



WORLDWIDE FLEET MANAGEMENT

Eagle Copters USA, Inc.
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INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

FOR

P139 AND P139-HD DIGITAL AUDIO SYSTEMS

MDL GA182

FOR

MODEL BELL 206, 206L & 407 HELICOPTERS

Report No.: ICA182-3

STC No.: SR00521SE

APPROVED BY: G. Andrews

Rev. C DATE: 11/7/17

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DETAILS OF REVISIONS

REV.	DATE	PAGES	DESCRIPTION	APPROVED
N/C	1/20/09	All	Initial Release	C. Bonar
A	10/15/12	20 22 28 - 31 91 - 103	Added G13115 & G13116 Added Section 3.1.2 Revised Router Installation Updated wiring diagrams	C. Bonar
B	5/12/14	All	Updated to add G13160 3-Board Router and wiring; Added Audio Mixer G13120	C. Bonar
C	11/7/17	1, 10, 11 11, 20 12 25, 27 91 - 116 118 ALL	Added ref to P139 Analog audio System Added G13115NS & G13116NS Added note on 'NS' panels Note [c] pointed at wrong p/n Updated wiring diagrams Updated Audio System Functional Check Updated Geneva Aviation to Eagle Copters	G. Andrews



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RECORD OF SERVICE BULLETINS (S/B'S)

S/B NO.	DATE	DESCRIPTION
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There are no Service Bulletins applicable to this STC.



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LIST OF APPLICABLE DOCUMENTS

Document Number	Description
GA182-6	Rotorcraft Flight Manual Supplement (Bell 206/407 Series)



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Section 1.0 Introduction

1.1 Scope

This manual provides description, operation, disassembly, inspection, repair and testing instructions, and an Illustrated Parts List for P/N P139 and P139-HD Digital Audio Systems.

1.2 Purpose

The purpose of this manual is to maintain the P/N P139 and P139-HD Digital Audio Systems in peak operating efficiency with the greatest service life.

1.3 Revision Control Procedure

All revisions to this document shall be identified in the Details of Revisions. All pages will be summarized on page 4, "List of Effective Pages."

1.4 Service Difficulty Reporting

A record of sales shall be maintained by Eagle Copters. Any changes to these instructions resulting from service difficulties shall be distributed to all previous recipients.

1.5 Applicability

This manual shall be used to maintain the P139 and P139-HD Digital Audio Systems for Bell 206, 206L & 407 Helicopters.

1.6 Abbreviations and Units of Measure

in	=	inches
lbs	=	pounds
P/N	=	part number
I/N	=	item number
LH	=	left hand
RH	=	right hand

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1.7 Precautions

The following precaution definitions will be used to indicate the seriousness of the hazard or condition.

WARNING: May be a maintenance procedure, practice, condition, etc., which could result in personal injury or loss of life.

CAUTION: May be a maintenance procedure, practice, condition, etc., which could result in damage or destruction of equipment.

NOTE: May be a maintenance procedure, practice, condition, etc., or a statement that needs to be highlighted

1.8 Distribution

This manual will be distributed to end users (or their mechanics or maintenance departments). A copy of this ICA shall be provided by Eagle Copters with each kit sold.

1.9 Description

Eagle Copters P139 and P139-HD Digital Audio Systems provide a communication system for aircraft crew members and passengers.

1.9.1 The Audio System Includes the Following:

- a. An Audio Router. The Audio Router comes in 5 different configurations. There are 2 analog Audio Routers P/N G11426 (6 slot) and P/N G12320 (8 slot) which contain removable printed circuit boards (control boards) that can be interchanged for diagnostic and spares purposes. And there are 3 Digital Router Systems to choose from, the first is P139-HD (D) which uses Router G13000 in a "Dual-board" configuration. The second is P139-HD (S) which uses Router G13000 in a "Single-board" configuration. The third is P139-HD (T) which uses Router G13160 and is a "3-Board" router.
- b. A minimum of 2 Audio Control Panels for the pilot and co-pilot. A typical installation will include 3 or more Audio Control panels for the pilot, co-pilot, crew members, and/or passengers. The Control Panels come in the following configurations: P/Ns G11431, G11460, G11462, G11470, G11480, G11490, G13115/G13115NS, and G13116/G13116NS as shown in Figure 7 through Figure 14. The Audio Control Panels can be used interchangeably, depending on the



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control functions desired although G13115NS and G13116NS panels must not be used as primary control panels for Pilot or Copilot.

- c. Sheet metal support tray G13009 and required hardware for mounting the G13000 Digital Audio Router; or sheet metal support tray G13161 and required hardware for mounting the G13160 3-Board Router.
- d. Sheet metal support brackets and required hardware for mounting G11431 Control Panels (if installed).

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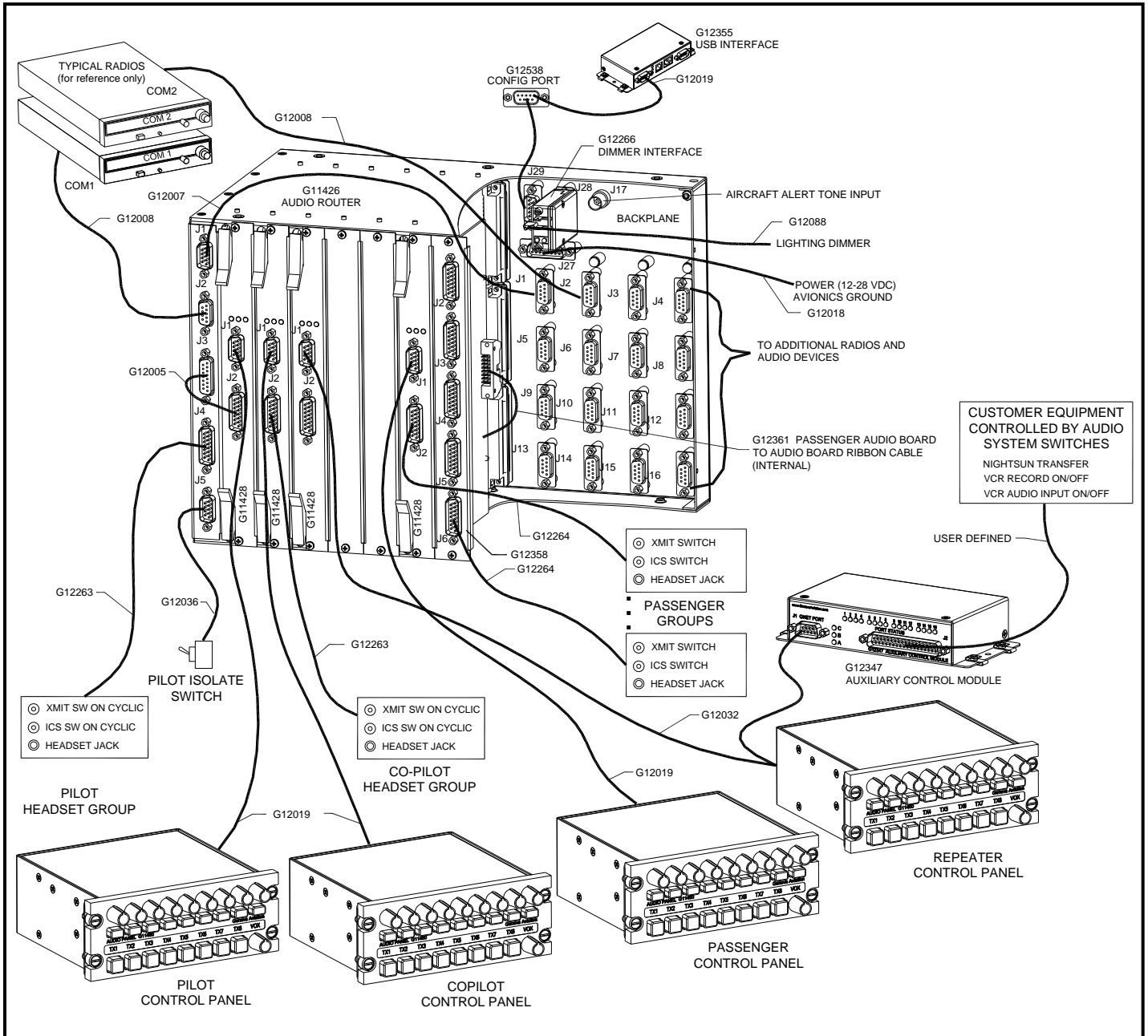


Figure 1: Complete Analog Audio System Overview

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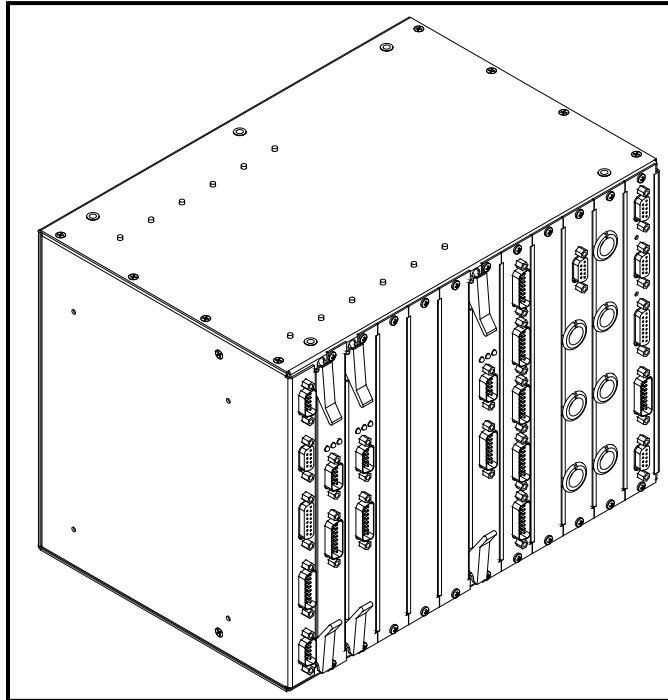


Figure 2: G11426 6 Slot Analog Audio Router

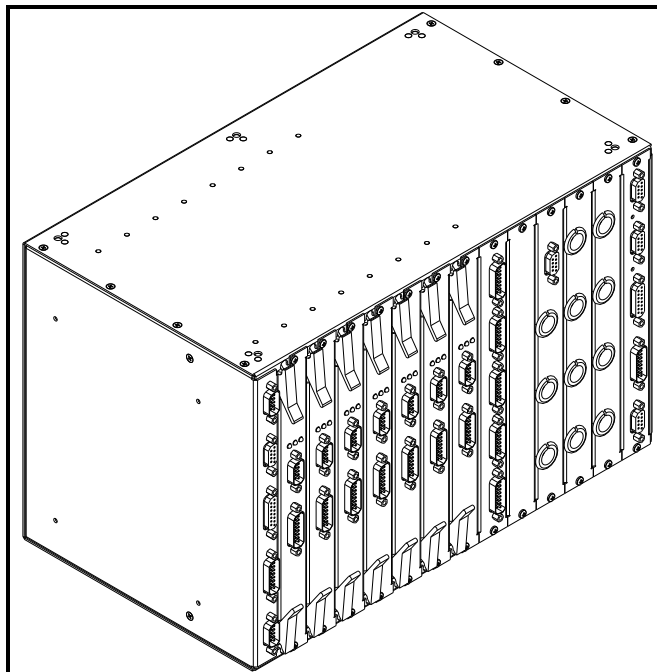


Figure 3: G12320 8 Slot Analog Router

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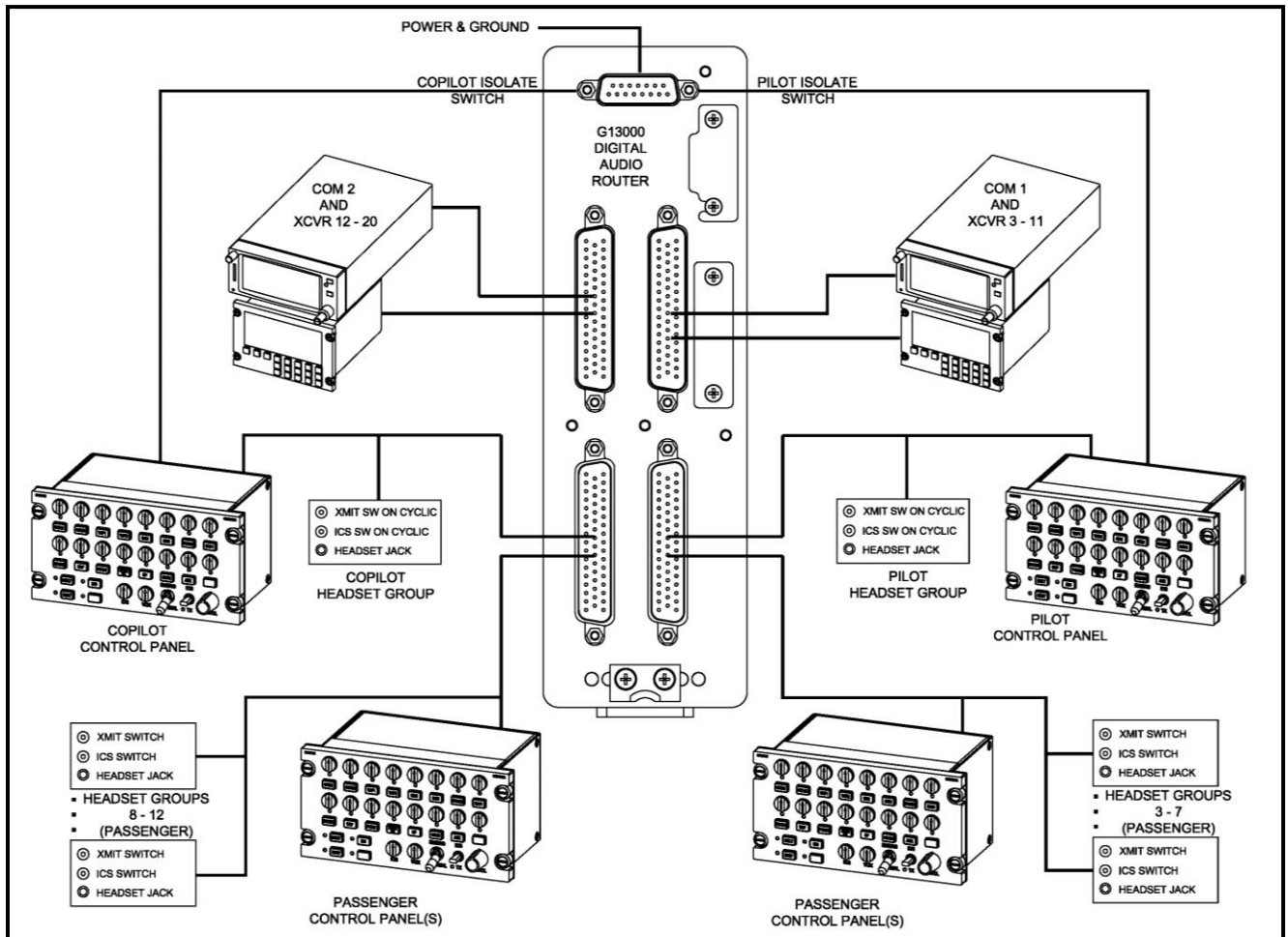


Figure 4: Digital Audio System Overview

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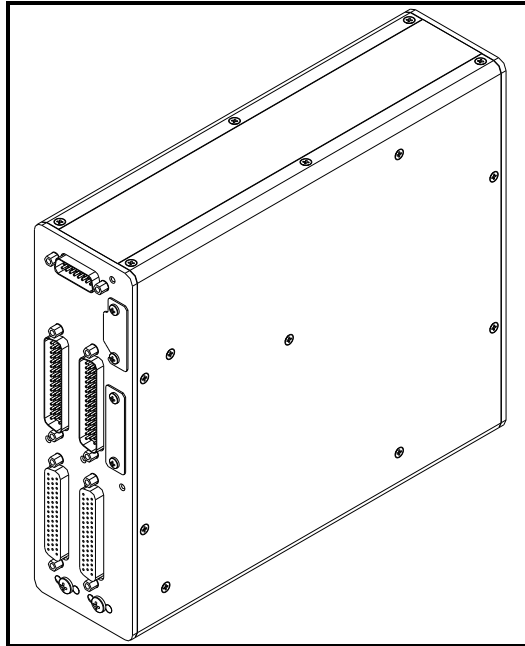


Figure 5: G13000 Digital Router

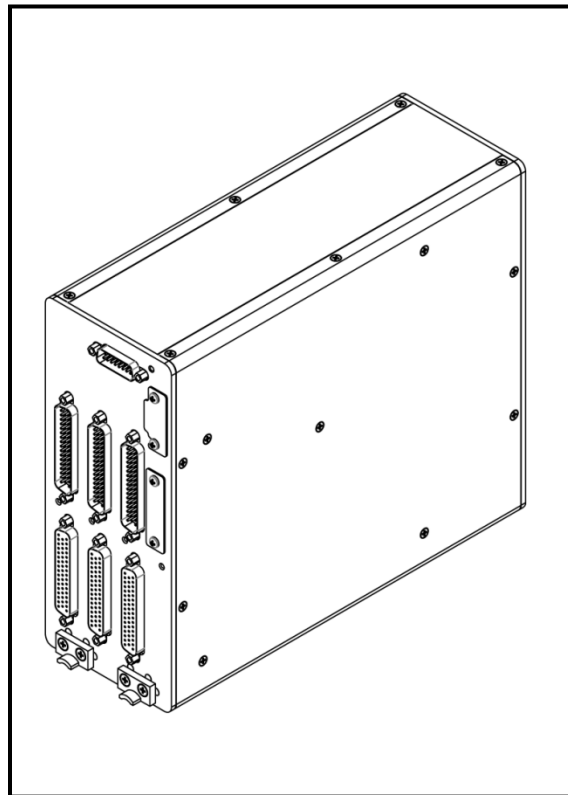


Figure 6: G13160 3-Board Router

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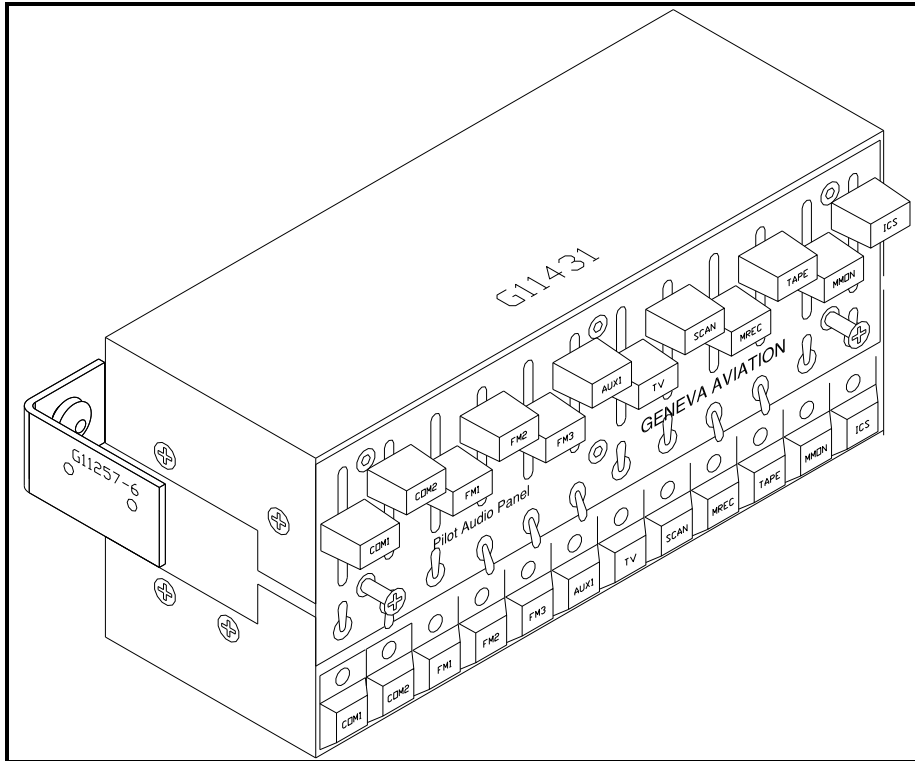


Figure 7: G11431 Control Panel

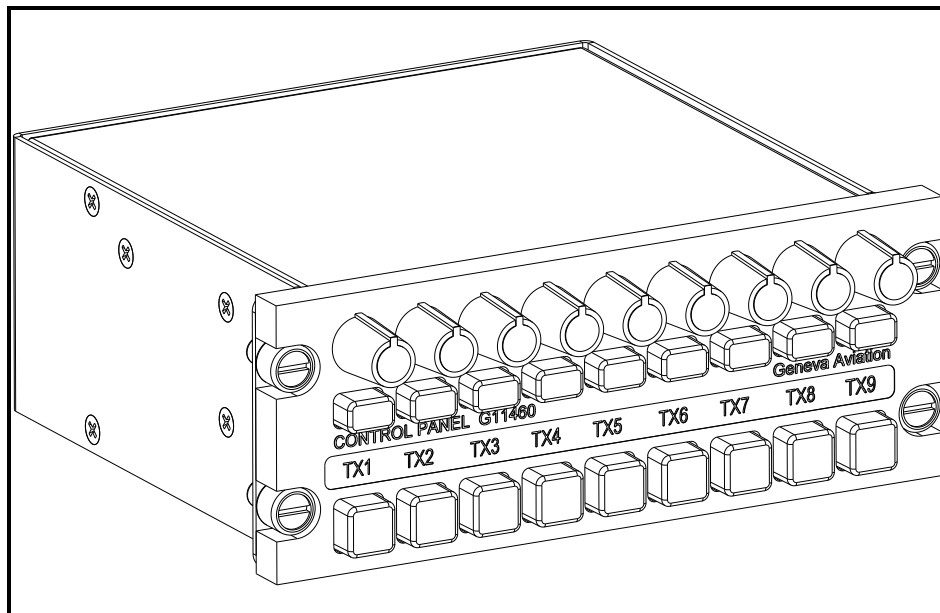


Figure 8: G11460 Control Panel

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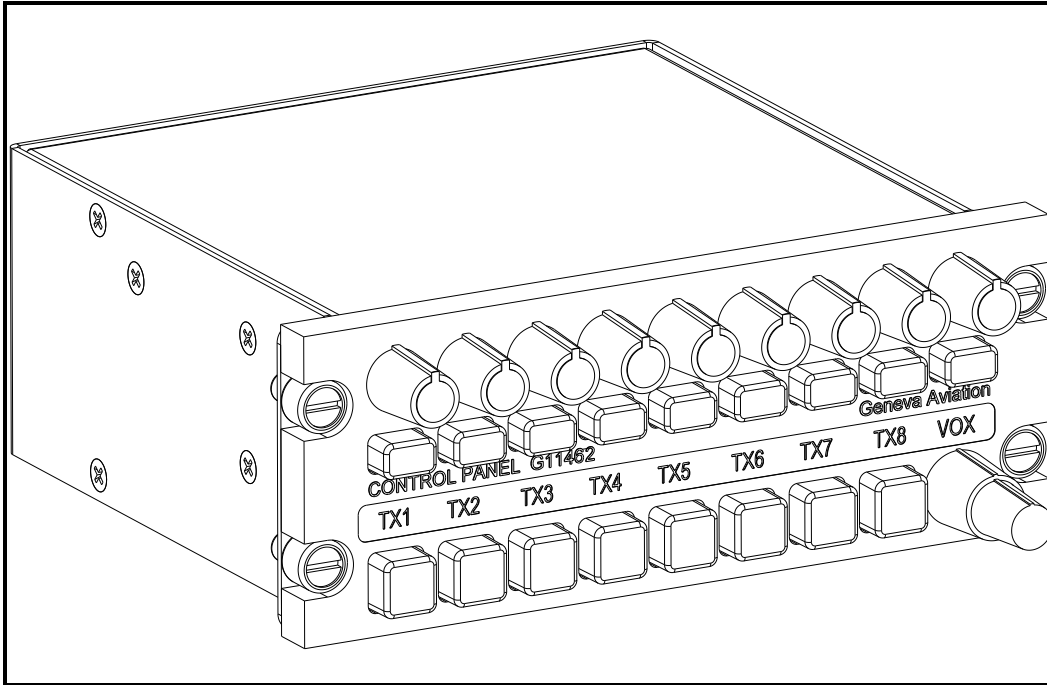


Figure 9: G11462 Control Panel

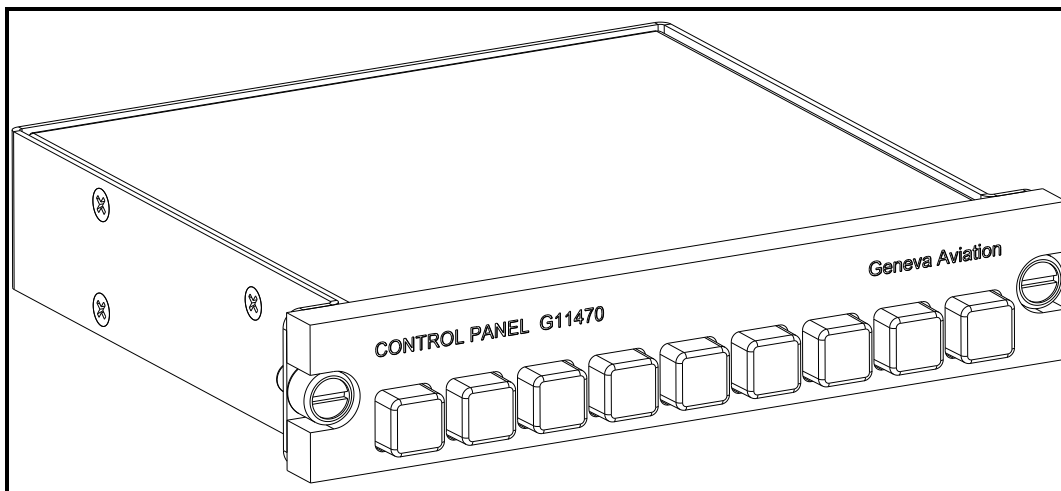


Figure 10: G11470 Auxiliary Control Panel

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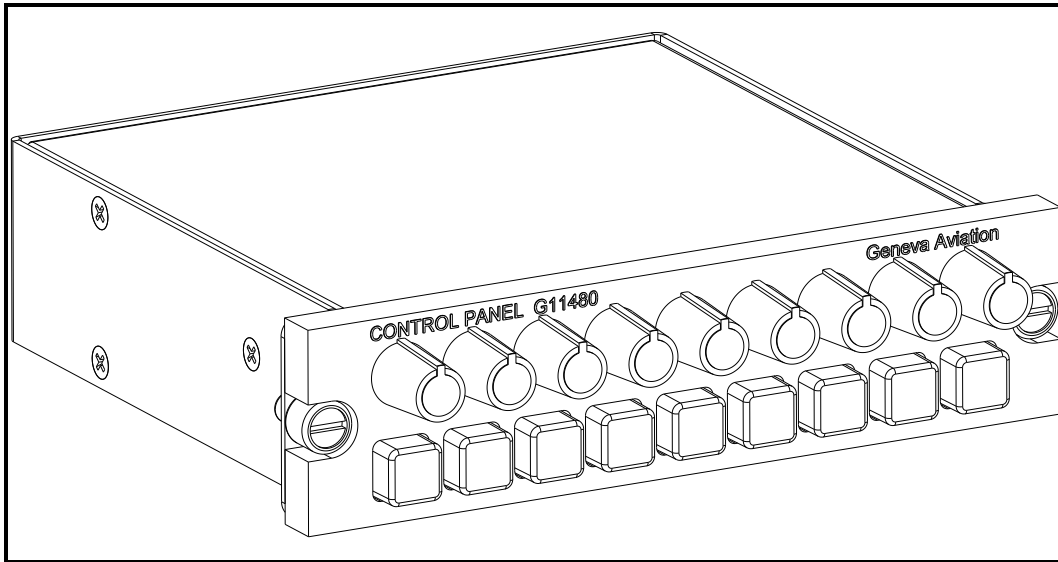


Figure 11: G11480 Control Panel

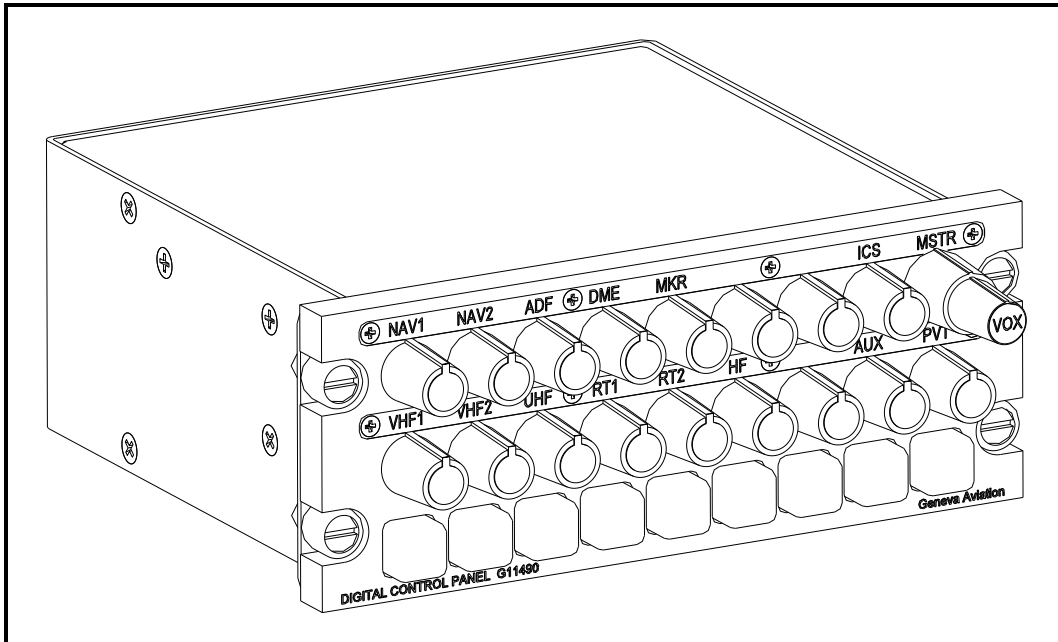


Figure 12: G11490 Control Panel

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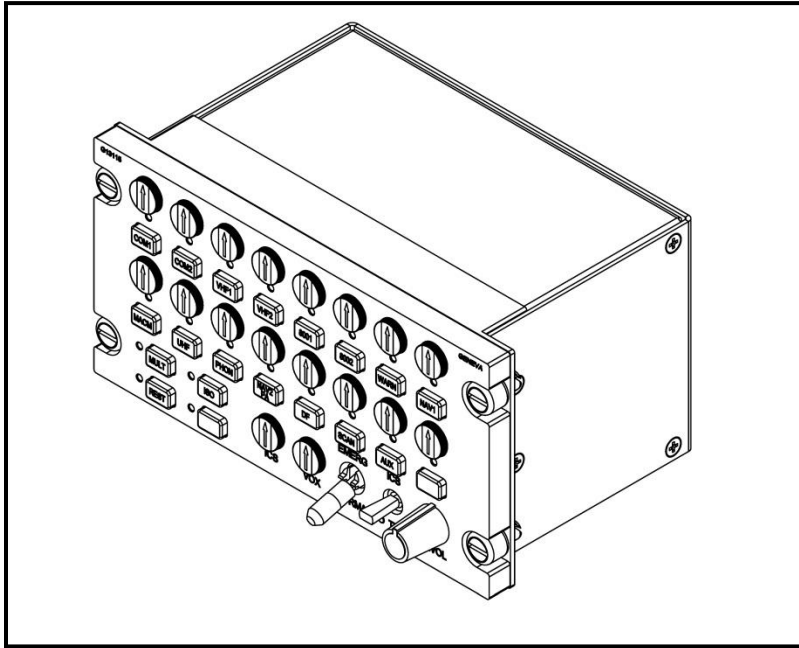


Figure 13: G13115/G13115NS Control Panel

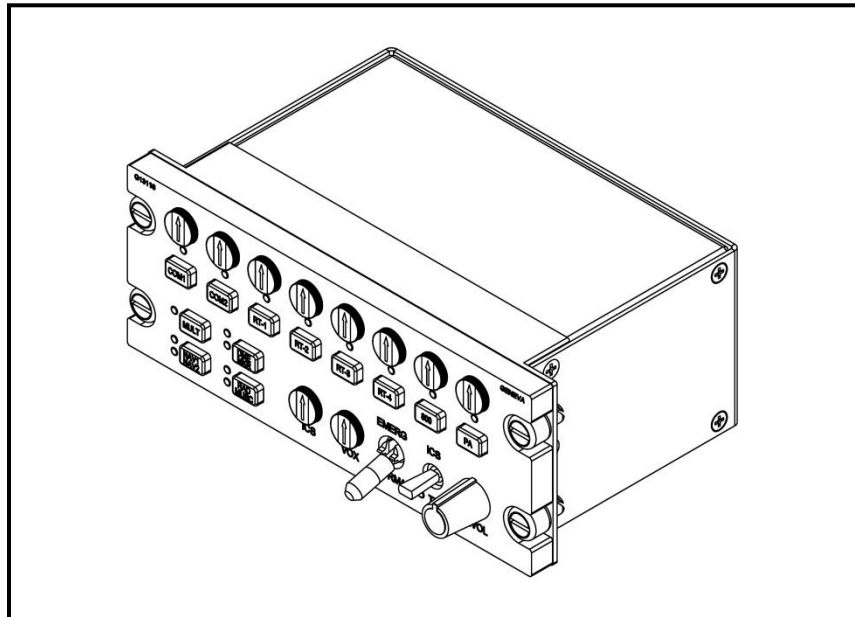


Figure 14: G13116/G13116NS Control Panel



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Section 2.0 Airworthiness Limitations

There no airworthiness limitations associated with this STC.

The Airworthiness Limitation section is FAA approved and specifies inspections and other maintenance required under Part 43.16 and 91.403 of Federal Regulations unless an alternate program has been FAA approved.

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Section 3.0 Inspection Requirements and Overhaul Schedule

3.1 Inspection Requirements

3.1.1 2 Year/2000 Hour Inspection

- a. Make sure the individual modules are properly secured and the restraining hardware is not damaged or deformed.
- b. Remove the Router Assembly from the mounting brackets. See Section 4.0 for the Analog Routers and Section 5.0 for the Digital Router.
- c. Inspect all sheet metal components for damage and corrosion. If damage or excessive corrosion is found replace parts per Section 4.0 for the Analog Routers and Section 5.0 for the Digital Router. Corrosion that has penetrated more than .02” is cause for replacement in machined aluminum components. Corrosion that has penetrated more than .02” is cause for replacement on sheet metal components.
- d. Inspect all wiring for damage and proper security. Any wires that are damaged need to be repaired or completely replaced.
- e. Reinstall any removed or replaced parts per applicable portions of Section 4.0 and Section 5.0 and return aircraft to operational condition.

3.1.2 Special Inspections

- a. In the event that the aircraft experiences a “Hard Landing”, then conduct the inspection requirements called out in Section 3.1.1.
- b. In the event that the aircraft experiences a “Lightning Strike”, then conduct the inspection requirements called out in Section 3.1.1.

3.2 Overhaul Schedule

There is no overhaul schedule for this kit.

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Section 4.0 Analog Audio Router Removal, Inspection and Re-Installation

4.1 Analog Router Removal

- a. Disconnect all cables from the Analog Router.
- b. The installation of the Router will vary depending on the aircraft configuration. Disconnect all hardware attaching the Router to the aircraft and completely remove the entire Router Assembly.

4.2 Analog Router Inspection

WARNING

Most electronic devices are subject to damage by electrostatic discharge (ESD). Installation or removal of components or circuit boards should follow the guidelines in AC43.13-1b Par 12-2 and AC 43-206 Par 905, which are summarized below:

When removing ESD-sensitive equipment from the aircraft, the aircraft should be grounded and power removed. Prior to disconnecting the cables from the equipment, personnel should touch the metal case of the equipment to equalize any electrostatic potential. Once the cables are disconnected, conductive dust caps or conductive grid tape should be placed on the connector receptacles.

Circuit cards and components should be packaged in ESD-protective packaging prior to leaving the ESD workstation. Static shielding bags which have a static-dissipative inner layer and a conductive outer layer are used for this purpose. They should be noncorrosive and should zip-lock or heat seal closed. Cushion wrap (bubble wrap) used around circuit cards should also be made of static-dissipative material.

- a. Inspect the Router Shell for cracks or excessive corrosion. If any of the parts are cracked or excessively corroded (refer to Section 3.1.1 for corrosion limits) they must be removed and replaced.
- b. The Audio Control Boards (P/N G11428) in the Router are field replaceable. The Audio Control Boards as shown in Slots 1-6 of Figure 15 and Slots 1-8 in Figure 16 are physically identical and may be interchanged for diagnostic and spares purposes.
- c. To remove an Audio Control Board remove the 2 retaining screws and apply pressure to the 2 card ejector tabs on either side of the Audio Control Board.

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NOTE

The Audio Control Boards have no serviceable parts. If an Audio Control Board is found to be broken or defective it must be returned to Eagle Copters for repair or replacement.

