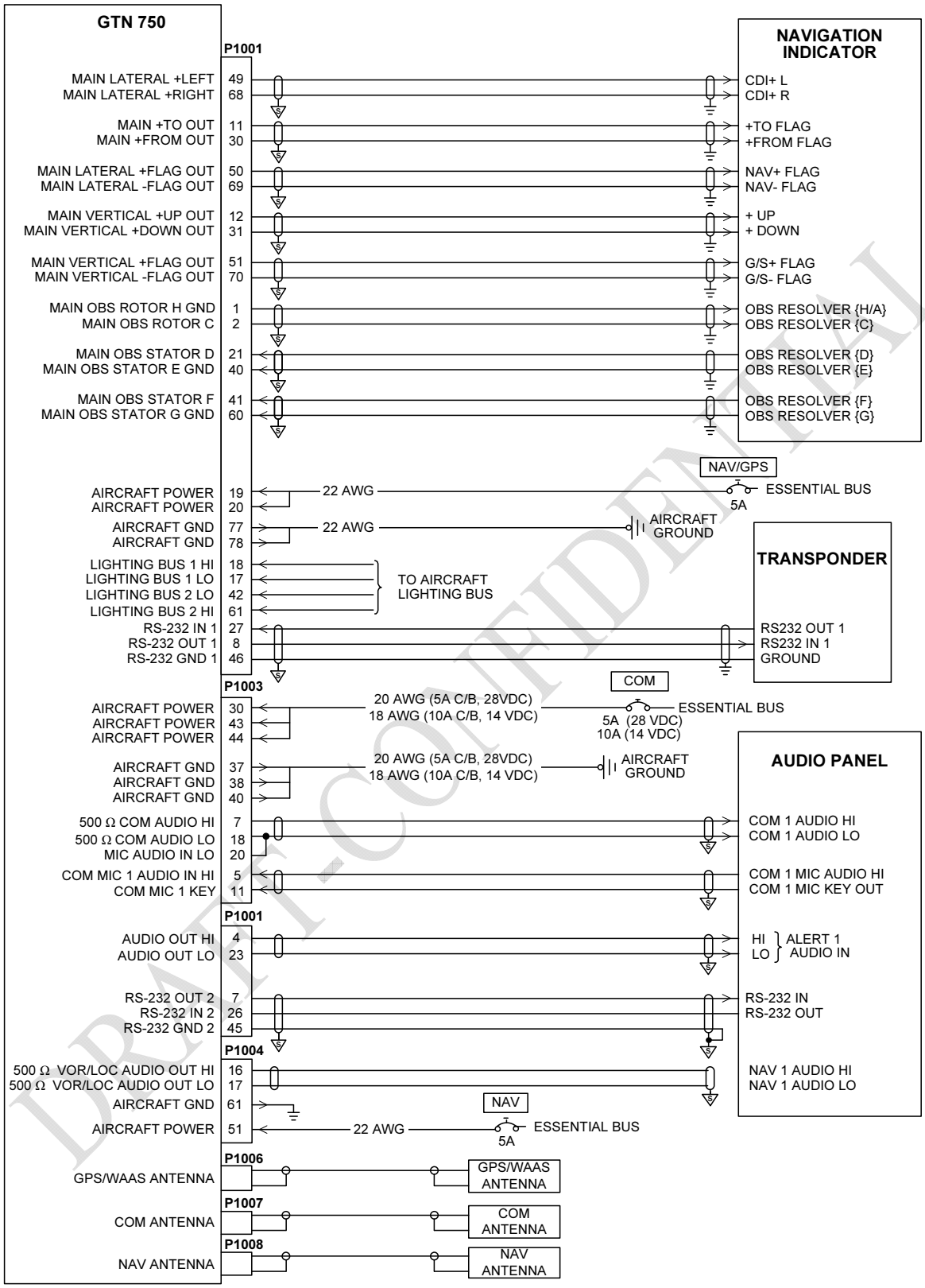


Figure D-2. GTN 750 Typical Installation
Sheet 1 of 2

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT GTN 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. THIS DIAGRAM PROVIDES AN OVERVIEW OF A TYPICAL GTN 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.

Figure D-2. GTN 750 Typical Installation
Sheet 2 of 2

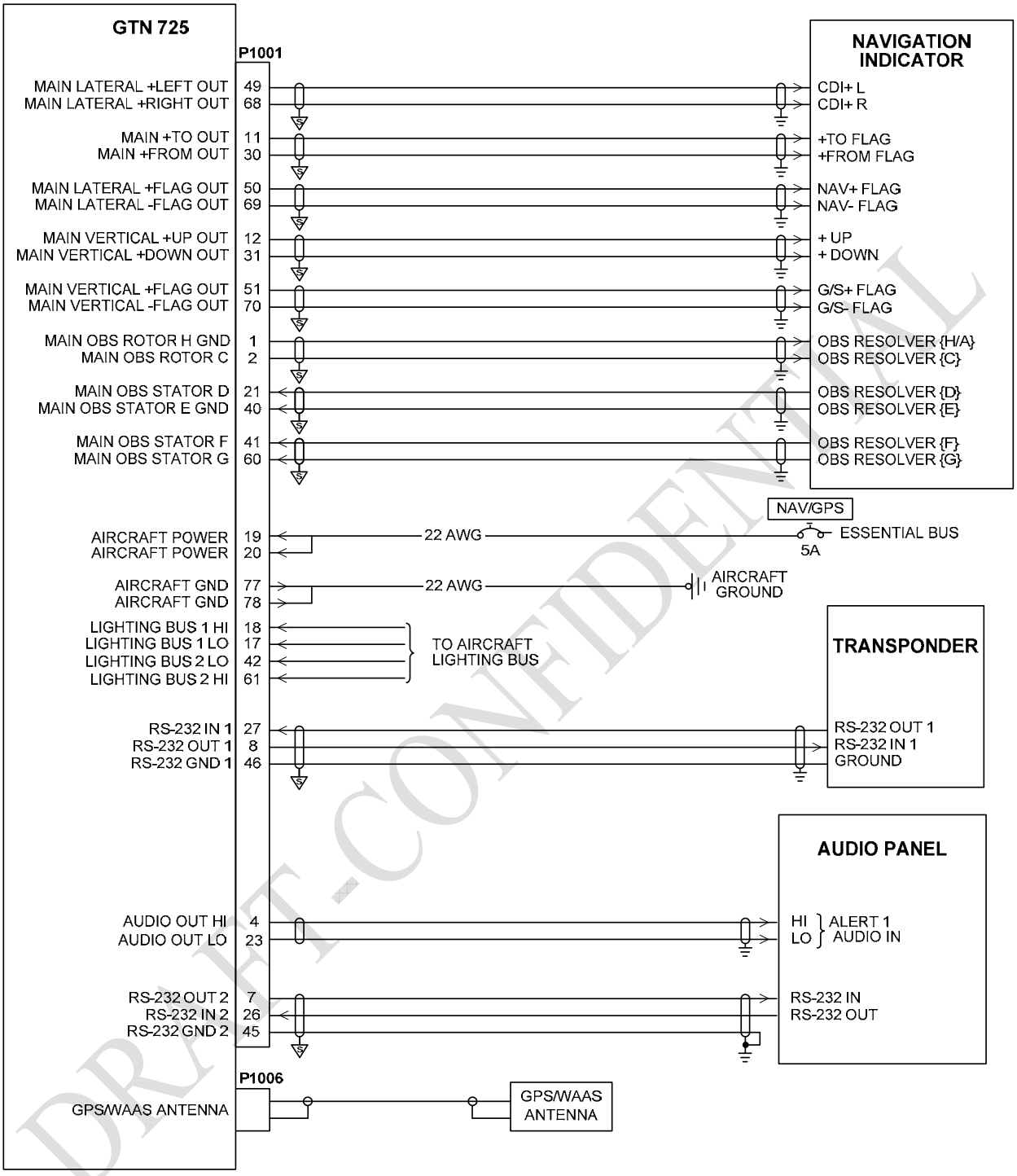
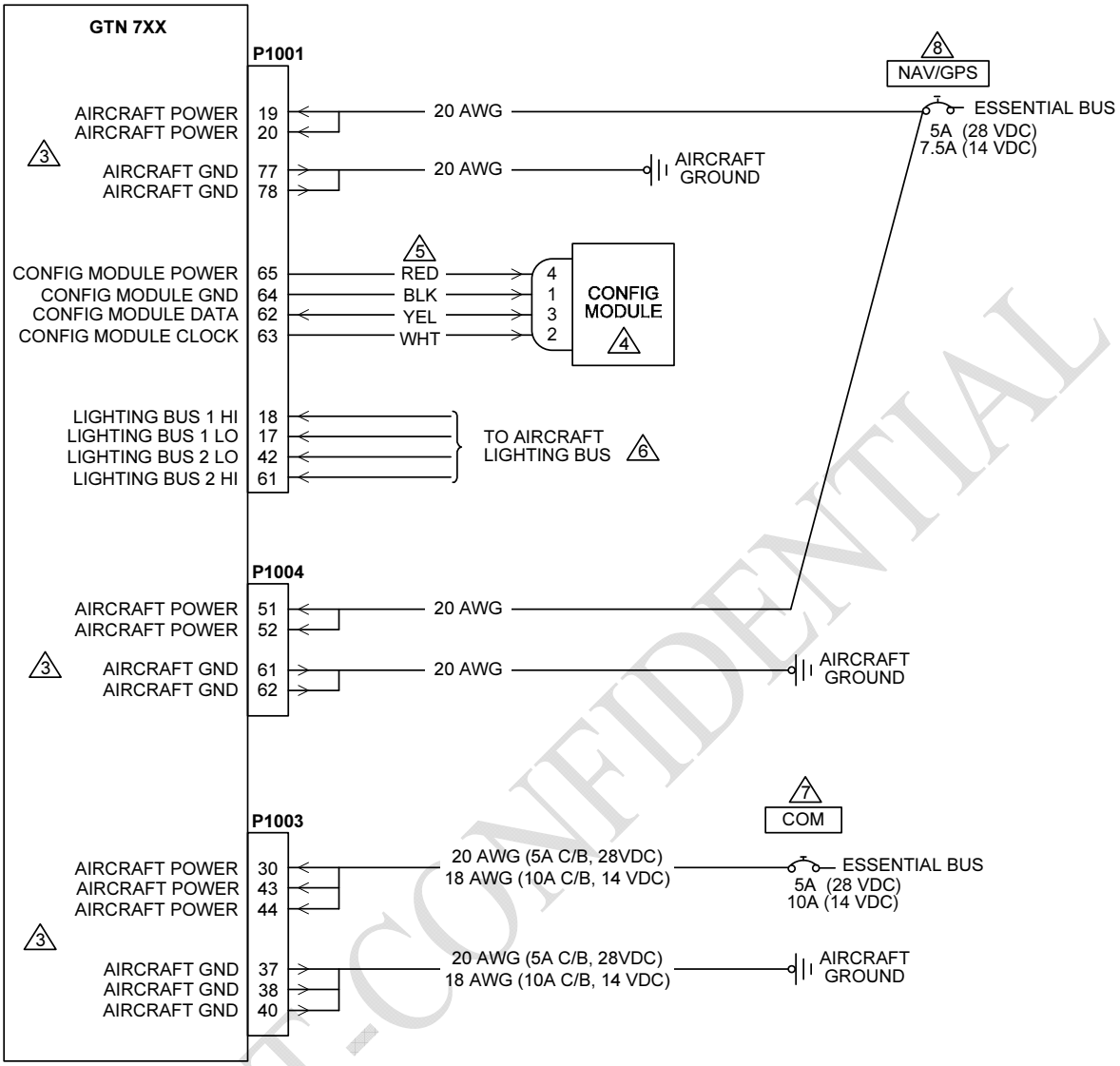


Figure D-3. GTN 725 Typical Installation
Sheet 1 of 2

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT GTN 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. THIS DIAGRAM PROVIDES AN OVERVIEW OF A TYPICAL GTN 725 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.

