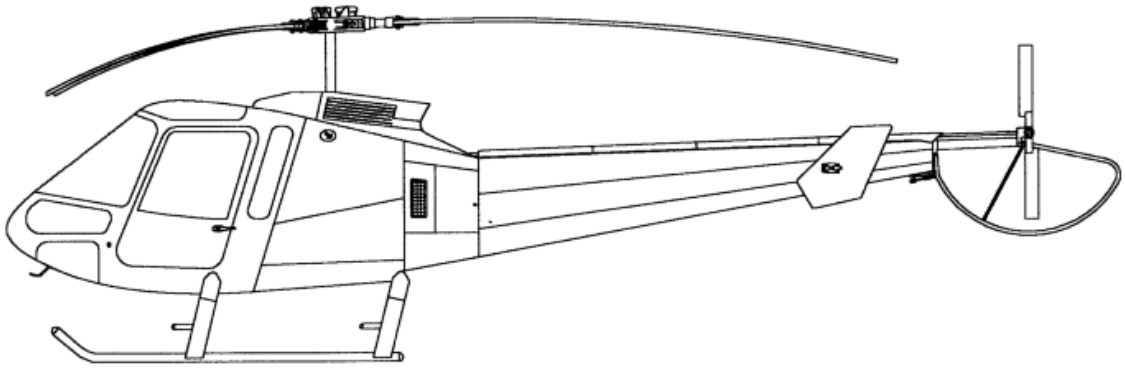
ENSTROM
HELICOPTER CORPORATION

ENSTROM TH-28/480 SERIES MAINTENANCE MANUAL

SUPPLEMENT 5

AVIONIC SYSTEMS



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For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

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RECOMMENDED CHANGE REPORT

This maintenance manual is prepared and distributed by The Enstrom Helicopter Corporation and is intended for use by personnel responsible for maintaining Enstrom TH-28, 480, and 480B helicopters. This manual is periodically revised. If, in the opinion of the user, any information has been omitted or requires clarification, please direct your comments to Enstrom via this form (duplicate) or other similar form. Send the recommended changes to:

The Enstrom Helicopter Corporation
2209 22nd Street
Menominee, MI 49858

ATTN: Technical Publications

Manual Identification: Enstrom TH-28/480 Series Maintenance Manual Supplement 5, Avionic Systems
Manual Date: November 5, 2008
Revision Number and Date: _____
Aircraft Model: _____

Recommended Change:

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RECORD OF REVISIONS

REV NO.	ISSUE DATE	DATE INSERTED	BY	REV NO.	ISSUE DATE	DATE INSERTED	BY
1	Nov 21/08	Nov 21/08	JW				
2	Mar 9/09	Mar 9/09	JW				
3	Jul 14/10	Jul 14/10	JW				
4	Nov 9/10	Nov 9/10	JW				
5	Jan 14/11	Jan 14/11	JW				
6	Feb 24/11	Feb 24/11	JW				
7	Nov 11/11	Nov 11/11	JW				
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9	May 1/13	May 1/13	JW				
10	Jun 5/14	Jun 5/14	JW				
11	Nov 12/14	Nov 12/14	JW				
12	Feb 18/15	Feb 18/15	JW				
13	Oct 20/15	Oct 20/15	JW				
14	Dec 20/17	Dec 20/17	JW				
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INTRODUCTION

Avionic System(s) Effectivity

A. The data is presented in this supplement is applicable to the optional avionic system(s) listed in the following table.

Avionic System(s)

Avionic System	Enstrom Part Number
Appareo Systems Vision 1000	4220641-( )
Attitude Indicator	4220542-( )
TAS600	4220569-1
Directional Gyro	4220542-( )
RA-4500 Radar Altimeter	4220517-( )
GMA 350H Audio Panel	4220672-3, -5, -7, -9
GMA 350Hc Audio Panel	4220672-109, -111
GNC 255A Nav/Comm	4220638-1
GNS 430W GPS/Nav/Comm	4220535-( )
GNS 530W GPS/Nav/Comm	4220534-( )
GTN 650 GPS/Nav/Comm	4220639-( )
GTN 750 GPS/Nav/Comm	4220644-( )
GTX 327 Transponder	4220512-1, -5
GTX 345 Transponder	4220645-5
SL30 Nav/Comm	4220558-( )
MD200 Series CDI	4220574-( )
NAT 247 Audio Mixing Amplifier	4220529-5
NAT AMS44 Dual Channel Audio Controller	4220529-1, -3 (NVIS)
Safe Flight Powerline Detection System	4220576-( )
SN3500 EHSI	4220609-5, -7
SAE5-35 Altitude Data System	4220561-( )

Aircraft Effectivity

A. The data presented in this TH-28/480 Series Maintenance Manual Supplement is applicable to all Enstrom 480 and 480B model helicopters.

Supplemental Changes and Revisions

A. Subsequent to the publication of the initial issue of this supplement, changes in the avionics equipment, support concepts and procedures, as well as information developed by experience may affect the contents of this supplement. To ensure that coverage in the supplement continues to reflect such changes, revised information is released by one of the following methods:

1. Revision - A revision alters portions of the manual by replacement, addition, and/or removal of pages.

2. Reissue - A reissue of this supplement will occur when the amount of changes warrants complete reissue.

3. Service Directive Bulletins – Used to direct the owner/operator and/or maintenance personnel to make mandatory changes, improvements, or inspections to the aircraft applicable to the entire fleet or a segment of the fleet that are typically safety/airworthiness related. The information provided in the Service Directive Bulletins will be incorporated in the maintenance manual as needed at a later date. At the time of incorporation, the Service Directive Bulletin is superseded by the maintenance manual, and accomplishment or sign-off of the Service Directive Bulletin in the maintenance records book is no longer required. A detailed entry should be made in the maintenance records to indicate that the Service Directive Bulletin is superseded by the maintenance manual.

4. Service Information Letters – Used to transmit information, recommendations, and general service instructions to the aircraft owner/operator and/or maintenance personnel applicable to the entire fleet or a segment of the fleet. The information provided in the Service Information Letters will be incorporated into the maintenance manual as needed at a later date.

5. Service Instructions – Used to provide the owner/operator and/or maintenance personnel with information that is applicable to specific aircraft and does not meet the criteria of a Service Information Letter or Service Directive Bulletin. Service Instructions will not be distributed to the entire fleet.

Enstrom distributes maintenance manual supplement revisions and reissues in electronic form via the Enstrom Helicopter website: www.enstromhelicopter.com (follow the applicable link under the Technical Publications section of the Technical Support page). Revision update notices are sent via email to owners and operators who are registered with Enstrom. Registration to receive publication mailing notifications can be coordinated through the Enstrom Technical Publications Administrator. A complete manual hardcopy may be ordered through Enstrom Customer Service.

Service Information Letters and Service Directive Bulletins incorporated into the maintenance manual are logged in the Service Information Letter Index or the Service Directive Bulletin Index (as appropriate) located on the Enstrom Helicopter website: www.enstromhelicopter.com (follow the applicable link under the Technical Publications section of the Technical Support page). Each index numerically lists all Service Information Letters and Service Directive Bulletins, respectively, and identifies those which have been incorporated into the maintenance manual. All Service Information Letters and Service Directive Bulletins are also located under the Technical Publications section of the website.

Notice of recently released Service Information Letters and Service Directive Bulletins is provided via email notification. Registration to receive publication mailing notifications can be coordinated through the Enstrom Technical Publications Administrator.

Application of Warnings, Cautions, and Notes

A. Throughout this supplement, it is necessary to highlight or emphasize important points to avoid injury to personnel, damage to equipment, or unnecessary confusion while performing maintenance procedures. The terms “WARNING”, “CAUTION”, and “NOTE” are used to draw attention to instructions or information deserving special consideration.

1.

WARNING

Calls attention to use of materials, processes, methods, procedures, or limits that must be followed to avoid injury to personnel.

2.

CAUTION

Calls attention to methods and procedures that must be followed to avoid damage to equipment.

3.

NOTE

Calls attention to information essential to highlight for clarification of procedures or to make a task easier.

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CHAPTER 1

TAS600 TRAFFIC ADVISORY SYSTEM

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The Avidyne Traffic Advisory System (TAS) is an Airborne Surveillance Radar system. The TAS600 uses transponder replies to compute bearing, relative altitude, and range from nearby Mode C- or Mode S-equipped aircraft. Non-Mode C aircraft provide range and bearing information only. The TAS600 Series System does not detect aircraft without operating transponders.

B. Traffic information from the Avidyne TAS600 is displayed on the Chelton EFIS, the Garmin GMX200, or the Garmin GNS430W/530W systems. If the TAS is interfaced with the Chelton EFIS, audible traffic advisories and annunciator light output are provided by the EFIS MFD. If the TAS is interfaced with Garmin systems, audible traffic advisories are provided by the TAS system and the annunciator light output is produced by the Garmin system.

C. Components of the TAS600 installation include the TAS600 processor, a transponder/coupler, and two antennas.

D. Power to the TAS600 is provided via the **TAS** circuit breaker (CB118) (3 Amp) located on the left side of the center pedestal and an **ON/OFF** power switch (SW82) located on the lower right side of the center pedestal.

E. Refer to the appropriate 480 or 480B Rotorcraft Flight Manual Supplement and the current vendor operating manuals/instructions for operation of the TAS600 system.

1-2. Vendor Publications

A. The following components listed in Table 1-1 are to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft:

Table 1-1. Vendor Manuals

Component	Publication	Vendor
TAS600	Pilot's Handbook, Part Number 32-2352, Revision 6, or subsequent	Avidyne Corporation 55 Old Bedford Rd. Lincoln, MA 01773

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the TAS600 system are “on condition”.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The TAS600 contains no user serviceable components or assemblies. Operations involving the removal of the TAS600 or any other line-replaceable unit (LRU) installed as a part of the TAS600 must be done by authorized maintenance technicians.

B. Database updates may be performed by the operator as described in the Pilot's Operating Guide or Reference.

3-2. Troubleshooting

A. Refer to the respective Pilot's Operating Guide and Reference when troubleshooting problems with the TAS600.

3-3. Periodic Inspections

A. The following inspection checklist is intended as a guide for 100 hour/annual inspections for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
TAS600 TRAFFIC ADVISORY SYSTEM	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the processor, electrical cables, and mounts for security, damage, and obvious defects.	
2. Inspect the antennas and mount for security, damage, and obvious defects.	

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

4-1. TAS600 Processor

4-1-1. Removal – TAS600 Processor

A. Turn the TAS and aircraft power off. Pull the TAS circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker system.

B. The TAS600 processor is installed on a tray mounted in the keel of the aircraft. Disconnect electrical cables from the processor. Remove hardware securing the processor to the mounting plate. (Figure 5-1).

C. Remove processor.

4-1-2. Inspection/Repair – TAS600 Processor

A. Inspect the condition and security of the mounting plate to the airframe.

B. Inspect the condition and security of electrical cables.

C. Repair procedures are not available for the TAS600.

4-1-3. Installation – TAS600 Processor

A. Install the TAS600 processor onto the mounting plate with mounting hardware.

B. Connect electrical cables.

C. Remove the cable tie or other similar device from the TAS circuit breaker stem and push the stem in to set the circuit breaker.

4-2. TAS600 Transponder/Coupler

4-2-1. Removal – TAS600 Transponder/Coupler

A. Turn the TAS and aircraft power off. Pull the TAS circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker system.

B. The transponder/coupler is installed on a bracket mounted in the forward section of the keel.

C. Disconnect electrical cables (Figure 5-2).

D. Remove hardware securing the transponder/coupler to the mounting bracket.

4-2-2. Inspection/Repair – TAS600 Transponder/Coupler

A. Inspect the condition and security of the mounting bracket to the aircraft frame.

B. Inspect the condition and security of electrical cables.

C. Repair procedures are not available for the transponder/coupler.

4-2-3. Installation – TAS600 Transponder/Coupler

A. Install the transponder/coupler onto the mounting bracket with mounting hardware.

B. Connect electrical cables to the transponder/coupler.

C. Remove the cable tie or other similar device from the TAS circuit breaker stem and push the stem in to set the circuit breaker.

4-3. TAS600 Antennas

4-3-1. Removal – TAS600 Antennas

A. Turn the TAS and aircraft power off. Pull the TAS circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker system.

B. Disconnect electrical cables from the top and bottom antennas (Figure 5-3).

C. Remove hardware securing the antennas to the mounting bracket.

4-3-2. Inspection/Repair – TAS600 Antennas

A. Inspect the condition and security of the mounting bracket to the aircraft frame.

B. Inspect the condition of the conductive gasket.

C. Repair procedures are not available for the antennas.

4-3-3. Installation – TAS600 Antennas

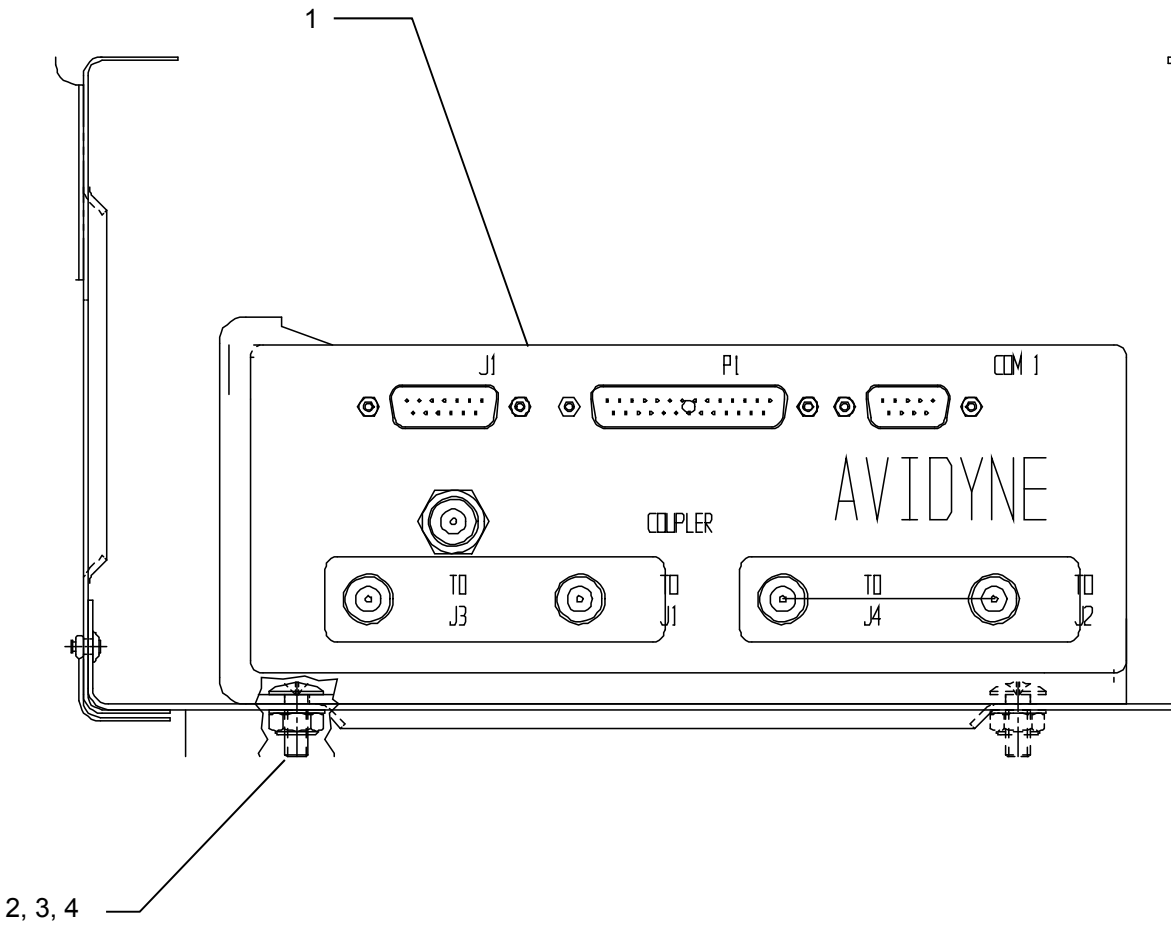
A. Install the top and bottom antennas onto the mounting bracket with the mounting hardware.

B. Connect electrical cables to the antennas.

C. Remove the cable tie or other similar device from the TAS circuit breaker stem and push the stem in to set the circuit breaker.

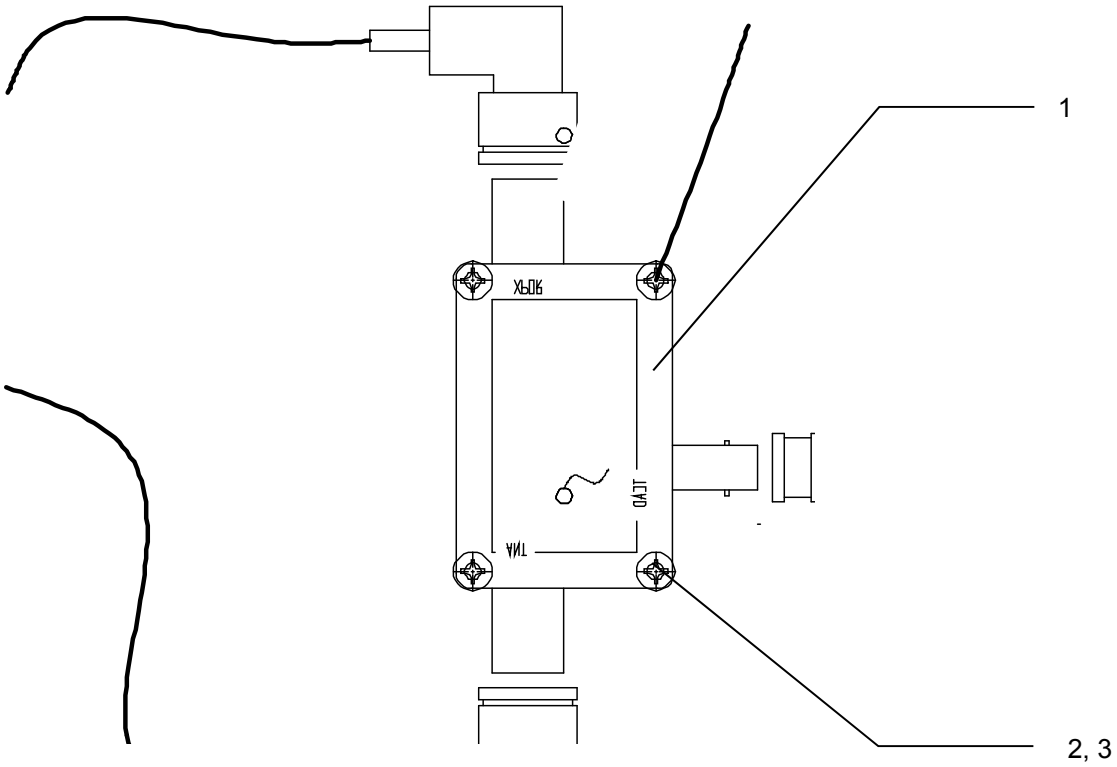
4-4. Wiring Harnesses/Connectors – TAS600

A. Remove, inspect/repair, and install the TAS600 system airframe mounted wiring harnesses/connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21. Refer to Diagram 1-1 and Diagram 1-2 for the TAS600 wiring interface.



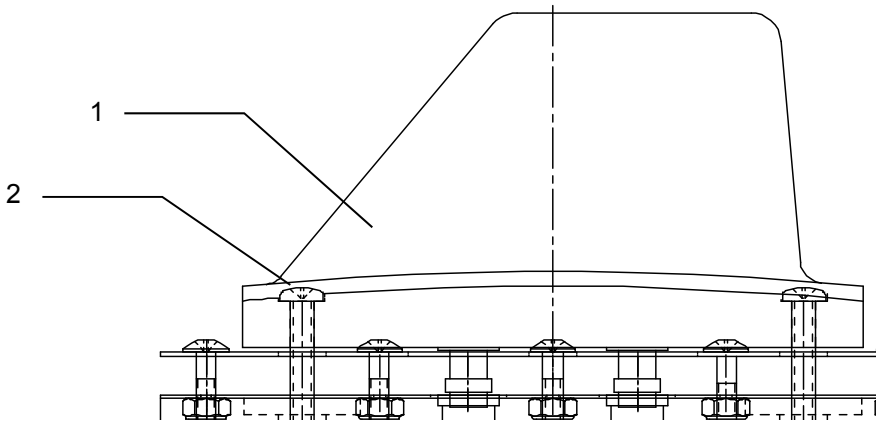
Item	Component	Part Number	Quantity
1	TAS600 Processor Assy	70-2420-8TAS600	1
2	Screw	AN525-1032R8	4
3	Washer	AN960-10	4
4	Nut	AN364-1032	4

Figure 1-1. TAS600 Processor

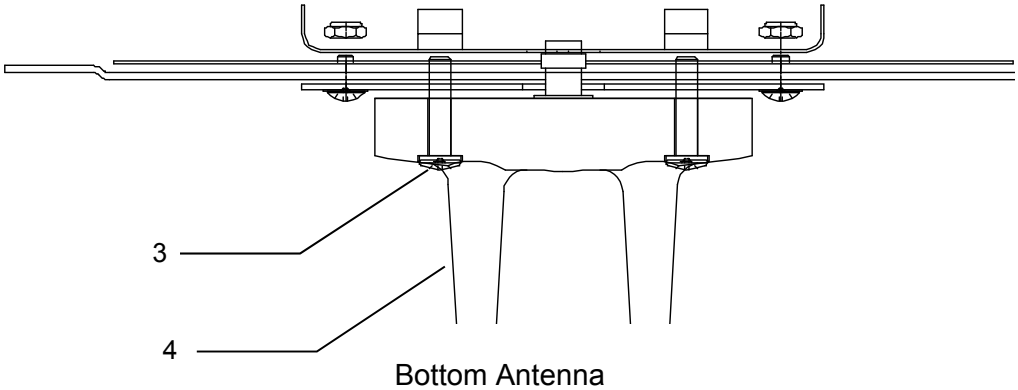


Item	Component	Part Number	Quantity
1	Transponder/Coupler	70-2040	1
2	Pan Head Screw	632 X 1 3/8 LG	4
3	Elastic Stop Nut	632	4

Figure 1-2. TAS600 Transponder/Coupler Installation



Top Antenna



Bottom Antenna

Item	Component	Part Number	Quantity
1	Single Blade Antenna	S72-1750-31L	1
2	Screw	MS27039C1-18	4
3	Screw	MS27039C1-18	4
4	Twin Blade Antenna	S72-1750-32L	1

Figure 1-3. TAS600 Antenna Installation

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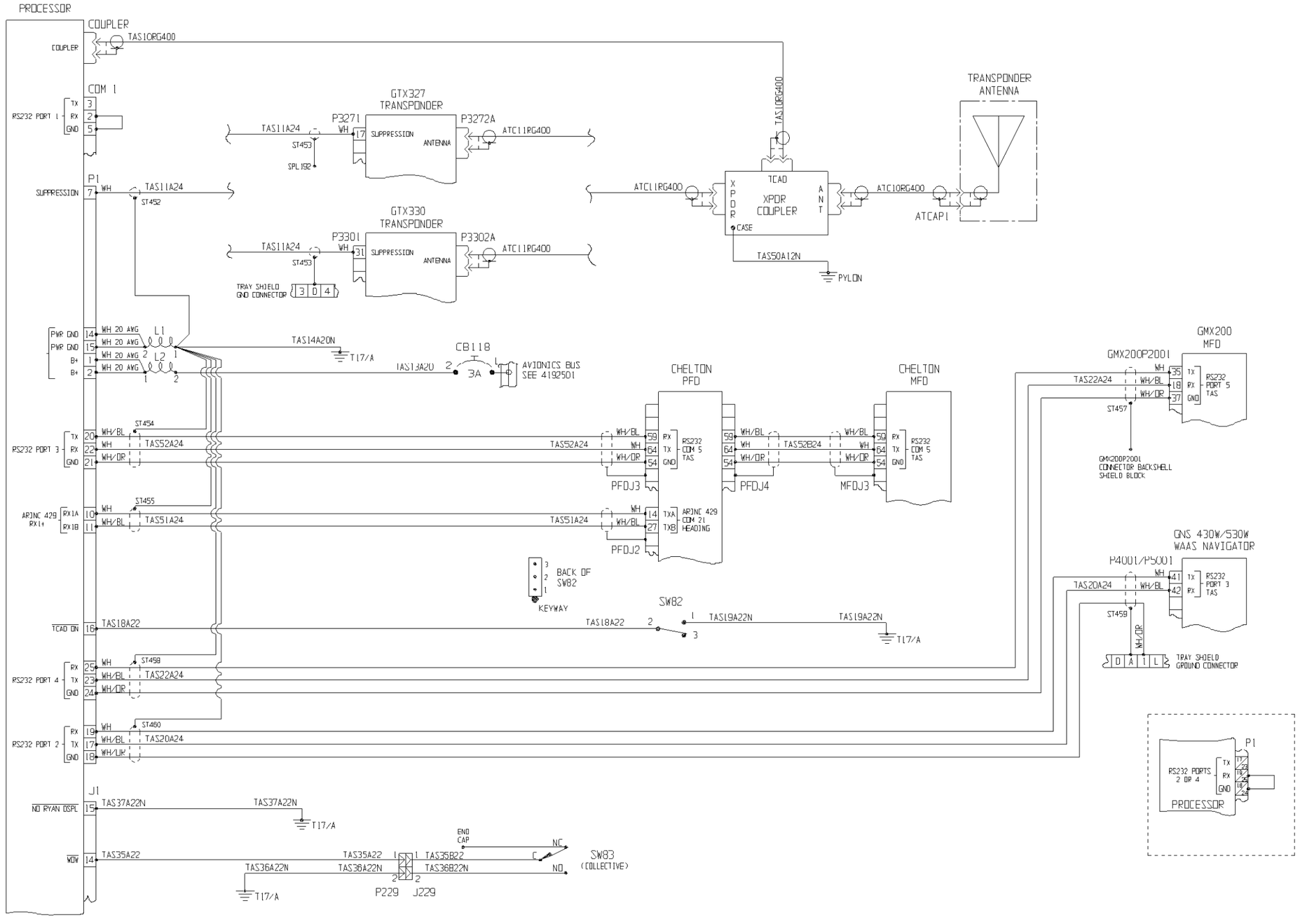

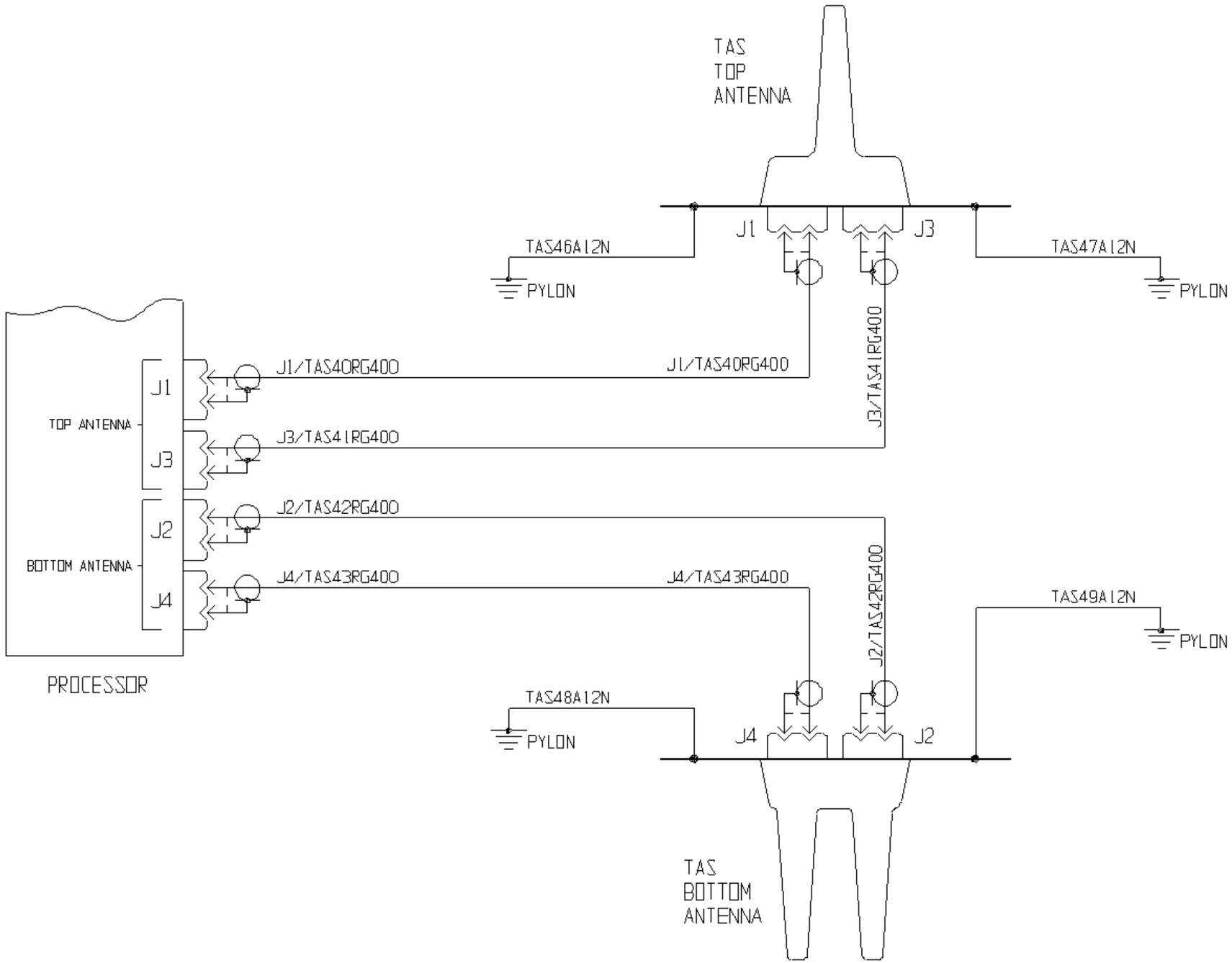

Diagram 1-1. TAS600, Sheet 2 of 2

CHAPTER 2

SL30 NAV COM

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The Garmin SL30 NAV/COM unit is a VHF Navigation/Communications Transceiver utilizing high performance Digital Signal Processing (DSP) filtering. It includes a 760-channel VHF Com transceiver and a 200-channel VOR/LOC/GS navigation receiver.

B. Functions and features of the SL30 include automatic decoding of the Morse code station identifier for VOR/LOC, memory storage for most-used frequency, built-in course deviation indicator, standby Com and Nav frequency monitoring, Nav receiving for both VOR and LOC navigation signals, and built in Glideslope receiver.

C. The components of the SL30 system include the panel mounted SL30 unit and nav and com antennas. If equipped, a dual SL30 installation contains two Garmin SL30 NAV/COM units that share one nav antenna and include two separate, independent com antennas. The SL30(s) provide output to a VOR/LOC/GS indicator and to either a VOX ICS or an audio panel.

D. The part number 4220558-( ) SL30 may be configured with a diode or an LED-based back course annunciator, each of which may be installed on the upper instrument panel.

E. Power to the SL30 unit is provided via the **COM** circuit breaker (CB61) (5 Amp) and the **NAV** circuit breaker (CB63) (2 Amp) located on the left side of the center pedestal. If equipped, power to the second SL30 unit is provided via the COM2 circuit breaker (also designated CB61) (5 Amp) and NAV2 circuit breaker (also designated CB63) (2 Amp) located on the left side of the center pedestal.

F. Refer to the 480B Rotorcraft Flight Manual Supplement and the current vendor operating manuals/instructions for operation of the SL30 system.

1-2. Vendor Publications

A. The SL30 is to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft. The applicable vendor manuals are listed in Table 2-1.

Table 2-1. Vendor Manuals

Component	Publication	Vendor
SL30	SL30 Nav Com Pilot's Guide	Garmin International 1200 E. 151st Street Olathe, KS 66062

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the SL30 system are “on condition”.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The SL30 contains no user serviceable components or assemblies. Operations involving the removal of the SL30 or any other line-replaceable unit (LRU) installed as a part of the SL30 must be done by authorized maintenance technicians.

3-2. Troubleshooting

A. Refer to the respective Pilot's Operating Guide and Reference when troubleshooting problems with the SL30.

3-3. Periodic Inspections

A. The following inspection checklist is intended as a guide for 100 hour/annual inspections for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
SL30 NAV COM	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the electrical cables, and mounts for security, damage, and obvious defects.	
2. Inspect the antennas and mount for security, damage, and obvious defects.	
3. Inspect the SL30 unit(s) and mounts for security, damage, and obvious defects.	

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

4-1. SL30

NOTE

Maintenance procedures are identical for either a single or dual SL30 installation.

4-1-1. Removal – SL30

A. Turn the SL30 and aircraft power off. Pull the NAV and COM circuit breakers out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker system.

B. The SL30 is mounted in a tray in the radio panel of the console. Using a 3/32 hex driver, turn the cam lock to release the unit from the tray. Pull the SL30 unit from the radio panel.

4-1-2. Inspection/Repair – SL30

A. Inspect the condition and security of the tray and electrical interface.

B. Inspect the condition and security of electrical cables.

C. Repair procedures are not available for the SL30.

4-1-3. Installation – SL30

A. Install the SL30 into the radio panel tray and lock the unit into the tray.

B. Remove the cable tie or other similar device from the NAV and COM circuit breaker stems and push the stems in to set the circuit breaker.

4-2. Wiring Harnesses/Connectors – SL30

A. Remove, inspect/repair, and install the SL30 system airframe mounted wiring harnesses/connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21. Refer to Diagram 2-1 for the SL30 wiring interface.

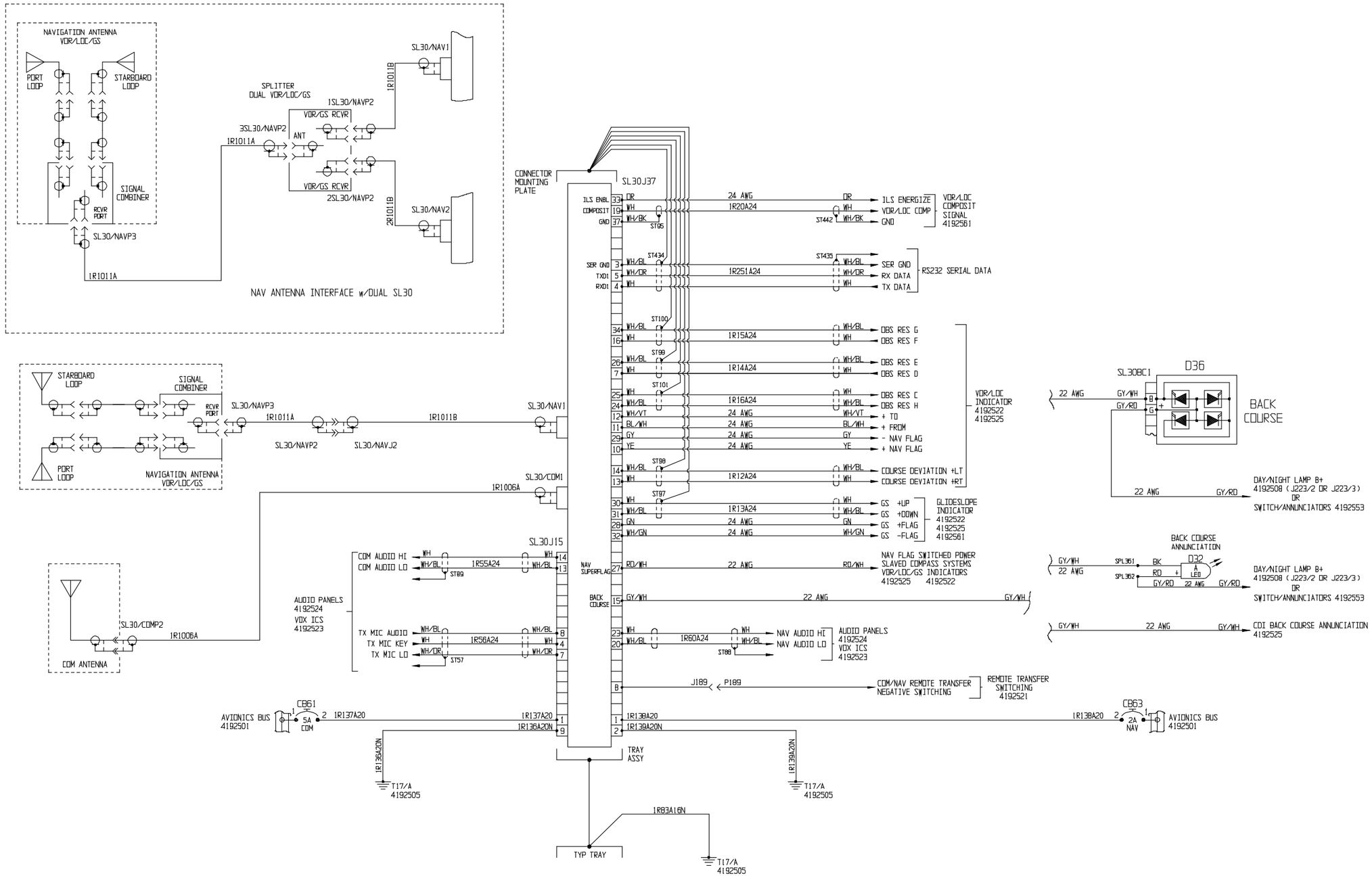

Diagram 2-1. SL30, Sheet 1 of 1
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CHAPTER 3

SANDIA SAE5-35 ALTITUDE DATA SYSTEM

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The Sandia SAE5-35 is a solid state altitude data system (blind encoder) that converts pressure altitude into a digital output. The data output is referenced to 29.92 in Hg (1013 Millibars).

B. The Sandia SAE5-35 outputs altitude data via Gillham Grey Code or two independent RS232 digital outputs to Mode C transponders. The transponders utilized include the Bendix/King KT73, KT76A, and KT76C; and the Garmin GTX327 and GTX330.

C. Two configurations of the Sandia SAE5-35 system are available. They are part numbers 4220561-1 and 4220561-3. P/N 4220561-1 is the standard system installation and P/N 28-4220561-3 is the standard system with the “Altitude In-Flight Monitoring” function.

D. Power to the Sandia SAE5-35 encoder is provided via the **ENCDR** circuit breaker (CB39) (2 Amp) located on the lower left side of the center pedestal.

E. Refer to the 480B Rotorcraft Flight Manual Supplement and the current vendor operating manuals/instructions for operation of the Sandia SAE5-35 altitude data system.

1-2. Vendor Publications

A. The Sandia SAE5-35 is to be operated and maintained I/A/W the current vendor’s instructions to ensure the continued airworthiness of the aircraft. The applicable vendor manuals are listed in Table 3-1.

Table 3-1. Vendor Manuals

Component	Publication	Vendor
Sandia SAE5-35	1. SAE5-35 Pilot’s Guide, Document 305221 2. SAE5-35 Altitude Data System Installation Manual, Document 305186	Sandia Aerospace, Inc. 3700 Osuna Rd. NE, Suite 171 Albuquerque, NM 87109

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the Sandia SAE5-35 system are “on condition”.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The Sandia SAE5-35 contains no user serviceable components or assemblies. Operations involving the removal of the Sandia SAE5-35 or any other line-replaceable unit (LRU) installed as a part of the Sandia SAE5-35 must be done by authorized maintenance technicians.

B. The Sandia SAE5-35 requires calibration every 24 mouths. Refer to the installation manual when calibrating the Sandia SAE5-35.

3-2. Troubleshooting

A. No troubleshooting guidelines are available for the Sandia SAE5-35.

3-3. Periodic Inspections

A. The following inspection checklist is intended as a guide for 100 hour/annual inspections for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
SANDIA SAE5-35 ALTITUDE DATA SYSTEM	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the electrical cables, and mounts for security, damage, and obvious defects.	

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom F-28F/280F Series Maintenance Manual).

4-1. Sandia SAE5-35

4-1-1. Removal – Sandia SAE5-35

A. Turn the Sandia SAE5-35 and aircraft power off. Pull the ENCDR circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker stem.

B. The Sandia SAE5-35 is installed in a tray mounted on a bracket in the keel below the console.

C. Disconnect the electrical cables.

D. Slide the unit out of the tray.

4-1-2. Inspection/Repair – Sandia SAE5-35

A. Inspect the condition and security of the mounting bracket and electrical interface.

B. Inspect the condition and security of electrical cables.

C. Repair procedures are not available for the Sandia SAE5-35.

4-1-3. Installation – Sandia SAE5-35

A. Install the Sandia SAE5-35 in the tray.

B. Connect the electrical cables.

C. Remove the cable tie or other similar device from the ENCDR circuit breaker stem and push the stem in to set the circuit breaker.

4-2. Wiring Harnesses/Connectors – Sandia SAE5-35

A. Remove, inspect/repair, and install the Sandia SAE5-35 system airframe mounted wiring harnesses/connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21. Refer to Diagram 3-1 for the Sandia SAE5-35 wiring interface.

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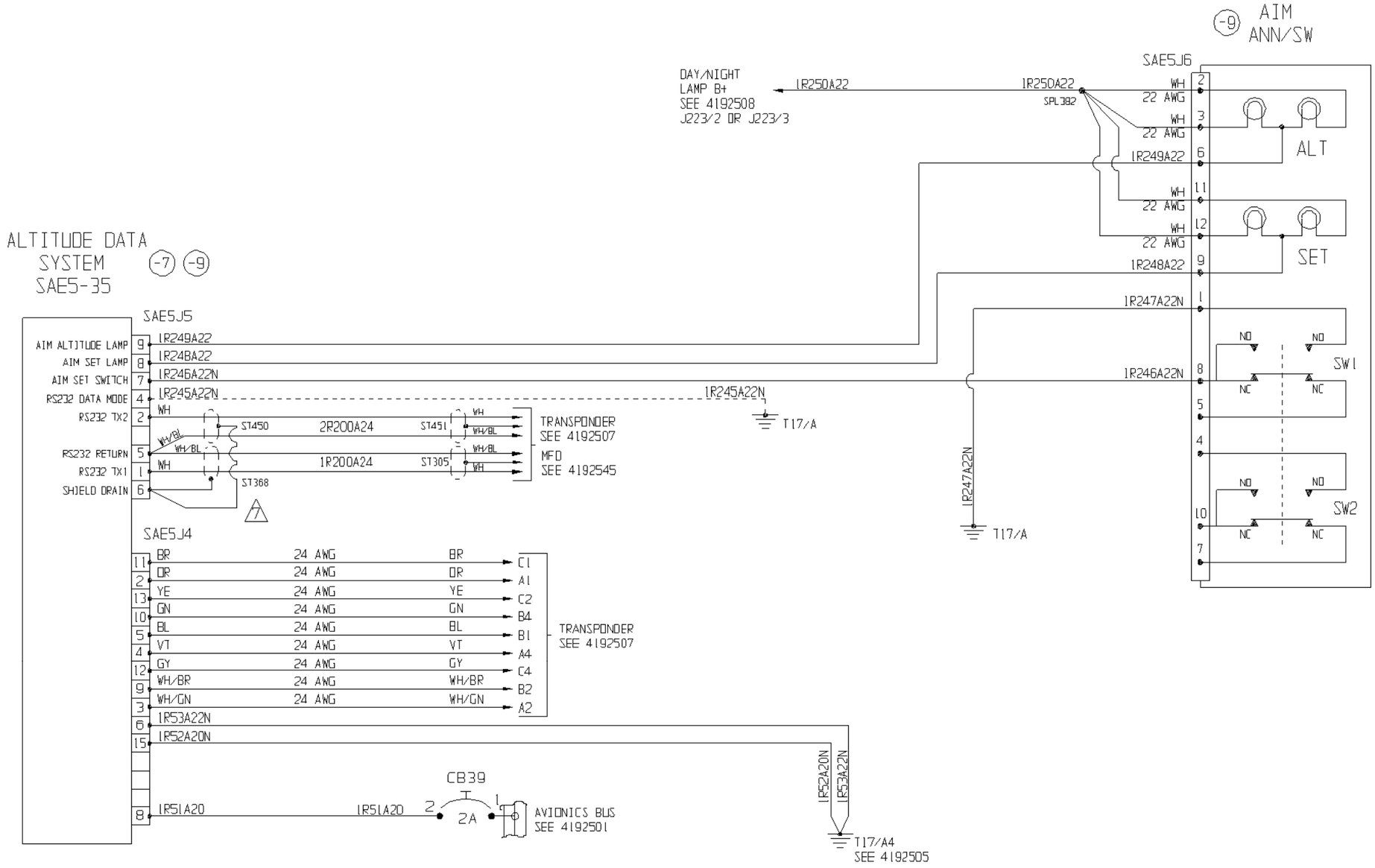

(-7) SANDIA SAE5-35 ALTITUDE DATA SYSTEM INTERFACE

(-9) SANDIA SAE5-35 ALTITUDE DATA SYSTEM w/AIM INTERFACE

Diagram 3-1. Sandia SAE5-35, Sheet 1 of 1
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CHAPTER 4

MD200 SERIES CDI

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The MD200 Series Course Deviation Indicator (CDI) is designed to operate with VHF and GPS navigational equipment to provide OMNI (VOR), GPS, localizer (VLOC), and glideslope (GS) information.

B. The MD200 Series CDI installation part number is 4220574-( ).

C. Power to the MD200 Series CDI is provided via the **NAV** or **NAV/GPS** circuit breaker (GNC 255A interface: CB63 (2 Amp); GTN 650/750 interface: CB194 (5 Amp)) located on the left side of the center pedestal.

D. Refer to 480B Rotorcraft Flight Manual Supplement 28-AC-063 (GNC 255A interface) or 28-AC-064 (GTN 650/750 interface), as applicable, for system interface limitations and basic operation instructions.

1-2. Vendor Publications

A. The following components listed in Table 4-1 are to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 4-1. Vendor Manuals

Component	Publication	Vendor
MD200-306	Installation Manual and Operating Instructions, Number 8017972, Rev. 3	Mid-Continent Inst. Co., Inc. 9400 E. 34th Street N. Wichita, KS 67226 Tel. 316.630.0101 Tel. 800.821.1212 Fax 316.630.0723 Email mcia@mcico.com Web https://www.mcico.com/
MD200-706	Installation Manual and Operating Instructions, Model MD200-706/707, Number 9018582, latest revision	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. For FAA approval, this Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, this Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the MD200 Series CDI are “on condition”.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The MD200 Series CDI contains no user serviceable components or assemblies. Operations involving the removal of the MD200 Series CDI or any other line-replaceable unit (LRU) installed as a part of the MD200 Series CDI must be done by authorized maintenance technicians.

3-2. Troubleshooting

A. Refer to the respective installation manual when troubleshooting problems with the MD200 Series CDI.

3-3. Periodic Inspections

A. The following inspection checklist is intended as a guide for 100 hour/annual inspections for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	

MD200 SERIES CDI	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Visually inspect the indicator for legibility and obvious damage.	
2. Inspect the electrical cables, and mounts for security, damage, and obvious defects.	

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

4-1. MD200 Series CDI

4-1-1. Removal

A. Turn the GPS navigation unit and aircraft power off. Pull the NAV circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker system.

B. The MD200 Series CDI is mounted in the upper panel of the console. Remove the three 6-32 x 1.0” attaching screws. Pull the MD200 Series CDI unit from the rear of the panel.

C. Disconnect the electrical cables.

4-1-2. Inspection/Repair

A. Inspect the condition and security of the electrical interface.

B. Inspect the condition and security of electrical cables.

C. Repair procedures are not available for the MD200 Series CDI.

4-1-3. Installation

A. Install the MD200 Series CDI into the panel with the three 6-32 x 1.0” attaching screws.

B. Remove the cable tie or other similar device from the NAV circuit breaker stem and push the stem in to set the circuit breaker.

C. Apply power and verify proper operation of the CDI.

D. If the unit is a replacement, annunciator dimming may be adjusted in accordance with the applicable MD200 Series CDI Installation Manual.

4-1-4. Wiring Harnesses/Connectors

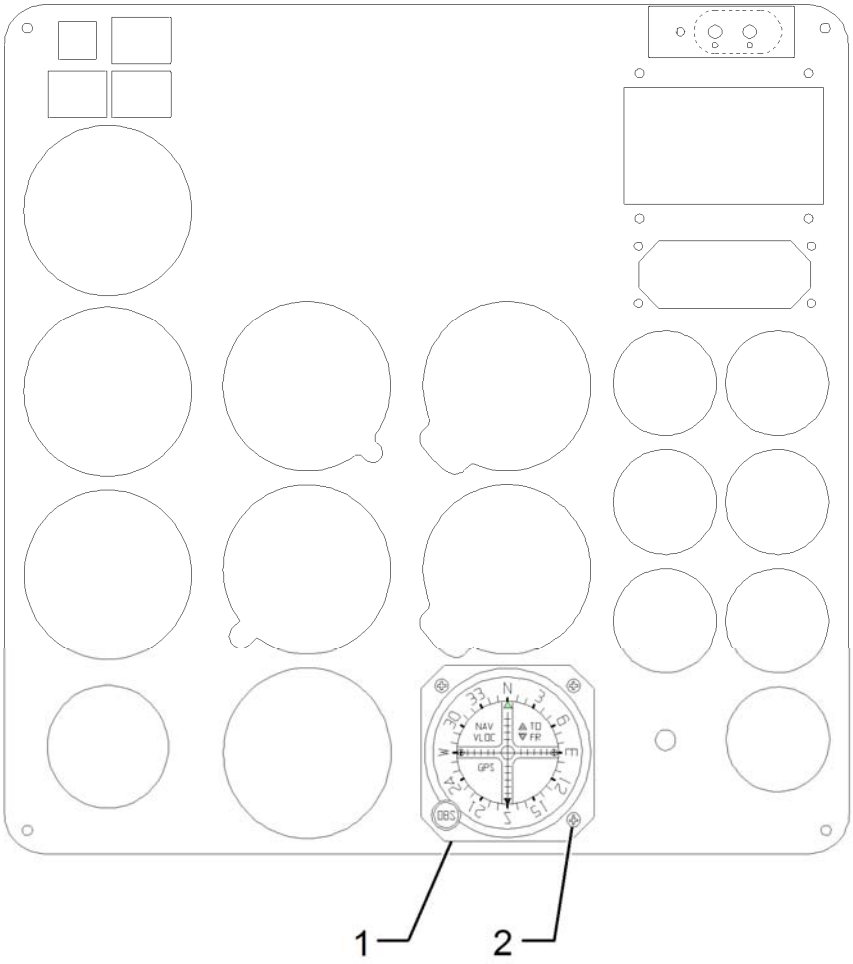
A. Remove, inspect/repair, and install the MD200 Series CDI system airframe mounted wiring harnesses/connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21.