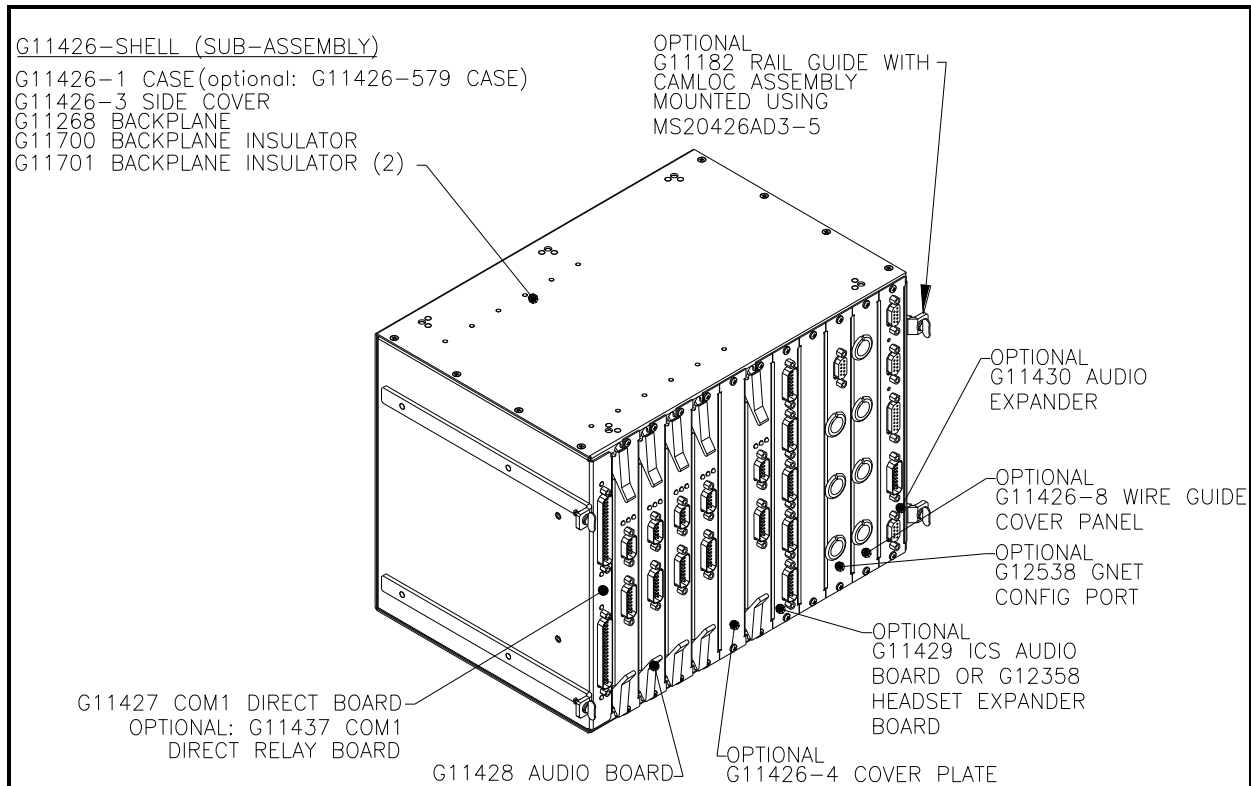


Figure 15: Typical 6 Slot Router Configuration



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NOTE

Assembly shown is typical in configuration. Optionally, the quantities and positions for G11428, G11429, G12358, G11426-4, G11426-8 and G11426-10 may change depending on the installers desired configuration requirements.

G11437 Relay Module may Replace G11427 COM1 Direct Board depending on the installers desired configuration requirements.

G11430 Audio Expander may be omitted depending on the installers desired configuration requirements.

Parts List for Figure 15:

I/N	QTY	PART NUMBER	DESCRIPTION
-	1	G11182	Rail Guide With Camloc Assembly
-	1	G11268	Backplane
-	1	G11426	Shell
-	1	G11426-1	Case
-	1	G11426-3	Side Cover
-	* [a]	G11426-4	Cover Plate
-	* [a]	G11426-8	Wire Guide Cover Panel
-	1 [b]	G11427	COM1 Direct Board
-	1 [b]	G11437	Relay Module Board
-	* [a]	G11428	Audio Board
-	* [a][c]	G11429	ICS Audio Board
-	* [a][c]	G12358	Headset Expander
-	* [a]	G11430	Audio Expander
-	* [a]	G12266	Dimmer Module
-	1	G11700	Backplane Insulator
-	1	G11701	Backplane Insulator (2)
-	* [a]	G12538	GNET Config Port

* [a] Quantities and positions for these components may change depending on the installer's desired configuration requirements.

* [b] Audio systems shall be fitted with either one G11427 COM1 Direct OR G11437 Relay Module.

* [c] Audio systems shall be fitted with either G11429 ICS Audio Board OR G12358 Headset Expander Boards.

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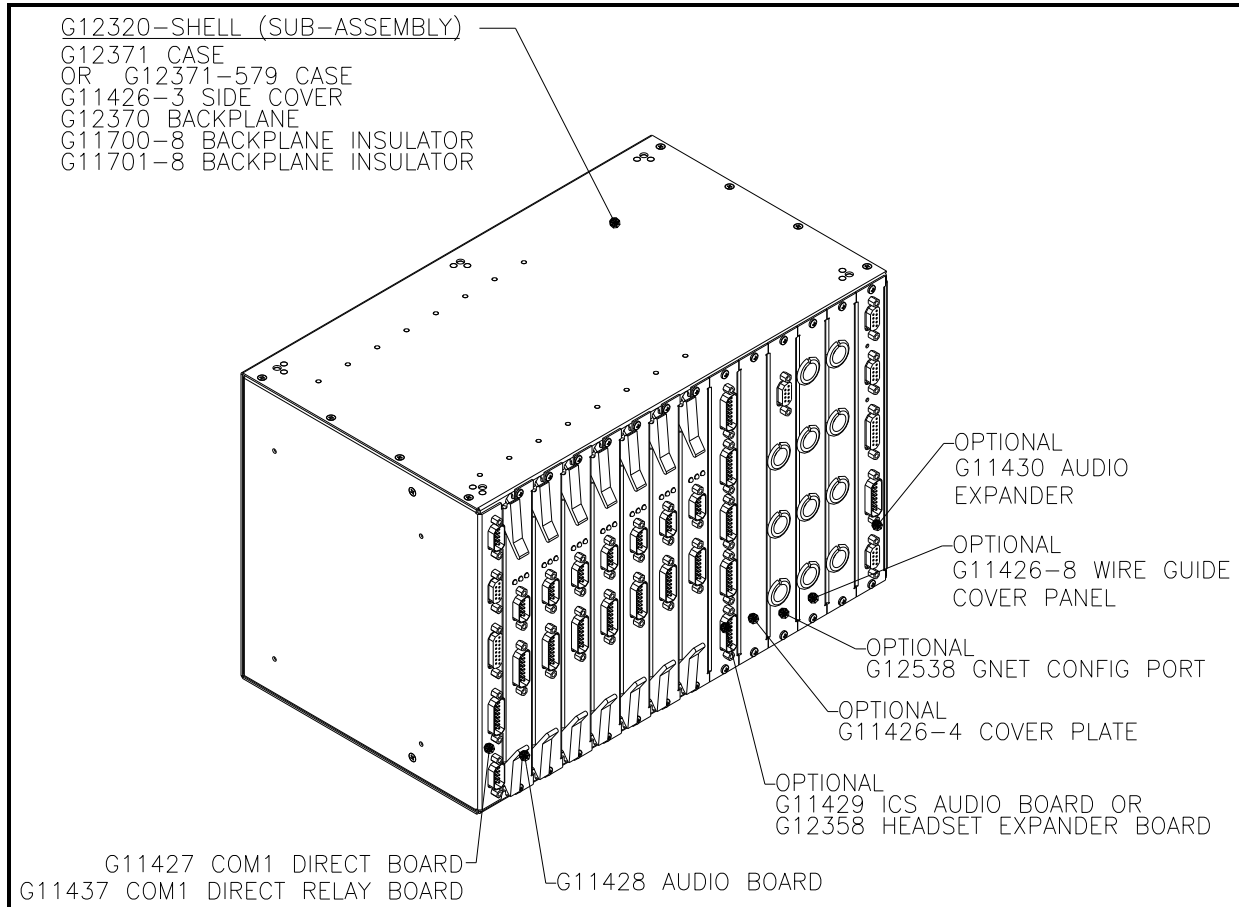


Figure 16: Typical 8 Slot Router Configuration

NOTE

Assembly shown is typical in configuration. Optionally, the quantities and positions for G11428, G11429, G12358, G11426-4, G11426-8 and G11426-10 may change depending on the installers desired configuration requirements.

G11437 Relay Module may Replace G11427 COM1 Direct Board depending on the installers desired configuration requirements.

G11430 Audio Expander may be omitted depending on the installers desired configuration requirements.

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Parts List for Figure 16:

I/N	QTY	PART NUMBER	DESCRIPTION
-	1	G12370	Backplane
-	1	G12320	Shell
-	1	G12371	Case
-	1	G11426-3	Side Cover
-	* [a]	G11426-4	Cover Plate
-	* [a]	G11426-8	Wire Guide Cover Panel
-	1 [b]	G11427	COM1 Direct Board
-	1 [b]	G11437	Relay Module Board
-	* [a]	G11428	Audio Board
-	* [a][c]	G11429	ICS Audio Board
-	* [a][c]	G12358	Headset Expander
-	* [a]	G11430	Audio Expander
-	* [a]	G12266	Dimmer Module
-	1	G11700-8	Backplane Insulator
-	1	G11701-8	Backplane Insulator
-	1	G12538	GNET Config Port

* [a] Quantities and positions for these components may change depending on the installer's desired configuration requirements.

* [b] Audio systems shall be fitted with either one G11427 COM1 Direct OR G11437 Relay Module

* [c] Audio systems shall be fitted with either G11429 ICS Audio Board OR G12358 Headset Expander Boards

4.3 Analog Router Reinstallation

- a. The router may be mounted into a rack, such as the Eagle P142 Modular Equipment Rack (STC # SR00474SE). It also may be mounted to an aircraft structure that is designed to carry the load of the router (11 lbs). Since installation will vary depending the aircraft configuration, the installer is responsible for receiving FAA approval for the mounting of the router to the structure if not previously approved. Two G12340 Brackets may also be used for mounting the router to the aircraft structure.

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Section 5.0 Digital Audio Router Removal, Inspection and Re-Installation

5.1 Digital Router Removal

Note: The following instructions are applicable to Digital Audio Routers G13000 & G13160 defined in Section 1.9.1.

- a. Disconnect all cables from the Digital Router.
- b. Loosen barrel nut on the front of the Router as shown in Figure 17 and slide router out of tray.

NOTE

The Tray and Doublers do not need to be removed on a regular basis for inspection or overhaul. The Tray and Doublers should only be removed if cracked or excessively corroded and need to be replaced.

- c. Remove the 4 MS24693S277 Screws, 4 #10 NAS1149F0332P Washers, and 4 #10-32 MS21042L3 Locknuts connecting the Tray to the Hat Rack Deck as shown in Figure 17.
- d. To remove the Doublers (G13006-4) drill out the 12 #4 Rivets connecting each doubler to the Hat Rack Deck as shown in Figure 17.

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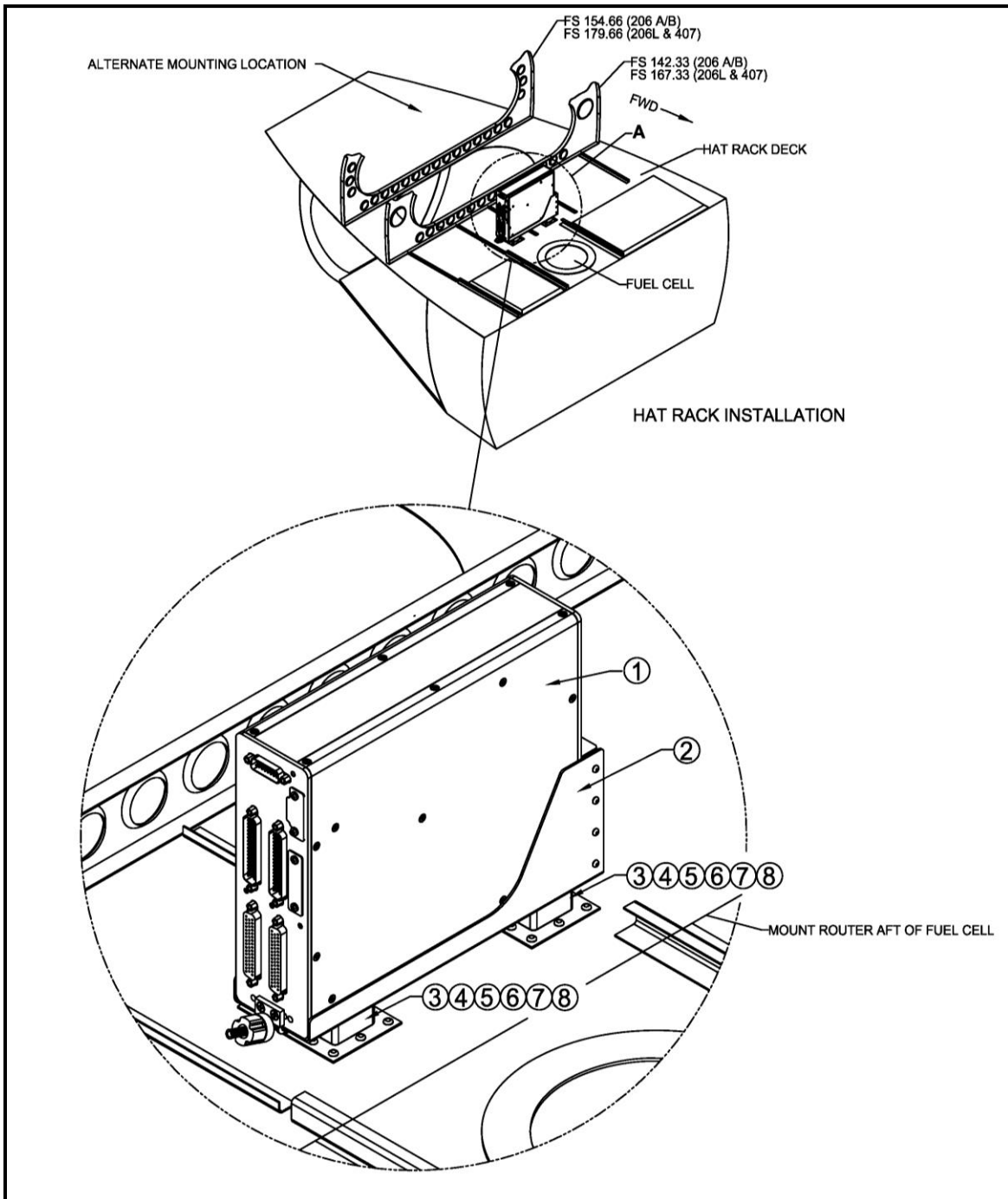


Figure 17: Bell 407 Digital Router Installation Overview



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Parts List for Figure 17: For Router G13000 Installation

I/N	QTY	PART NUMBER	DESCRIPTION
1	1	G13000	P139-HD Router
2	1	G13009	Tray
3	2	G13009-3	Shim
4	2	G13006-4	Doubler
5	24	MS20470AD4-4	Rivet, #4 Round Head
6	4	MS24693S277	Screw, #10-32 x 1-1/8"
7	4	NAS1149F0332P	Washer, #10
8	4	MS21042L3	Locknut, #10-32

Parts List for Figure 17: For Router G13160 Installation

I/N	QTY	PART NUMBER	DESCRIPTION
1	1	G13160	P139-HD 3-Board Router
2	1	G13161	Tray
3	2	G13161-3	Shim
4	2	G13161-5	Doubler
5	24	MS20470AD4-4	Rivet, #4 Round Head
6	4	MS24693S277	Screw, #10-32 x 1-1/8"
7	4	NAS1149F0332P	Washer, #10
8	4	MS21042L3	Locknut, #10-32

5.2 Digital Router and Support Bracket Inspection

- a. The Digital Router contains no user serviceable internal components. Do not disassemble router or the factory warranty will be voided. Return the unit to Eagle Copters for service.
- b. Inspect all sheet metal doublers and brackets for cracks or excessive corrosion. If any of the parts are cracked or excessively corroded (refer to Section 3.1.1 for corrosion limits) they must be removed from the aircraft and replaced.

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5.3 Digital Router Re-Installation

NOTE

This installation provides mounting provisions for the G13000 or G13160 Digital Router in the Hat Rack area for the Bell 407. The location is shown for reference only. The exact placement of the components is dependent on the other pre-existing installed equipment. Mount Router aft of the fuel cell area.

NOTE

If the Tray has not been removed skip to step (d) and connect to the Router to the existing Tray. If Tray has been replaced continue to step (a).

- a. Locate Tray to avoid existing structures and devices installed. Orientation of the tray is at the installer's discretion.
- b. Before installing doublers, assemble with tray to maintain proper spacing. For each doubler, back drill Hat Rack Deck and install 12 #4 Rivets, MS20470AD4-4 as shown in Figure 17.
- c. Mount Tray to deck using (2) Shims, 4 MS24693S277 Screws, (4) #10 NAS1149F0332P Washers, and (4) #10-32 MS21042L3 Locknuts.
- d. Slide router into tray and tighten Barrel Nut to secure router. Be sure router is seated fully down.
- e. Reconnect all applicable cables to the Digital Router. Reference Figure 18 and Figure 19 for all Digital Router Connection Ports.

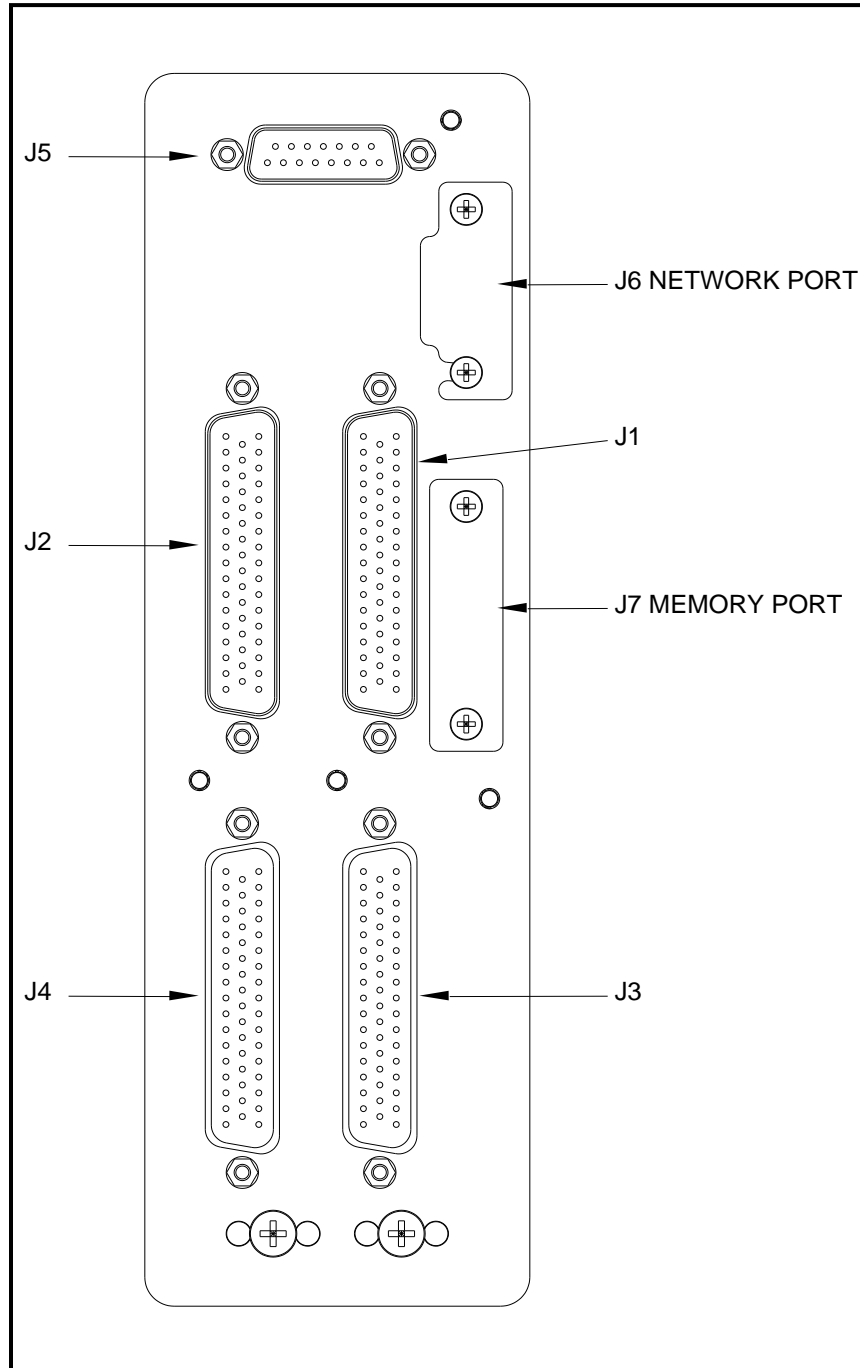


Figure 18: G13000 Digital Router Connector Layout



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- f. G13000 Digital Router Connections
 - 1. J1 is used to connect COM1 and radios XCVR3 – XCVR11.
 - 2. J2 is used to connect COM2 and radios XCVR12 – XCVR20.
 - 3. J3 is used to connect the Pilot's control panel, Pilot's headset group, headset groups 3 – 7 and passenger control panels.
 - 4. J4 is used to connect the Copilot's control panel, Copilot's headset group, headset groups 8 – 12 and additional passenger control panels.
 - 5. J5 is used to connect power, ground, Pilot's COM1 Isolate, and Copilot's COM2 Isolate.
 - 6. J6 is a network port used for system configuration adjustment.
 - 7. J7 is a memory card slot used for storing system configuration data onto removable media.

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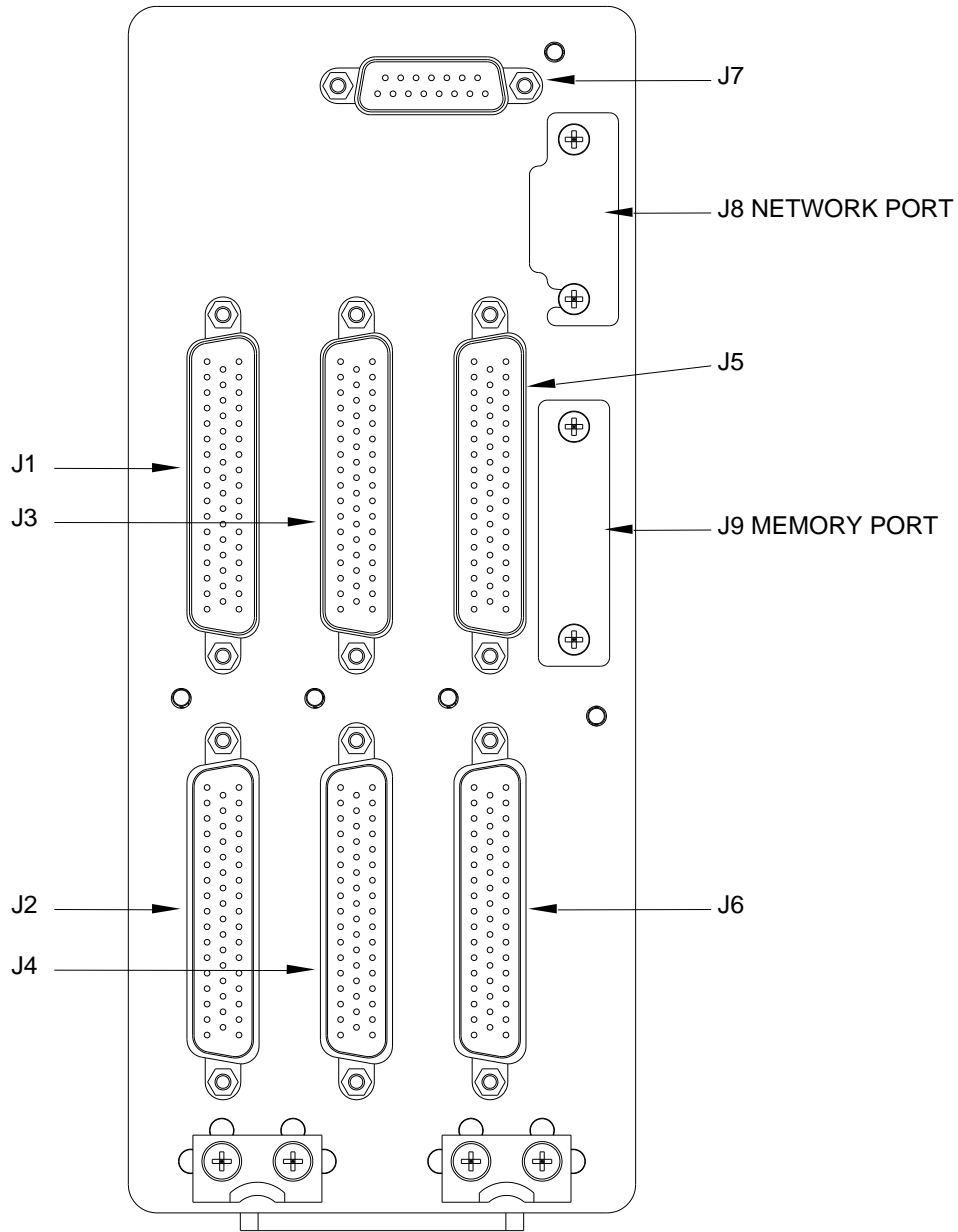


Figure 19: G13160 Digital Router Connector Layout



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g. G13160 Digital Router Connections

1. J1 is used to connect COM1 and radios XCVR3 – XCVR11.
2. J2 is used to connect the Pilot's control panel, Pilot's headset group, headset groups 3 – 7 and passenger control panels.
3. J3 is used to connect COM2 and radios XCVR12 – XCVR20.
4. J4 is used to connect the Copilot's control panel, Copilot's headset group, headset groups 8 – 12 and additional passenger control panels.
5. J5 is used to connect radios XCVR21 – XCVR30.
6. J6 is used to connect headset groups 13 – 18 and additional passenger control panels.
7. J7 is used to connect power, ground, Pilot's COM1 Isolate, and Copilot's COM2 Isolate.
8. J8 is a network port used for system configuration adjustment.
9. J9 is a memory card slot used for storing system configuration data onto removable media.

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Section 6.0 G13120 Audio Mixer Removal, Inspection and Re-Installation

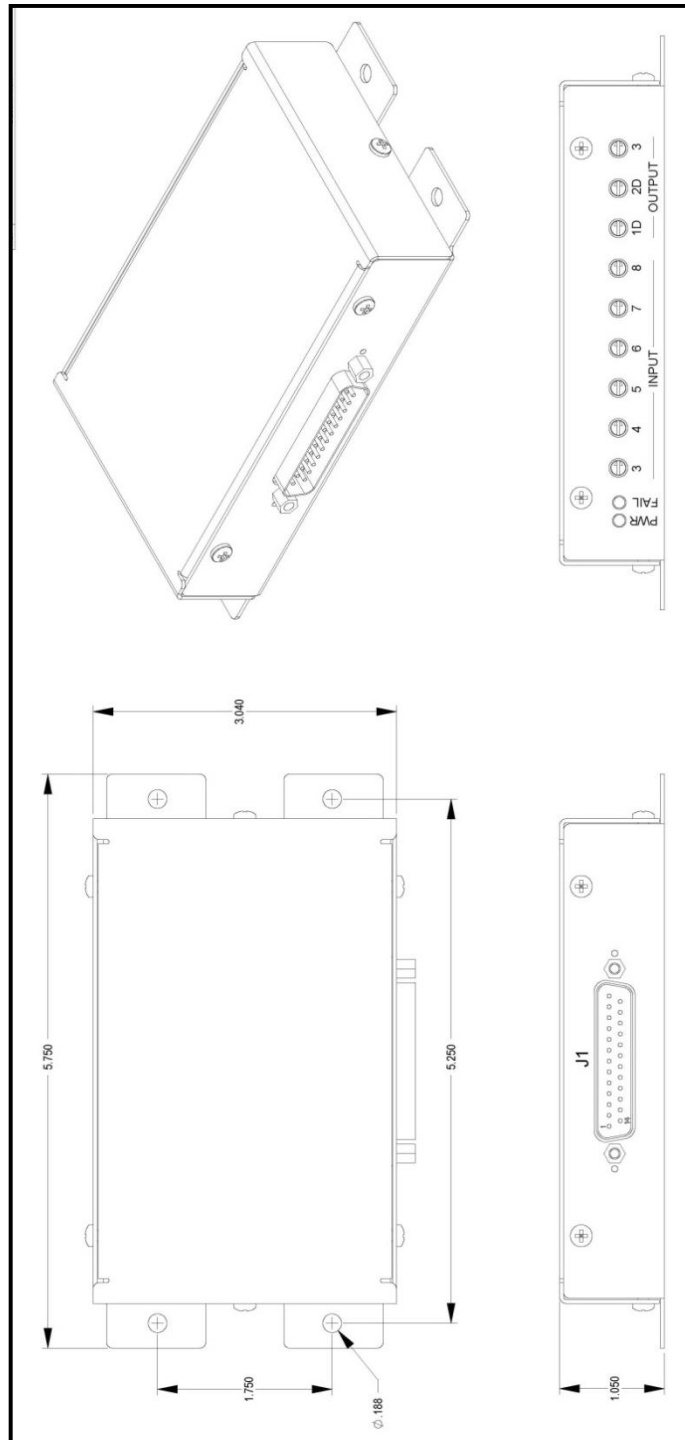


Figure 20: G13120 Audio Mixer

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6.1 G13120 Audio Mixer Removal

- a. Disconnect cable connector from the Audio Mixer.
- b. Disconnect (4) #8-32 screws securing the Audio Mixer to the mounting structure.

6.2 G13120 Audio Mixer Inspection

- a. The Audio Mixer contains no user serviceable internal components. Do not disassemble router or the factory warranty will be voided. Return the unit to Eagle Copters for service.
- b. Inspect all sheet metal for cracks or excessive corrosion. If any of the parts are cracked or excessively corroded (refer to Section 3.1.1 for corrosion limits) they must be removed from the aircraft and replaced.

6.3 G13120 Audio Mixer Installation

- a. The Audio Mixer is designed to be mounted in a variety of locations within the airframe, provided it is protected from the environment. It may be mounted to a deck, bulkhead, tray, avionics shelf or other structure rated to carry a 8 oz. load.
- b. The exact mounting location is left to the installer's discretion provided that the installation of the Audio Mixer does not interfere with other equipment installed. Refer to Figure 20 for laying out mounting holes.
- c. Mount the Audio Mixer using (4) #8-32 screws, washers and locknuts or nutplates. When mounting into composite structure, #8-32 potted inserts should be used.
- d. Unless otherwise specified, follow aircraft manufacturer's standard practices and maintenance manuals for installation of all hardware.
- e. Maintain a minimum 2 e/d edge margin for all installed fasteners.

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6.4 G13120 Audio Mixer Cable Maintenance

- a. Refer to Figure 21 and Figure 22 for cable harness fabrication instructions.
- b. Unless otherwise specified, follow the aircraft manufacturer's electrical wiring practices and maintenance manuals for installation of all system wiring.
- c. Unless otherwise noted, all shielded wire is M27500-(ga)TG(n)T14 and all unshielded wire is M22759/16-(ga)-9, where (ga) is the wire gauge and (n) is the number of wires inside the shield.
- d. Unless otherwise noted, all wire is 22 GA.
- e. All Bonding and Grounding will be In Accordance With AC 43.13-1B, Chapter 11, Section 15.
- f. Route all system cabling through existing cable runs.
- g. Secure all cabling using nylon cable ties and/or cable clamps using standard practices.

6.5 G13120 Audio Mixer Operation

- a. The G13120 Audio Mixer is designed to mix audio from up to 8 sources into 3 outputs.
- b. The first two inputs and outputs (1D and 2D) are considered Essential, and will remain functional even when the mixer is not powered or detects an internal fault due to the failsafe relays and detection internal to the mixer.
- c. If the mixer is not powered or is in fault mode (Essential), Input 1 will be connected directly via relay closure to Output 1D, and Input 2 will be connected directly to Output 2D.
- d. The direct inputs in essential mode are non-adjustable.
- e. The level that is present at Inputs 1 and 2 will be present at 1D and 2D respectively.
- f. Output 3 is not relay direct protected and will therefore drop off line in unpowered or fail mode. This output is designed to be a monitor port to a non-critical device.
- g. It is important to follow the setup instructions exactly in order for the mixer to work properly in the Essential Mode.

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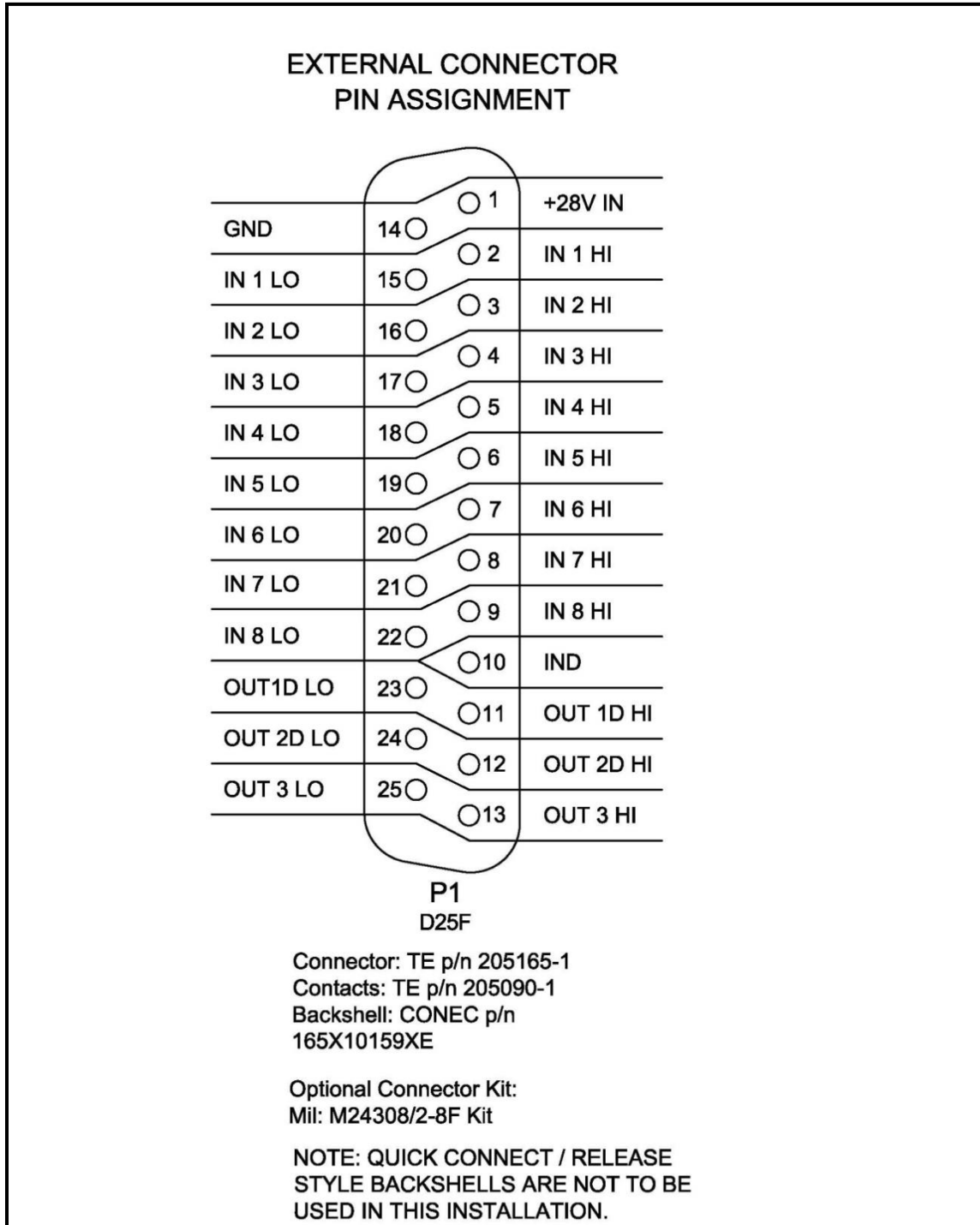


Figure 21: G13120 Audio Mixer Wiring

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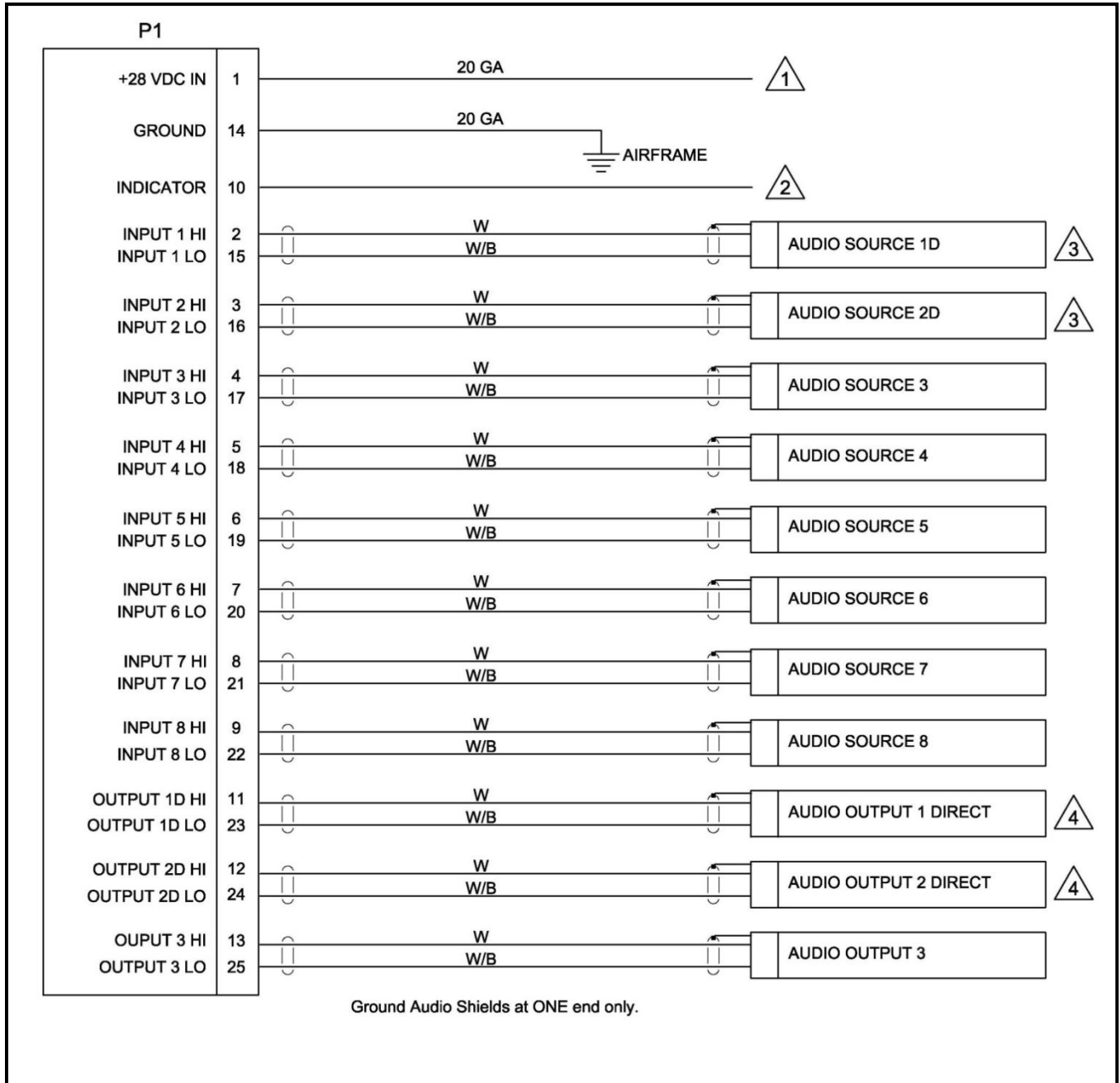


Figure 22: G13120 Audio Mixer Wiring

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6.6 G13120 Audio Mixer Setup and Adjustment

- a. Notes listed below apply to Figure 21 and Figure 22.