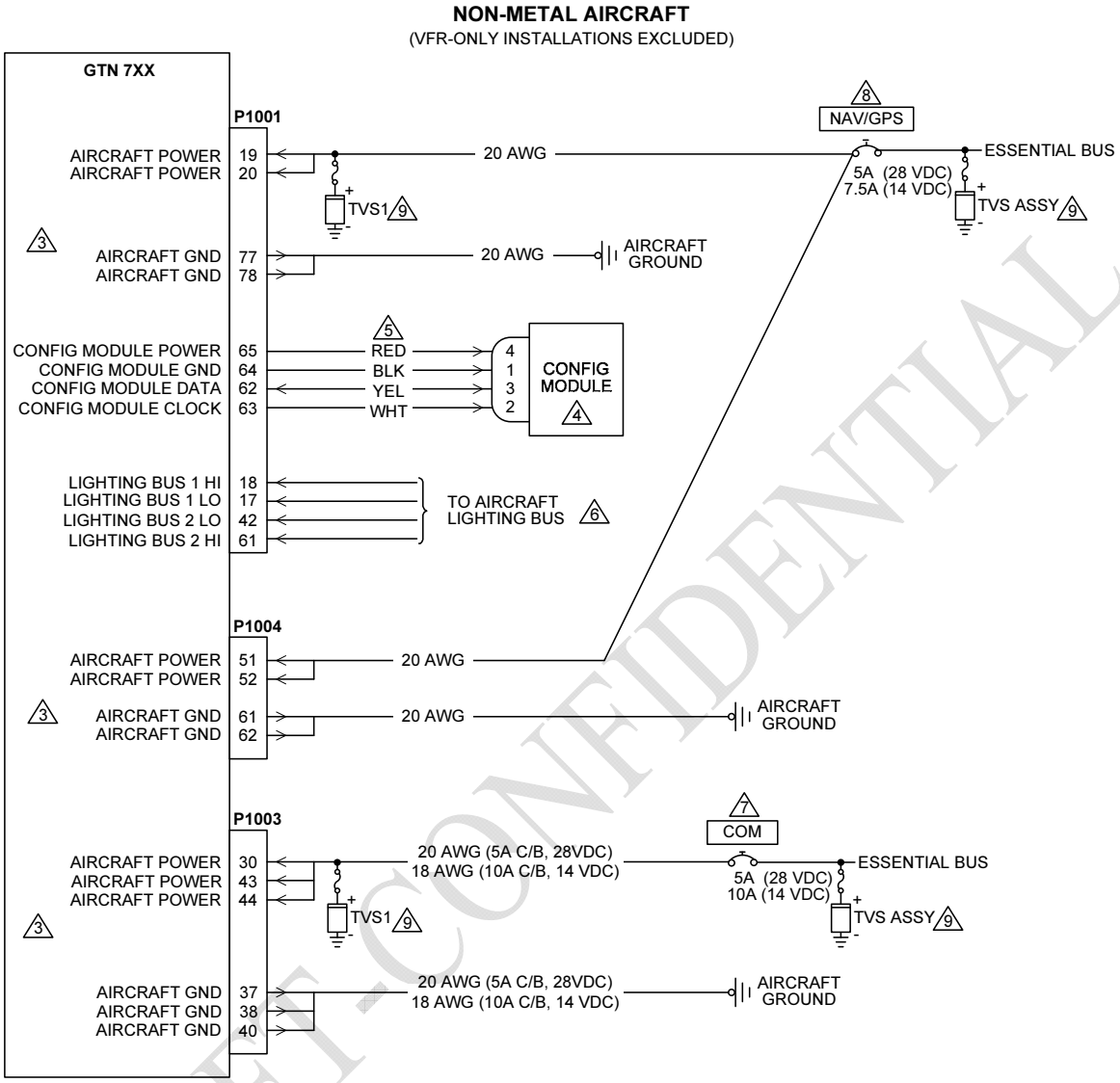
Figure D-3. GTN 725 Typical Installation
Sheet 2 of 2



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. ALL POWER LEADS AND GROUND LEADS ARE REQUIRED.
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. REFER TO SECTION TBD FOR MORE DETAILS.
7. CIRCUIT BREAKER SHOULD BE LABELED AS SHOWN.
8. CIRCUIT BREAKER SHOULD BE LABELED AS: “GPS” FOR THE GTN 725, AND “NAV/GPS” FOR THE GTN 750

Figure D-4. GTN Power Lighting Configuration 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. ALL POWER LEADS AND GROUND LEADS ARE REQUIRED.
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. REFER TO SECTION TBD FOR MORE DETAILS.
7. CIRCUIT BREAKER SHOULD BE LABELED AS SHOWN.
8. CIRCUIT BREAKER SHOULD BE LABELED AS: "GPS" FOR THE GTN 725, AND "NAV/GPS" FOR THE GTN 750.
9. TVS ASSEMBLY PROTECTION IS ONLY REQUIRED ON ONE GTN IN A DUAL NAV/COM INSTALLATION.

Figure D-4. GTN Power Lighting Configuration Interconnect
Sheet 2 of 2

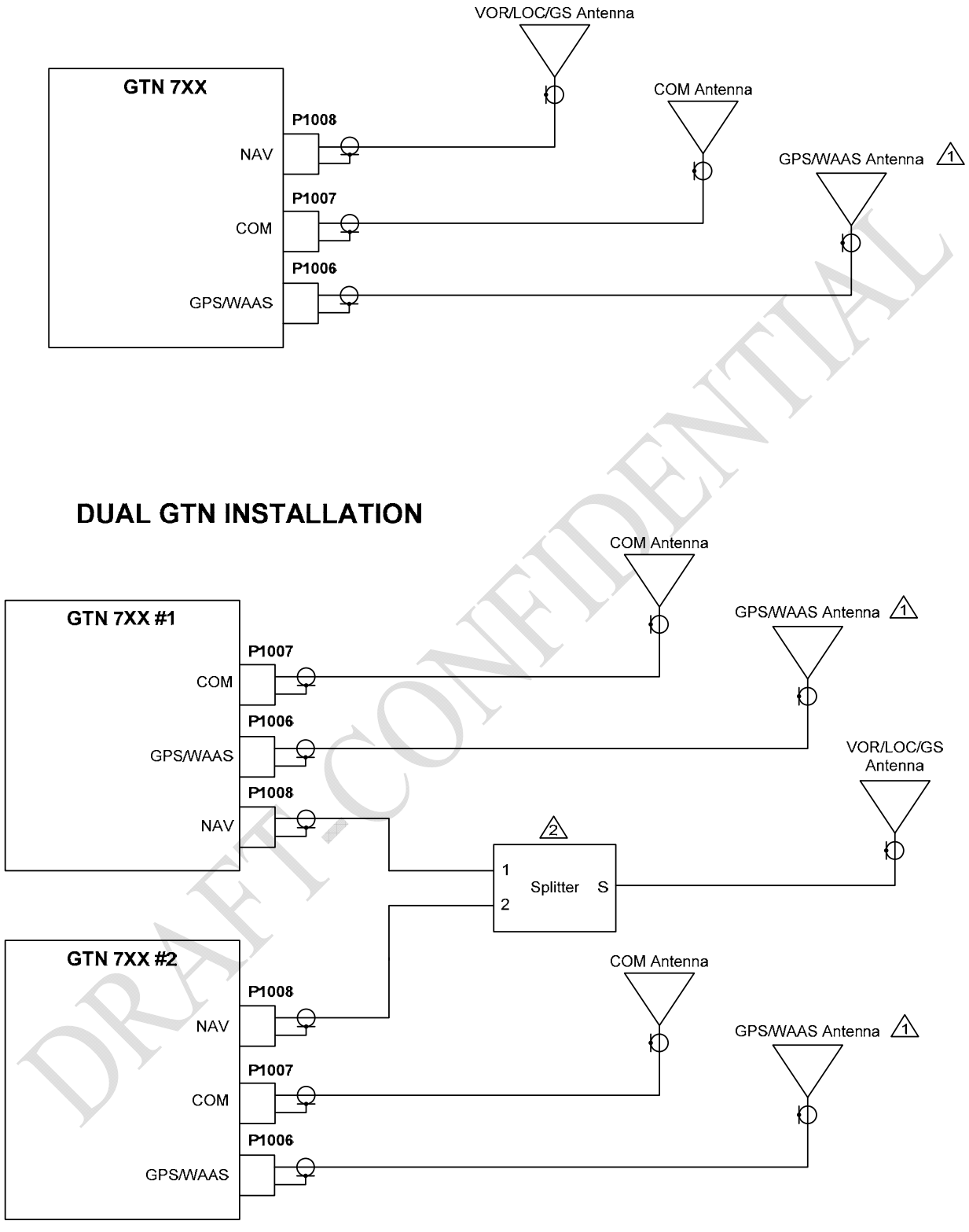


Figure D-5. GTN – Antenna Interconnect
Sheet 1 of 3

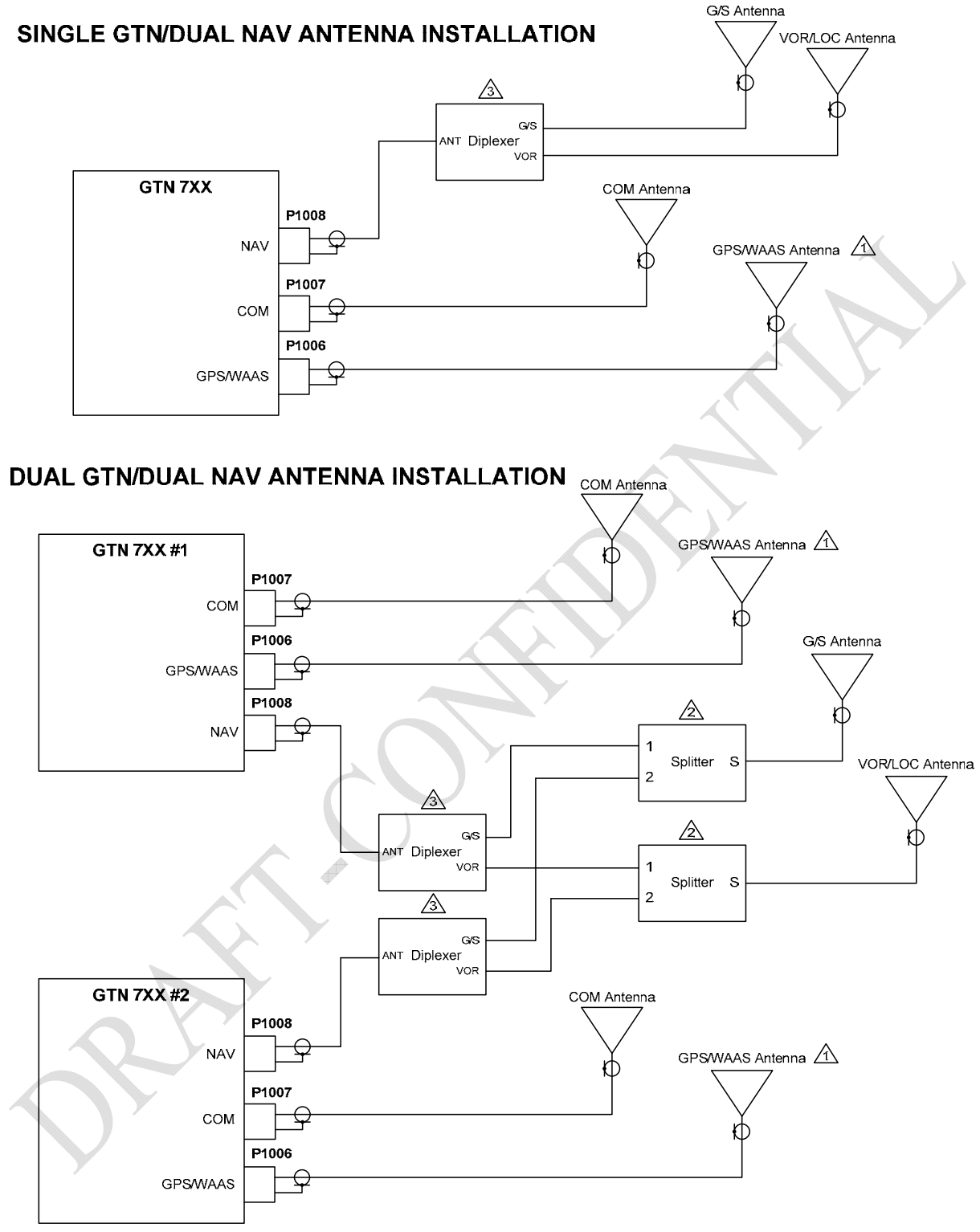
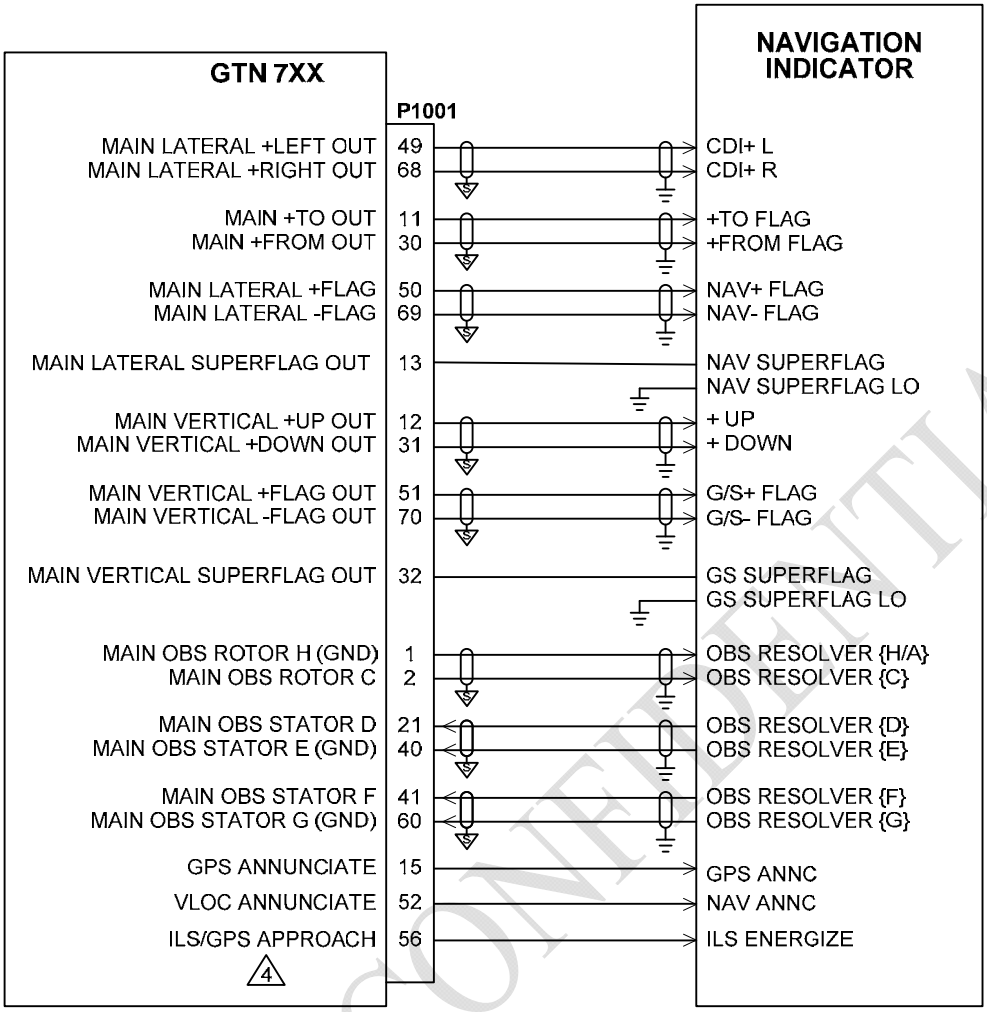