4-1-5. Figures and Electrical Diagrams

A. MD200 Series CDI installation: Figure 4-1

B. MD200-306 wiring diagrams: Diagrams 4-1 and 4-2

C. MD200-706 wiring diagrams: Diagrams 4-3 and 4-4



Item	Part Number	Description	Quantity
-	4220574-1	MD200-306 CDI Installation	REF
-1	MD200-306	. Indicator	1
-	4220574-3	MD200-706 CDI Installation	REF
1	MD200-706	. Indicator	1
2	AN515B6R14	. . Screw	3
2	MS35214-30	. . Screw (alternate)	3

Figure 4-1. MD200 Series CDI Installation

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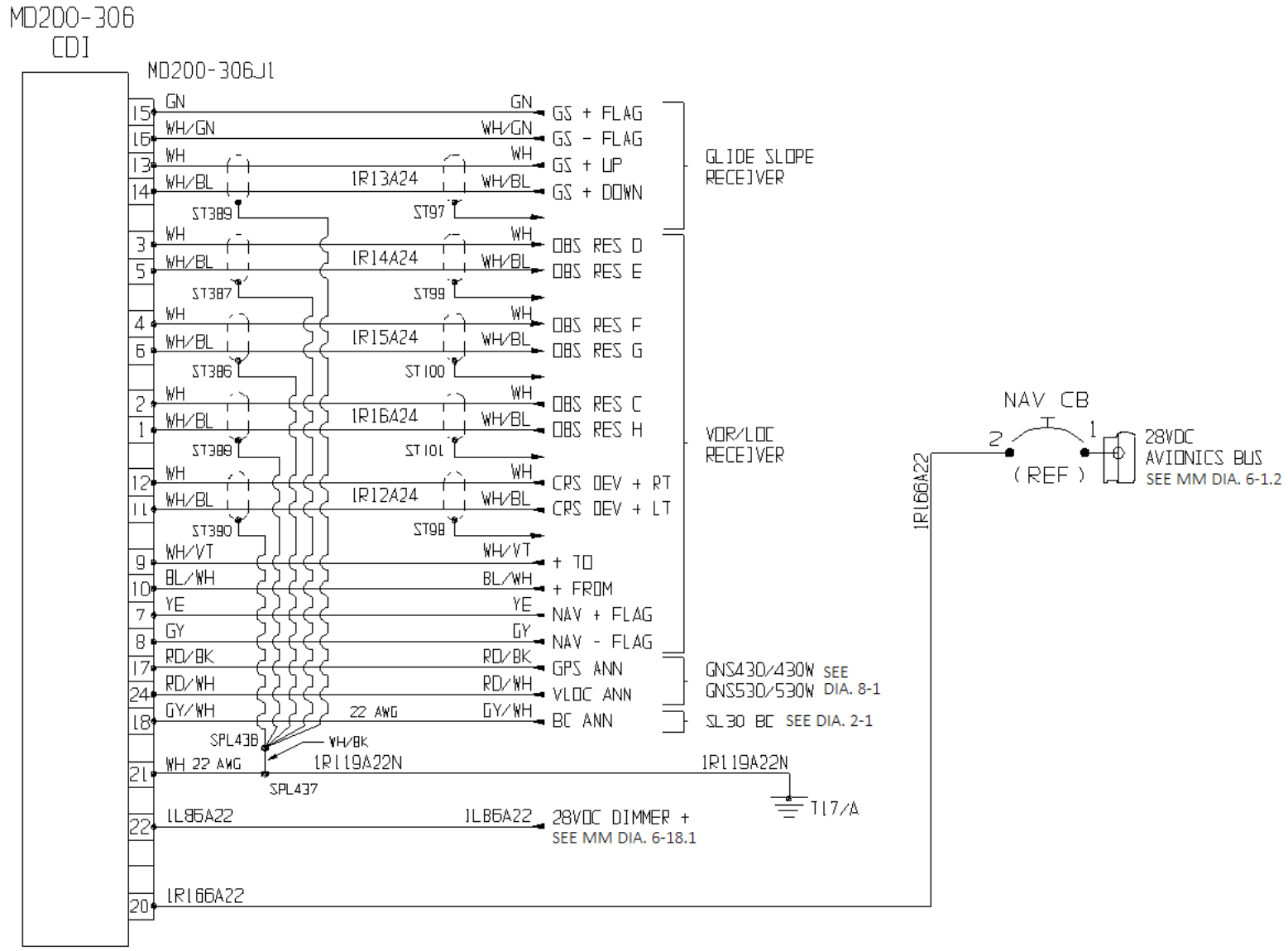


Diagram 4-1. MD200-306 Interface (Shown as typically installed with a GNS 430/530/W or SL 30)

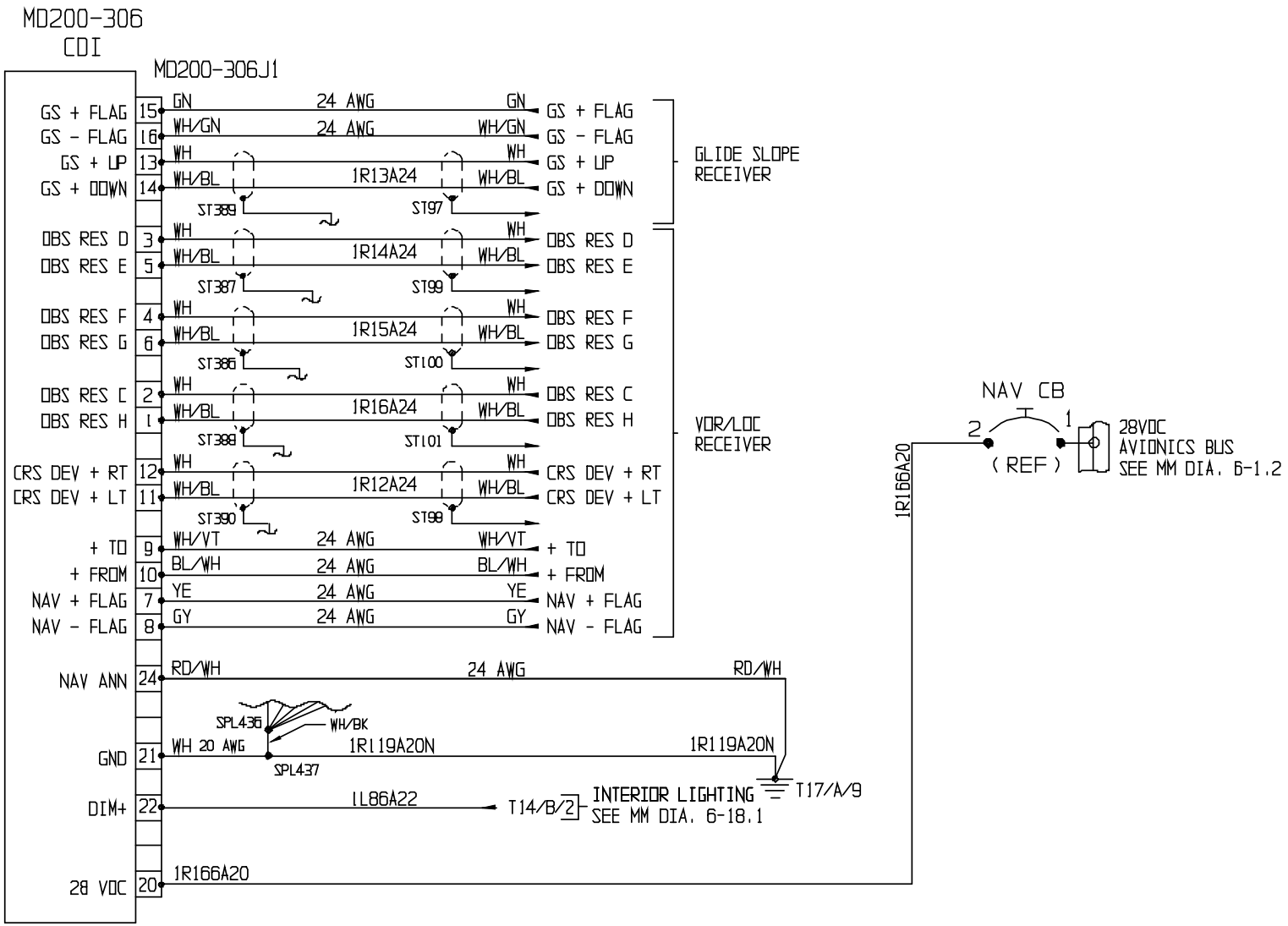


Diagram 4-2. MD200-306 Interface (Shown as typically installed with a GNC 255A)

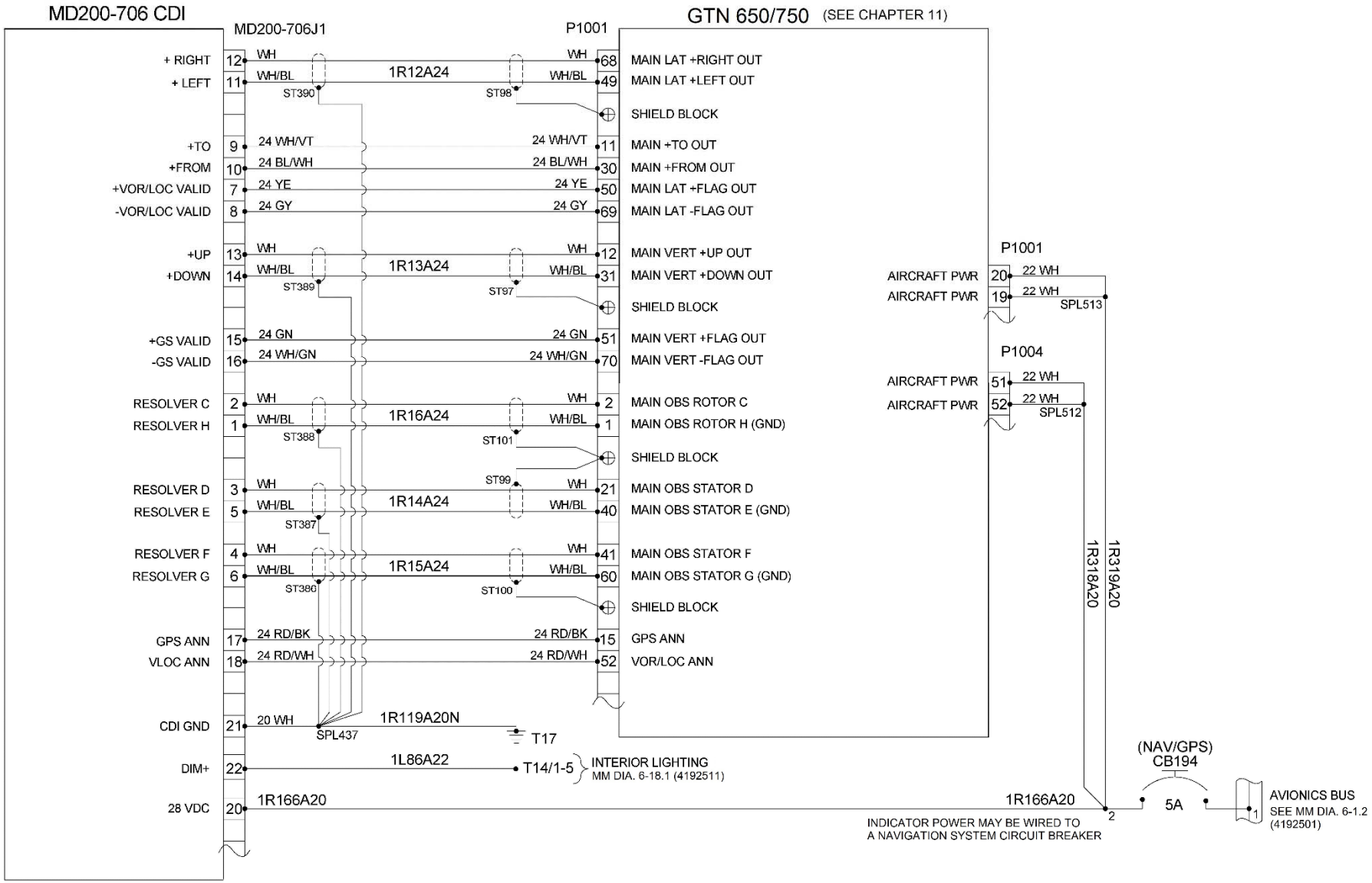


Diagram 4-3. MD200-706 Interface (Shown as typically installed with a GTN 650/750)

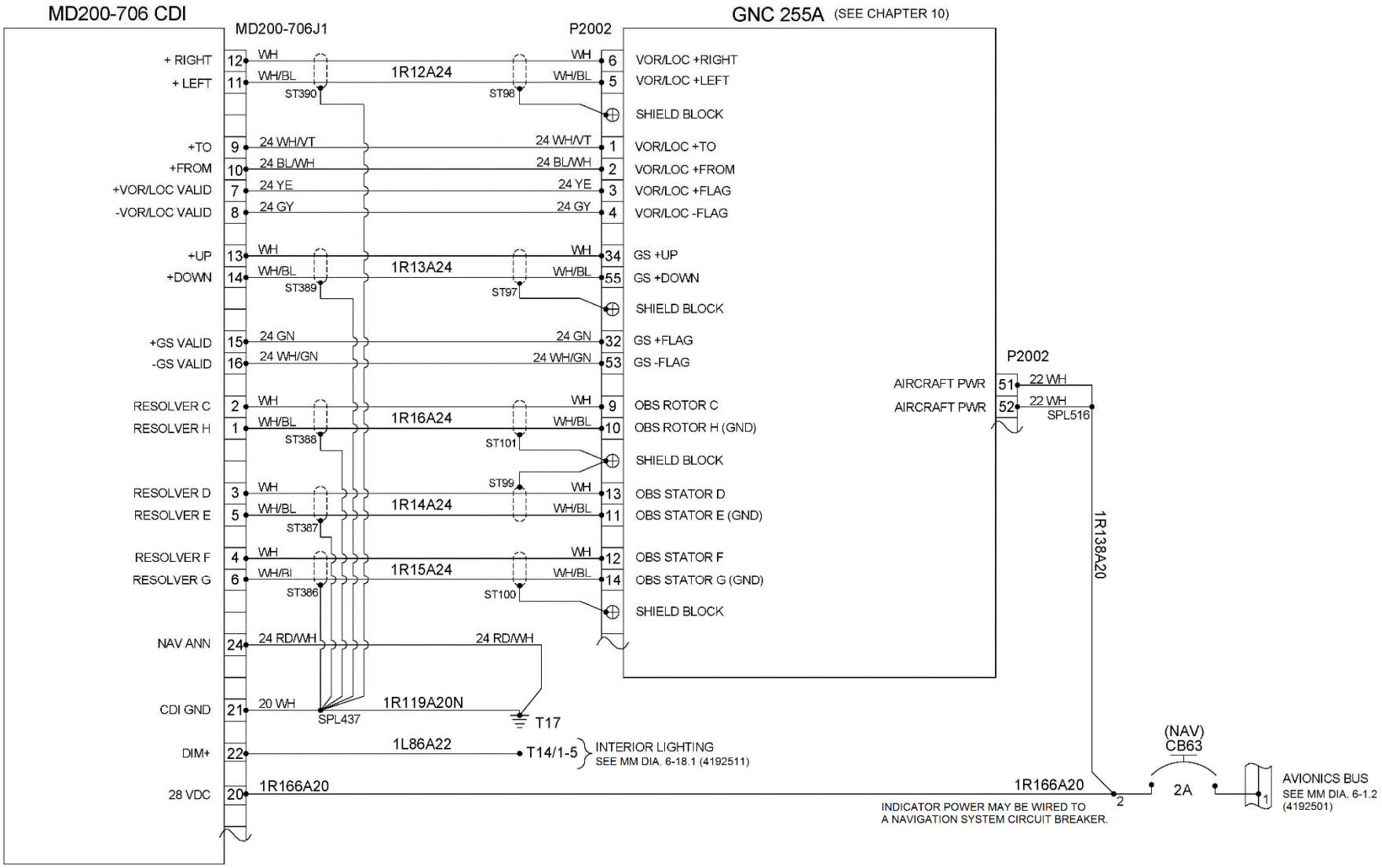


Diagram 4-4. MD200-706 Interface (Shown as typically installed with a GNC 255A)

CHAPTER 5

POWERLINE DECTECTION SYSTEM

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The Powerline Detection System (PDS) was designed as an aid to helicopter pilots to alert them of their proximity to "live" power lines. The Safe Flight Powerline Detection System emits a pulsing, audible tone along with a visual alert. The system contains a super low frequency (SLF) radio receiver that is tuned to the power line frequency. As the field strength of the power line increases, the system increases the frequency of the aural alerts similar to a Geiger counter. The pilots can literally "hear" their relationship to the power line.

B. The system consists of three primary components: (1) the panel-mounted Powerline Detector, PD (the SLF receiver and other circuits); (2) an antenna coupler to match the impedance of the antenna to the receiver; and (3) the antenna itself.

C. An annunciator located on the front panel illuminates a red warning lamp when the field intensity exceeds a preset value and an amber caution lamp when the audio is muted.

D. Power to the PDS unit is provided via the **PDS** circuit breaker (CB139) (1 Amp) located on the left side of the center pedestal.

E. Two configurations are available: P/N 4220576-1 is a 60 Hz Powerline Detector installation; P/N 4220576-3 is a 50 Hz Powerline Detector installation.

F. Refer to the 480B Rotorcraft Flight Manual Supplement and the current vendor operating manuals/instructions for operation of the PDS.

1-2. Vendor Publications

A. The PDS is to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft. The applicable vendor manuals are listed in Table 5-1.

Table 5-1. Vendor Manuals

Component	Publication	Vendor
PDS	Instructions for Continued Airworthiness	Safe Flight Instrument Corporation White Plains, NY

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, this Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the PDS are “on condition”.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The PDS contains no user serviceable components or assemblies. Operations involving the removal of the PDS or any other line-replaceable unit (LRU) installed as a part of the PDS must be done by authorized maintenance technicians.

3-2. Troubleshooting

A. Refer to Table 5-2 when troubleshooting problems with the PDS.

3-3. Periodic Inspections

A. The following inspection checklist is intended as a guide for 100 hour/annual and 1200 hour/biannual inspections for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
Powerline Detection System	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the electrical cables and mounts for security, damage, and obvious defects.	
2. Inspect the antenna and antenna coupler for security, damage, and obvious defects.	
3. Inspect the PD and mount for security, damage, and obvious defects.	
Inspect the following items at 1200 hours or 24 months	
1. Inspect the antenna mounting security and perform a functional test.	

3-4. Special Instructions

A. Hard Landings or Lightning Strike

(1) Inspect Powerline Detector, Antenna Coupler and Antenna for damage. Perform a Functional Test per paragraph 4.6.

Table 5-2. Troubleshooting

Step	Malfunction	Remedial Action
1	PD does not work. (No lights, system dead.)	Check for 28 VDC power to pins 5 and 2 of the PD. Check the ground connection to pins 1 and 8 of the PD. If the wiring is good, replace the PD.
2	No audio from system. No warning indication from system.	Activate the self-test and check to audio output from the (PD) on pins 6 (Hi) and 4 (Lo). The output shall vary from 6 to 0.6 VAC rms at approximately 30 Hz (± 20%). **If the output is present**, check aircraft wiring or the aircraft audio system.
		If the audio output is still missing, disconnect the antenna cable from the PD. Activate the self-test; if there is still no audio output, replace the PD.
		If the audio output is present, reconnect the antenna cable to the PD and remove the connection to the antenna coupler. Activate the self-test. If the audio output is present. Check the continuity of the center conductor and of the shielding from one end to the other end of the antenna cable. If the self-test and continuity test are good, the antenna cable is good. Check the antenna coupler and the antenna
		If there is no audio output after reconnecting the antenna cable to the PD, removing the connection to the antenna coupler and performing a self-test, the cable is shorted. Replace the cable.
		If the antenna cable is good disconnect the antenna from the antenna coupler and check the resistance across the COM (center conductor) of the antenna. The resistance should be greater than 5 MΩ. If the antenna is out of specification, replace the antenna. If the antenna is not shorted, replace the antenna coupler.
3	No mute when activated. Warning is on all the time. Gain knob does not work properly.	Check the wiring to pin 7 of the PD and the self-test switch. The self-test is normally open and requires a ground to activate the self-test
		If the self-test wiring and switch is good, disconnect the antenna. If the warning stops, check for external source 50 or 60 Hz interference.
		If the warning does not stop when you disconnect the antenna, replace the PD.
4	Self-Test is inoperative.	Check the wiring and the self-test switch. The self-test is normally open and requires a ground to activate the self-test. If the self-test wiring and switch are good, replace the PD.
5	Mute when not selected.	Replace the PD.
6	Panel Light or Warn/Mute Button lights are not working.	Replace the PD.
7	Problems with mechanical rotation of gain knob or the mute button.	Replace the PD.

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

4-1. PD

4-1-1. Removal – PD

A. Gain access to the back of the instrument panel I/A/W paragraph 7-3 of the TH-28/480 Series Maintenance Manual.

B. Pull the PDS circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker system.

C. Disconnect the electrical connector from the PD.

D. Remove the four mounting screws and remove the PD from the instrument panel.

4-1-2. Installation – PD

A. Install the PD in the instrument panel and install the mounting screws.

B. Connect the electrical connector to the PD.

C. Install the instrument panel cover and glare shield I/A/W paragraph 7-7 of the TH-28/480 Series Maintenance Manual.

D. Remove the cable tie or other similar device from the PDS circuit breaker stem and push the stem in to set the circuit breaker.

E. Perform a Functional Test per paragraph 4.6.

4-2. Test Switch (TS)

4-2-1. Removal – Test Switch

A. Pull the PDS circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker system.

B. Disconnect the wiring from the test switch.

C. Remove the test switch from the instrument panel.

4-2-2. Installation – Test Switch

A. Install the test switch in the instrument panel.

B. Connect the wiring to the test switch.

C. Remove the cable tie or other similar device from the PDS circuit breaker stem and push the stem in to set the circuit breaker.

D. Perform a Functional Test per paragraph 4.6.

4-3. Antenna Coupler

4-3-1. Removal – Antenna Coupler

A. Pull the PDS circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker system.

B. Remove the left horizontal stabilizer I/A/W paragraph 8-97 of the TH-28/480 Series Maintenance Manual.

C. Remove the forward access panels from the spar.

D. Disconnect the coax cable from the coupler and disconnect the coupler lead from the antenna.

E. Remove the hardware securing the coupler mounting clamp to the bulkhead support and remove the coupler from the aircraft.

4-3-2. Installation – Antenna Coupler

A. Install the coupler and mounting clamp onto the bulkhead support and secure with the mounting hardware.

B. Connect the coupler lead to the antenna and connect the coax cable to the coupler.

C. Install the forward access panels onto the stabilizer spar.

D. Install the horizontal stabilizer I/A/W paragraph 8-102 of the TH-28/480 Series Maintenance Manual.

E. Remove the cable tie or other similar device from the PDS circuit breaker stem and push the stem in to set the circuit breaker

F. Perform a Functional Test per paragraph 4.6.

4-4. Antenna

4-4-1. Removal – Antenna

A. Pull the PDS circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker system.

B. Remove the right horizontal stabilizer I/A/W paragraph 8-97 of the TH-28/480 Series Maintenance Manual.

C. Remove the forward access panels from the spar.

D. Disconnect the coupler lead from the antenna.

E. Remove the antenna from the aircraft.

4-4-2. Installation – Antenna

A. Install the antenna in the tailcone.

B. Torque the antenna mounting nut to 10 ft-lbs/13.6 Nm.

C. Connect the coupler lead to the antenna.

D. Install the forward access panels onto the stabilizer spar.

E. Install the horizontal stabilizer I/A/W paragraph 8-102 of the TH-28/480 Series Maintenance Manual.

F. Remove the cable tie or other similar device from the PDS circuit breaker stem and push the stem in to set the circuit breaker.

G. Perform a Functional Test per paragraph 4.6.

4-5. Wiring Harnesses/Connectors – PD

A. Remove, inspect/repair, and install the Powerline Detection System airframe mounted wiring harnesses/connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21. Refer to Diagram 5-1 for the PDS wiring interface.

B. Perform a Functional Test per paragraph 4.6.

4-6. Functional Test

After maintenance of the system or removal/reinstallation of component it is necessary to perform a Functional Test before return to service. To perform this test:

A. Increase the SENS control clockwise to maximum.

B. Push the test button on the warning panel. The red warning light (see Figure 5-1) will come on and the clicking of the audio will be heard in the headset.

C. Release the test button.

D. Place a lighted droplight (as a test source) in the vicinity of the antenna on the lower rear of the rotorcraft. The red warning light will come on and the audio will be heard in the headset.

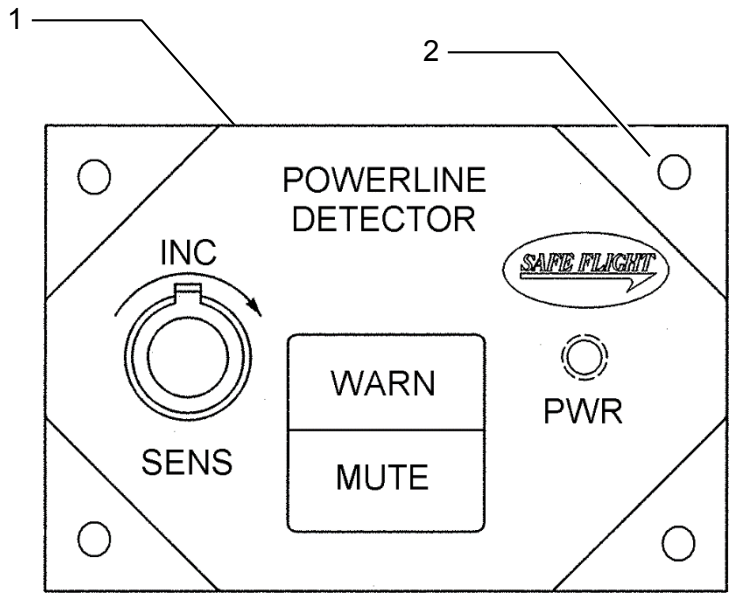
E. Push the push button switch to check the warning is silenced. The amber mute light will illuminate. Figure 5-1 shows the split legend push button switch/annunciator, with MUTE being the lower annunciator.

F. Remove the lighted droplight from the vicinity of the antenna and assure that there is no loose hardware. Assure the warning placard is still in place. Reinstall the placard, if necessary.

G. Successful completion of steps A thru F permits the Powerline Detection System to be returned to service.

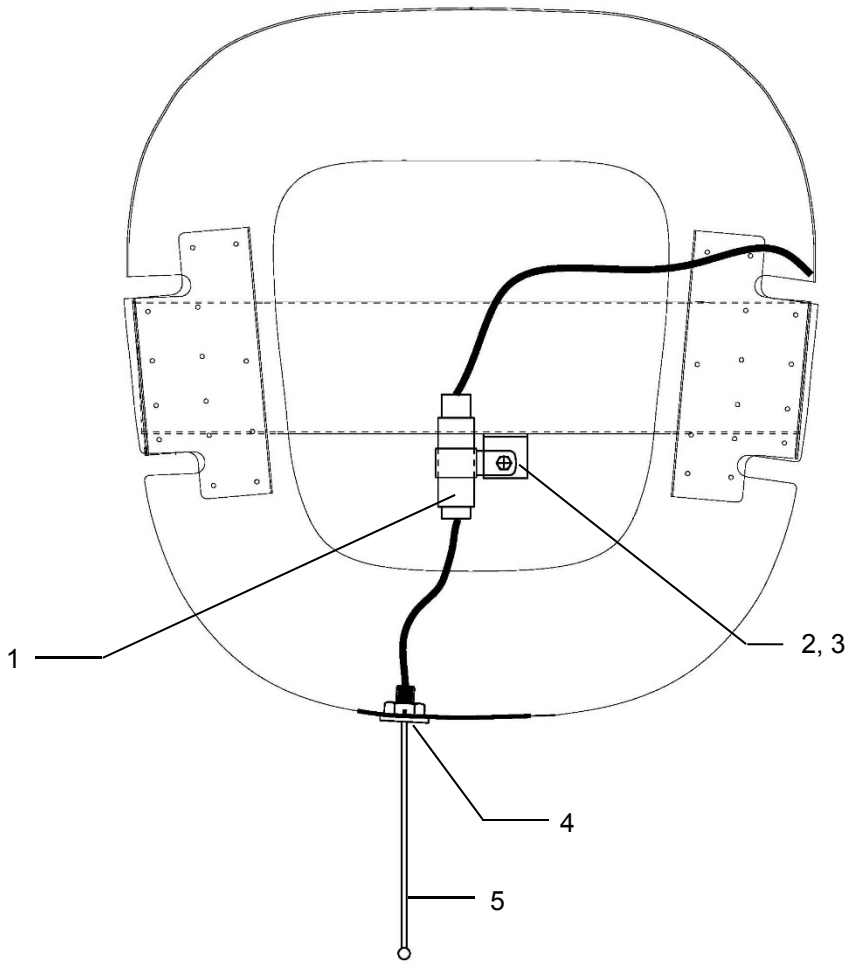
5-1. System Installation Figures and Wiring Schematic

The Powerline Detector unit is shown in Figure 5-1. The antenna coupler and antenna assembly installation are shown in Figure 5-2. The wiring schematic is shown in Diagram 5-1.



Item	Component	Part Number	Quantity
1	Powerline Detector (60 Hz)	7101-4	1
1	Powerline Detector (50 Hz)	7101-5	1
2	Screw	AN515-8R8	4
-	Test Button	59783	1
-	Connector Plug	51397 (M39012/1680007)	1
-	Connector	51451	1
-	Strain Relief	59410	1

Figure 5-1. Powerline Detector



Item	Component	Part Number	Quantity
1	Coupler	7102-2	1
2	Clamp	51450 (MS21919WDG14)	1
3	Screw	59412 (AN515-8R8)	1
-	Washer	61063 (AN960-8L)	1
-	Nut	56566 (AN364-832)	1
-	Connector Plug	51397 (M39012/1680007)	1
-	Clip	AN743-13	1
4	Backing Plate	4220576-11	1
5	Whip Antenna Assy.	50058	1
-	Cable Coax	7102-207-2	A/R

Figure 5-2. Antenna Coupler and Antenna Assembly

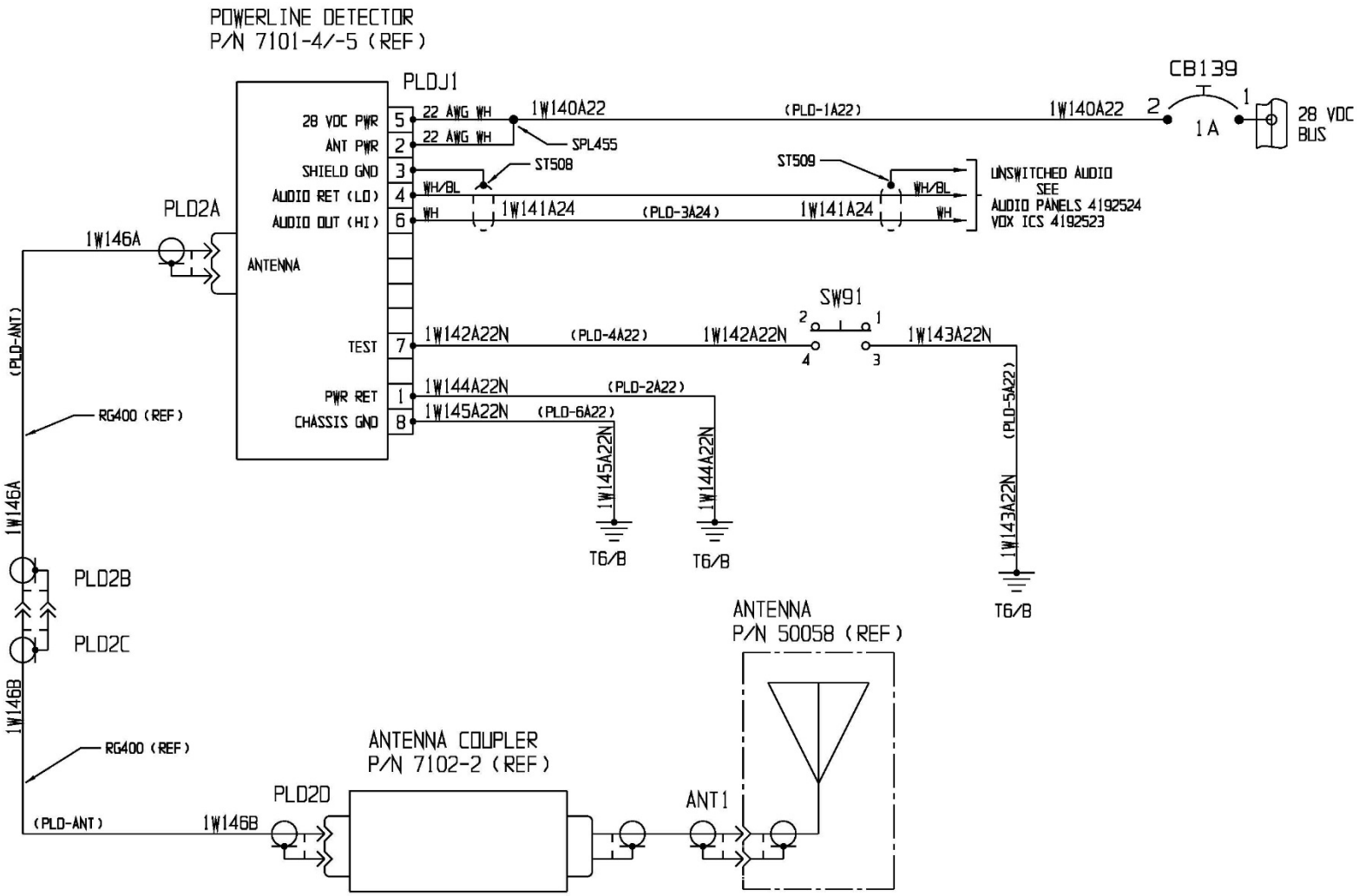


Diagram 5-1. Powerline Detector System Wiring Schematic

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CHAPTER 6

NAT AMS44 DUAL CHANNEL AUDIO CONTROLLER / NAT 247 AUDIO MIXING AMPLIFIER

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The NAT AMS44 Dual Channel Audio Controller provides one central controller for all aircraft audio, allowing selection of transmit and receive audio, LIVE, PTT (keyed), or VOX intercom, pilot isolation, and emergency operation. Individual control over receive and transmit functions are provided for both the pilot and copilot. Common control is provided for LIVE, PTT, and VOX ICS. Additionally, control is provided for normal, emergency, or isolate operation.

B. The system consists of the dual controller unit located in the avionics panel and the wiring interface for radio, nav/com, and other additional inputs.

C. The NAT 247 is an audio mixing amplifier used in conjunction with the NAT AMS44 to accommodate additional aural warning inputs, if required. The installation is remotely located in the keel.

D. Power to the NAT AMS44 controller is provided via the **AUDIO PANEL** circuit breaker (CB35) (1 Amp) located on the left side of the center pedestal. Power to the NAT 247 amplifier is provided via the **AUD WRN** circuit breaker (CB140) (1 Amp) located on the lower left side of the center pedestal.

E. Refer to the 480B Rotorcraft Flight Manual Supplement and the current vendor operating manuals/instructions for operation of the NAT AMS44 and the NAT 247.

1-2. Vendor Publications

A. The NAT audio units are to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft. The applicable vendor manuals are listed in Table 6-1.

Table 6-1. Vendor Manuals

Component	Publication	Vendor
NAT AMS44 Dual Channel Audio Controller	AMS44/AMS44 Series Installation and Operation Manual, Revision 4 or later.	Northern Airborne Technology Ltd. 1925 Kirschner Road Kelowna BC, Canada V1Y 4N7 Tele: (250) 763-2232 Fax: (250) 762-3374
NAT 247 Audio Mixing Amplifier	Model 247 SM247 Installation and Operation Manual, Issue 2 or later.	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, this Airworthiness Limitations Section is approved and variations must also be approved.

C. The NAT audio components are “on condition”.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The NAT AMS44 and the NAT 247 contain no user serviceable components or assemblies. Operations involving the removal of either of the units or any other line-replaceable unit (LRU) installed as a part of the audio installations must be done by authorized maintenance technicians.

3-2. Troubleshooting

A. Refer to the schematic/interface diagrams in this supplement when troubleshooting problems with either the NAT AMS44 or the NAT 247 unit.

3-3. Periodic Inspections

A. The following inspection checklist is intended as a guide for the 100 hour/annual inspection for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
NAT AMS44 AUDIO CONTROLLER / NAT 247 AUDIO AMPLIFIER	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the NAT AMS44 for security, damage, and obvious defects.	
2. Inspect the NAT 247 for security, damage, and obvious defects.	
3. Inspect the connectors and wiring harness for security, damage, and obvious defects.	

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

4-1. AMS44 Dual Channel Audio Controller

4-1-1. Removal

A. Turn the aircraft power off. Pull the AUDIO PANEL and AUD WRN circuit breakers out. Disable the circuit breakers by installing a cable tie or other similar device around the circuit breaker stems.

B. The AMS44 is located in the avionics panel. Turn each Dzus fasteners ¼ turn to disengage the unit from the mounting rail. Refer to Figure 6-1.

C. Gradually pull the AMS44 unit from the panel.

D. Disconnect the electrical connectors.

4-1-2. Installation

A. Connect the electrical connectors.

B. Slide the AMS44 into the mounting rails.

C. Tighten the (4) Dzus fasteners.

D. Remove the cable tie or other similar device around the circuit breaker stems and push the stems in to set the circuit breakers.

4-2. 247 Audio Mixing Amplifier

4-2-1. Removal

A. Turn the aircraft power off. Pull the AUD WRN circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker stem.

B. The unit is located in the keel. Refer to Figure 6-2. Access the unit through the pilot side keel access panel.

C. Disconnect the electrical connectors.

D. Remove the attachment screws.

4-2-2. Installation

A. Install the unit with the attachment screws.

B. Connect the electrical connectors.

C. Install the keel access panel.

4-3. Wiring Harnesses/Connectors

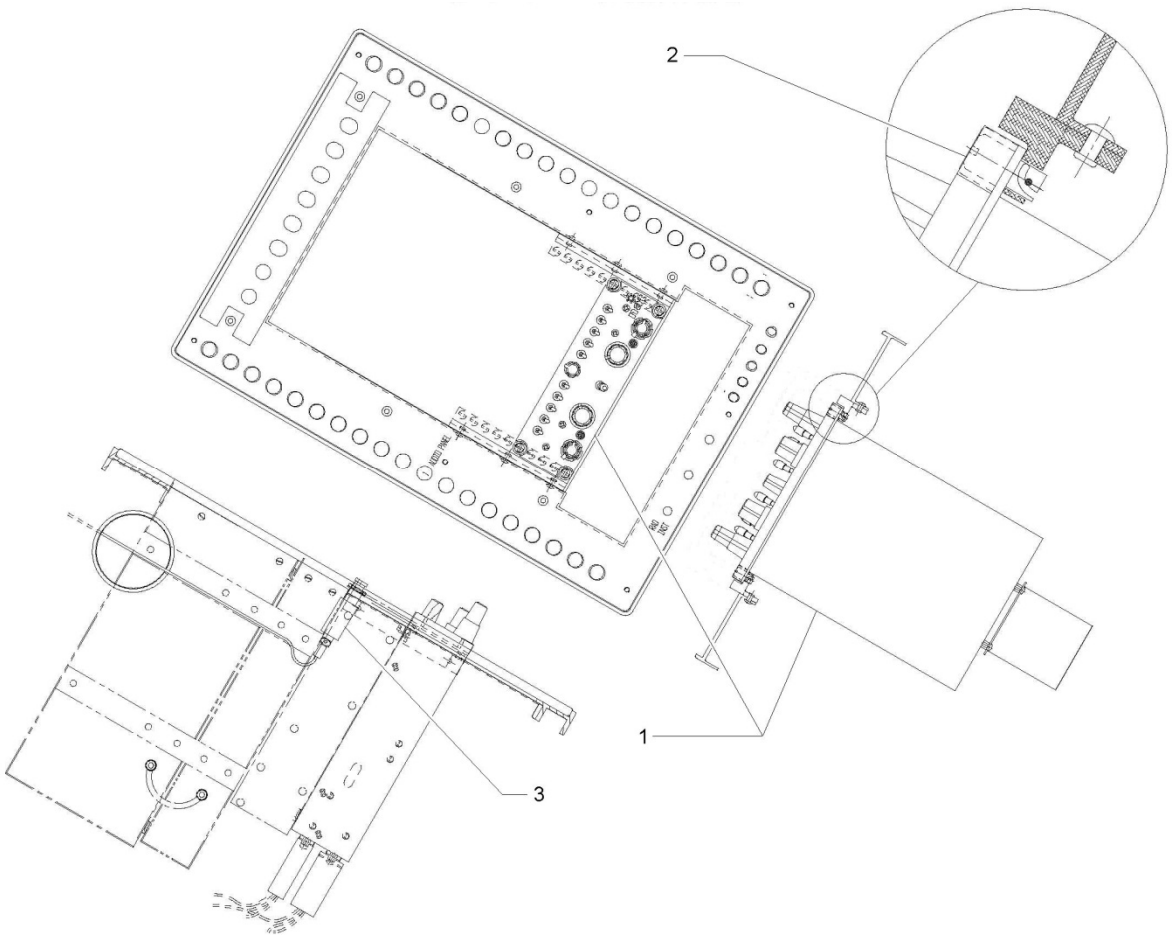
A. Remove, inspect/repair, and install the audio airframe mounted wiring harnesses/connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21. Refer to Diagram 6-1 for the NAT AMS44 electrical wiring interface. Refer to Diagram 6-2 for the NAT 247 electrical wiring interface.

4-4. Figures and Electrical Diagrams

A. The NAT AMS44 installation is shown in Figure 6-1. The NAT 247 installation is shown in Figure 6-2.

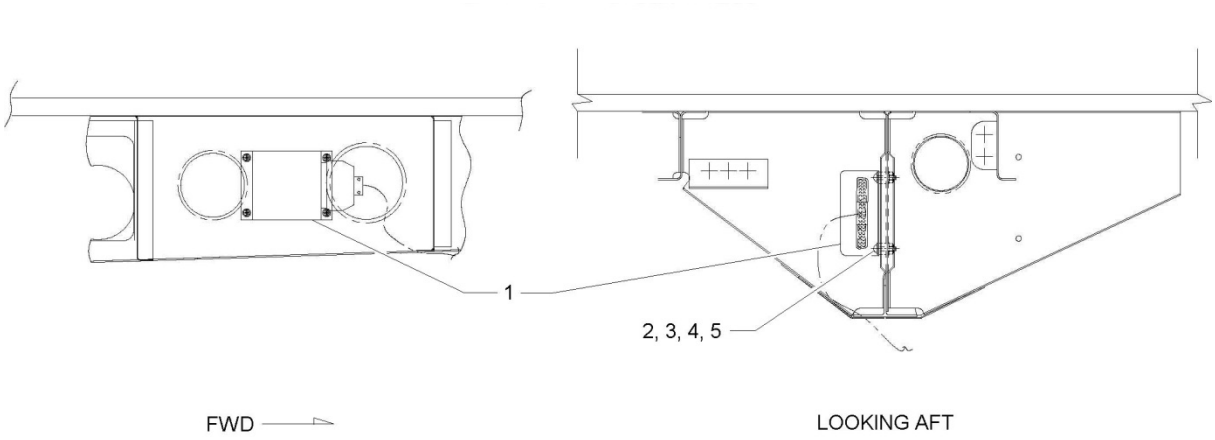
B. The NAT AMS44 electrical wiring interface is shown in Diagram 6-1 and Diagram 6-3. Diagram 6-1 is applicable to S/N 5245 and prior; Diagram 6-3 is applicable to S/N 5246 and subsequent.

C. The NAT 247 electrical wiring interface is shown in Diagram 6-2. Diagram 6-2 is applicable to S/N 5245 and prior; refer to Diagram 6-3 for S/N 5246 and subsequent.



Item	Part Number	Description	Quantity
1	AMS44	Dual Channel Audio Controller	1
1	AMS44N	Dual Channel Audio Controller - NVIS	1
2	N/A	Dzus Fastener	4
3	7277-5-1	Circuit Breaker (1 Amp)	1

Figure 5-1. NAT AMS44 Installation



Item	Part Number	Description	Quantity
1	NAT 247	Audio Mixing Amplifier	1
2	AN525-832R14	Screw	4
3	4220529-11	Spacer	4
4	NAS1149FN816P	Washer	4
5	MS21044N08	Nut	4
-	D44SV-IKC	Audio Mixing Amplifier Kit	1
-	7277-5-1	Circuit Breaker (1 Amp)	1

Figure 5-2. NAT 247 Installation

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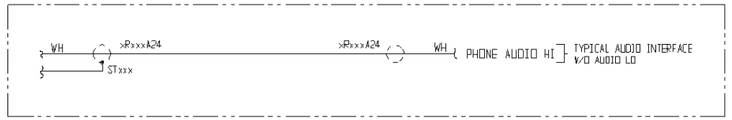

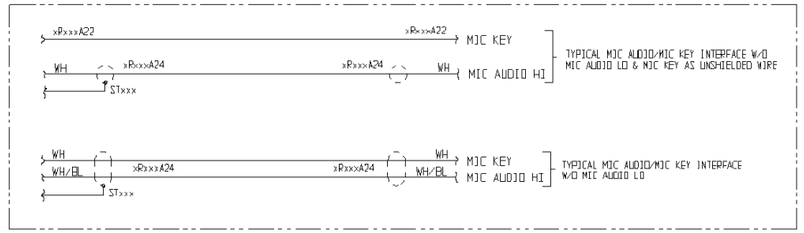

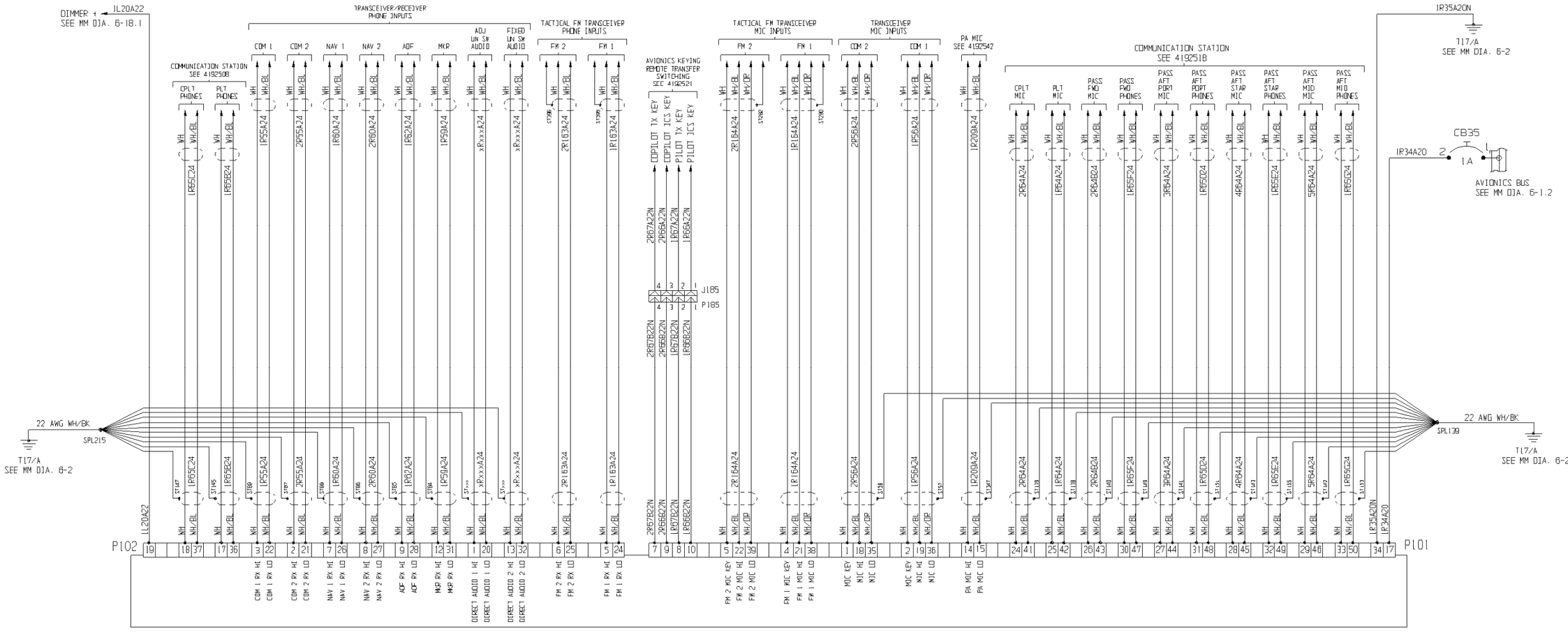

Diagram 6-1. NAT AMS44 Wiring Schematic
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6-9/6-10 (Blank)

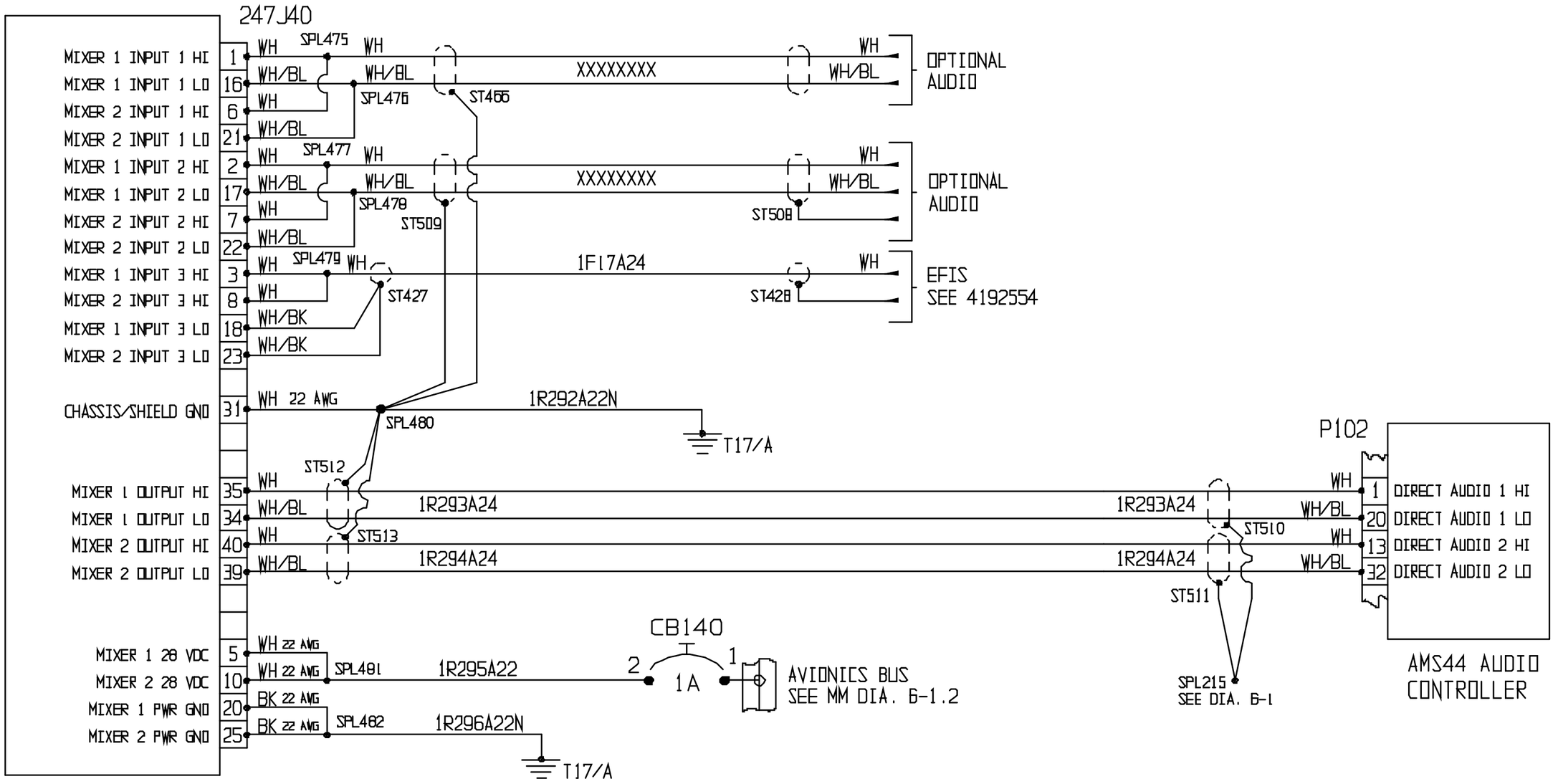


Diagram 6-2. NAT 247 Wiring Schematic (4192524-119 Rev M)
Nov 12/14, Rev. 11
6-11/6-12 (Blank)

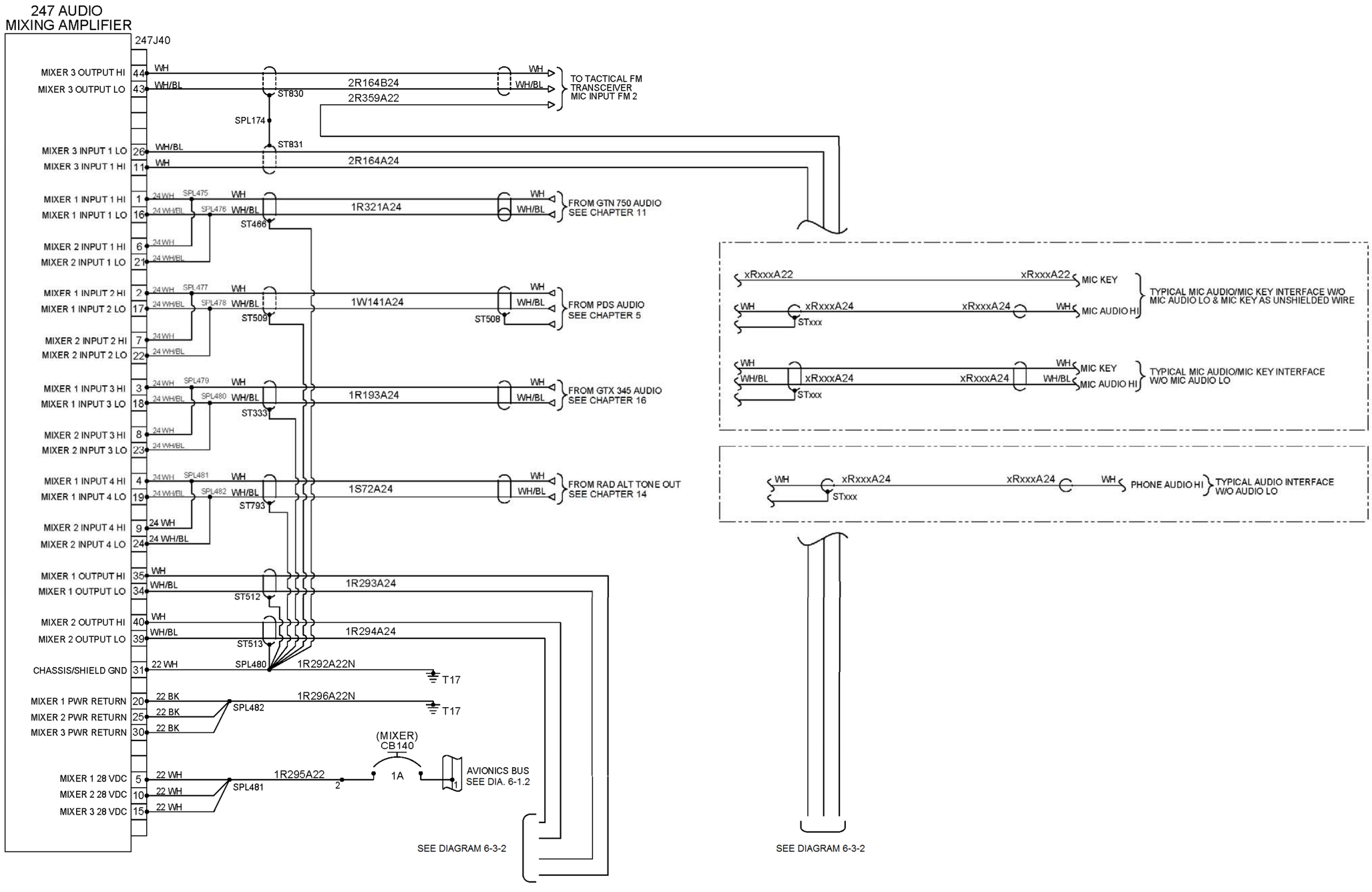


Diagram 6-3. AMS44 Audio Panel Wiring Schematic (4192524-7 Rev Q)

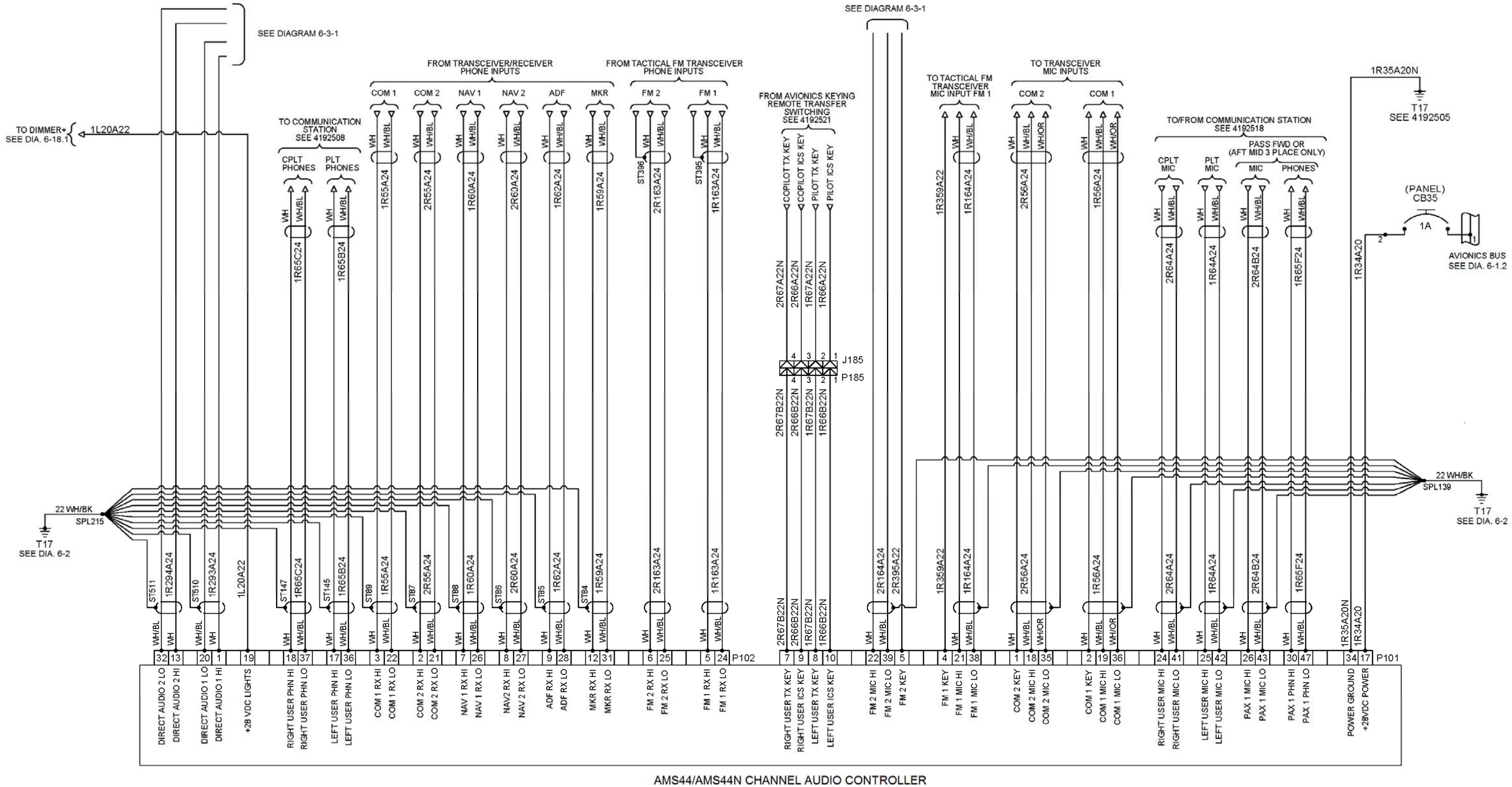


Diagram 6-3. AMS44 Audio Panel Wiring Schematic (4192524-7 Rev Q)
Sheet 2 of 2
Apr 30/2020, Rev. 18
6-15/6-16 (Blank)

CHAPTER 7

ATTITUDE INDICATOR AND DIRECTIONAL GYRO

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The Attitude Indicator Installation, P/N 4220542-( ), provides an indication of the aircraft's attitude relative to the earth by means of an electrically powered gyroscope. The unit is mounted in the instrument panel. Power to the attitude indicator is provided via the **ATTD GYRO** circuit breaker (CB8) located on the left side of the center pedestal. This installation consists of several configurations depending on the manufacturer (refer to Figure 7-1).