NOTES:



Power to be supplied by either Avionics or Essential Bus 1 if equipped. Circuit Breaker to be 1 Amp with the appropriate part number for the bus the mixer is being connected to.



This pin may optionally be used as a pull low for a remote fail indicator for the mixer. Power would be supplied to the desired indicator and this pin would supply a ground to the indicator if a fault occurred. This is optional and not a requirement for installation.



Audio Source 1D and 2D are the relay protected inputs. When connected to a Master Caution System with a single Output the two Inputs may be connected in parallel. If two Outputs are available from the Device use both independently for redundancy. The Setup Instructions on this document must be followed exactly to ensure proper operation.



Audio Output 1 Direct and 2 Direct are Relay Protected Outputs from Audio Sources 1D and 2D. Connect these Outputs to the Pilot's and Co-Pilot's Unswitched or Alert Tone Inputs of the installed audio system. Do Not connect Outputs 1 and 2 Direct in parallel. The Setup Instructions on this document must be followed exactly to ensure proper operation.



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- a. Setup Notes: Failure to follow these instructions will result in improper operation of the Audio Mixer.
 1. With the circuit breaker to the mixer pulled (Off) and the audio system on, Adjust the source to Audio Source 1D and 2D so that proper level is heard at both the Pilot and Co-Pilots Headsets when the source is triggered, i.e. Master Caution. DO NOT adjust the 1D or 2D outputs of the mixer. Adjust the source to the mixer.
 2. With all other avionics off. Push the mixer's circuit breaker In (On). Verify visually that the Power Indicator on the mixer is on, and the Fail Indicator is off. The mixer is now in powered mode. Trigger the source for Inputs 1D and 2D. Adjust the mixer Output Adjustments 1D and 2D so that the proper level is heard in the Pilot and Co-Pilot Headsets. It should be the same as in the unpowered mode. Pull the circuit breaker to the mixer in order to verify this operation.
 3. Once steps 1 and 2 are completed, turn on all avionics or other sources connected to Audio Sources 3 through 8. Adjust the levels as required at Output 3 through 8 on the mixer. DO NOT change the adjustments on Outputs 1D, 2D or 3.
 4. After Completion of Steps 1 through 3, adjust Output 3 to the desired level required by the device connected to Output 3.



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Section 7.0 Cable Maintenance

7.1 General Notes

- a. The installation of Eagle Copters P139 and P139-HD Digital Audio Systems requires the application of accepted aircraft equipment practices, according to FAA publication, AC43.13-1B, *ACCEPTABLE METHODS, TECHNIQUES AND PRACTICES, AIRCRAFT INSPECTION AND REPAIR*, and the installer shall strictly comply with paragraph 428.a of that Advisory Circular.
- b. The requirement regarding the securing of wire bundles using nonmetallic clamps is addressed by the use of nylon cable ties. The part numbers and description of these ties is as follows:

**Cable Tie Selection Chart
Thomas & Betts Brand**

Cat. No.	UPC	Bod Width in.	Length in.	Max. Wire Bundle Dia. in.	Military Standard Part No.	Tensile Strength lbs.
TY23M	82436	.091	3.62	.625	MS3367-4	18
TY24M	82447	.140	5.50	1.125	MS3367-5	40
TY25M	82457	.184	7.31	1.750	MS3367-1	50

- c. Following the guidelines in AC43.13-1B, cable ties are attached at a maximum of 4" spacing and ties are attached to nylon cable tie anchors, as necessary.
- d. The configuration of the wiring and cabling will vary from aircraft to aircraft. The installation of the Eagle Copters Audio System will not change the existing wiring or cabling, but rather will utilize existing wire and cable runs and will not interfere with the existing aircraft equipment installations.

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7.2 Cable Maintenance

- a.** Refer to Figure 23 thru Figure 25 for the Cable Part Numbers associated with a general Analog Audio System installation.
- b.** For the installation of a Digital Audio System using a G13000 Digital Router, refer to Figure 103 thru Figure 115 for detailed wiring schematic drawings G13004 (Sheets 1 -13).
- c.** For the installation of a Digital Audio System using a G13160 3-board Router, refer to Figure 116 thru Figure 128 for detailed wiring schematic drawings G13162 (Sheets 1-13).
- d.** Each cable configuration and location will vary from installation to installation. Refer to notes made during installation to determine exactly where each cable is installed. Be sure to carefully document the Radios and Control panels installed and their related connections for future maintenance and troubleshooting purposes.
- e.** If a cable needs to be repaired or replaced due to damage, refer to the appropriate cable drawing in Section 7.3. Refer to Figure 26 and Figure 27 to identify materials labeled on all cable drawings. Refer to Figure 28 through Figure 40 for all cable assembly details. All cables should be built utilizing proper aviation practices.

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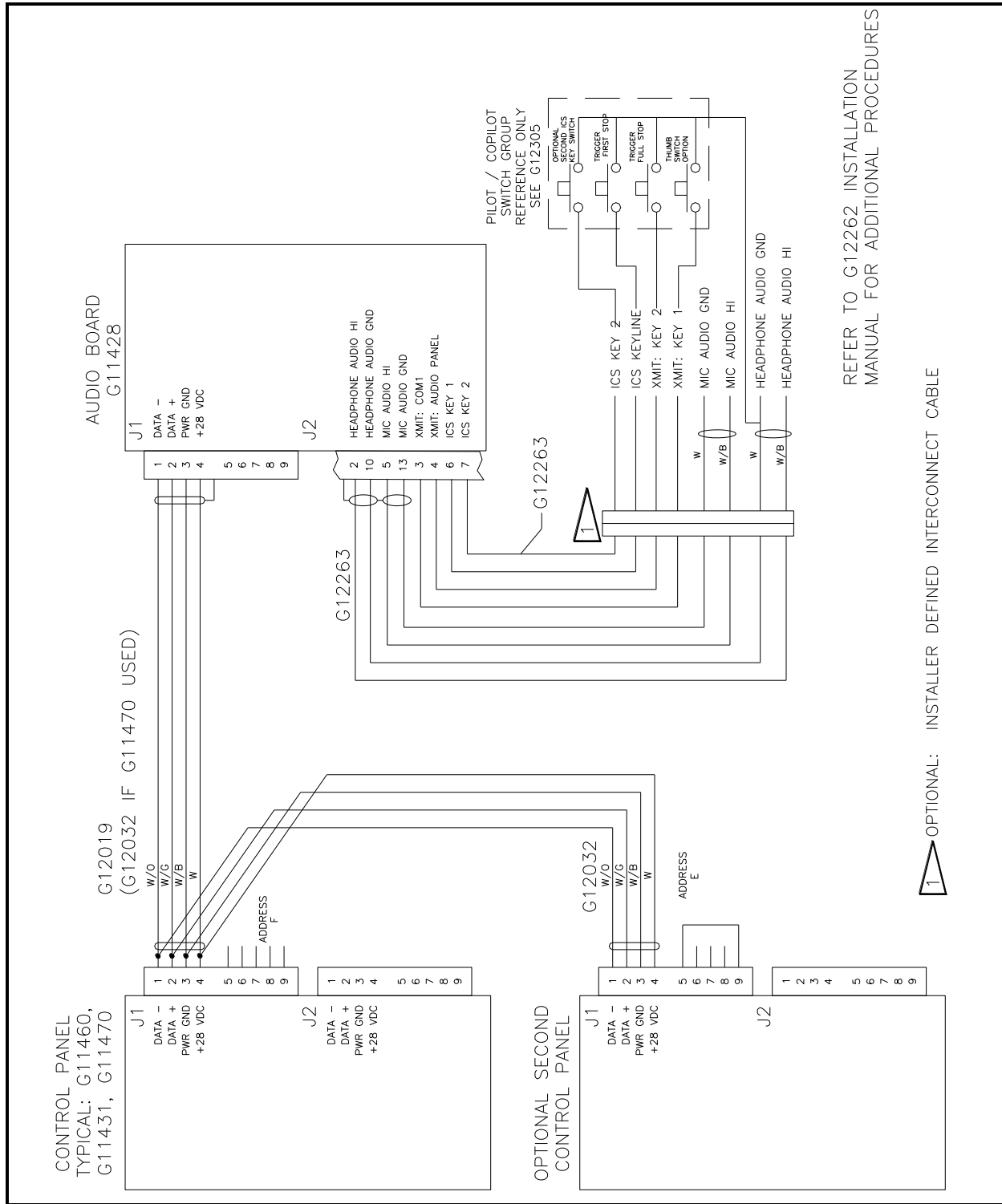


Figure 23: Audio System Pilot/CoPilot

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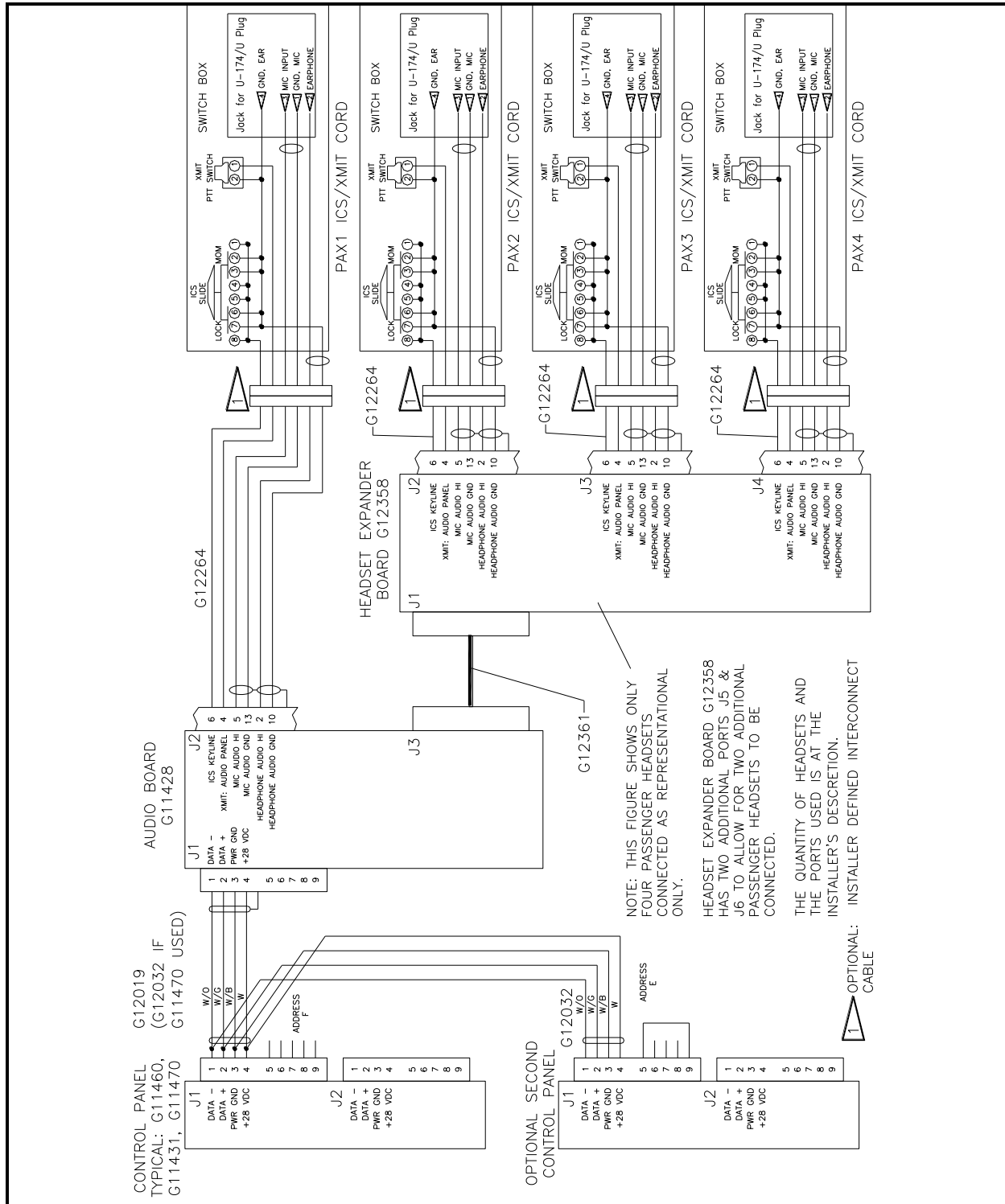


Figure 24: Audio System Passenger

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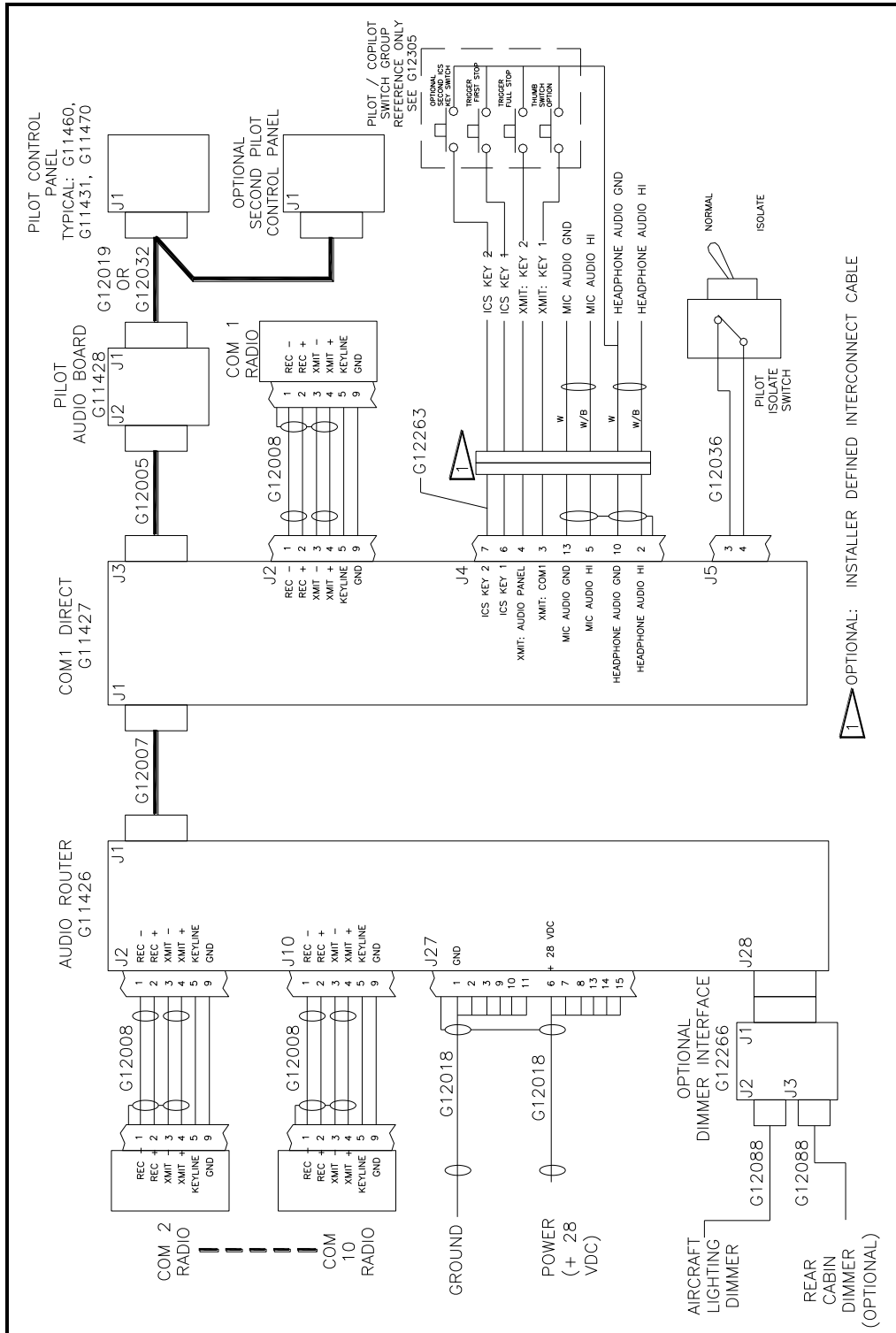


Figure 25: Audio System Router/Com1 Direct Hookup

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7.3 Cable Construction

(D9F) OR (9F)	9 POSITION FEMALE D SUBMINIATURE CONNECTOR CONNECTOR: TYCO/AMP 1757820-1 CONTACTS: TYCO/AMP 205090-1 BACKSHELL: KOBICONN 156-3009-E	(2M)	2 POSITION MALE MATE-N-LOK CONNECTOR CONNECTOR: TYCO/AMP 1-480319-0 CONTACTS: TYCO/AMP 60618-1
(D9M) OR (9M)	9 POSITION MALE D SUBMINIATURE CONNECTOR CONNECTOR: TYCO/AMP 1757819-1 CONTACTS: TYCO/AMP 205089-1 BACKSHELL: KOBICONN 156-3009-E	(4F3)	3 POSITION FEMALE INLINE XLR CONNECTOR DELTRON 712-0300
(D15F) OR (15F)	15 POSITION FEMALE D SUBMINIATURE CONNECTOR CONNECTOR: TYCO/AMP 1757820-21 CONTACTS: TYCO/AMP 205090-1 BACKSHELL: KOBICONN 156-3015-E	(4F4)	4 POSITION FEMALE INLINE XLR CONNECTOR DELTRON 712-0400
(D15M) OR (15M)	15 POSITION MALE D SUBMINIATURE CONNECTOR CONNECTOR: TYCO/AMP 1757819-2 CONTACTS: TYCO/AMP 205089-1 BACKSHELL: KOBICONN 156-3015-E	(4F5)	5 POSITION FEMALE INLINE XLR CONNECTOR DELTRON 712-0500
(D25F) OR (25F)	25 POSITION FEMALE D SUBMINIATURE CONNECTOR CONNECTOR: TYCO/AMP 1757820-3 CONTACTS: TYCO/AMP 205090-1 BACKSHELL: KOBICONN 156-3025-E	(4M3)	3 POSITION MALE INLINE XLR CONNECTOR DELTRON 713-0300
(D25M) OR (25M)	25 POSITION MALE D SUBMINIATURE CONNECTOR CONNECTOR: TYCO/AMP 1757819-3 CONTACTS: TYCO/AMP 205089-1 BACKSHELL: KOBICONN 156-3025-E	(4M4)	4 POSITION MALE INLINE XLR CONNECTOR DELTRON 713-0400
(D37F) OR (37F)	37 POSITION FEMALE D SUBMINIATURE CONNECTOR CONNECTOR: TYCO/AMP 1757820-4 CONTACTS: TYCO/AMP 205090-1 BACKSHELL: KOBICONN 156-3037-E	(1U-18)	SINGLE CONDUCTOR UNSHIELDED, 18 GAGE MIL-W-22759/16-18-9
(D37M) OR (37M)	37 POSITION MALE D SUBMINIATURE CONNECTOR CONNECTOR: TYCO/AMP 1757819-4 CONTACTS: TYCO/AMP 205089-1 BACKSHELL: KOBICONN 156-3037-E	(1U-20)	SINGLE CONDUCTOR UNSHIELDED, 20 GAGE MIL-W-22759/16-20-9
(D15FS) OR (15FS)	15 POSITION FEMALE D SUBMINIATURE CONNECTOR, SOLDER CUP CONNECTOR: TYCO/AMP 5-747909-2 BACKSHELL: KOBICONN 156-3015-E	(1U-22)	SINGLE CONDUCTOR UNSHIELDED, 22 GAGE MIL-W-22759/16-22-9
(15HMS)	15 POSITION MALE D SUBMINIATURE CONNECTOR, SOLDER CUP, HIGH DENSITY CONNECTOR: NORCOMP 180-015-103L001 BACKSHELL: KOBICONN 156-3009-E	(1U-24)	SINGLE CONDUCTOR UNSHIELDED, 24 GAGE MIL-W-22759/16-24-9
(U92)	U92/UA HELICOPTER HEADSET JACK BULKHEAD: NEXUS TJ-120 INLINE: NEXUS TJ-102	(1S-10)	SINGLE CONDUCTOR SHIELDED, 10 GAGE MIL-DTL-27500-10TG1T14
(2F)	2 POSITION FEMALE MATE-N-LOK CONNECTOR CONNECTOR: TYCO/AMP 1-480318-0 CONTACTS: TYCO/AMP 60617-1	(1S-14)	SINGLE CONDUCTOR SHIELDED, 14 GAGE MIL-DTL-27500-14TG1T14
		(1S-16)	SINGLE CONDUCTOR SHIELDED, 16 GAGE MIL-DTL-27500-16TG1T14
		(1S-18)	SINGLE CONDUCTOR SHIELDED, 18 GAGE MIL-DTL-27500-18TG1T14
		(1S-20)	SINGLE CONDUCTOR SHIELDED, 20 GAGE MIL-DTL-27500-20TG1T14
		(1S-22)	SINGLE CONDUCTOR SHIELDED, 22 GAGE MIL-DTL-27500-22TG1T14
		(2S-20)	SHIELDED TWISTED PAIR, 20 GAGE MIL-DTL-27500-20TG2T14
		(2S-22)	SHIELDED TWISTED PAIR, 22 GAGE MIL-DTL-27500-22TG2T14
		(3S-22)	SHIELDED TWISTED TRIPLE, 22 GAGE MIL-DTL-27500-22TG3T14
		(4S-22)	SHIELDED TWISTED QUAD, 22 GAGE MIL-DTL-27500-22TG4T14

Figure 26: Connector and Wire Parts List Part 1

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(15S-22)	15 CONDUCTOR SHIELDED, 22 GAGE WIREMASTERS WMTZWAAF247
(16U-28)	16 CONDUCTOR RIBBON CABLE, 28 GAGE 3M 3365/16SF
(1U-18)	SINGLE CONDUCTOR UNSHIELDED, 18 GAGE MIL-W-22759/16-18-9
(1U-20)	SINGLE CONDUCTOR UNSHIELDED, 20 GAGE MIL-W-22759/16-20-9
(1U-22)	SINGLE CONDUCTOR UNSHIELDED, 22 GAGE MIL-W-22759/16-22-9
(1U-24)	SINGLE CONDUCTOR UNSHIELDED, 24 GAGE MIL-W-22759/16-24-9
(1S-10)	SINGLE CONDUCTOR SHIELDED, 10 GAGE MIL-DTL-27500-10TG1T14
(1S-14)	SINGLE CONDUCTOR SHIELDED, 14 GAGE MIL-DTL-27500-14TG1T14
(1S-16)	SINGLE CONDUCTOR SHIELDED, 16 GAGE MIL-DTL-27500-16TG1T14
(1S-18)	SINGLE CONDUCTOR SHIELDED, 18 GAGE MIL-DTL-27500-18TG1T14
(1S-20)	SINGLE CONDUCTOR SHIELDED, 20 GAGE MIL-DTL-27500-20TG1T14
(1S-22)	SINGLE CONDUCTOR SHIELDED, 22 GAGE MIL-DTL-27500-22TG1T14
(2S-20)	SHIELDED TWISTED PAIR, 20 GAGE MIL-DTL-27500-20TG2T14
(2S-22)	SHIELDED TWISTED PAIR, 22 GAGE MIL-DTL-27500-22TG2T14
(3S-22)	SHIELDED TWISTED TRIPLE, 22 GAGE MIL-DTL-27500-22TG3T14
(4S-22)	SHIELDED TWISTED QUAD, 22 GAGE MIL-DTL-27500-22TG4T14
(15S-22)	15 CONDUCTOR SHIELDED, 22 GAGE WIREMASTERS WMTZWAAF247
(16U-28)	16 CONDUCTOR RIBBON CABLE, 28 GAGE 3M 3365/16SF

Figure 27: Connector and Wire Parts List Part 2

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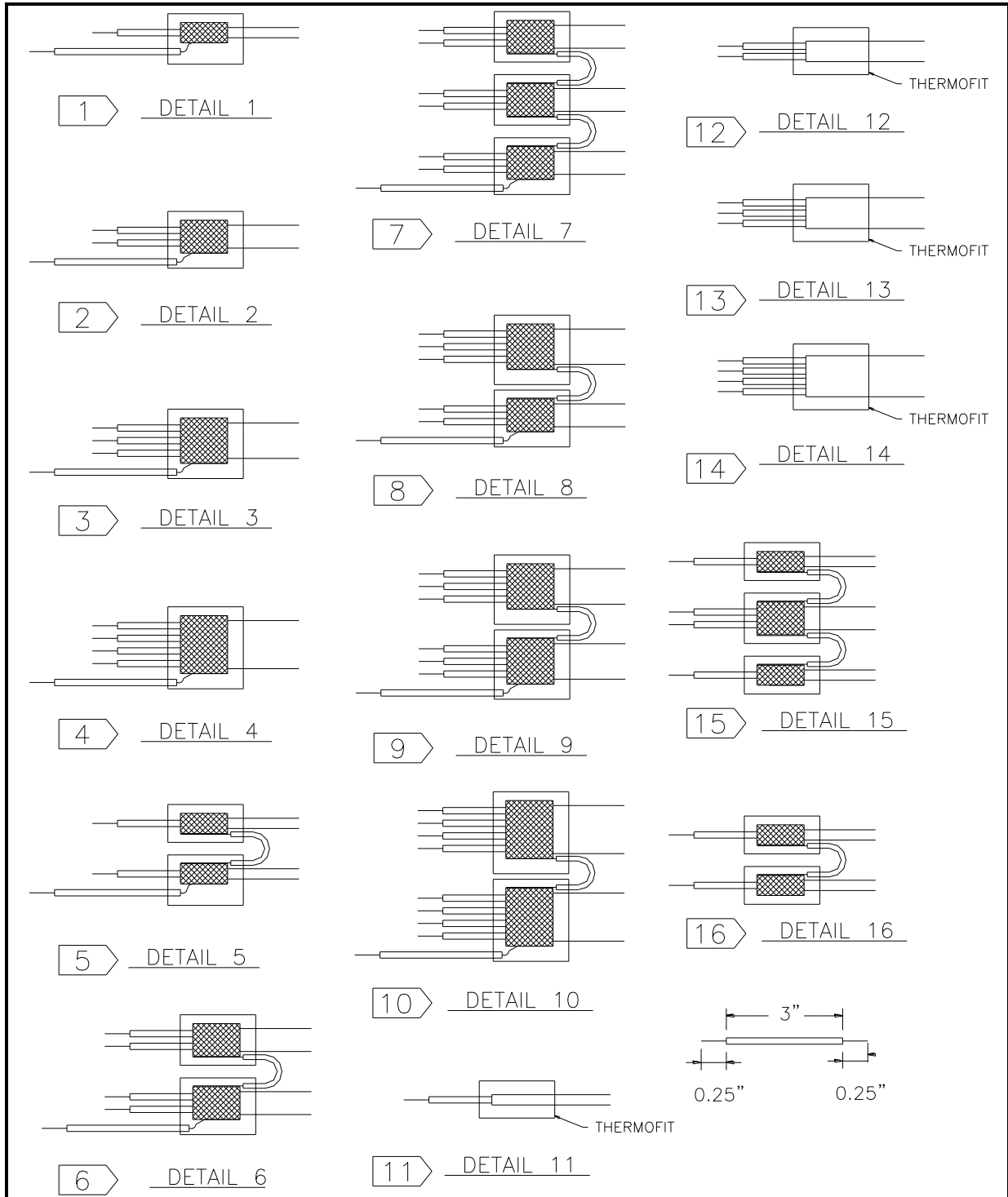


Figure 28: Cable Assembly Detail Wire Termination

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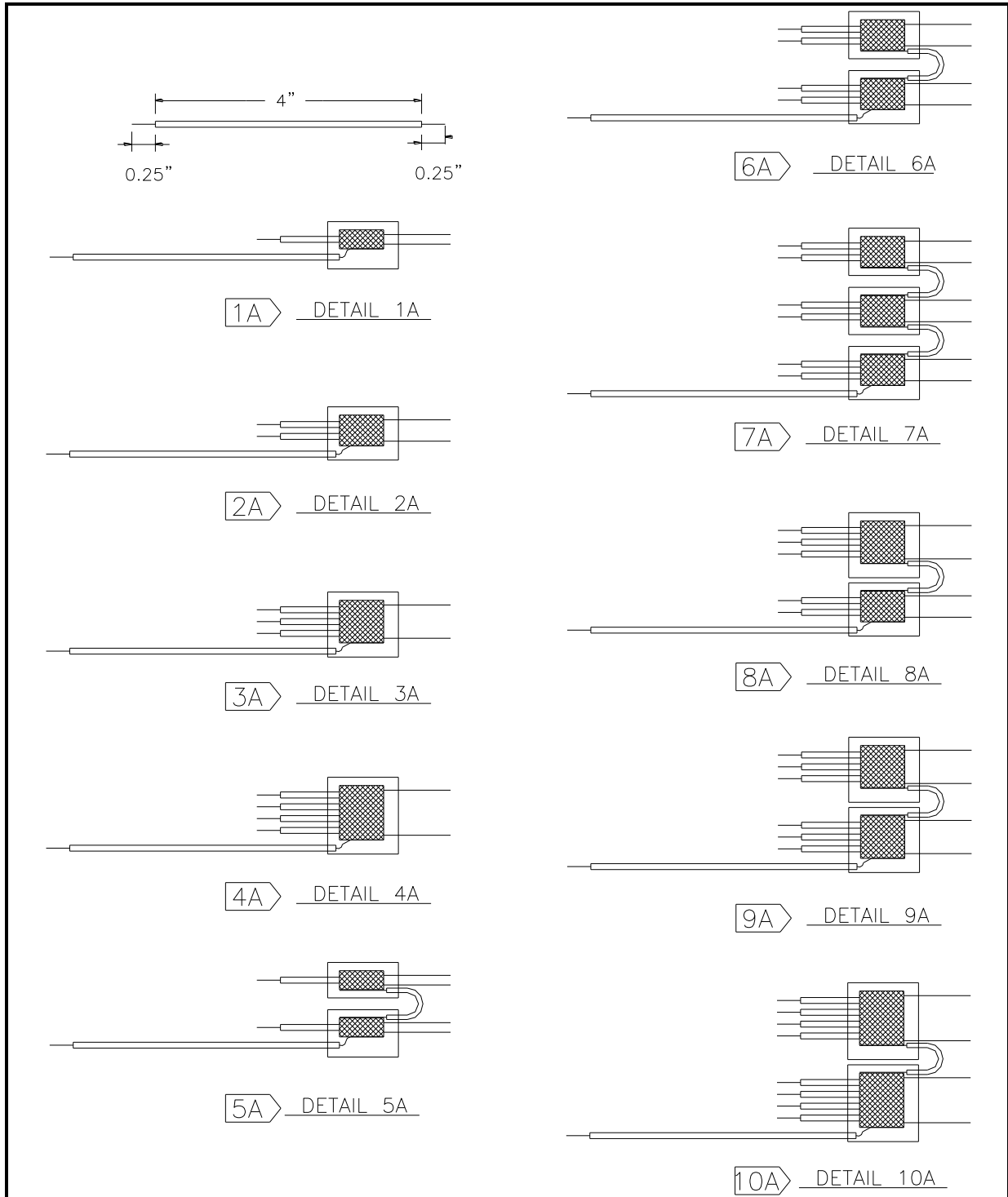


Figure 29: Cable Assembly Detail Wire Termination 2

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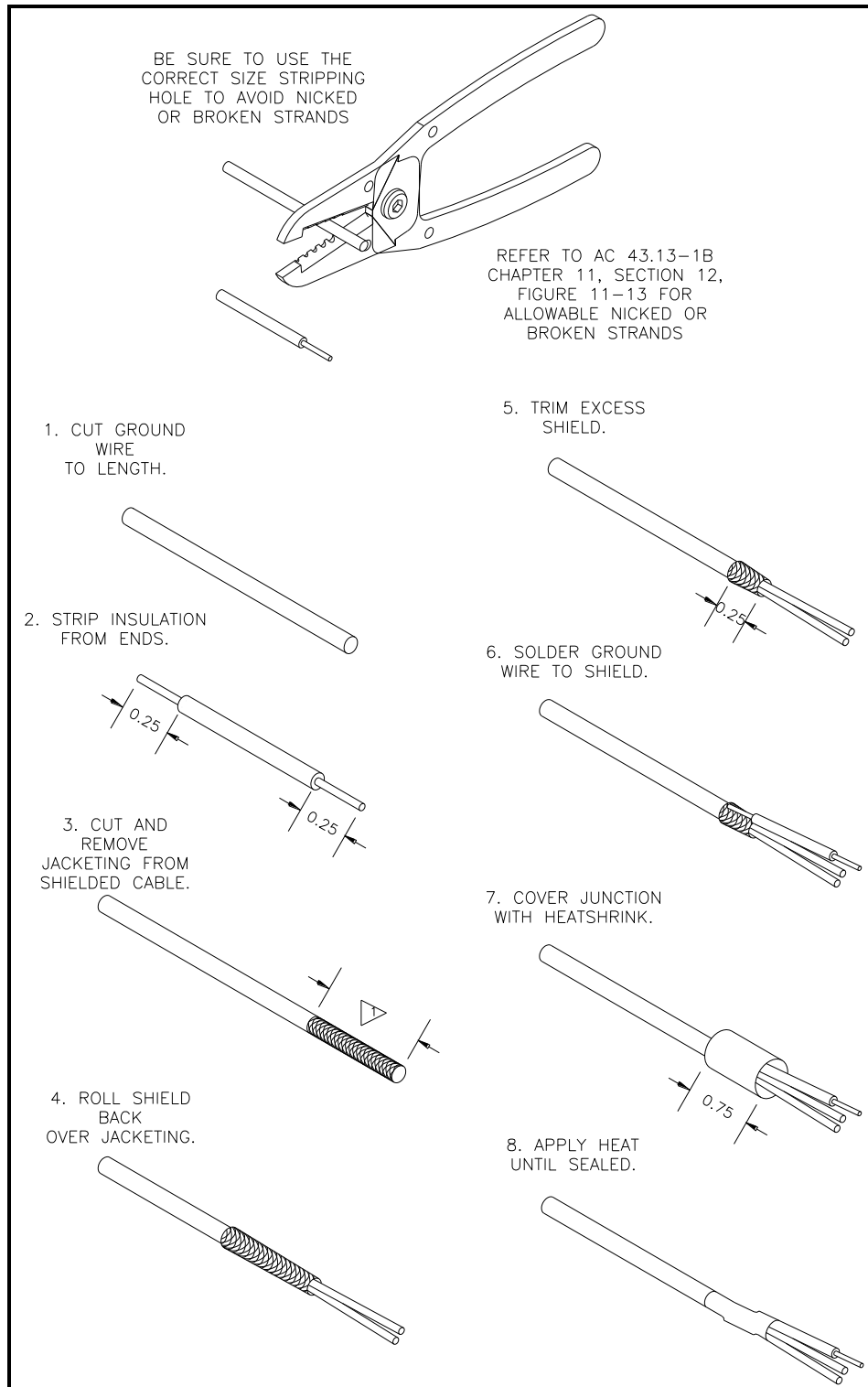


Figure 30: Cable Assembly Detail Wire Preparation

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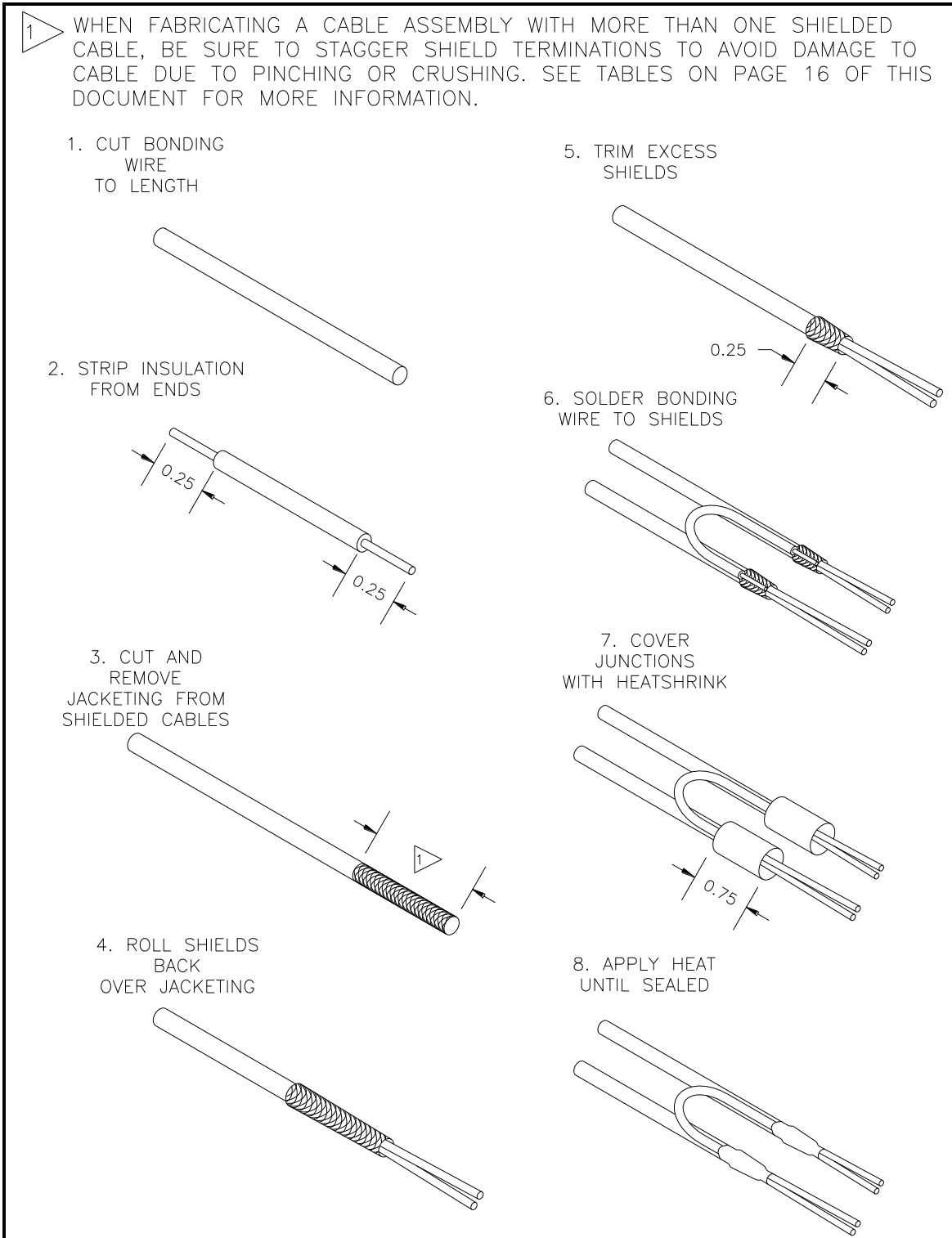