Figure D-5. GTN – Antenna Interconnect
Sheet 2 of 3

1. 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 dB. REFER TO SECTION TBD FOR ADDITIONAL INFORMATION.
2. MINI-CIRCUITS SPLITTER P/N ZFSC-2-1B+ (OR EQUIVALENT) SHOULD BE USED.
3. COMANT DIPLEXER P/N CI 507 (OR EQUIVALENT) SHOULD BE USED.

Figure D-5. GTN – Antenna Interconnect
Sheet 3 of 3



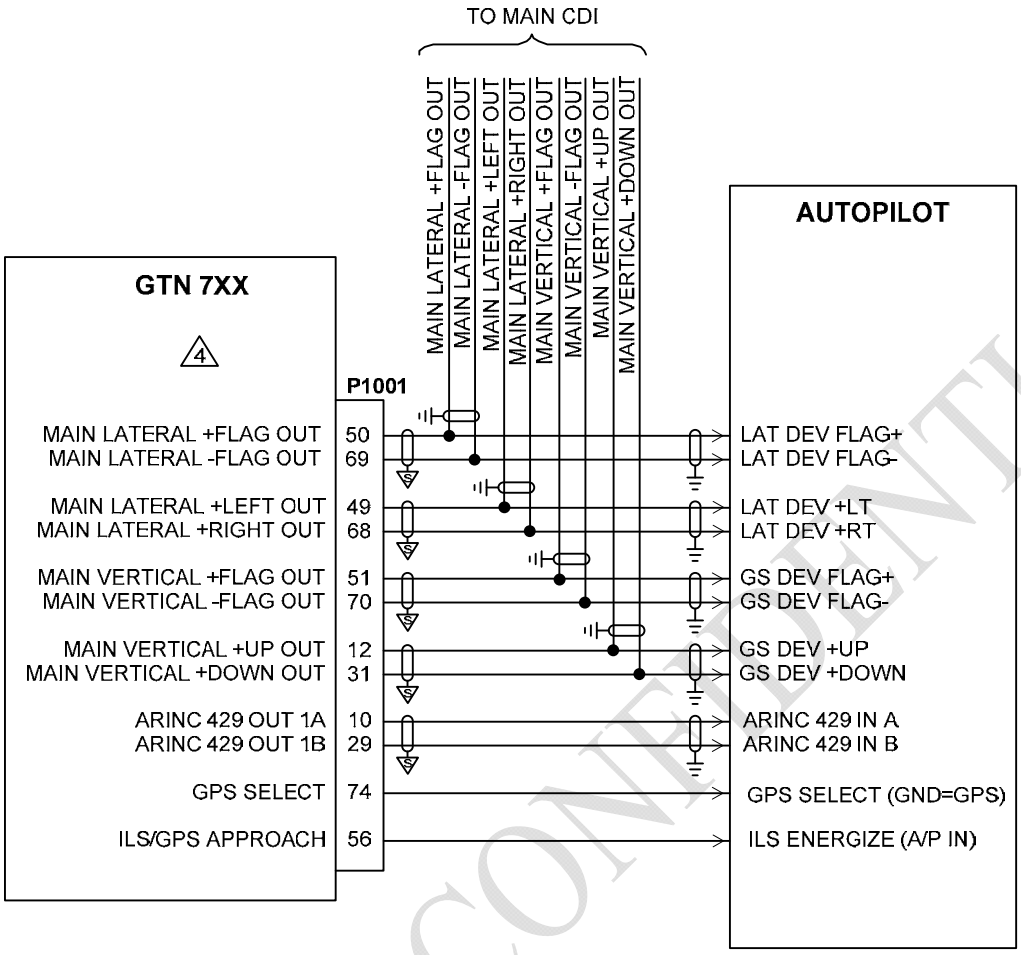
NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT 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. 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.

Figure D-6. GTN - Main Indicator Interconnect

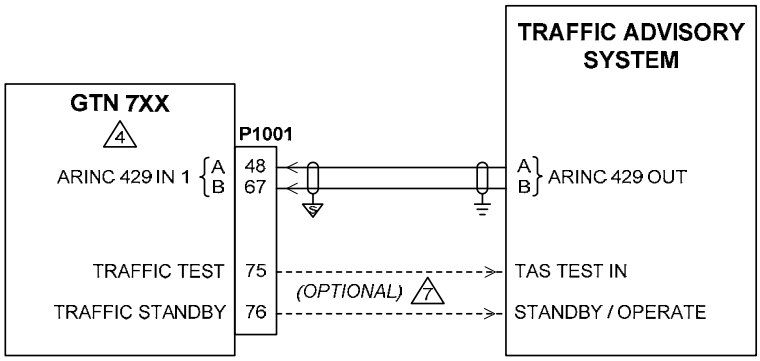


NOTES:

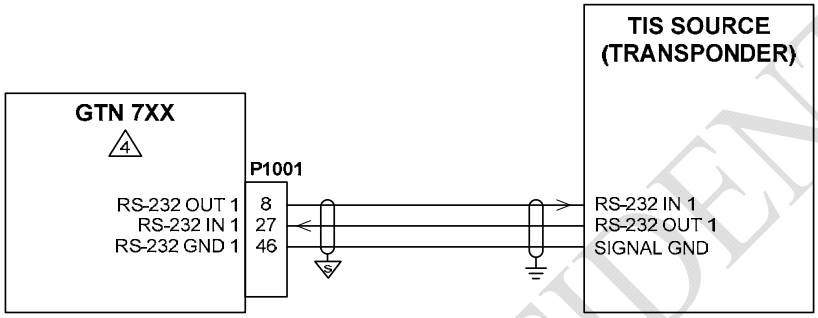
1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT GROUND WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. SEE SECTION TBD FOR GTN CONFIGURATION SETUP INSTRUCTIONS.

Figure D-7. GTN - Autopilot Interconnect

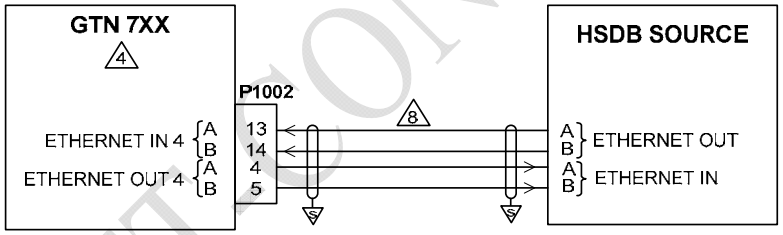
TYPICAL CONNECTIONS TO ARINC 429 TRAFFIC SOURCE



TYPICAL CONNECTIONS TO TIS SOURCE



TYPICAL CONNECTIONS TO HSDB SOURCE

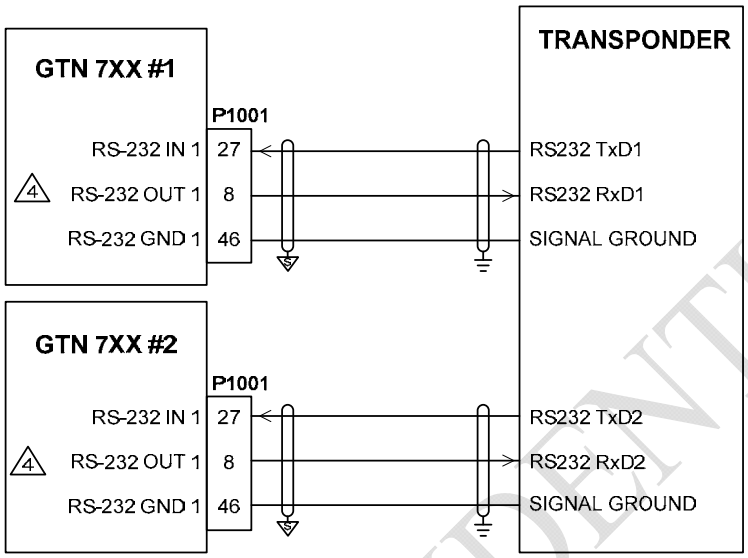


NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 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 7XX.
5. REFER TO SECTION TBD FOR GTN 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 7XX IS CONFIGURED FOR '+ EXTERNAL CONTROL'. IN THIS CASE, THE GTN 7XX WILL NOT CONTROL THE TRAFFIC ADVISORY SYSTEM OPERATION. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.
8. USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE. THIS INCLUDES THE FOLLOWING:

MANUFACTURER	P/N
PIC WIRE AND CABLE	10424 (24 AWG)
ELECTRONIC CABLE SPECIALIST	392404 (24 AWG)