B. The Directional Gyro Installation, P/N 4220542-( ), provides a heading indication displayed on a rotating compass card by means of an electrically powered gyroscope. The unit is mounted in the instrument panel. Power to the directional gyro is provided via the **D.G.** circuit breaker (CB58) located on the left side of the center pedestal. This installation consists of several configurations depending on the manufacturer (refer to Figure 7-1).

C. Each gyro contains internal lighting and a power monitor indication. The attitude indicator contains a slip indicator attached to the base of the display bezel.

D. Refer to the 480B Rotorcraft Flight Manual for general operational features for the attitude indicator.

1-2. Vendor Manuals

A. The following components listed in Table 7-1 are to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 7-1. Vendor Manuals

Component	Publication	Vendor
Attitude Indicator AIM Model 1100-( ) Part Number 504-111( )-9( )	Installation and Operation Manual, TP-554, latest revision	L3 Communications Avionic Systems, Inc. 5353 52nd Street, S.E. Grand Rapids, MI 49512-9704, USA www.as.l-3com.com
Attitude Indicator AIM Model 1200-( ) Part Number 504-112( )-9( )	Installation and Operation Manual, TP-551, latest revision	
Directional Gyro Aim Series 205 Part Number 505-0031-( )	Installation and Operation Manual, TP-584, latest revision	
Slip Indicator for AIM Model 1100-( )/1200-( ) Part Number 248-0168-901	Service Letter SL-237, latest revision	
Attitude Gyro RCA 26 Series	Installation/Operation Guide, Publication No. 1403	Kelly Manufacturing Company 555 South Topeka Wichita, KS 67202 www.kellymfg.com
Slip Indicator for Model 300-14E(L) Part Number 6648-1009-0901	Field Replacement or Installation of Inclinometer, 0050-1002, latest revision	Castleberry Instruments & Avionics, Austin, TX www.ciamfg.com

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, this Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the gyro systems are “on condition”.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The attitude indicator and directional gyro installations contain no user serviceable components or assemblies. Operations involving the removal of either of the gyros must be done by authorized maintenance technicians.

3-2. Troubleshooting

A. Refer to electrical schematics in Diagram 7-1 when troubleshooting the attitude indicator or directional gyro installations.

3-3. Periodic Inspections

A. The following inspection checklist is intended as a guide for 100 hour/annual inspections for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
ATTITUDE INDICATOR AND/OR DIRECTIONAL GYRO	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the electrical wiring and mounts for security, damage, and obvious defects.	
2. Inspect the gyro unit and mount for security, damage, and obvious defects.	

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

4-1. Attitude Indicator/Directional Gyro

NOTE

All work must be accomplished in accordance with the Enstrom TH-28/480 Series Maintenance Manual.

Maintenance procedures are identical for either the attitude indicator or directional gyro installation.

See Figure 7-1 of this supplement for gyro location(s) in the instrument panel.

4-1-1. Removal

CAUTION

The attitude indicator and directional gyro are delicate electro-mechanical instruments, which must be handled with care. Rough handling can result in damage to the instrument and reduce performance and life of the instrument.

A. Remove the appropriate gyro in accordance with Paragraph 7-11 of the maintenance manual.

B. Attitude indicator only: Remove the slip indicator by removing the two attachment screws. Pull slip indicator up over the adjustment knob.

4-1-2. Inspection

A. Inspect the gyro unit(s) in accordance with Paragraph 7-12 of the maintenance manual.

4-1-3. Repair

A. Replace the gyro unit(s) if the cover glass is loose, cracked, broken, or when the unit is defective.

B. Attitude indicator only: Replace the slip indicator if it is damaged or defective.

4-1-4. Installation

CAUTION

The attitude indicator and directional gyro are delicate electro-mechanical instruments, which must be handled with care. Rough handling can result in damage to the instrument and reduce performance and life of the instrument.

A. Install the gyro unit(s) in accordance with Paragraph 7-14 Steps A through B of the maintenance manual.

NOTE

See Figure 7-1 of this supplement for gyro location in the instrument panel.

B. Attitude indicator only:

1) Ensure that the aircraft is on a level surface.

2) Verify that the ball in the slip indicator comes to rest between the lubber lines when viewed straight on. Check the slip indicator ball level with a reference level tool ("L" bubble or equivalent). Place the reference tool on the aircraft floor or place the "L" bubble on the lip of the bezel at the bottom of the slip indicator glass, as appropriate. Adjust the slip indicator ball to correspond with the ball position in the reference level tool.

C. Attitude indicator only: If required, install the slip indicator.

NOTE

For P/N 6648-1009-0901 slip indicator (Castleberry), refer to the *Field Replacement or Installation of Inclinometer* procedure (ref. Table 7-1).

For P/N 248-0168-901 slip indicator (Aim/L3), refer to *Service Letter SL-237* (ref. Table 7-1).

1) Position the slip indicator housing such that the ball is centered between the lubber lines. Install screws and tighten until snug.

2) Check the bubble level in accordance with 4-1-4.B.

3) Tighten the screws to 2 to 4 in-lbs/0.23-0.45 Nm.

D. Apply power to the gyro(s). Check that the OFF flag moves out of view and lighting is working properly.

NOTE

The flag on the Castleberry instrument will not retract until the gyroscope is up to operational speed. This may take up to two minutes. The flag on the Aim and RC Allen instruments will retract as soon as adequate power is applied.

4-2. Wiring Harnesses/Connectors

A. Remove, inspect/repair, and install the airframe mounted wiring harnesses/ connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21. Refer to Diagram 7-1 for the wiring interfaces.

4-3. Figures and Diagrams

A. The installation locations and parts of the attitude indicator and directional gyro configurations are shown in Figure 7-1.

B. The configuration wiring interfaces are shown in Diagram 7-1.

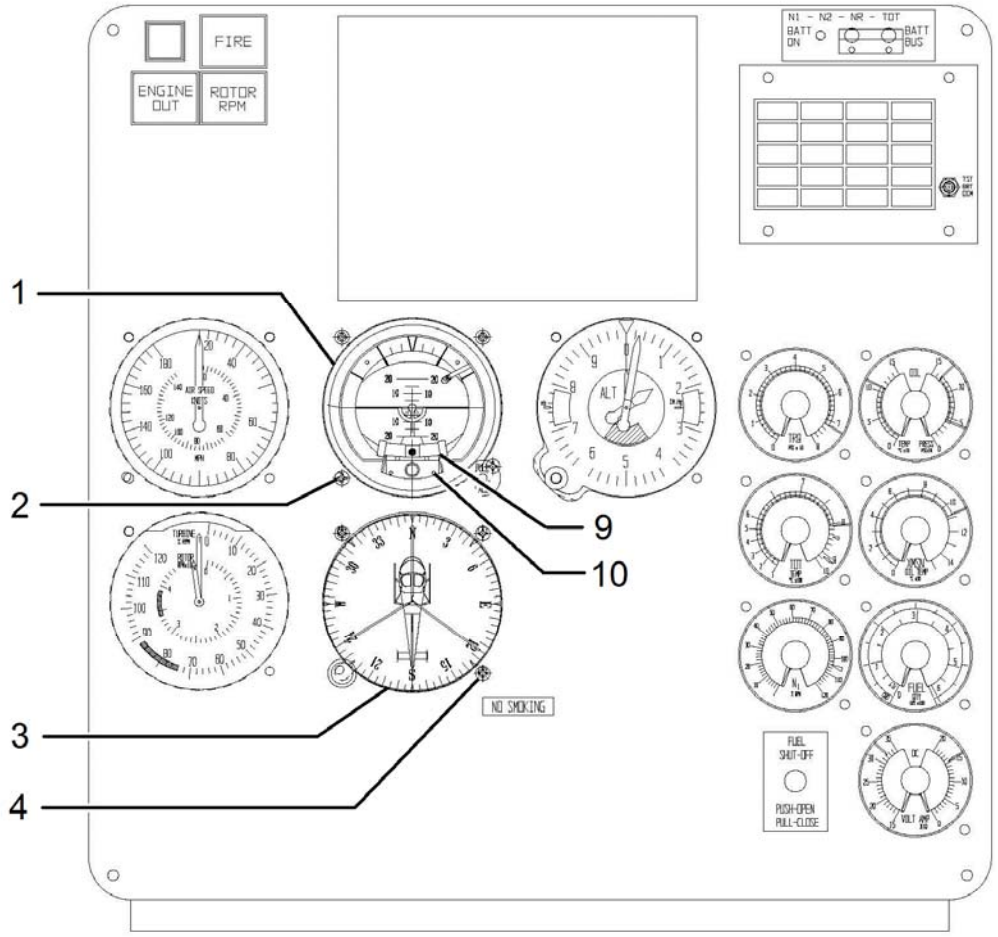
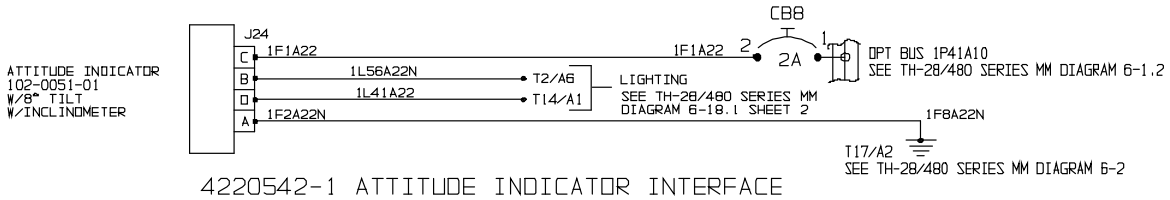


Figure 7-1. Attitude Indicator and Directional Gyro Installations

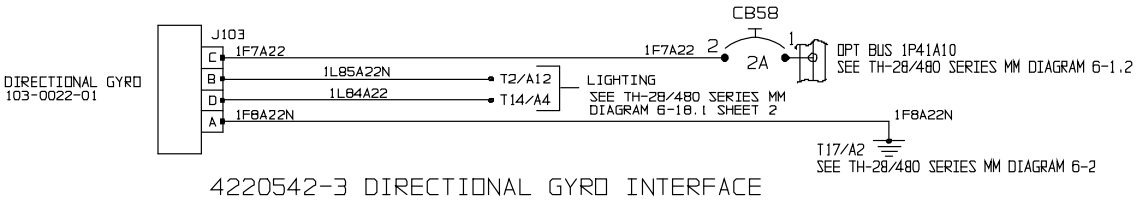
Figure 7-1. Attitude Indicator and Directional Gyro Installations

Item	Part Number	Component	Quantity
-	4220542-1	Attitude Indicator Installation (RC Allen / Kelly Manufacturing)	REF
-	4220542-105	Directional Gyro Installation (Castleberry Instruments & Avionics)	REF
-	4220542-107	Attitude Indicator Installation (Castleberry Instruments & Avionics)	REF
-	4220542-3	Directional Gyro Installation (RC Allen / Kelly Manufacturing)	REF
-	4220542-5	Directional Gyro Installation (AIM / L-3 Avionics)	REF
-	4220542-7	Attitude Indicator Installation (AIM / L-3 Avionics)	REF
-	4220542-9	Attitude Indicator Installation (AIM / L-3 Avionics)	REF
1	504-0006-95204	Attitude Indicator (Used with -107)	1
-1	504-0111-907	Attitude Indicator (Used with -7)	1
-1	504-0121-916	Attitude Indicator (Used with -9)	1
-1	102-0051-01	Attitude Indicator (Used with -1)	1
2	AN515B6R16	. Screw (Used with -107)	3
-2	AN515B6R14	. Screw (Used with -1)	3
-2	AN515B6R16	. Screw (Used with -7 and -9)	4
3	505-0001-95604	Directional Gyro (Used with -105)	1
-3	505-0031-928	Directional Gyro (Used with -5)	1
-3	103-0022-01	Directional Gyro (Used with -3)	1
4	AN515B6R16	. Screw (Used with -105)	3
-4	AN515B6R7	. Screw (Used with -3)	3
-4	AN515B6R14	. Screw (Used with -5)	3
-5	MS3116F8-4S	Connector (Used with -1, -3, -105, and -107)	1
-6	7277-5-1	Circuit Breaker (1 Amp) (Used with -105 and -107)	1
-7	7277-5-1 1/2	Circuit Breaker (1 1/2 Amp) (Used with -5 -7, and -9)	1
-8	7277-5-2	Circuit Breaker (2 Amp) (Used with -1 and -3)	1
9*	6648-1009-0901	. Slip indicator	1
-9**	2480168901	. Slip indicator	1
-9†	444-0010-01	. Slip indicator	1
10*	N/A	. . Screw	2
-10**	603-3256-106	. . Screw	2
-10†	N/A	. . Screw	2

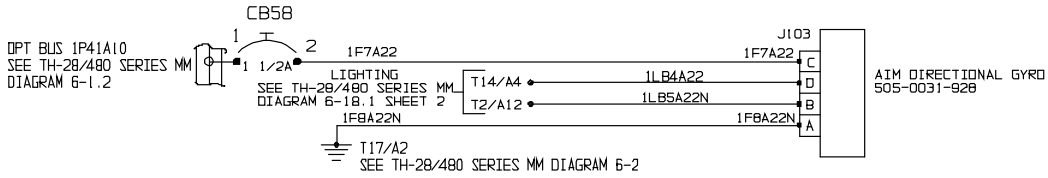
- ITEM NOT ILLUSTRATED
* Included with attitude indicator P/N 504-0006-95204 (Castleberry)
** Included with attitude indicator P/N 504-0111-907 and 504-0121-916 (Aim/L-3)
† Included with attitude indicator P/N 102-0051-01 (RC Allen/Kelly)



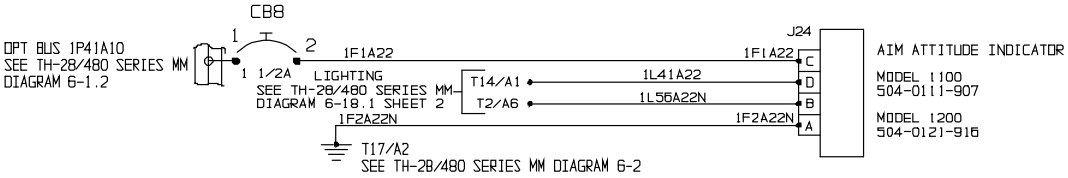
4220542-1 ATTITUDE INDICATOR INTERFACE



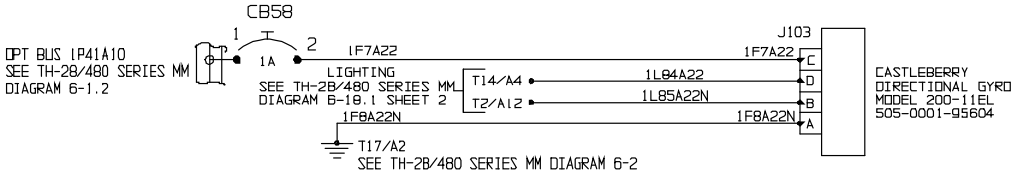
4220542-3 DIRECTIONAL GYRO INTERFACE



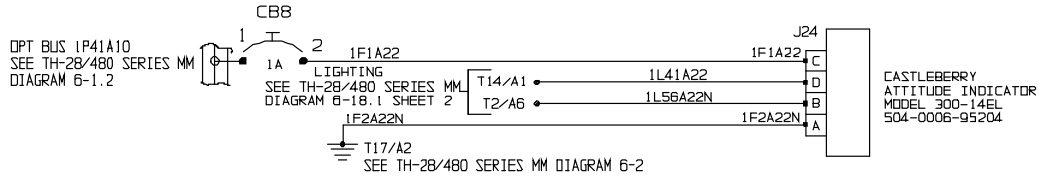
4220542-5 DIRECTIONAL GYRO INTERFACE



4220542-7 AND 4220542-9 ATTITUDE INDICATOR INTERFACE



4220542-105 DIRECTIONAL GYRO INTERFACE



4220542-107 ATTITUDE INDICATOR INTERFACE

Diagram 7-1. Attitude Indicator and Directional Gyro Wiring Schematics

CHAPTER 8

GNS 430W/530W GPS/WAAS NAVIGATOR

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The 430W/530W GPS/WAAS Navigator is a panel-mounted product that contains a GPS/WAAS receiver for GPS approved primary navigation under TSO C146a, and also VHF COM and VHF NAV radios in an integrated system unit with a moving map and color display. The graphical display is used to depict traffic, weather, or terrain data.

B. Four configurations of the 430W installation are available. They are part numbers 4220535-107, 4220535-109, 4220535-111, and 4220535-113. The dash numbers differentiate between installations with or without VOR/LOC/GS activation and between installations that are upper or lower panel mounted.

C. Six configurations of the 530W installation are available. They are part numbers 4220534-107, 4220534-109, 4220534-111, 4220534-113, 4220534-115, and 4220534-117. The dash numbers differentiate between map database variations and installations that are upper or lower panel mounted.

D. The 430W/530W provides optional output to a VOR/LOC/GS Indicator and to either a VOX ICS or an audio panel.

E. Power to the 430W/530W unit is provided via the **COMM/NAV GPS** or the **GPS COM** (4220535-109 and 4220535-113 only) circuit breaker (CB79) (5 Amp) and the **COMM TX** circuit breaker (CB80) (5 Amp) located on the left side of the lower panel.

F. Refer to the 480B Rotorcraft Flight Manual Supplement and the current vendor operating manuals/instructions for operation of the 430W/530W.

1-2. Vendor Manuals

A. The following components listed in Table 8-1 are to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 8-1. Vendor Manuals

Component	Publication	Vendor
GNS 430W	400W Series Pilot's Guide and Reference, Document Number 190-00356-00, latest revision 400W Series Installation Manual, Document Number 190-00356-02, latest revision	Garmin International 1200 E. 151st Street Olathe, KS 66062 913-397-8200 (Direct) 866-739-5687
GNS 530W	500W Series Pilot's Guide and Reference, Document Number 190-00357-00, latest revision 500W Series Installation Manual, Document Number 190-00181-02, latest revision	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, this Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the GNS 430W/530W are “on condition”.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The 430W/530W contains no user serviceable components or assemblies. Operations involving the removal of the 430W/530W or any other line-replaceable unit (LRU) installed as a part of the 430W/530W must be done by authorized maintenance technicians.

3-2. Cleaning

A. 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.

3-3. Troubleshooting

A. If error indications are displayed on the 430W/530W, consult the Troubleshooting section contained in the applicable installation manual, listed under reference documentation in Table 8-1.

3-4. Periodic Inspections

A. The following inspection checklist is intended as a guide for 100 hour/annual inspections for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
GARMIN GNS 430W/530W GPS/WAAS NAVIGATOR	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the electrical wiring and mounts for security, damage, and obvious defects.	
2. Inspect the 430W/530W unit and mount for security, damage, and obvious defects.	
3. Inspect the antennas and mounts for security, damage, and obvious defects.	

3-4.1. Periodic Maintenance Inspections – Display Backlight

A. The display backlight lamp is rated by the manufacturer as having a usable life of 20,000 hours. This life may be more or less than the rated time depending on operating conditions of the 430W/530W, the backlight lamp may dim and the display may not perform as well in direct sunlight conditions. The user must determine by observation when the display brightness is not suitable for its intended use. Contact the authorized repair station when the backlight lamp requires service.

3-4.2. Periodic Maintenance Inspections – Battery Replacement

A. The 430W/530W has an internal keep-alive battery that will last about 10 years. The battery is used for GPS system information. Regular planned replacement is not necessary. The 430W/530W will display a 'low battery' message when replacement is required. Once the low battery message is displayed, the battery should be replaced within 1 to 2 months.

B. If the battery is not replaced and becomes totally discharged, the 430W/530W will remain fully operational, but the GPS signal acquisition time may be increased. This acquisition time can be reduced by entering a new seed position each time the unit is powered on. There is no loss of function or accuracy of the 430W/530W unit with a dead battery.

C. The battery must be replaced by a factory authorized repair station.

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

4-1. GNS 430W/530W

4-1-1. Removal – GNS 430W/530W

A. Turn the 430W/530W and aircraft power off. Pull the COMM GPS or COMM/NAV GPS and the COMM TX circuit breakers out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker system.

B. To remove the 430W/530W unit from the mounting rack, insert a 3/32-inch hex drive tool into the access hole at the bottom of the unit face. Rotate the hex tool counterclockwise until the unit is forced out about 3/8 inch and can be freely pulled from the rack.

C. Slide the unit out of the tray.

4-1-2. Inspection/Repair – GNS 430W/530W

A. Inspect the 430W/530W unit for damage or inoperable functions. Inspect the condition and security of the 430W/530W unit, mounting bracket and electrical interface.

B. Inspect the condition and security of the 430W/530W unit, mounting bracket and electrical interface.

C. Inspect the condition and security of electrical cables.

D. Repair procedures are not available for the 430W/530W unit.

4-1-3. Installation – GNS 430W/530W

A. The 430W/530W unit is installed in the rack by sliding it straight in until it stops, about 1 inch short of the final position. Insert the hex drive tool 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.

B. Remove the cable tie or other similar device from the COMM GPS or COMM/NAV GPS and the COMM TX circuit breaker stems and push the stem in to set the circuit breaker.

4-2. Wiring Harnesses/Connectors – GNS 430W/530W

4-2-1. Removal – Wiring Harnesses/Connectors – GNS 430W/530W

CAUTION

Before removing or adjusting any electrical component, ensure all electrical power is off and the battery is disconnected.

A. Refer to Diagram 8-1 for the 430W/530W wiring interface.

B. Remove the attaching hardware, clamps, connectors, leads, or wiring.

C. Identify the connectors, leads, or wiring.

D. Remove the component.

4-2-2. Inspection – Wiring Harnesses/Connectors – GNS 430W/530W

A. Inspect the plugs, connectors and receptacles for security, contact corrosion, damaged contacts, broken wires, faulty contacts, insert cracks, and faulty insulation.

B. Inspect the leads and wiring for loose terminals, chafing, corrosion or deteriorated condition, faulty or damaged insulation, excessive mechanical stress, broken strands, damaged shielding, shorted shielding, routing and mounting conditions.

4-2-3. Repair – Wiring Harnesses/Connectors – GNS 430W/530W

A. Tighten lose terminal connectors, mounting hardware, and electrical component attachments.

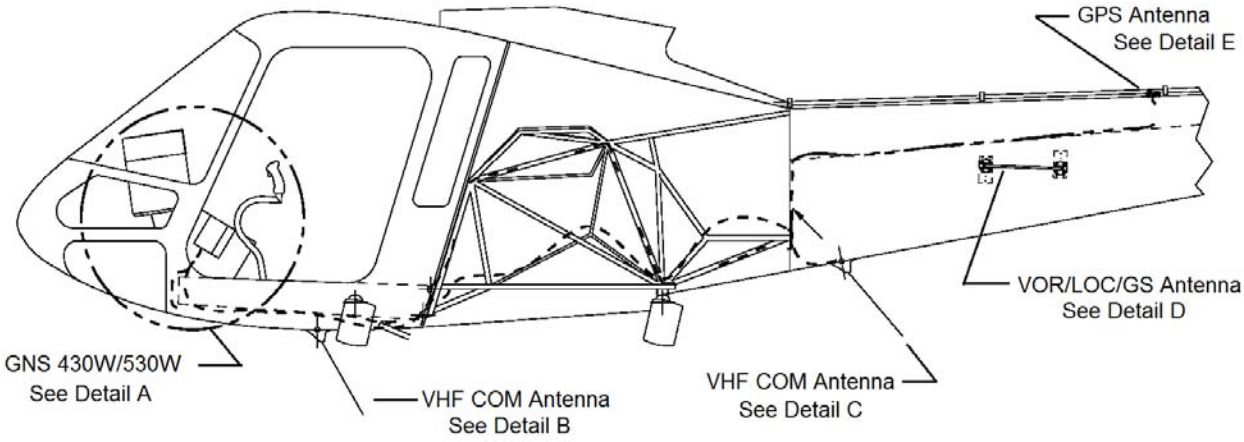
B. Replace miscellaneous electrical components that fail to meet the inspection requirements.

C. Clean corrosion from the connections and receptacles with contact cleaner.

4-2-4. Installation – Wiring Harnesses/Connectors – GNS 430W/530W

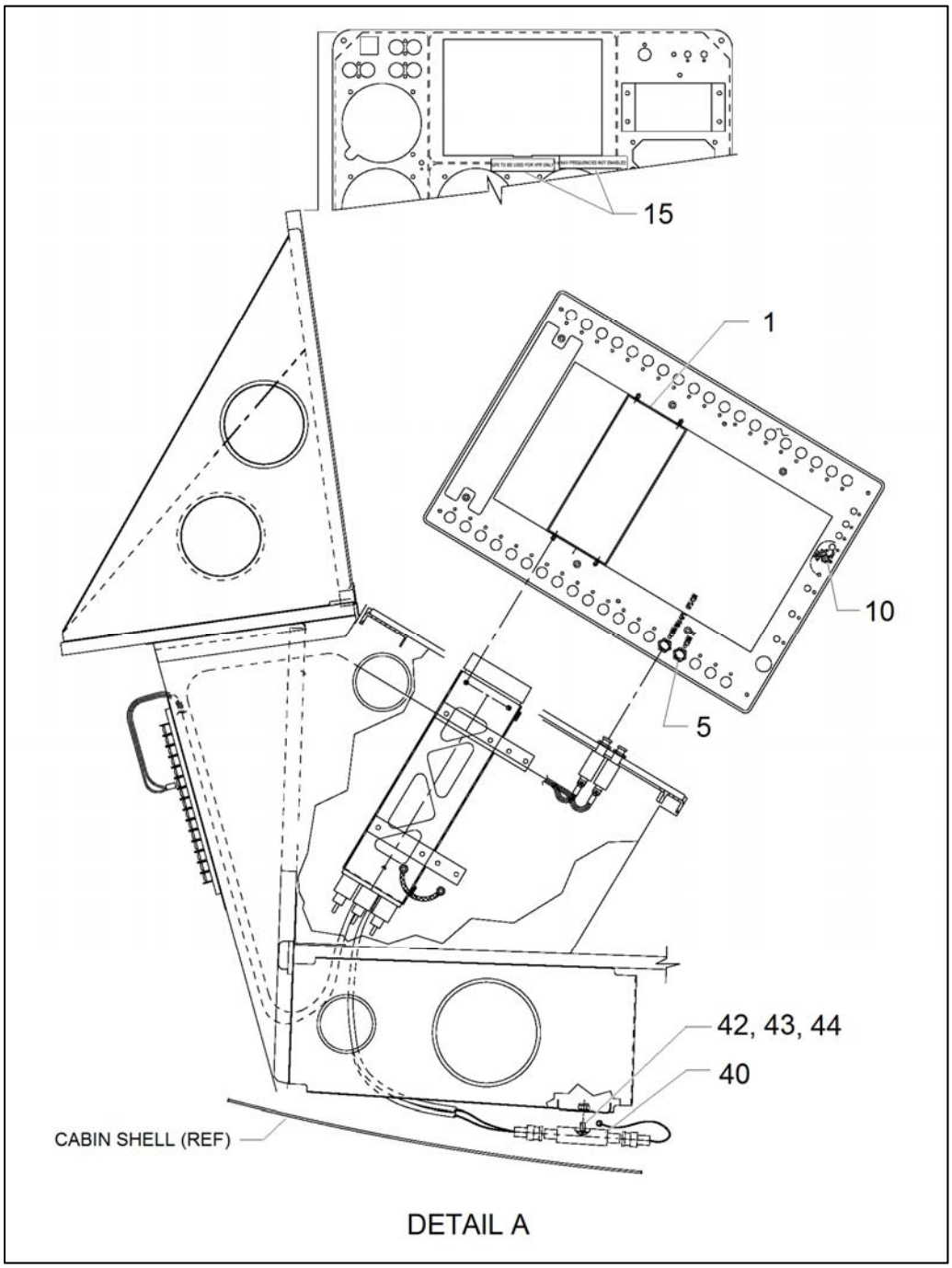
A. Refer to Diagram 8-1 for the GNS 430W/530W wiring interface.

B. Install the electrical component and secure with attaching hardware, clamps, or cable ties.



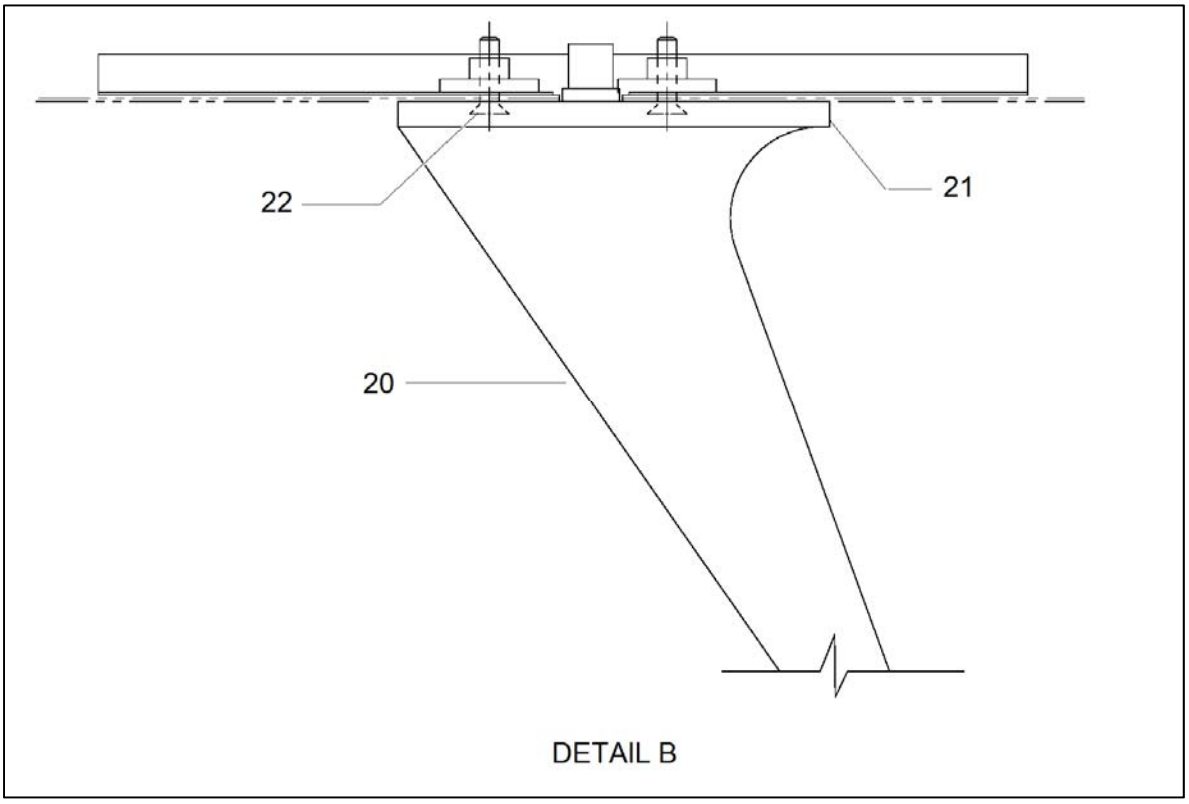
Sheet 1 of 4

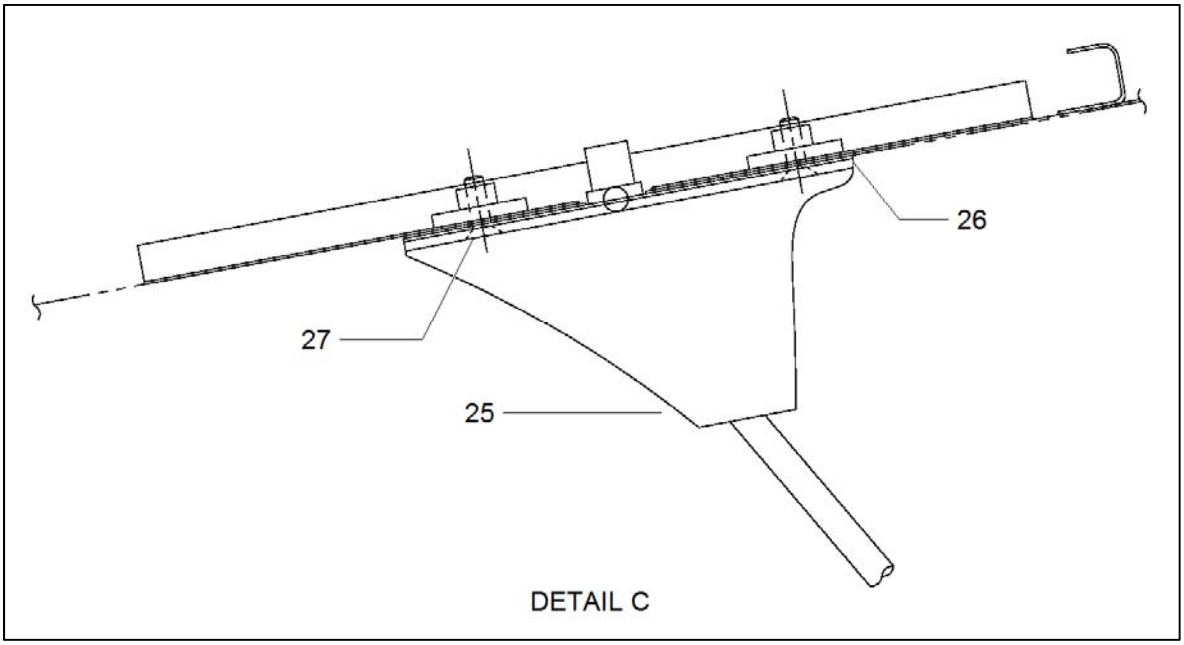
Figure 8-1. GNS 430W/530W Installation



Sheet 2 of 4

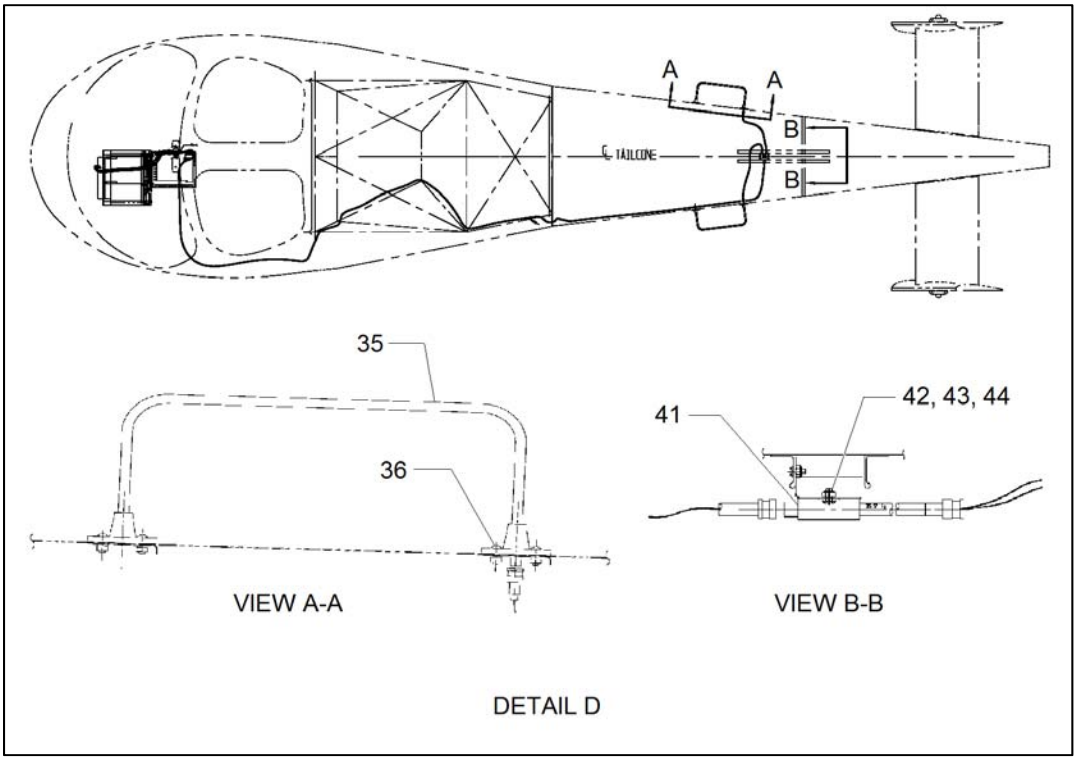
Figure 8-1. GNS 430W/530W Installation

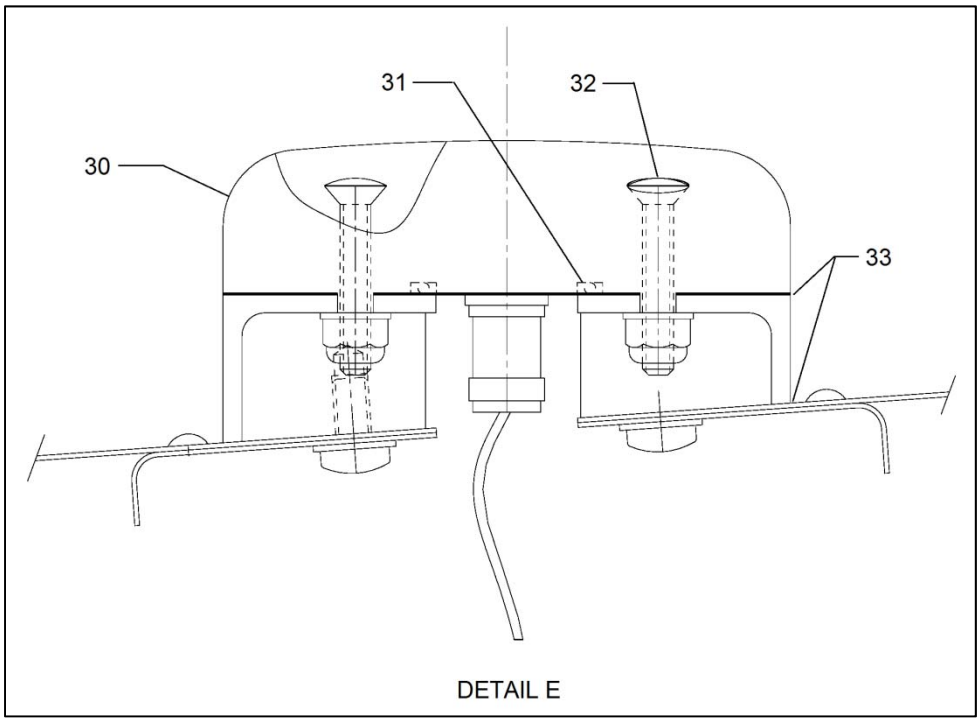




Sheet 3 of 4

Figure 8-1. GNS 430W/530W Installation





Sheet 4 of 4

Figure 8-1. GNS 430W/530W Installation

Figure 8-1. GNS 430W/530W Installation

Item	Part Number	Component	Quantity
-	4220535-107	GNS 430W with VOR/LOC/GS (lower panel mount)	REF
-	4220535-109	GNS 430W without VOR/LOC/GS (lower panel mount)	REF
-	4220535-111	GNS 430W with VOR/LOC/GS (upper panel mount)	REF
-	4220535-113	GNS 430W without VOR/LOC/GS (upper panel mount)	REF
-	4220534-107	GNS 530W Worldwide System (lower panel mount)	REF
-	4220534-109	GNS 530W Americas System (lower panel mount)	REF
-	4220534-111	GNS 530W International System (lower panel mount)	REF
-	4220534-113	GNS 530W Worldwide System (upper panel mount)	REF
-	4220534-115	GNS 530W Americas System (upper panel mount)	REF
-	4220534-117	GNS 530W International System (upper panel mount)	REF
1	010-00412-01	. GNS 430W	1
-	011-01060-00	. . GNS 430W Unit (included with 010-00412-01)	1
-	115-00243-00	. . Mount Rack (included with 010-00412-01)	1
-	011-00351-00	. . Connector Kit (included with 010-00412-01)	1
-	011-00676-00	. . Back Plate Assembly (included with 010-00412-01)	1
-	K00-00162-00	. . Product Information Kit (included with 010-00412-01)	1
-1	010-00416-01	. GNS 530W	1
-	011-01064-00	. . GNS 530W Unit (included with 010-00416-01)	1
-	115-00345-00	. . Mount Rack (included with 010-00416-01)	1
-	011-00351-00	. . Connector Kit (included with 010-00416-01)	1
-	011-00676-00	. . Back Plate Assembly (included with 010-00416-01)	1
-	K00-00165-00	. . Product Information Kit (included with 010-00416-01)	1
-2	010-10201-21	. Datacard, TAWS/Terrain	1
-3	010-10546-00	. Datacard, Worldwide	1
-3	010-10546-01	. Datacard, Americas (alternate)	1
-3	010-10546-02	. Datacard, International (alternate)	1
5	7277-5-5	. Circuit Breaker	2
-6	MS51957-26	. . Screw	2
10	7101SYZQE	. Switch (omitted if audio panel is installed)	1
15	28-19064-1	. Placard	1
-	4199034-1	VHF COM Antenna Installation	REF
20	DM C70-1/A	. VHF COM Antenna	1
21	--	. . Gasket (supplied with antenna)	1
22	AN507-C832R10	. . Screw	3
-	4199025-1	VHF COMM Antenna Installation	REF
25	CI292-1	. VHF Com Antenna Installation	1
26	--	. . Gasket (supplied with antenna)	1
27	MS24693-C53	. . Screw	4
-	4196582-121	GPS Antenna Installation (left side)	REF
-	4196582-123	GPS Antenna Installation (right side)	REF
30	013-00235-00	. GA35 GPS Antenna	1
31	MS28775-116	. . O-ring (supplied with antenna)	1
32	MS51959-50	. . Screw	4
33	102	. . . Caulk, Phenoseal	A/R

Figure 8-1. GNS 430W/530W Installation

Item	Part Number	Component	Quantity
-	4220537-1	VOR/LOC/GS CI205-3 Antenna Installation	REF
-	4220537-5	VOR/LOC/GS DMN4-17 Antenna Installation (alternate)	REF
35	D20543	. Antenna Element (used with 4220537-1)	2
-35	DMN4-17	. Antenna Kit (used with 4220537-5)	1
36	MS24693-C55	. . Screw (used with 4220537-1)	16
-36	AN526C632R10	. . Screw (used with 4220537-5)	8
40	CI507	. Diplexer	1
-40	CI1125	. Diplexer (used when two VOR/LOC/GS receivers without internal diplexers are installed in the aircraft)	1
-40	DMH22-1	. Diplexer (used with 4220537-5)	1
41	C20544	. Combiner (supplied with antenna)	1
-41	---	. Phasing Coupler (used with 4220537-5)	1
42	AN525-832R6	. . Screw	2
-42	AN526-632R7	. . Screw (used with 4220537-5)	2
43	NAS1149FN816P	. . Washer	2
-43	NAS1149FN616P	. . Washer (used with 4220537-5)	2
44	MS21083N08	. . Nut	2
-44	MS21083N06	. . Nut (used with 4220537-5)	2
-45	NAS1149FN632P	. . Washer (shim, used with 4220537-5)	A/R

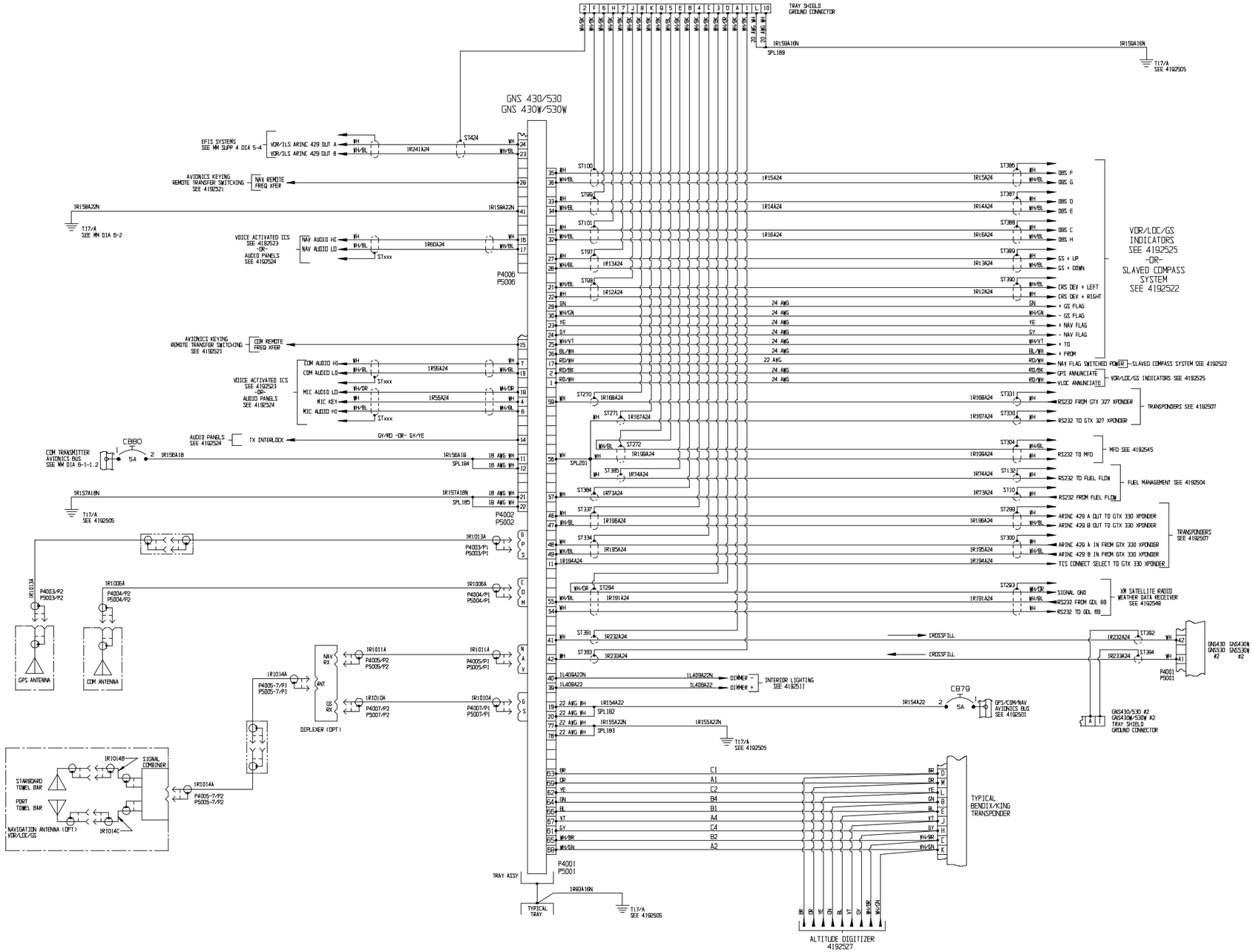


Diagram 8-1. GNS 430W/530W
May 1/13, Rev. 9
8-13/8-14 (Blank)

CHAPTER 9
GMA 350H AUDIO PANEL
SECTION 1
SYSTEM DESCRIPTION

1-1. System Description

NOTE

The GMA 350Hc variant is covered in Chapter 17 of this supplement.