Figure 31: Cable Assembly Detail Wire Preparation 2

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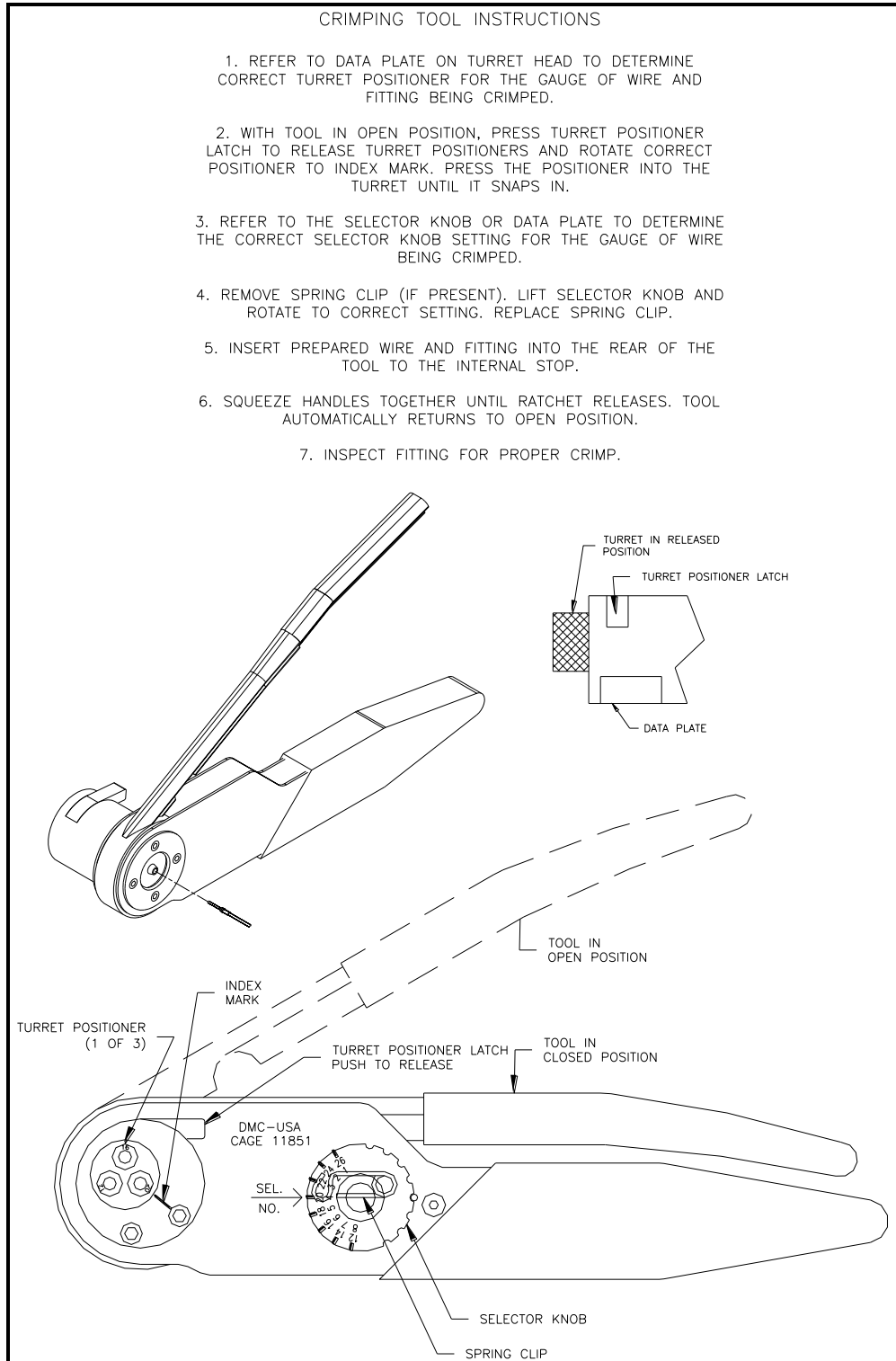


Figure 32: Cable Assembly Detail Crimping Tool

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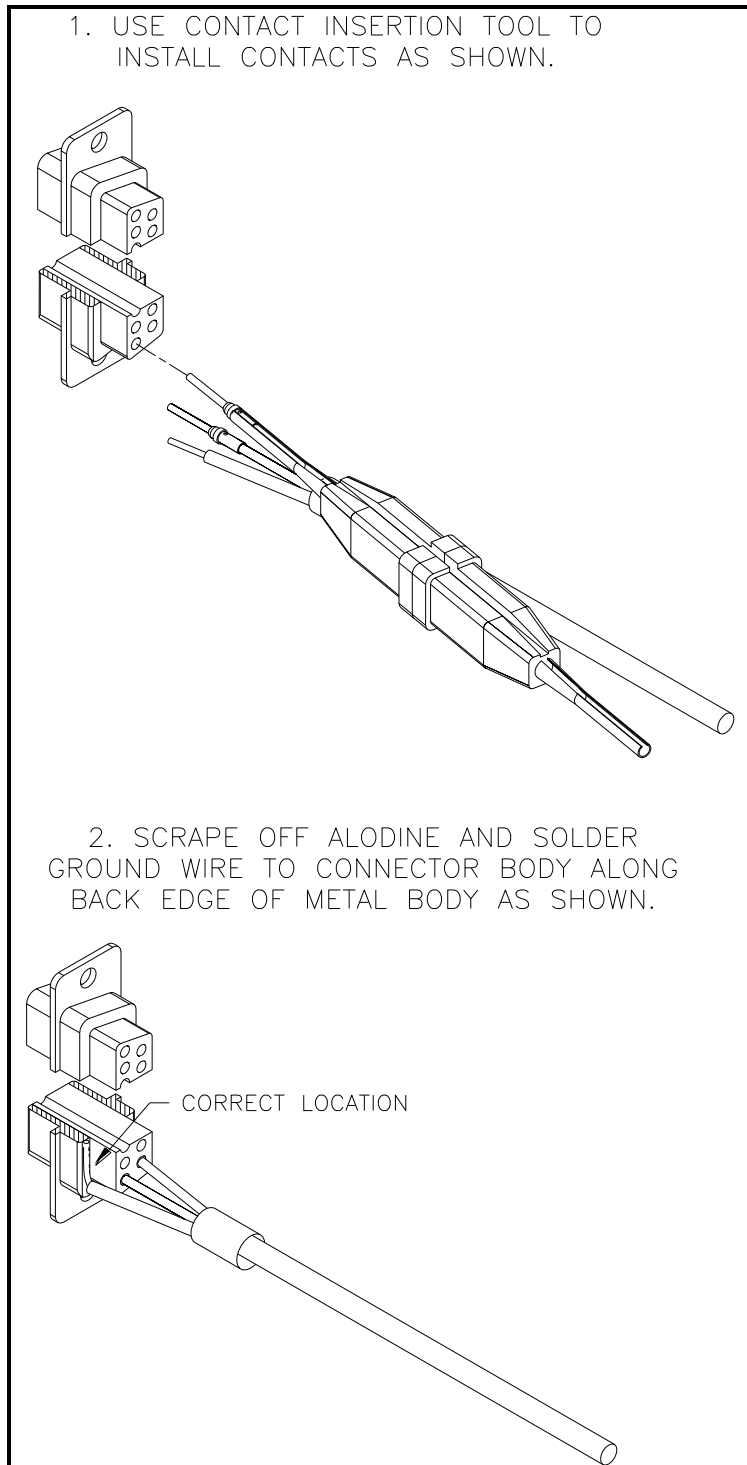


Figure 33: Cable Assembly Detail Contacts and Shield

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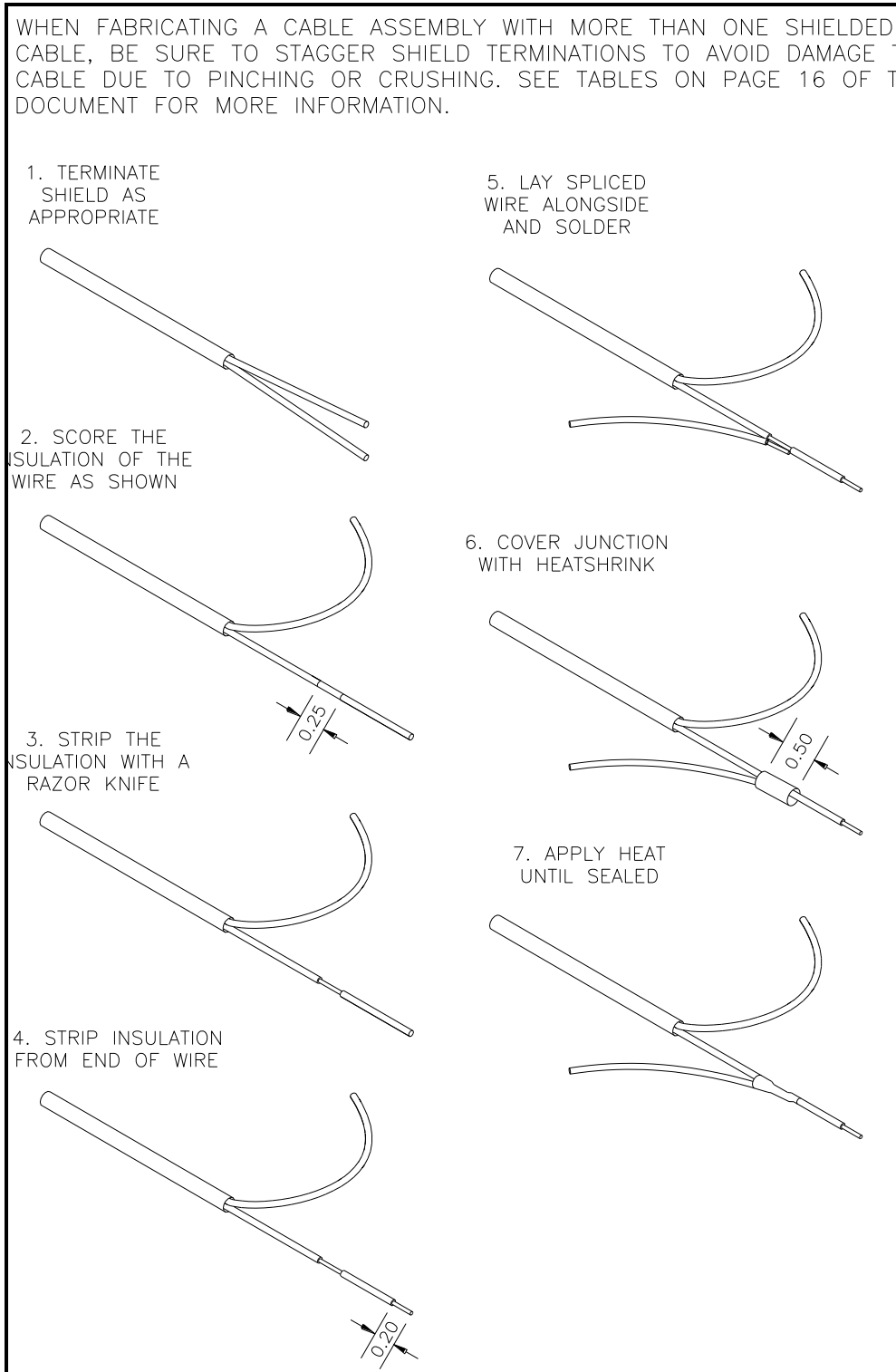


Figure 34: Cable Assembly Detail Inline Splice

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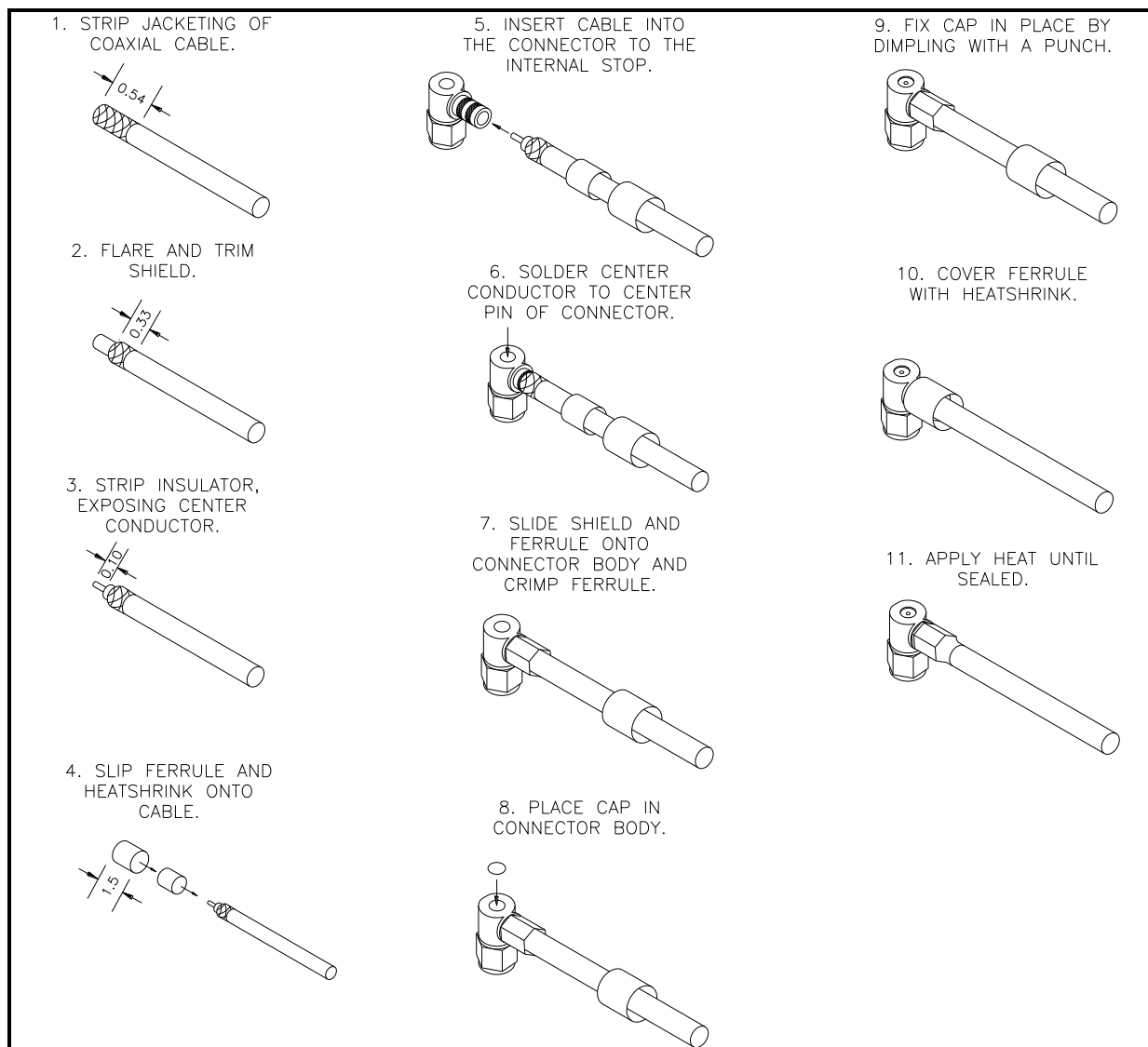


Figure 35: Cable Assembly Detail Amphenol R/A SMA Connector

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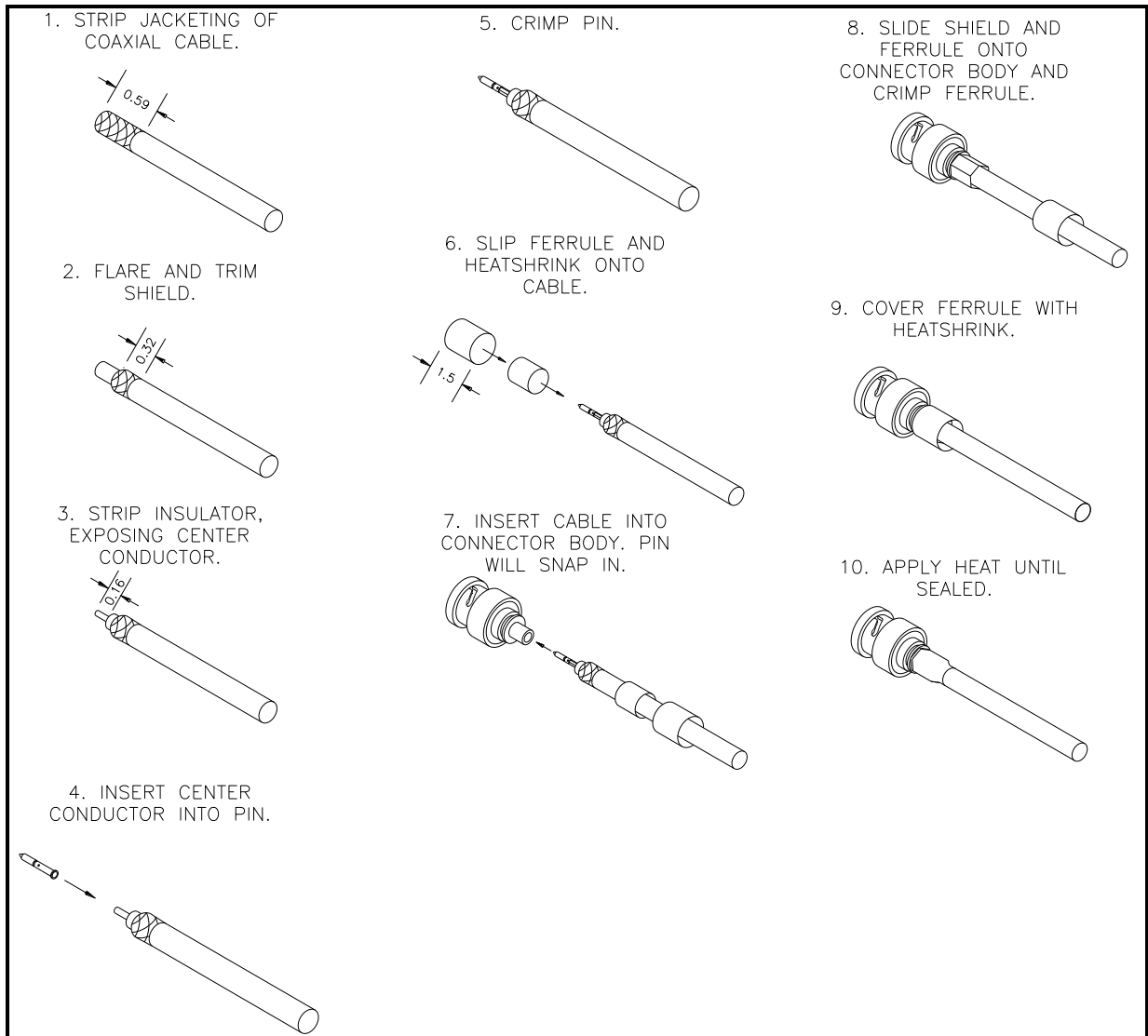


Figure 36: Cable Assembly Detail BNC, Coaxial

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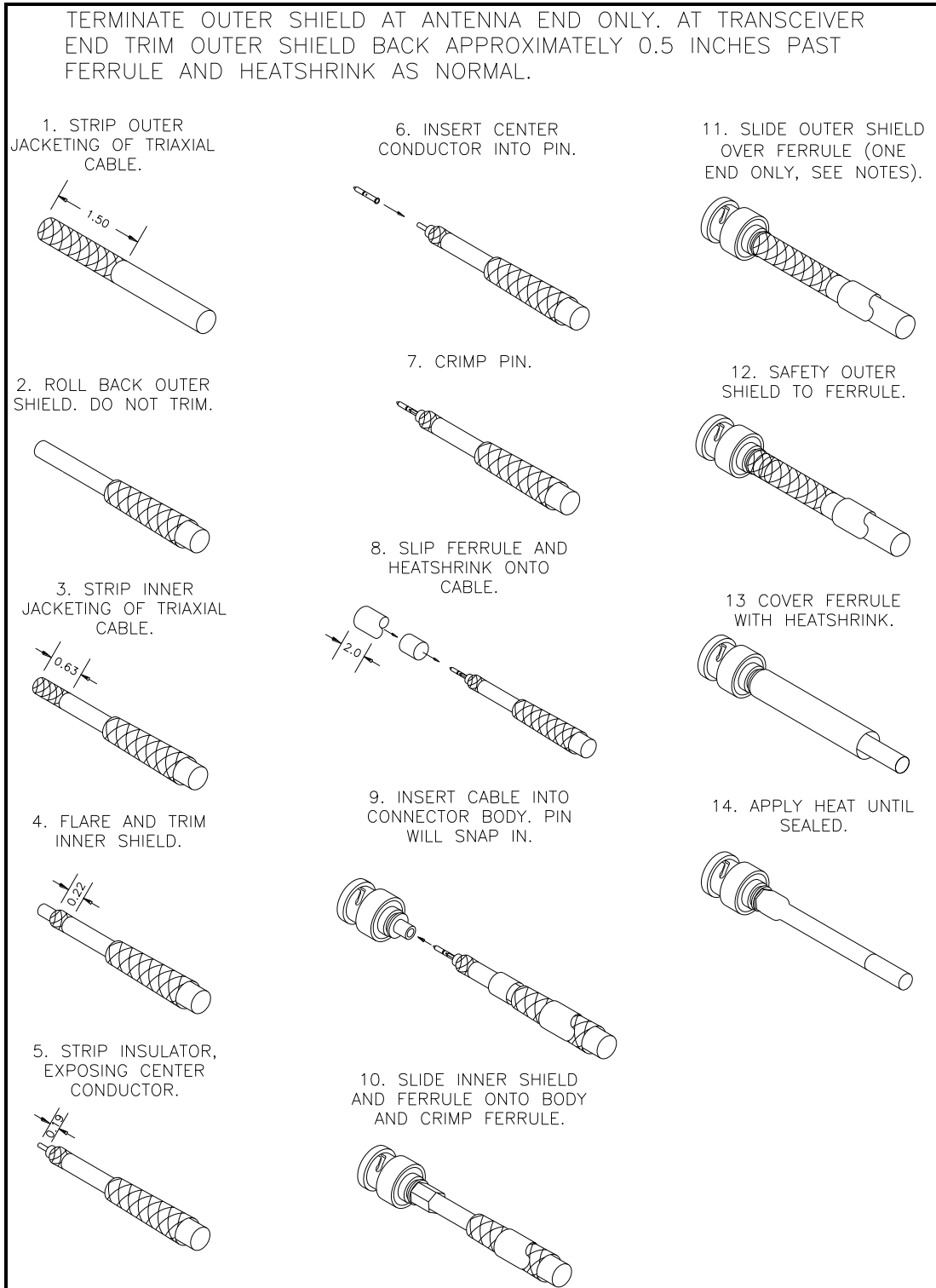


Figure 37: Cable Assembly Detail BNC, Triaxial

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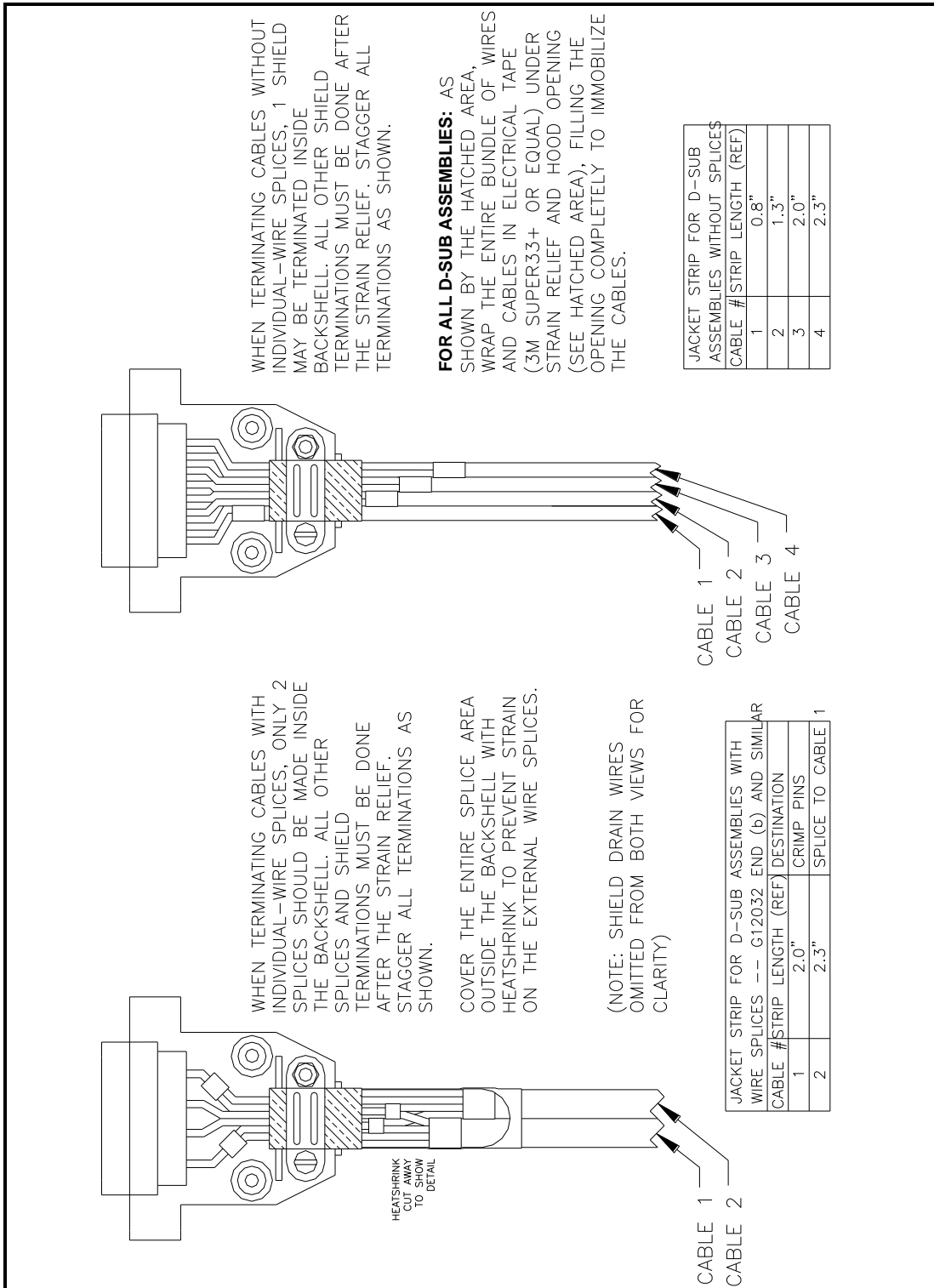


Figure 38: Cable Assembly Detail Splice and Shield Staggering

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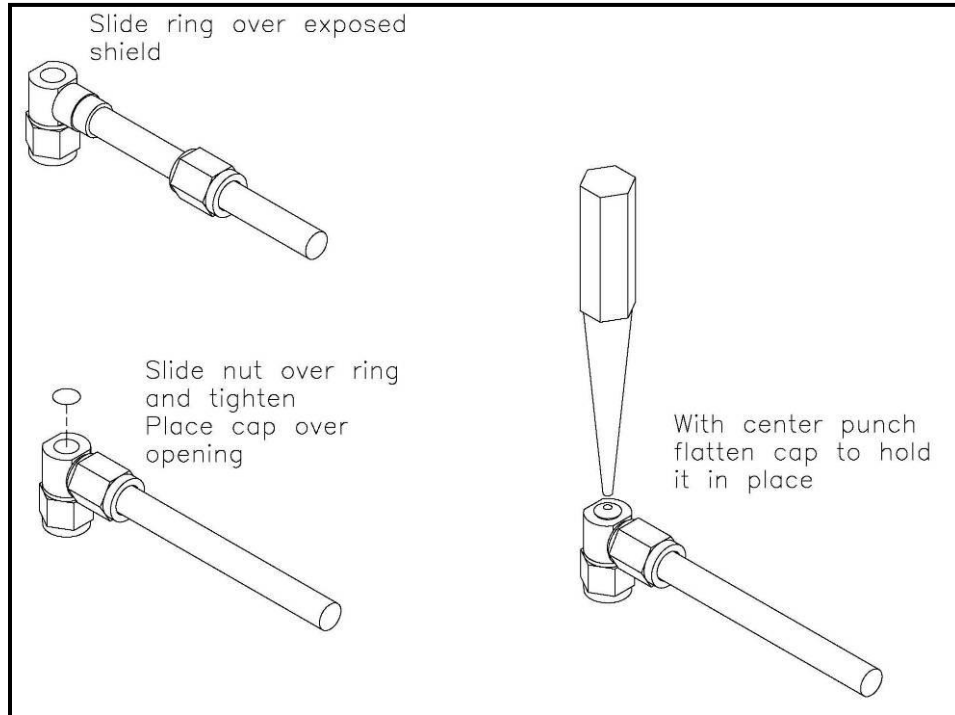


Figure 39: Cable Assembly Detail Spice and Shield Staggering

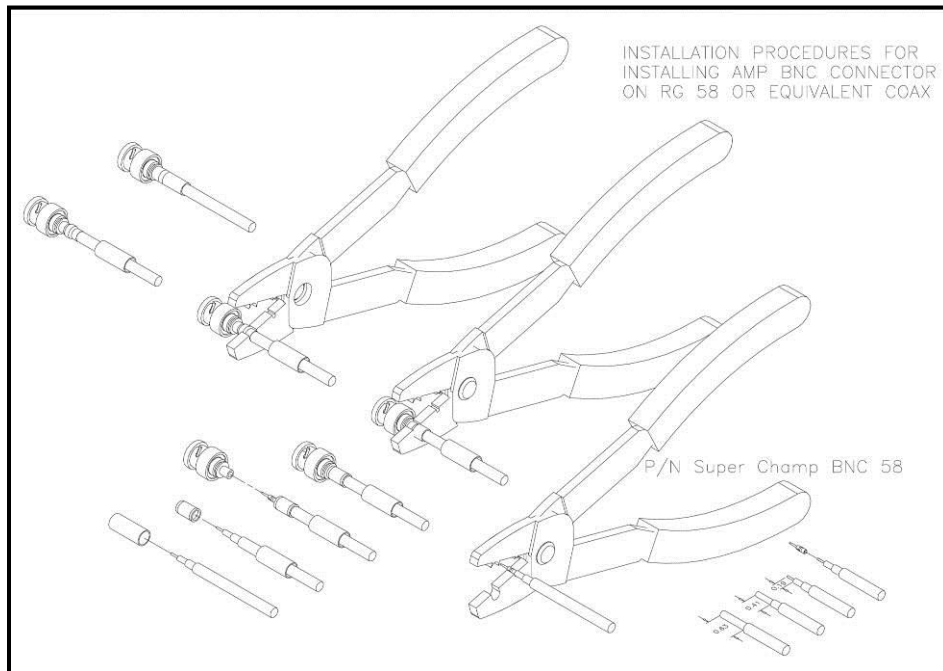


Figure 40: Cable Assembly Detail AMP 22395-1 50 OHM

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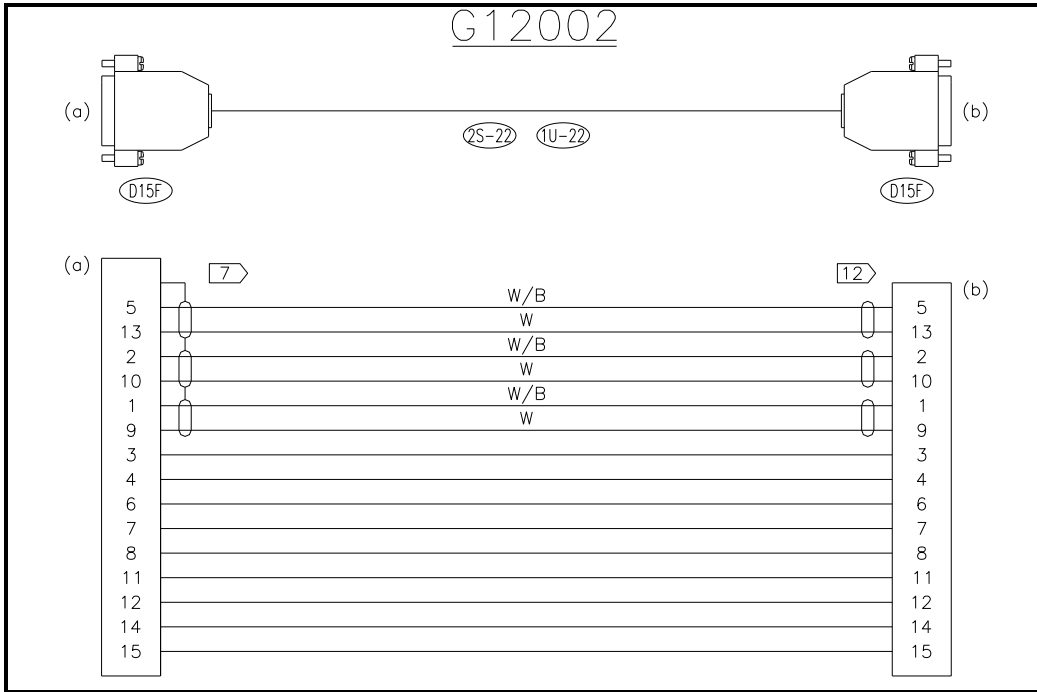


Figure 41: G12002 Passenger Audio and Keying Cable

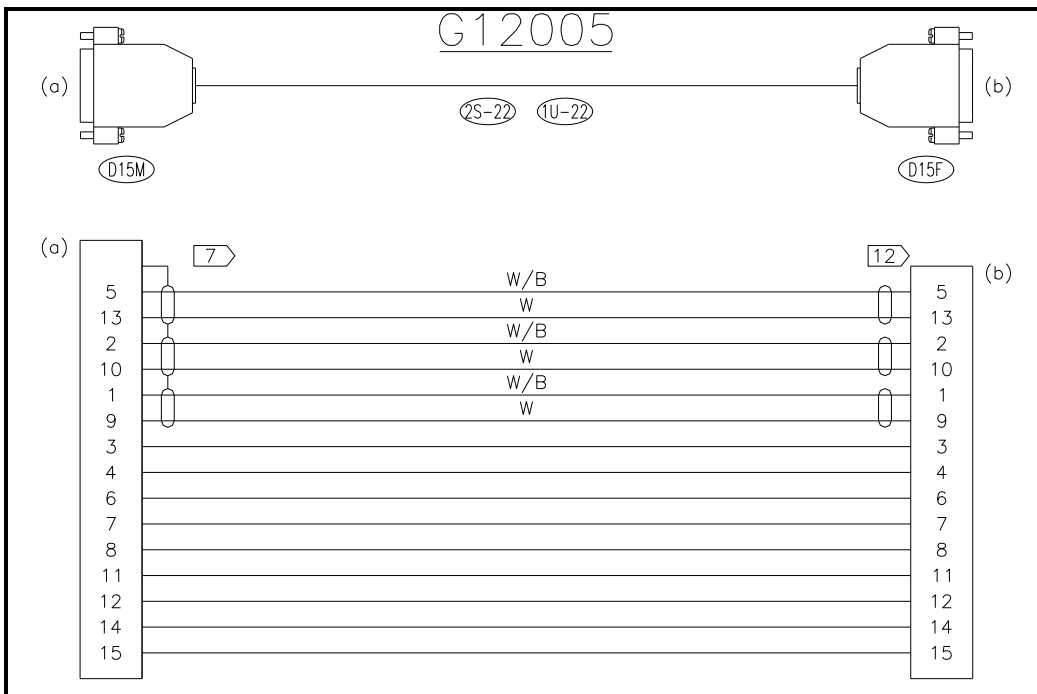


Figure 42: G12005 COM 1 Direct to Audio Control Interconnect Cable

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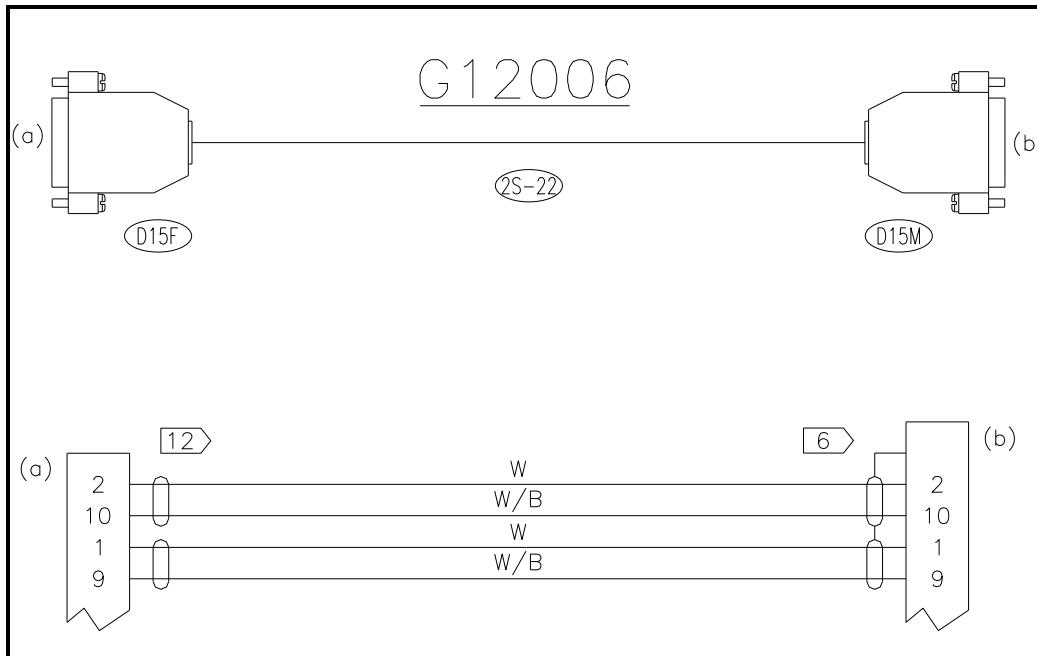