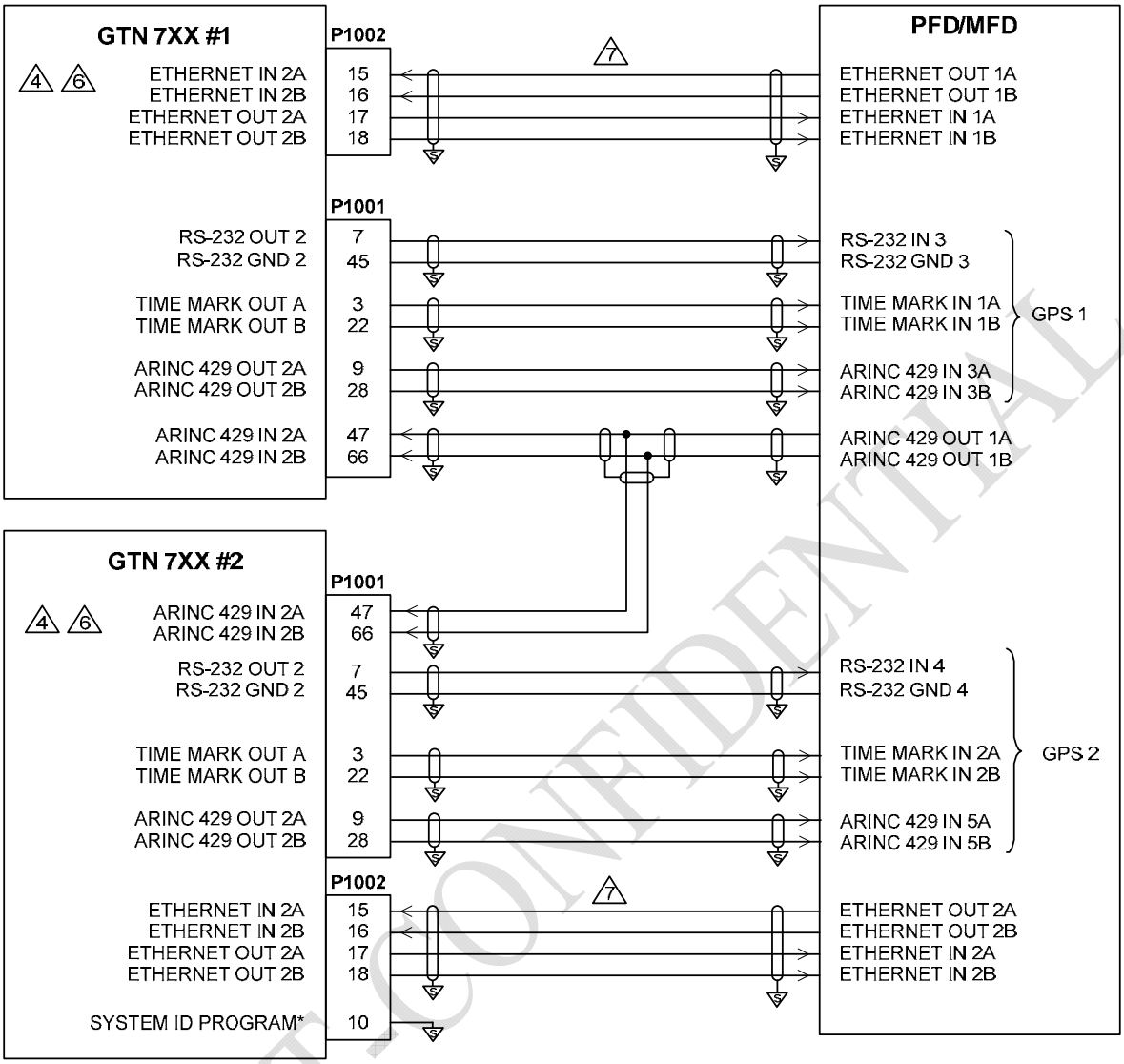
Figure D-8. GTN - Traffic Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 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. IF RS-232 PORT 1 IS ALREADY USED FOR ANOTHER PURPOSE, ANY RS-232 PORT MAY BE CONNECTED IN LIEU OF PORT 1. REFER TO SECTION TBD FOR RS-232 SETTINGS.
5. WHEN TIS IS USED IN THE AIRCRAFT DO NOT CONNECT ANOTHER TRAFFIC SYSTEM TO THE SAME GTN 7XX UNIT.
6. REFER TO SECTION TBD FOR RS-232 CONFIGURATION SETTINGS.
7. SPLICE BOTH RS-232 SIGNAL GROUND WIRES TOGETHER AND TERMINATE PIN 25. ALTERNATELY, THE SIGNAL GROUND WIRES CAN BE TERMINATED TO THE CONNECTOR BACKSHELL.

Figure D-9. GTN - Transponder Interconnect

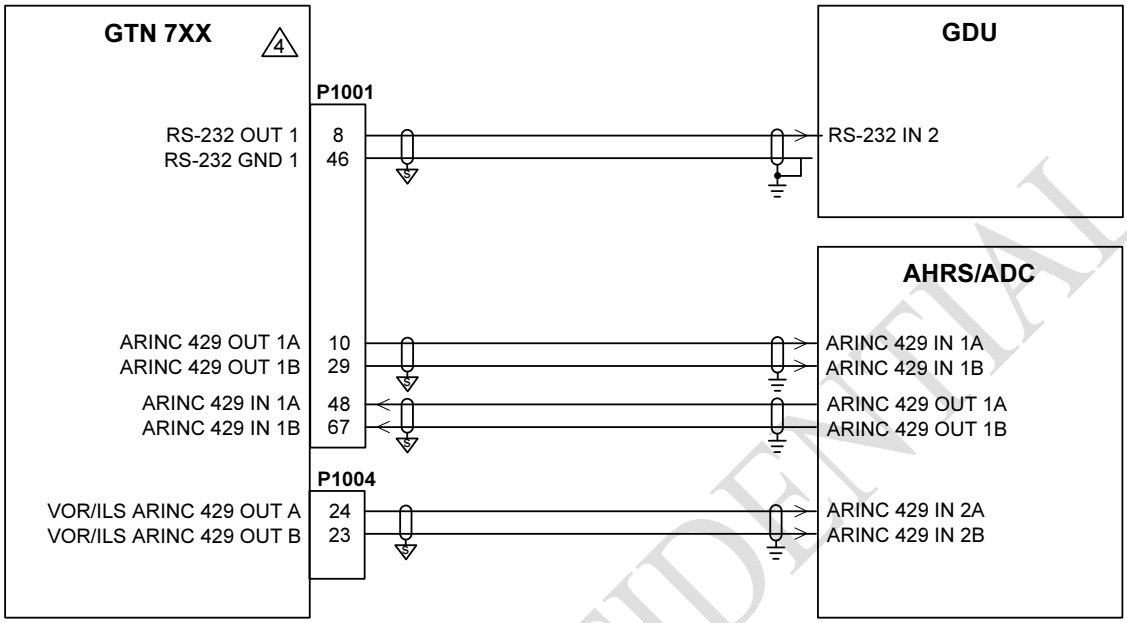


NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0 ".
3. IF ONLY ONE GTN 7XX IS INSTALLED, CONNECT AS SHOWN FOR GTN #1.
4. IF A TAWS-EQUIPPED GTN 7XX UNIT IS INSTALLED, IT **MUST** BE CONNECTED AS GTN #1 – ONLY TAWS ANNUNCIATIONS FROM GTN #1 ARE DISPLAYED ON THE PFD. IF TWO TAWS-EQUIPPED UNITS ARE INSTALLED, THE TAWS-EQUIPPED UNIT THAT IS CONNECTED TO THE AUDIO PANEL **MUST** BE CONNECTED AS GTN #1.
5. REFER TO MANUFACTURER INSTALLATION MANUAL FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.
6. SEE DRAWING TBD FOR GTN #1 AND GTN #2 INTERCONNECT DETAILS.
7. USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE. THIS INCLUDES THE FOLLOWING:

MANUFACTURER	P/N
PIC WIRE AND CABLE	10424 (24 AWG)
ELECTRONIC CABLE SPECIALIST	392404 (24 AWG)

Figure D-10. Dual GTN to Single GDU Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN 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. FOR GTN 7XX CONFIGURATION SETTINGS, SEE SECTION TBD.

Figure D-11. GTN - GDU/AHRS Interconnect

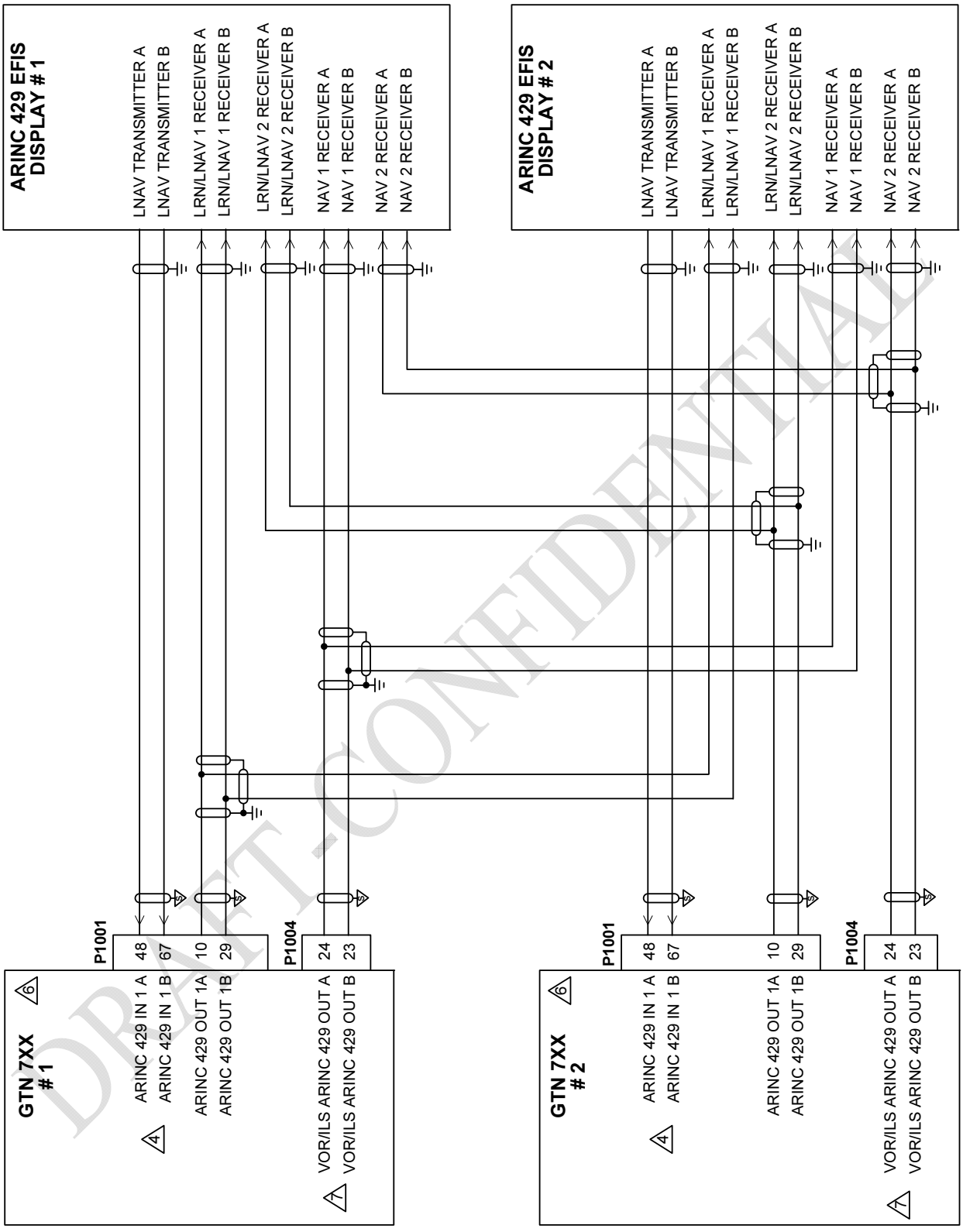
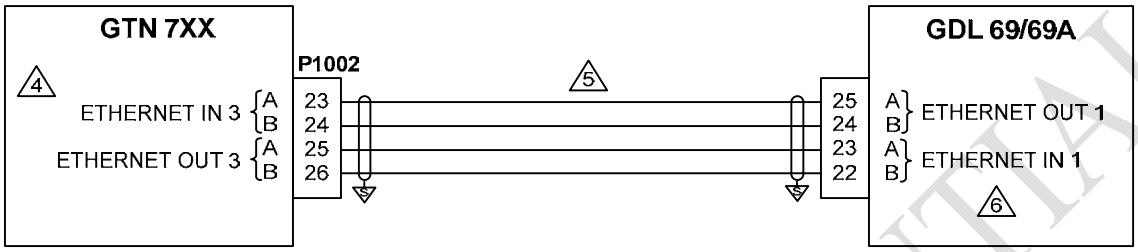


Figure D-12. GTN - ARINC 429 EFIS Interconnect
Sheet 1 of 2

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 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. IF THE ARINC 429 IN 1 PORT (P1001 PINS -48 AND -67) IS ALREADY USED FOR ANOTHER PURPOSE, THE ARINC 429 IN 2 PORT (P1001 PINS -47 AND -66) MAY BE CONNECTED INSTEAD.
5. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.
6. REFER TO SECTION TBD FOR GTN 7XX CONFIGURATION SETTINGS.
7. THESE OUTPUTS ARE USED ON THE GTN 750 ONLY.