A. The Garmin GMA 350H is a horizontally oriented panel-mounted audio controller that collects, processes, and distributes audio signals between avionics, crew, and passengers. The configuration part numbers are listed in Table 9-1.

Table 9-1. GMA 350H Configuration Part Numbers

Part Number	Installation Interface	Marker Beacon Receiver
4220672-3	G1000H Integrated Flight Deck System	Yes
4220672-5	G1000H Integrated Flight Deck System	No
4220672-7	Standard (non-G1000H) Instrument System	Yes
4220672-9	Standard (non-G1000H) Instrument System	No

B. Configurations without a GDL 69AH interface include the GMA 350H audio panel unit mounted in the avionics panel of the pedestal and an entertainment (J148) jack located on the copilot side of the pedestal. P/N 4220672-3 and 4220672-7 also include a marker beacon sensitivity toggle switch (**MKR SENS**) (SW97 and SW93, respectively) remotely located on the lower right side of the circuit breaker panel and a marker beacon antenna.

C. The GMA 350H may be configured with a traditional avionic system: VOR/LOC/GS, GPS, NAV/COM, transponder, etc., or with the Garmin G1000H Integrated Flight Deck.

D. Power to the audio panel is provided via the **AUDIO PANEL** circuit breaker (CB157, 2 A (P/N 4220672-3 and P/N 4220672-5) or CB35, 5 A (P/N 4220672-7 and P/N 4220672-9)) located on the left side of the circuit breaker panel.

E. Refer to the 480B Rotorcraft Flight Manual Supplement 28-AC-051 for general operational features of the GMA 350H audio panel.

1-2. Vendor Manuals

A. The following components listed in Table 9-2 are to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 9-2. Vendor Manuals

Component	Publication	Vendor
GMA 350H	GMA 350/350H Configuration Tool User's Guide, Document No. 190-01349-00, latest revision	Garmin International, Inc. 1200 East 151st Street Olathe, KS 66062 Tele: (913) 397-8200 Fax: (913) 397-8282 www.garmin.com
	GMA 350/350c/350H/350Hc Installation Manual, Document No. 190-01134-11, latest revision	
	GMA 350/350H Audio Panel Maintenance Manual, Document No. 190-01134-13, latest revision	
	GMA 350H/350Hc Pilot's Guide, Document No. 190-01134-14, latest revision	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. For FAA approval, this Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, this Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the GMA 350H are "on condition".

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The GMA 350H audio panel installation contains no user serviceable components or assemblies. Operations involving the removal of the audio panel must be done by authorized maintenance technicians.

3-2. Troubleshooting

A. Refer to the *GMA 350/350H Audio Panel Maintenance Manual* (para. 1-2) and the electrical schematic in Diagram 9-1 or Diagram 9-2 when troubleshooting the GMA 350H installation. If the audio panel fails to operate after troubleshooting efforts, contact Garmin aviation product support for assistance (ref. para. 1-2).

3-3. Periodic Inspections

A. The following inspection checklist is intended as a guide for 100 hour/annual inspections for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
GMA 350H AUDIO PANEL	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the antenna (if equipped), electrical wiring and mounts for security, damage, and obvious defects.	
2. Inspect the GMA 350H audio panel unit and mount for security, damage, and obvious defects.	

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

4-1. GMA 350H Audio Panel

NOTE

All work must be accomplished in accordance with the Enstrom TH-28/480 Series Maintenance Manual.

4-1-1. Removal

A. Remove power to the GMA 350H audio panel unit.

B. Unlock the unit from the rack using the appropriate size hex wrench.

C. Carefully pull the unit from the rack.

4-1-2. Inspection

A. Verify the audio panel operation in accordance with paragraph 3-2 of the *GMA 350/350H Audio Panel Maintenance Manual* (para. 1-2).

4-1-3. Repair

A. Replace the audio panel if any of the tests performed in paragraph 4-1-2 fail.

4-1-4. Installation

NOTE

Do not use excessive force when inserting the GMA 350H into the rack. This may damage the connectors, unit, and/or unit rack.

A. Insert the GMA 350H unit into the rack.

B. Lock the unit in place using the appropriate size hex wrench.

C. If the installation is a replacement, configure the GMA 350H as follows:

NOTE

The configuration parameters provided in Figure 9-3 apply to G1000H System Software 1852.03, or later version, only.

(1) G1000H Option, System Software 1852.02: contact Enstrom Product Support.

(2) G1000H Option, System Software 1852.03, or later version: Refer to the G1000H Standard Maintenance Manual (Document No. 190-01739-00, latest revision), Section 8.3 and Section 5.4. Accomplish Section 5.4.3. Verify that the parameters are in accordance with Figure 9-3.

(3) Standard Option: configure the GMA 350H in accordance with Figure 9-4.

D. Perform a post installation checkout in accordance with paragraph 3.8 of the *GMA 350/350c/350H/350Hc Installation Manual* (para. 1-2).

4-2. Wiring Harnesses/Connectors

A. Remove, inspect/repair, and install the airframe mounted wiring harnesses/ connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21.

4-3. Figures and Diagrams

A. The GMA 350H audio panel installation is shown in Figure 9-1 and Figure 9-2.

B. The GMA 350H, G1000H Option, System Software 1852.03 configuration parameters are shown in Figure 9-3.

C. The standard GMA 350H configuration parameters are shown in Figure 9-4.

D. The GMA 350H-G1000H audio panel wiring interface is shown in Diagram 9-1.

E. The standard GMA 350H audio panel wiring is shown in Diagram 9-2.

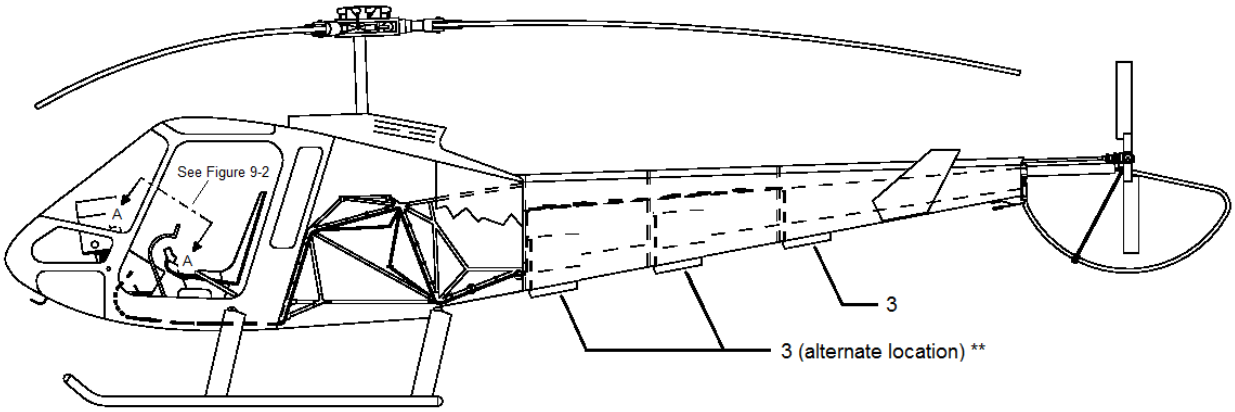
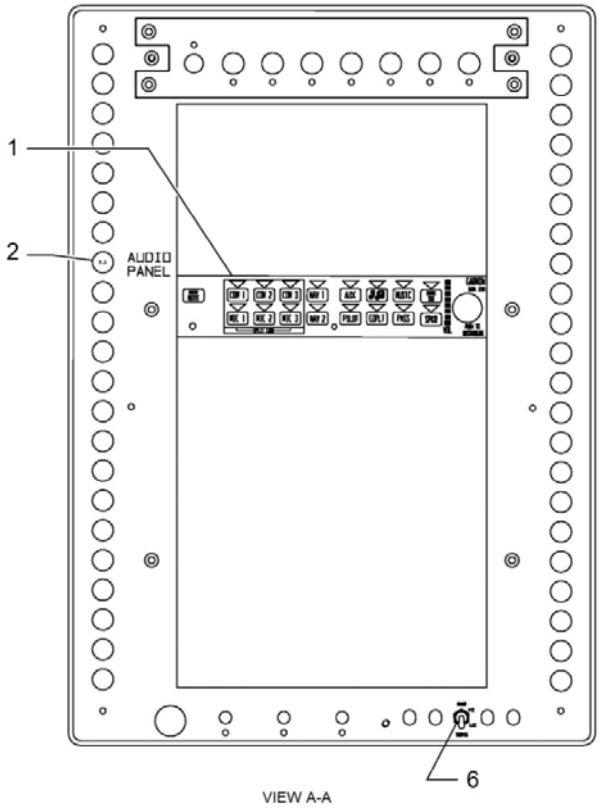


Figure 9-1. GMA 350H Installation



Item	Part Number	Component	Quantity
-	4220672-3	GMA 350H Audio Panel Installation with Marker Beacon Receiver (G1000H option)	REF
-	4220672-5	GMA 350H Audio Panel Installation without Marker Beacon Receiver (G1000H option)	REF
-	4220672-7	GMA 350H Audio Panel Installation with Marker Beacon Receiver	REF
-	4220672-9	GMA 350H Audio Panel Installation without Marker Beacon Receiver	REF
1	011-02385-10	. GMA 350H	1
-	011-02302-00	. Connector Kit (Included with GMA 350H)	REF
2	7277-5-2 (2 amp)	. Circuit Breaker (Used with 4220672-3, 4220672-5)	1
-2	7277-5-5 (5 amp)	. Circuit Breaker (Used with 4220672-7, -9,)	1
3	DMN43-1*	. . Antenna (Used with 4220672-3 and 4220672-7)	1
-4	AN960-8L	. . Washer	3
-5	AN365-832	. . Nut	3
6	7101SYZQE	. Switch (Used with 4220672-3 and 4220672-7)	1
-7	161-3402-E	. Entertainment Jack	1

* REF 4196512-1; or alternate locations 4196512-3** or 4196512-5**

** Applicable to 4220672-3 only

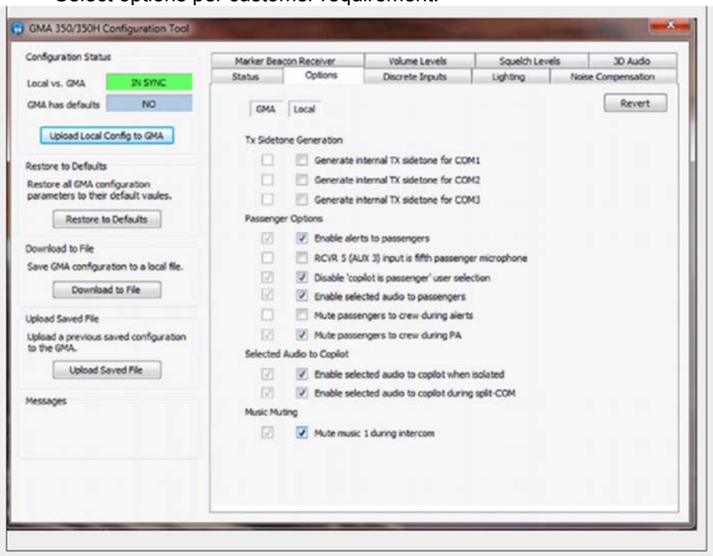
Figure 9-2. GMA 350H Installation

NOTE

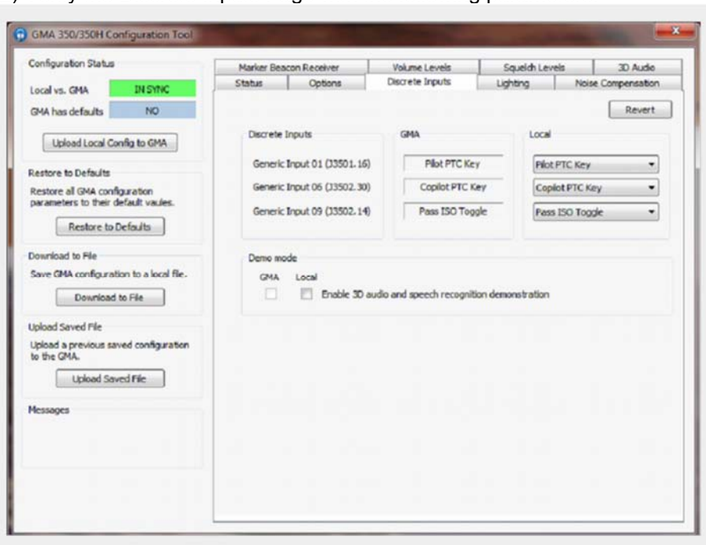
Configuration parameters provided in Figure 9-3 apply to G1000H System Software 1852.03, or later version, only. If equipped with G1000H System Software 1852.02, contact Enstrom Product Support for configuration set-up assistance.

(1) Verify the Options Page with the following parameters:

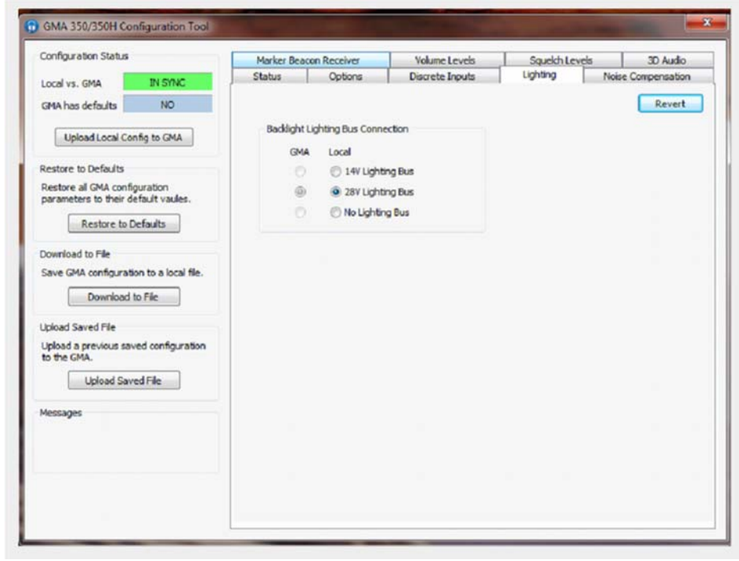
- Select options per customer requirement.



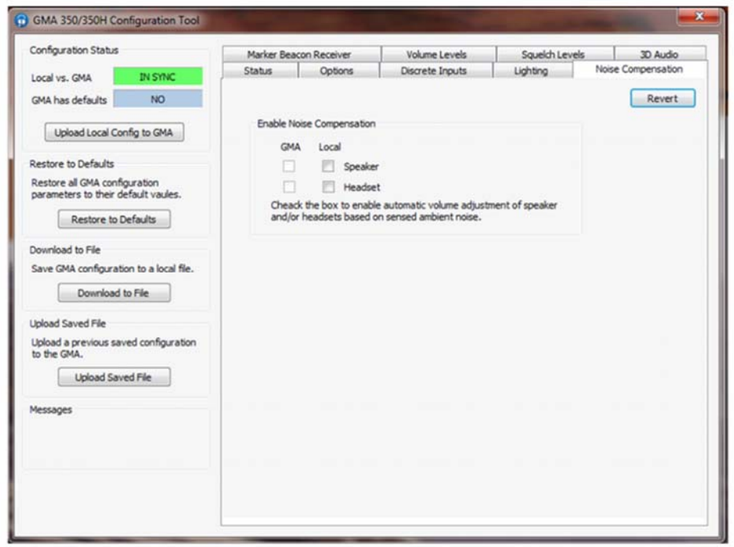
(2) Verify the Discrete Inputs Page with the following parameters:



(3) Verify the Landing Light Page with the following parameters:

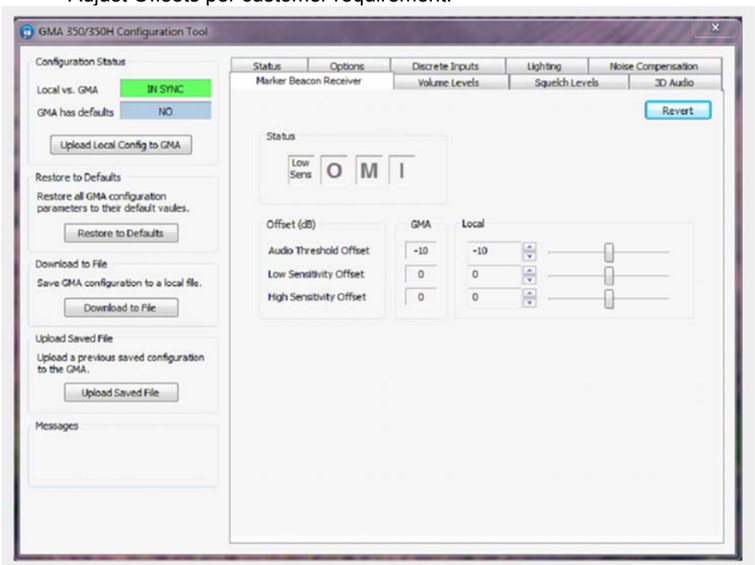


(4) Verify the Noise Compensation Page with the following parameters:



(5) Verify the Marker Beacon Receiver Page with the following parameters:

- Adjust Offsets per customer requirement.



(6) Verify the Volume Levels Page with the following parameters:

- Adjust Volume levels per customer requirement.

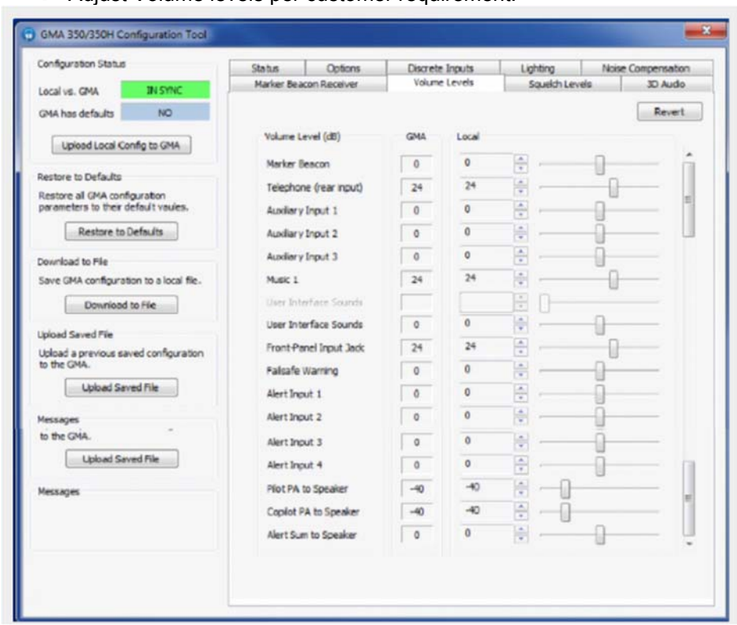


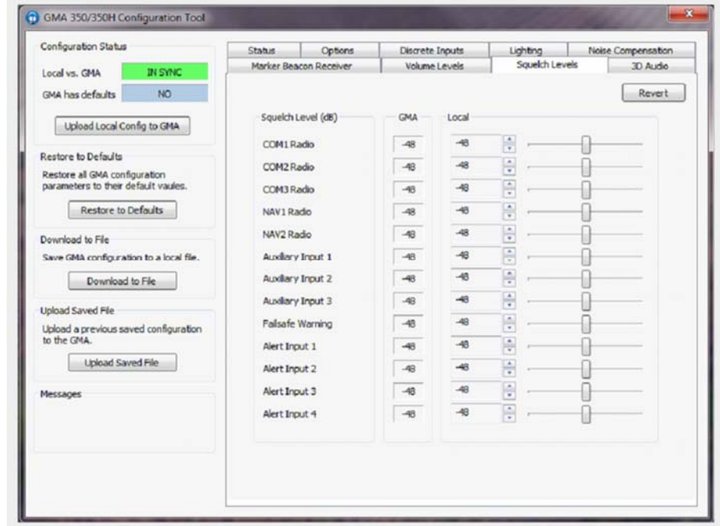
Figure 9-3. GMA 350H (G1000H Option) Configuration Set-Up
(Ref. 4220672-3 Rev. B and P/N 4220672 -5 Rev. B) (Sheet 1 of 2)
Aug 15/18, Rev. 15

NOTE

Configuration parameters provided in Figure 9-3 apply to G1000H System Software 1852.03, or later version, only. If equipped with G1000H System Software 1852.02, contact Enstrom Product Support for configuration set-up assistance.

(7) Verify the Squelch Levels Page with the following parameters:

- Adjust Squelch levels per customer requirement.



(8) Verify the 3D Audio Page with the following parameters:

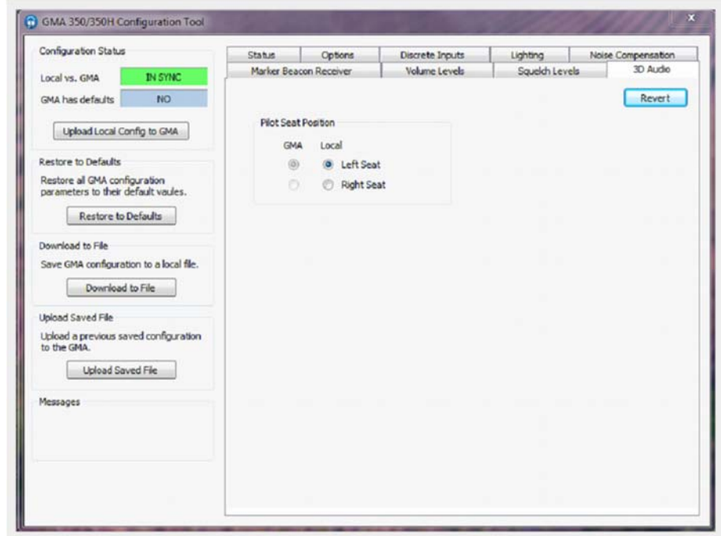
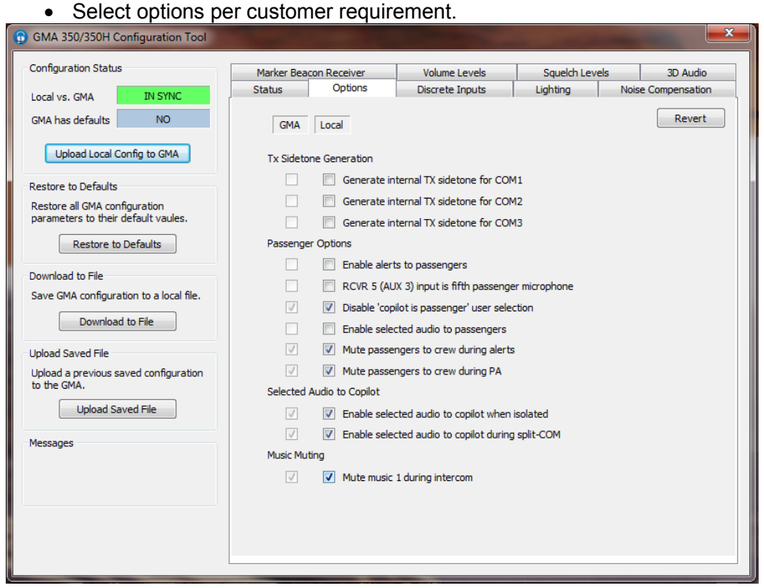


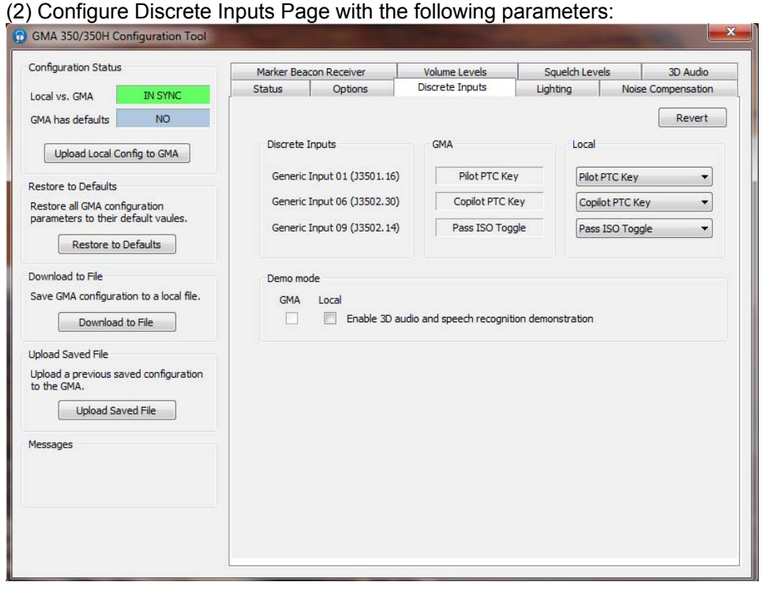
Figure 9-3. GMA 350H (G1000H Option) Configuration Set-Up
(Ref. 4220672-3 Rev. B and P/N 4220672 -5 Rev. B) (Sheet 2 of 2)
Aug 15/18, Rev. 15

(1) Configure Options Page with the following parameters:

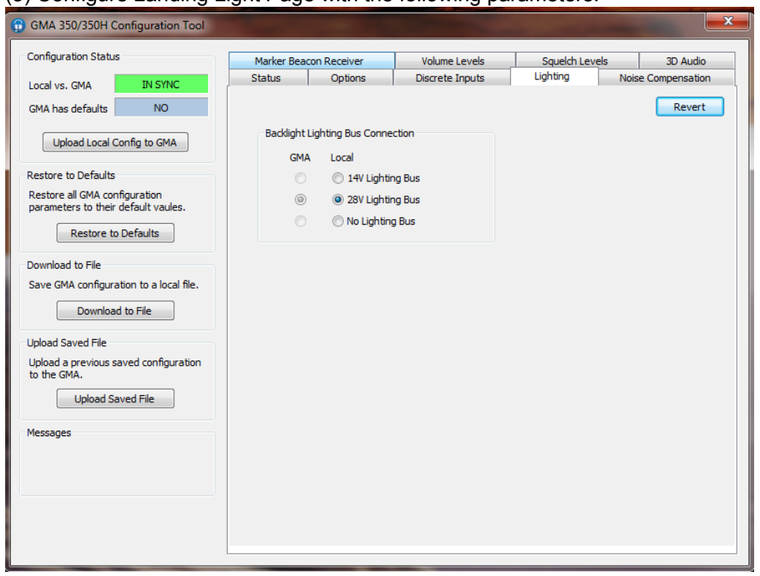
- Select options per customer requirement.



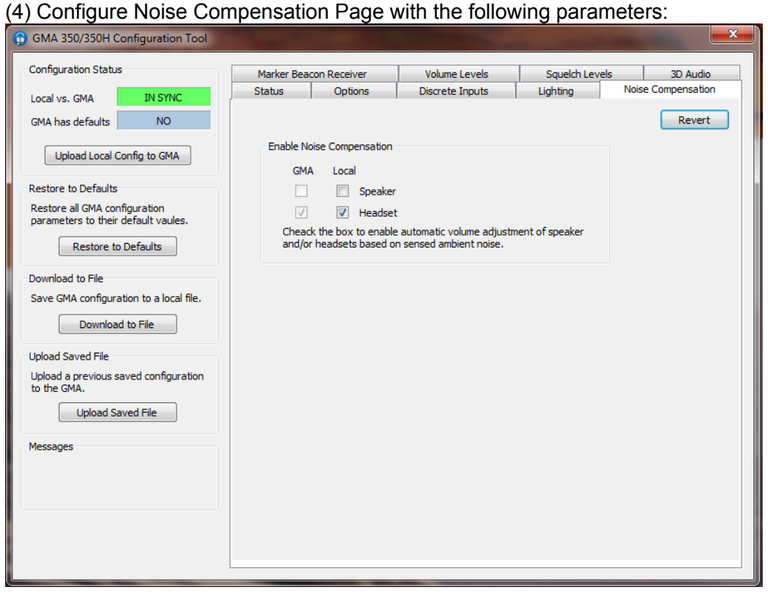
(2) Configure Discrete Inputs Page with the following parameters:



(3) Configure Landing Light Page with the following parameters:

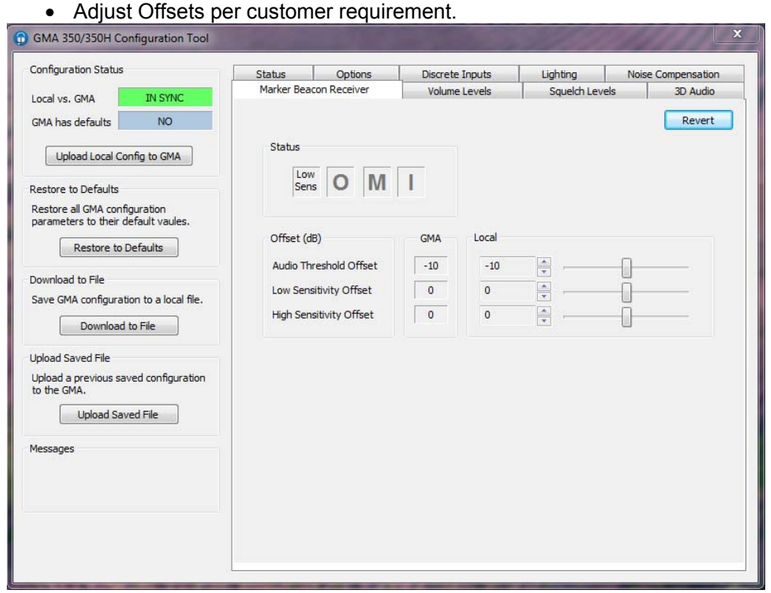


(4) Configure Noise Compensation Page with the following parameters:



(5) Configure Marker Beacon Receiver Page with the following parameters:

- Adjust Offsets per customer requirement.



(6) Configure Volume Levels Page with the following parameters:

- Adjust Volume levels per customer requirement.

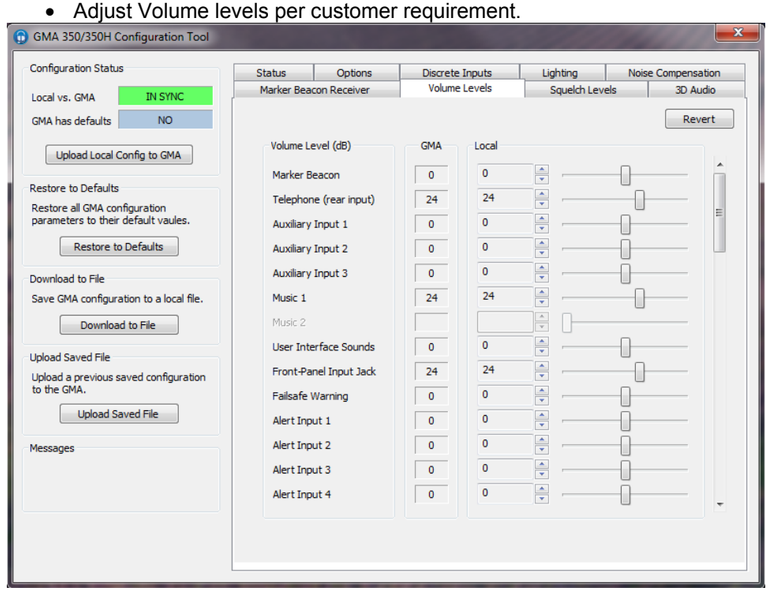
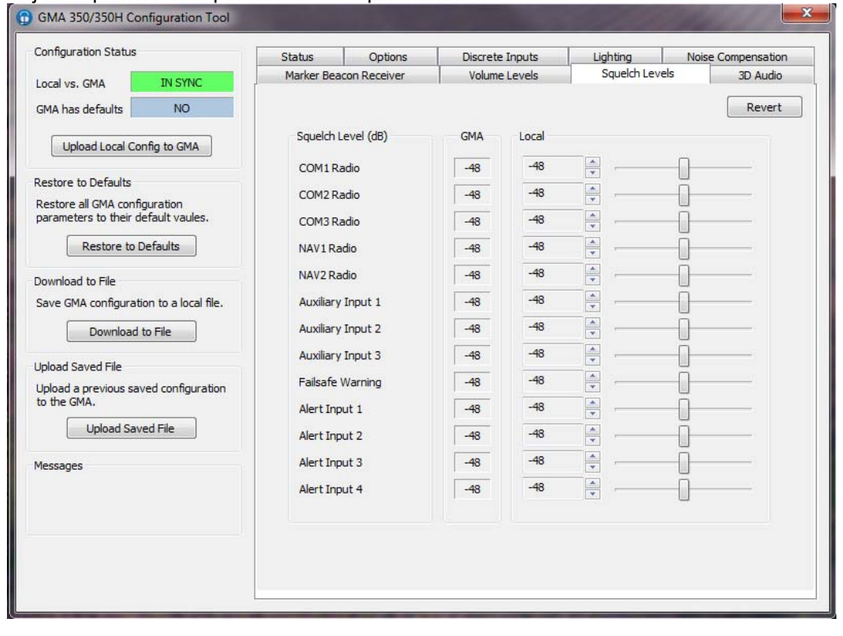


Figure 9-4. GMA 350H (Standard) Configuration Set-Up
(Ref. 4220672-7 Rev. B, P/N 4220672 -9 Rev. -) (Sheet 1 of 2)
Aug 15/18, Rev. 15

(7) Configure Squelch Levels Page with the following parameters:

- Adjust Squelch levels per customer requirement.



(8) Configure 3D Audio Page with the following parameters:

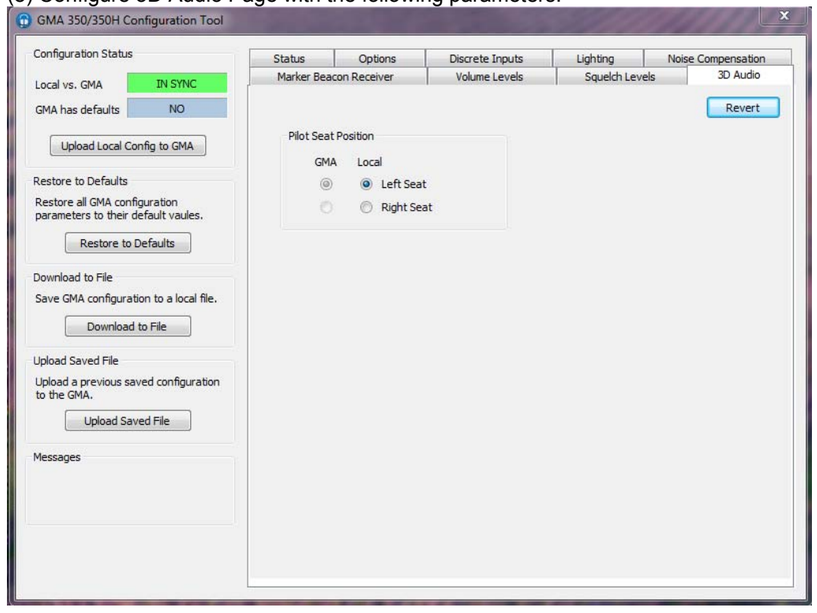


Figure 9-4. GMA 350H (Standard) Configuration Set-Up
(Ref. 4220672-7 Rev. B, P/N 4220672 -9 Rev. -) (Sheet 2 of 2)

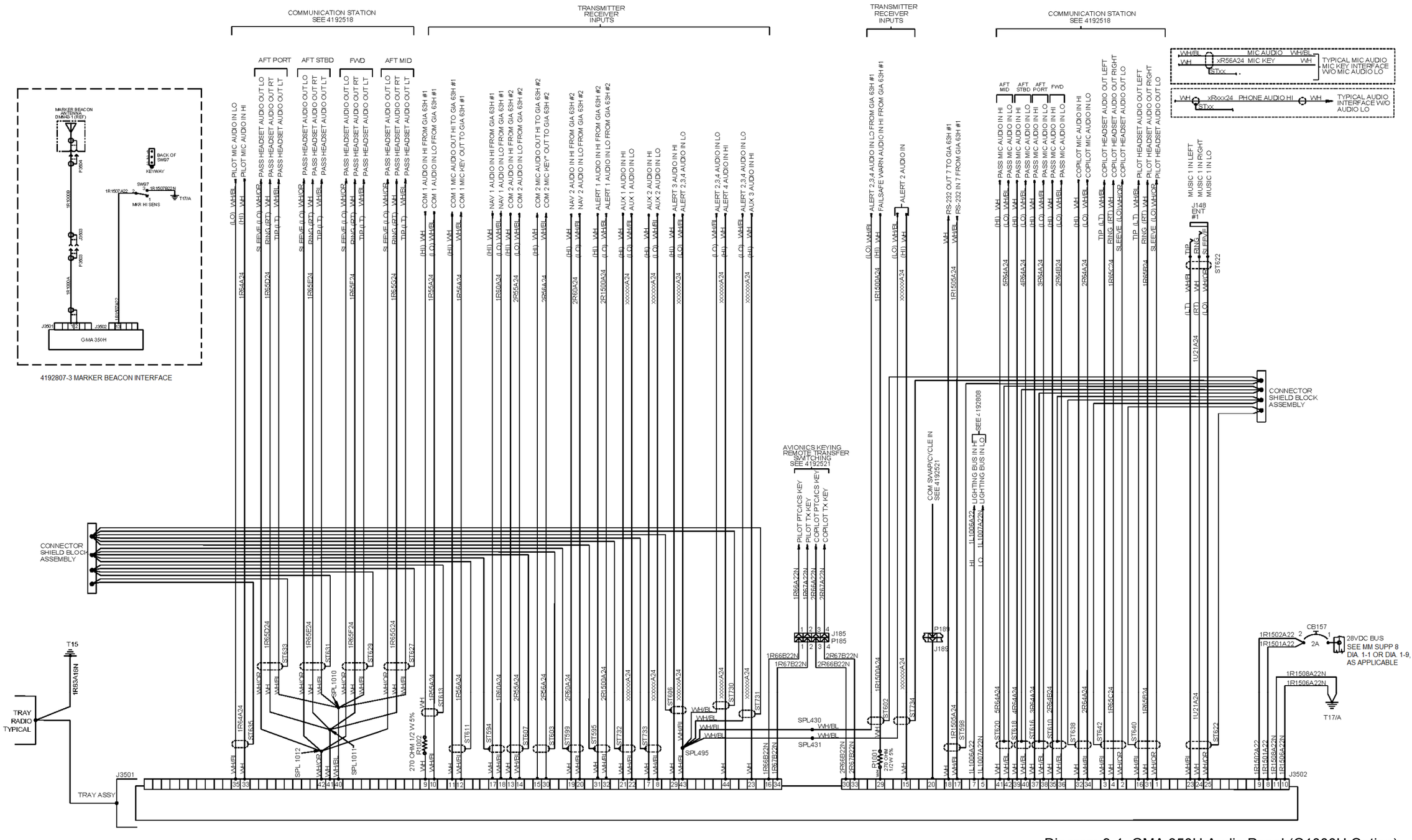
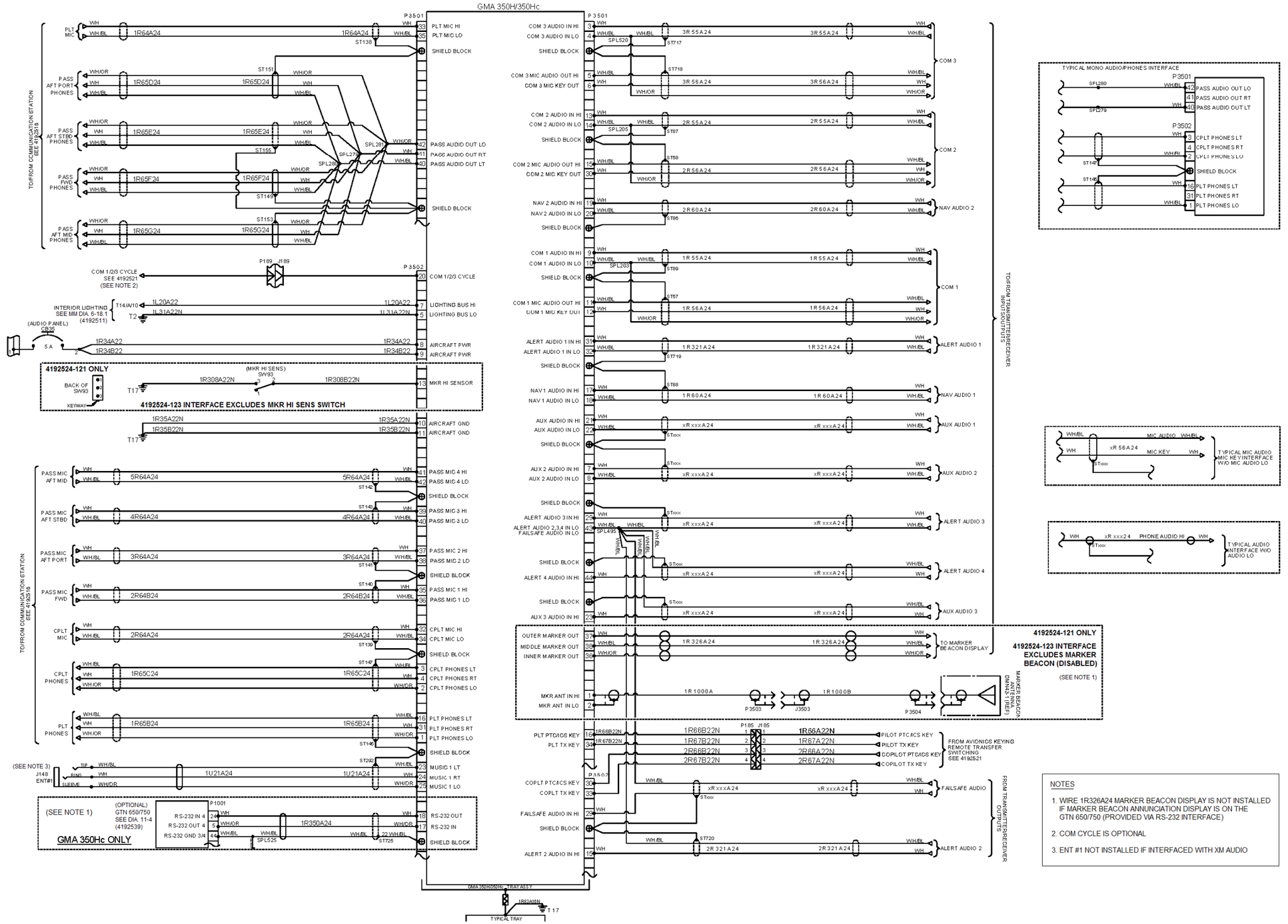


Diagram 9-1. GMA 350H Audio Panel (G1000H Option)
(Ref. 4192807-1 Rev. A and P/N 4192807-3 Rev. -)
Dec 20/17, Rev. 14
9-11/9-12 Blank



NOTES

1. WIRE 1R326A24 MARKER BEACON DISPLAY IS NOT INSTALLED IF MARKER BEACON ANNUNCIATION DISPLAY IS ON THE GTN 650/750 (PROVIDED VIA RS-232 INTERFACE)
2. COM CYCLE IS OPTIONAL
3. ENT #1 NOT INSTALLED IF INTERFACED WITH XM AUDIO

Diagram 9-2. GMA 350H (Standard)
(Ref. 4192524-121 and 4192524-123 Rev. P)
Apr 30/2020, Rev. 18
9-13/9-14 (Blank)

CHAPTER 10

GNC 255A NAV/COM

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The GNC 255A is a VHF communications transceiver combined with 200-channel VOR, LOC, and GS navigation receivers. The com radio operates from 118.000 to 139.975 MHz in either 25 kHz or 8.33 kHz channel spacing. Transmitting power is 10W.

B. The GNC 255A installation part number is 4220638-1.

C. The components of the GNC 255A include the panel mounted GNC 255A unit and Nav and Com antennas. The GNC 255A provides output to a VOR/LOC/GS Indicator, such as the MD200 Series CDI (see Chapter 4), and to either a VOX ICS or an audio panel.

D. Power to the GNC 255A is provided via the **COM** circuit breaker (CB61) (5 Amp) and the **NAV** circuit breaker (CB63) (2 Amp) located on the left side of the center pedestal. If equipped with a second transceiver unit (such as the GTN 650), power is provided via the **COM 1** or **COM 2** circuit breaker (CB61) (5 Amp) and **NAV 1** or **NAV 2** circuit breaker (CB63) (2 Amp).

E. Refer to the 480B Rotorcraft Flight Manual Supplement 28-AC-063 for GNC 255A limitations and basic operation instructions.

1-2. Vendor Manuals

A. The following components listed in Table 10-1 are to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 10-1. Vendor Manuals

Component	Publication	Vendor
GNC 255A	GTR 255/GNC 255 Installation Manual, Document No. 190-01182-02, latest revision	Garmin International, Inc. 1200 East 151st Street Olathe, KS 66062 Tele: (913) 397-8200 Fax: (913) 397-8282 www.garmin.com
	GNC 255A/255B Pilot's Guide, Document No. 190-01182-01, latest revision	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. For FAA approval, this Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, this Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the GNC 255A are “on condition”.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The GNC 255A NAV/COM installation contains no user serviceable components or assemblies. Operations involving the removal of the GNC 255A must be done by authorized maintenance technicians.

3-2. Troubleshooting

A. Refer to the electrical schematic in Diagram 10-1 when troubleshooting the GNC 255A installation. If the unit fails to operate after troubleshooting efforts, contact Garmin aviation product support for assistance (ref. para. 1-2).

3-3. Periodic Inspections/Maintenance

A. The following inspection checklist is intended as a guide for 100 hour/annual inspections for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
GNC 255A NAV/COM	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the antenna, electrical wiring and mounts for security, damage, and obvious defects.	
2. Inspect the GNC 255A unit and mount for security, damage, and obvious defects.	

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

4-1. GNC 255A NAV/COM

NOTE

All work must be accomplished in accordance with the Enstrom TH-28/480 Series Maintenance Manual.

4-1-1. Cleaning

A. The front bezel, keypad, and display can be cleaned with a microfiber cloth or 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.

4-1-2. Removal

A. Remove power to the GNC 255A unit. Pull the **COM** and **NAV** circuit breakers out. Disable the circuit breakers by installing a cable tie or other similar device around each circuit breaker stem.

B. Insert the 3/32-inch hex drive tool into access hole on the unit face. Rotate the hex tool counterclockwise until the unit is forced out about 3/8 inch and the hex drive tool completely stops.

C. Carefully pull the unit from the rack.

4-1-3. Installation

NOTE

Do not use excessive force when inserting the GNC 255A into the rack. This may damage the connectors, unit, and/or unit rack.

A. Insert the GNC 255A unit into the rack by sliding it straight in until it stops, about 3/8 inch short of the final position.

B. Insert the 3/32-inch hex drive tool into access hole on 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.

C. Remove the cable tie or other similar device from the **COM** and **NAV** circuit breaker stems and push the stems in to set the circuit breakers.

4-1-4. Functional Check

A. If the installation is a replacement, configure the GNC 255A in accordance with Figure 10-3 and perform the post installation checkout in accordance with section 6 of the GTR 225/GNC 255 Installation Manual (para. 1-2).

4-2. Wiring Harnesses/Connectors

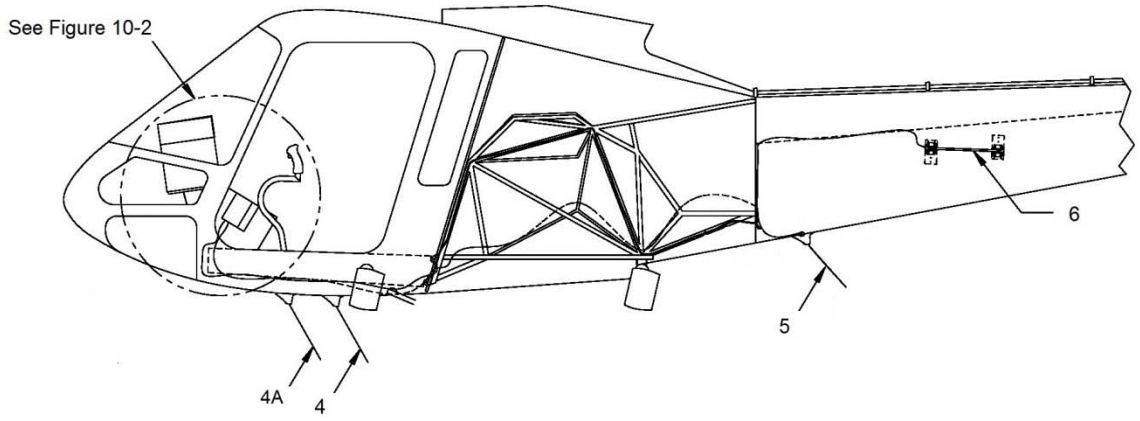
A. Remove, inspect/repair, and install the airframe mounted wiring harnesses/ connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21.