Figure 43: G12006 Audio Control J2 to Audio Expander J3 Cable

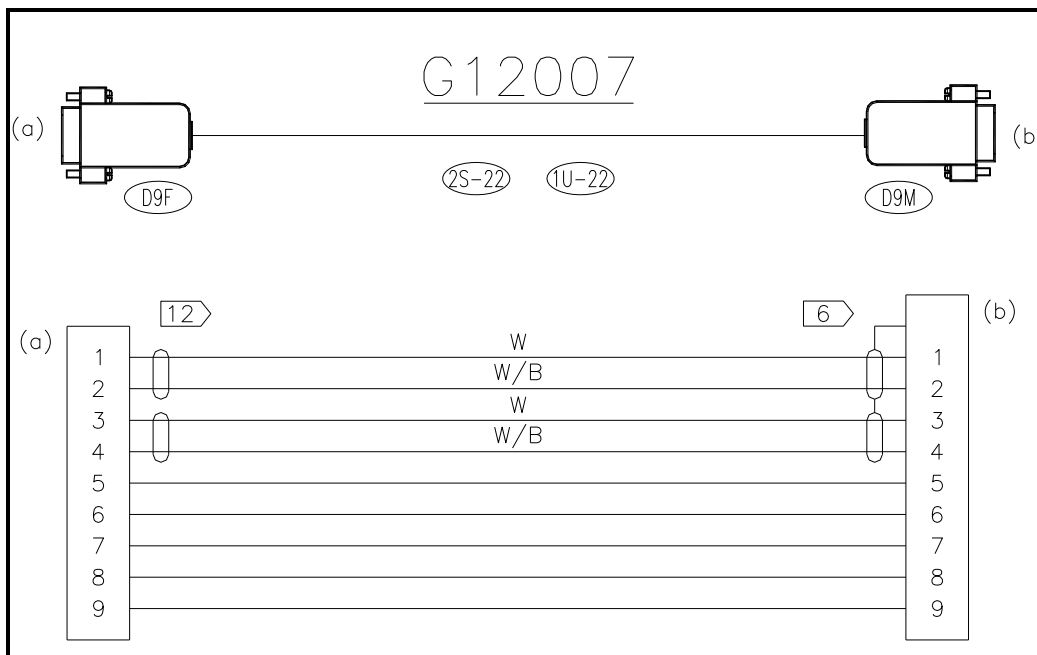


Figure 44: G12007 Audio Expander to Backplane Interconnect Cable

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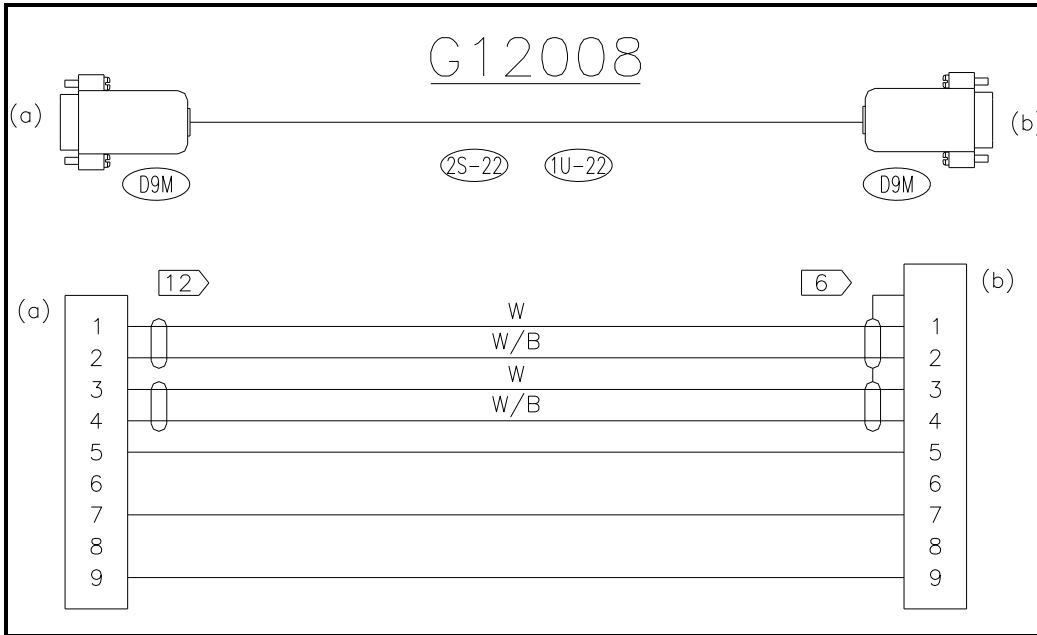


Figure 45: G12008 Radio to Backplane Interconnect Cable

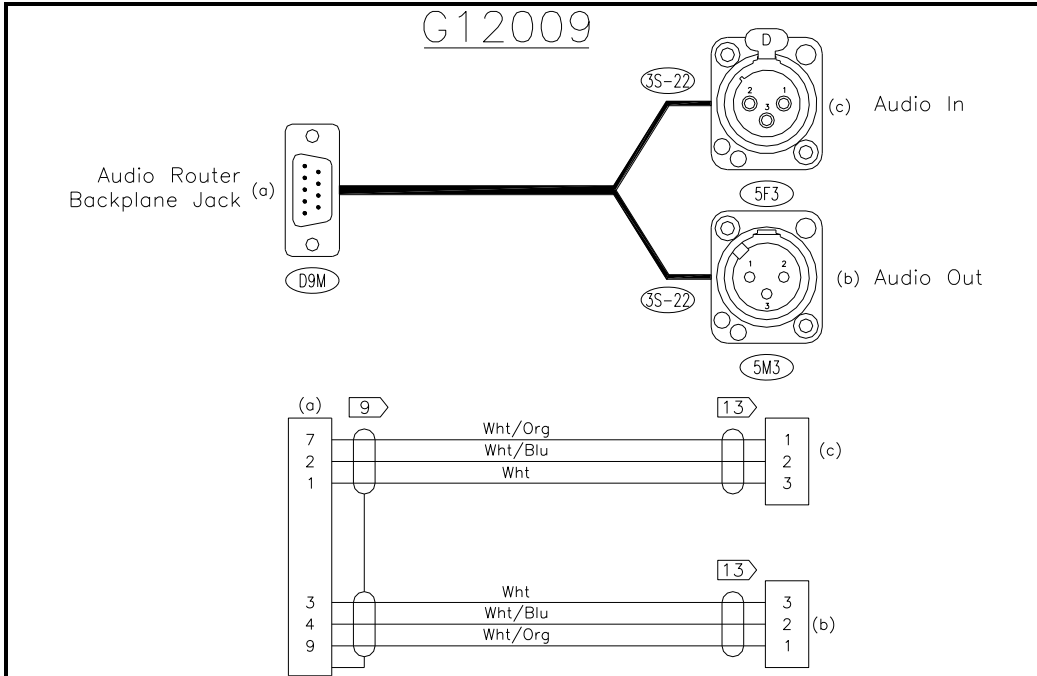


Figure 46: G12009 Bulkhead XLRs to/from Audio Backplane Cable

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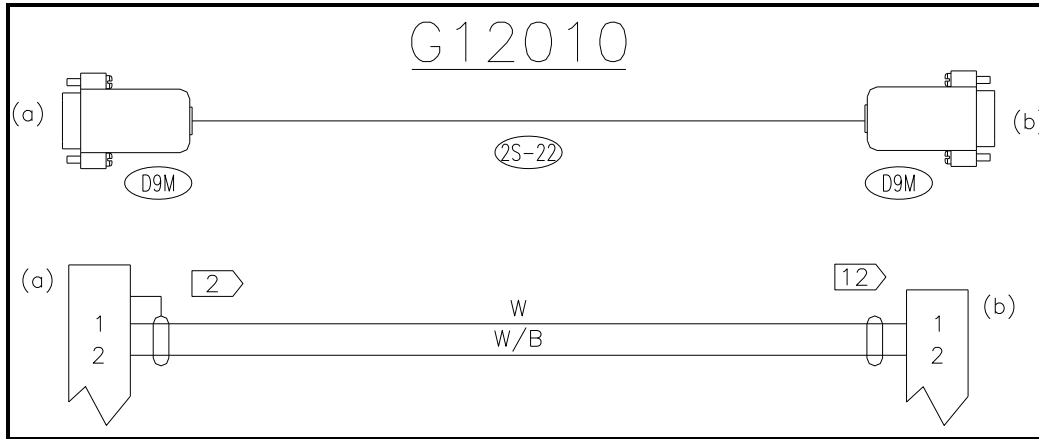


Figure 47: G12010 Receive Audio to Backplane Cable

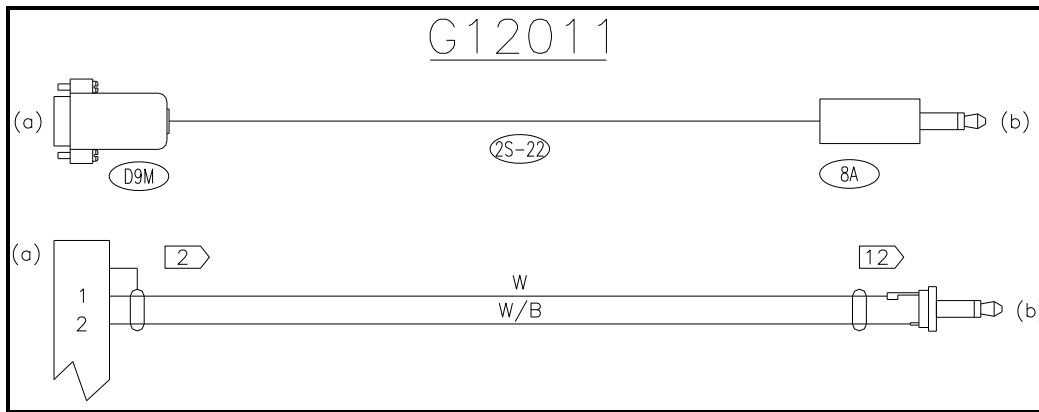


Figure 48: G12011 Scanner Audio Cable

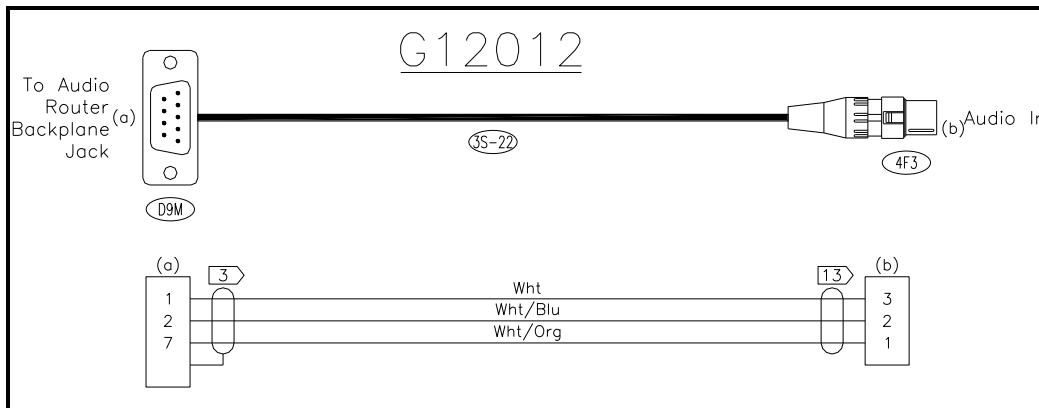


Figure 49: G12012 Inline XLR3F to Audio Backplane Cable

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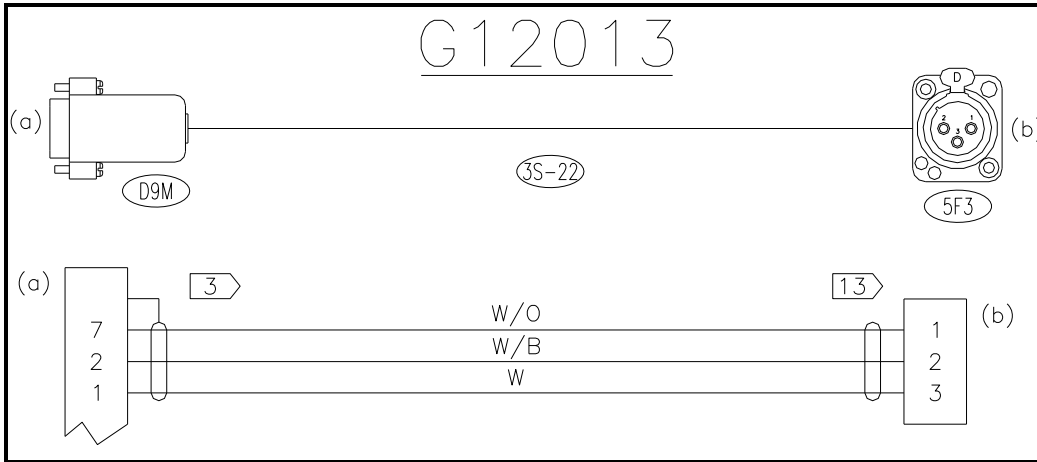


Figure 50: G12013 Audio to Backplane Cable

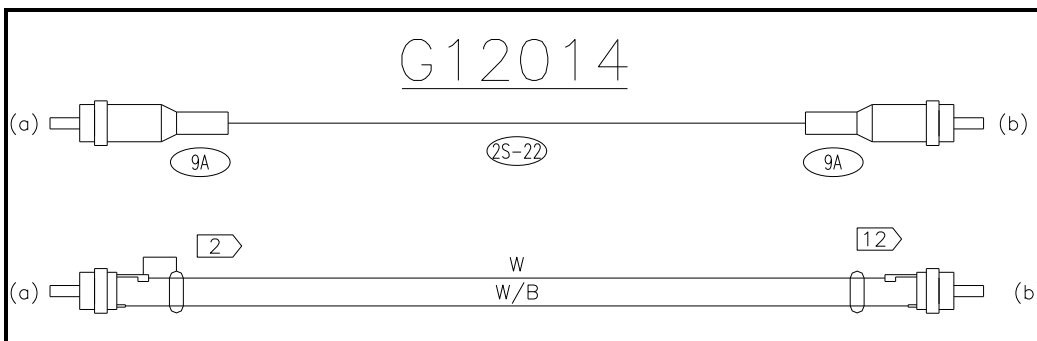


Figure 51: G12014 Audio Backplane J17 Cable

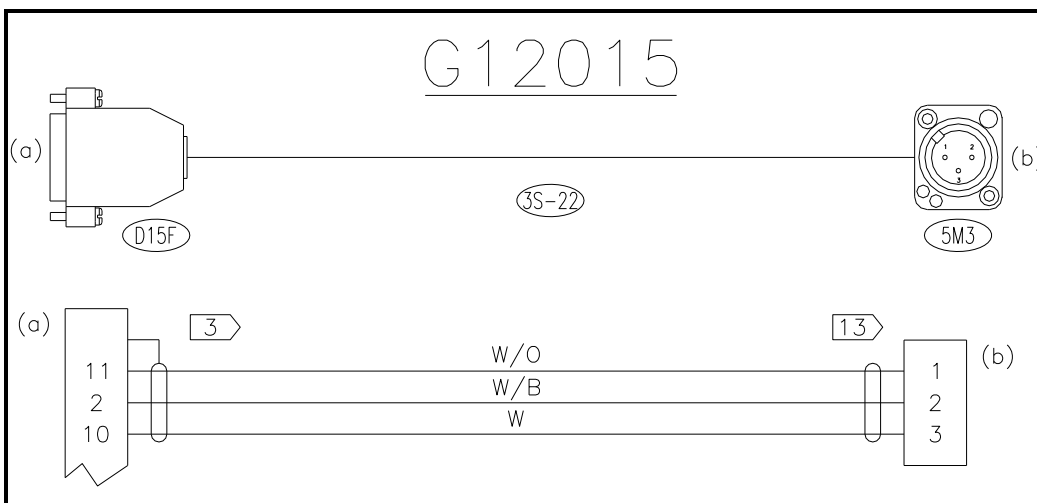


Figure 52: G12015 Audio Cable

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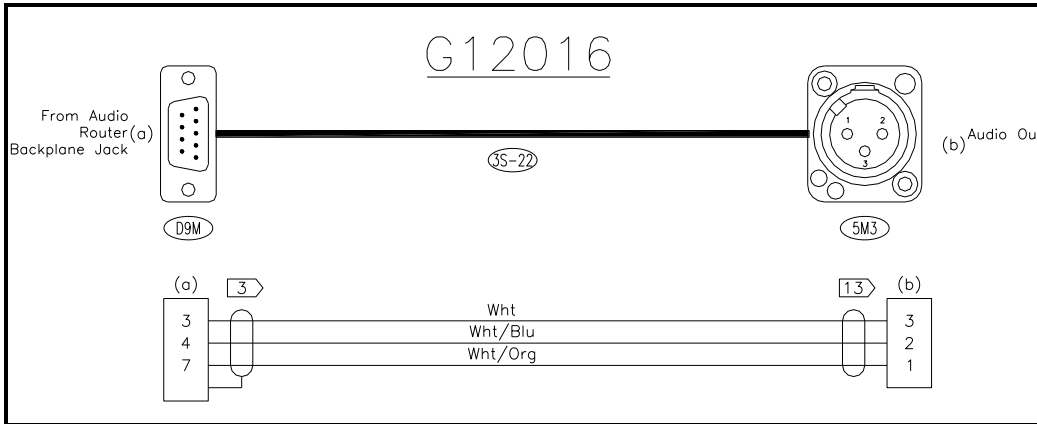


Figure 53: G12016 From Backplane to Bulkhead XLR3M Cable

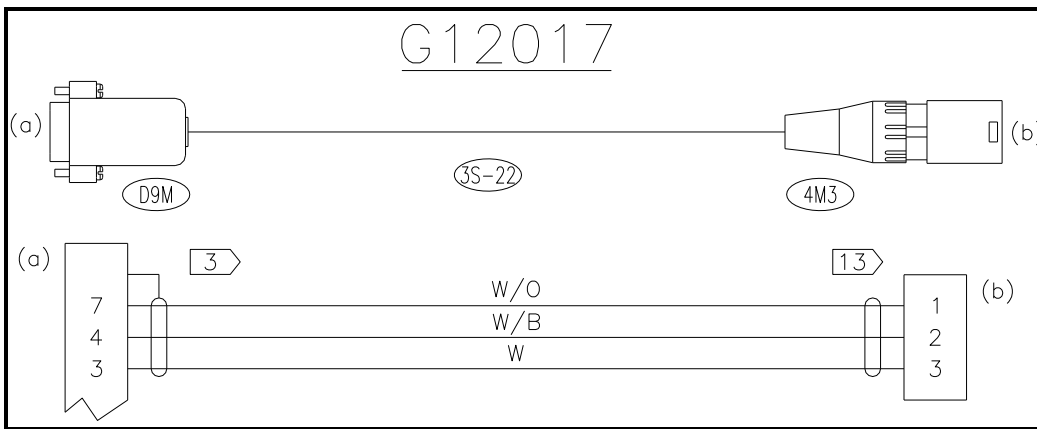


Figure 54: G12017 Audio Cable

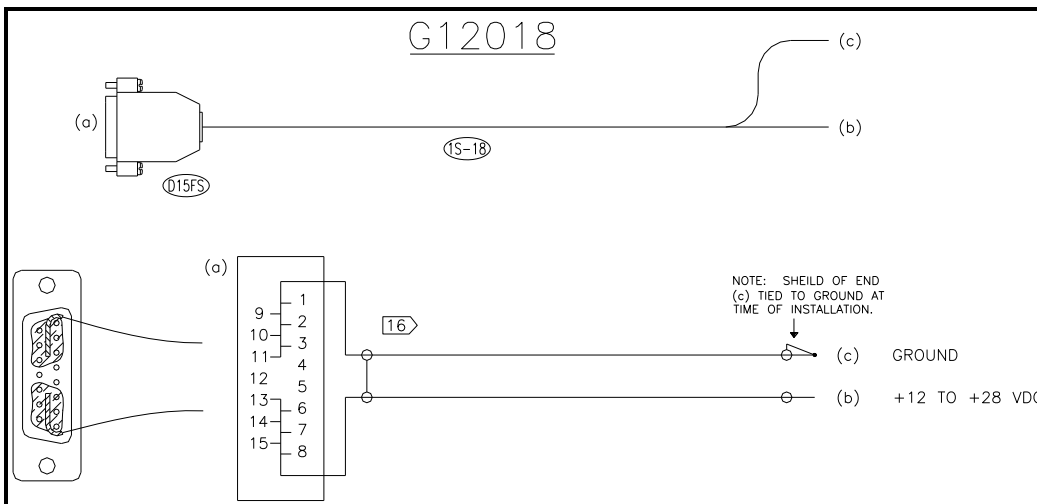


Figure 55: G12018 Audio Router Power Cable

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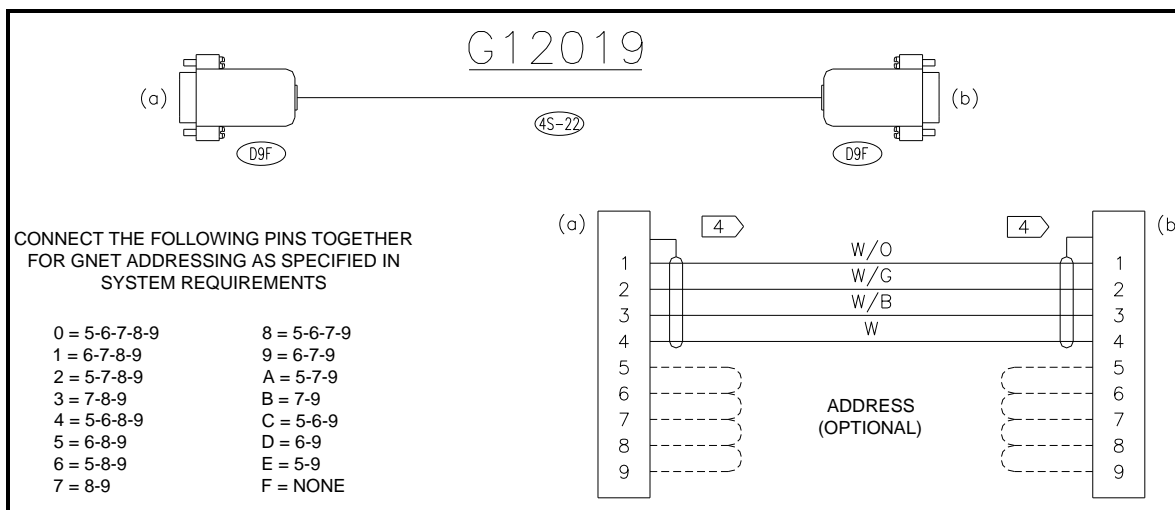


Figure 56: G12019 Standard GNET Cable

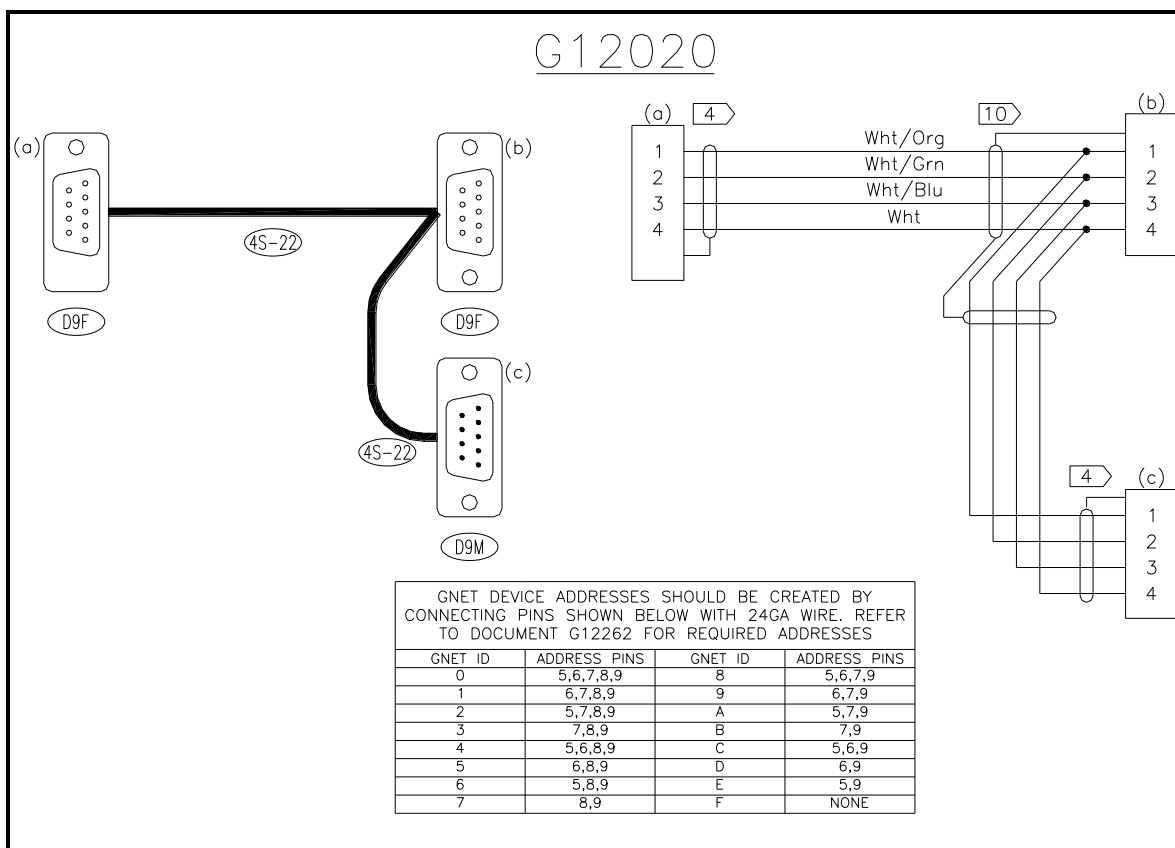


Figure 57: G12020 GNET Non-Standard D9F to D9F and D9M Cable

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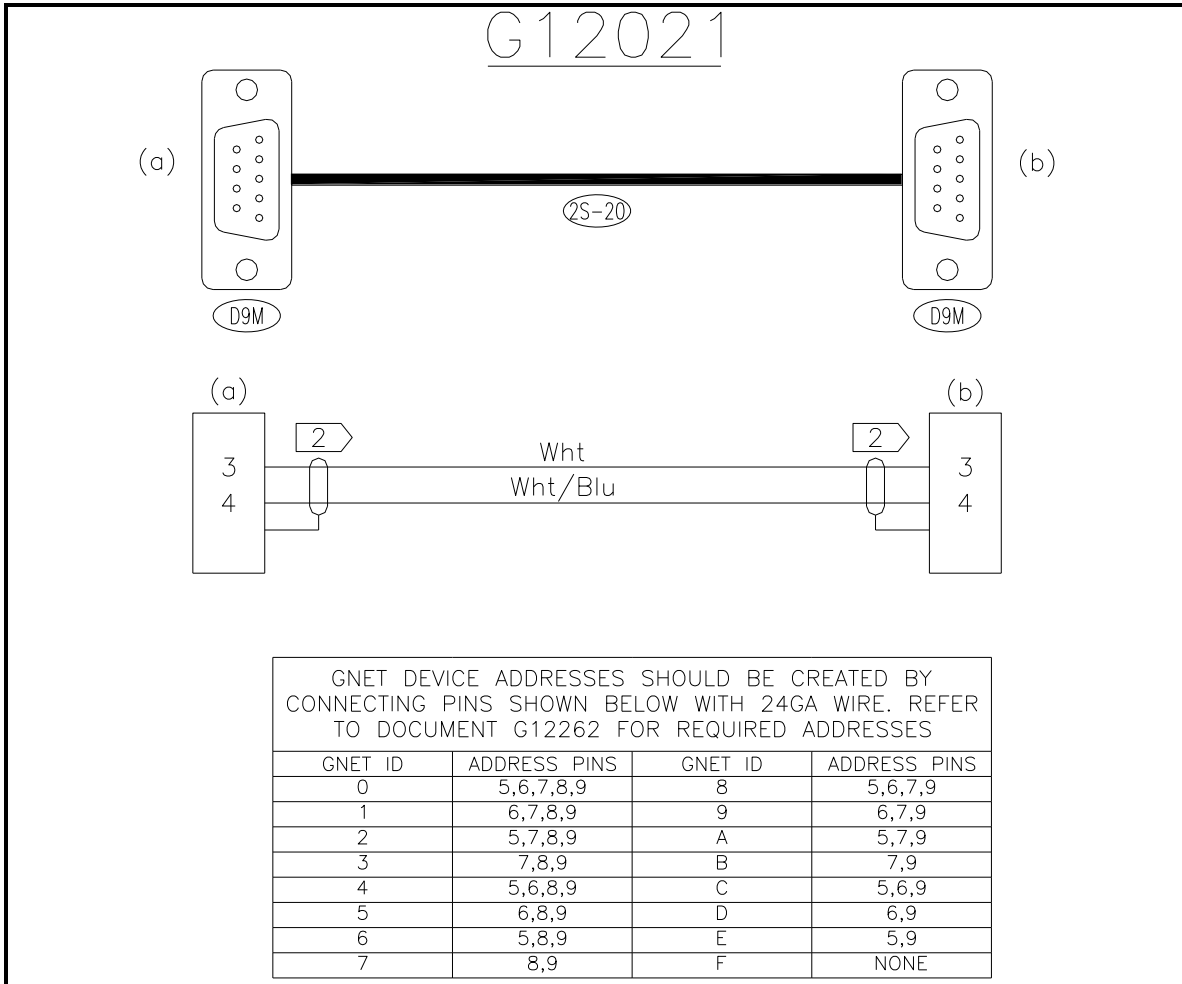


Figure 58: G12021 GNET Non-Standard D9F to D9F Power Only Cable

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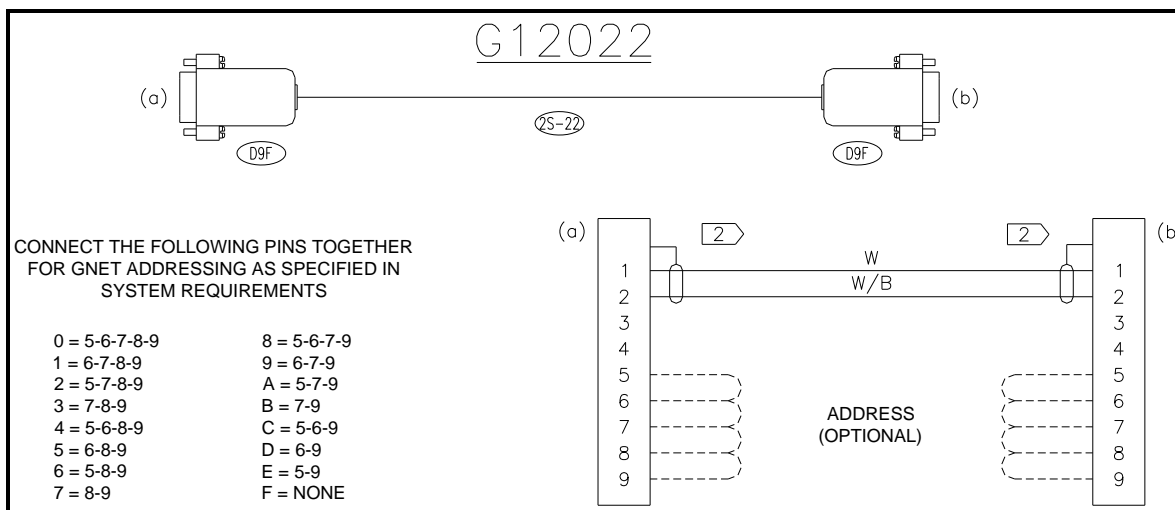


Figure 59: G12022 Non-Standard Data Only GNET Cable

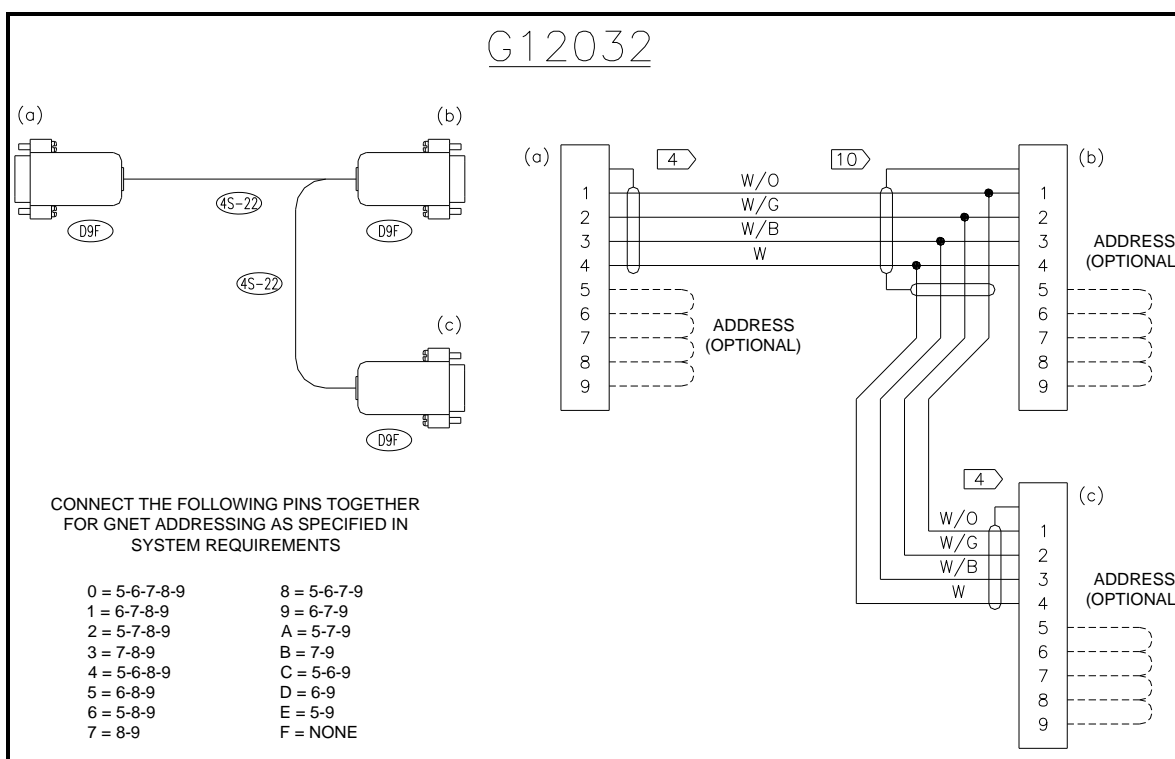


Figure 60: G12032 Non-Standard, Two Device GNET Cable

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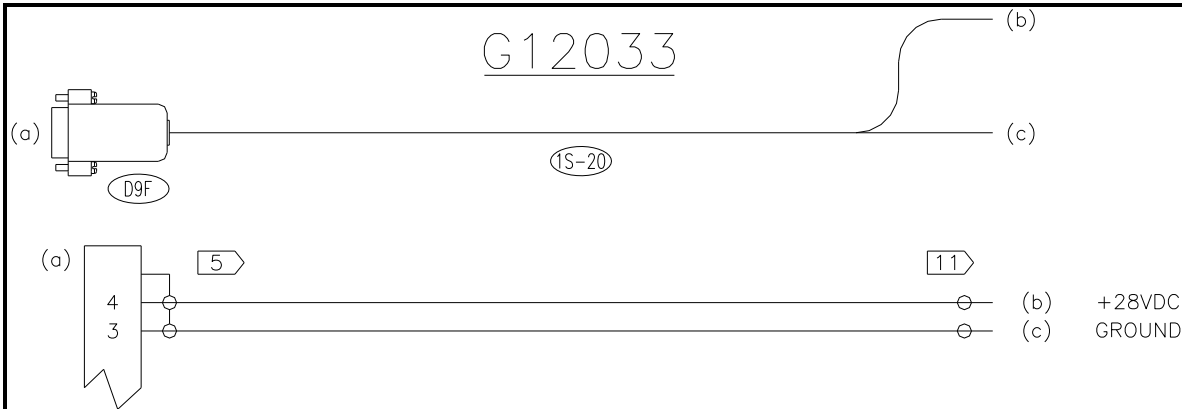