Figure D-12. GTN - ARINC 429 EFIS Interconnect
Sheet 2 of 2



1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 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.

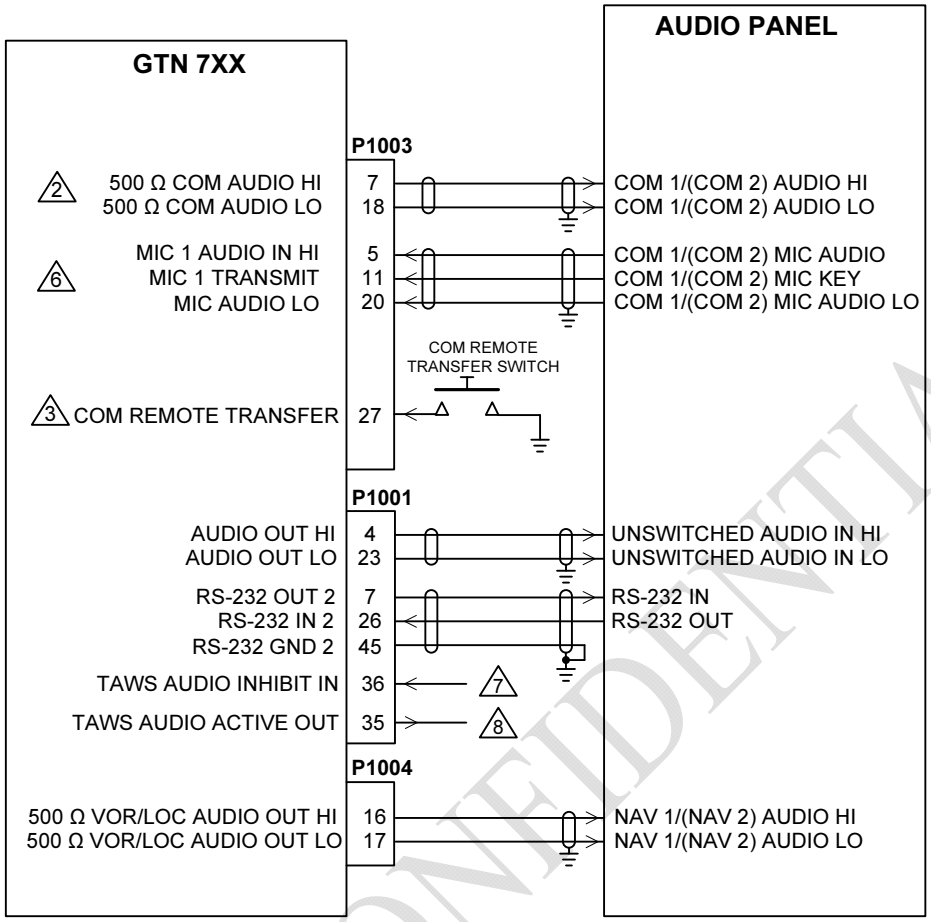
4. ANY ETHERNET PORT MAY BE USED IN LIEU OF ETHERNET PORT 3. IF THERE ARE NO FREE PORTS ON THE GTN 7XX, THE OTHER LRU CAN BE DISCONNECTED FROM THE GTN 7XX AND THE GDL 69/69A CAN BE CONNECTED TO THE GTN 7XX IN ITS PLACE. THE DISCONNECTED LRU CAN BE CONNECTED TO ETHERNET PORT 2, 3, OR 4 ON THE GDL 69/69A. REFER TO SECTION TBD FOR HSDB ARCHITECTURE OPTIONS.

5. USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE. THESE INCLUDE THE FOLLOWING:

MANUFACTURER	P/N
PIC WIRE AND CABLE	10424 (24 AWG)
ELECTRONIC CABLE SPECIALIST	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.

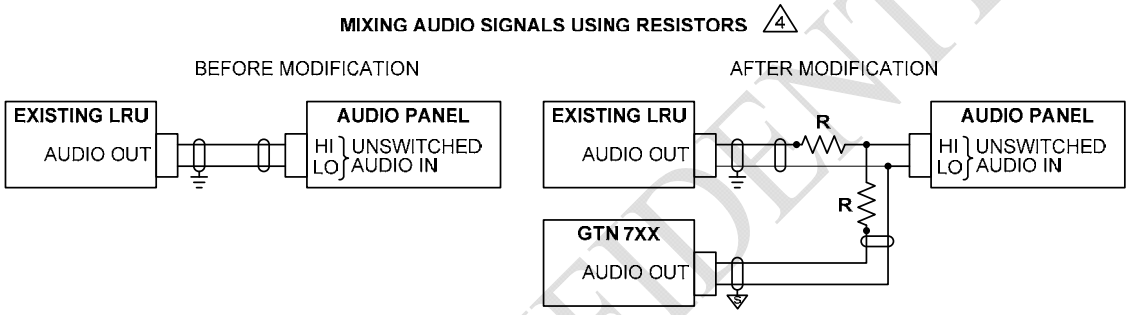
Figure D-13. GTN - GDL 69/69A Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. 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.
3. THE COM REMOTE TRANSFER INPUT MAY BE USED FOR EMERGENCY OPERATION OF THE COM TRANSMITTER. IF THE REMOTE TRANSFER SWITCH IS ACTIVE FOR TWO SECONDS, THE ACTIVE COM FREQUENCY WILL CHANGE TO 121.50 MHZ.
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. USE THE AUDIO INHIBIT IN DISCRETE INPUT TO INHIBIT GTN 7XX AURAL ALERTS WHEN A HIGHER PRIORITY SYSTEM IS PLAYING AUDIO MESSAGES.
8. USE THE AUDIO ACTIVE OUT DISCRETE OUTPUT TO INHIBIT AURAL ALERTS FROM LOWER PRIORITY SYSTEMS WHENEVER THE GTN 7XX IS PLAYING AUDIO MESSAGES.

Figure D-14. Audio Panel 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 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0 ". SHIELDS FOR AUDIO CABLES SHOULD BE GROUNDED AT ONE END ONLY 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.

4. IF AUDIO PANEL DOES NOT HAVE AN AVAILABLE UNSWITCHED INPUT, AUDIO FROM THE GTN 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.

Figure D-14. Audio Panel Interconnect
Sheet 2 of 2

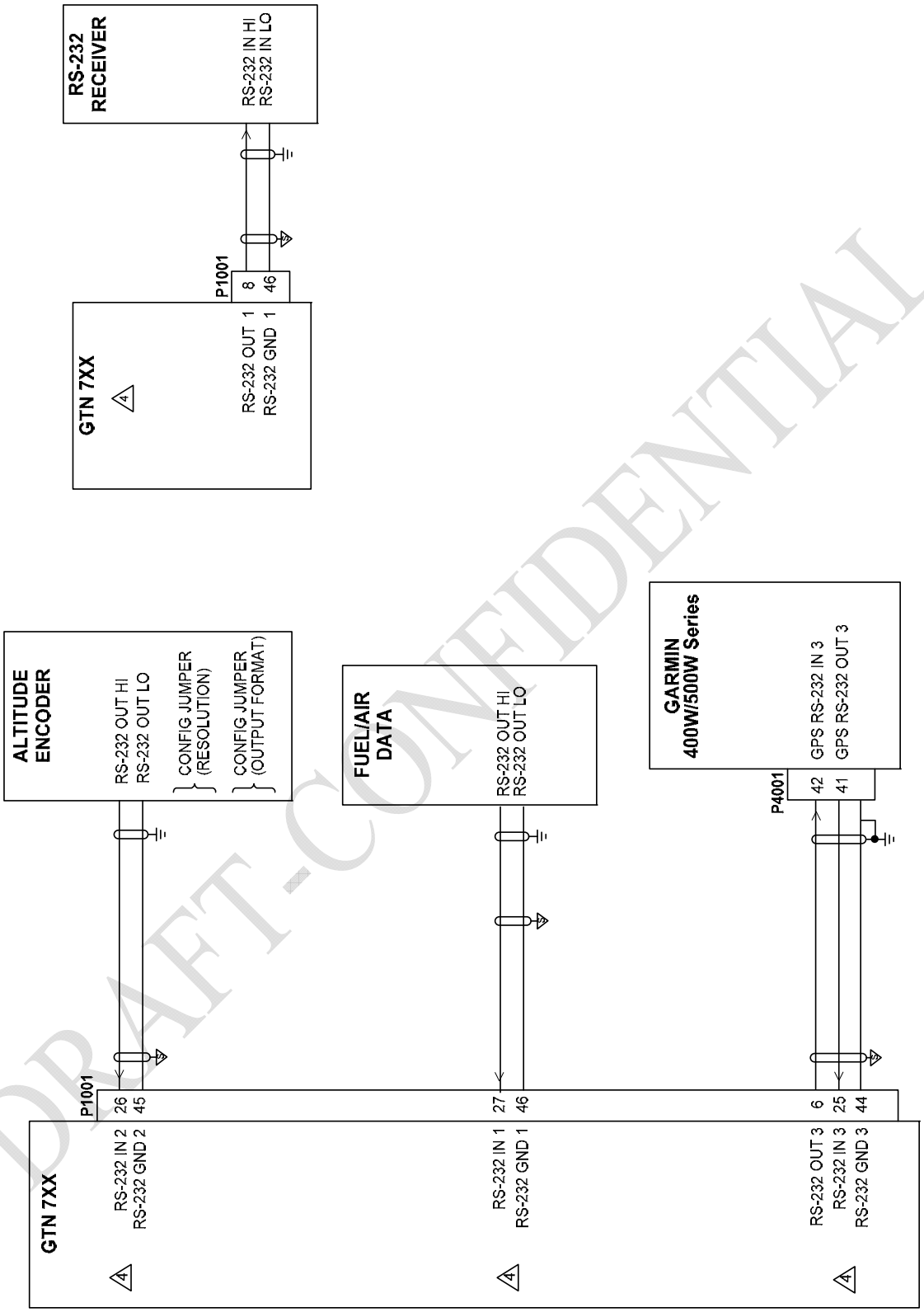
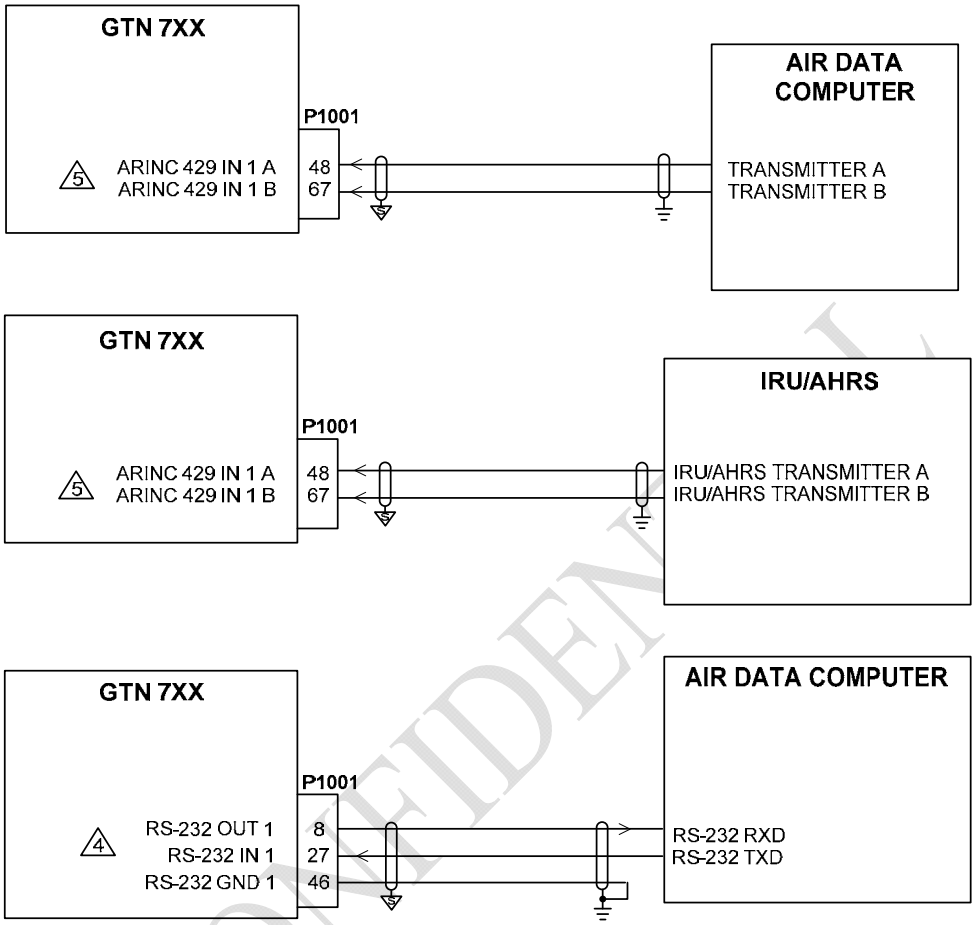