4-3. Figures and Diagrams

A. The GNC 255A installation is shown in Figure 10-1. Refer to Table 1 for basic parts list.

B. The GNC 255A wiring interface is shown in Diagram 10-1.

C. If interfaced with a MD200 Series CDI, refer to Chapter 4.



Item	Part Number	Component	Quantity
-	4220638-1	GNC 255A Installation	REF
-	010-01025-50	GNC 255A Kit	REF
1	011-02806-00	. GNC 255A NAV/COM	1
-	011-02721-10	. GNC 255A Connector Kit	REF
-	006-D3844-00	. Frequency Data Worldwide	1
2	7277-5-2 (2 amp)	. Circuit Breaker (NAV)	1
3	7277-5-5 (5 amp)	. Circuit Breaker (COM)	1
4	4199034-3	Antenna Installation, VHF COM 1	REF
4A	4199034-7	Antenna Installation, VHF COM 1 (alternate to 4199034-3)	REF
-	DM C70-1/A	. Antenna	1
-	MS24693-C53	. . Screw	4
-	AN960-8L	. . Washer	4
-	AN364-832A	. . Nut	4
5	4199025-1	Antenna Installation, VHF COM 2 (alternate to 4199034-3)	REF
-	C1292-1	. Antenna	1
-	AN507-C832R10	. . Screw	3
6	4220537-3	Antenna Installation, VOR/LOC/GS	REF
-	CI205-3	. Antenna System	1
-	D20543	. Antenna Element (Left and Right Side)	2
-	MS24693-C55	. . Screw	8

Figure 10-1. GNC 255A Installation

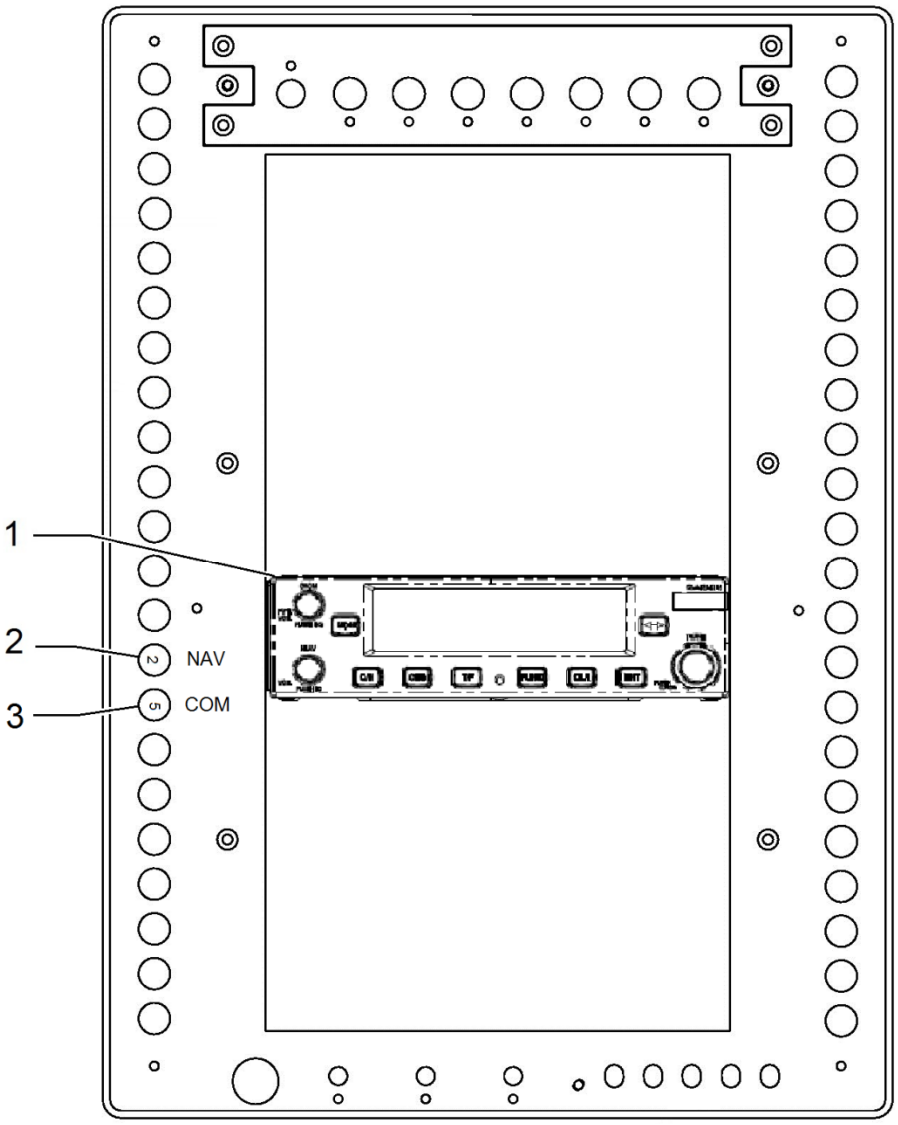


Figure 10-2. GNC 255A Installation

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SYSTEM CONFIGURATION GROUP		NOTES
↔ = NEXT	**SERIAL PORT** IO MODE .....AVN IN/MAPCOM NONE	FOR INTERFACE TO GTN 650/750 WHEN NOT CONNECTED
↔ = NEXT	**DST PRIORITY** DST.....GPS,DME	
↔ = NEXT	**INTERCOM ENABLE** CONTROL.....DISPLAY	DISABLE INTERCOM IN NORMAL MODE
↔ = NEXT	**BACKLIGHT** DISPLAY.....LIGHT BUS 1 BEZEL KEY.....PHOTOCELL DSP MIN.....1 KEY MIN.....1	
↔ = NEXT	**PHOTOCELL** TRNSN.....10 SLOPE.....50 KEY CO.....80 OFFSET.....50	ADJUST OFFSET TO MATCH/SYNC TO OTHER INSTALLED EQUIPMENT
↔ = NEXT	**LIGHTING BUS 1** INPUT.....28 VDC SLOPE.....25 OFFSET.....15	ADJUST OFFSET TO MATCH/SYNC TO OTHER INSTALLED EQUIPMENT

NAV CONFIGURATION GROUP		NOTES
↔ = NEXT	**CDI INDICATOR** TYPE .....RESOLVER	OBS CALIBRATION REQUIRED FOR INTERFACE TO CDI OR SLAVED COMPASS SYSTEM
↔ – NEXT	**ARINC 429** N/A	NO ACTION TAKEN
↔ = NEXT	**DME** N/A	NO ACTION TAKEN
↔ = NEXT	**FILTERED LOC/GS** ENABLED .....OFF	

COM CONFIGURATION PAGE		NOTES
↔ = NEXT	**MIC GAIN** MIC1 GAIN.....12 DB MIC2 GAIN.....12 DB	ADJUST PER CUSTOMER REQUIREMENT
↔ = NEXT	**COM CARRIER SQUELCH** MODE.....BASIC SPACING..... 25 kHz OR 8.33 kHz SQUELCH.....0	ADJUST PER CUSTOMER REQUIREMENT
↔ = NEXT	**COM RX SQUELCH** MODE.....BASIC SPACING..... 25 kHz OR 8.33 kHz SQUELCH.....80	ADJUST PER CUSTOMER REQUIREMENT

AUDIO CONFIGURATION PAGE		NOTES
↔ = NEXT	**COM SIDETONE** VOLUME .....90 MODE.....EXTERNAL PILOT CONTROL.....ENABLED	ADJUST VOLUME PER CUSTOMER REQUIREMENT
↔ = NEXT	**MIX NAV AUDIO** MIXED WITH COM.....OFF	
↔ = NEXT	**HI-FIDELITY AUDIO** ENABLED.....OFF	

ICS CONFIGURATION PAGE (NORMAL MODE)		NOTES
118.250 ENT=DONE CLR=UNDO	**INTERCOM ON/OFF** INTERCOM OFF	
118.250 ENT=DONE CLR=UNDO	**SPEAKER ON/OFF** SPEAKER OFF	
118.250 ENT=DONE CLR=UNDO	**AUX AUDIO** AUX OFF	

Figure 10-3. GNC 255A Configuration Set-Up (Ref. 4192516-113 Rev. H)

SYSTEM CONFIGURATION PAGE (NORMAL MODE)		NOTES
118.250 ENT=DONE CLR=UNDO	**COM SPACING** CHNL SPACE 25.0 kHz	SWITCH TO 8.33 KHZ PRIOR TO SHIPMENT PER CUSTOMER REQUIREMENT (TYPICAL FOR EUROPE/ASIA)
118.250 ENT=DONE CLR=UNDO	**COM SIDETONE** MODE: FIXED OFFSET: N/A	ADJUST PER CUSTOMER REQUIREMENT
118.250 ENT=DONE CLR=UNDO	**DISPLAY BRIGHTNESS** BRIGHTNESS OFFSET 0	ADJUST PER CUSTOMER REQUIREMENT
118.250 ENT=DONE CLR=UNDO	**DISPLAY CONTRAST** OFFSET 0	ADJUST PER CUSTOMER REQUIREMENT

Figure 10-3. GNC 255A Configuration Set-Up (Ref. 4192516-113 Rev. H)

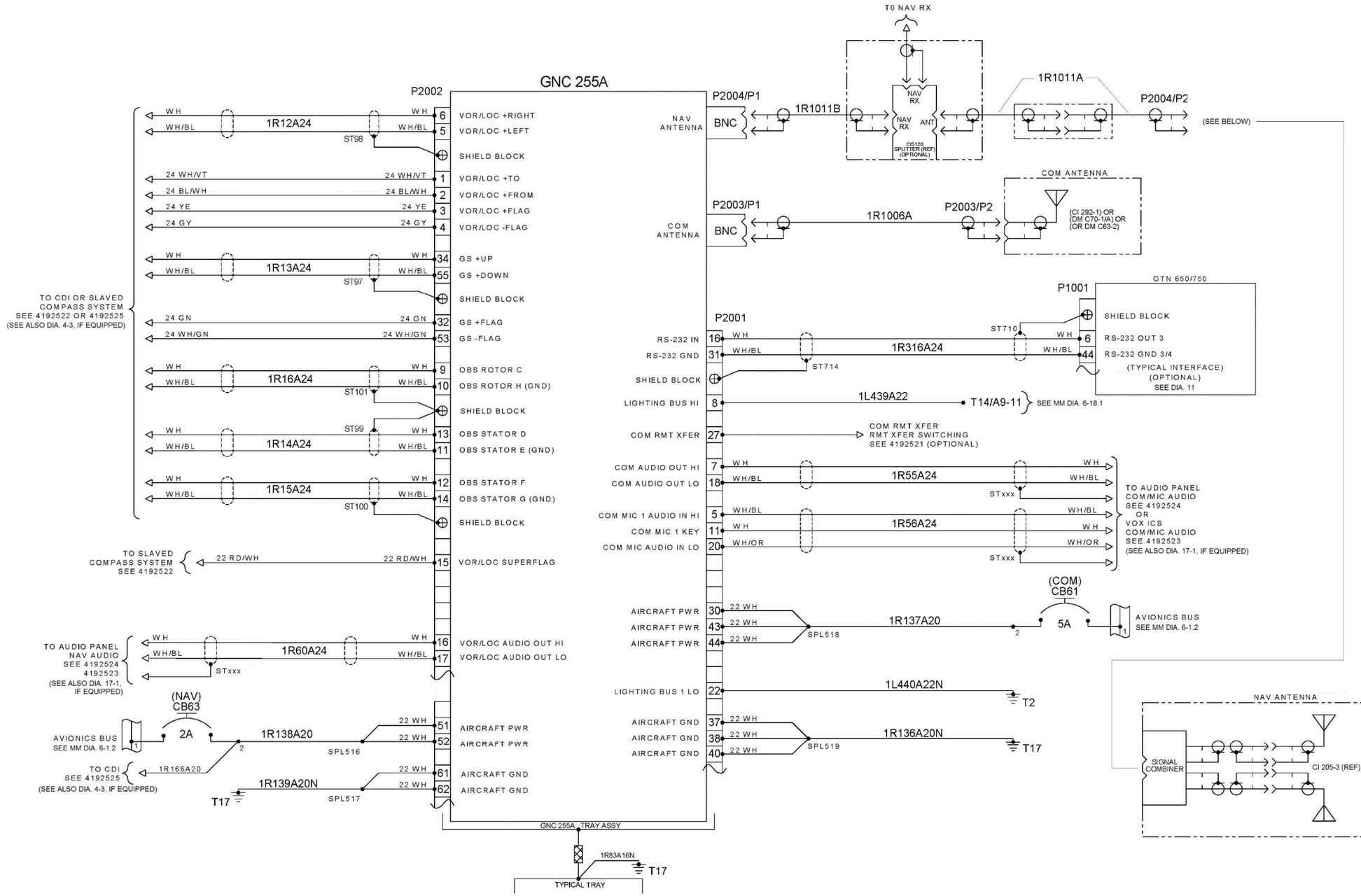


Diagram 10-1. GNC 255A NAV/COM (Ref. 4192516-113 Rev. H)

CHAPTER 11
GTN 650/750 GPS/NAV/COM
SECTION 1
SYSTEM DESCRIPTION

1-1. System Description

A. The GTN 650 installation part numbers are 4220639-1, 4220639-3, and 4220639-5. The GTN 750 installation part number is 4220644-1. The differences are explained in the following table:

Part Number	Location	Nav Enabled
4220639-1	Lower Console	Yes
4220639-3	Instrument Panel	No
4220639-5	Instrument Panel	Yes
4220644-1	Instrument Panel	Yes

B. The GTN installation may be interfaced with navigation, audio, and fuel management systems, as well as integrated control and display of transponder functions. The GTN uses a Secure Digital (SD) card to load and store various types of data. For basic flight operations, the SD card is required for Terrain, Obstacle, and SafeTaxi database storage as well as Jeppesen aviation database updates.

C. The components of the GTN include the panel mounted GTN unit and Nav (4220639-1, 4220639-5, or 4220644-1 only), Com, and GPS antennas. For 4220639-1, 4220639-5, and 4220644-1, an external CDI, HSI, EHSI, or EFIS is required. (If the installation is configured with MD200 series CDI, refer to Chapter 4.)

D. Power to the GTN is provided via the **COM** circuit breaker (CB193) (5 Amp) and the **NAV/GPS** or **GPS** circuit breaker (4220639-3) circuit breaker (CB194) (5 Amp) located on the left side of the center pedestal.

E. For installation 4220639-1, 4220639-5, and 4220644-1, refer to 480B Rotorcraft Flight Manual Supplement 28-AC-064 for GTN 650/750 limitations and basic operation instructions. For installation 4220639-3, refer to 480B Rotorcraft Flight Manual Supplement 28-AC-068 for GTN 650 (Nav Disabled) limitations and basic operation instructions.

1-2. Vendor Manuals

A. The following components listed in Table 11-1 are to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 11-1. Vendor Manuals

Component	Publication	Vendor
GTN 650/750	GTN 6XX/7XX Part 27 AML STC Maintenance Manual, Document No. 190-01007-B1, latest revision	Garmin International, Inc. 1200 East 151st Street Olathe, KS 66062 Tele: (913) 397-8200 Fax: (913) 397-8282 www.garmin.com

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. For FAA approval, this Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, this Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the GTN 650/750 are “on condition”.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The GTN installation contains no user serviceable components or assemblies. Operations involving the removal of the GTN unit must be done by authorized maintenance technicians.

3-2. Troubleshooting

A. Refer to the electrical schematics (ref. para. 4.3) when troubleshooting the GTN installation. Refer also to the Troubleshooting chapter of the applicable manual publication listed in Table 11-1. If the unit fails to operate after troubleshooting efforts, contact Garmin aviation product support for assistance (ref. Table 11-1).

3-3. Periodic Inspections/Maintenance

A. The following inspection checklist is intended as a guide for 100 hour/annual inspections for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
GTN	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the antennas, electrical wiring and mounts for security, damage, and obvious defects.	
2. Inspect the GTN unit and mount for security, damage, and obvious defects.	
3. Check fan intake slots (if applicable) on the sides and bottom of the GTN unit's bezel for dust, dirt, or obstructions. Clean as needed.	
4. Inspect interfaced fuel management system equipment (if equipped) for security, damage, and obvious defects.	
5. Check legibility of switch labels and placards.	

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

4-1. GTN

NOTE

All work must be accomplished in accordance with the Enstrom TH-28/480 Series Maintenance Manual.

4-1-1. Cleaning

A. The front bezel, keypad, and display can be cleaned with a microfiber cloth or 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.

4-1-2. Removal

A. Remove power to the GTN unit. Pull the **COM** and **NAV/GPS** or **GPS** circuit breakers out. Disable the circuit breakers by installing a cable tie or other similar device around each circuit breaker stem.

B. For removal, refer to Section 5.1 of the GTN 6XX/7XX Part 27 AML STC Maintenance Manual (ref. Table 11-1).

4-1-3. Installation

NOTE

Do not use excessive force when inserting the GTN into the rack. This may damage the connectors, unit, and/or unit rack.

A. For installation, refer to Section 5.1 of the GTN 6XX/7XX Part 27 AML STC Maintenance Manual (ref. Table 11-1).

C. Remove the cable tie or other similar device from the **COM** and **NAV/GPS** or **GPS** circuit breaker stems and push the stems in to set the circuit breakers.

4-1-4. Functional Check

A. Perform return-to-service procedures in accordance *GTN 6XX/7XX Maintenance Manual*, Document 190-01007-B1, latest revision. Modify the installed GTN 650/750 configuration settings in accordance with the applicable figure referenced in Table 11-2.

B. Optional fuel management system interface: Configure a replacement Miniflo-L (Shadin) in accordance with Figure 11-4 (refer also to the Miniflo-L Operating Manual, Document Number OP91204E for data entry and functional test procedures).

C. If the returned GTN is used as the ADS-B Out position source, perform an ADS-B Out test in accordance with *GTX 345 Part 27 AML Maintenance Manual*, Document No. 190-00734-21, Section 8.4.

4-2. Wiring Harnesses/Connectors

A. Remove, inspect/repair, and install the airframe mounted wiring harnesses/ connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21.

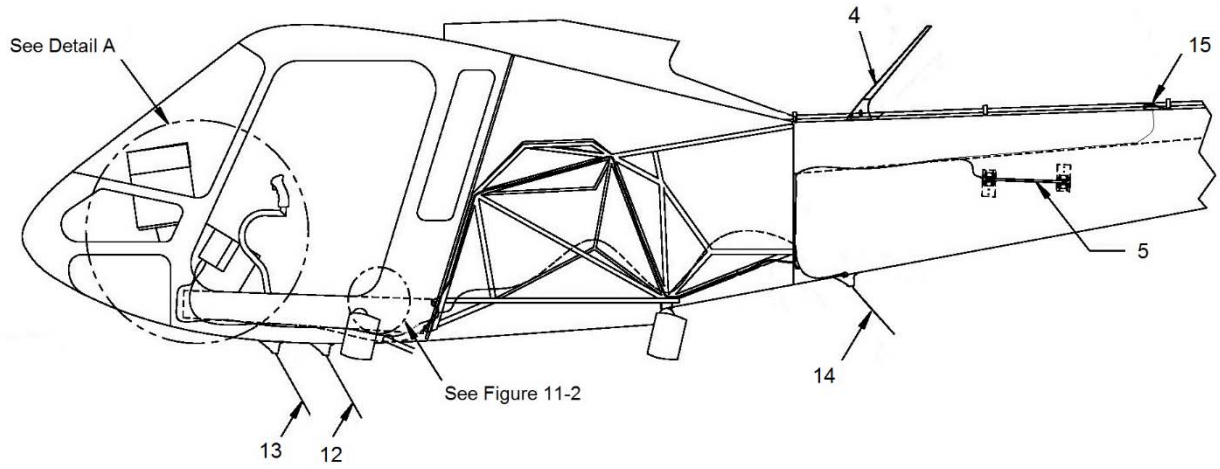
4-3. Figures and Diagrams

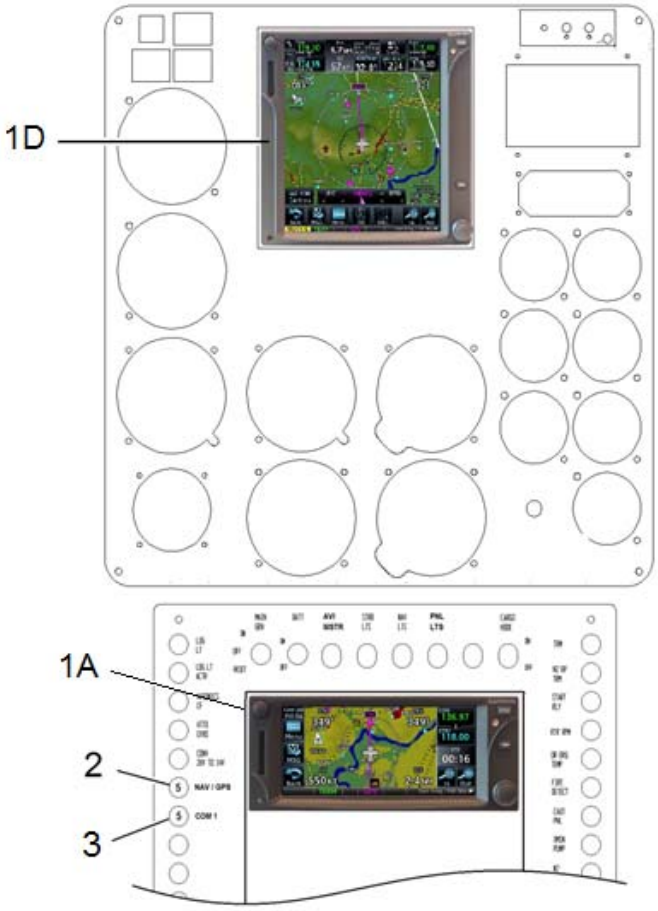
A. Refer to Figures 11-1 and 11-2 and Table 11-3 GTN 650/750 for system installation information.

B. Refer to Table 11-2 for configuration set-up pages and wiring diagrams.

Table 11-2. Figures and Diagrams Reference

Part Number	SW			Figure Reference	Diagram Reference
	5.00	6.41	6.51		
4220639-1	X			11-3	11-1
		X	X	11-5	11-2
4220639-3	X			11-3	11-3
		X	X	11-6	11-4
4220639-5			X	11-5	11-2
4220644-1			X	11-5	11-2
Shadin Miniflo Fuel Management				11-4	As applicable





NOTE: Actual location of GTN 650/750 may vary depending on customer preferences.

DETAIL A

Figure 11-1. GTN 650/750 Installation

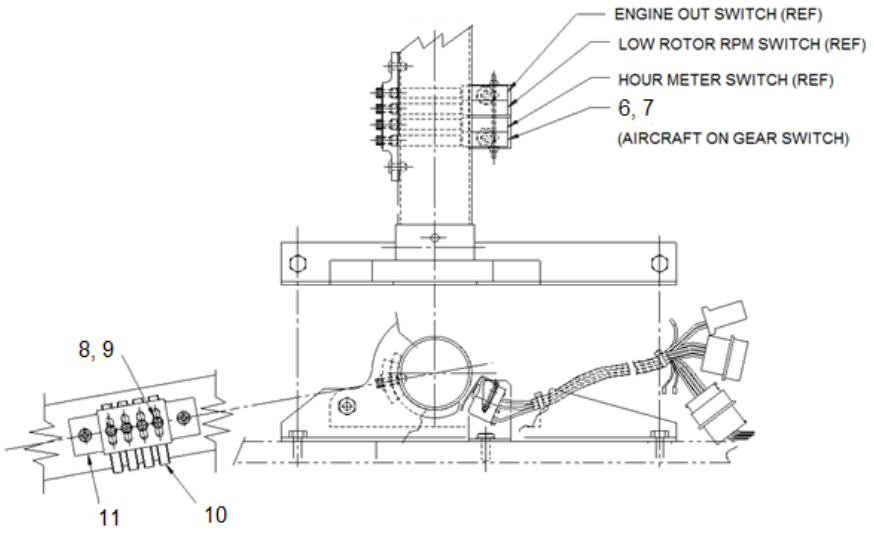


Figure 11-2. GTN 650/750 Installation – Aircraft on Ground Switch

Table 11-3. GTN 650/750 Installation

Item	Part Number	Description	Quantity
-A	4220639-1	GTN 650 Installation	REF
-B	4220639-3	GTN 650 Installation	REF
-C	4220639-5	GTN 650 Installation	REF
-D	4220644-1	GTN 750 Installation	REF
-	011-00979-03	. Configuration Module Kit (Used with Items 1A and 1B)	1
-	010-00813-A0	GTN 650 Kit	REF
1A	011-02256-00	. GTN 650	1
-	011-02325-02	. GTN 650 Connector Kit	1
-	011-02245-02	. GTN 650 Backplate Assembly	1
-	115-01293-A0	. GTN 650 Mounting Rack	1
-	010-00820-A0	GTN 750 Kit	REF
1D	011-02282-00	. GTN 750	1
-	011-02326-02	. GTN 750 Connector Kit	1
-	011-02246-02	. GTN 750 Backplate Assembly	1
-	115-01294-A0	. GTN 750 Mounting Rack	1
-*	010-01157-41	. Helo, Americas North	A/R
-*	010-01157-42	. Helo, Americas South	A/R
-*	010-01157-43	. Helo, Atlantic North	A/R
-*	010-01157-44	. Helo, Atlantic South	A/R
-*	010-01157-45	. Helo, Pacific North	A/R
-*	010-01157-46	. Helo, Pacific South	A/R

Table 11-3. GTN 650/750 Installation

Item	Part Number	Description	Quantity
2	7277-5-5 (5 amp)	. Circuit Breaker (NAV/GPS)	1
-2B	7277-5-5 (5 amp)	. Circuit Breaker (GPS) (4220639-3 only)	1
3	7277-5-5 (5 amp)	. Circuit Breaker (COM)	1
4	4220668-3	Antenna Installation, VHF COM 1/GPS 1	REF
-	CI 2580-200	. Antenna	1
-	MS24693-C52	. . Screw	4
5	4220537-3	Antenna Installation, VOR/LOC/GS (4220639-1, 4220639-5, or 4220644-1 only)	REF
-5	4220537-9	Antenna Installation, VOR/LOC/GS (Dual Nav) (4220639-1, 4220639-5, or 4220644-1 only)	REF
-	CI 205-3	. Antenna System	1
-	MS24693-C55	. . Screw	8
-	4119835-33	. Placard (GPS TO BE USED FOR VFR ONLY)	1
-	4119835-33	. Placard (COM 1 RMT.FREQ.XFER) (Located on Cyclic)	1
-	28-19064-1	. Placard (NAV FREQUENCIES NOT ENABLED) (4220639-3 only)	1
6	1SE1	. Micro Switch (SW 109)	1
7	JE-1	. Actuator	1
8	MS16998-10L	. Cap Screw	1
9	NAS620-6L	. Washer	2
10	4199072-13	. Actuator Contactor	1
11	4199072-11	. Actuator Contactor Positioner	1
12†	4199034-3	Antenna Installation, VHF COM 1 (alternate)	REF
13†	4199034-7	Antenna Installation, VHF COM 1 (alternate)	REF
-	DM C70-1/A	. Antenna	1
-	MS24693-C53	. . Screw	4
-	AN960-8L	. . Washer	4
-	AN364-832A	. . Nut	4
14†	4199025-1	Antenna Installation, VHF COM 2 (alternate)	REF
-	CI 292-1	. Antenna	1
-	AN507-C832R10	. . Screw	3
15	4196582-121	Antenna Installation (alternate, GPS, left side)	REF
-15	4196582-123	Antenna Installation (alternate, GPS, right side)	REF
-	013-00235-00	. Antenna	1
-	MS51959-50	. . Screw	4

\- Not illustrated

* Per customer requirements

† This antenna with installation of Item 15 is an alternate antenna system for Item 4

ARINC 429 Configuration Page				
	4220639-1		4220639-3	
	Speed	**Data**	**Speed**	**Data**
ARINC 429 In 1	Low	EFIS Format 4 (Note 1)	- - -	OFF
	---	OFF (Note 2)		
ARINC 429 In 2	---	OFF (Note 2)	- - -	OFF
ARINC 429 Out 1	Low	GAMA Format 3 (Note 1)	- - -	OFF
	---	OFF (Note 2)		
ARINC 429 Out 2	---	OFF (Note 2)	- - -	OFF
SDI		LNAV 1 (Note 1)		LNAV 1
Notes: 1) When interfaced to a Sandel SN3500 EHSI 2) When not connected				

RS-232 Configuration Page			
	Input	**Output**	
RS232 1	GTX Mode C #1	GTX Mode C #1	Note 1
	GTX Mode S #1	GTX Mode S #1	Note 2
	OFF	OFF	Note 5
RS232 2	Fuel Format 2	Aviation Output 1	Note 3
	OFF	OFF	Note 5
RS232 3	OFF	Aviation Output 1	Note 4
	OFF	OFF	Note 5
RS232 4	OFF	OFF	Note 5
Notes: 1) When interfaced to a Garmin GTX 327 and Remote operation is desired 2) When interfaced to a Garmin GTX 330 and Remote operation is desired 3) When interfaced to a Shadin Miniflo-L 4) When interfaced to a Garmin GNC 255A 5) When not connected			

HSDB (Ethernet) Configuration Page	
Ethernet Port 1	Not Connected
Ethernet Port 2	Not Connected
Ethernet Port 3	Not Connected
Ethernet Port 4	Not Connected

Interfaced Equipment Page		
Unit	**Present**	**Type**
Cross-Side Nav	Not Present	- - -
GDL 69/69A	Not Present	- - -
GDL 88	Not Present	- - -
Transponder #1	Present	GTX Mode C (Note 1)
	Present	GTX Mode S (Note 2)
	Not Present	- - - (Note 3)
Transponder #2	Not Present	- - -
GSR 56	Not Present	- - -
Notes: 1) When interfaced to a Garmin GTX 327 and Remote operation is desired 2) When interfaced to a Garmin GTX 330 and Remote operation is desired 3) When not connected		

Main Indicator (Analog) Configuration page		
	P/N 4220639-1	*P/N 4220639-3*
Calibrate OBS Resolver	Calibrate (Note 1)	Calibrate (Note 2)
CDI Key	Enabled	Disabled
Selected Course For GPS	Allowed	Allowed
Selected Course For VOR/LOC	Allowed	Allowed
V-Flag State	Declutter	Declutter
Notes: 1) No action taken with Sandel SN3500 EHSI 2) No action taken		

Lighting Configuration Page	
Display	**Keys**
Source Lighting Bus 1	**Source** Lighting Bus 1
Minimum Level 5.00%	**Minimum Level** 5.00%

Photocell Configuration Page		
Response Time 2sec	**Slope** 50	**Offset** 50 (Note 1)
	Key Backlight Cutoff 80%	**Photocell Transition** 10%
Notes: 1) Adjust Offset to match/sync to other installed equipment		

Lighting Bus Configuration Page		
Lighting Bus 1 28V DC		
Response Time 0sec	**Slope** 15	**Offset** 15 (Note 1)
Lighting Bus 2 28V DC	(Note 2)	
Response Time 2sec	**Slope** 50	**Offset** 50
Notes: 1) Adjust Offset to match/sync to other installed equipment 2) Lighting Bus 2 not applicable		

Audio Configuration Page
Alert Volume 50% (Adjust per customer requirement)

Traffic Configuration Page
Not applicable at this time

Main System Configuration Page		
	P/N 4220639-1	*P/N 4220639-3*
Airframe Type	Rotorcraft	Rotorcraft
Air/Ground Threshold	10KT	10KT
Air/Ground Discrete	Active for Ground	Active for Ground
GPS Antenna Height Above Ground	6.0 feet	6.0 feet
Fuel Type	Jet A	Jet A
GPS Select	Auto	Auto
Heading Source Input	Connected (Note 1)	Not Connected
Radio Altimeter Input	Not Connected	Not Connected
Altitude Source Input	Not Connected	Not Connected
Enhanced Lighting Mode	Disabled	Disabled
Crossfill Status Alert	Disabled	Disabled
System ID	GTN 1	GTN 1
Notes: 1) As applicable (EHSI, EFIS, HSI)		

Figure 11-3. GTN 650 Main SW 5.00 Configuration Set-Up (Sheet 1 of 2)
(Ref. 4220639-1 Rev. B, 4220639-3 Rev. B)

Com Configuration Page	
Com Radio	Enabled
Com RF Squelch	80% (Note 1)
Mic 1 Gain	+12db (Note 1)
Sidetone Volume	+60.0db (Note 1)

Notes:
1) Adjust per customer requirement

VOR/LOC/GS Configuration Page		
	P/N 4220639-1	*P/N 4220639-3*
Nav Radio	Enabled	Disabled
Selected Course	- - - (Note 1)	- - - (Note 1)
Calibrate OBS Resolver	(Note 2)	(Note 1)
ARINC 429 Speed RX	Low	Low
ARINC 429 Speed TX	Low	Low
SDI	VOR/ILS 1	VOR/ILS 1
DME Mode	(Note 1)	(Note 1)
DME Channel Mode	(Note 1)	(Note 1)

Notes:
1) No action taken
2) No action taken with a Sandel SN3500 EHSI

Discrete Configuration Page
N/A (No action taken)

Waypoint Configuration Page	
Mark on Target	Disabled

Terrain Configuration Page
Not applicable at this time

Com Transmit Power Configuration Page	
Com Transmit Power	
Normal	16W

Flight Simulator Configuration Page
Not applicable at this time

System - Setup (Note 1)	
CDI Scale	Auto
ILS CDI Capture	Auto Switch
Local Offset	Adjust to Local time
Time Format	Local 12 hour
Runway Surface	Hard/Soft
Runway Length	0 FT
Com Channel Spacing	25.0 kHz (Note 2)
Crossfill	Disabled

Notes:
1) These settings can be modified per customer requirements unless noted otherwise
2) Switch to 8.33 KHz prior to shipment per customer requirement (Europe/Asia)

System - Alerts (Note 1)	
Arival	Active
Proximity	3.0 NM
Airspace Alerts	All Active
Altitude Buffer	200 FT

Notes:
1) These settings can be modified per customer requirements unless noted otherwise

System - Units (Note 1)	
Nav Angle	Magnetic (°)
Temperature	Celsius (°)
Fuel	Pounds (LB)
Position Format	LAT/LON

Notes:
1) These settings can be modified per customer requirements unless noted otherwise

System – Ownship (Note 1)	
Ownship	3-Blade Rotorcraft

Notes:
1) These settings can be modified per customer requirements unless noted otherwise

System – Audio (Note 1)	
Click Volume	60%
HTAWS Alert Voice	N/A (Not applicable at this time)
Voice Callout	N/A (Not applicable at this time)

Notes:
1) These settings can be modified per customer requirements unless noted otherwise

System - Backlight	
Manual Offset	N/A (Not applicable at this time)

Figure 11-3. GTN 650 Main SW 5.00 Configuration Set-Up (Sheet 2 of 2)
(Ref. 4220639-1 Rev. B, 4220639-3 Rev. B)

Group 1 Configuration Page			Notes		
L =	XXXX Enter K-FACTOR	LEFT K-FACTOR	EXAMPLE: K-FACTOR* OF 41.6	left window 4	right window 160
			(*The K-FACTOR value entered should match the K-FACTOR identified on the fuel flow transducer.)		
R =	0	RIGHT K-FACTOR	N/A		
A =	0	LEFT FUEL FLOW OFFSET	N/A		
b =	0	RIGHT FUEL FLOW OFFSET	N/A		
U =	3	FUEL UNITS	3 = LBS (6.7 LBS/GAL)		
E =	0	NUMBER OF ENGINES	0 = SINGLE		
C =	0	LOW FUEL CUT OFF	0 = OFF		
o =	5	GPS OUTPUT	5 = GARMIN		
I =	1	GPS INPUT	1 = ON		
d =	0	ENDURANCE WARNING TIME	0 = 45 MIN		
F =	0	ENGINE TYPE	0 = INJECTOR/TURBINE		
u =	0	IGNORE LORAN WARNINGS	0 = NO		
s =	53	LOW FUEL LEVEL	53 = 53 LBS		

Group 2 Configuration Page			Notes
o =	5	GPS OUTPUT	5 = GARMIN
I =	1	GPS INPUT	1 = ON
d =	0	ENDURANCE WARNING TIME	0 = 45 MIN
F =	0	ENGINE TYPE	0 = INJECTOR/TURBINE
u =	0	IGNORE LORAN WARNINGS	0 = NO
s =	53	LOW FUEL LEVEL	53 = 53 LBS

Figure 11-4. GTN 650-Shadin Miniflo Configuration Set-Up
(Ref. 4220515 Rev. A, EO5)

ARINC 429 Configuration Page			Notes
	Speed	Data	
ARINC 429 In 1	Low	EFIS Format 4	For Sandel SN3500 EHSI
	Low	Off	When not connected
ARINC 429 In 2	Low	OFF	
ARINC 429 In 3	Low	OFF	GTN 750 Only
ARINC 429 In 4	Low	OFF	
ARINC 429 Out 1	Low	GAMA Format 3	For Sandel SN3500 EHSI
	Low	OFF	When not connected
ARINC 429 Out 2	Low	OFF	
ARINC 429 Out 3	Low	OFF	GTN 750 Only
ARINC 429 Out 4	Low	OFF	
SDI		LNAV 1	For Sandel SN3500 EHSI
		Common	When not connected

RS-232 Configuration Page			Notes
	Input	Output	
RS232 1	GTX Mode S+ #1	GTX Mode S+ #1	For Garmin GTX 345
	OFF	OFF	When not connected
RS232 2	Fuel Format 2	Aviation Output 1	For Shadin Miniflo
	OFF	OFF	When not connected
RS232 3	OFF	Aviation Output 1	For GTR/GNC
	OFF	OFF	When not connected
RS232 4	GMA Format 2	GMA Format 2	For GMA
	OFF	OFF	When not connected
RS232 5	OFF	OFF	GTN 750 Only
RS232 6	OFF	OFF	
More RS-232 Setup	Disable Forward ALT to GTX		For Garmin GTX 345
	No Action		When not connected

HSDB (Ethernet) Configuration Page		Notes
Ethernet Port 1	Not Connected	
Ethernet Port 2	Not Connected	
Ethernet Port 3	Connected	For Garmin GTX 345
	Not Connected	When not connected
Ethernet Port 4	Not Connected	

Interfaced Equipment Page			Notes
Unit	Present	Type	
Cross-Side Nav	Not Present	---	
GDL 69/69A	Not Present	---	
GDL 88	Not Present	---	
ADS-B In Source	Present	GTX #1	For Garmin GTX 345
	Not Present	---	When not connected
GDU #1	Not Present	---	
GDU #2	Not Present	---	
GDU #3	Not Present	---	
Transponder #1	Present	GTX Mode S+	For Garmin GTX 345
	Not Present	---	When not connected
Transponder #2	Not Present	---	
GSR 56	Not Present	---	
GWX	Not Present	---	GTN 750 Only

Main Indicator (Analog) Configuration page		Notes
Calibrate OBS Resolver	Calibrate	Calibrate for CDI/Slaved Compass System
CDI Key	Enabled	
Selected Course For GPS	Allowed	
Selected Course For VOR/LOC	Allowed	
V-Flag State	Normal	

Lighting Configuration Page		Notes
Display	Keys	
Source: Lighting Bus 1	Source: Photocell	
Minimum Level: 5.00%	Minimum Level: 5.00%	

Photocell Configuration Page			Notes
Response Time: 2sec	Slope: 50	Offset: 50	Adjust Offset to match/sync to other installed equipment
	Key Backlight Cutoff: 80%	Photocell Transition: 10%	

Lighting Bus Configuration Page			Notes
Lighting Bus 1: 28V DC			
Response Time: 0sec	Slope: 15	Offset: 15	Adjust Offset to match/sync to other installed equipment
Lighting Bus 2: 28V DC			
Response Time: 2sec	Slope: 50	Offset: 50	Lighting Bus 2 not applicable

Audio Configuration Page	Notes
Alert Volume: 50%	Adjust per customer requirement

Voice Command Configuration Page			Notes
	Voice Commands		For GMA Voice Commands, otherwise disable all. Disable all for EASA specified configuraiton. (Delivery to Europe)
"Say..." Commands		Mute Tone	

Traffic Configuration Page		Notes
Traffic Intruder Symbol Color	White	
GTN Control of Traffic System	Yes	

Figure 11-5. GTN 650/750 Configuration Set-Up
(P/N 4220639-1, P/N 4220639-5, or P/N 4220644-1; SW 6.41/SW 6.51)
Sheet 1 of 3 (Ref. 4192539-9 Rev. H)

Main System Configuration Page		Notes
Airframe Type	Rotorcraft	
Air/Ground Threshold	10KT	
Air/Ground Discrete	Active for Ground	
GPS Antenna Height Above Ground	5.6 feet	
Fuel Type	Jet A	
Synchro Heading Input	Not Connected	GTN 750 Only
GPS Select	Auto	
Heading Source Input	Connected	For Sandel SN3500 EHSI
	Not Connected	When not connected
Radio Altimeter Input	Not Connected	
Altitude Source Input	Connected	For Garmin GTX 345
	Not Connected	When not connected
Enhanced Lighting Mode	Disabled	
Pilot Positon	Left	GTN 750 Only
Crossfill Status Alert	Disabled	
System ID	GTN 1	
Database Sync	Pilot Control	
Airspace Labels	Enabled	
Checklist Page	Task List	
Blackout Mode	Disabled	

Com Configuration Page		Notes
Com Radio	Enabled	
RX Squelch Mode	Advanced	
Mic 1 Gain	+12db	Adjust per customer requirement
Sidetone Source	External	
Sidetone Volume	+60.0db	Adjust per customer requirement
Sidetone Pilot Control	Enabled	(SW 6.51 ONLY)

Advanced Com RX Squelch		Notes
25kHz		
Low	80%	
Mid	80%	
High	80%	
8.33kHz (SW 6.51 ONLY)		Adjust all per customer requirement
Low	80%	
Mid	80%	
High	80%	

Advanced Carrier Squelch		Notes
25kHz		(SW 6.51 ONLY)
Low	55%	
Mid	55%	
High	55%	Adjust all per customer requirement
8.33kHz		
Low	0%	
Mid	0%	
High	0%	

VOR/LOC/GS Configuration Page		Notes
Nav Radio	Enabled	
Selected Course	---	
Calibrate OBS Resolver		No action taken
ARINC 429 Speed RX	Low	
ARINC 429 Speed TX	Low	
SDI	VOR/ILS 1	
DME Mode		No action taken
DME Channel Mode		No action taken
LOC/GS Filtering	Disabled	(SW 6.51 ONLY)

ARINC 453/708 Configuration Page		Notes
Port 1	OFF	GTN 750 Only

Discrete Configuration Page	Notes
N/A	No action taken/Default

Navigation Features Configuration Page		Notes
Mark on Target	Disabled	
RF Procedure Legs	Disabled	

Vertical Navigation Configuration Page	Notes
	(SW 6.51 ONLY)

Vertical Navigation Type

VCALC	VNAV	
Transition to Approach	Transition Altitude **FL180**	VDI Scale **500 FT**

Ownship Configuration Page	Notes
Color Ownship	**The following settings can be modified per customer requirements unless noted otherwise**
 3-Blade Rotorcraft	

Terrain Configuration Page			Notes
Terrain Mode		**Alert Configuration** (SW 6.51)	(Applicable SW version where noted)
HTerrain Proximity	HTerrain Alerting (SW 6.51)	Audio Clips (SW 6.41/6.51)	
HTAWS		Alert Settings (SW 6.51)	
		Airport Criteria	
		Runway Surface **Any**	
		Minimum Length **0 FT**	

Figure 11-5. GTN 650/750 Configuration Set-Up
(P/N 4220639-1, P/N 4220639-5, or P/N 4220644-1; SW 6.41/SW 6.51)
Sheet 2 of 3 (Ref. 4192539-9 Rev. H)

Chart Configuration Page	Notes
Charts Configured: None / **FliteCharts** ▬ / ChartView	GTN 750 Only

Com Transmit Power Configuration Page	Notes
Com Transmit Power: **Normal** ▬ / 16W	

Weather Radar Configuration Page	Notes
N/A	GTN 750 Only, Not applicable at this time

Flight Simulator Configuration Page	Notes
N/A	Not applicable at this time

Search and Rescue Configuration Page	Notes
N/A	Not applicable at this time

External Systems - Audio Panel	Notes
Marker Beacon Display ▬	For GMA Marker Beacon Display, otherwise disable

System - SBAS Providers	Notes
WAAS ▬	WAAS provides SBAS service for North America and most of Central America
EGNOS	Switch to EGNOS prior to shipment per customer requirement (Europe) (SW 6.51 ONLY)
MSAS	Switch to MSAS prior to shipment per customer requirement (Japan)
GAGAN	Switch to GAGAN prior to shipment per customer requirement (India) (SW 6.51 ONLY)

System -GTX 345 FIS-B Weather	Notes
Enabled ▬	For Garmin GTX 345 FIS-B Weather, otherwise disable Disable prior to shipment per customer requirement (Typical for Non-U.S.)

System - Setup		Notes
CDI Scale	Auto	**The following settings can be modified per customer requirements unless noted otherwise**
ILS CDI Capture	Auto Switch	
Local Offset	Adjust to Local time	
Time Format	Local 12 hour	
Runway Surface	Any	
Runway Length	0 FT	
Include User Airports	Enabled	(SW 6.51 ONLY)
Com Channel Spacing	25.0 kHz	Switch to 8.33 kHz prior to shipment per customer requirement (Europe/Asia)
Reverse Frequency Lookup	Toggled On	(SW 6.51 ONLY)
Com Sidetone Control:		
Link to COM VOL	Toggled Off	
Offset	+0%	
Keyboad Format	ABC	(SW 6.51 ONLY)
Crossfill	Disabled	

System - Alerts		Notes
Arival	Active	**The following settings can be modified per customer requirements unless noted otherwise**
Proximity	3.0 NM	
Airspace Alerts	All Active	
Altitude Buffer	200 FT	

System - Units		Notes
Altitude/Verticle Speed	Feet (FT/FPM)	**The following settings can be modified per customer requirements unless noted otherwise**
Distance /Speed	Nautical Miles	
Fuel	Pounds (LB)	
Nav Angle	Magnetic (°)	
Magnetic Variation	N/A	
Position Format	LAT/LON	
Pressure	Inches of Mercury	
Temperature	Celsius (°)	

System - Audio		Notes
Click Volume	60%	**Setting can be modified per customer requirements unless**
HTAWS Alert Voice	N/A	Not applicable at this time
Voice Callout	N/A	Not applicable at this time

System - Backlight		Notes
Manual Offset	No Action	**Setting can be modified per customer requirements unless**

System - Connext Setup - GTX 345	Notes
Bluetooth ▬	For Garmin GTX 345 Bluetooth, otherwise disable

System - Voice Commands	Notes
Voice Commands ▬	For GMA Voice Commands, otherwise disable Disable all for EASA specified configuraiton. (Delivery to

Figure 11-5. GTN 650/750 Configuration Set-Up
(P/N 4220639-1, P/N 4220639-5, or P/N 4220644-1; SW 6.41/SW 6.51)
Sheet 3 of 3 (Ref. 4192539-9 Rev. H)

ARINC 429 Configuration Page			Notes
	Speed	Data	
ARINC 429 In 1	Low	OFF	
ARINC 429 In 2	Low	OFF	
ARINC 429 In 3	Low	OFF	GTN 750 Only
ARINC 429 In 4	Low	OFF	
ARINC 429 Out 1	Low	OFF	
ARINC 429 Out 2	Low	OFF	
ARINC 429 Out 3	Low	OFF	GTN 750 Only
ARINC 429 Out 4	Low	OFF	
SDI		LNAV 1	
		Common	

RS-232 Configuration Page			Notes
	Input	Output	
RS232 1	GTX Mode S+ #1	GTX Mode S+ #1	For Garmin GTX 345
	OFF	OFF	When not connected
RS232 2	Fuel Format 2	Aviation Output 1	For Shadin Miniflo
	OFF	OFF	When not connected
RS232 3	OFF	Aviation Output 1	For GTR/GNC
	OFF	OFF	When not connected
RS232 4	GMA Format 2	GMA Format 2	For GMA
	OFF	OFF	When not connected
RS232 5	OFF	OFF	GTN 750 Only
RS232 6	OFF	OFF	
More RS-232 Setup	Disable Forward ALT to GTX		For Garmin GTX 345
	No Action		When not connected

HSDB (Ethernet) Configuration Page		Notes
Ethernet Port 1	Not Connected	
Ethernet Port 2	Not Connected	
Ethernet Port 3	Connected	For Garmin GTX 345
	Not Connected	When not connected
Ethernet Port 4	Not Connected	

Interfaced Equipment Page			Notes
Unit	Present	Type	
Cross-Side Nav	Not Present	- - -	
GDL 69/69A	Not Present	- - -	
GDL 88	Not Present	- - -	
ADS-B In Source	Present	GTX #1	For Garmin GTX 345
	Not Present	- - -	When not connected
GDU #1	Not Present	- - -	
GDU #2	Not Present	- - -	
GDU #3	Not Present	- - -	
Transponder #1	Present	GTX Mode S+	For Garmin GTX 345
	Not Present	- - -	When not connected
Transponder #2	Not Present	- - -	
GSR 56	Not Present	- - -	
GWX	Not Present	- - -	GTN 750 Only

Main Indicator (Analog) Configuration page		Notes
Calibrate OBS Resolver	Calibrate	No Action Taken
CDI Key	Disabled	
Selected Course For GPS	Allowed	
Selected Course For VOR/LOC	Allowed	
V-Flag State	Normal	

Lighting Configuration Page		Notes
Display	Keys	
Source: Lighting Bus 1	Source: Photocell	
Minimum Level: 5.00%	Minimum Level: 5.00%	

Photocell Configuration Page			Notes
Response Time: 2sec	Slope: 50	Offset: 50	Adjust Offset to match/sync to other installed equipment
	Key Backlight Cutoff: 80%	Photocell Transition: 10%	

Lighting Bus Configuration Page			Notes
Lighting Bus 1: 28V DC			
Response Time: 0sec	Slope: 15	Offset: 15	Adjust Offset to match/sync to other installed equipment
Lighting Bus 2: 28V DC			
Response Time: 2sec	Slope: 50	Offset: 50	Lighting Bus 2 not applicable

Audio Configuration Page	Notes
Alert Volume: 50%	Adjust per customer requirement

Voice Command Configuration Page			Notes
	Voice Commands		For GMA Voice Commands, otherwise disable all.
"Say..." Commands		Mute Tone	Disable all for EASA specified configuraiton. (Delivery to Europe)

Traffic Configuration Page		Notes
Traffic Intruder Symbol Color	White	
GTN Control of Traffic System	Yes	

Figure 11-6. P/N 4220639-3 (Main SW 6.41/SW 6.51) Configuration Set-Up (Sheet 1 of 3) (Ref. 4192539-101 Rev. H)

Main System Configuration Page		Notes
Airframe Type	Rotorcraft	
Air/Ground Threshold	10KT	
Air/Ground Discrete	Active for Ground	
GPS Antenna Height Above Ground	5.6 feet	
Fuel Type	Jet A	
Synchro Heading Input	Not Connected	GTN 750 Only
GPS Select	Auto	
Heading Source Input	Not Connected	
Radio Altimeter Input	Not Connected	
Altitude Source Input	Connected	For Garmin GTX 345
	Not Connected	When not connected
Enhanced Lighting Mode	Disabled	
Pilot Positon	Left	GTN 750 Only
Crossfill Status Alert	Disabled	
System ID	GTN 1	
Database Sync	Pilot Control	
Airspace Labels	Enabled	
Checklist Page	Task List	
Blackout Mode	Disabled	

Com Configuration Page		Notes
Com Radio	Enabled	
RX Squelch Mode	Advanced	
Mic 1 Gain	+12db	Adjust per customer requirement
Sidetone Source	External	
Sidetone Volume	+60.0db	Adjust per customer requirement
Sidetone Pilot Control	Enabled	

Advanced Com RX Squelch		Notes
25kHz		
Low	80%	
Mid	80%	
High	80%	
8.33kHz		Adjust all per customer requirement
Low	80%	
Mid	80%	
High	80%	

Advanced Carrier Squelch		Notes
25kHz		
Low	55%	
Mid	55%	
High	55%	
8.33kHz		
Low	0%	
Mid	0%	
High	0%	

VOR/LOC/GS Configuration Page		Notes
Nav Radio	Disabled	
Selected Course	- - -	
Calibrate OBS Resolver		No action taken
ARINC 429 Speed RX	Low	
ARINC 429 Speed TX	Low	
SDI	VOR/ILS 1	
DME Mode		No action taken
DME Channel Mode		No action taken
LOC/GS Filtering	Disabled	

ARINC 453/708 Configuration Page		Notes
Port 1	OFF	GTN 750 Only

Discrete Configuration Page	Notes
N/A	No action taken/Default

Navigation Features Configuration Page		Notes
Mark on Target	Disabled	
RF Procedure Legs	Disabled	

Vertical Navigation Configuration Page	Notes

Vertical Navigation Type

VCALC	VNAV	
Transition to Approach	Transition Altitude	VDI Scale
	FL180	500 FT

Ownship Configuration Page	Notes
Color Ownship	The following settings can be modified per customer requirements unless noted otherwise
3-Blade Rotorcraft	

Terrain Configuration Page		Notes
Terrain Mode		Alert Configuration
HTerrain Proximity	HTerrain Alerting	Audio Clips
HTAWS		Alert Settings
		Airport Criteria
		Runway Surface: Any
		Minimum Length: 0 FT

Figure 11-6. P/N 4220639-3 (Main SW 6.41/SW 6.51) Configuration Set-Up
(Sheet 2 of 3) (Ref. 4192539-101 Rev. H)

Chart Configuration Page		Notes
Charts Configured	None **FliteCharts** ChartView	GTN 750 Only

Com Transmit Power Configuration Page		Notes
Com Transmit Power		
Normal	16W	

Weather Radar Configuration Page	Notes
N/A	GTN 750 Only, Not applicable at this time

Flight Simulator Configuration Page	Notes
N/A	Not applicable at this time

Search and Rescue Configuration Page	Notes
N/A	Not applicable at this time

External Systems - Audio Panel	Notes
Marker Beacon Display	Disable

System - SBAS Providers	Notes
WAAS	WAAS provides SBAS service for North America and most of Central America
EGNOS	Switch to EGNOS prior to shipment per customer requirement (Europe)
MSAS	Switch to MSAS prior to shipment per customer requirement (Japan)
GAGAN	Switch to GAGAN prior to shipment per customer requirement (India)

System -GTX 345 FIS-B Weather	Notes
Enabled	For Garmin GTX 345 FIS-B Weather, otherwise disable Disable prior to shipment per customer requirement (Typical for Non-U.S.)