Figure 61: G12033 Power Cable

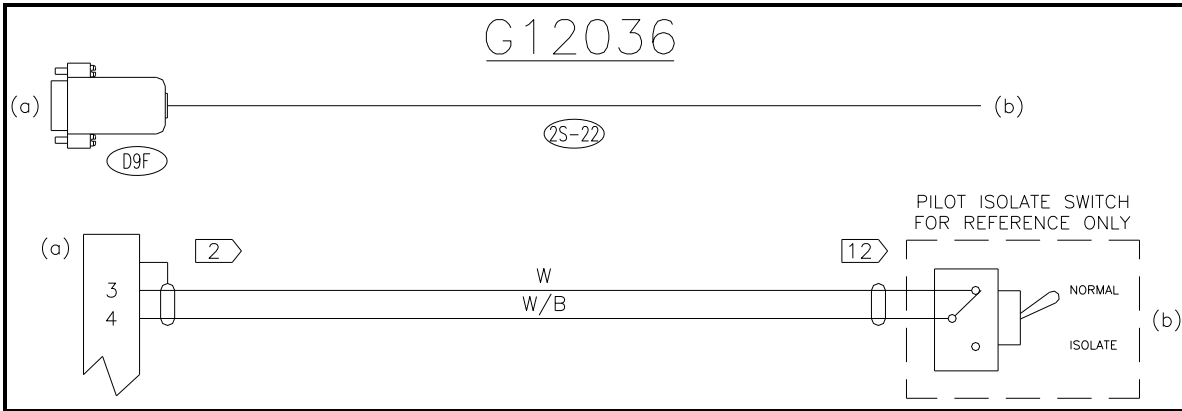


Figure 62: G12036 Pilot Isolate Cable

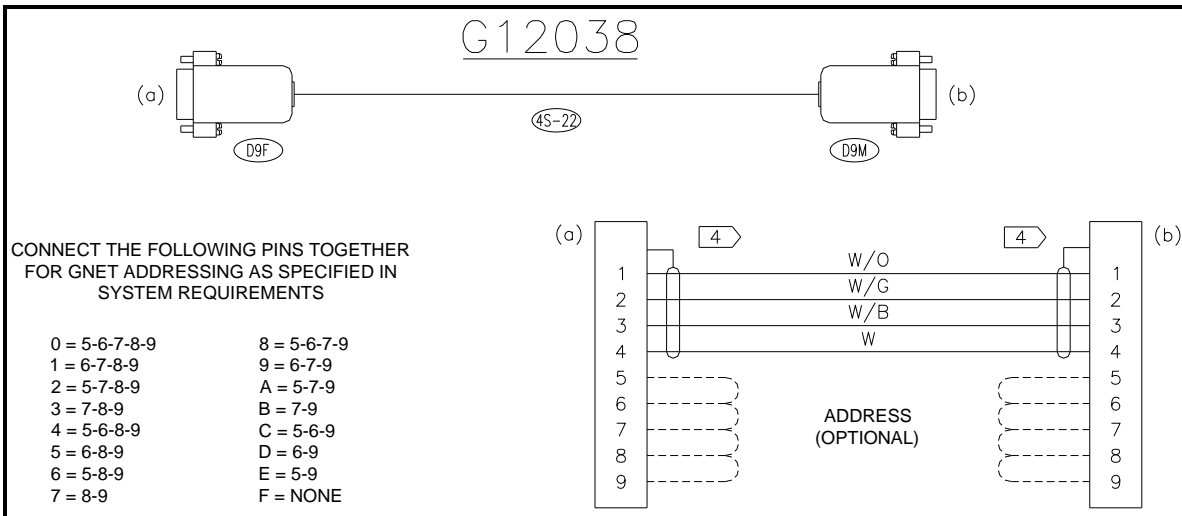


Figure 63: G12038 Non-Standard Male End GNET Cable

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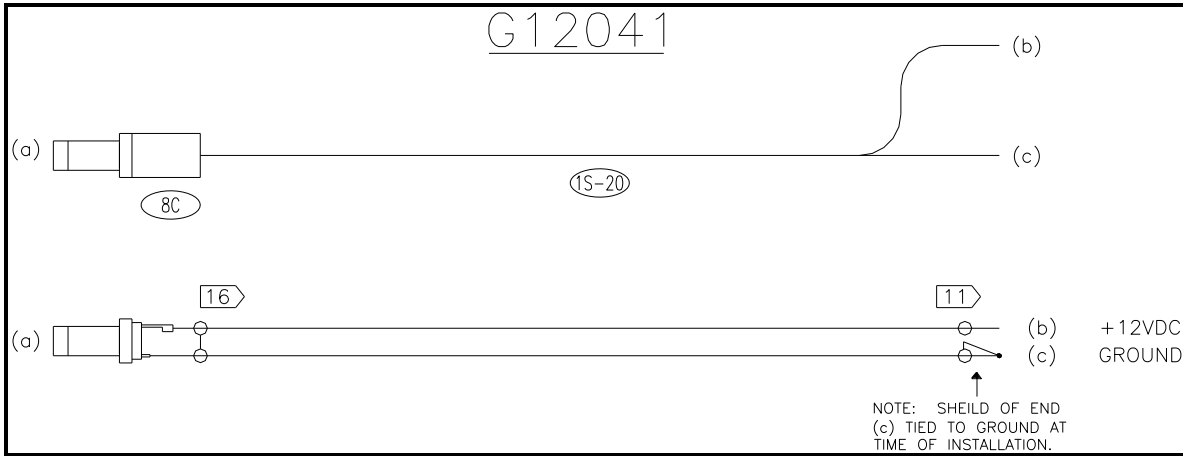


Figure 64: G12041 Scanner Power Cable

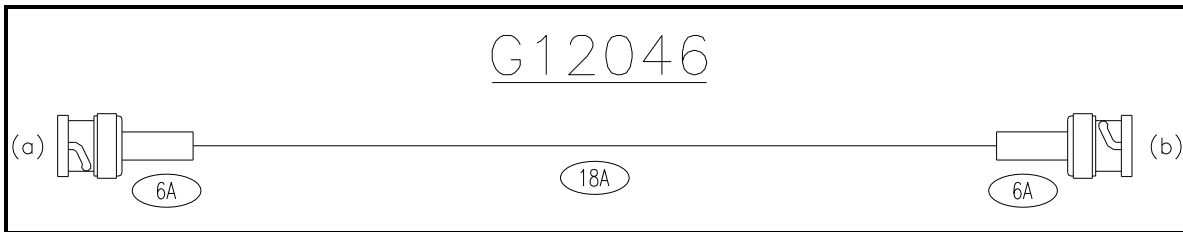


Figure 65: G12046 Antenna Coax Cable

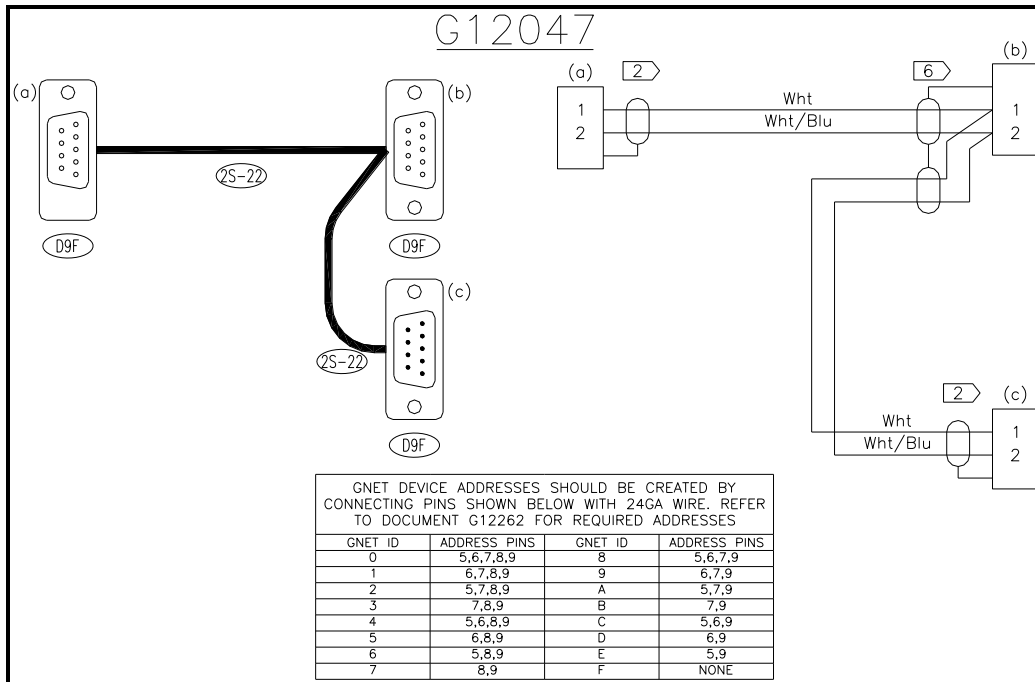


Figure 66: G12047 Non-Standard Triple D9F Data Only GNET Cable

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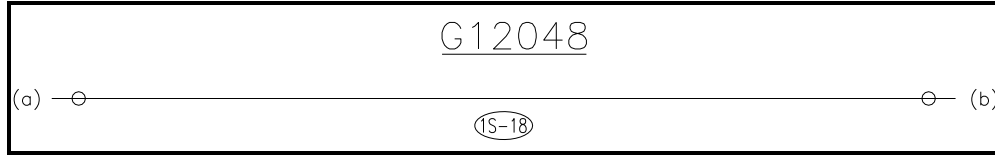


Figure 67: G12048 Shielded Cable

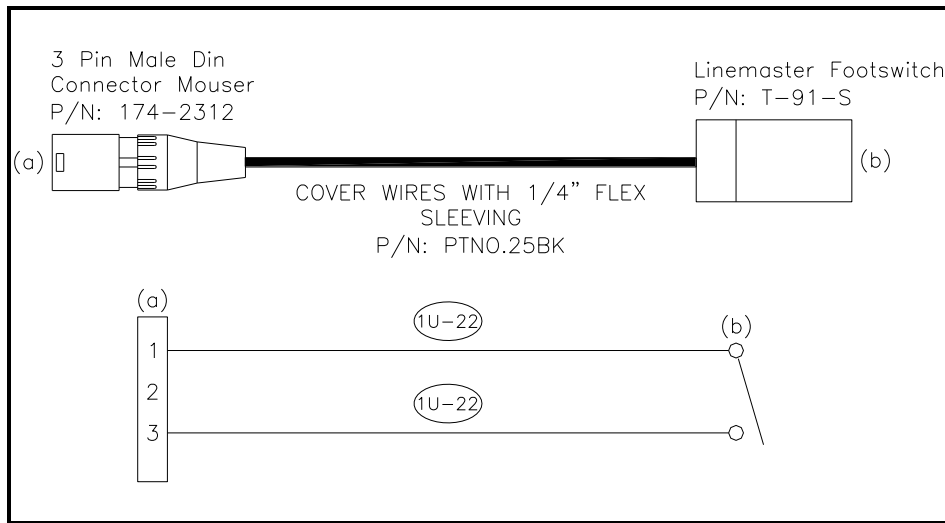


Figure 68: G12050 TX or ICS Keying Audio Footswitch

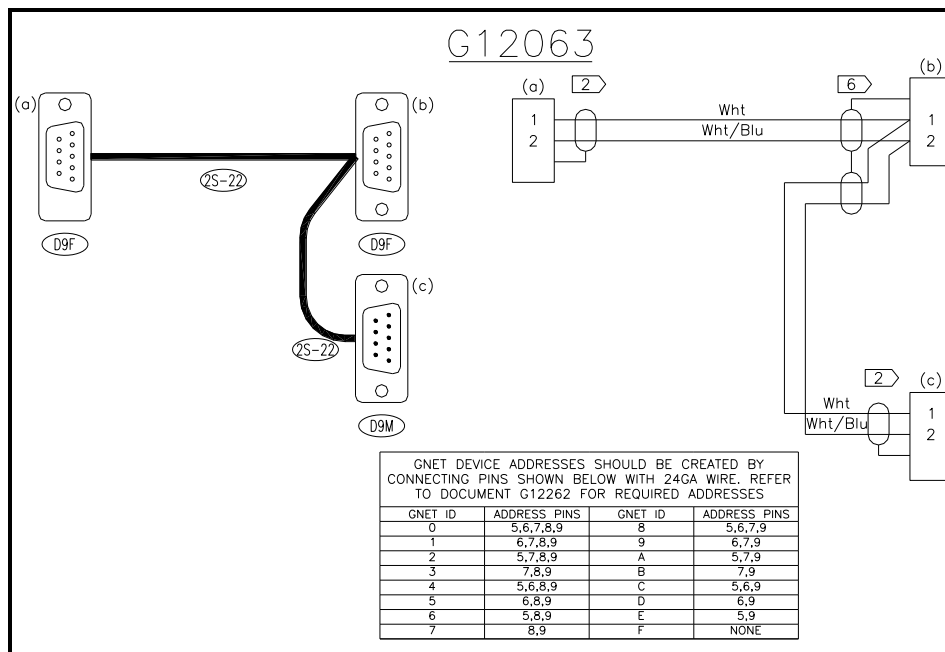


Figure 69: G12063 Non-Standard D9F to D9F and D9M Data Only GNET Cable

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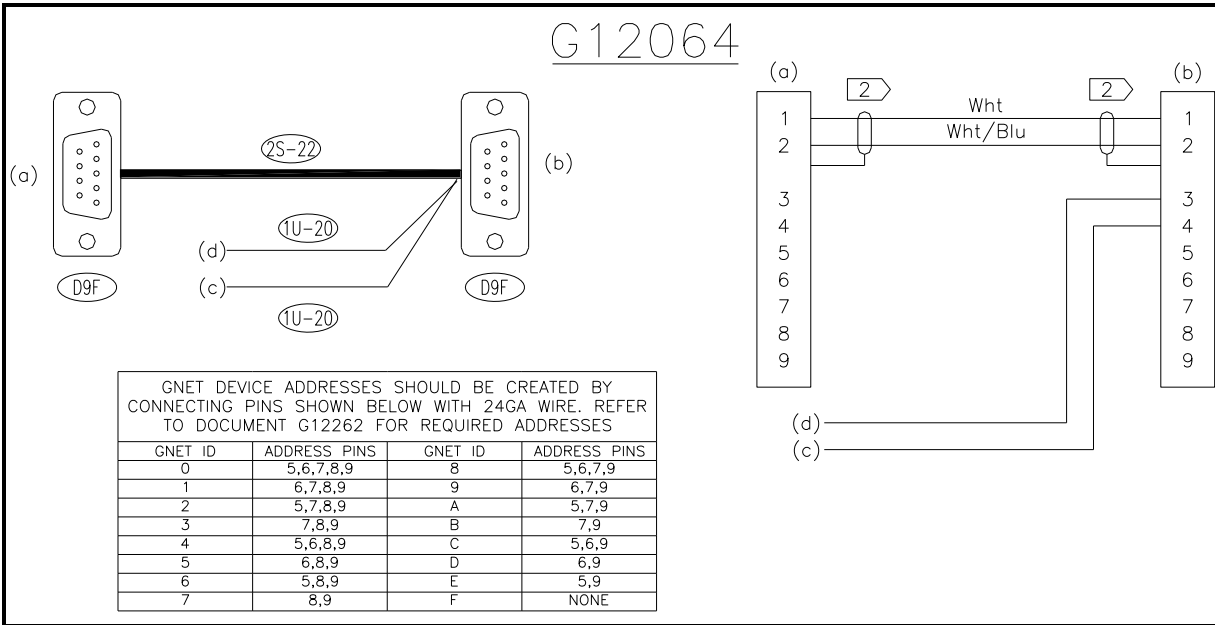


Figure 70: G12064 Non-Standard D9F to D9F External Power GNET Cable

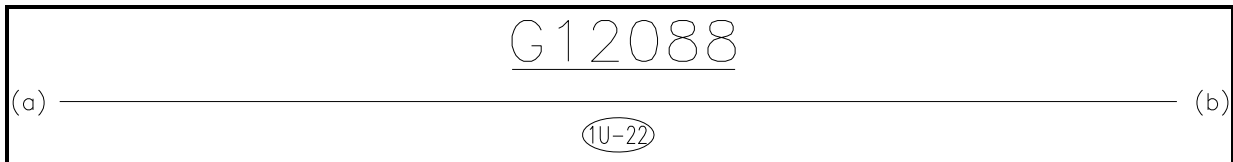


Figure 71: G12088 Cable

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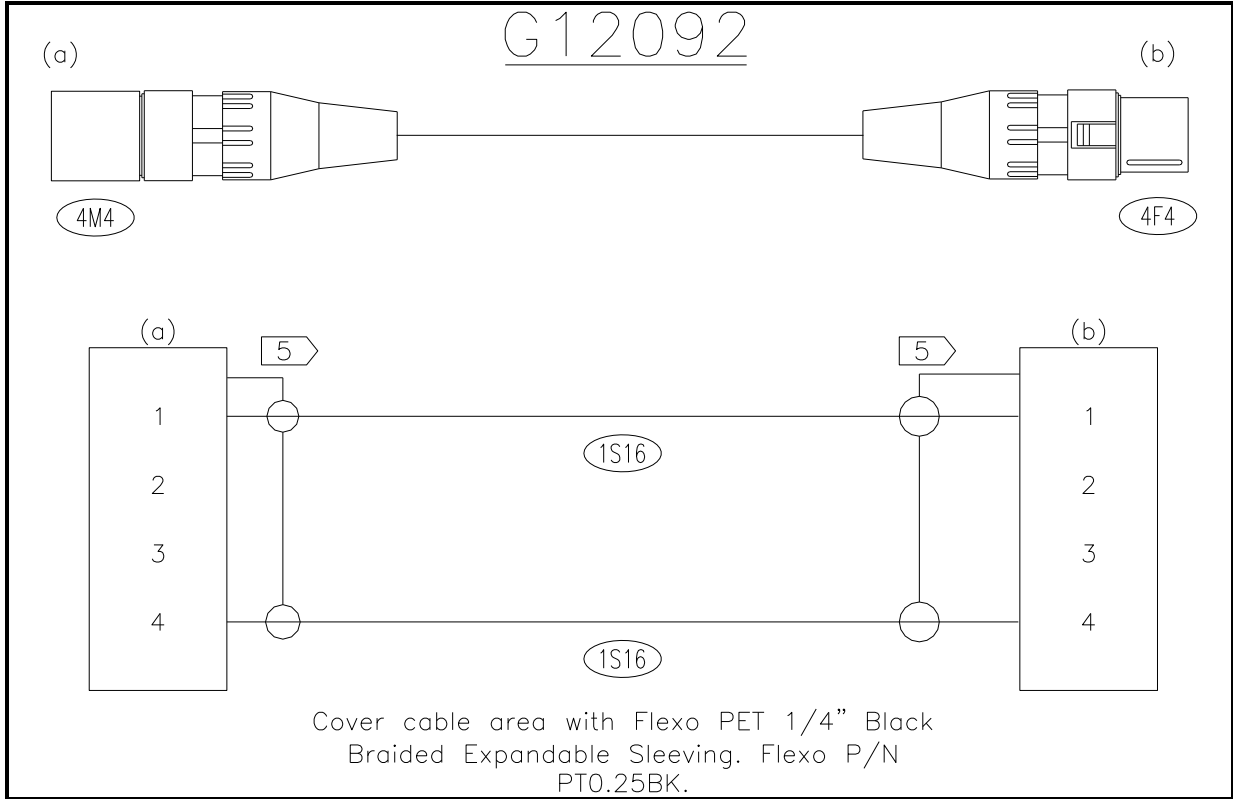


Figure 72: G12092 12V External Jumper Power Cable

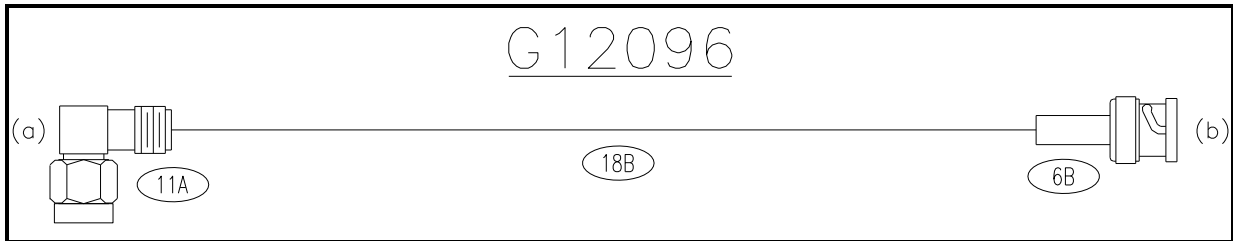


Figure 73: G12096 FM Radio Pigtail Antenna Cable

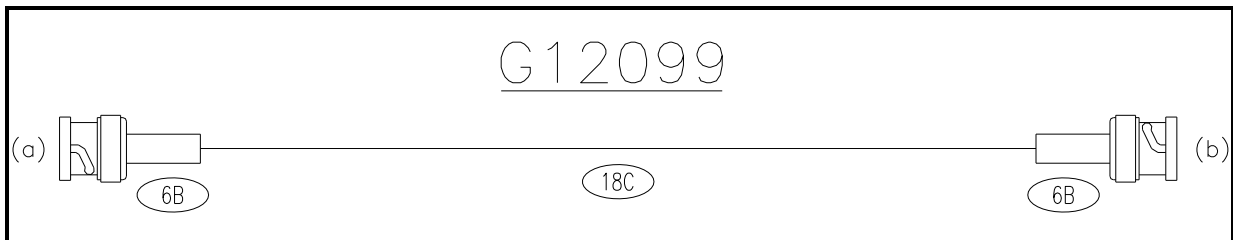


Figure 74: G12099 Triax Antenna Cable

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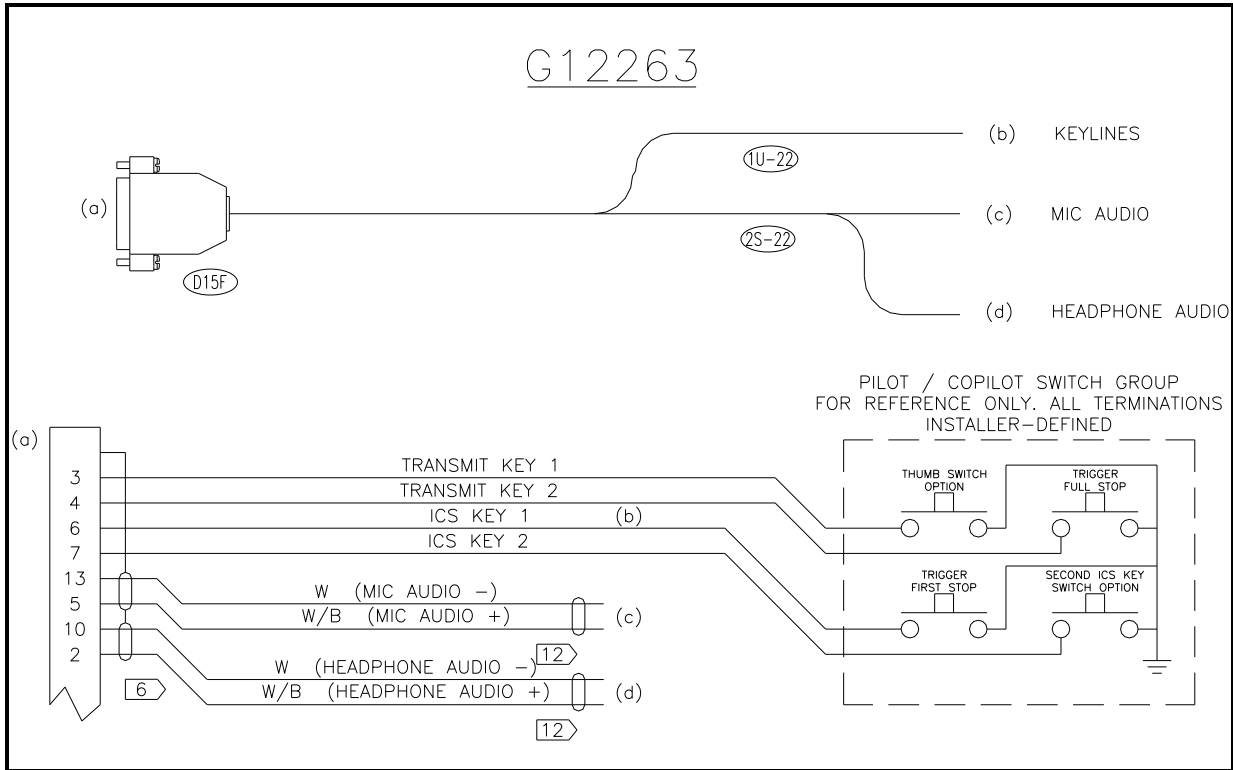


Figure 75: G12263 Pilot/Copilot Audio Cable

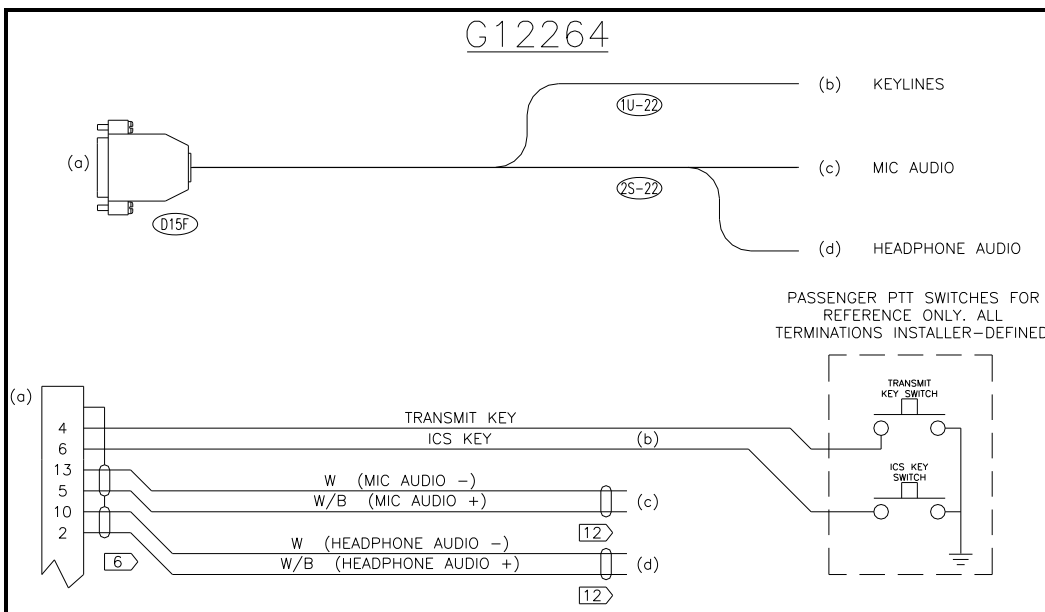


Figure 76: G12264 Passenger Audio Cable

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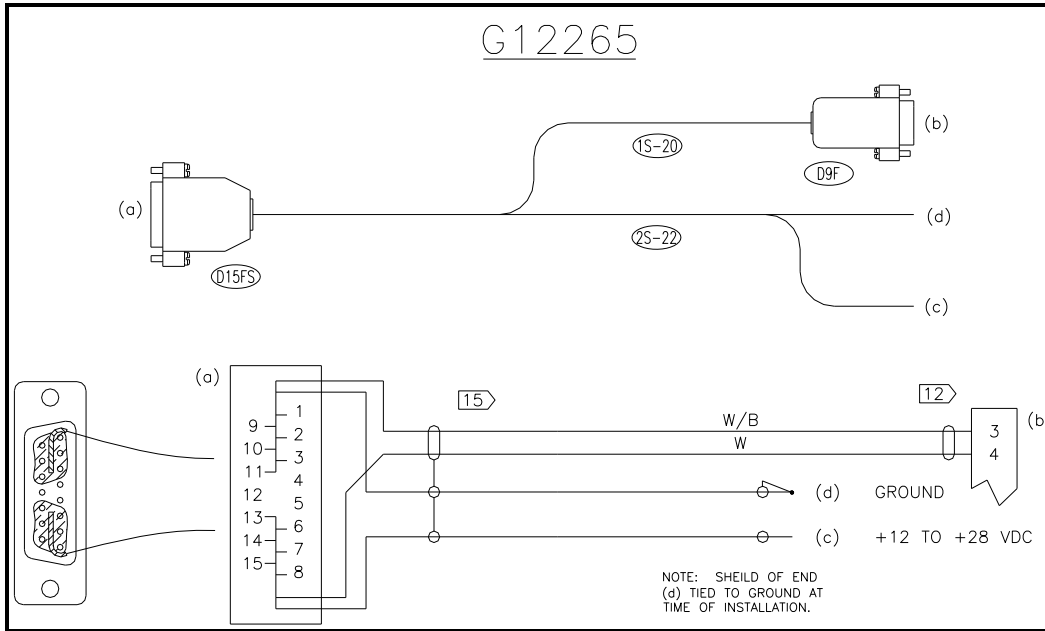


Figure 77: G12265 Audio Router Power Cable

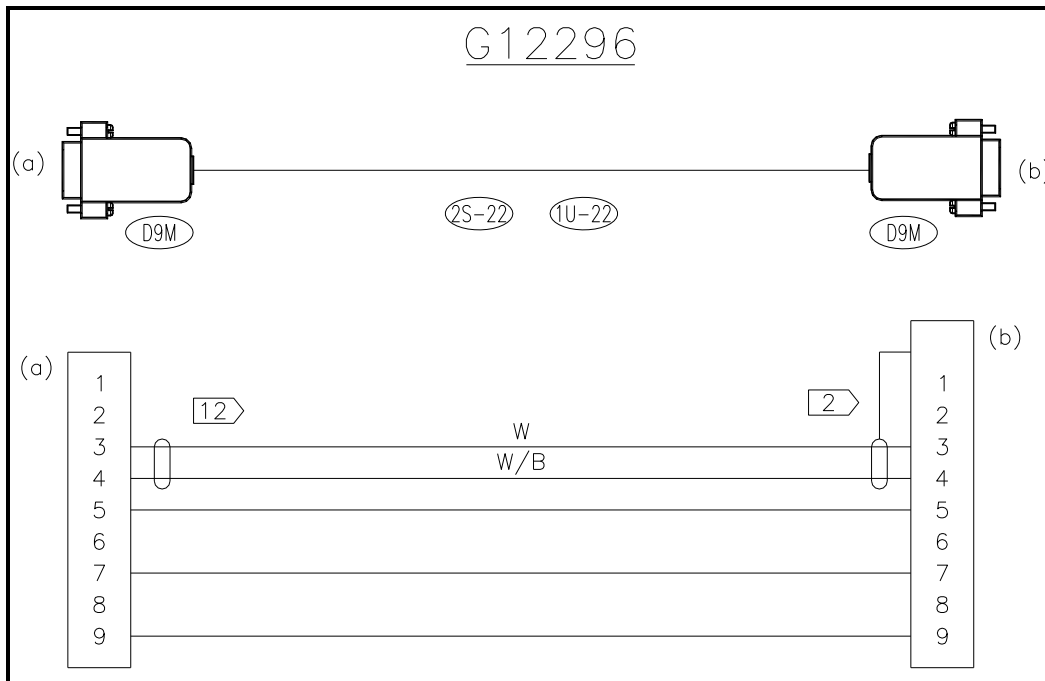


Figure 78: G12296 PA Audio Cable

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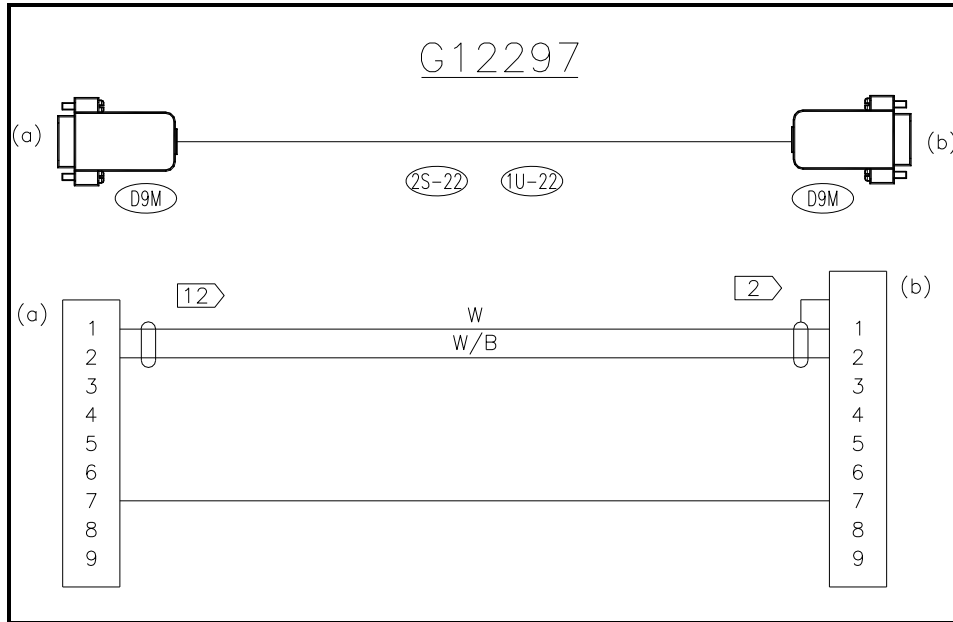


Figure 79: G12297 Receive Only Audio Cable

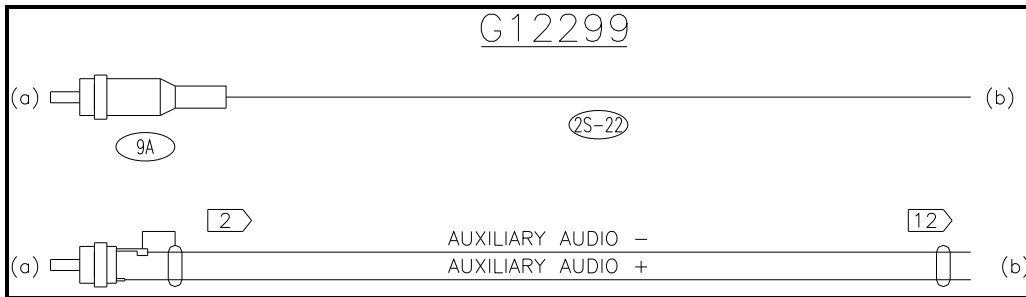


Figure 80: G12299 Auxiliary In Audio Cable

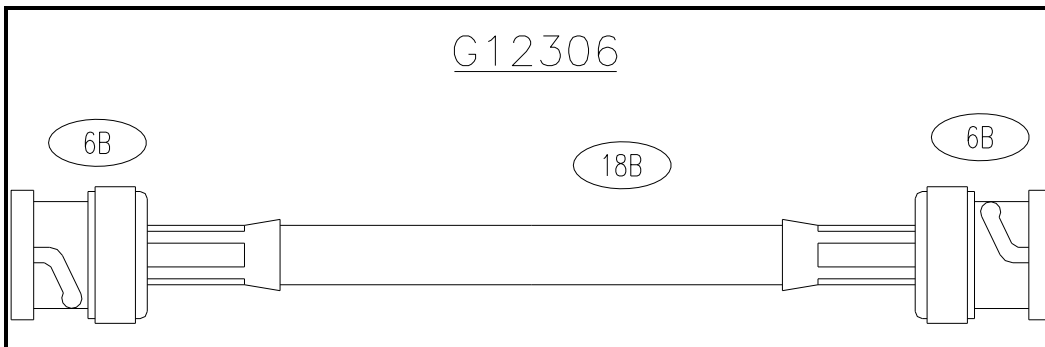


Figure 81: G12306 Coax Antenna Cable

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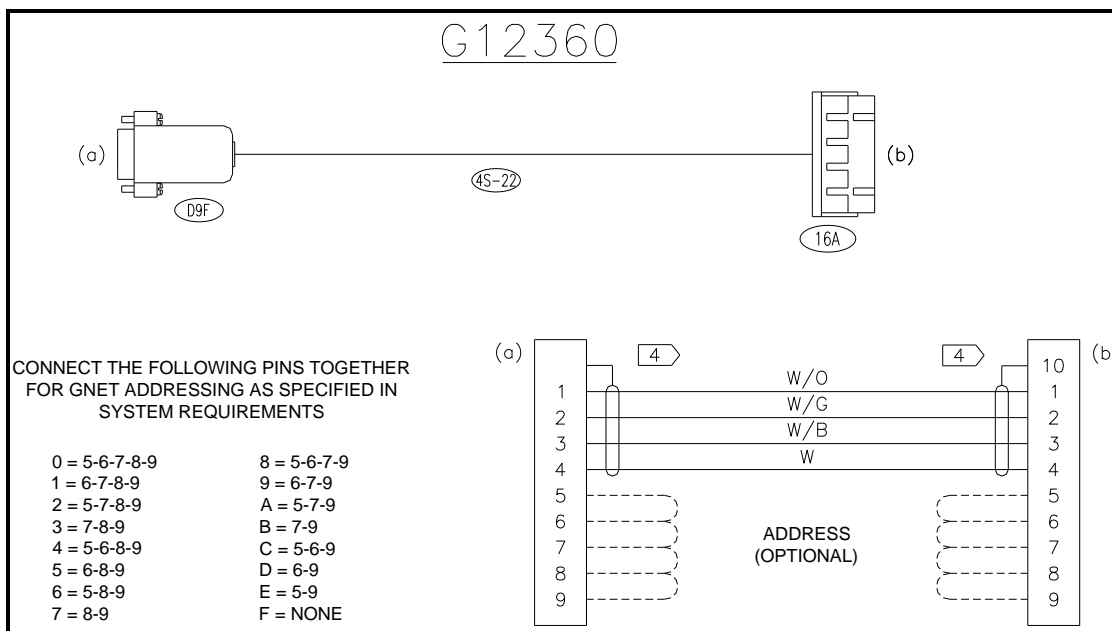


Figure 82: G12360 Terminal GNET Cable

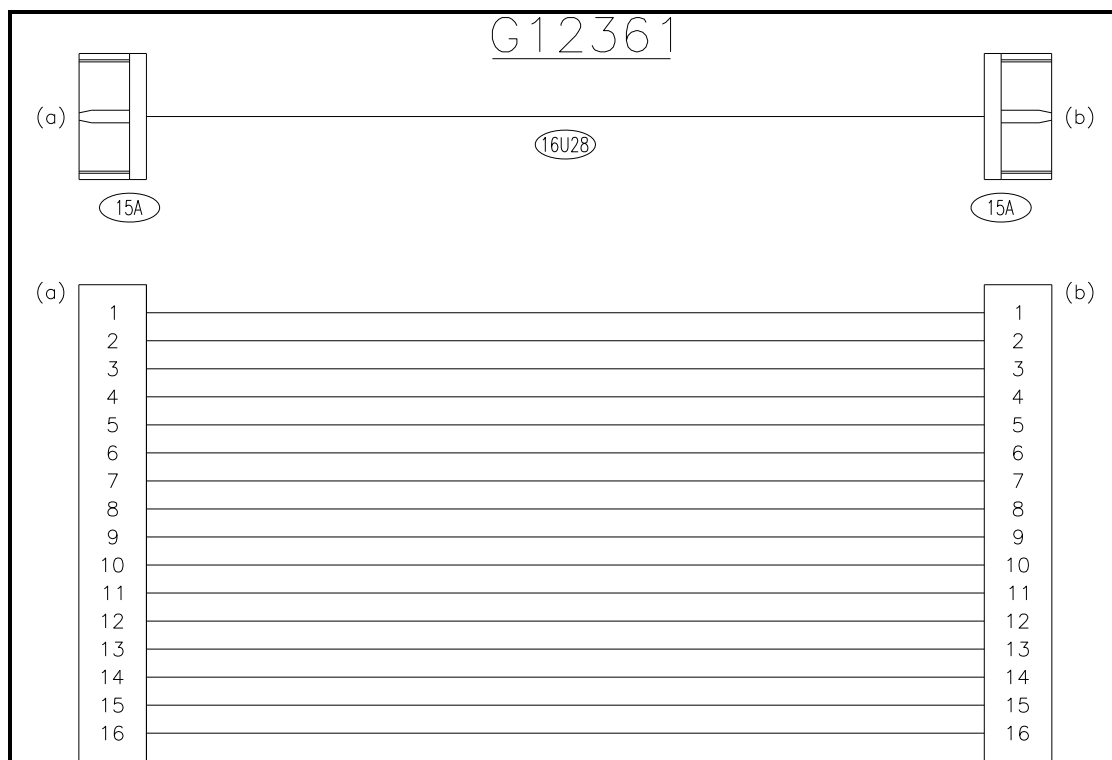


Figure 83: G12361 Headset Expander to Audio Cable

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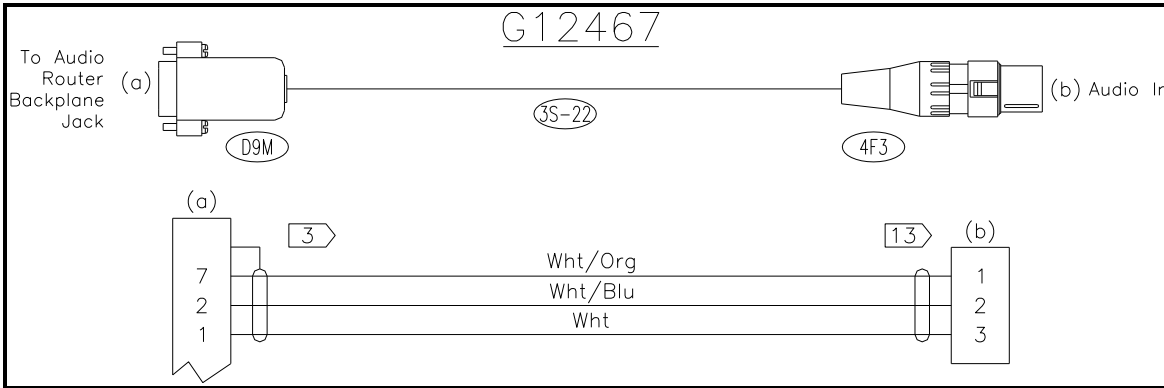