Figure D-15. Air Data/IRU/AHRS RS-232 Interconnect
Sheet 1 of 2

NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 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. REFER TO SECTION TBD FOR RS-232 CHANNEL SETTINGS. RS-232 CHANNEL PORTS 1 TO 3 ARE SHOWN. ANY AVAILABLE RS-232 PORT MAY BE USED.
5. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

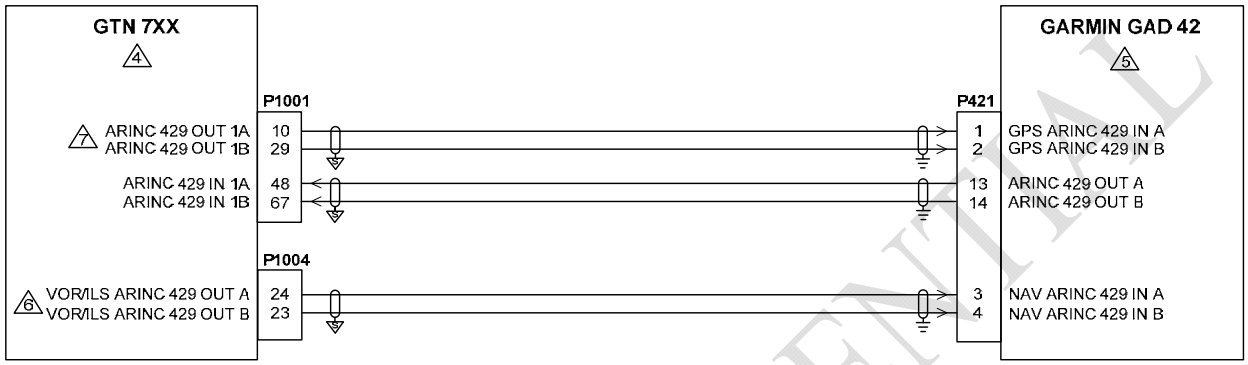
Figure D-15. Air Data/IRU/AHRS RS-232 Interconnect
Sheet 2 of 2



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 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. REFER TO SECTION TBD FOR RS-232 CHANNEL SETTINGS. RS-232 CHANNEL 1 PORT IS SHOWN. ANY AVAILABLE RS-232 PORT MAY BE USED.
5. REFER TO SECTION TBD FOR ARINC 429 CHANNEL SETTINGS. IF ARINC 429 IN 1 PORT IS BEING USED FOR ANOTHER PURPOSE, THE ARINC 429 IN 2 PORT (P1001 PINS -47 AND -66) MAY BE CONNECTED IN LIEU OF PORT 1.
6. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
7. OTHER AVAILABLE ARINC 429 TRANSMIT PORTS MAY BE USED AS AN ALTERNATE. ALL ARINC 429 PORTS TRANSMIT THE SAME DATA.

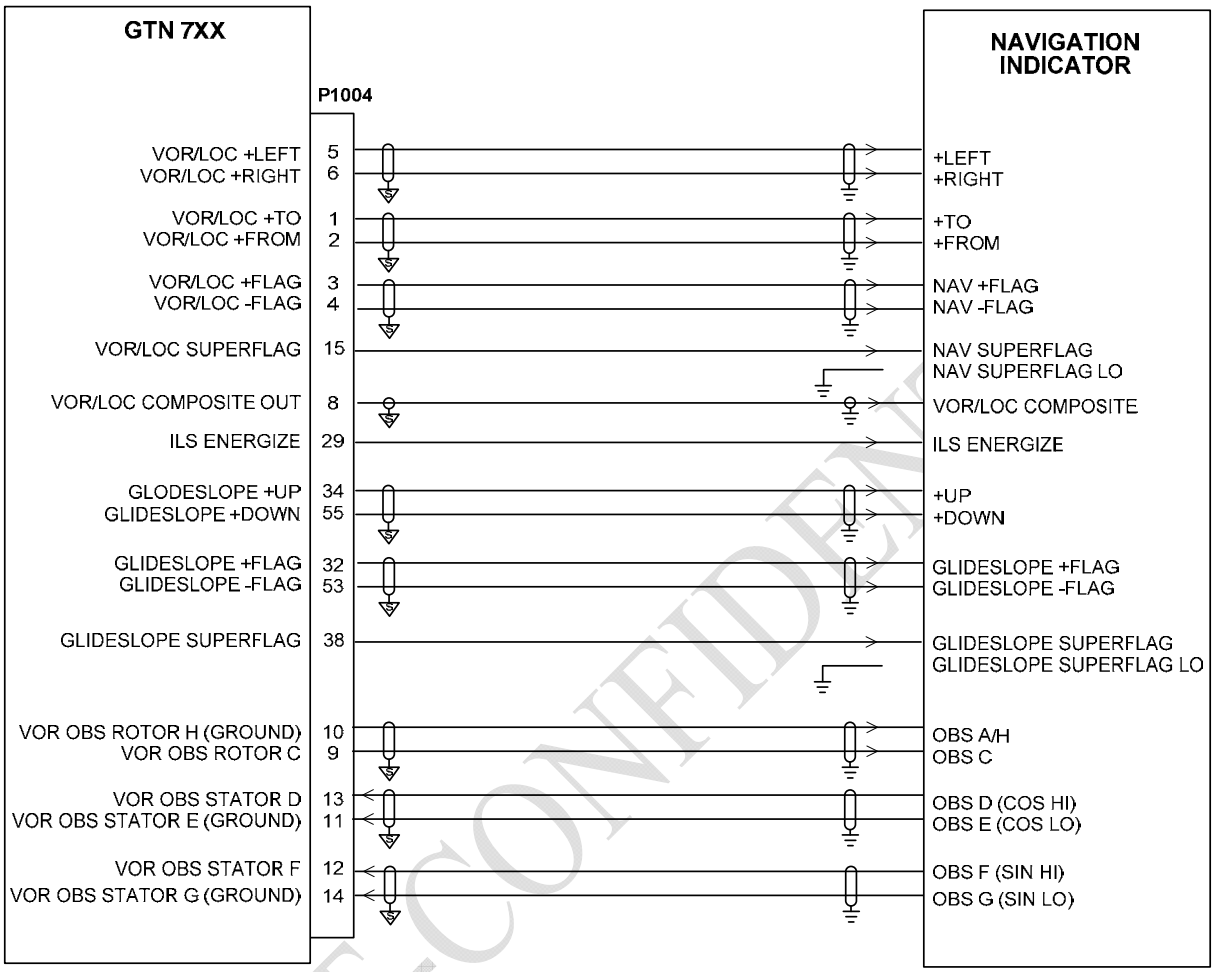
Figure D-16. Air Data/IRU/AHRS ARINC 429 Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 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. FOR GTN 7XX CONFIGURATION SETTINGS, SEE SECTION TBD.
5. SEE GARMIN GAD 42 INSTALLATION MANUAL FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. CONFIGURE THE ARINC 429 BUS SPEED TO MATCH THE GTN 750 OUTPUT SPEED.
6. THESE CONNECTIONS ARE ONLY USED ON THE GTN 750.
7. IF THE ARINC 429 OUT 1 PORT (P1001 PINS -10 AND -29) IS ALREADY USED FOR ANOTHER PURPOSE, THE ARINC 429 OUT 2 PORT (P1001 PINS -9 AND -28) MAY BE CONNECTED IN LIEU OF PORT 1.

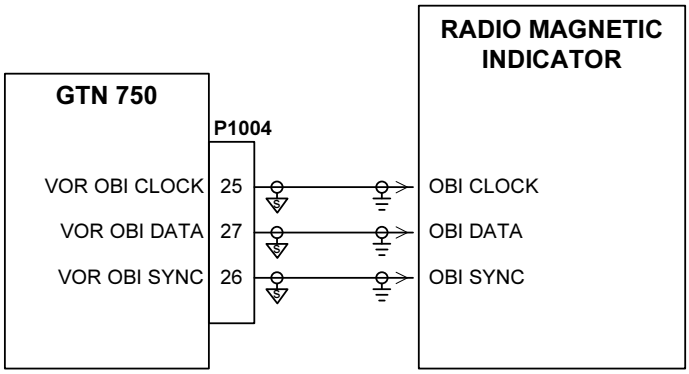
Figure D-17. GAD 42 Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 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. 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 750 VOR/ILS INFORMATION REGARDLESS OF THE CDI BUTTON STATUS.

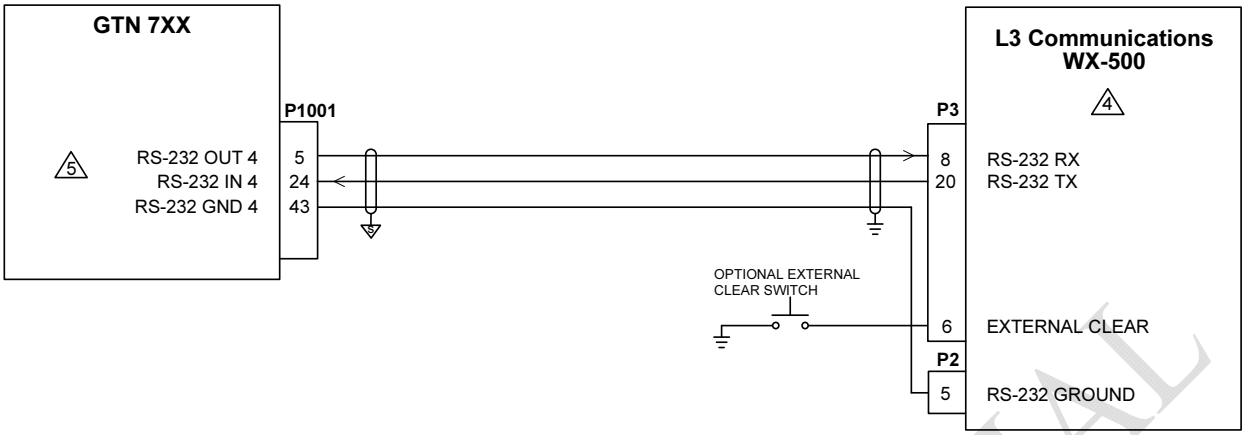
Figure D-18. VOR/ILS Indicator Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN 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. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.