System - Setup		Notes
CDI Scale	Auto	**The following settings can be modified per customer requirements unless noted otherwise**
ILS CDI Capture	Auto Switch	
Local Offset	Adjust to Local time	
Time Format	Local 12 hour	
Runway Surface	Any	
Runway Length	0 FT	
Include User Airports	Enabled	
Com Channel Spacing	25.0 kHz	Switch to 8.33 kHz prior to shipment per customer requirement (Europe/Asia)
Reverse Frequency Lookup	Toggled On	
Com Sidetone Control:		
Link to COM VOL	Toggled Off	
Offset	+0%	
Keyboad Format	ABC	
Crossfill	Disabled	

System - Alerts		Notes
Arival	Active	**The following settings can be modified per customer requirements unless noted otherwise**
Proximity	3.0 NM	
Airspace Alerts	All Active	
Altitude Buffer	200 FT	

System - Units		Notes
Altitude/Verticle Speed	Feet (FT/FPM)	
Distance /Speed	Nautical Miles	
Fuel	Pounds (LB)	**The following settings can be modified per customer requirements unless noted otherwise**
Nav Angle	Magnetic (°)	
Magnetic Variation	N/A	
Position Format	LAT/LON	
Pressure	Inches of Mercury	
Temperature	Celsius (°)	

System - Audio		Notes
Click Volume	60%	**Setting can be modified per customer requirements unless noted otherwise**
HTAWS Alert Voice	N/A	Not applicable at this time
Voice Callout	N/A	Not applicable at this time

System - Backlight		Notes
Manual Offset	No Action	**Setting can be modified per customer requirements unless noted otherwise**

System - Connext Setup - GTX 345	Notes
Bluetooth	For Garmin GTX 345 Bluetooth, otherwise disable

System - Voice Commands	Notes
Voice Commands	For GMA Voice Commands, otherwise disable Disable all for EASA specified configuraiton. (Delivery to Europe)

Figure 11-6. P/N 4220639-3 (Main SW 6.41/SW 6.51) Configuration Set-Up
(Sheet 3 of 3) (Ref. 4192539-101 Rev. H)

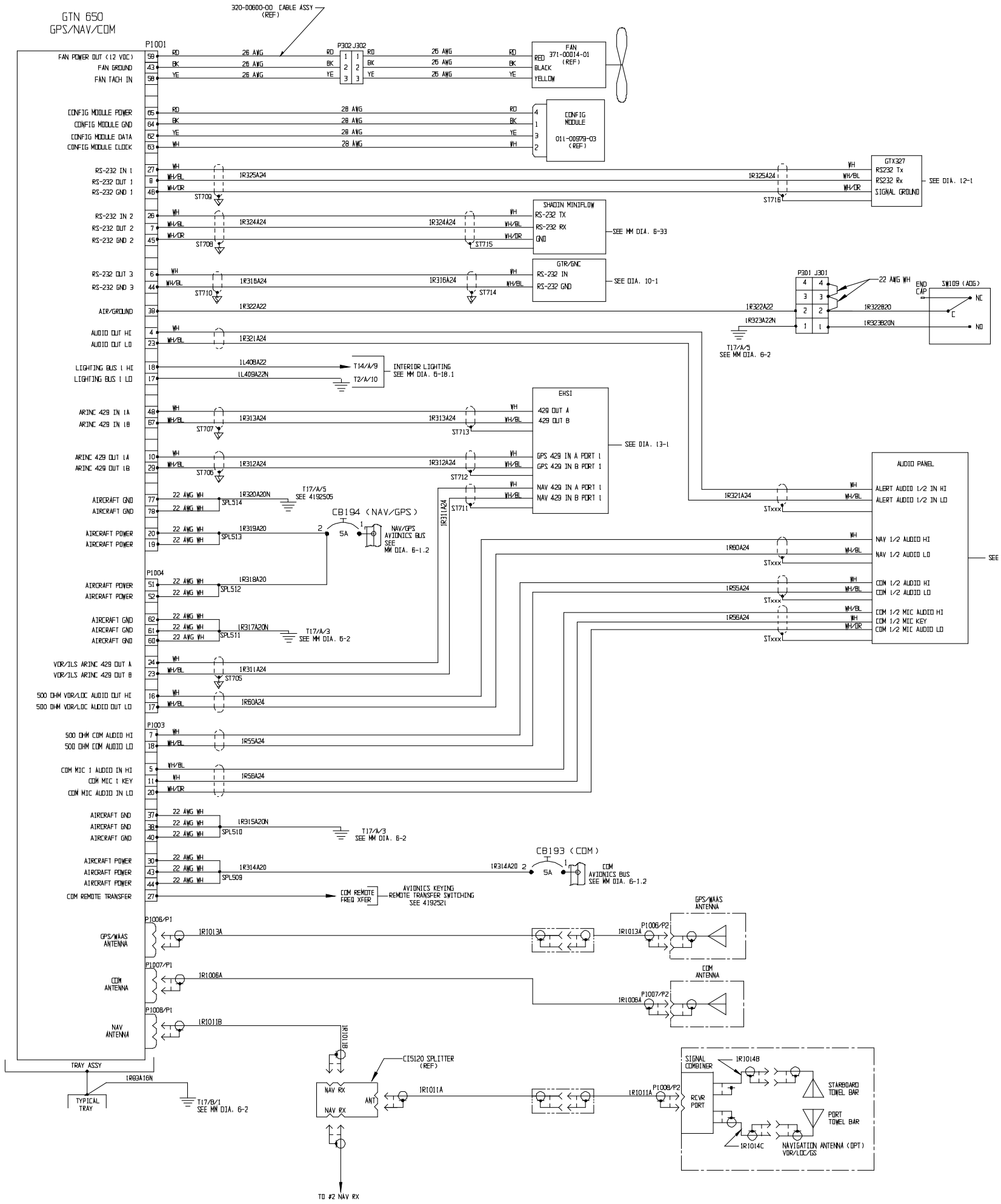
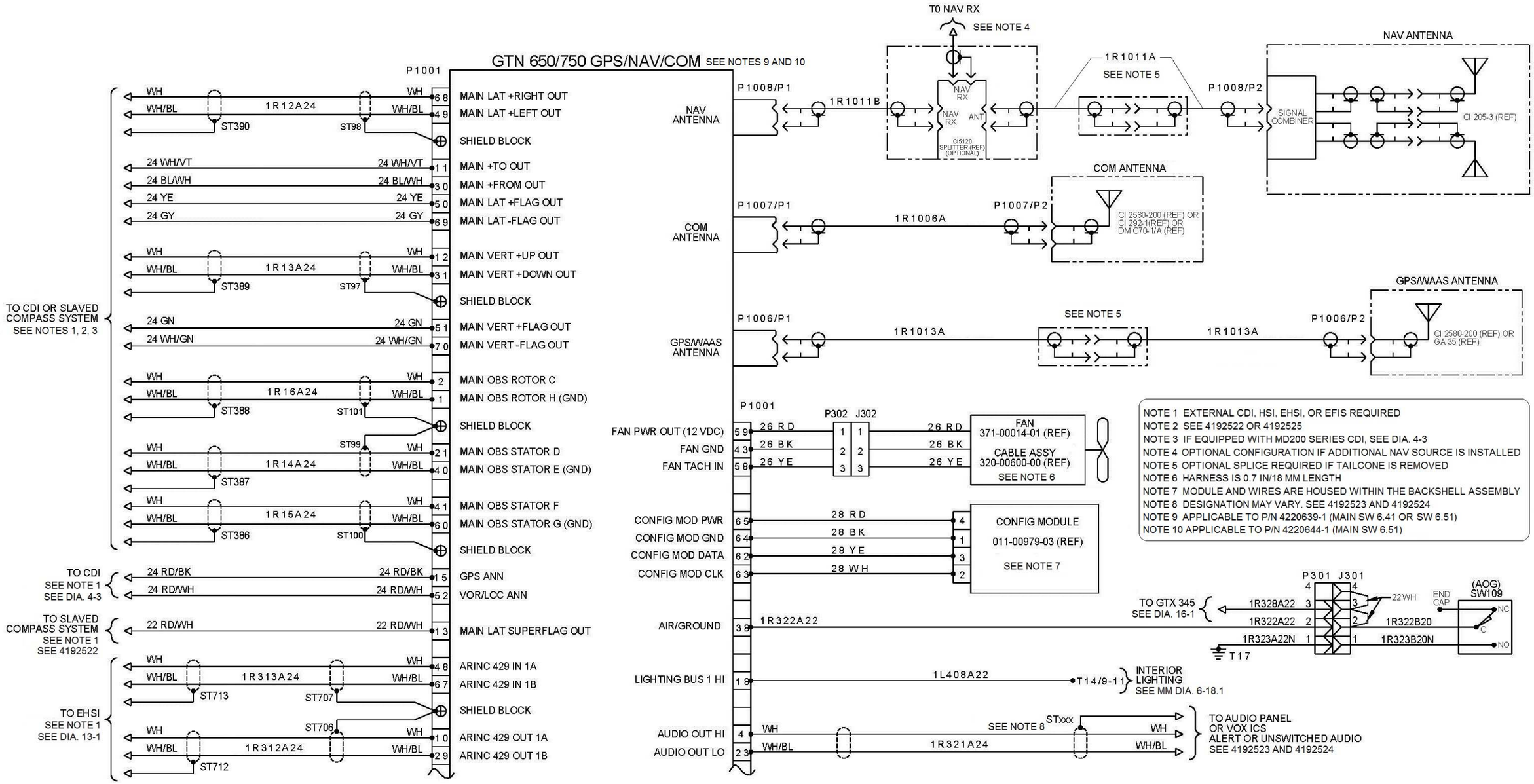


Diagram 11-1. GTN 650 P/N 4220639-1, Main SW 5.00
(Ref. 4192539-9 Rev. E)



(See Diagram 11-2, Sheet 2)

Diagram 11-2. GTN 650/750 Interface
(See NOTES 9 and 10)
Sheet 1 of 2 (Ref. 4192539-9 Rev. H)
Rev. 16, May 7/19

(See Diagram 11-2, Sheet 1)

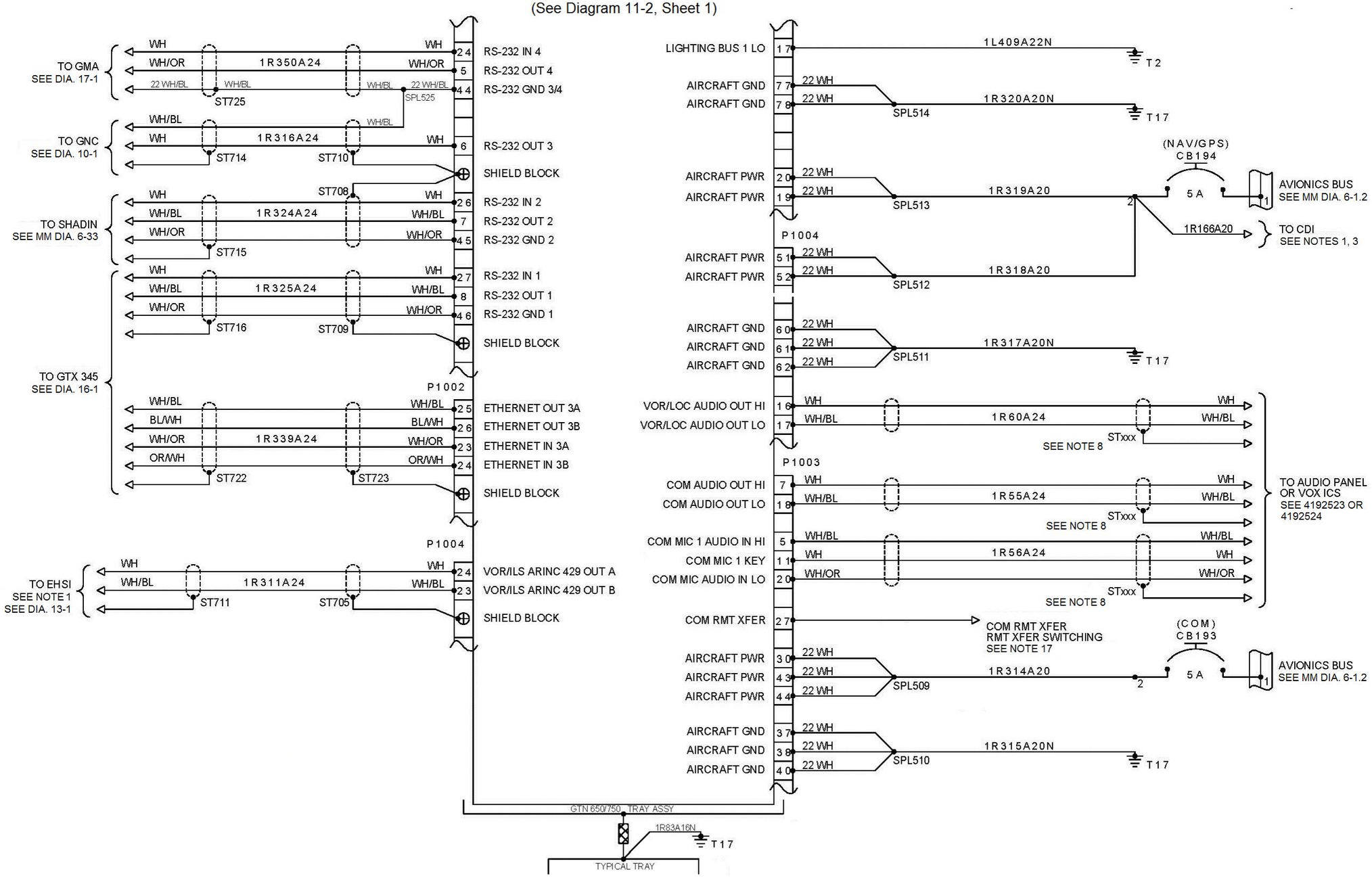


Diagram 11-2. GTN 650/750 Interface
(See NOTES 9 and 10)
Sheet 2 of 2 (Ref. 4192539-9 Rev. H)
Rev. 16, May 7/19

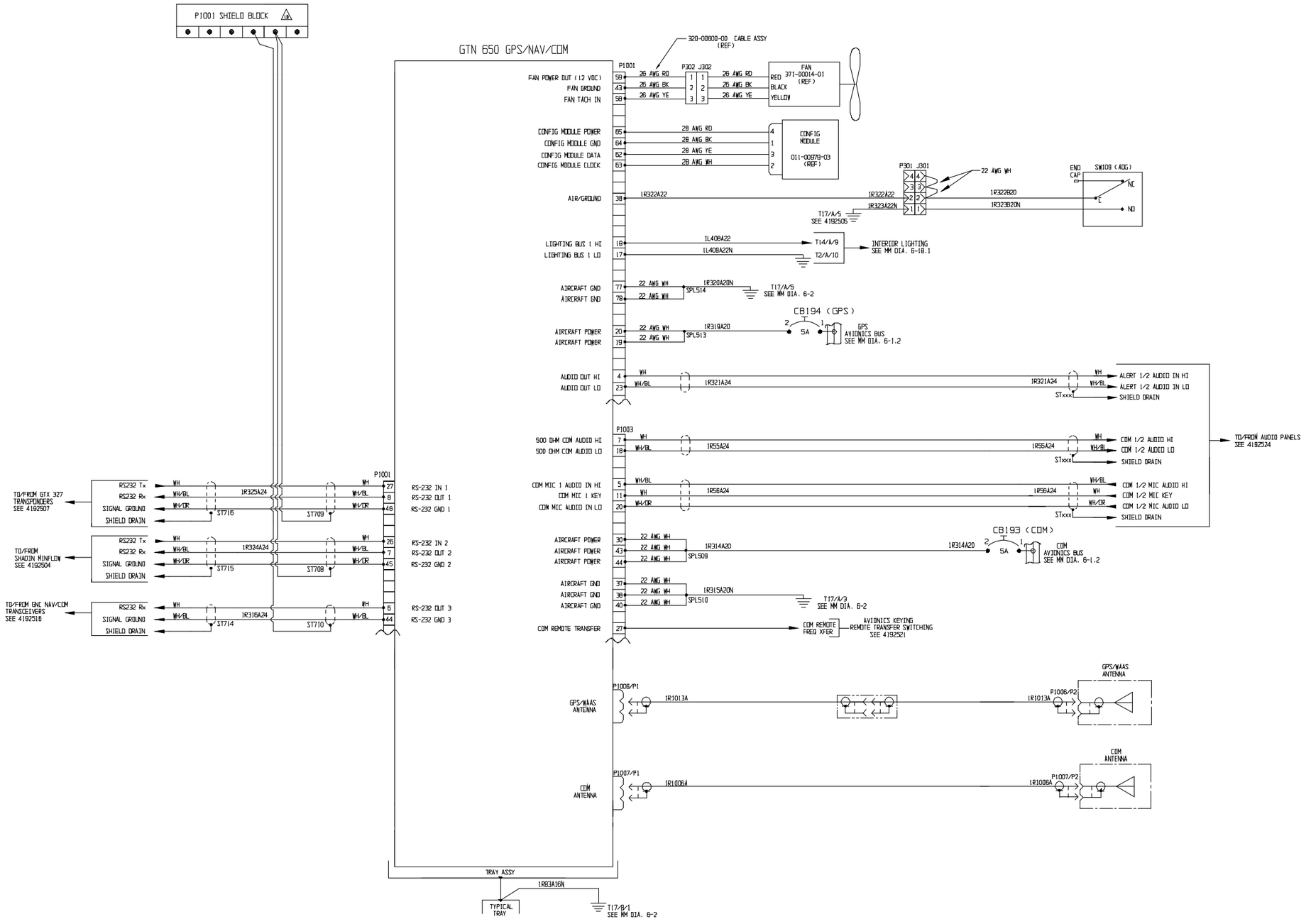


Diagram 11-3. GTN 650 P/N 4220639-3, Main SW 5.00
(Ref. 4192539-101 Rev. F)
Rev. 15, Aug 15/18
11-31/11-32 (Blank)

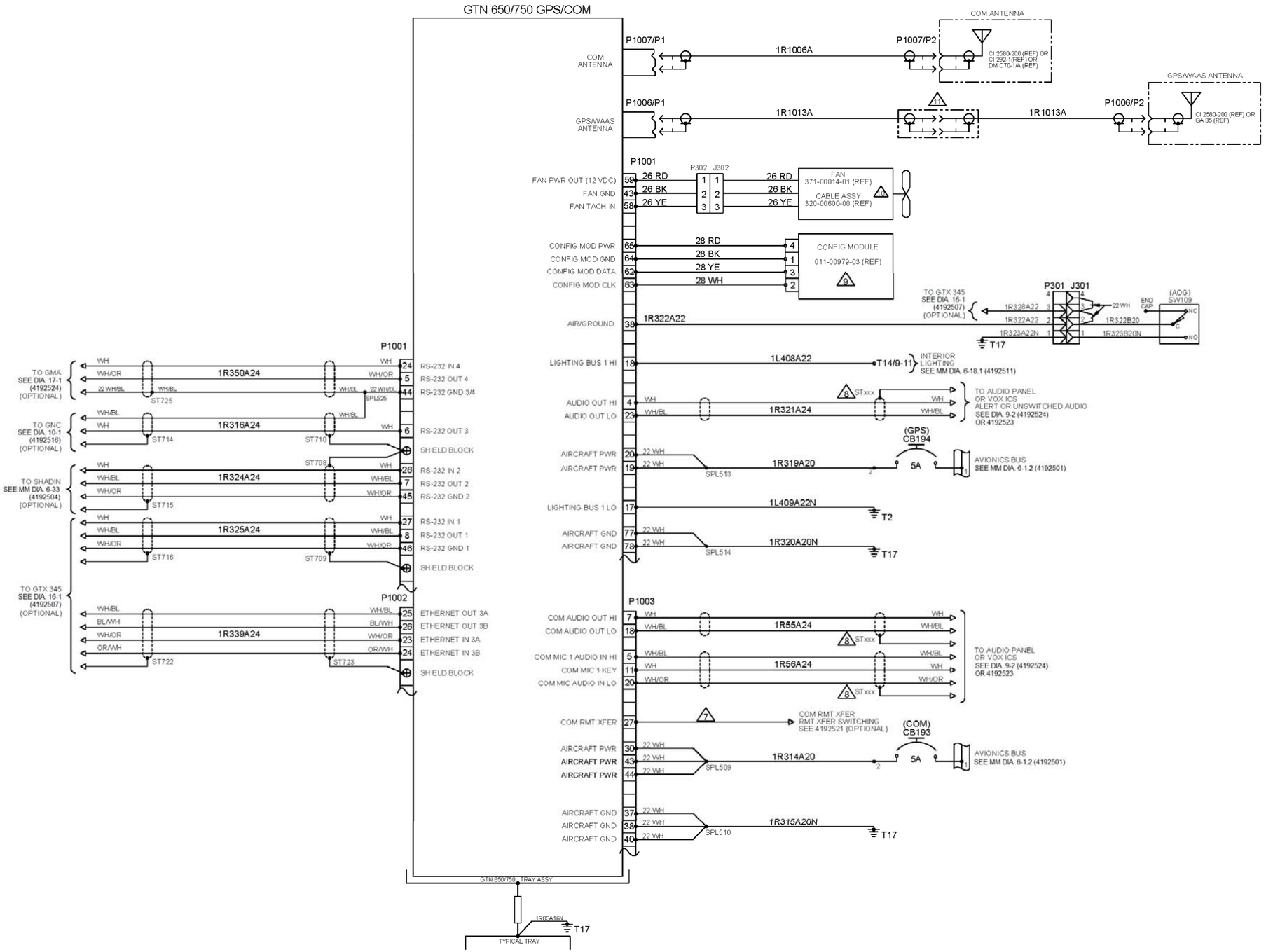


Diagram 11-4. GTN 650 (Main SW 6.41/SW 6.51)
(Ref. 4192539-101 Rev. H)
Rev. 18, Apr 30/2020
11-33/11-34 (Blank)

CHAPTER 12

GTX 327 TRANSPONDER

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The GTX 327 is a panel-mounted transponder with the addition of altitude reporting and timing functions. The transponder is a radio transmitter and receiver that operates on radar frequencies, receiving ground radar or TCAS interrogations at 1030 MHz and transmitting a coded response of pulses to ground-based radar on a frequency of 1090 MHz.

B. The GTX 327 installation part number is 4220512-1 (forward antenna location) or 4220512-5 (aft antenna location). The components of the GTX 327 installation include the panel mounted GTX 327 unit and antenna.

C. The GTX 327 installation may be configured with other compatible display units such as the GNS 430W/530W or the GTN 650. The GTN 650 can also be configured as the GTX 327 control head.

D. Power to the GTX 327 is provided via the **XPNDR** circuit breaker (CB38) (3 Amp) located on the left side of the center pedestal.

E. Refer to the 480B Rotorcraft Flight Manual Supplement 28-AC-065 for GTX 327 limitations and basic operation instructions.

1-2. Vendor Manuals

A. The following components listed in Table 12-1 are to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 12-1. Vendor Manuals

Component	Publication	Vendor
GTX 327	GTX 327 Installation Manual, Document No 190-00187-02, latest revision	Garmin International, Inc. 1200 East 151st Street Olathe, KS 66062 Tele: (913) 397-8200 Fax: (913) 397-8282 www.garmin.com
	GTX 327 Pilot's Guide, Document No. 190-00187-00, latest revision	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, this Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the GTX 327 are “on condition”.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The GTX 327 installation contains no user serviceable components or assemblies. Operations involving the removal of the GTX 327 must be done by authorized maintenance technicians.

3-2. Troubleshooting

A. Refer to the electrical schematic in Diagram 12-1 when troubleshooting the GTX 327 installation. If the unit fails to operate after troubleshooting efforts, contact Garmin aviation product support for assistance (ref. para. 1-2).

3-3. Periodic Inspections/Maintenance

A. The following inspection checklist is intended as a guide for 100 hour/annual inspections for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
GTX 327	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the antenna, electrical wiring and mounts for security, damage, and obvious defects.	
2. Inspect the GTX 327 unit and mount for security, damage, and obvious defects.	

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

4-1. GTX 327

NOTE

All work must be accomplished in accordance with the Enstrom TH-28/480 Series Maintenance Manual.

4-1-1. Cleaning

A. The front bezel, keypad, and display can be cleaned with a microfiber cloth or 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.

4-1-2. Removal

A. Remove power to the GTX 327 unit. Pull the **XPNDR** circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker stem.

B. Insert the 3/32-inch hex drive tool into access hole on the unit face. Turn the hex tool counterclockwise until the unit disengages from the rack.

C. Carefully pull the unit from the rack.

4-1-3. Installation

NOTE

Do not use excessive force when inserting the GTX 327 into the rack. This may damage the connectors, unit, and/or unit rack.

A. Looking at the bottom of the transponder, ensure the front lobe of the locking mechanism is in a vertical position. This can be accomplished by using a 3/32-inch hex drive tool through the face plate.

B. Slide the unit into the rack until the front lobe of the unit touches the rack.

C. Insert the 3/32-inch hex drive tool into access hole on the unit face. Turn the hex tool clockwise until the unit is secured in the rack. Do not overtighten the screw.

D. Remove the cable tie or other similar device from the **XPNDR** circuit breaker stem and push the stem in to set the circuit breaker.

4-1-4. Functional Check

A. If the unit is removed and reinstalled or is a replacement, a functional check of the equipment should be conducted in accordance with section 5 of the GTX 327 Installation Manual (para. 1-2).

B. Verify proper operation of the transponder by testing in accordance with Appendix F to 14 CFR Part 43 – ATC Transponder Tests and Inspections.

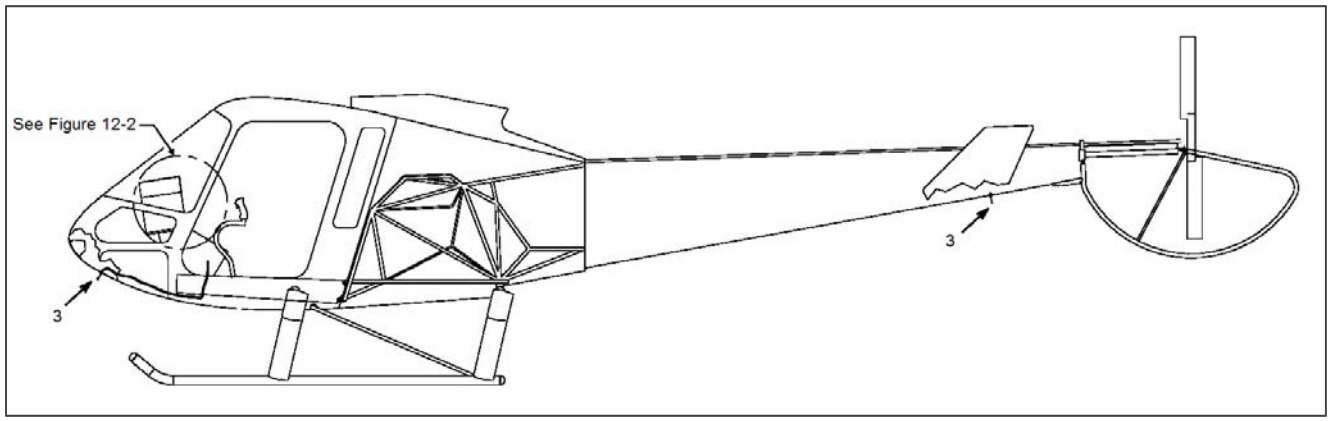
4-2. Wiring Harnesses/Connectors

A. Remove, inspect/repair, and install the airframe mounted wiring harnesses/ connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21. Refer to Diagram 12-1 for the GTX 327 wiring interface.

4-3. Figures and Diagrams

A. The GTX 327 installation is shown in Figure 12-1 and Figure 12-2.

B. The GTX 327 wiring interface is shown in Diagram 12-1.



Item	Part Number	Component	Quantity
-	4220512-1	GTX 327 Installation (forward Antenna)	REF
-	4220512-5	GTX 327 Installation (aft Antenna)	REF
1	010-00188-03	. GTX 327 Kit	1
2	7277-5-3	. Circuit Breaker	1
3	4220521-1	Antenna Installation (forward)	REF
3	4220521-3	Antenna Installation (aft, alternate)	REF
-	AV-22	. Antenna	1

Figure 12-1. GTX 327 Installation

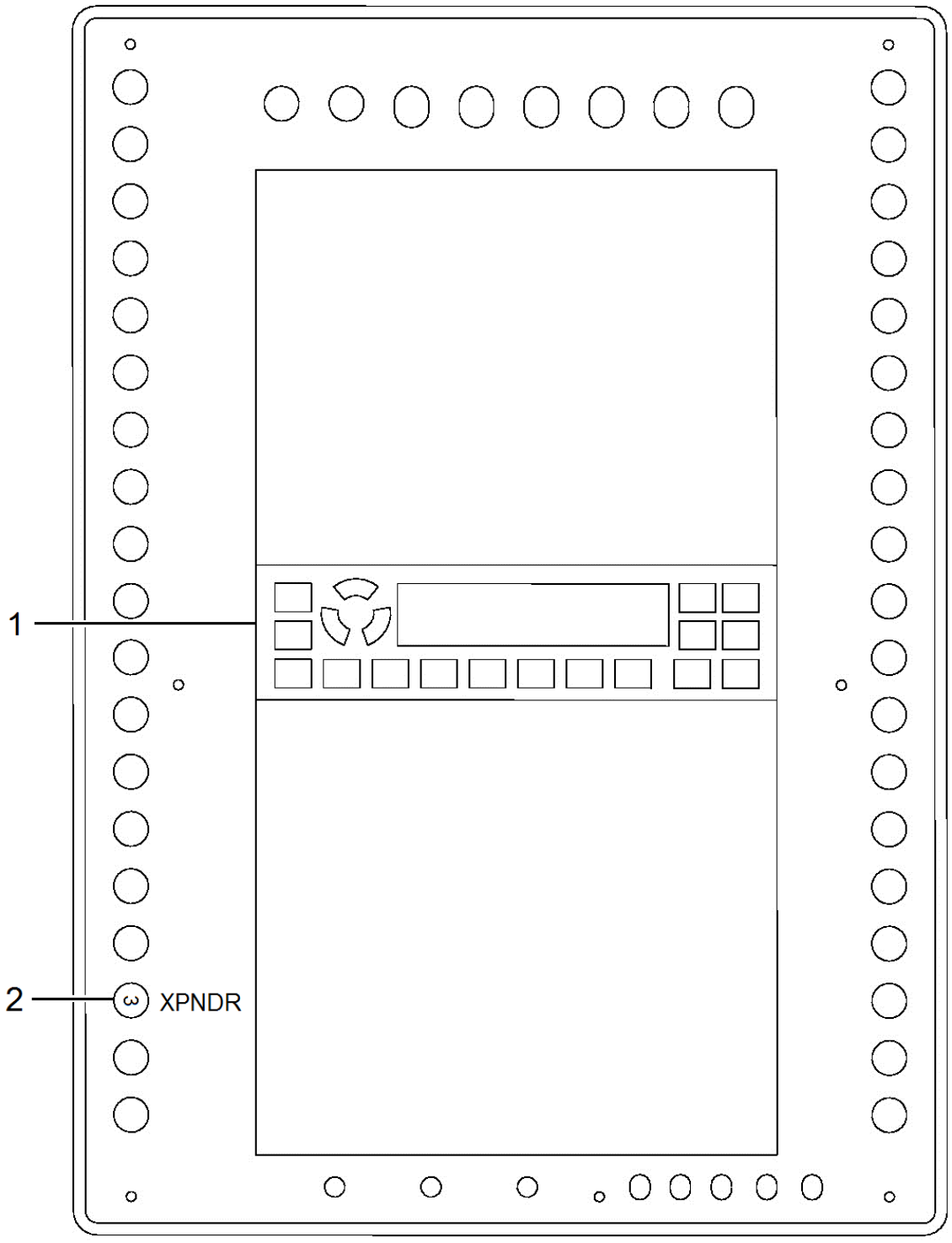


Figure 12-2. GTX 327 Installation

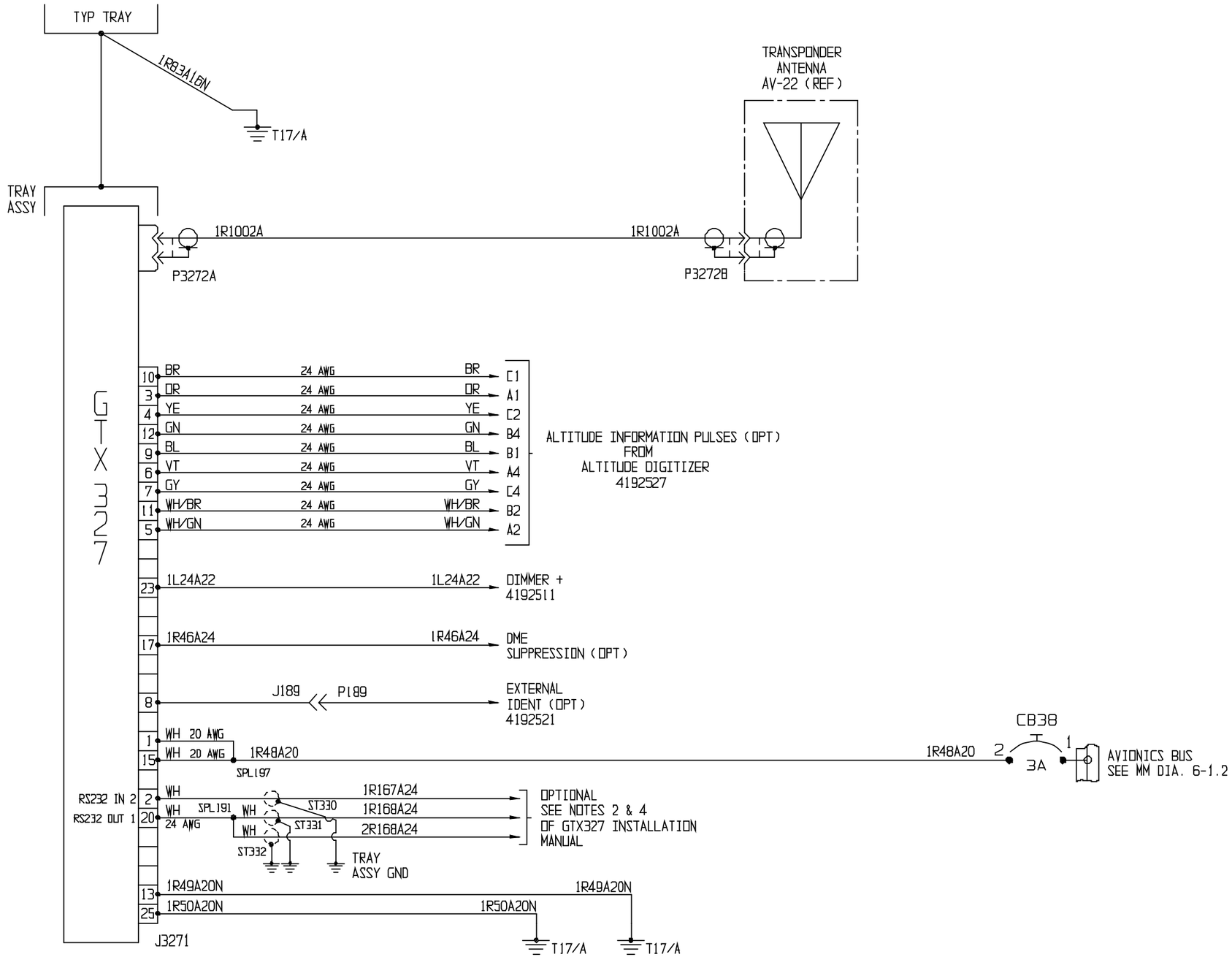


Diagram 12-1. GTX 327 Transponder, GNS 430W/530W Interface (Sheet 1 of 2)
(Ref. 4192507 Rev. G)
Nov 12/14, Rev. 11
12-7/12-8 (Blank)

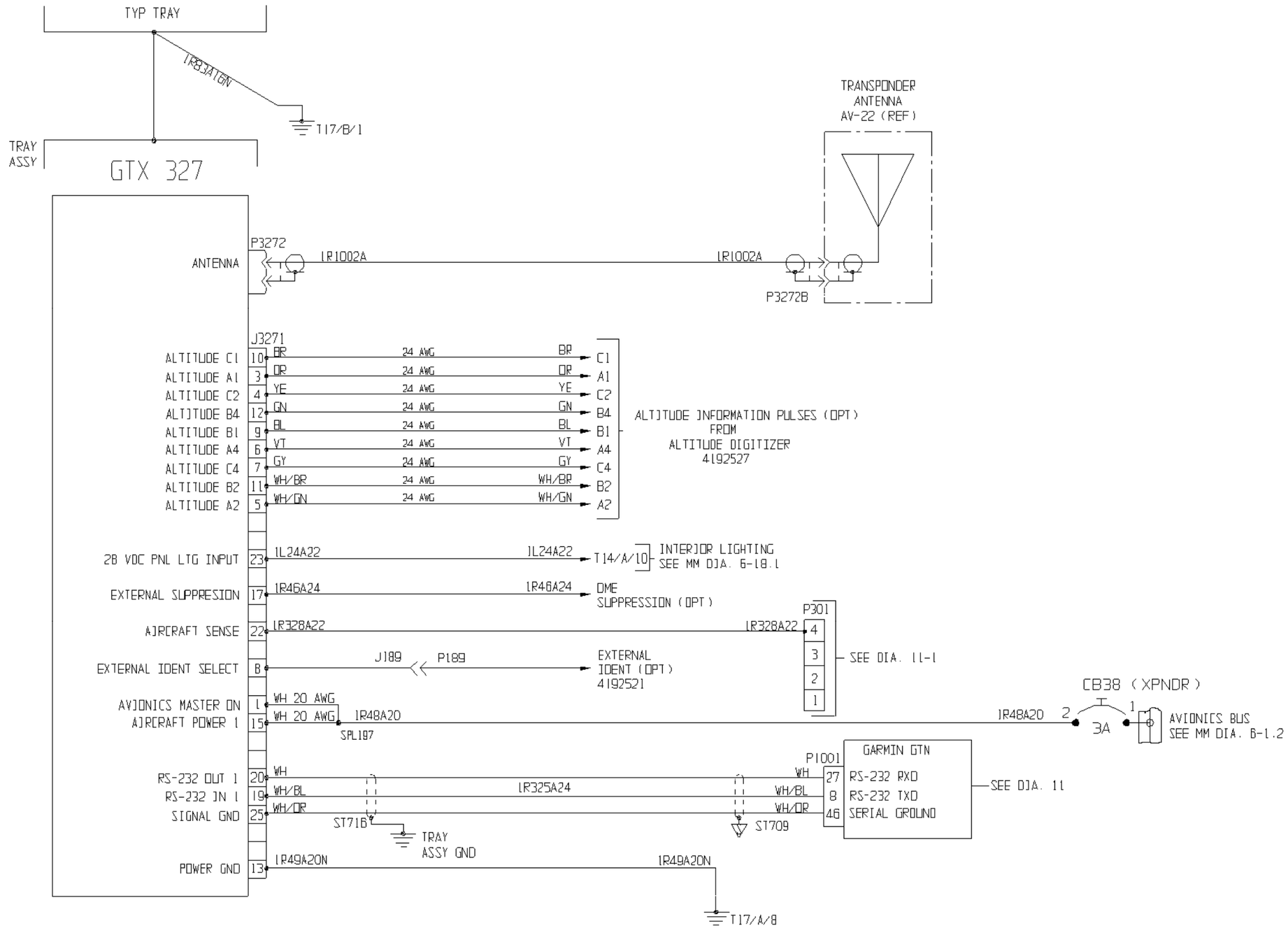


Diagram 12-1. GTX 327 Transponder, GTN Interface (Sheet 2 of 2)
(Ref. 4192507)
May 7/19, Rev. 16
12-9/12-10 (Blank)

CHAPTER 12

SANDEL SN3500 EHSI

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The Sandel SN3500 is an enhanced electronic horizontal situation indicator (EHSI). It also functions as a secondary attitude indicator when the LED annunciator switch labeled **ATTD IND** is activated. The SN3500 combines the functions of several electronic navigation sources into one unit. For this installation, the SN3500 is configured to display navigation information from a NAV/COM transceiver (VOR/LOC/GS) and an optional navigation receiver. Traffic, weather, ADF, DME, and FCS functions are not integrated into this installation.

B. The SN3500 installation (P/N 4220609-5 and P/N 4220609-7) includes the SN3500 EHSI and LED annunciator switch located on the instrument panel, the SG102 Attitude Heading Reference System (AHRS) located in the baggage box, the MT102 Magnetic Transducer Accessory (MTA) located in the tailcone, and associated wiring. The reversionary function is disabled for configuration P/N 4220609-7 (excluded components include the reversionary switch, day/night illuminated circuit breaker, and associated wiring connections).

C. Power to the EHSI system is provided via the **AHRS** circuit breaker (CB145) (5 Amp) and the **EHSI** circuit breaker (CB144) (5 Amp) located on the left side of the center pedestal. Illumination of the ATTD IND switch is powered by the DAY/NIGHT circuit breaker (CB143) (P/N 4220609-5 only).

D. Refer to the 480B Rotorcraft Flight Manual Supplement, 28-AC-049 Revision 1 (or later), and the current vendor operating manuals/instructions for operation of the EHSI system.

1-2. Vendor Publications

A. The Sandel EHSI installation is to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft. The applicable vendor manuals are listed in Table 13-1.

Table 13-1. Vendor Manuals

Component	Publication	Vendor
SN3500	Component Maintenance Manual, Document No. 82005-0133	Sandel Avionics, Inc. 2401 Dogwood Way Vista, CA 92081, USA Tel: (760) 727-4900 Fax: (760) 727-4899 www.sandel.com
	Installation Manual, Document No. 82005-IM	
	Pilot's Guide, Document No. 82005-PG	
SG102 and MT102	Installation Manual, Document No. 82011-IM	
	Installation/Calibration Utility Software Users Guide, Document No. 82011-ICUG	
	Pilot's Guide, Document No. 82011-PG	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, this Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the Sandel EHSI installation are “on condition”.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. Components of the EHSI installation contain no user serviceable components or assemblies. Operations involving the removal of the SN3500 or any other line-replaceable unit (LRU) installed as a part of the EHSI installation must be done by authorized maintenance technicians.

3-2. Troubleshooting

A. Refer to the schematic/interface diagrams in this supplement when troubleshooting problems with the EHSI installation. If any difficulty is experienced with the functionality or operational performance of the SN3500, contact Sandel Avionics for assistance.

3-3. Periodic Inspections

A. The following inspection checklist is intended as a guide for the 100 hour/annual inspection for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
SN3500 EHSI INSTALLATION	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the SN3500, electrical cables, and mounts for security, damage, and obvious defects.	
2. Inspect the SG102, electrical cables, and mounts for security, damage, and obvious defects.	
3. Inspect the MT102, electrical cables, and mounts for security, damage, and obvious defects.	
4. Inspect the LED annunciator switch, connections, and wiring harness for security, damage, and obvious defects.	

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

NOTE

All work must be accomplished in accordance with the Enstrom TH-28/480 Series Maintenance Manual.

4-1. SN3500 EHSI

4-1-1. Removal

A. Remove the SN3500 in accordance with paragraph 7-11 of the maintenance manual.

4-1-2. Inspection/Repair

A. Inspect the SN3500 in accordance with paragraph 7-12, steps A-D of the maintenance manual.

B. Inspect the condition of the SN3500 for corrosion. Inspect the pin receptacle connectors for deformity, corrosion, and recessed or bent pins. Clean corrosion and debris from the SN3500 and the receptacles in accordance with acceptable practices and methods.

C. Inspect the SN3500 for proper operation by performing an “Operational Flight Check Procedure/Report” in accordance with paragraph 11.3 of the SN3500 Installation Manual, document number 82005-IM.

D. Replace the SN3500 if it is damaged or fails to operate.

4-1-3. Installation

A. Install the SN3500 in accordance with paragraph 7-14, steps A-B of the maintenance manual.

B. A replacement SN3500 must be properly configured in accordance steps (1) through (16) below. Refer to Appendix A of the SN3500 Installation Manual, document number 82005-IM, for accessing the maintenance pages on the SN3500 display.

(1) Page 1, INDEX, requires no input.

(2) Configure Page 2, SYSTEM, with the following parameters:

Configuration Field	Set To	Comment
RMT SWITCH ANNUN	NO	
TCN DISCR OUT	NONE	
INSTALL POSITION	PLT ONLY	
HDG BUG COLOR	ORANGE	
LOC/GS POINTER	TRIANGLE	
AIRCRAFT IDENT		Enter 7 character aircraft identification

(3) Configure Page 3, COMPASS SYSTEM, with the following parameters:

Configuration Field	Set To	Comment
PINS	P3-6	Only active when ATT PIN is selected as ACTIVE L and cursor is pointed to ATT PIN
HEADING	429H	This is the Gyro input to the SN3500
ATT KEY		**DO NOT CHANGE ATT KEY**
ATT PIN	ACTIVE L	With ACTIVE L set then PINS (above) can be set to P3-6 with cursor pointed to ATT PIN
PTCH CAL		No action taken – default is 0.00
FLXGATE	NONE	

(4) Configure Page 4, ADF/TACAN/MKR, with the following parameters:

Configuration Field	Set To	Comment
ADF1	NONE	
ADF2	NONE	
TCN KEY	BLANK BY DEFAULT	
TCN1	NONE	
TCN2	NONE	
MARKERS	ACTIVE H	Marker Beacon input from GMA 350H
THOLD	003	003 = 3VDC

(5) Configure Page 5, NAV1/ILS1/DME1, with the following parameters:

Configuration Field	Set To	Comment
NAV	429 FR	I/O to GTN 650/750
CAL	(Will not be shown)	No action taken
ENRGZ	429	I/O to GTN 650/750
LOC DV	429	I/O to GTN 650/750
GAIN	(Will not be shown)	No action taken
GS DV	429	I/O to GTN 650/750
OBS CAL	0.0	No action taken
DME	NONE	

(6) Configure Page 6, NAV2/ILS2/DME2, with the following parameters:

Configuration Field	Set To	Comment
NAV	NONE	
ENEGZ	NONE	
LOC DV	NONE	
GS DV	NONE	
OBS CAL	0.0	No action taken
DME	NONE	

(7) Configure Page 7, GPS1, with the following parameters:

Configuration Field	Set To	Comment
ANNUN	SERIAL	I/O to GTN 650/750
LAT DV	SERIAL	I/O to GTN 650/750
VERT DV	SERIAL	I/O to GTN 650/750
VERT ENA	SERIAL	I/O to GTN 650/750
OBS CAL	0.0	No action taken
ARINC-429	429.0	I/O to GTN 650/750
APR ACTV	NONE	
"SELECT UNIT"	GTN (6XX/7XX)	I/O to GTN 650/750 - **Select this first**

(8) Configure Page 8, GPS2, with the following parameters:

Configuration Field	Set To	Comment
ANNUN	NONE	
LAT DV	NONE	
VERT DV	NONE	
VERT ENA	NONE	
OBS CAL	0.0	No action taken
APR ACTV	NONE	

(9) Configure Page 9, FCS, requires no input.

(10) Configure Page 10, OBS/RELAY/CDI, with the following parameters:

Configuration Field	Set To	Comment
OBS ROT	NORMAL	
BTSTRP	NONE	
MODE	MASTER	
SENSE	NONE	
NS GPS2	GPS2	No action taken
ILS LCK	DISABLE	
LAT DEV		No action taken
OFFSET		No action taken
VERT DV		No action taken
OFFSET		No action taken
FEEDBAK		No action taken
ROLL STR		No action taken - **Leave key code as is**

(11) Configure Page 11, WX-500, with the following parameters:

Configuration Field	Action / Set To	Comment
SOURCE	NONE	

(12) Configure Page 12, TRAFFIC, with the following parameters:

Configuration Field	Action / Set To	Comment
DATA LINK	NONE	
DLINK		**DO NOT CHANGE DLINK KEY**
TCAS KEY		**DO NOT CHANGE TCAS KEY**
TCAS MODEL		No action taken – TCAS model will not be displayed unless a TCAS KEY is installed

(13) Page 13, STATUS, requires no input.

(14) Configure Page 14, BRT/DATA BLK, with the following parameters:

Configuration Field	Action / Set To	Comment
SELECTION	EXTERNAL	
P1-26		No action taken, monitors bus voltage
Min Brt V Norm	15.0	Or adjust/sync to other installed equipment
DATA RECORD BLK		No action taken, factory use only

(15) Page 15, POWER, requires no input.

(16) Page 16, SOFTWARE CRC, requires no input.

C. Verify the installation and functional performance by completing the "Functional Ground Test Procedures/Report" and the "Operational Flight Check Procedures/Report" checkout procedures, which are provided in Appendix E of the SN3500 Installation Manual, document number 82005-IM.

4-1-4. Cleaning

A. Clean the front panel with a soft cloth dampened with clean water.

4-2. SG102 Attitude Heading Reference System

4-2-1. Removal

A. Ensure all electrical power is OFF.

B. Access the SG102 through the baggage box door.

C. Disconnect the electrical connectors.

D. Remove the safety wire from the mounting base clamp screws. Loosen the clamp screws so the SG102 is free to slide out of the rear hold-down of the mounting base.

E. Remove the SG102.

NOTE

The SG102 is mechanically and precisely aligned to the aircraft axis by means of a fixed mounting base. The mounting base is designed to allow removal and replacement of the SG102 without realignment. Removing the mounting base is not recommended.

F. If removal of the mounting base is necessary, remove the attachment hardware. Note the number and position of shims, as applicable.

4-2-2. Inspection

A. Inspect the condition and security of the mounting base. Inspect for loose, missing, or improperly installed hardware.

B. Inspect the condition of the SG102 for damage or corrosion. Inspect the pin receptacle connectors for deformity, corrosion, and recessed or bent pins. Clean corrosion and debris from the SG102 and the receptacles in accordance with acceptable practices and methods.

C. Inspect the SG102 for proper operation by performing a “Functional Ground Test Procedures/Report” in accordance with paragraph 13.1 of the SG102 Installation Manual, document number 82011-IM.

4-2-3. Repair

NOTE

The system calibration values are stored in the MT102. In the event of an SG102 replacement, the calibration data stays with the aircraft and therefore realignment of the SG102 is not required.

A. Replace the SG102 if it is damaged or fails to operate.

4-2-4. Installation

A. If required, install the mounting base. Ensure the number and position of shims in the correct location, as applicable. If any misalignment occurs during installation of the mounting base, the mounting base must be re-aligned in accordance with paragraph 3.7 of the SG102 Installation Manual, document number 82011-IM.

B. Slide the SG102 into the rear hold-down.

C. Tighten the clamp screws and safety wire.

D. Connect the electrical connections.

E. Verify the installation and functional performance by completing the “Functional Ground Test Procedures/Report” checkout procedure. This procedure is provided in Appendix E of the SG102 Installation Manual, document number 82011-IM. This procedure includes performing the compass calibration instructions in the SG102 Installation-Calibration Utility Software Users Guide, document number 82011-ICUG.

4-3. MT102 Magnetic Transducer Accessory

4-3-1. Removal

A. Ensure all electrical power is OFF.

B. Access the MT102 through the baggage box door and through the second bulkhead to Station 241. Remove the vented metal covers as required to gain access.

C. Disconnect the electrical connector.

D. Remove the mounting hardware. Note the number and location of shims, if installed.

E. Remove the MT102.

4-3-2. Inspection

A. Inspect the condition and security of the mounting bracket. Inspect for loose, missing, or improperly installed hardware.

B. Inspect the condition of the MT102 for damage or corrosion. Inspect the electrical connector for deformity, corrosion, and recessed or bent pins. Clean corrosion and debris from the MT102 and the connector in accordance with acceptable practices and methods.

C. Inspect the MT102 for proper operation by performing a “Functional Ground Test Procedures/Report” in accordance with paragraph 13.1 of the SG102 Installation Manual, document number 82011-IM.

4-3-3. Repair

A. Replace the MT102 if it is damaged or fails to operate.

4-3-4. Installation

NOTE

MT102 mounting hardware must be non-magnetic.