Figure 84: G12467 D9M to XLR3F Audio Cable

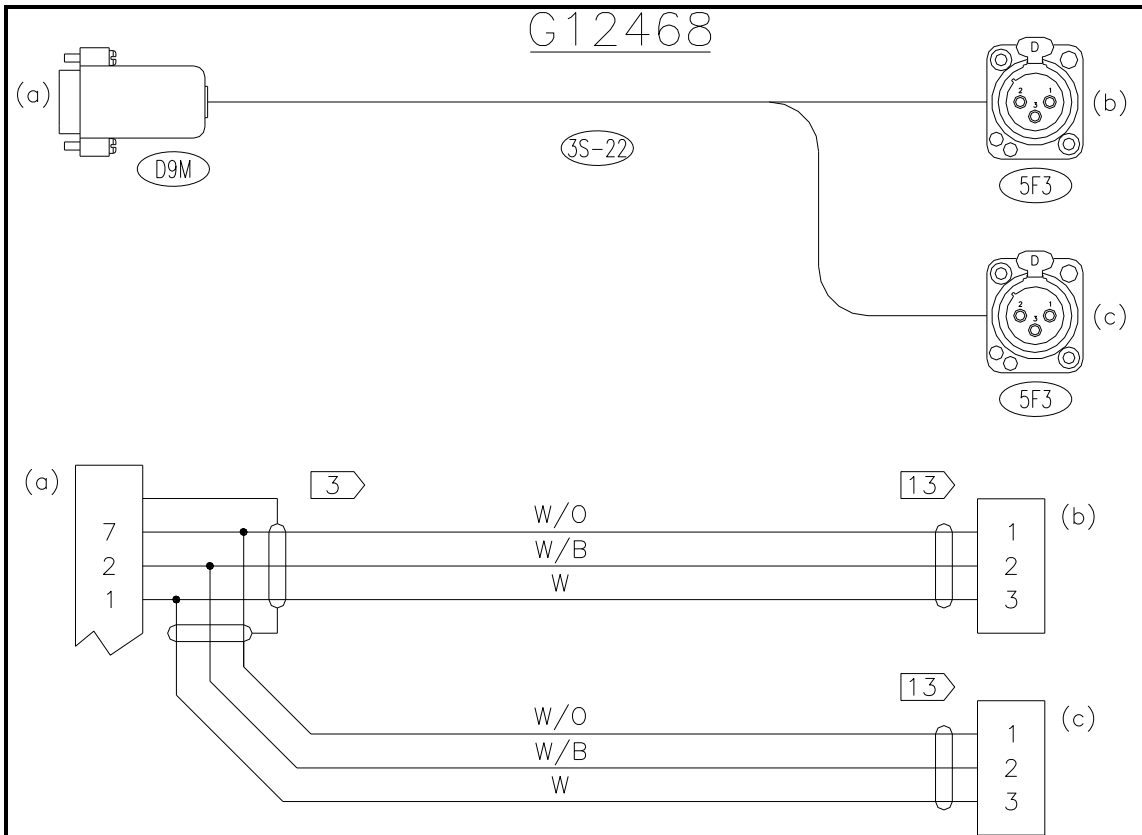


Figure 85: G12468 Dual Auxiliary Audio Input Audio Cable

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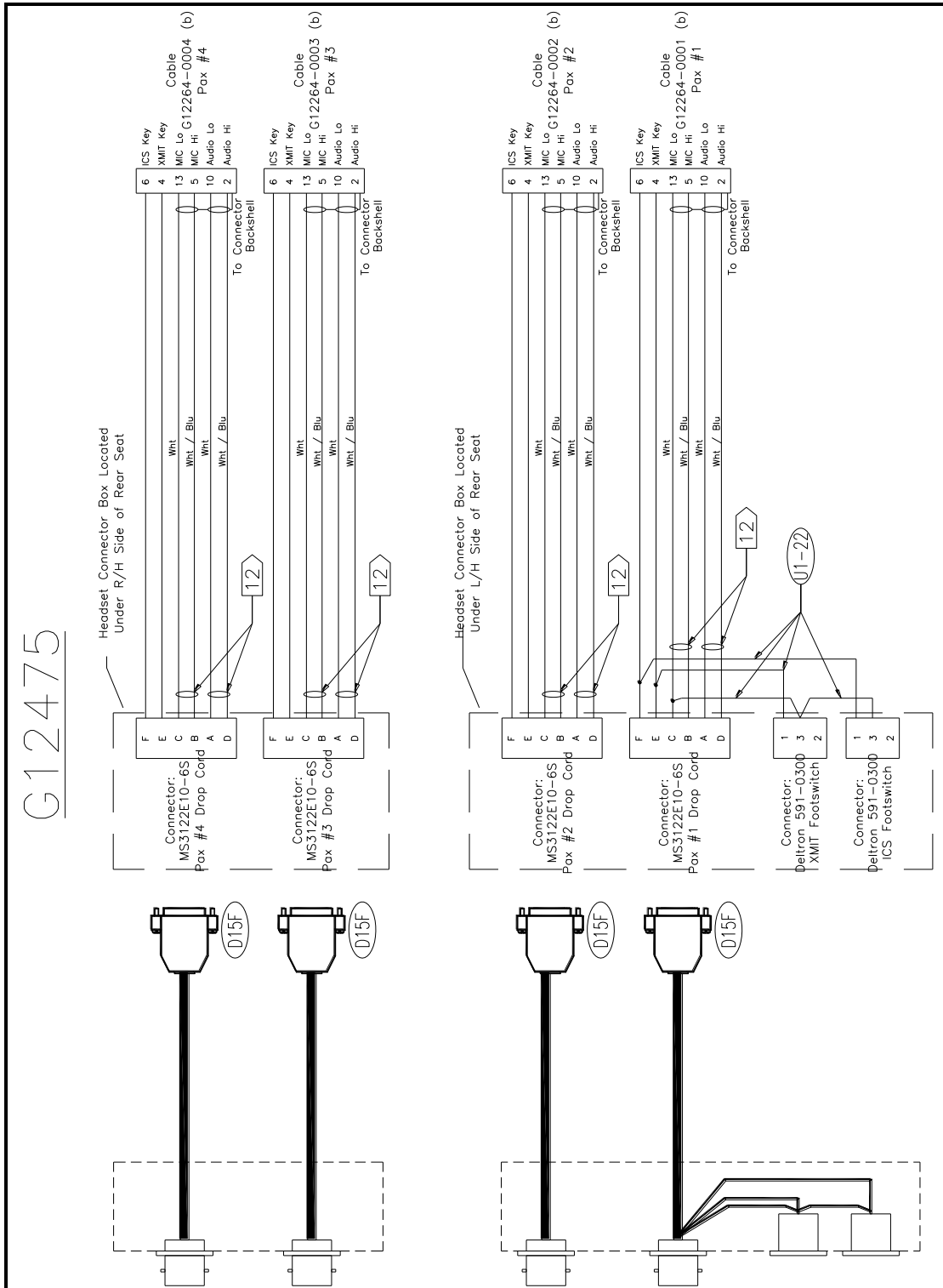


Figure 86: G12475 Rear Passengers Audio Wiring

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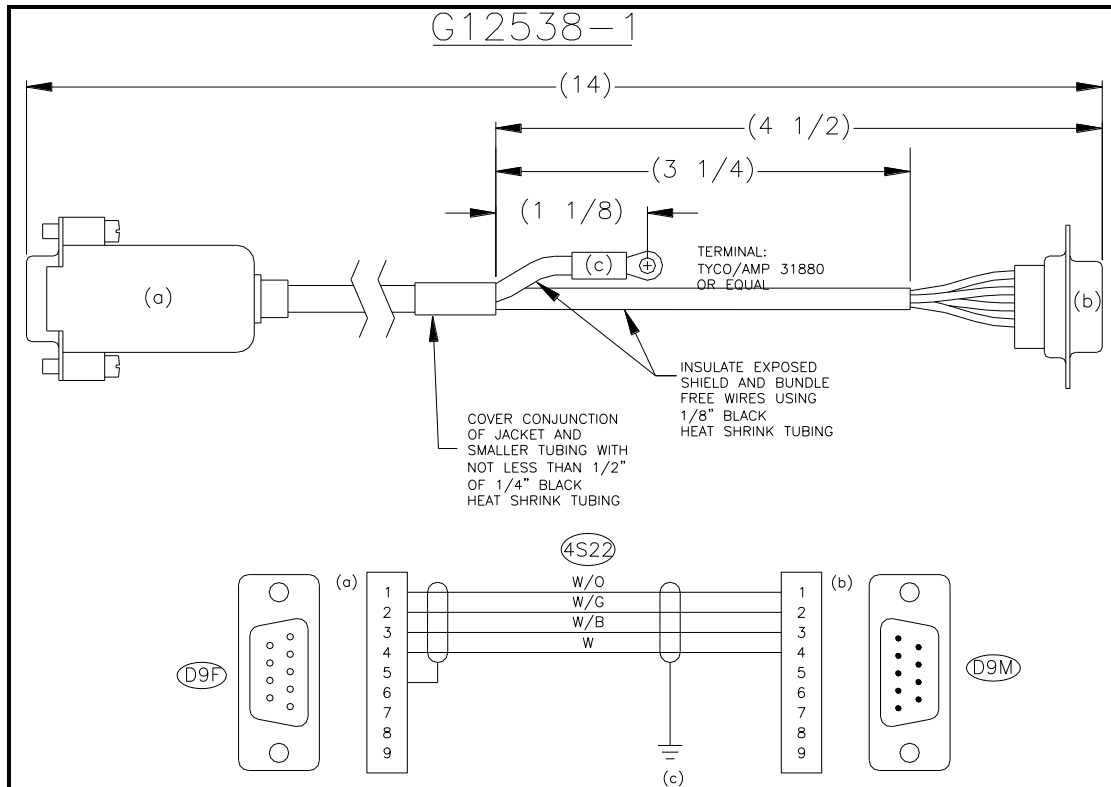


Figure 87: G12538-1 GNEET Config Port Extension Cable

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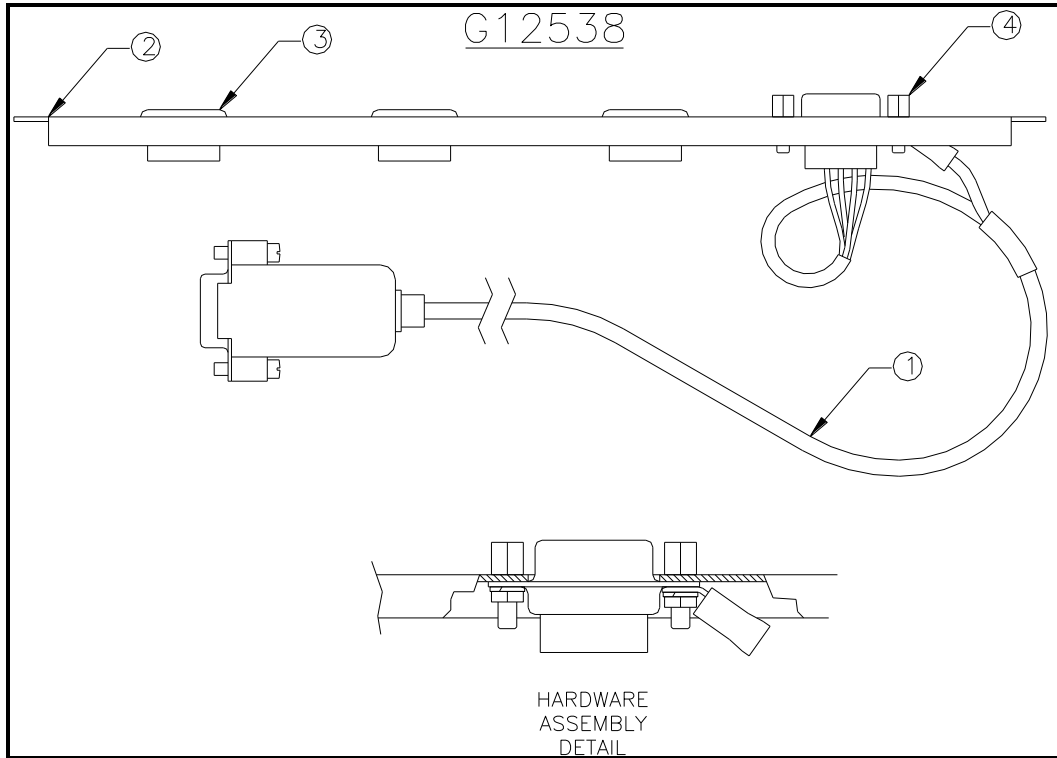


Figure 88: G12538 GNET Config Port Assembly

Parts List for Figure 88

I/N	QTY	PART NUMBER	DESCRIPTION
1	1	G12538-1	GNET Config Port Extension Cable
2	1	G10426-10	Cable Guide Cover Plate
3	3	8493	Bushing, Split, Black (Keystone)
4	2	534-7231	Jackscrew/Nut/Washer Set (Mouser)

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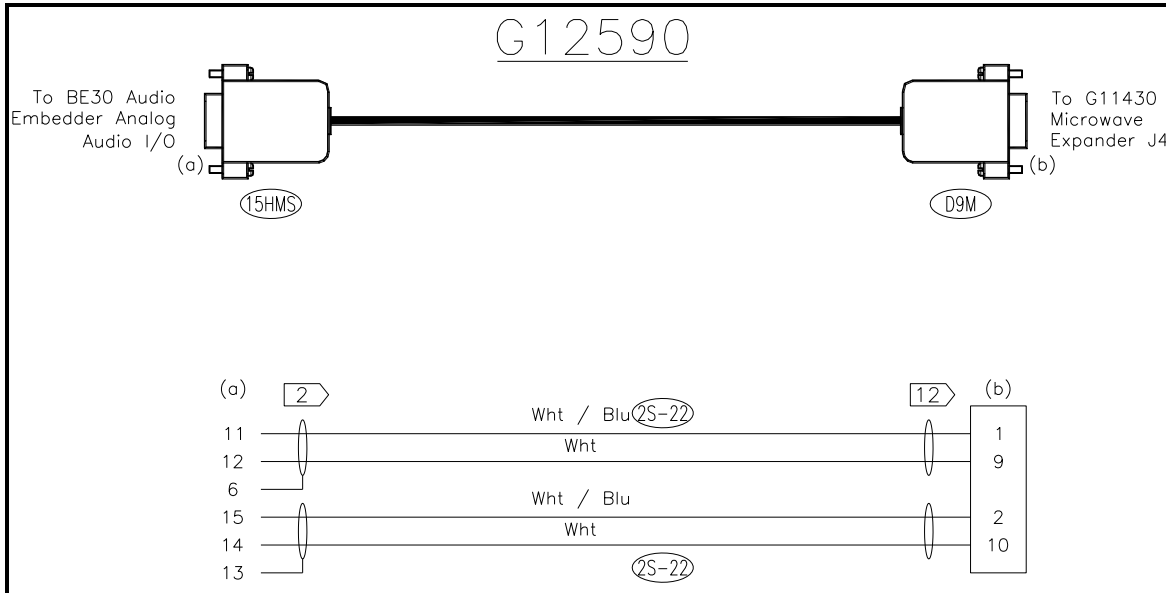


Figure 89: G12590 MW Expander Out to BrightEye 30 Analog in Audio Cable

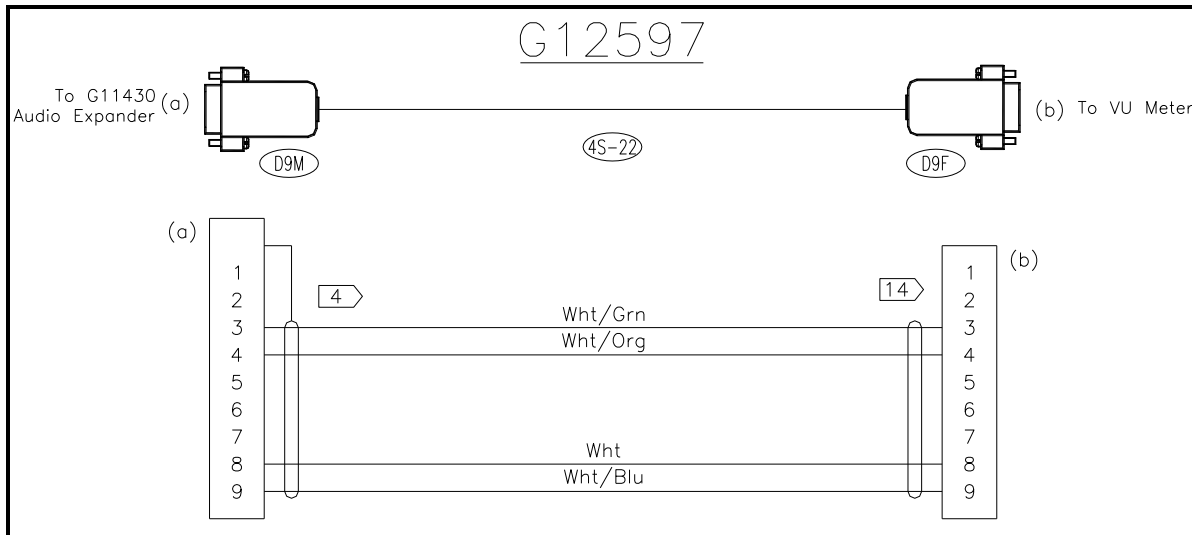


Figure 90: G12597 Expander J2 to VU Meter Audio Cable

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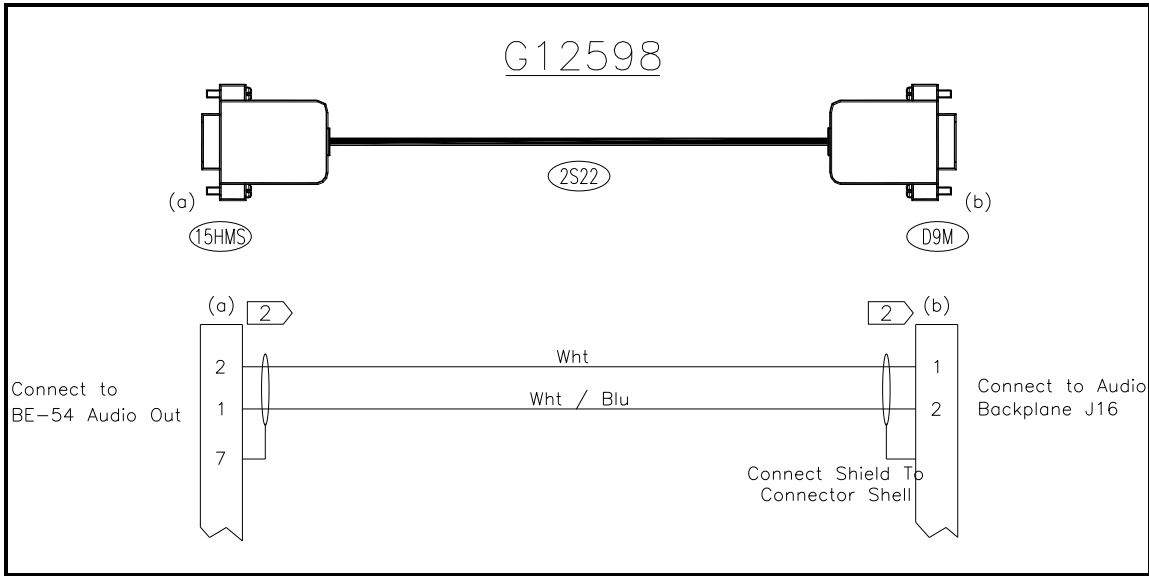


Figure 91: G12598 BE54 Tone Out to Audio Backplane Audio Cable

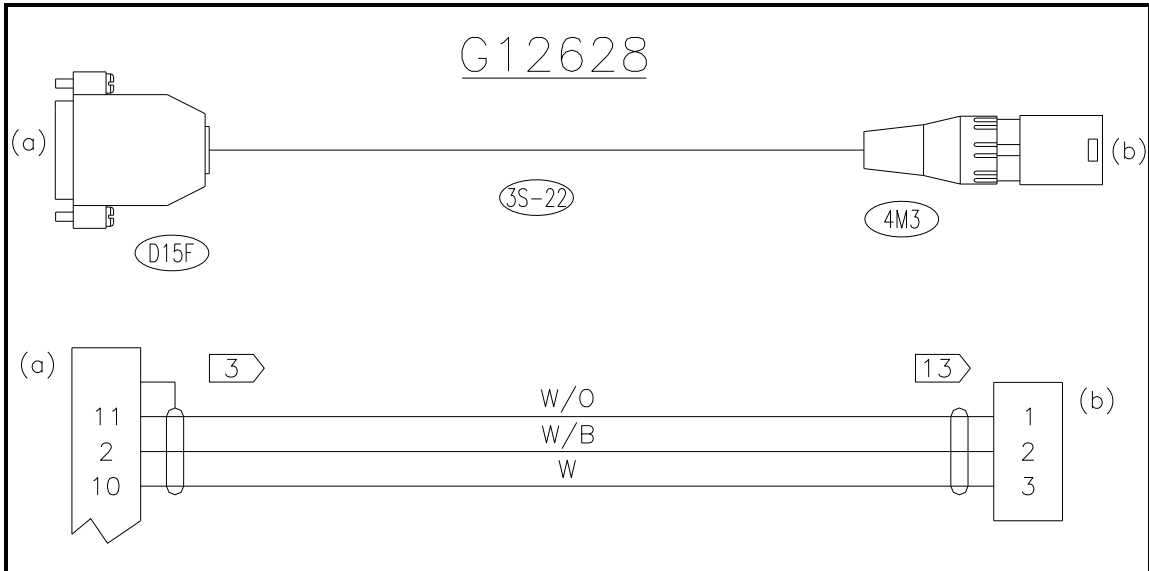


Figure 92: G12628 VTR to VTR Audio Control J2 Audio Cable

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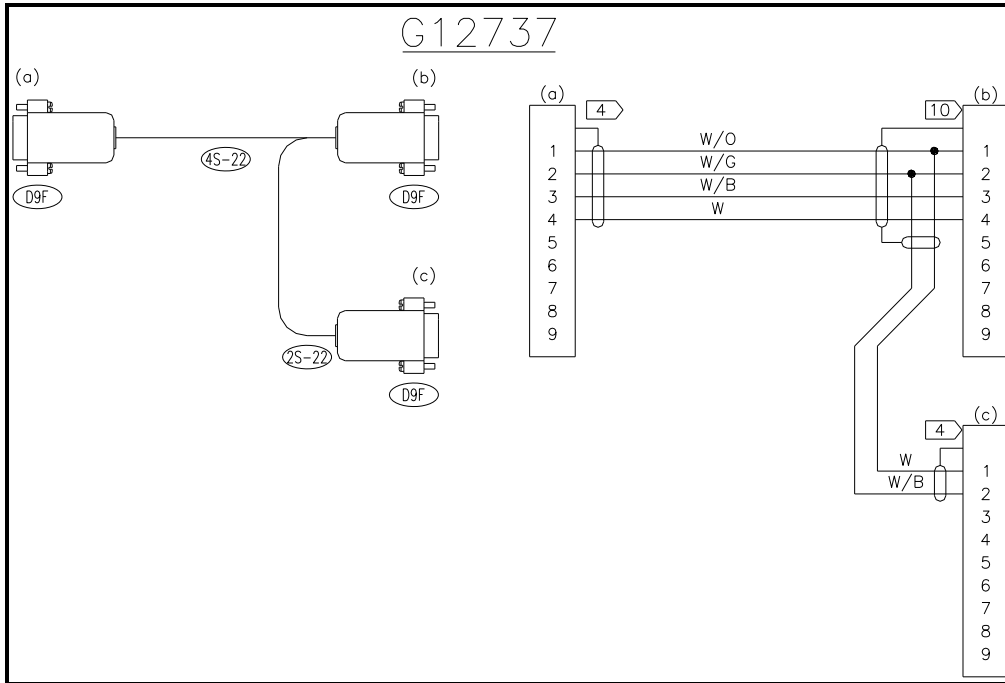


Figure 93: G12737 Non-Standard All D9F Ends, Data Only Pigtail GNET Cable

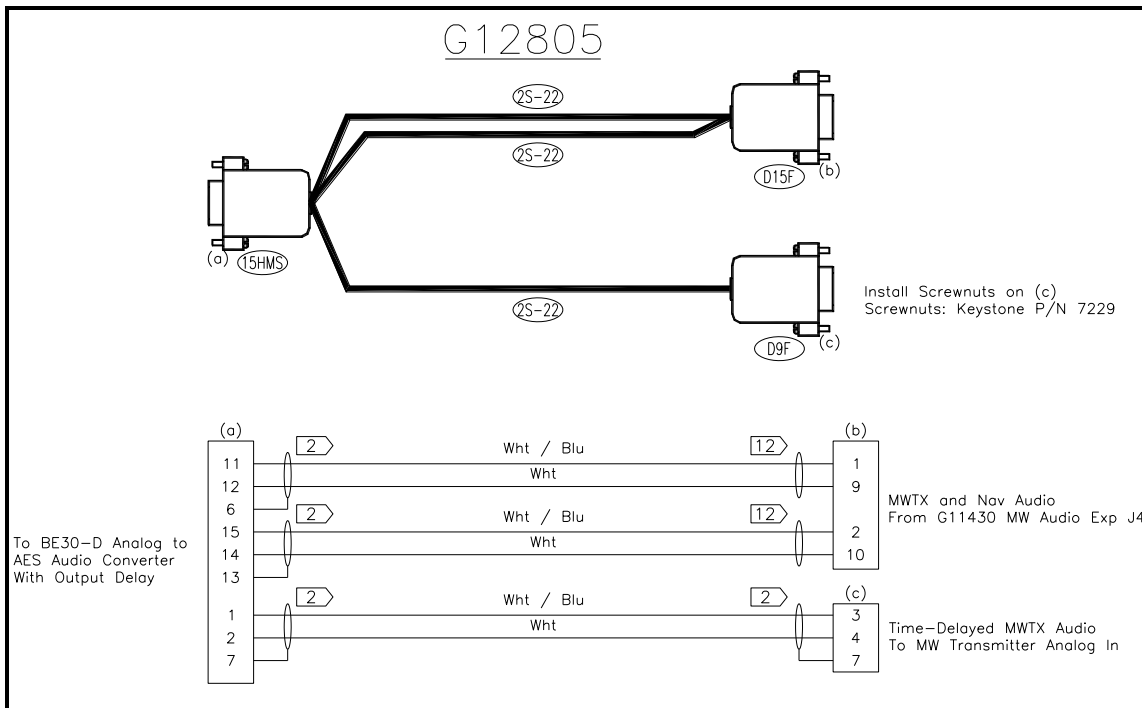


Figure 94: G12805 MW Audio Expander to BE30 and MWTX Audio Cable

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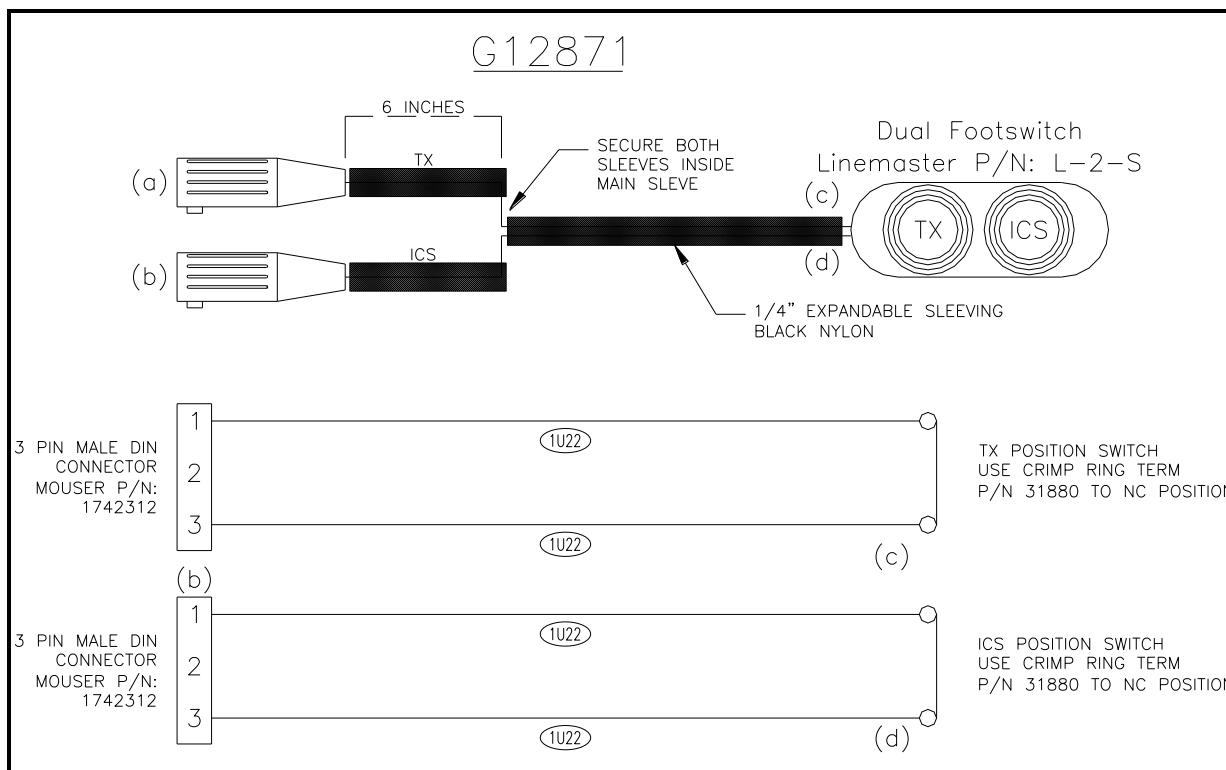


Figure 95: G12871 Audio System Dual Foot Switch Cable

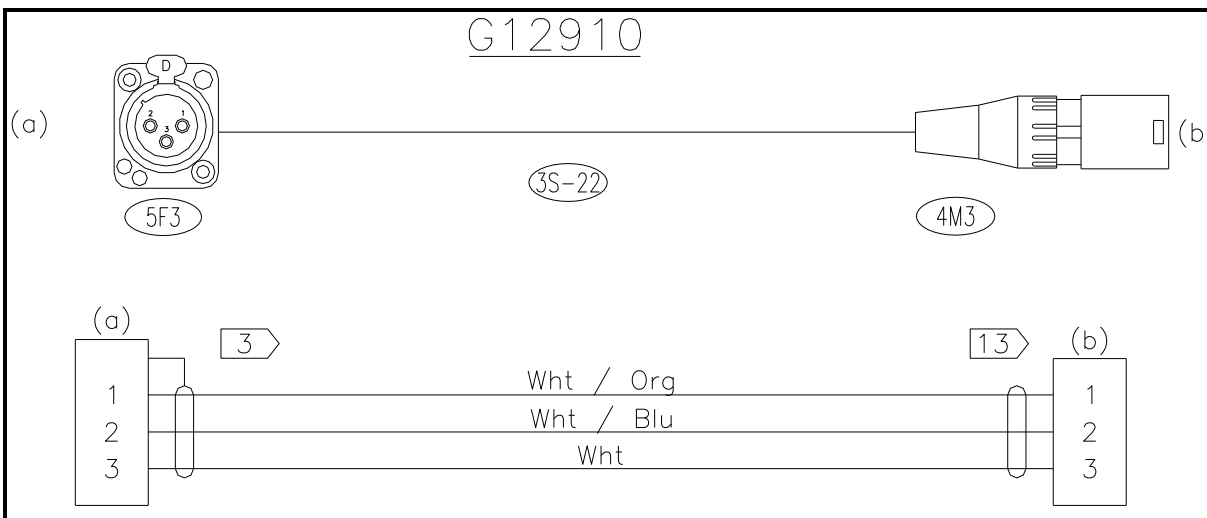


Figure 96: G12910 Bulkhead XLR3F to Inline XLR3M Audio Cable

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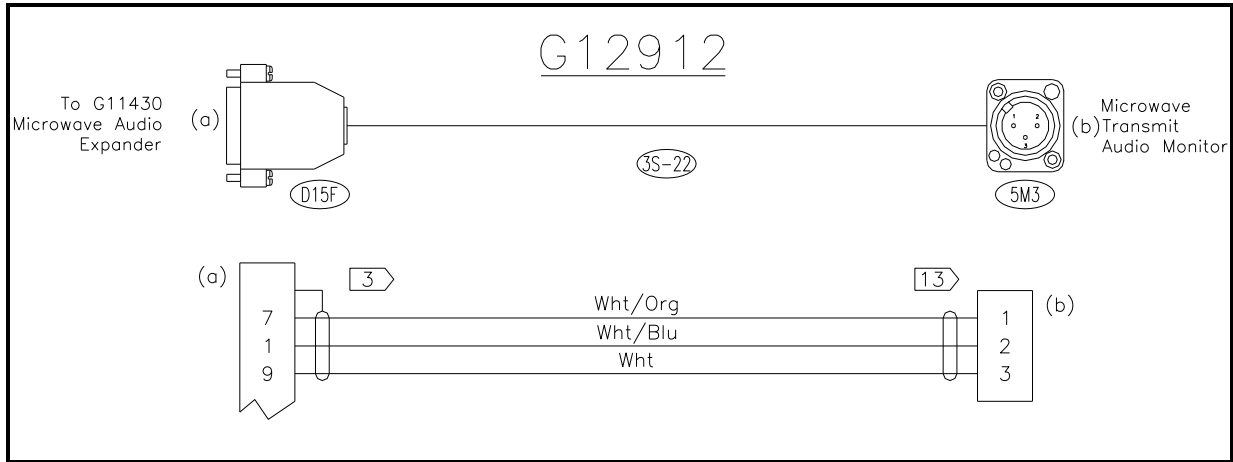


Figure 97: G12912 MWTX Audio Monitor Out Audio Cable

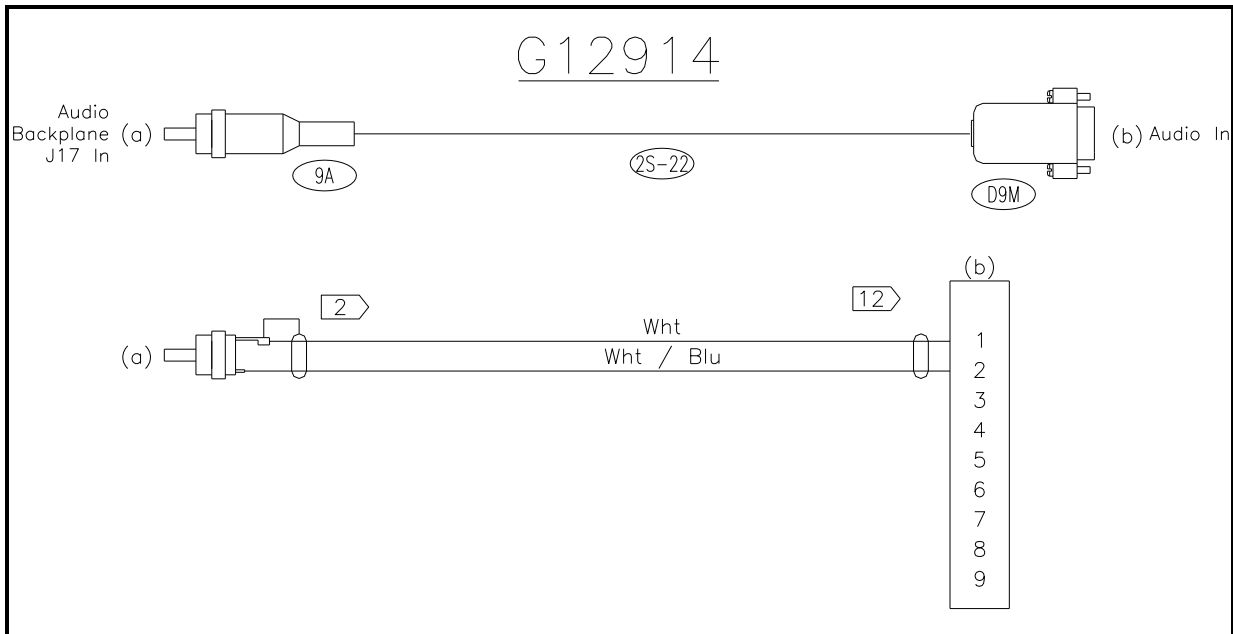


Figure 98: G12914 Backplane J17 Audio Cable

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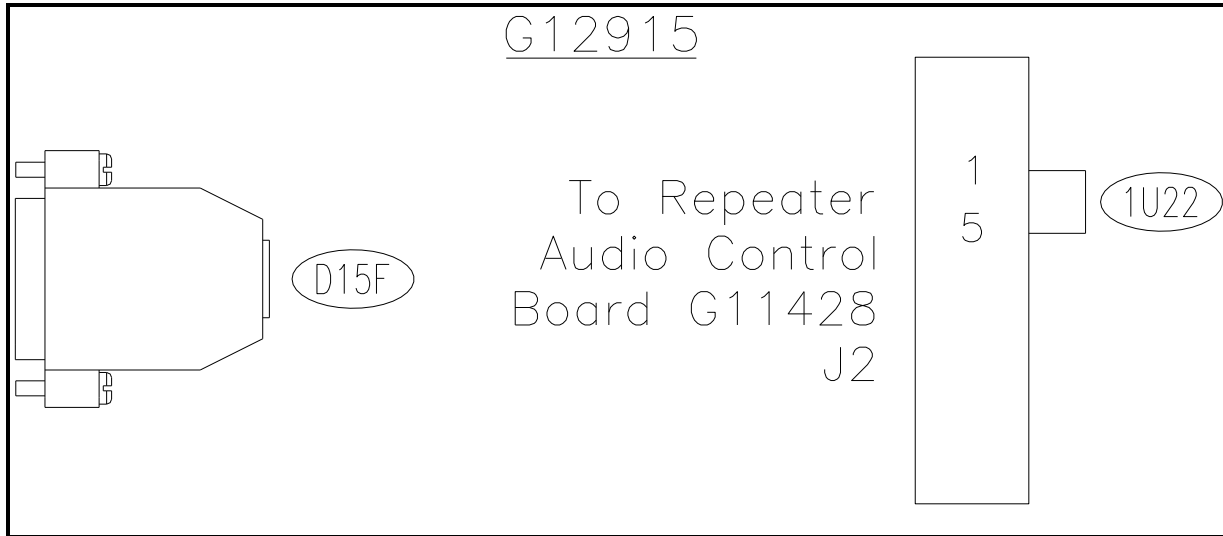