Figure D-19. RMI OBI Interconnect



NOTES:

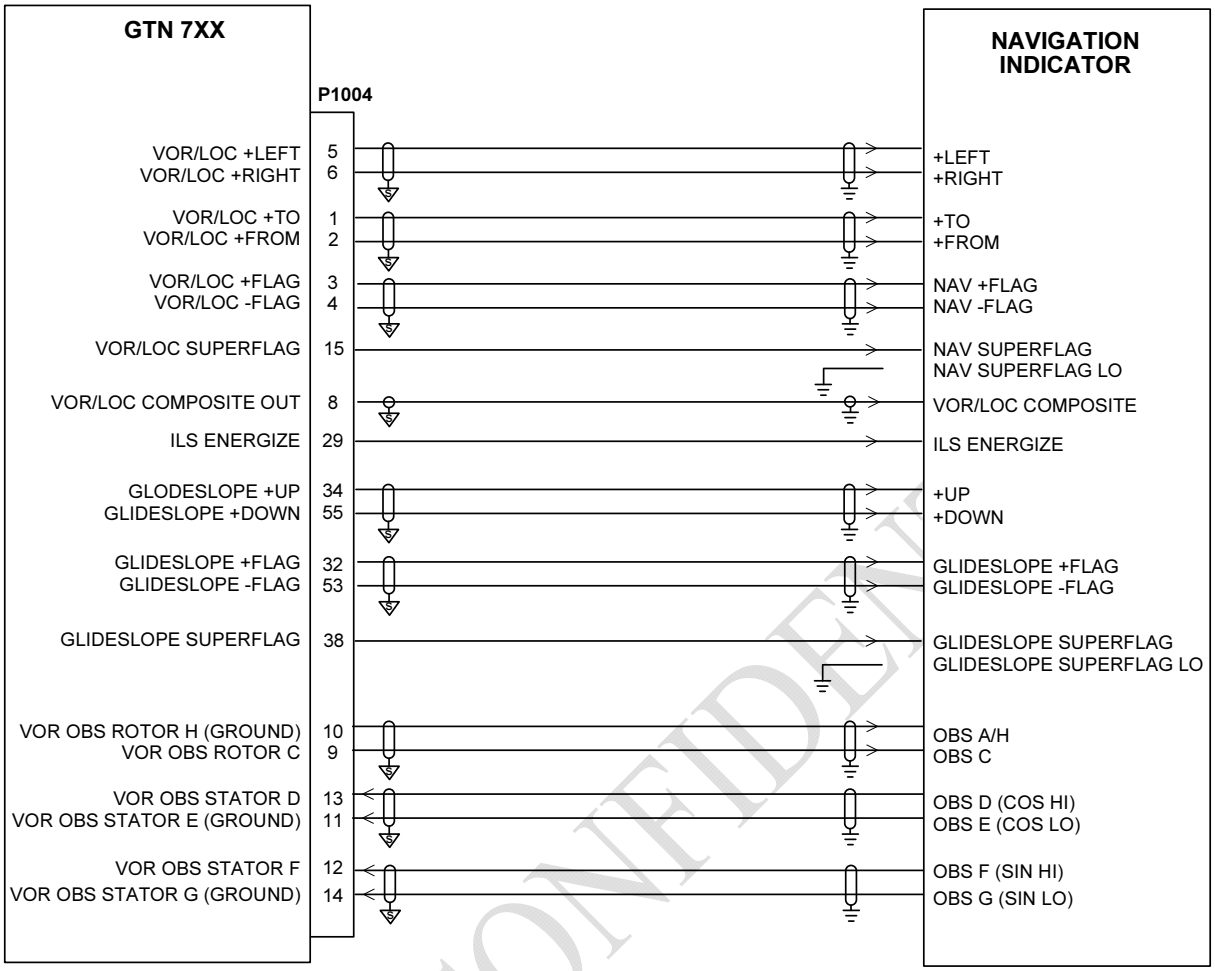
1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN 7XX, CONNECT SHIELD GROUNDS TO THE CONNECTOR BACKSHELL -- THE SHIELD LEADS MUST BE LESS THAN 3.0". CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

4. FOR WX-500 DATA TO BE DISPLAYED ON THE GTN 7XX MAP PAGE THE GTN 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 TBD 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. ANY AVAILABLE ETHERNET PORT MAY BE USED. REFER TO FIGURE TBD FOR HSDB ARCHITECTURE OPTIONS.

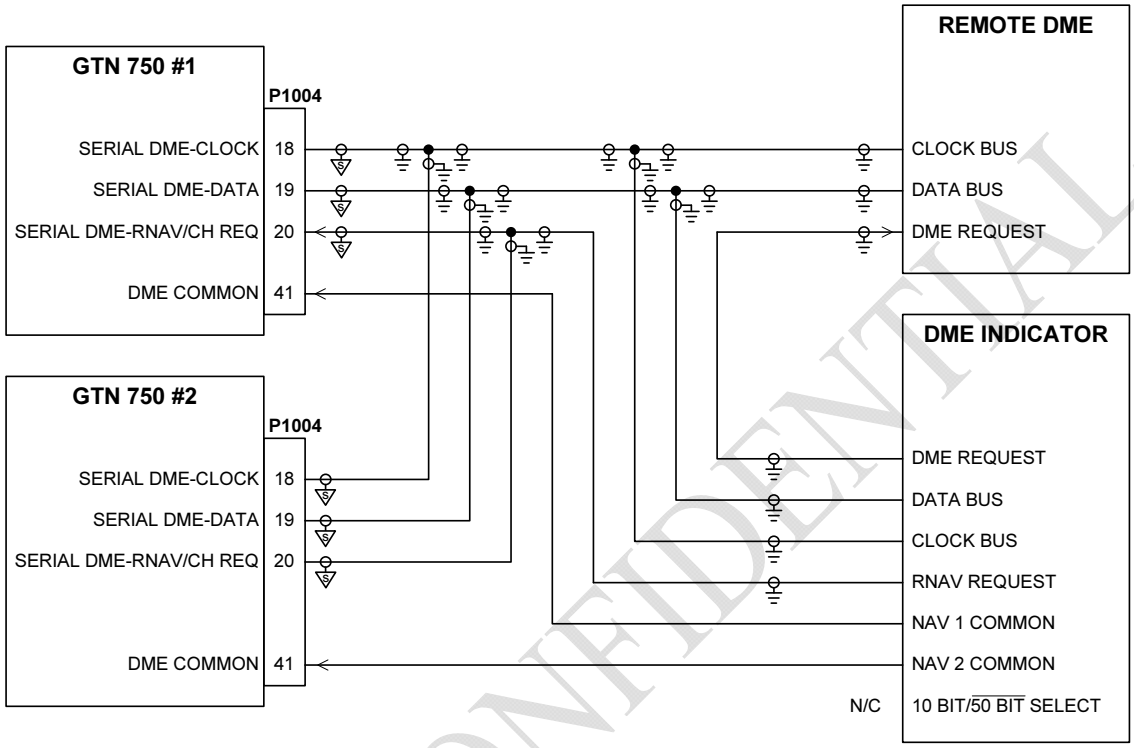
Figure D-20. GTN – WX-500 Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 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. 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 750 VOR/ILS INFORMATION REGARDLESS OF THE CDI BUTTON STATUS.

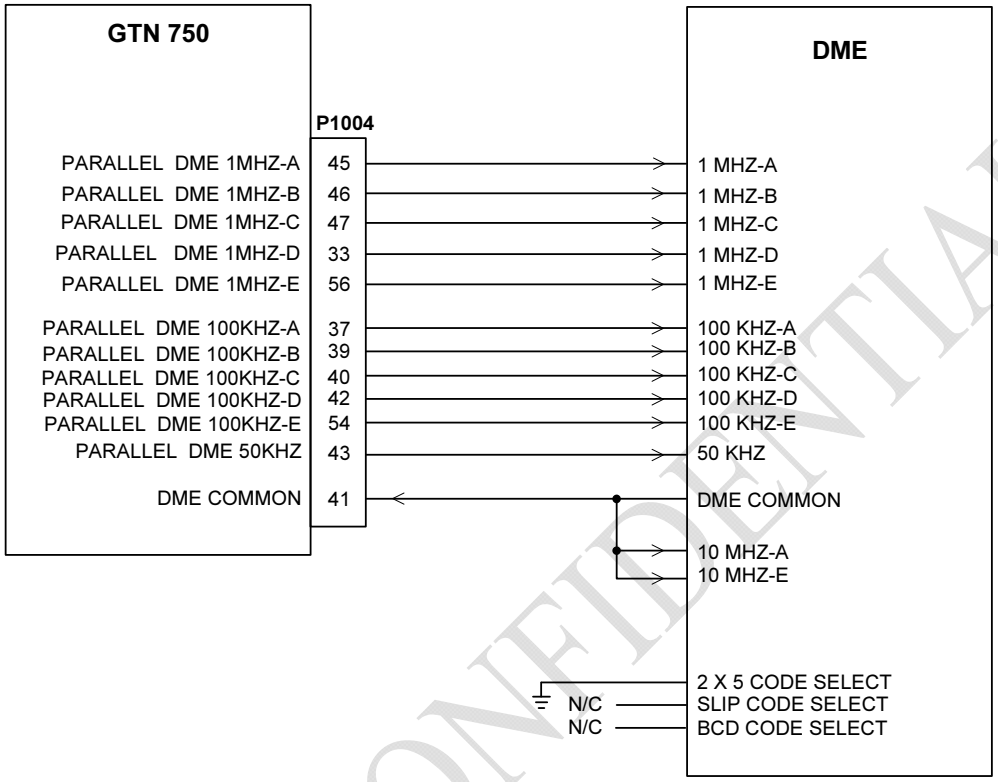
Figure D-21. GTN 750 - DME Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 750, 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. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.
5. THE GTN 750 MUST BE CONFIGURED AT INSTALLATION TO OUTPUT DME TUNING DATA UNDER THE DME CHANNEL MODE.

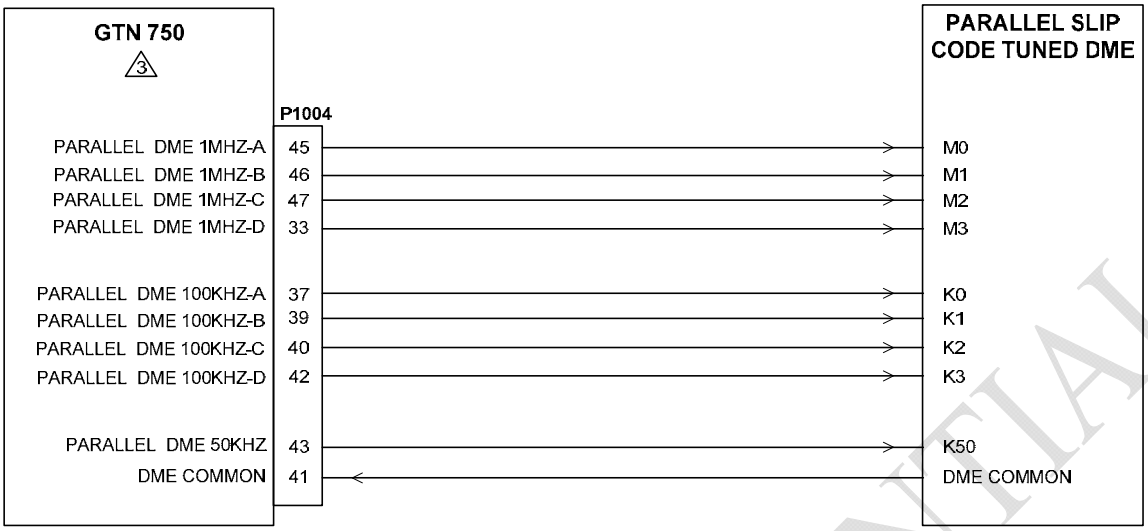
Figure D-22. GTN 750 – Remote DME Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 750, 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. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT.

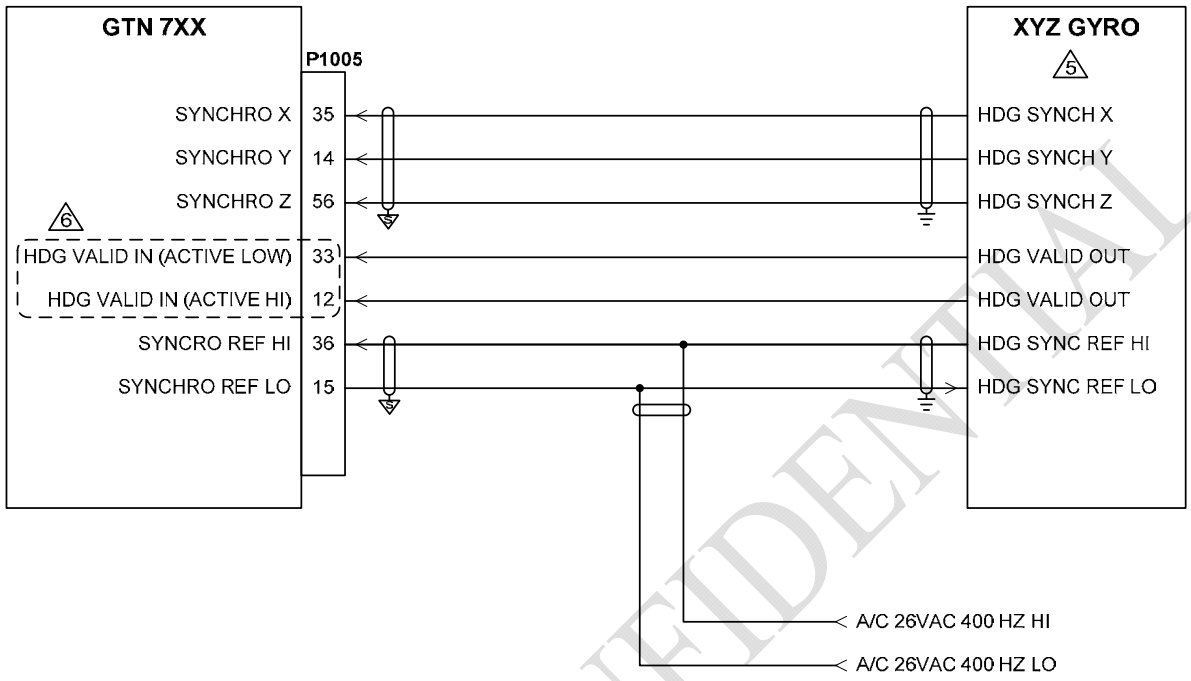
Figure D-23. Parallel 2 of 5 DME Tuning



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
3. THE GTN 750 MUST BE CONFIGURED TO OUTPUT SLIP CODE DME TUNING DATA FOR PROPER OPERATION IN THIS CONFIGURATION. REFER TO SECTION TBD FOR CONFIGURATION SETTINGS.