A. Install the MT102 with the mounting hardware. Ensure the alignment arrow on the top of the unit is pointed in the forward direction and aligns with the longitudinal axis of the aircraft.

B. Connect the electrical connector.

C. Install the covers if required.

D. Verify the installation and functional performance by completing the “Functional Ground Test Procedures/Report” checkout procedure. This procedure is provided in Appendix E of the SG102 Installation Manual, document number 82011-IM. This procedure includes performing the compass calibration instructions in the SG102 Installation-Calibration Utility Software Users Guide, document number 82011-ICUG.

4-4. LED Annunciator Switch (P/N 4220609-5 only)

4-4-1. Removal

A. Ensure electrical power is off.

B. Gain access to the back of the instrument panel (paragraph 7-3 of the maintenance manual).

C. Using Vivisun Tool 18-234, remove the electrical connector from the back of the switch.

D. Using Vivisun Tool 17-150, grasp the detents on the sides of the switch face and pull the front of the switch from the rest of the unit. Allow the front portion to hang on its hinge. Using a small screwdriver, unlock the retaining latches by turning the retaining screws. Slide the unit from the instrument panel and remove the retaining collar at the back of the instrument panel.

4-4-2. Inspection/Repair

A. Inspect the annunciator switch for failed LED circuits and security of installation. Replace the annunciator switch if it is damaged or fails to operate.

4-4-3. Installation

A. Install the annunciator switch into the instrument panel and install the retaining collar from behind the instrument panel.

B. Lock the retaining latches by tightening the retaining screws.

C. Push the front of the switch onto the unit.

D. Install the electrical connector.

E. Install the instrument panel covers (reversal of paragraph 7-3 of the maintenance manual).

4-5. Wiring Harnesses/Connectors

A. Remove, inspect/repair, and install the airframe mounted wiring harnesses/ connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21. Refer to Diagram 13-1 for the wiring interfaces.

4-6. Figures and Diagrams

A. The SN3500 system installation is shown in Figure 13-1. The SN3500 EHSI installation is shown in Figure 13-2. The SG102 AHRS installation is shown in Figure 13-3. The MT102 installation is shown in Figure 13-4.

B. The configuration wiring interfaces are shown in Diagram 13-1.

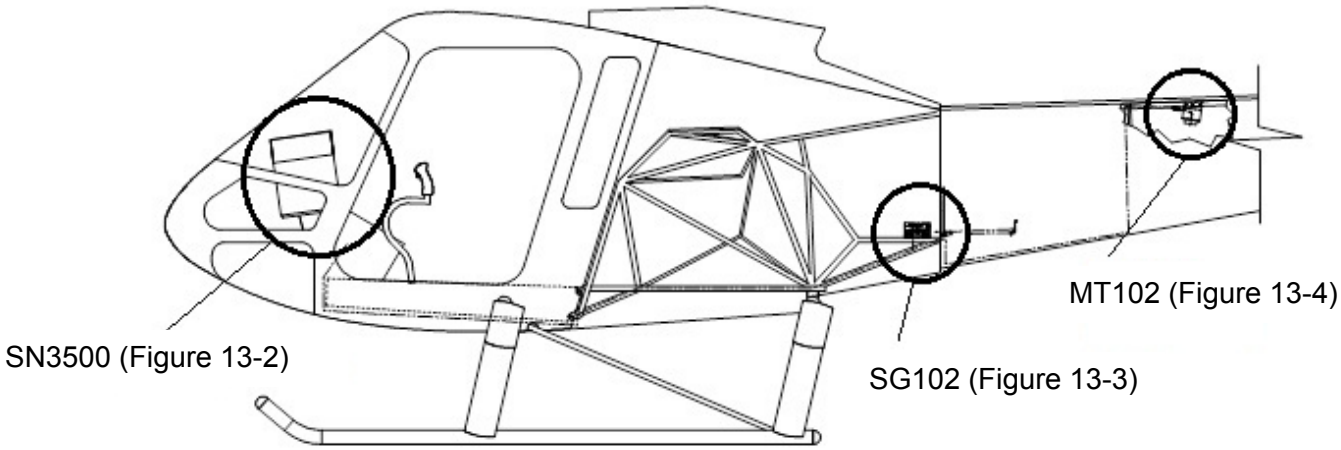


Figure 13-1. SN3500 System Installation

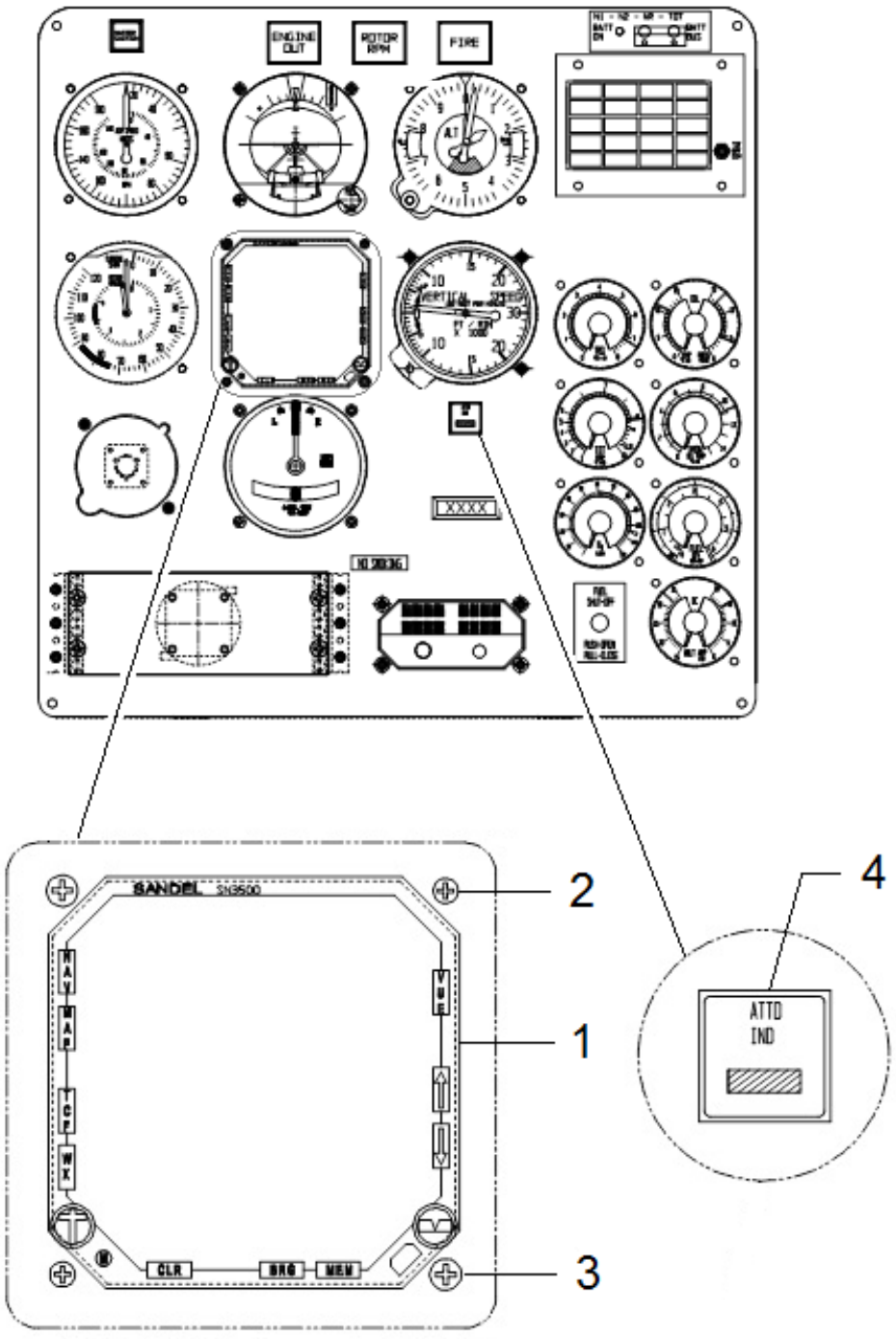
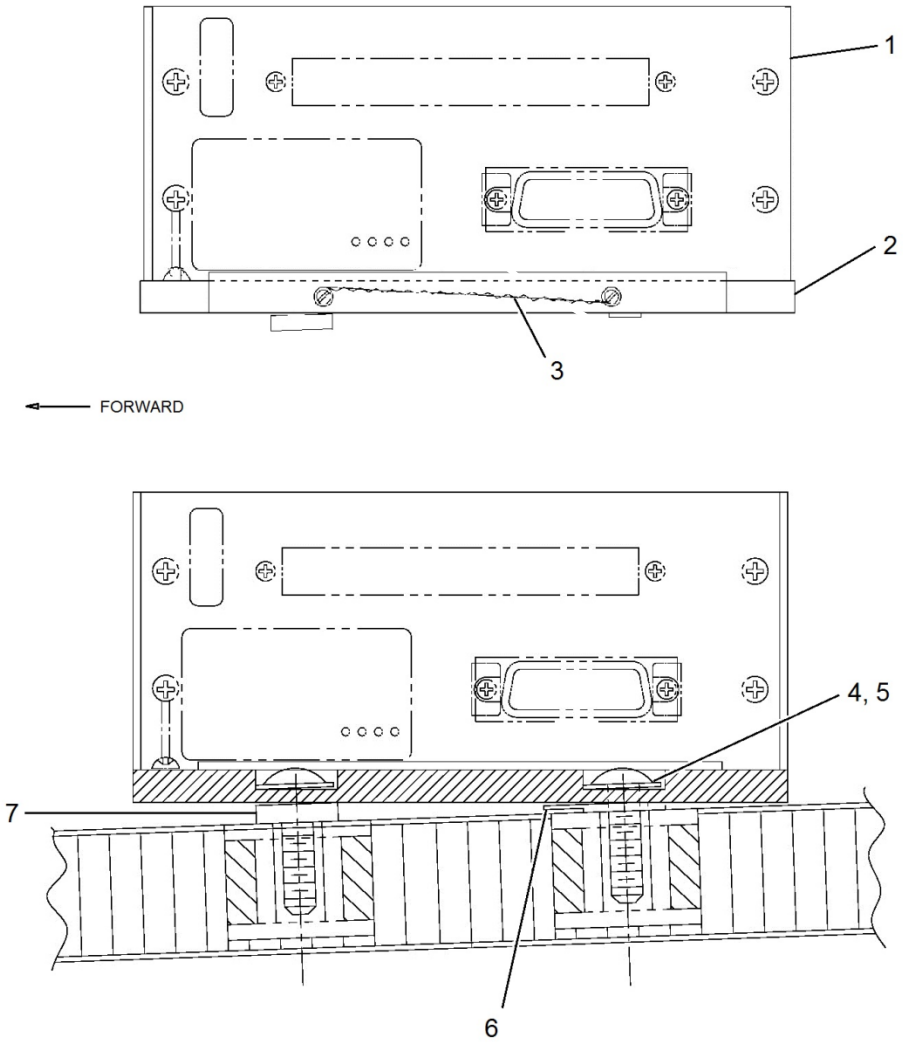


Figure 13-2. SN3500 EHSI Installation

Figure 13-2. SN3500 EHSI Installation

Item	Part Number	Component	Quantity
-	4220609-5	EHSI SN3500 Installation	REF
-	90143-IK	. SN3500 Installation Kit	REF
-	90143-ATT	. Reversionary Attitude Display	REF
-*	90143-ADB-AA	. Americas AIRNAV Database	A/R
-*	90143-ADB-EA	. Europe/Africa AIRNAV Database	A/R
-*	90143-ADB-AP	. Asia/Pacific AIRNAV Database	A/R
1	SN3500-004	. . EHSI SN3500-004 Black High Vibration (included with 90143-IK)	1
2	8-32x2	. . . Screw (one top/one bottom)	2
3	6-32x.75	. . . Screw (one top/one bottom)	2
4	LED-44-15-BA-E0WJE	. Push Button Switch/Annunciator (P/N 4220609-5 only)	1
-	7277-5-5	. Circuit Breaker (P/N 4220609-5 only)	2
-	18-258	. Panel Plug (P/N 4220609-7 only)	1
-	1684	. Hole Plug (P/N 4220609-7 only)	1

* Per customer requirements

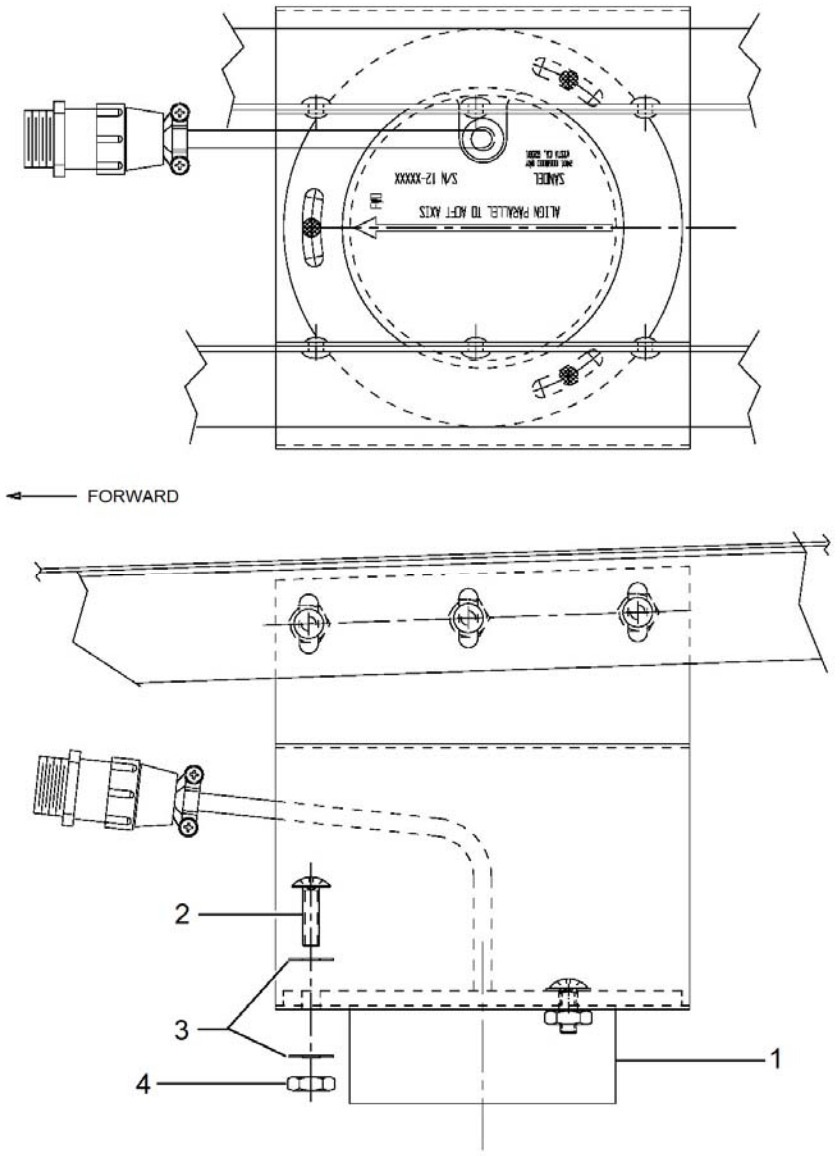


NOTE

Removal and reinstallation of the mounting base will affect the factory set alignment.

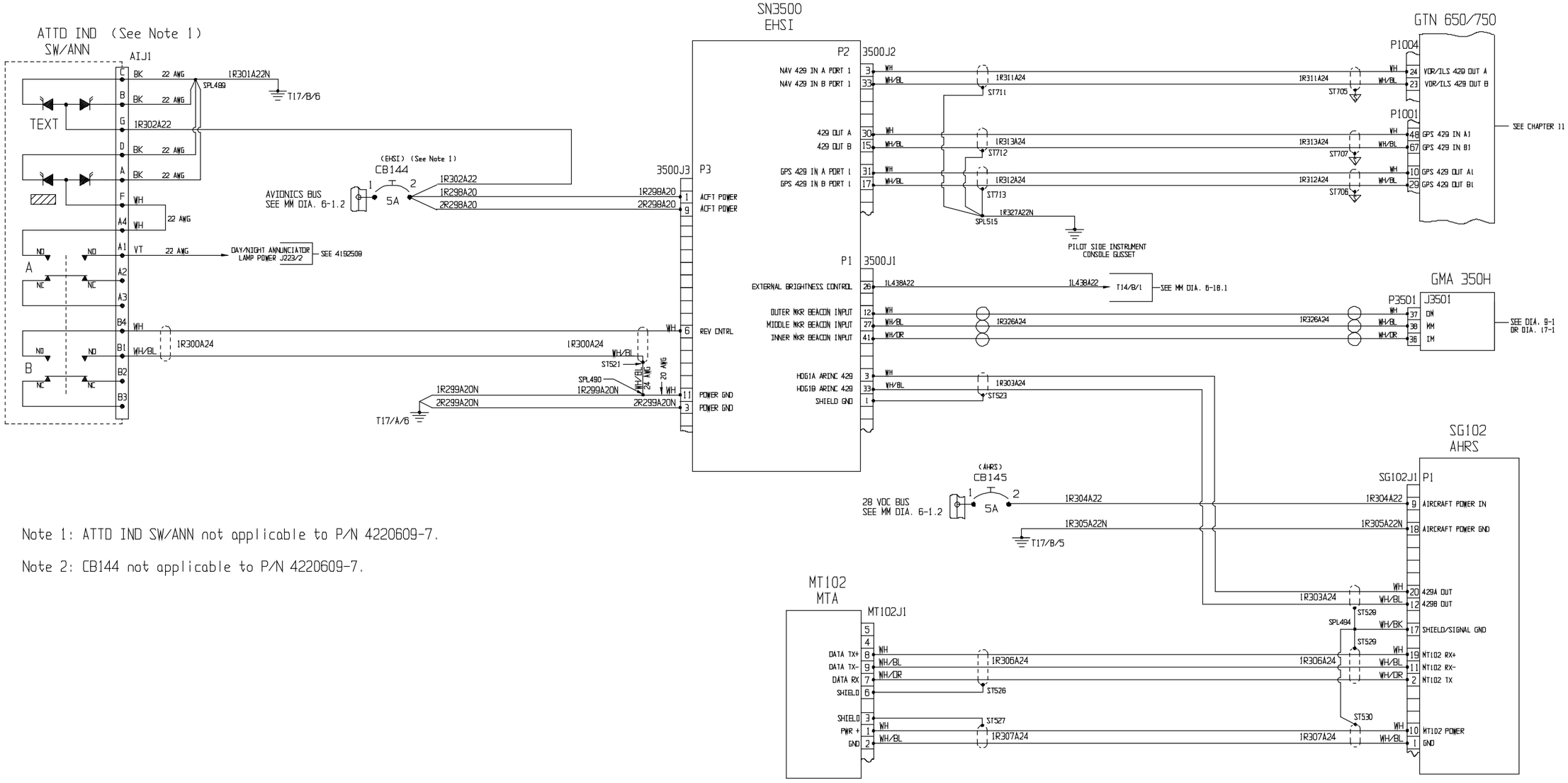
Item	Part Number	Component	Quantity
-	90224-C	AHRS SG102-200 and MT102-300 with Kit and Software	REF
-	90171-K01	. SG102-200 AHRS Installation Kit	REF
1	SG102-200	. AHRS (included with 90224-C)	1
2	84051	. . Mounting Base (included with 90171-K01)	1
3	MS20995C25	. . Safety Wire	A/R
4	MS27039-1-07	. . . Screw	4
5	60221	. . . Washer (included with 90171-K01)	4
6	61251	. . . Shim (included with 90171-K01)	A/R
7	4220609-11	. . . Shim (forward side only)	1

Figure 13-3. SG102 AHRS Installation



Item	Part Number	Component	Quantity
-	90224-C	AHRS SG102-200 and MT102-300 with Kit and Software	REF
-	90171-K01	. SG102-200 AHRS Installation Kit	REF
1	MT102-300	. Magnetic Transducer (included with 90224-C)	1
2	60222	. . Screw, 6-32 X .75 brass (included with 90171-K01)	3
3	60223	. . Washer (included with 90171-K01)	6
4	60224	. . Nut (included with 90171-K01)	3
-	F6NY-875NA	Clamp	2
-	AN515B8R8	. Screw	2
-	AN960B8	. Washer	4
-	MS35338-99	. Lock Washer	2
-	MS35649-286B	. Nut	2

Figure 13-4. MT102 Installation



Note 1: ATTD IND SW/ANN not applicable to P/N 4220609-7.

Note 2: CB144 not applicable to P/N 4220609-7.

Diagram 13-1. EHSI SN3500
(Ref. 4192561-3 Rev. B)
May 7/19, Rev. 16
13-17/13-18 (Blank)

CHAPTER 14

RA-4500 RADAR ALTIMETER

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. Enstrom P/N 4220517 provides for installation of the RA-4500 radar altimeter system. P/N 4220517-1, -3, and -5 installations consist of the radar altimeter receiver/transmitter, the RAD-40 radar altimeter display, and two antennas. P/N 4220517-3 and -5 installations include a tone generator to provide audio alerts via an interfaced audio panel. Also, P/N 4220517-5 provides a belly-mounted antenna installation. In comparison, the P/N 4220517-1 and -3 tailcone-mounted antennas allows compatibility when combined with optional float kit equipment.

B. Power to the radar altimeter system is provided via the **RA** circuit breaker (CB119) (3 amp) located on the lower left side of the center pedestal. Power to the **RAD-40** altimeter display is also controlled by switch (SW130), located on the lower side of the circuit breaker panel.

C. A **RA-4500 ZERO CAL** switch is mounted on the forward side of the aft fuel cell support bulkhead. The switch is set to OFF during normal operation. The switch is set to ON while performing calibration (ref. paragraph 4-1-3). A switch guard prevents inadvertent activation of the switch to ON during normal operation.

D. Refer to the 480B Rotorcraft Flight Manual Supplement, 28-AC-071 and the current vendor operating manuals/instructions for operation of the radar altimeter system.

1-2. Vendor Publications

A. The RA-4500 radar altimeter system is to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft. The applicable vendor manuals are listed in Table 14-1.

Table 14-1. Vendor Manuals

Component	Publication	Vendor
RA-4500	Equipment Installation Manual for FreeFlight Systems RA-4000 and RA-4500 Radar Altimeters, Document No. 84629	FreeFlight Systems 3700 Interstate 35 South Waco, TX 76706-3756 1 (254) 662-0000 1 (800) 487-4662
RAD-40	Operation/Installation Manual for FreeFlight Systems RAD-40 Radar Altimeter Display, Document No. 84948	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, this Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the RA-4500 installation are “on condition”.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. Components of the RA-4500 radar altimeter system contain no user serviceable components or assemblies. Operations involving the removal of the radar altimeter or any other line-replaceable unit (LRU) installed as a part of the radar altimeter installation must be done by authorized maintenance technicians.

3-2. Troubleshooting

A. Refer to the schematic/interface diagrams in this supplement when troubleshooting problems with the radar altimeter installation.

3-3. Periodic Inspections

A. The following inspection checklist is intended as a guide for the 100 hour/annual inspection for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
RA-4500 INSTALLATION	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the RA-4500, electrical cables, and mounts for security, damage, and obvious defects.	
2. Inspect the RAD-40, electrical cables, and mounts for security, damage, and obvious defects.	
3. Inspect the antenna, electrical cables, and mounts for security, damage, and obvious defects.	
4. Verify the switch guard is positioned down over the RA-4500 ZERO CAL on/off switch.	
5. Inspect the ATG-410 tone generator and electrical cables for security, damage, and obvious defects.	

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

NOTE

All work must be accomplished in accordance with the Enstrom TH-28/480 Series Maintenance Manual.

4-1. RA-4500 (See Figure 14-1)

4-1-1. Removal

A. Remove power to the RA-4500 system. Pull the **RA** circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker stem.

B. Remove the lower cowl assembly (TH-28/480 Series Maintenance Manual, para. 8-14, O).

C. Locate the unit installed in a mounting tray attached to the underside of the oil cooler shelf.

D. Disconnect the aircraft wiring harness and the two antenna cables from the unit.

E. Remove the safety wire from the knob.

F. Loosen the knob on the mounting tray. Support the bottom of the unit with one hand while pivoting the knob away (outboard) from the unit. When the knob is clear of the unit, slide the unit a small distance outboard to disengage the unit from the retaining flange on the mounting tray. Remove the unit.

4-1-2. Inspection/Repair

A. Replace the RA-4500 if it is damaged or fails to operate.

4-1-3. Installation

A. Install the RA-4500 unit into the mounting tray (antenna cable connections on the far side). (Reverse step 4-1-1.F.) Safety wire the knob to the mounting tray.

B. Connect the aircraft wiring harness and the antenna cables.

C. Reinstall the lower cowl assembly.

D. Remove the cable tie or other similar device from the **RA** circuit breaker stem and push the stem in to set the circuit breaker.

E. If servicing was performed or the installation is a replacement, perform the Altitude Zero Calibration procedure in accordance with the RA-4500 installation manual (paragraph 6.5.2).

NOTE

Paragraph 6.5.2, step 5 of the RA-4500 installation manual is accomplished by switching the RA-4500 ZERO CAL switch to ON.

1) Position the **RA-4500 ZERO CAL** switch to ON when performing altitude zero calibration.

2) When calibration is completed, position the **RA-4500 ZERO CAL** switch to OFF, and position the switch guard down.

F. Perform the Post-Installation Testing procedures in accordance with the RA-4500 installation manual (paragraph 6.6) (ref. Table 14-1).

4-2. RAD-40 (See Figure 14-1)

4-2-1. Removal

A. Remove the RAD-40 in accordance with TH-28/480 Series Maintenance Manual, paragraph 7-11.

4-2-2. Inspection/Repair

A. Inspect the RAD-40 in accordance with TH-28/480 Series Maintenance Manual, paragraph 7-12.

B. Replace the unit if the display is damaged or if the unit is found to be unserviceable.

4-2-3. Installation

A. Install the RAD-40 in accordance with TH-28/480 Series Maintenance Manual, paragraph 7-14.

B. Perform the Final Testing procedure in accordance with the RAD-40 operation/installation manual (paragraph 6.4.4) (ref. Table 14-1).

4-3. ATG-401 Tone Generator (See Figure 14-1, View G)

4-3-1. Removal

A. Remove power to the RA-4500 system. Pull the **RA** circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker stem.

B. Remove the pilot side keel access panel (TH-28/480 Series Maintenance Manual, para. 8-14, B).

C. Locate the unit installed to the forward side of the transverse keel bulkhead.

D. Disconnect the wiring.

E. Remove the four attachment screws and remove the tone generator.

4-3-2. Inspection/Repair

A. Replace the unit if the display is damaged or if the unit is found to be unserviceable.

4-1-3. Installation

A. Install the ATG-401 tone generator to the keel bulkhead.

B. Connect the wiring harness.

C. Remove the cable tie or other similar device from the **RA** circuit breaker stem and push the stem in to set the circuit breaker.

D. Adjust the potentiometers for an approximate three second 600 Hz tone. Adjust the volume level per customer requirement.

E. Reinstall the pilot side keel access panel (TH-28/480 Series Maintenance Manual, para. 8-17, B).

F. Remove the cable tie or other similar device from the **RA** circuit breaker stem and push the stem in to set the circuit breaker

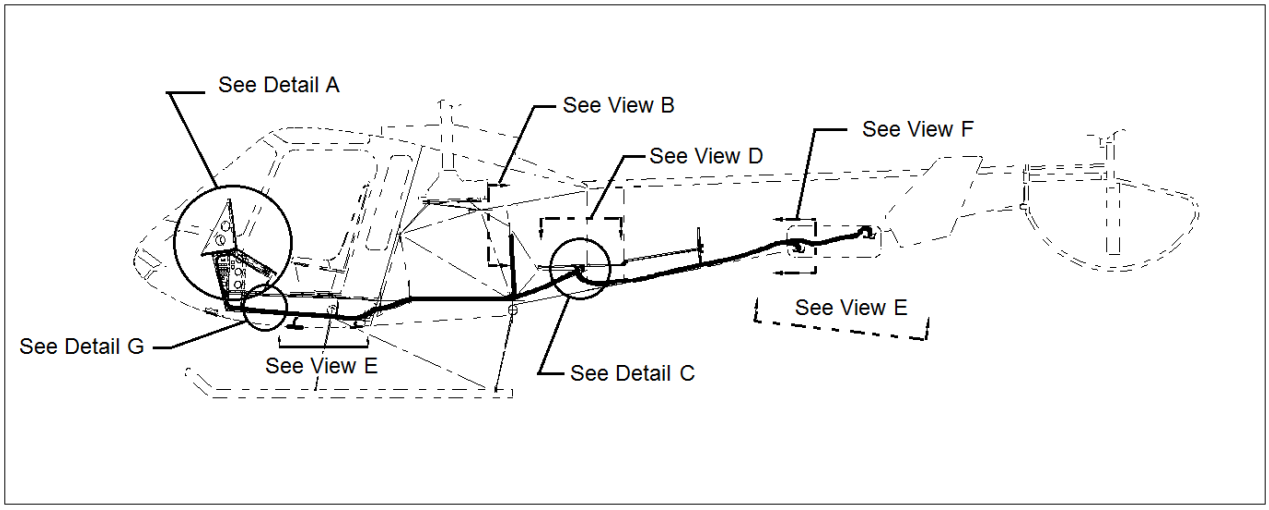
4-4. Wiring Harnesses/Connectors

A. Remove, inspect/repair, and install the airframe mounted wiring harnesses/ connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21.

4-5. Figures and Diagrams

A. The RA-4500 system installation is shown in Figure 14-1.

B. The configuration wiring interfaces are shown in Diagram 14-1 and Diagram 14-2.



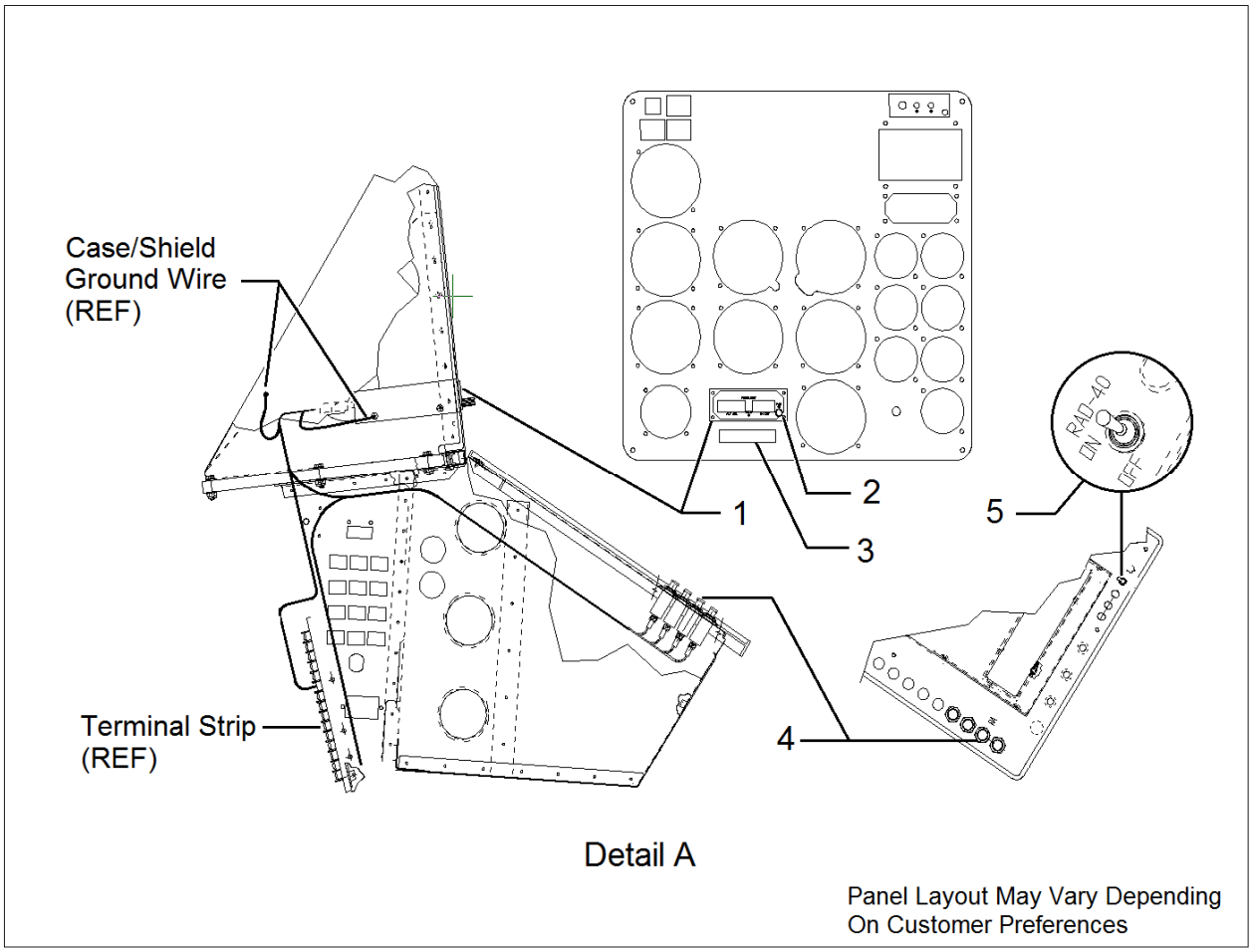


Figure 14-1. RA-4500 System Installation

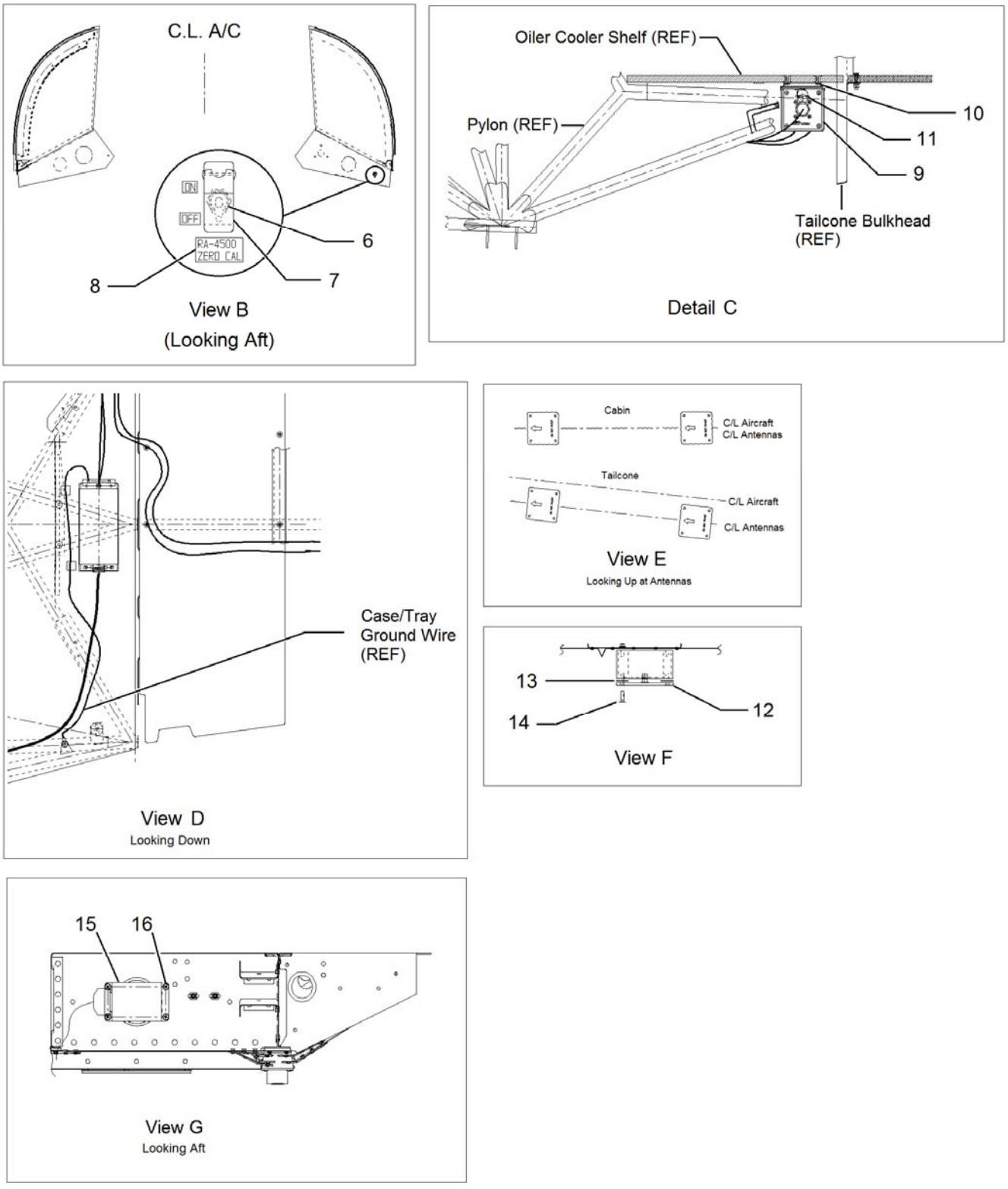


Figure 14-1. RA-4500 System Installation

Figure 14-1. RA-4500 System Installation

Item	Part Number	Component	Quantity
-	4220517-1	Radar Altimeter Installation	REF
-	4220517-3	Radar Altimeter Installation (With Tone Generator, Float Compatible)	REF
-	4220517-5	Radar Altimeter Installation (With Tone Generator)	REF
1	84939-00-0200	. Radar Altimeter Display (RAD-40)	1
2	MS35214-14	. . Screw	4
3	4119918-13	. Placard	1
4	7277-5-3	. Circuit Breaker (CB119)	1
-	MS51957-26	. . Screw	1
5	7101SYZQE	. Switch	1
6	MS24523-23	. Switch	1
7	MS25224-1	. Switch Guard	1
8	4119918-11	. Placard	1
9	84560-12-300A	. Radar Altimeter R/T Unit	1
10	84947-00	. Mounting Tray	1
-	MS27039-1-14	. . Screw (Far side)	2
-	MS27039-1-09	. . Screw (Near side)	2
-	NAS1149F0332P	. . Washer	4
11	MS20995C25	. Safety Wire	A/R
12	S67-2002	. Antenna (Sensor Systems)	2
13	S67-200222	. Conductive Gasket (Supplied with antenna)	2
14	MS24694S56	. . Screw	8
-	4196591-11	. Wedge, Aft (Used with 4220517-5)	1
-	4196591-13	. Wedge, Forward (Used with 4220517-5)	1
-	4196640-17	. Wedge, Aft	1
-	4196640-19	. Wedge, Forward	1
-	NK501-10-6	. . Screw	8
-	NAS1149F0332P	. . Washer	8
15	85601-00	. ATG-410 Tone Generator (Used with 4220517-3 and 4220517-5)	1
16	MS35206-244	. . Screw	4
-	NAS1149FN816P	. . Washer	4
-	NAS1149FN832P	. . Washer	4
-	MS21083N08	. . Nut	4

* Per customer requirements

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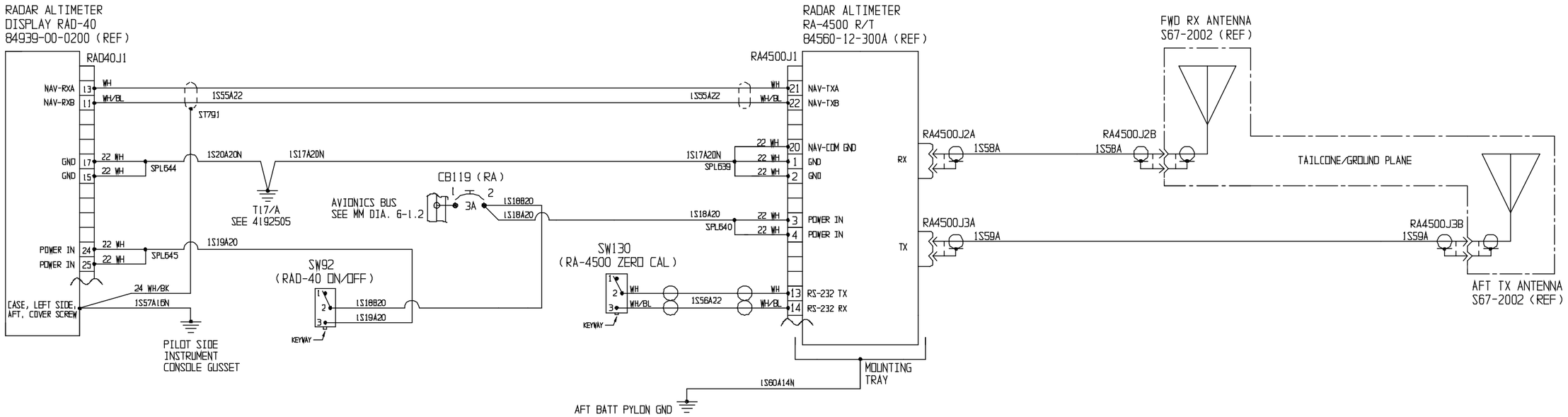

Diagram 14-1. RA-4500
(Ref. 4192536-7 Rev. C)
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14-11/14-12 (Blank)

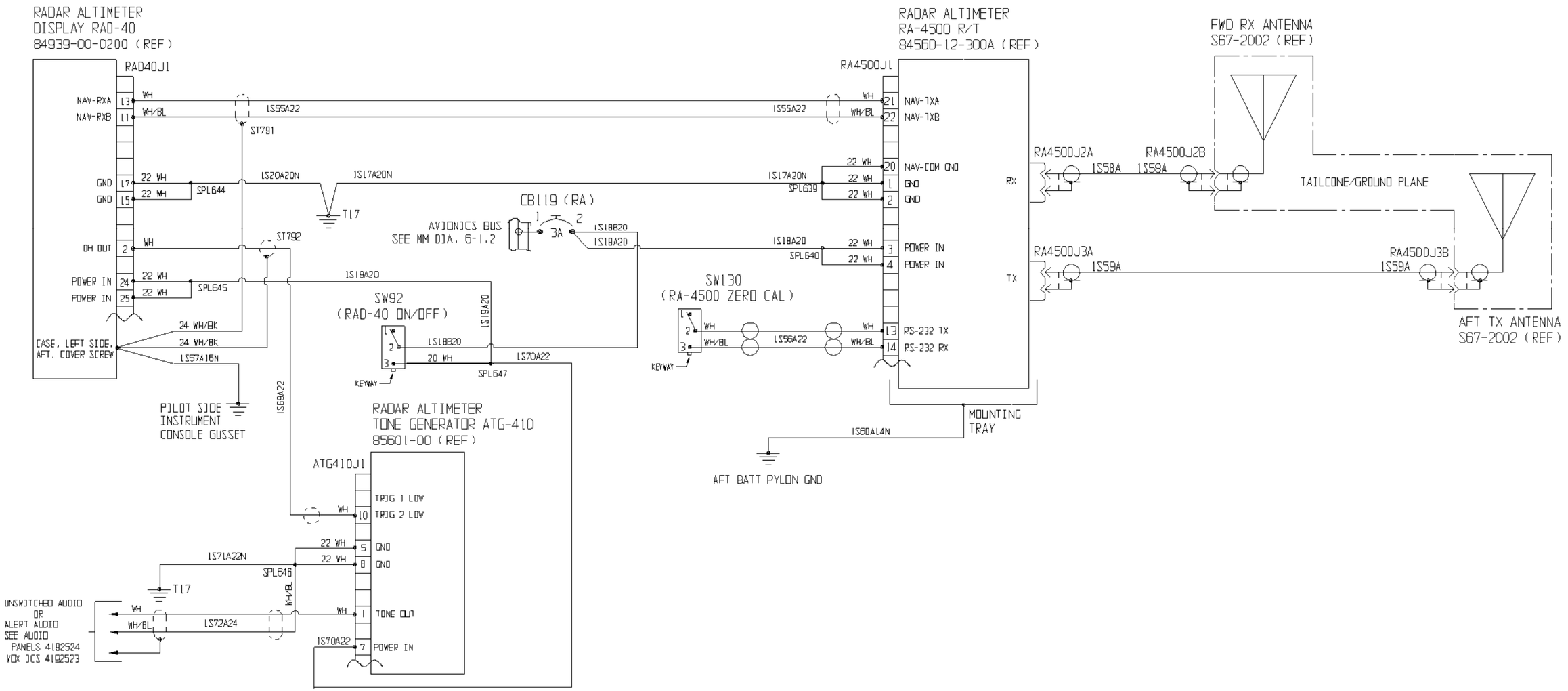


Diagram 14-2. RA-4500 with Audio Interface
(Ref. 4192536-9 Rev. D)
Dec 20/17, Rev. 14
14-13/14-14 (Blank)

CHAPTER 15

APPAREO SYSTEMS VISION 1000

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The Vision 1000 is a data gathering system utilizing data from GPS, image capturing, flight attitude acquisition, and ambient and pilot headset audio recording with the intent to aid flight safety and analysis. It will record the aircraft's airframe attitudes, rates, accelerations, GPS position and record cockpit audio and images. Data is recorded simultaneously to both the internal memory and an Appareo SD card.

B. The base Vision 1000 installation is part number 4220641-1, which can also be installed under P/N 4220641-5 or P/N 4220641-6. The -5 and -6 variants are configured to enclose the Vision 1000 installation within a compatible overhead dome light and shroud assembly installation.

C. Components of the installation include the Vision 1000 unit and GPS antenna. The Vision 1000 (0.5 lb) is mounted to the overhead console; the GPS antenna (0.15 lb) is mounted to the top of the instrument panel.

D. Power to the Vision 1000 is provided via the **VISION 1000** circuit breaker (1 Amp) located on the left side of the pedestal circuit breaker panel.

E. Refer to the 480B Rotorcraft Flight Manual Supplement 28-AC-067 for the Vision 1000 limitations and basic operation instructions.

1-2. Vendor Manuals

A. The following components listed in Table 15-1 are to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 15-1. Vendor Manuals

Component	Publication	Vendor
Vision 1000	Vision 1000 Installation Instructions, Manual Number 600840-000024, latest revision	Appareo Systems 1810 NDSU Research Circle North Fargo, ND 58102 USA Tel: +1 701-356-2200 E-mail: support@appareo.com Website: www.appareo.com
	Vision 1000 Instructions for Continued Airworthiness, Manual Number 600845-000019	
	Vision 1000 Configuration Tool User's Guide, Manual Number 600890-000004, latest revision	
	Vision 1000 Playback Utility User's Guide, Manual Number 600890-000006, latest revision	
	Vision 1000 Configuration Overview, Manual Number 600890-000009, latest revision	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, this Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the Vision 1000 are “on condition”.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The Vision 1000 installation contains no user serviceable components or assemblies. A defective Vision 1000 shall be sent to the address listed in Table 15-1. Operations involving the removal of the installation mount sub-assemblies or wiring must be done by authorized maintenance technicians.

B. Refer to the Vision 1000 Instructions for Continued Airworthiness, Section 10, for additional servicing requirements (reference Table 15-1).

3-2. Troubleshooting

A. Refer to the electrical schematic in Diagram 15-1 and the Vision 1000 Instructions for Continued Airworthiness, Section 10 (reference Table 15-1) when troubleshooting. If the unit fails to operate after troubleshooting efforts, contact Appareo Systems for assistance.

3-3. Periodic Inspections/Maintenance

A. Refer to the Vision 1000 Instructions for Continued Airworthiness, Section 3, for scheduled maintenance requirements (reference Table 15-1).

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

4-1. Vision 1000 Unit (Figure 15-1)

4-1-1. Removal

A. Remove aircraft power.

B. Pull the **VISION 1000** and **DOME LT** (if equipped) circuit breaker(s) out or remove the **DOME LIGHT** fuse (if equipped), as applicable. Disable the circuit breaker(s) by installing a cable tie or other similar device around the circuit breaker stem(s).

C. Remove the dome light assembly by removing the six attachment screws and disconnecting the wiring harness.

D. Disconnect the power harness (4).

E. Disconnect the GPS antenna cable (3).

F. Loosen the screw (12) that secures the clamping plate (14) to the Vision 1000.

G. Using a 5/16 wrench, remove main bolt (8) that attaches the Vision 1000 (2) to the mounting bracket (5). Remove the two washers (9), two spacers (10) and nut (11).

H. If required, remove two screws (6) and washers (7) that attach the camera bracket (5) to the airframe bracket.

4-1-2. Inspection

A. Inspect the Vision 1000 unit for damage or obvious defects.

B. Inspect the condition and security of the electrical wiring.

C. Inspect the condition and security of the GPS antenna and cable.

4-1-3. Installation

A. If required, attach the camera bracket to airframe bracket with screws (6) and washers (7). Torque to 36 in-lb.

B. Insert bolt (8) through washer (9), bracket (5), spacer (10), Vision 1000 (2), spacer (10), bracket (5), and washer (9) into nut (11). Torque the bolt and nut to 60 in-lb.

C. Hand tighten the clamping plate screw (12) to secure the clamping plate (14).

D. Place the dust cap, as required, over the E1 port on the Vision 1000.

E. Connect the power harness (4) to the Vision 1000 port labeled P1.

F. Connect the GPS cable (3) to the SMB connector on the top of the Vision 1000 unit.

G. Final configuration is required for a replacement installation. Refer to the Vision 1000 Installation Instructions, Section 5 (reference Table 15-1). Otherwise, proceed to step H.

H. Perform a functional test. (Functional tests should be executed in an area where the aircraft has unimpeded view of the sky, such that a proper GPS fix can be established.

(1) Ensure the Vision 1000 breaker is closed.

(2) Open the SD access door. (Push SD door latch to the side and swing card door open.)

(3) Insert SD card (1).

(4) Connect power to the aircraft.

(5) Observe LED status; Green LED should be on continuously.

a. If a solid Yellow LED is seen, ensure SD card is inserted and check GPS signal (allow 15 minutes for complete signal reception). Contact Appareo Systems if the problem persists.

b. If LED is Red, Contact Appareo Systems.

(6) Close the access door and latch shut

I. Connect the dome light assembly wiring harness.

J. Install the dome light assembly.

K. Remove the cable tie or other similar device from the **VISION 1000** and **DOME LT** (if equipped) circuit breaker stem(s) and push the stem in to set the circuit breaker(s). If required, install the **DOME LIGHT** fuse.

4-1-4. SD Card Replacement

A. SD card use should be limited to 500 flight hours. A replacement may be ordered from Appareo Systems. If the SD card were ever to become corrupt, it must be reformatted. Contact Appareo Systems for assistance.

4-2. GPS Antenna (Figure 15-1)

4-2-1. Removal

A. Remove the instrument console shroud.

B. Pull the **VISION 1000** and **DOME LT** (if equipped) circuit breaker(s) out or remove the **DOME LIGHT** fuse (if equipped), as applicable. Disable the circuit breaker(s) by installing a cable tie or other similar device around the circuit breaker stem(s).