Figure D-24. Parallel Slip Code DME Tuning Interconnect



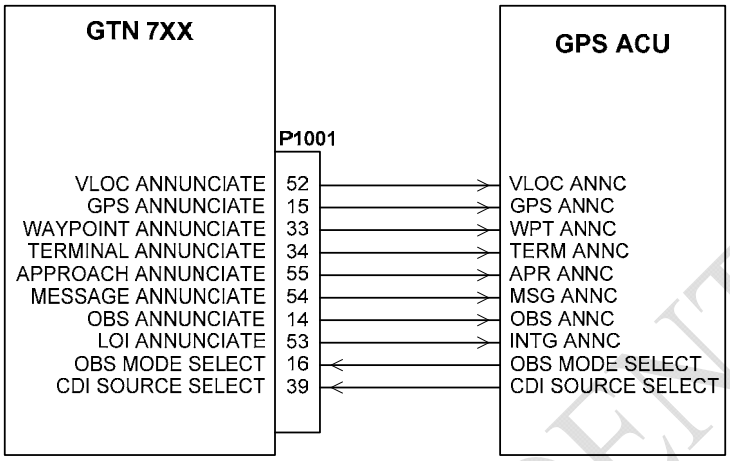
NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: ⏚ SHIELD BLOCK GROUND ⏚ AIRFRAME GROUND
3. AT THE GTN 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. 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.

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.

Figure D-25. Heading Synchro Interconnect



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.

Figure D-26. GPS Annunciator Interconnect

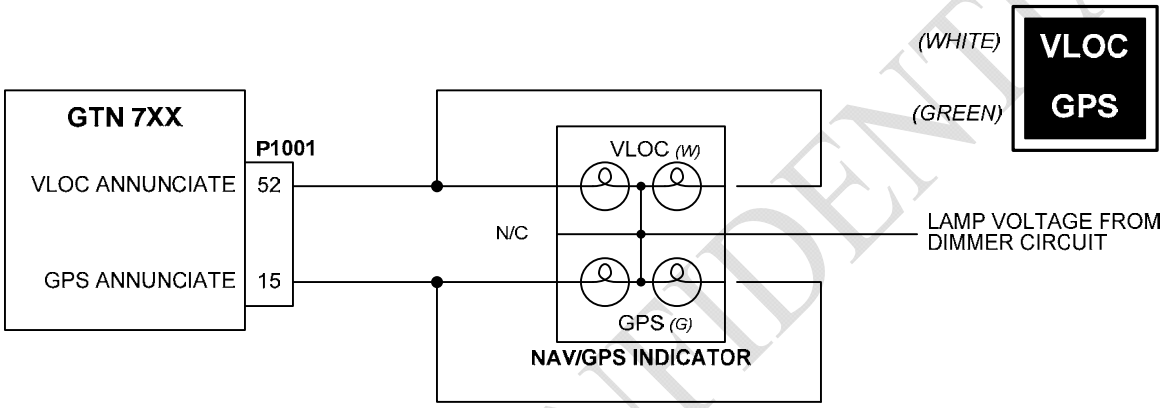


Figure D-27. NAV Source Select Annunciator Interconnect

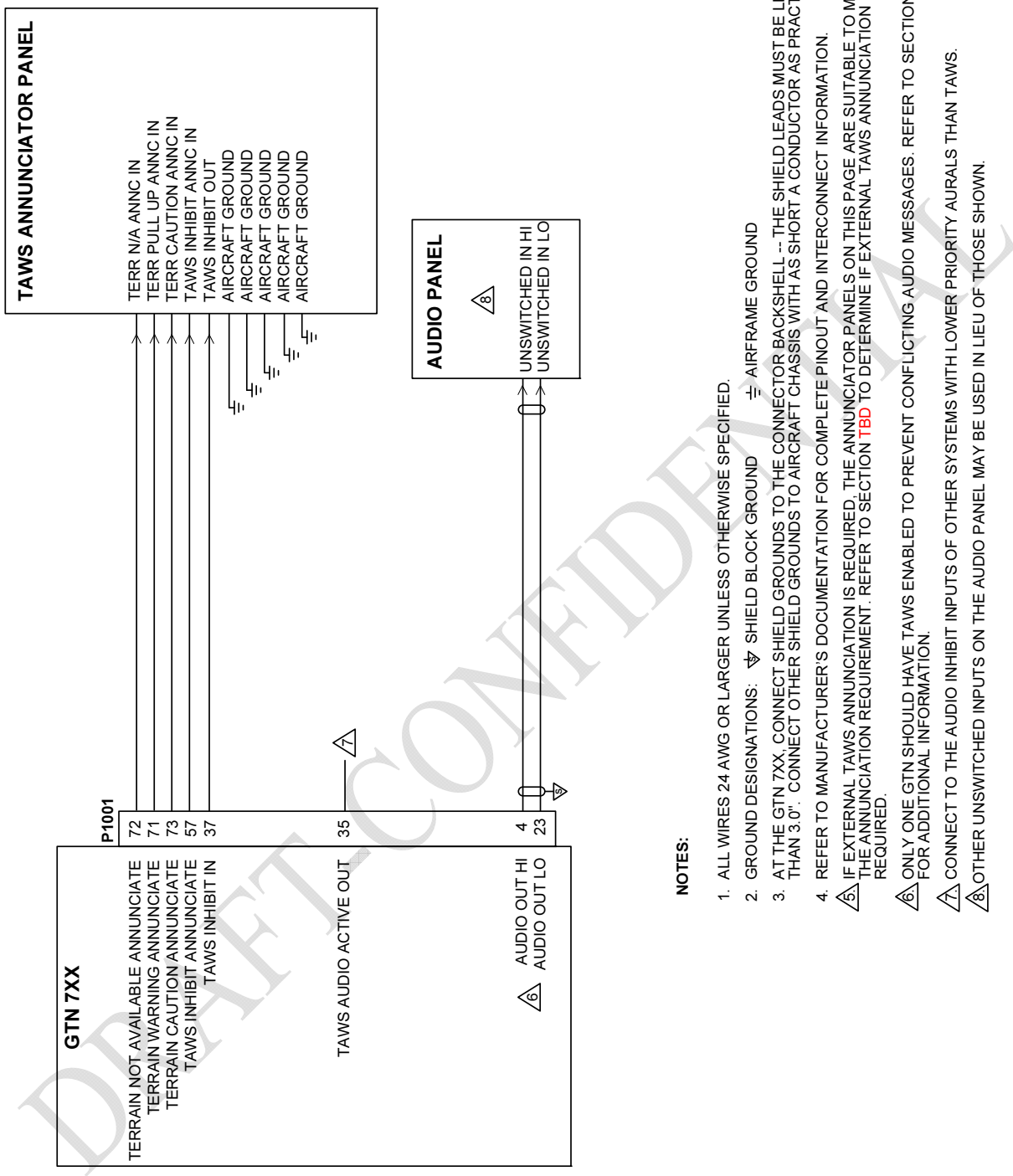
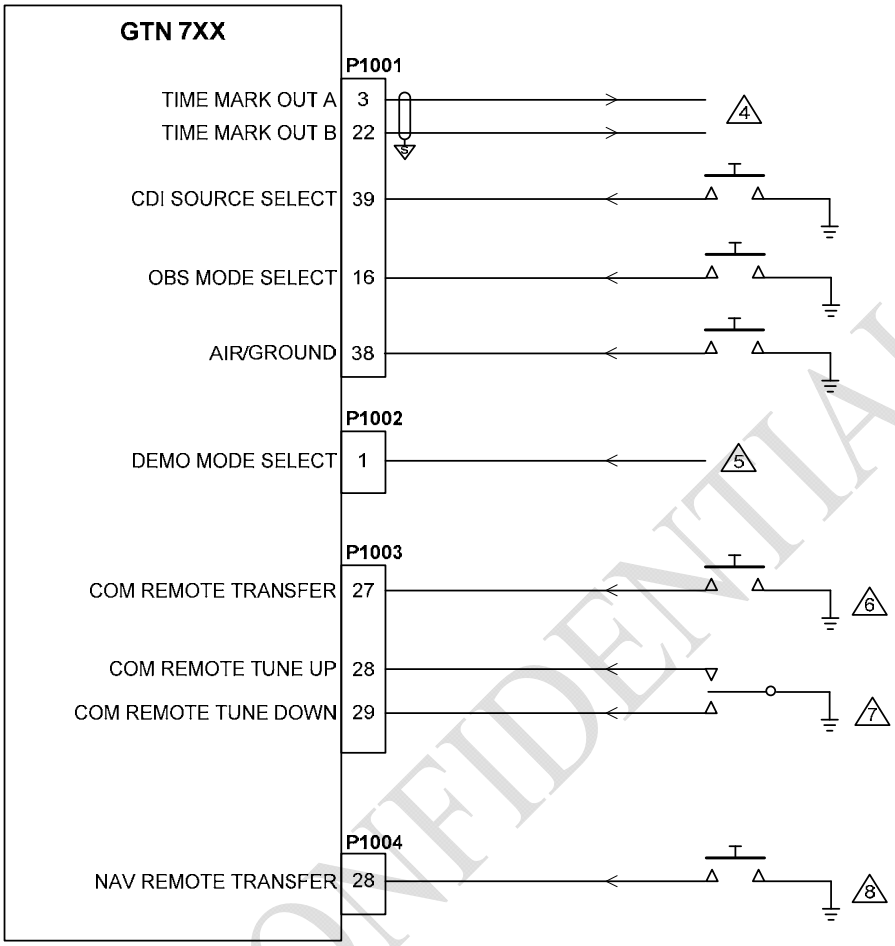


Figure D-28. TAWS Interconnect



NOTES:

1. ALL WIRES 24 AWG OR LARGER UNLESS OTHERWISE SPECIFIED.
2. GROUND DESIGNATIONS: SHIELD BLOCK GROUND AIRFRAME GROUND
3. AT THE GTN 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. TIME MARK OUT (P1001-3 & -22) OUTPUTS A DIFFERENTIAL 1 MILLISECOND WIDE PULSE ONCE PER SECOND.
5. DEMO MODE SELECT (P1002-1) MAY BE GROUNDED TO START THE UNIT IN DEMO MODE. DO NOT USE IN AN AIRCRAFT INSTALLATION.
6. COM REMOTE TRANSFER MAY BE USED TO TRANSFER THE STANDBY COM FREQUENCY TO THE ACTIVE COM FREQUENCY VIA REMOTE SWITCH. REFER TO SECTION TBD FOR ADDITIONAL INFORMATION.
7. COM REMOTE TUNE UP AND COM REMOTE TUNE DOWN MAY BE USED TO SCROLL THROUGH A LIST OF PRESET COM FREQUENCIES. REFER TO SECTION TBD FOR ADDITIONAL INFORMATION.
8. NAV REMOTE TRANSFER MAY BE USED TO TRANSFER THE STANDBY NAV FREQUENCY TO THE ACTIVE NAV FREQUENCY VIA REMOTE SWITCH. REFER TO SECTION TBD FOR ADDITIONAL INFORMATION.
9. SOME DISCRETE INPUTS AND OUTPUTS ARE CONFIGURABLE FOR OTHER FUNCTIONS. DEFAULTS ARE SHOWN. REFER TO SECTION TBD FOR ADDITIONAL INFORMATION.

Figure D-29. Switches Interconnect

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