C. Disconnect the GPS antenna cable.

D. Remove two screws that attach the GPS antenna to the doubler plate.

E. Pull the cable connection and grommet through the instrument panel and remove the GPS antenna.

4-2-2. Inspection

A. Inspect the GPS antenna for security and damage.

B. Inspect the wiring and connectors for security and damage.

4-2-3. Installation

A. Install the GPS to the instrument console.

B. Insert the cable connection through the hole in the shroud.

C. Press the grommet into place.

D. Connect the GPS cable.

E. Install the instrument console shroud.

4-3. Wiring Harnesses/Connectors

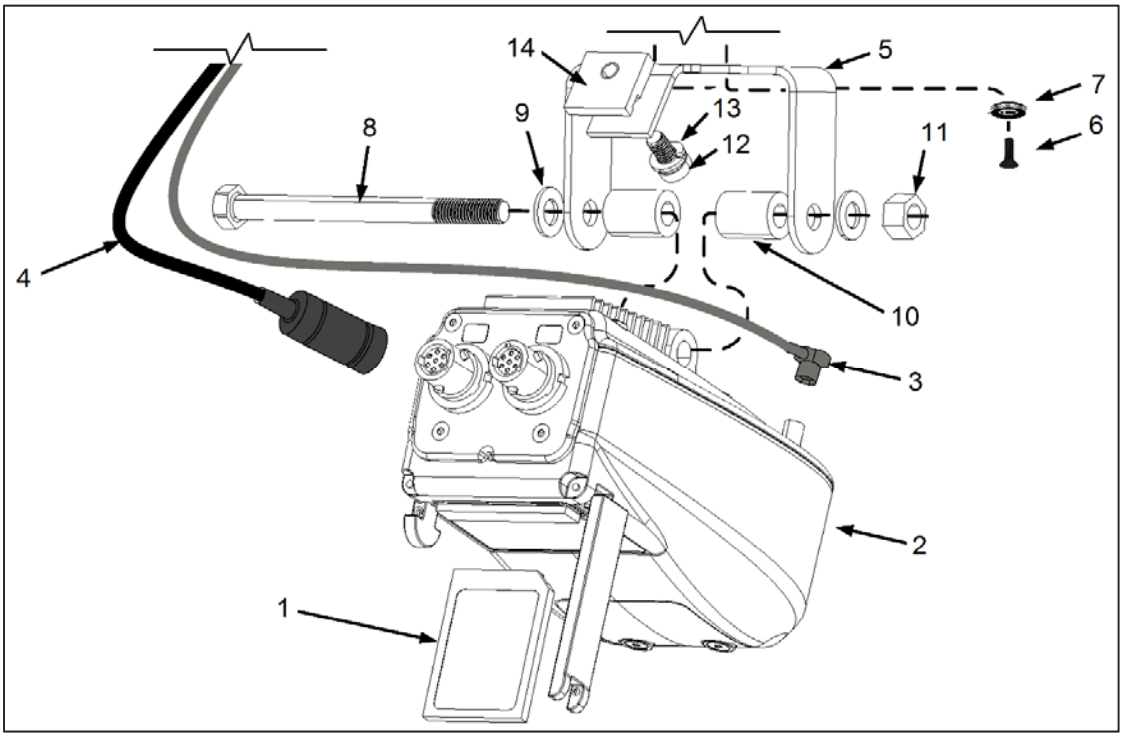
A. Remove, inspect/repair, and install the airframe mounted wiring harnesses/ connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21.

4-4. Figures and Diagrams

A. The Vision 1000 installation is shown in Figure 15-1.

B. The Vision 1000 wiring interface is shown in Diagram 15-1.

(1) Refer to TH-28/480 Series Maintenance Manual, Diagram 6-17.2, for the LED dome light wiring interface.



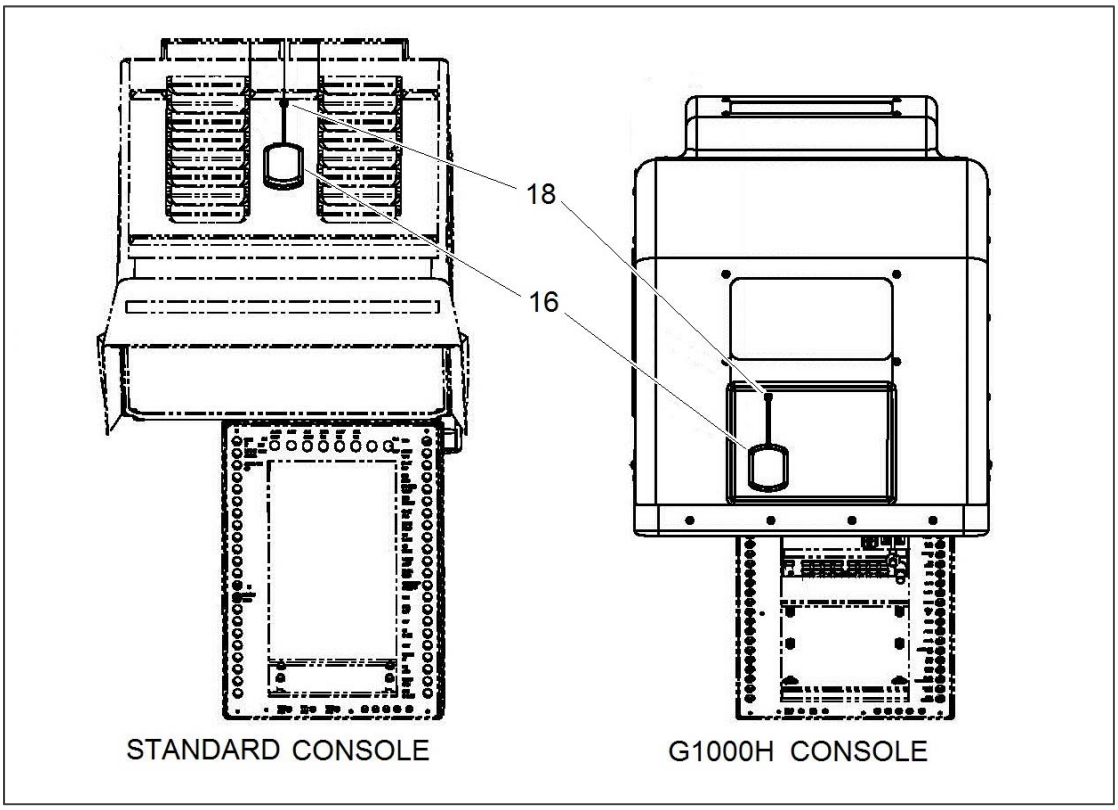


Figure 15-1. Vision 1000 Installation

Figure 15-1. Vision 1000 Installation			
Item	Part Number	Component	Quantity
-A	4220641-1	Appareo Systems Vision 1000 Installation (Without Dome Light Assembly)	REF
-B	4220641-5	Appareo Systems Vision 1000 Installation (With Dome Light Assembly – Circuit Breaker-Protected)	REF
-C	4220641-6	Appareo Systems Vision 1000 Installation (With Dome Light Assembly – Fuse-Protected)	REF
1	104030-000019	. SD Card	1
2	150575-000021	. Vision 1000	1
3*	153560-000003	. GPS Cable	REF
4*	355020-000042	. Power Harness	REF
5	351050-000019	. Bracket	1
6	MS35207-263	. . Screw	2
7	NAS11490316P	. . Washer	2
8	352010-000088	. . Bolt	1
9	352012-000035	. . Washer	2
10	352041-000004	. . Spacer	2
11	352011-000046	. . Nut	1
12	352010-000089	. . Screw	1
13	352012-000027	. . Washer	1
14	351005-000037	. Clamping Plate	1
-15	7277-5-1	. Circuit Breaker (1 Amp)	1
16	153560-000002	. GPS Antenna	1
-17	352010-000022	. . Screw	2
18	MS35489-1	. . Grommet	1
-19B† -19C†	4220641-3	. Dome Light Assembly	1
-20	ELR17-2800DB-2	. . LED Reading Light w/Black Anodize	1
-21	6-1437622-0	. . KN700B1/4 Knob	1
-22	ELP30-28-03	. . Dimmer Module	1
-23B -23C	4220641-7	. Shroud Assembly	1
-24	AN525-10R7	. . Screw	6
-25	4220641-19	. Mount Bracket Assembly	1
-26	MS35207-263	. . Screw	4
-27	NAS1149F0316P	. . Washer	4

- Not illustrated

* Not included as P/N 4220641-( ) equipment; contained in P/N 4192562-1 harness installation

† Refer to TH-28/480 Series Illustrated Parts Catalog, Figure 11-6, for circuit breaker and fuse part numbers, as applicable.

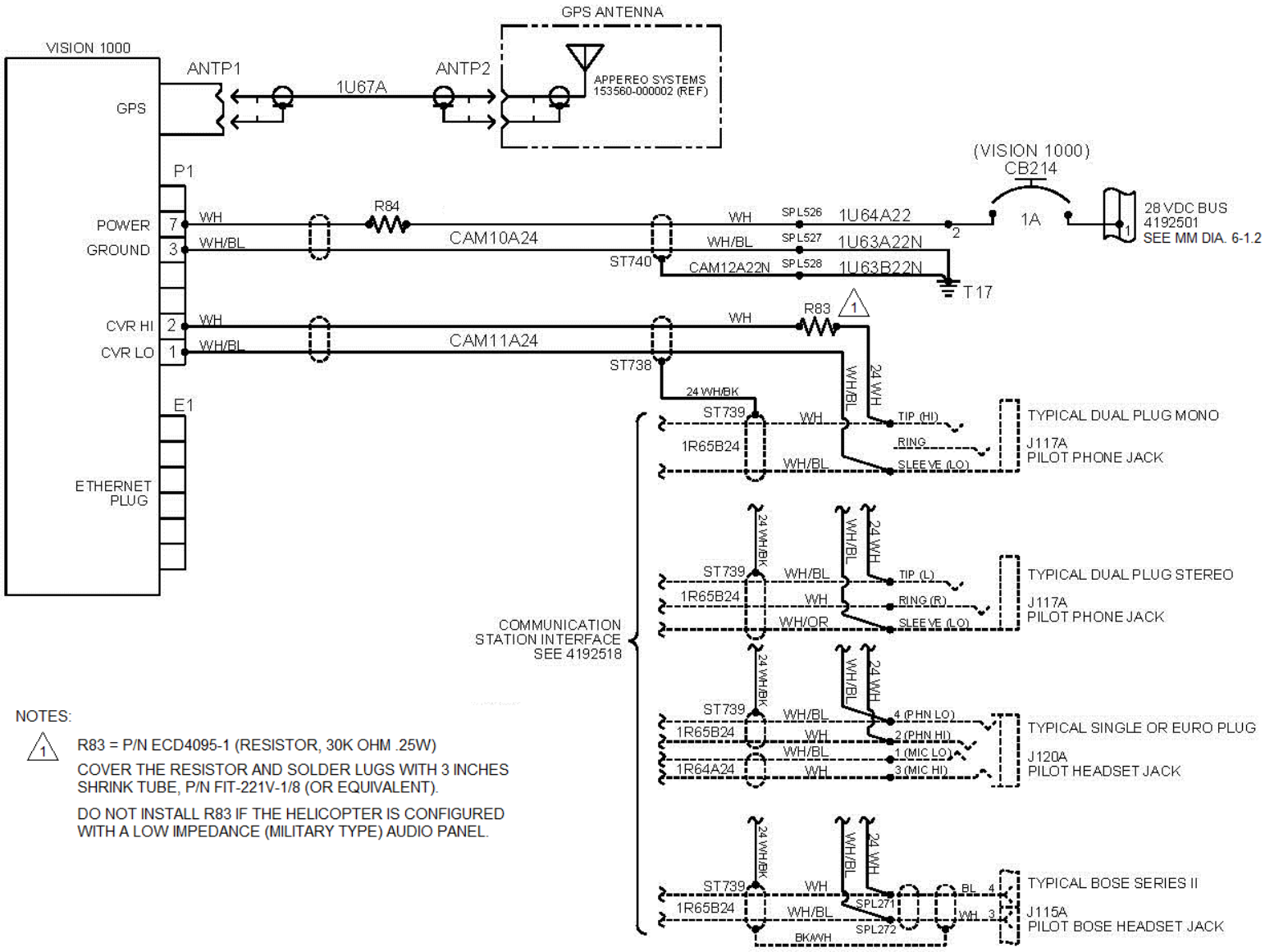


Diagram 15-1. Appareo Systems Vision 1000 Schematic (Ref. 4192562-1 Rev -)

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CHAPTER 16

GTX 345 ADS-B TRANSPONDER

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The GTX 345 is installed as P/N 4220645-5. It supplies Mode S with ADS-B Out extended squitter, and UAT and 1090 receivers for ADS-B In capabilities.

NOTE

A GPS position source is required when the GTX 345 is installed for ADS-B IN/OUT operation.

B. The P/N 4220645-5 installation includes interface to power/ground, antenna, GPS source (via GPS/Nav/Comm), collective (AOG) switch, altitude encoder, as well as audio panel, OAT probe, and cyclic switch control interfaces (external ident (optional) and 'traffic cancel'). (For interface with the GTN 650/750, see also Chapter 11.)

C. Power to the GTX 345 installation is provided via the **XPNDR** circuit breaker (CB38) (5 Amp) located on the left side of the center pedestal.

D. Refer to the 480B Rotorcraft Flight Manual Supplement 28-AC-078 for GTX 345 limitations and basic operation instructions.

E. The following component listed in Table 16-1 is to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 16-1. Vendor Manuals

Component	Publication	Vendor
GTX 345 ADS-B Transponder	GTX 3X5 Part 27 AML Maintenance Manual, Document No 190-00734-21, latest revision	Garmin International, Inc. 1200 East 151st Street Olathe, KS 66062 Tele: (913) 397-8200 Fax: (913) 397-8282 www.garmin.com
	GTX 335/345 Series Pilot's Guide, Document No. 190-01499-00, latest revision	
	GTX 3X5 Installation Manual, Document No. 190-01499-02, latest revision	
	GTX 3X5 Installation Tool Guide, Document No. 190-01499-30, latest revision	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. For FAA approval, this Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, this Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the GTX 345 system are “on condition.” No component-level overhaul is required for the GTX 345.

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. Performing maintenance on the GTX 345 is limited to identifying, troubleshooting, and replacing components according to the parts list in Figure 16-1. Replacement and/or servicing should occur when an item fails to operate only after the authorized maintenance technician troubleshoots the system.

3-2. Troubleshooting

A. Refer to *GTX 345 Part 27 AML Maintenance Manual*, Document No. 190-00734-21, Section 5 and the electrical schematic, Diagram 16-1, when troubleshooting the GTX 345 installation.

3-3. Periodic Inspections

A. Refer to *GTX 345 Part 27 AML Maintenance Manual*, Document No. 190-00734-21, Table 4-1.

B. The following inspection checklist is intended as a guide for 100 hour/annual inspections for aircraft operating under normal conditions.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
GTX 345 ADS-B Transponder	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the GTX 345 and antenna for condition and security (Refer to *GTX 345 Part 27 AML Maintenance Manual*, Document No. 190-00734-21, Section 4.5.1 and Section 4.5.3)	

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

4-1. GTX 345

NOTE

All work must be accomplished in accordance with the Enstrom TH-28/480 Series Maintenance Manual.

NOTE

Replacement of the GPS position source requires that the GTX 345 be tested and shown to comply with 14 CFR Part 91.225 and 91.227.

4-1-1. Cleaning

A. The front bezel, keypad, and display can be cleaned with a microfiber cloth or 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.

4-1-2. GTX 345 Removal

A. Remove power to the GTX 345 unit. Pull the **XPNDR** circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker stem.

B. Insert the 3/32-inch hex drive tool into access hole on the unit face. Turn the hex tool counterclockwise until the unit is forced out about 3/8 inch.

C. Pull the unit straight out of the rack.

4-1-3. GTX 345 Installation

CAUTION

Do not use excessive force when inserting the GTX 345 into the rack. This may damage the connectors, unit, and/or unit rack. Be sure not to over-tighten the unit into the rack. Torque exceeding 8 in-lb can damage the locking mechanism.

A. Slide the GTX 345 straight into the rack until it stops, about one inch short of the final position.

B. Insert the 3/32-inch hex drive tool into access hole at the bottom of the unit face.

C. Turn the hex tool clockwise while pressing on the left side of the bezel until the unit is firmly seated in the rack.

D. Count the number of complete revolutions the hex screw can be turned, not exceeding 8 in-lb of torque. Be careful not overtighten. Three turns is the minimum for proper installation. If fewer than three turns are possible, ensure there are no obstructions to the unit fully seating in the rack.

E. Remove the cable tie or other similar device from the **XPNDR** circuit breaker stem and push the stem in to set the circuit breaker.

F. Continue to paragraph 4-1-6 for system checkout.

4-1-4. GAE Altitude Encoder Removal

A. Remove power to the GTX 345 unit. Pull the **XPNDR** circuit breaker out. Disable the circuit breaker by installing a cable tie or other similar device around the circuit breaker stem.

B. Remove the transponder (para. 4-1-1).

C. Remove the static line attached to the altitude encoder.

D. Disconnect the wiring harness at the altitude encoder.

E. Remove the two screws securing the unit to the backplate.

4-1-5. GAE Altitude Encoder Installation

A. Secure the altitude encoder to the backplate assembly with two screws, torque to 8 in-lb.

B. Connect the wiring harness to the altitude encoder.

C. Secure the static line to the altitude encoder using standard practice.

D. Install the transponder (para. 4-1-3).

E. Remove the cable tie or other similar device from the **XPNDR** circuit breaker stem and push the stem in to set the circuit breaker.

F. Perform static system and transponder checks in accordance with *GTX 345 Part 27 AML Maintenance Manual*, Document No. 190-00734-21, Section 8.4.2.

4-1-6. System Checkout

A. No software or configuration loading is required if the removed GTX is reinstalled.

1) Verify configuration parameters in accordance with Figure 16-2.

B. If a new or repaired or exchange GTX is installed:

1) The approved software (Main 2.12 or later version) must be loaded into the unit (refer to *GTX 345 Part 27 AML Maintenance Manual*, Document No. 190-00734-21, Section 7).

2) Set configuration parameters per Figure 16-2 (refer to *GTX 345 Part 27 AML Maintenance Manual*, Document No. 190-00734-21, Section 8.3.1, Section 8.3.2, or refer to *GTX 3X5 Installation Tool Guide*, Document No. 190-01499-30, Section 2.3).

C. Perform GTX Test in accordance with *GTX 345 Part 27 AML Maintenance Manual*, Document No. 190-00734-21, Section 8.4.

D. When checkout procedures have been completed, record the following information in appropriate aircraft maintenance logs.

1) Part number and version number of any software updates performed during maintenance.

2) Record part and serial number of any LRU which was replaced.

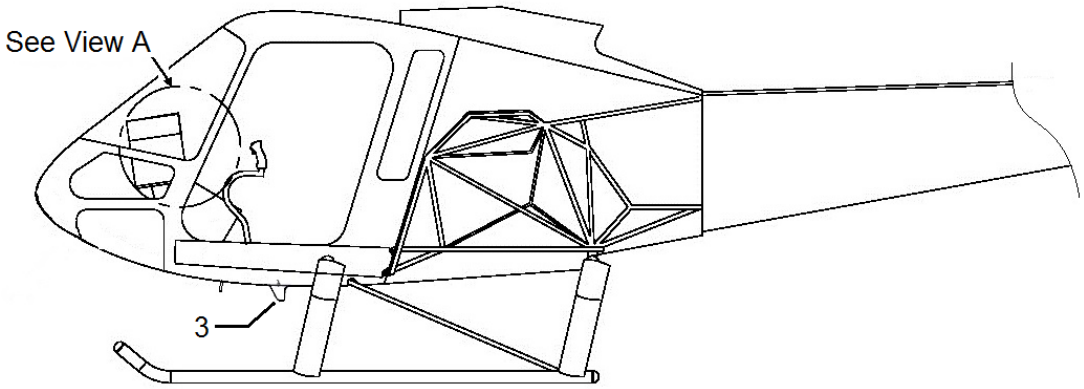
4-1-7. Figures and Diagrams

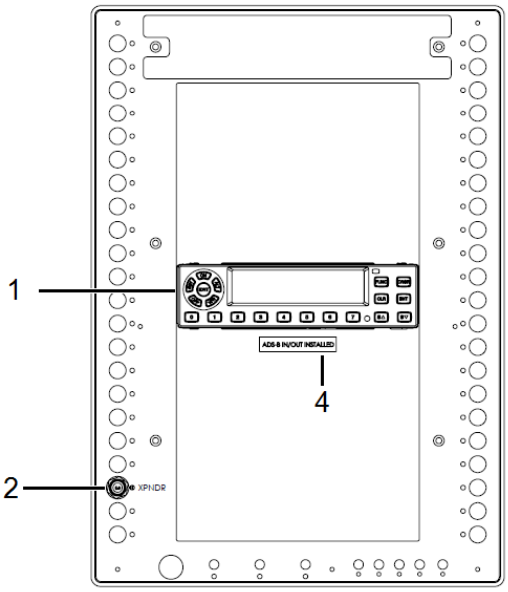
A. GTX 345 installation is shown in Figure 16-1.

B. Refer to *GTX 345 Part 27 AML Maintenance Manual*, Document No. 190-00734-21, Figure 6-7, for GTX 345 unit, rack, backplate, altitude encoder, and connector kit illustration.

C. P/N 4220645-5 SW version 2.12 configuration set-up pages are shown in Figure 16-2.

D. P/N 4220645-5 electrical schematic is shown in Diagram 16-1.





View A

Item	Part Number	Component	Quantity
-	4220645-5	GTX 345 Installation	REF
-	010-01216-01	GTX 345 Kit	REF
1	011-03302-00	. GTX 345 unit	1
2	7277-5-3	. Circuit Breaker	1
-	4220637-5	Antenna Installation	REF
3	AV-74-1	. Antenna	1
-	#8	. . Split Washer	2
-	#8-32	. . Hex Nut	2
-	No number	. . Rubber pad	1
4	28-19064-1	. Placard (ADS-B IN/OUT INSTALLED)	1
-	4119835-33	. Placard (RMT.XPNDR.IDENT)	A/R
-	4119835-47	. Placard (TRAFFIC CANCEL)	A/R

Figure 16-1. GTX 345 Installation

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Aircraft Configuration

Aircraft Registration:	Enter tail # per customer requirement
ICAO Address Format:	Hex
ICAO Address:	Enter ICAO address per customer requirement

Flight ID

Allow Pilot Entry:	No, Typical default setting Yes, Per customer requirement
Default Selection:	Same as Tail
Default:	Tail #
Prefix Selection	Disabled, Typical default setting Enabled , Per customer requirement
Prefix:	If Enabled, enter prefix per customer requirement

Airframe Configuration

Max Airspeed:	<= 150 knots
Length:	<= 15.0 meters
Width:	<= 23.0 meters
Category:	A: Rotorcraft
Stall Speed (knots):	Unspecified

Operational Options

1090 ES In Capable:	Yes
UAT In Capable:	Yes
1090 ES Out Capable:	Pilot Controlled
UAT Out Remote Control:	Disabled
ADS-B In Processing:	Enabled
Enhanced Surveillance:	Disabled

Identification

VFR Squawk Code:	1200
Installation ID:	GTX #1

Unit Options

FIS-B:	Enabled
Bluetooth:	Enabled

Display Options

Altitude Units:	Feet
Temperature Units:	°C
Restore Pages on Power-Up:	No
Flash Message Indicator:	Yes

Serial

RS-232 Channel 1 Input:	Off
RS-232 Channel 1 Output:	Off
RS-232 Channel 2 Input:	Off
RS-232 Channel 2 Output:	Off
RS-232 Channel 3 Input:	Remote Format 1
RS-232 Channel 3 Output:	Remote Format 1
RS-232 Channel 4 Input:	Off
RS-232 Channel 4 Output:	Off
RS-422 Output:	Off

A429

Input Channel 1 Speed:	Low
Input Channel 1 Format:	Off
Input Channel 2 Speed:	Low
Input Channel 2 Format:	Off
Output Channel 1 Speed:	High
Output Channel 1 Format:	Off

Discrete Inputs

Audio Mute:	J3251-15
Audio Cancel:	J3251-37
Ident:	J3251-36
Standby:	Unassigned
Squat:	J3251-57
Altitude Source Select:	Unassigned
Air Data Source Select:	Unassigned
Install ID Select:	Unassigned
Squat (A/C On Ground State):	Ground (0V)
Gillham Altitude:	Disabled

Discrete Outputs

No action taken

HSDB

G500/600:	Not Present
GTN:	Present
GTS:	Not Present
GX000:	Not Present
Indirect A429 TCAS:	Not Present

Garmin Altitude Encoder

Installed:	GAE-12
Ceiling:	13000 ft
Point Count:	3 is typical. Adjust as needed.

GPS 1

Source:	GTN #1
Source Integrity Level (Errors/Hour):	(3) 10^-7
Lateral Antenna Offset:	0 m
Longitudinal Antenna Offset:	6 m, for CI 2580-200 Antenna 8 m, for GA 35 Antenna
System Design Assurance Level:	(2) Level C (<=10^-5)

GPS 2

Source:	None
Source Integrity Level (Errors/Hour):	(0) Unknown
Lateral Antenna Offset:	Unknown
Longitudinal Antenna Offset:	Unknown
System Design Assurance Level:	(0) Unknown (>10^-3)

AHRS Orientation

No action taken

Additional Sensors

Primary Altitude Source:	None
Secondary Altitude Source:	None
OAT Probe Installed:	Yes

Audio Options

Output:	Transponder
Volume:	50 is typical. Adjust per customer requirement.
Voice:	Female

Audio Alerts

Timer Expired:	Message with Chime
Traffic:	Message
Altitude Monitor:	Message with Chime
Alert Deviation:	200 ft

Backlight

Display Backlight Source:	Lighting Bus
Display Backlight Minimum:	0
Keypad Backlight Source:	Lighting Bus
Keypad Backlight Minimum:	1

(Adjust to match/sync with other installed equipment)

Display Defaults

Brightness Offset:	0
Contrast Offset:	0

(Adjust to match/sync with other installed equipment)

Photocell Curve

Slope:	37
Offset:	37
Transition:	10

(Adjust to match/sync with other installed equipment)

Lighting Bus Curve

Slope:	25
Offset:	0
Bus Type:	28V DC

(Adjust to match/sync with other installed equipment)

TYPICAL GTX 345 CONFIGURATION WITH A GTN 650/750

Figure 16-2. GTX 345 Configuration (4192507-111J)

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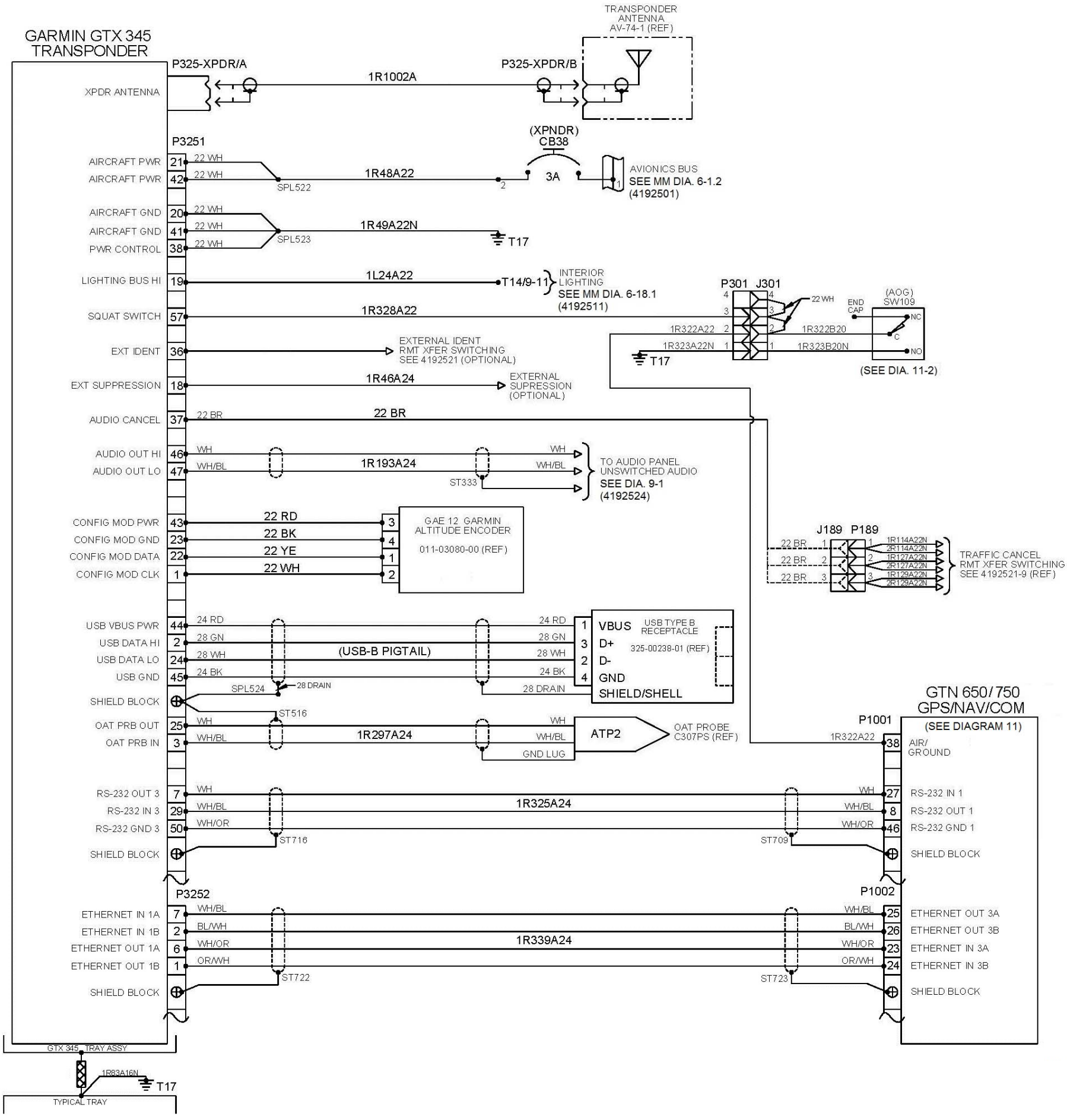


Diagram 16-1. GTX 345 Wiring Schematic (4192507-111J)

CHAPTER 17
GMA 350Hc AUDIO PANEL
SECTION 1
SYSTEM DESCRIPTION

1-1. System Description

NOTE

The GMA 350H variant is covered in Chapter 9 of this supplement.

A. The Garmin GMA 350Hc is a horizontally oriented panel-mounted audio controller that collects, processes, and distributes audio signals between avionics, crew, and passengers. The GMA 350Hc digital signal processor cleans up audio using advanced filtering techniques and provides VOX control for mic inputs. It also includes digital recording and playback feature, allows ICS volume adjustments for pilot, copilot, and passenger, and Bluetooth technology to wirelessly connect smartphones and tablets to stream audio and make phone calls.

B. The configuration part numbers are listed in Table 17-1. The configurations include the GMA 350Hc audio panel unit mounted in the avionics panel of the pedestal and an entertainment (J148) jack located on the copilot side of the pedestal. P/N 4220672-109 includes a marker beacon sensitivity toggle switch (**MKR SENS**) (SW93) remotely located on the lower right side of the circuit breaker panel and a marker beacon antenna.

Table 17-1. GMA 350Hc Configuration Part Numbers

Part Number	Installation Interface	Marker Beacon Receiver
4220672-109	Standard (non-G1000H) Instrument System	Yes
4220672-111	Standard (non-G1000H) Instrument System	No

C. The GMA 350Hc may be configured with a traditional avionic system: (VOR/LOC/GS, GPS, NAV/COM, transponder, etc., or with the Garmin G1000H Integrated Flight Deck.

D. Power to the audio panel is provided via the **AUDIO PANEL** circuit breaker (CB35, 5 A) located on the left side of the circuit breaker panel.

E. Refer to the 480B Rotorcraft Flight Manual Supplement 28-AC-076 for general operational features of the GMA 350Hc audio panel.

1-2. Vendor Manuals

A. The following components listed in Table 17-2 are to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 17-2. Vendor Manuals

Component	Publication	Vendor
GMA 350Hc	GMA 350/350H Configuration Tool User's Guide, Document No. 190-01349-00, latest revision	Garmin International, Inc. 1200 East 151st Street Olathe, KS 66062 Tele: (913) 397-8200 Fax: (913) 397-8282 www.garmin.com
	GMA 350/350c/350H/350Hc Installation Manual, Document No. 190-01134-11, latest revision	
	GMA 350/350H Audio Panel Maintenance Manual, Document No. 190-01134-13, latest revision	
	GMA 350H/350Hc Pilot's Guide, Document No. 190-01134-14, latest revision	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. For FAA approval, this Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, this Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the GMA 350Hc are "on condition".

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The GMA 350Hc audio panel installation contains no user serviceable components or assemblies. Operations involving the removal of the audio panel must be done by authorized maintenance technicians.

3-2. Troubleshooting

A. Refer to the *GMA 350/350H Audio Panel Maintenance Manual* (para. 1-2) and the electrical schematic in Diagram 17-1 when troubleshooting the GMA 350Hc installation. If the audio panel fails to operate after troubleshooting efforts, contact Garmin aviation product support for assistance (ref. para. 1-2).

3-3. Periodic Inspections

A. The following inspection checklist is intended as a guide for 100 hour/annual inspections for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
GMA 350Hc AUDIO PANEL	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the antenna (if equipped), electrical wiring and mounts for security, damage, and obvious defects.	
2. Inspect the GMA 350Hc audio panel unit and mount for security, damage, and obvious defects.	

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom TH-28/480 Series Maintenance Manual).

4-1. GMA 350Hc Audio Panel

NOTE

All work must be accomplished in accordance with the Enstrom TH-28/480 Series Maintenance Manual.

4-1-1. Removal

A. Remove power to the GMA 350Hc audio panel unit.

B. Unlock the unit from the rack using the appropriate size hex wrench.

C. Carefully pull the unit from the rack.

4-1-2. Inspection

A. Verify the audio panel operation in accordance with paragraph 3-2 of the *GMA 350/350H Audio Panel Maintenance Manual* (para. 1-2).

4-1-3. Repair

A. Replace the audio panel if any of the tests performed in paragraph 4-1-2 fail.

4-1-4. Installation

NOTE

Do not use excessive force when inserting the GMA 350Hc into the rack. This may damage the connectors, unit, and/or unit rack.

A. Insert the GMA 350Hc unit into the rack.

B. Lock the unit in place using the appropriate size hex wrench.

C. If the installation is a replacement, perform a post installation checkout in accordance with paragraph 3.8 of the *GMA 350/350c/350H/350Hc Installation Manual* (para. 1-2).

(1) Configure the GMA 350Hc in accordance with Figure 17-3 or Figure 17-4, as applicable (ref. para. 4-3, B or C, as applicable).

4-2. Wiring Harnesses/Connectors

A. Remove, inspect/repair, and install the airframe mounted wiring harnesses/ connectors in accordance with the TH-28/480 Series Maintenance Manual, Section 6, Paragraphs 6-10 through 6-21.

4-3. Figures and Diagrams

A. GMA 350Hc installation parts list: Figure 17-1 and Figure 17-2.

B. GMA 350Hc (with marker beacon) installation configuration set-up: Figure 17-3.

C. GMA 350Hc (without marker beacon) installation configuration set-up: Figure 17-4.

D. GMA 350Hc audio panel wiring: Diagram 17-1.

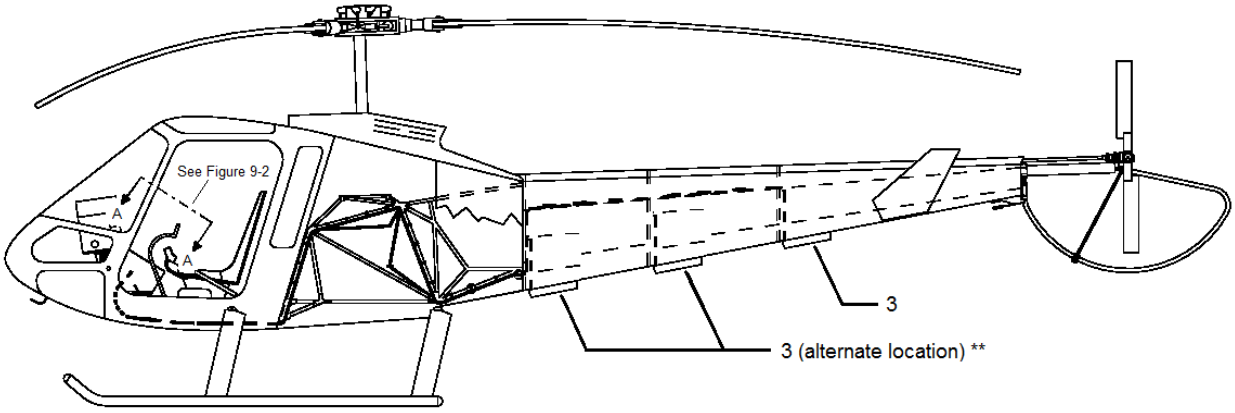
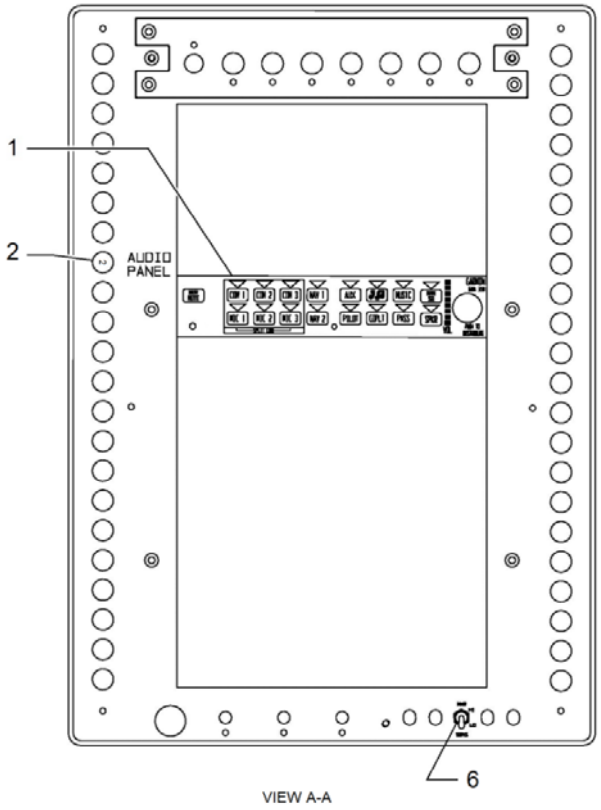


Figure 17-1. GMA 350Hc Installation



Item	Part Number	Component	Quantity
-	4220672-109	GMA 350Hc Audio Panel Installation with Marker Beacon Receiver	REF
-	4220672-111	GMA 350Hc Audio Panel Installation without Marker Beacon Receiver	REF
1	011-02385-50	. GMA 350Hc	1
-	011-02302-00	. Connector Kit (Included with GMA 350Hc)	REF
2	7277-5-5 (5 amp)	. Circuit Breaker	1
3	DMN43-1*	. . Antenna (Used with 4220672-109)	1
-4	AN960-8L	. . Washer	3
-5	AN365-832	. . Nut	3
6	7101SYZQE	. Switch (Used with 4220672-109)	1
-7	161-3402-E	. Entertainment Jack	1
-8**	28-19065-11	. Placard (VOICE COMMANDS DISABLED)	1

\- Item not illustrated

* REF 4196512-1; or alternate locations 4196512-3** or 4196512-5**

** EASA-specific configuration only

Figure 17-2. GMA 350Hc Installation

Status Tab

GMA Software Version

Product	Part Number	Version
Main System	006-B2103-04	4.22C
Main Bootblock	006-B2103-BG	4.20C
Main Region List	006-D3035-77	4.10C
Auxiliary System	006-B2104-04	4.21C
Aux Bootblock	006-B2104-BG	4.20C
Aux Region List	006-D3034-29	4.10C
Aux Config	006-D3034-30	4.20C
ARC Database	006-D3035-CJ	4.23C
Audio Data	006-D3034-36	4.20C
ASR DB1 (grammar)	006-D3034-33	4.20
ASR DB2 (lang)	006-D3034-08	2.00
ASR DB3 (g2P)	006-D3034-09	2.00
TTS Grammar	006-D3034-23	4.10
TTS Data	006-D3034-24	4.10

Marker Beacon Receiver Tab

Offset (dB)	GMA	Local
Audio Threshold Offset	-10	-10
Low Sensitivity Offset	0	0
High Sensitivity Offset	0	0

Note: Offsets are shown as typical, and can be adjusted per customer requirement.

Options Tab

GMA | Local

Tx Sidetone Generation

- ☐ ☐ Generate internal TX sidetone for COM1
- ☐ ☐ Generate internal TX sidetone for COM2
- ☐ ☐ Generate internal TX sidetone for COM3

Passenger Options

- ☑ ☑ Enable alerts to passengers
- ☐ ☐ RCVR 5 (AUX 3) input is fifth passenger microphone
- ☑ ☑ Disable 'copilot is passenger' user selection
- ☑ ☑ Enable selected audio to passengers
- ☐ ☐ Mute passengers to crew during alerts
- ☑ ☑ Mute passengers to crew during PA

Selected Audio to Copilot

- ☑ ☑ Enable selected audio to copilot when isolated
- ☑ ☑ Enable selected audio to copilot during split-COM

Other Muting

- ☐ ☐ Mute music 1 during intercom
- ☐ ☐ Mute music 2 during intercom
- ☐ ☐ Mute other COMs during TX
- ☐ ☐ Mute Bluetooth during intercom

Note: Options settings are shown as typical, and can be adjusted per customer requirement.

Volume Levels Tab

Volume Level (dB)	GMA	Local
Marker Beacon	0	0
Telephone (rear input)	24	24
Auxiliary Input 1	0	0
Auxiliary Input 2	0	0
Auxiliary Input 3	0	0
Music 1	24	24
Music 2		
User Inferface Sounds	0	0
Com 1	0	0
Com 2	0	0
Com 3	0	0
Nav 1	0	0
Nav 2	0	0
Front-Panel Input Jack	24	24
Failsafe Warning	0	0
Alert Input 1	0	0
Alert Input 2	0	0
Alert Input 3	0	0
Alert Input 4	0	0
Pilot PA to Speaker	0	0
Copilot PA to Speaker	0	0
Alert Sum to Speaker	0	0
Selected Audio to Speaker	0	0
TTS	0	0
Bluetooth Music	0	0
Bluetooth Telephone	0	0

Note: Volume levels are shown as typical, and can be adjusted per customer requirement.

Discrete Inputs Tab

Discrete Inputs	GMA	Local
Generic Input 01 (J3501.16)	Pilot PTC Key or Pilot ICS Key	Pilot PTC Key or Pilot ICS Key
Generic Input 06 (J3502.30)	Copilot PTC Key or Copilot ICS Key	Copilot PTC Key or Copilot ICS Key
Generic Input 09 (J3502.14)	Disabled	Disabled

Note: Set to Pilot/Copilot PTC Key to enable GMA Voice Commands.
Set to Pilot/Copilot ICS Key to disable GMA Voice Commands, which is required for EASA specified configurations (i.e. delivery to Europe).

Discrete Inputs Presets

GMA	Local	
☐	☐	Enable 3D audio and speech recognition demonstration
☐	☐	Configure for both PTC keys and Keyed ICS

Squelch Levels Tab

Squelch Level (dB)	GMA	Local
COM1 Radio	-48	-48
COM2 Radio	-48	-48
COM 3 Radio	-48	-48
NAV1 Radio	-48	-48
NAV2 Radio	-48	-48
Auxiliary Input 1	-48	-48
Auxiliary Input 2	-48	-48
Auxiliary Input 3	-48	-48
Failsafe Warning	-48	-48
Alert Input 1	-48	-48
Alert Input 2	-48	-48
Alert Input 3	-48	-48
Alert Input 4	-48	-48

Note: Squelch levels are shown as typical, and can be adjusted per customer requirement.

Lighting Tab

Backlight Lighting Bus Connection

GMA	Local	
☐	☐	14V Lighting Bus
☑	☑	28V Lighting Bus
☐	☐	No Lighting Bus

Noise Compensation Tab

Enable Noise Compensation

GMA	Local	
☐	☐	Speaker
☐	☐	Heaset

Note: Noise compensation settings are shown as typical, and can be adjusted per customer requirement.

3D Audio Tab

Pilot Seat Position

GMA	Local	
☑	☑	Left Seat
☐	☐	Right Seat

Figure 17-3. GMA 350Hc Configuration Set-Up
(Ref. 4220672-109 Rev. B)
May 23/19, Rev. 17
17-7/17-8 Blank

Status Tab

GMA Software Version

Product	Part Number	Version
Main System	006-B2103-04	4.22C
Main Bootblock	006-B2103-BG	4.20C
Main Region List	006-D3035-77	4.10C
Auxiliary System	006-B2104-04	4.21C
Aux Bootblock	006-B2104-BG	4.20C
Aux Region List	006-D3034-29	4.10C
Aux Config	006-D3034-30	4.20C
ARC Database	006-D3035-CJ	4.23C
Audio Data	006-D3034-36	4.20C
ASR DB1 (grammar)	006-D3034-33	4.20
ASR DB2 (lang)	006-D3034-08	2.00
ASR DB3 (g2P)	006-D3034-09	2.00
TTS Grammar	006-D3034-23	4.10
TTS Data	006-D3034-24	4.10

Marker Beacon Receiver Tab

Offset (dB)	GMA	Local
Audio Threshold Offset	-10	-10
Low Sensitivity Offset	0	0
High Sensitivity Offset	0	0

Note: No action required.

Options Tab

GMA | Local

Tx Sidetone Generation

GMA	Local	
☐	☐	Generate internal TX sidetone for COM1
☐	☐	Generate internal TX sidetone for COM2
☐	☐	Generate internal TX sidetone for COM3

Passenger Options

GMA	Local	
☑	☑	Enable alerts to passengers
☐	☐	RCVR 5 (AUX 3) input is fifth passenger microphone
☑	☑	Disable 'copilot is passenger' user selection
☑	☑	Enable selected audio to passengers
☐	☐	Mute passengers to crew during alerts
☑	☑	Mute passengers to crew during PA

Selected Audio to Copilot

GMA	Local	
☑	☑	Enable selected audio to copilot when isolated
☑	☑	Enable selected audio to copilot during split-COM

Other Muting

GMA	Local	
☐	☐	Mute music 1 during intercom
☐	☐	Mute music 2 during intercom
☐	☐	Mute other COMs during TX
☐	☐	Mute Bluetooth during intercom

Note: Options settings are shown as typical, and can be adjusted per customer requirement.

Volume Levels Tab

Volume Level (dB)	GMA	Local
Marker Beacon	0	0
Telephone (rear input)	24	24
Auxiliary Input 1	0	0
Auxiliary Input 2	0	0
Auxiliary Input 3	0	0
Music 1	24	24
Music 2		
User Inferface Sounds	0	0
Com 1	0	0
Com 2	0	0
Com 3	0	0
Nav 1	0	0
Nav 2	0	0
Front-Panel Input Jack	24	24
Failsafe Warning	0	0
Alert Input 1	0	0
Alert Input 2	0	0
Alert Input 3	0	0
Alert Input 4	0	0
Pilot PA to Speaker	0	0
Copilot PA to Speaker	0	0
Alert Sum to Speaker	0	0
Selected Audio to Speaker	0	0
TTS	0	0
Bluetooth Music	0	0
Bluetooth Telephone	0	0

Note: Volume levels are shown as typical, and can be adjusted per customer requirement.

Discrete Inputs Tab

Discrete Inputs	GMA	Local
Generic Input 01 (J3501.16)	Pilot PTC Key or Pilot ICS Key	Pilot PTC Key or Pilot ICS Key
Generic Input 06 (J3502.30)	Copilot PTC Key or Copilot ICS Key	Copilot PTC Key or Copilot ICS Key
Generic Input 09 (J3502.14)	Disabled	Disabled

Note: Set to Pilot/Copilot PTC Key to enable GMA Voice Commands.
Set to Pilot/Copilot ICS Key to disable GMA Voice Commands, which is required for EASA specified configurations (i.e. delivery to Europe).

Discrete Inputs Presets

GMA	Local	
☐	☐	Enable 3D audio and speech recognition demonstration
☐	☐	Configure for both PTC keys and Keyed ICS

Squelch Levels Tab

Squelch Level (dB)	GMA	Local
COM1 Radio	-48	-48
COM2 Radio	-48	-48
COM 3 Radio	-48	-48
NAV1 Radio	-48	-48
NAV2 Radio	-48	-48
Auxiliary Input 1	-48	-48
Auxiliary Input 2	-48	-48
Auxiliary Input 3	-48	-48
Failsafe Warning	-48	-48
Alert Input 1	-48	-48
Alert Input 2	-48	-48
Alert Input 3	-48	-48
Alert Input 4	-48	-48

Note: Squelch levels are shown as typical, and can be adjusted per customer requirement.

Lighting Tab

Backlight Lighting Bus Connection

GMA	Local	
☐	☐	14V Lighting Bus
☑	☑	28V Lighting Bus
☐	☐	No Lighting Bus

Noise Compensation Tab

Enable Noise Compensation

GMA	Local	
☐	☐	Speaker
☐	☐	Heaset

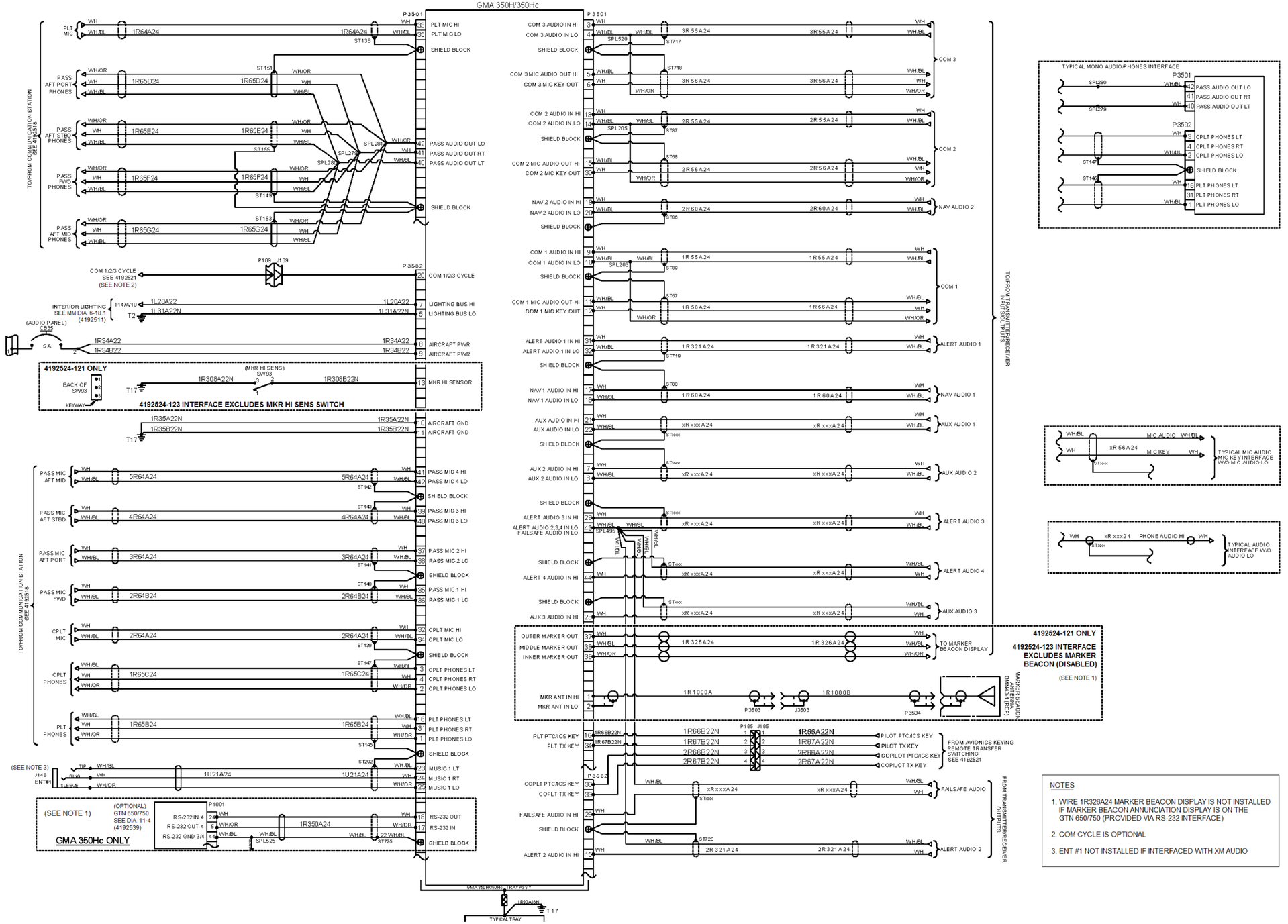
Note: Noise compensation settings are shown as typical, and can be adjusted per customer requirement.

3D Audio Tab

Pilot Seat Position

GMA	Local	
☑	☑	Left Seat
☐	☐	Right Seat

Figure 17-4. GMA 350Hc Configuration Set-Up (Without Marker Beacon) (Ref. 4220672-111 Rev. B)



NOTES

1. WIRE 1R326A24 MARKER BEACON DISPLAY IS NOT INSTALLED IF MARKER BEACON ANNUNCIATION DISPLAY IS ON THE GTN 650/750 (PROVIDED VIA RS-232 INTERFACE)
2. COM CYCLE IS OPTIONAL
3. ENT #1 NOT INSTALLED IF INTERFACED WITH XM AUDIO

Diagram 17-1. GMA 350Hc (Standard)
(Ref. 4192524-121P and 4192524-123P)
Apr 30/2020, Rev. 18
17-11/17-12 (Blank)