Figure 99: G12915 Repeater Audio Control Board Jumper Plug

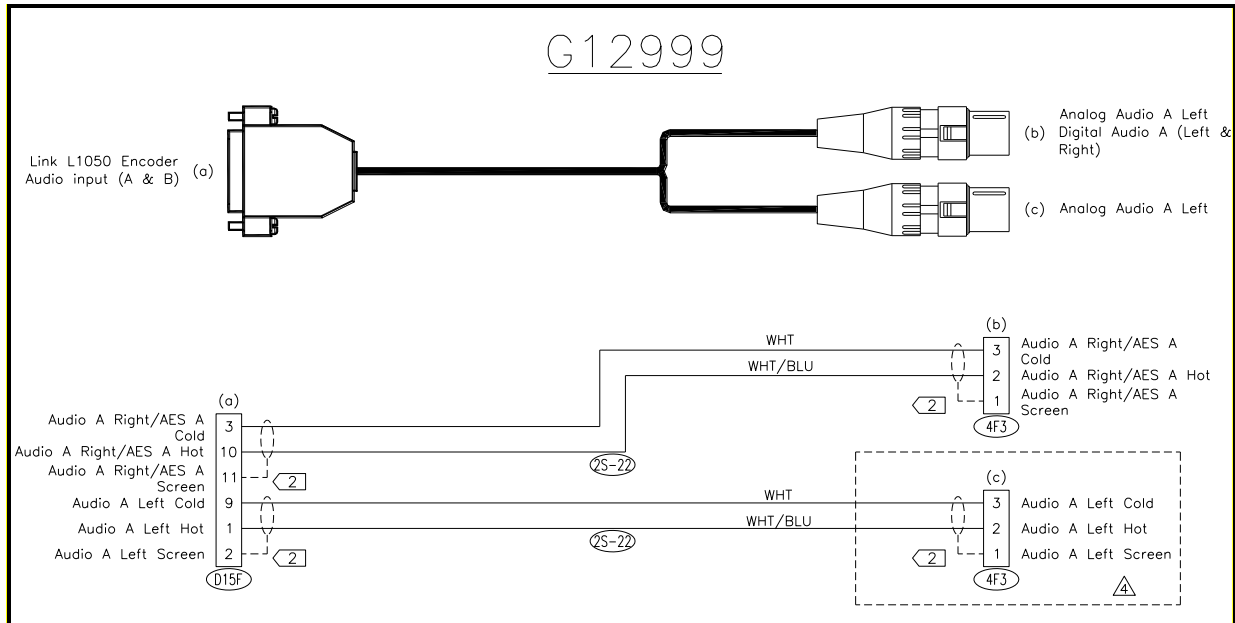


Figure 100: G12999 Dual XLR3F to Link L1050 Encoder Cable

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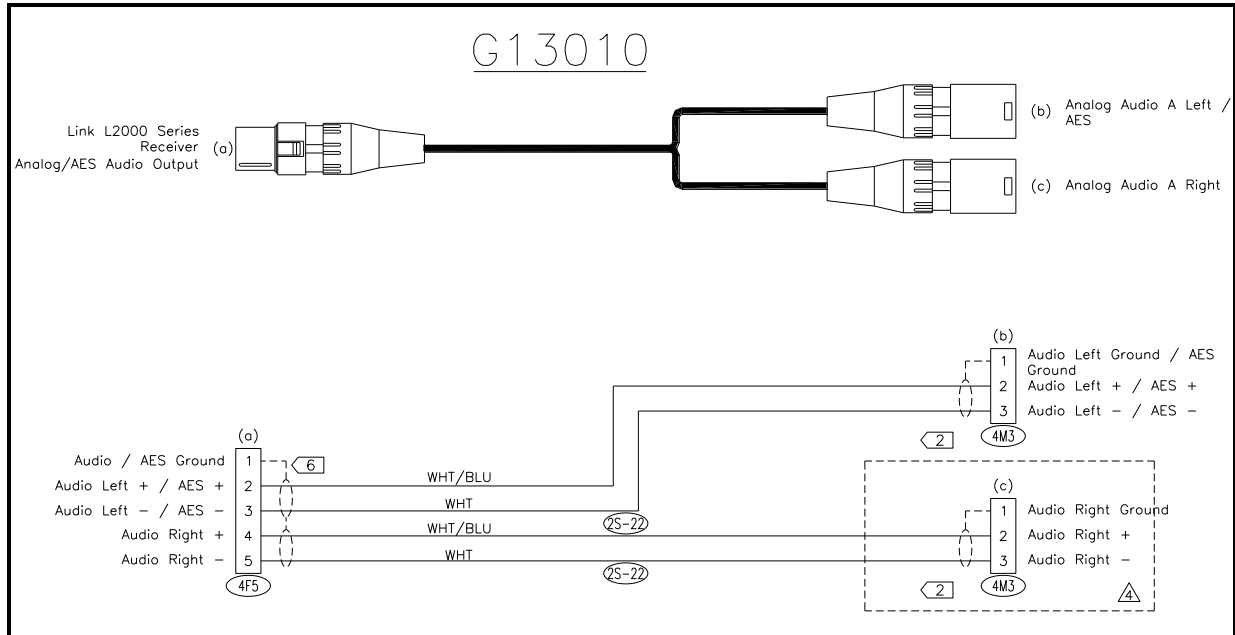


Figure 101: G13010 Link L2000 Receiver Audio XLR5F to Dual XLR3M Cable

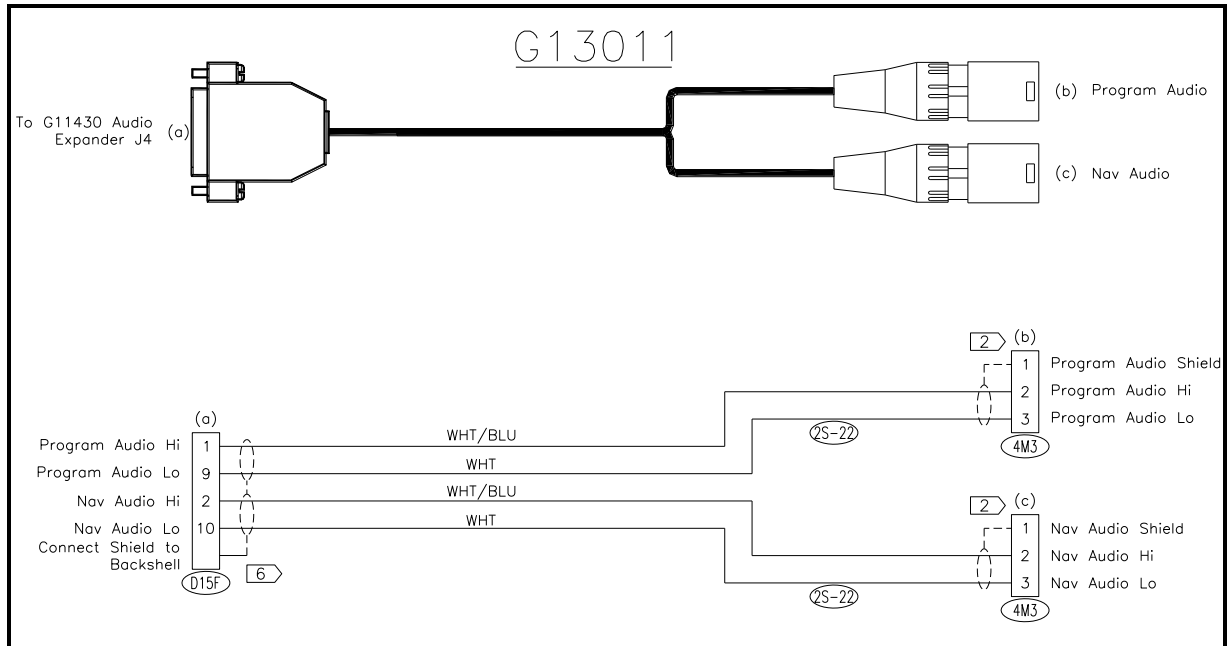


Figure 102: G13011 Audio Expander to Dual XLR3M Cable

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














This drawing set applies to the G13000 Audio Router.
It is not compatible with the G13160 3-board Audio Router.

The G13000 Audio Router can be set up in one of two configurations:
-- Dual Audio Board system with 4 audio connectors J1, J2, J3, J4
-- Single Audio Board with 2 audio connectors J2 and J4

Pages 1, 11 and 12 are common to all installations.
Wiring diagrams for the Dual Audio Board system are found on pages 2 through 7
Wiring diagrams for the Single Audio Board system are found on pages 8 through 10

Wiring Diagram for using physical switches on G13115/G13116 control panels are on page 13.

NOTES:

- | | |
|--|--|
| <p>1. Unless otherwise noted: All wires are 22 awg, all shielded wire is MIL-DTL-27500; all unshielded wire is MIL-VV-22759/16.</p> <p>2. All Grounding and Bonding will be I/AAW AC 43.13-1B, Chapter 1, Section 15.</p> | <p> D15F connector preferred assembly consists of: Connector M24308/2-2F; Cinch backshell DA-24658-31; 2ea. Cinch Screwlocks D20419-46. Alternate Backshell: Conec P/N: 165X10149X. Splices on 20 AWG wire shall also be 20 AWG, length 3 inches maximum. Alternate assembly consists of: Kobiconn Solder-Cup Connector 156-1315T-E and Cinch backshell DA-24658-31; 2ea. Cinch Screwlocks D20419-46. Alternate Backshell: Conec P/N: 165X10149X. Conductors shown with splices may be implemented by soldering the supply wire to both pins after soldering and insulating the adjacent connections.</p> |
| <p> Ground the shield return to the metal connector backshell if used, or otherwise to the metal connector housing.</p> <p> SPARE KEY line function and connections are installer defined and depend on the specific system configuration.</p> <p> D50M connector assembly consists of: Connector M24308/4-5F; Cinch backshell DD-24661-34; 2ea. Cinch Screwlocks D20420-42. Alternate Backshell: Conec 165X10179X.</p> <p> D50F connector assembly consists of: Connector M24308/2-5F; Cinch backshell DD-24661-34; 2ea. Cinch Screwlocks D20420-42. Alternate Backshell: Conec 165X10179X.</p> <p> D9F connector assembly consists of: Connector M24308/2-1F; Cinch backshell DE-24657-30; 2ea. Cinch Screwlocks D20419-46. Alternate Backshell: Conec 165X10139X.</p> <p> When COM1DIR (P5, Pin 10) is not grounded, the Pilot headset is in EMERGENCY mode and the following lines are diverted:</p> <ul style="list-style-type: none"> • HEADSET 1 connects directly to RX1, RX11 (Unswitched Alert Tones) and the emergency intercom. • MIC 1 connects directly to TX 1 and the emergency Intercom. • XMIT KEY 1 and PLT COM1 KEY connect to TX KEY 1. • ICS KEY 1 keys the emergency intercom, if at least one Power Input Circuit Breaker to the G13000 Audio Router has power. • TX11 (CVR) transmits HEADSET1, MIC1 and Emergency Intercom if at least one Power Input Circuit Breaker to the G13000 Audio Router has power. <p>When COM2DIR (P5, Pin 11) is not grounded, the Copilot headset is in EMERGENCY mode and the following lines are diverted:</p> <ul style="list-style-type: none"> • HEADSET 2 connects directly to RX2, RX20 (Unswitched Alert Tones) and the emergency intercom. • MIC 2 connects directly to TX 2, and the emergency Intercom. • XMIT KEY 2 and CPLT COM2 KEY connect to TX KEY 2. • ICS KEY 2 keys the emergency intercom, if at least one Power Input Circuit Breaker to the G13000 Audio Router has power. • TX20 (CVR) transmits HEADSET2, MIC2 and Emergency Intercom if at least one Power Input Circuit Breaker to the G13000 Audio Router has power. <p> TERMINAL BLOCK assembly consists of: Deutsch block CTJ122E05E; Deutsch socket contacts CTS-S22/22 or M39029/22-191. A Gnet channel that is connected to only one control panel or other device may be wired directly without using a terminal block.</p> | <p> D9M connector assembly consists of: Connector M24308/4-1F; Cinch backshell DE-24657-30; 2ea. Cinch Screwlocks D20419-46. Alternate Backshell: Conec 165X10139X.</p> <p> The COM1DIR pin MUST be wired to an appropriate switch to control Emergency Mode for the pilot headset. Emergency Mode is mandatory when the G13000 Audio Router is used as the primary audio system. See notes on sheet 13.</p> <p> For EC135 connect alert tone ports to TB9 of factory wiring. See Eurocopter Maint. Manual WDM for detail.
For EC145 connect alert tone ports to TB55028 of factory wiring. See Eurocopter Maint. Manual WDM for detail.
For Bell 204, 205, 214 and 412 connect alert tone ports to 8Z1P3. See Bell Maint. Manual BHT-xx-MM for detail.</p> <p> SHIELDING: For shielded wire, the shield must be connected to airframe ground or connector ground as follows:</p> <ul style="list-style-type: none"> • For wire carrying audio signals, the shield must be grounded at one end ONLY. Grounding both ends may lead to audio noise. • Audio shield ground connections should be made at the G13000 connectors but may be made at the other end at the installers discretion. • For all other shielded wire, e.g. Gnet and power, the shield must be grounded at both ends. <p> BUS CONNECTIONS: Breakers should be connected to two separate busses for redundancy. Consult installation instructions to determine appropriate bus assignments.</p> <p> CONTROL PANEL CONNECTIONS: Control panel J1 is the default Gnet connection. J2 is used for expansion in specific configurations only.</p> <p> HEADSET LO is NOT a power ground and MUST NOT be used as a ground for powered devices. MIC LO may be used as a ground for low-powered devices or use an external ground connection.</p> |

DEFINITIONS:

- N/C: MAKE NO CONNECTION. The pin is not connected to anything internally and therefore shall have no connection externally
- RESERVED: MAKE NO CONNECTION. Internal circuitry may be added in the future, or may be present and relevant for testing but not relevant to operation for flight.

Figure 103: G13004 SHT 1 NOTES

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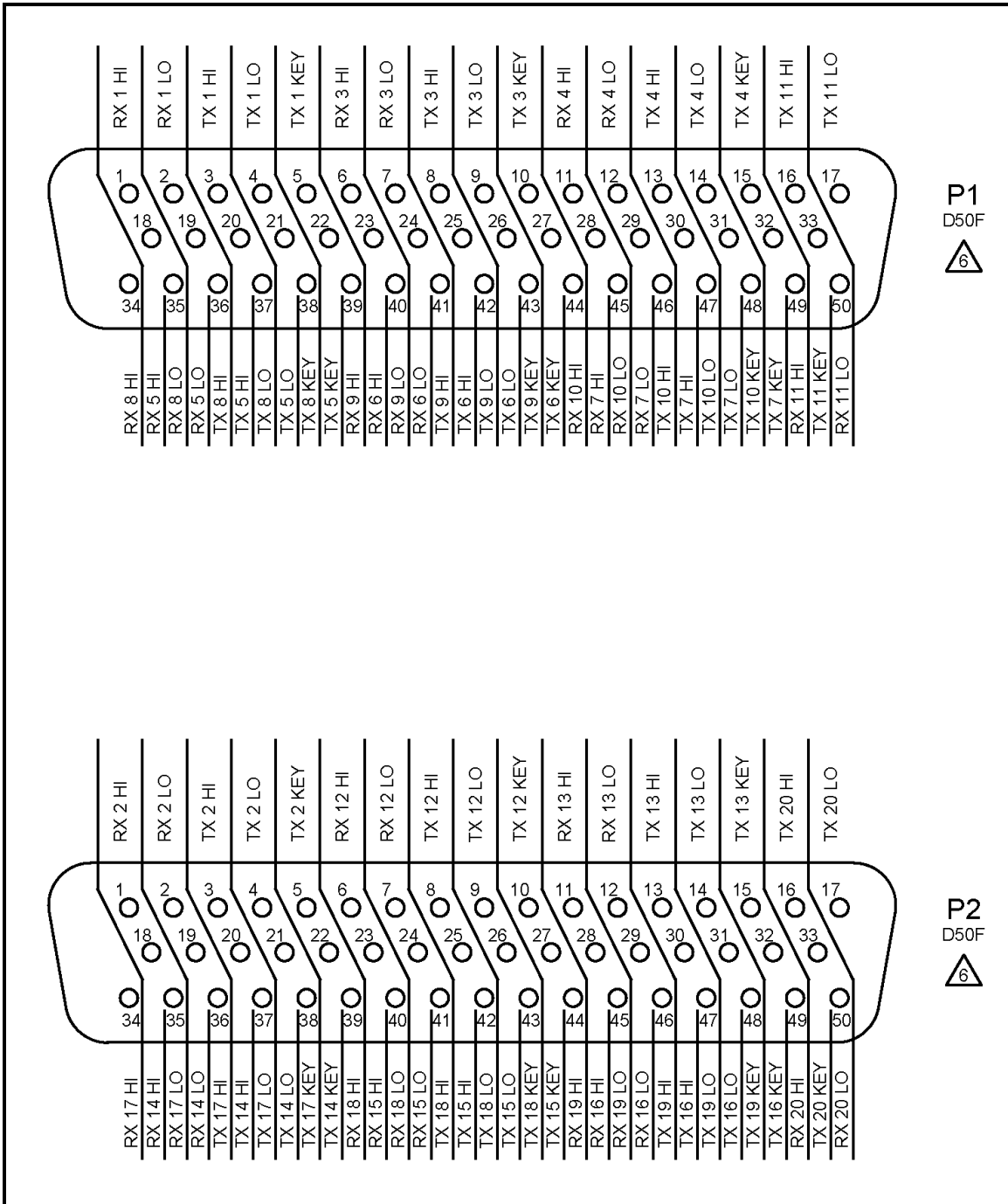


Figure 104: G13004 SHT 2 Map for P1, P2

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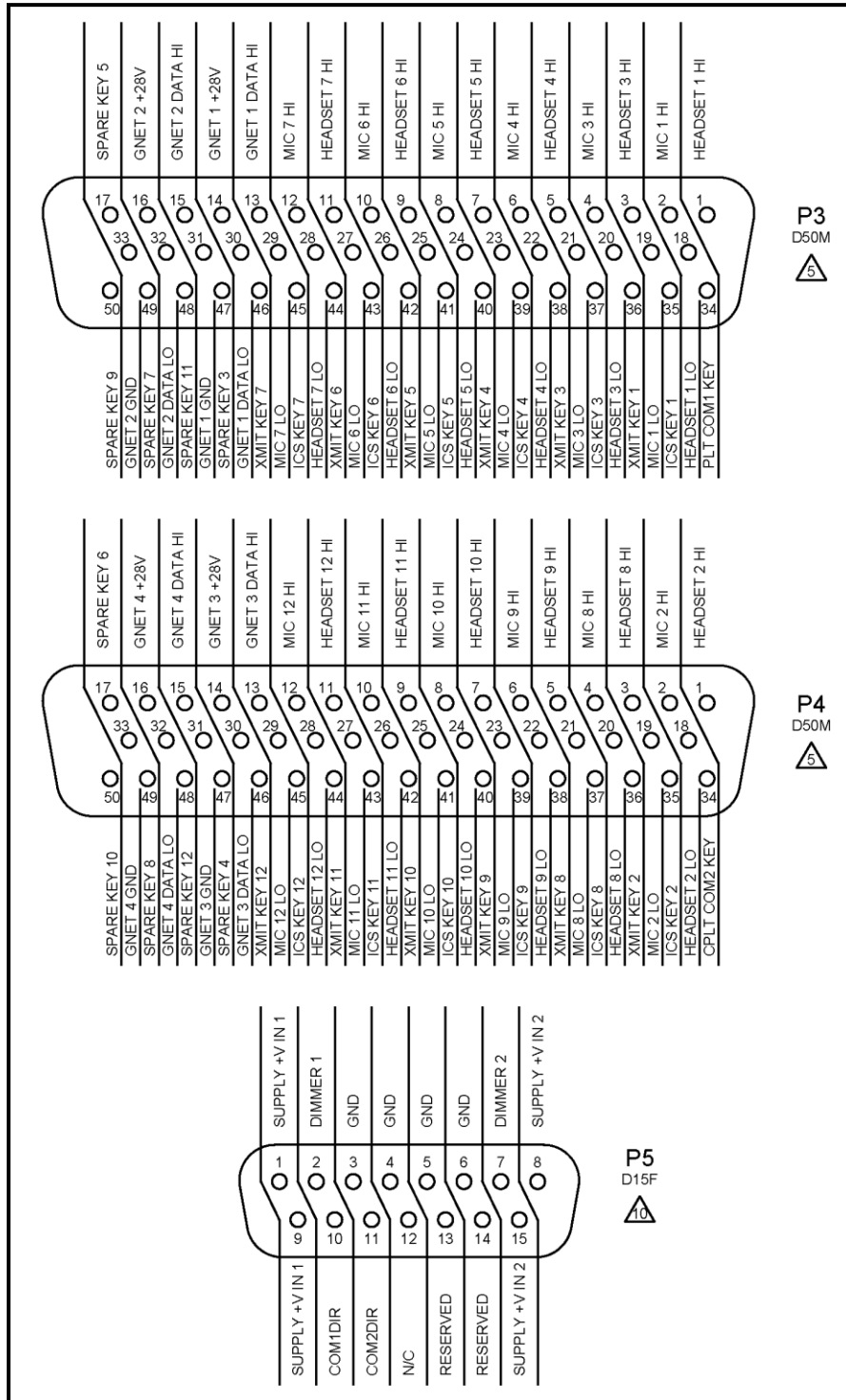


Figure 105: G13004 SHT 3 Map for P3, P4, P5

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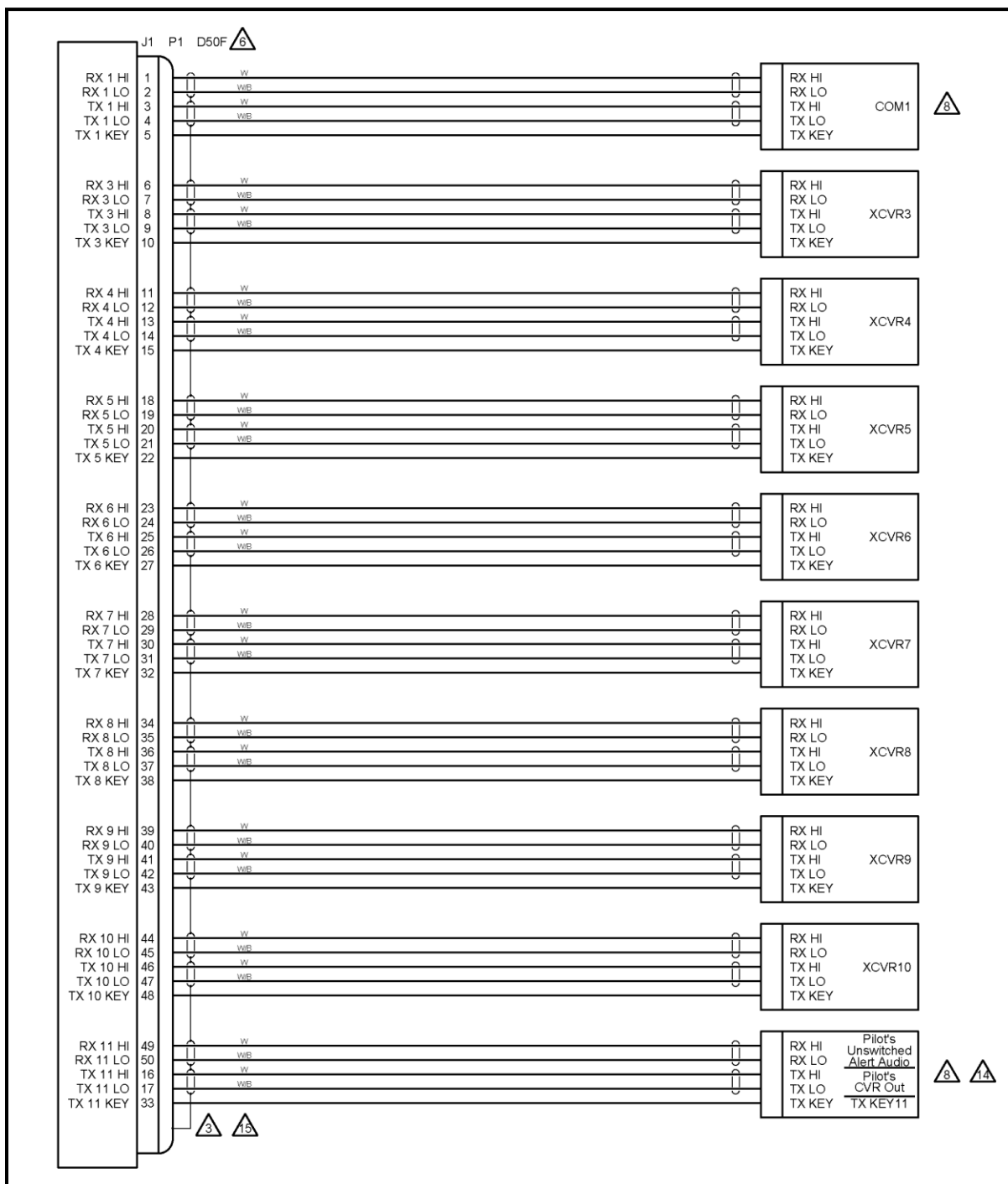


Figure 106: G13004 SHT 4 J1 Connections

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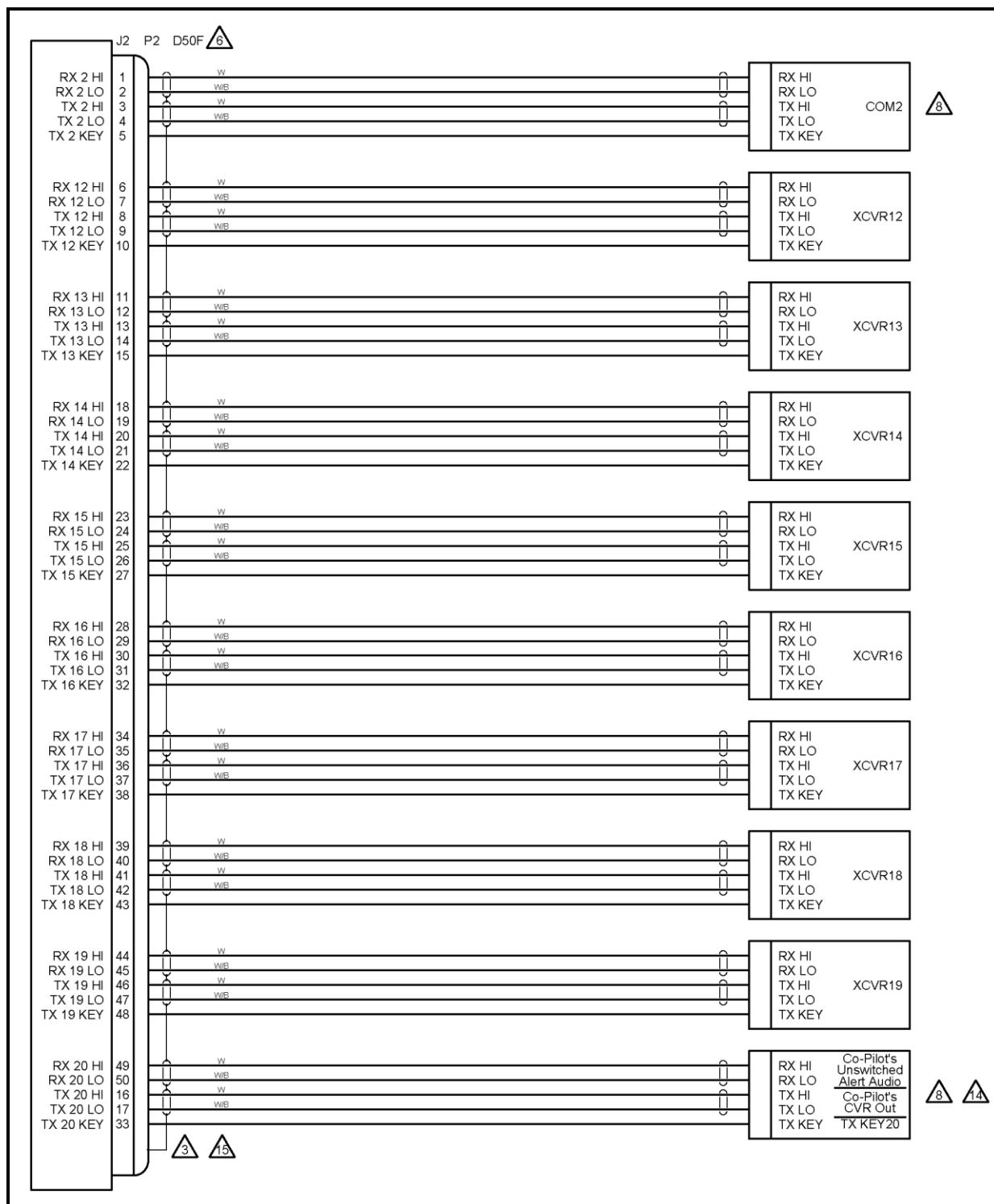


Figure 107: G13004 SHT 5 J2 Connections

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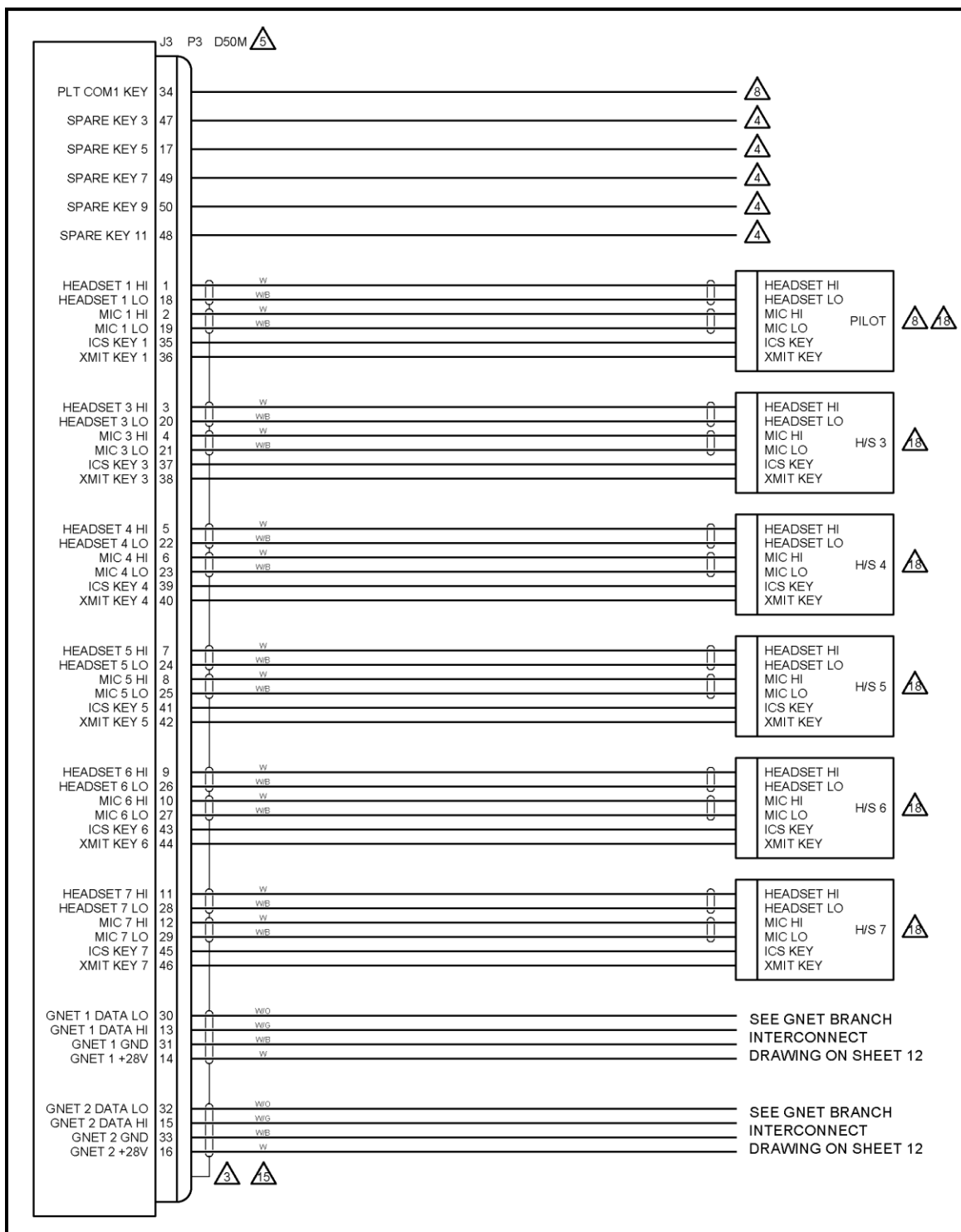


Figure 108: G13004 SHT 6 J3 Connections

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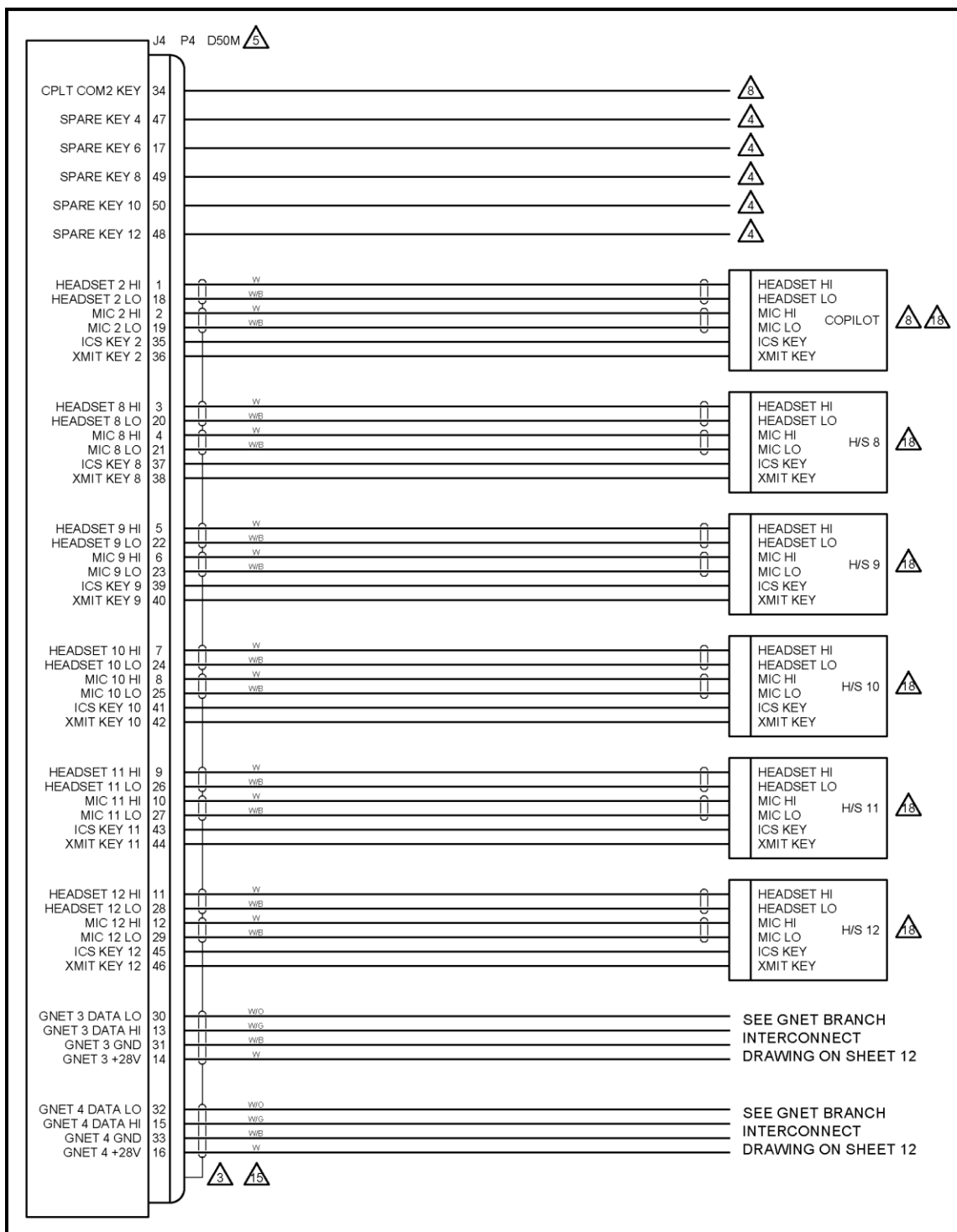


Figure 109: G13004 SHT 7 J4 Connections

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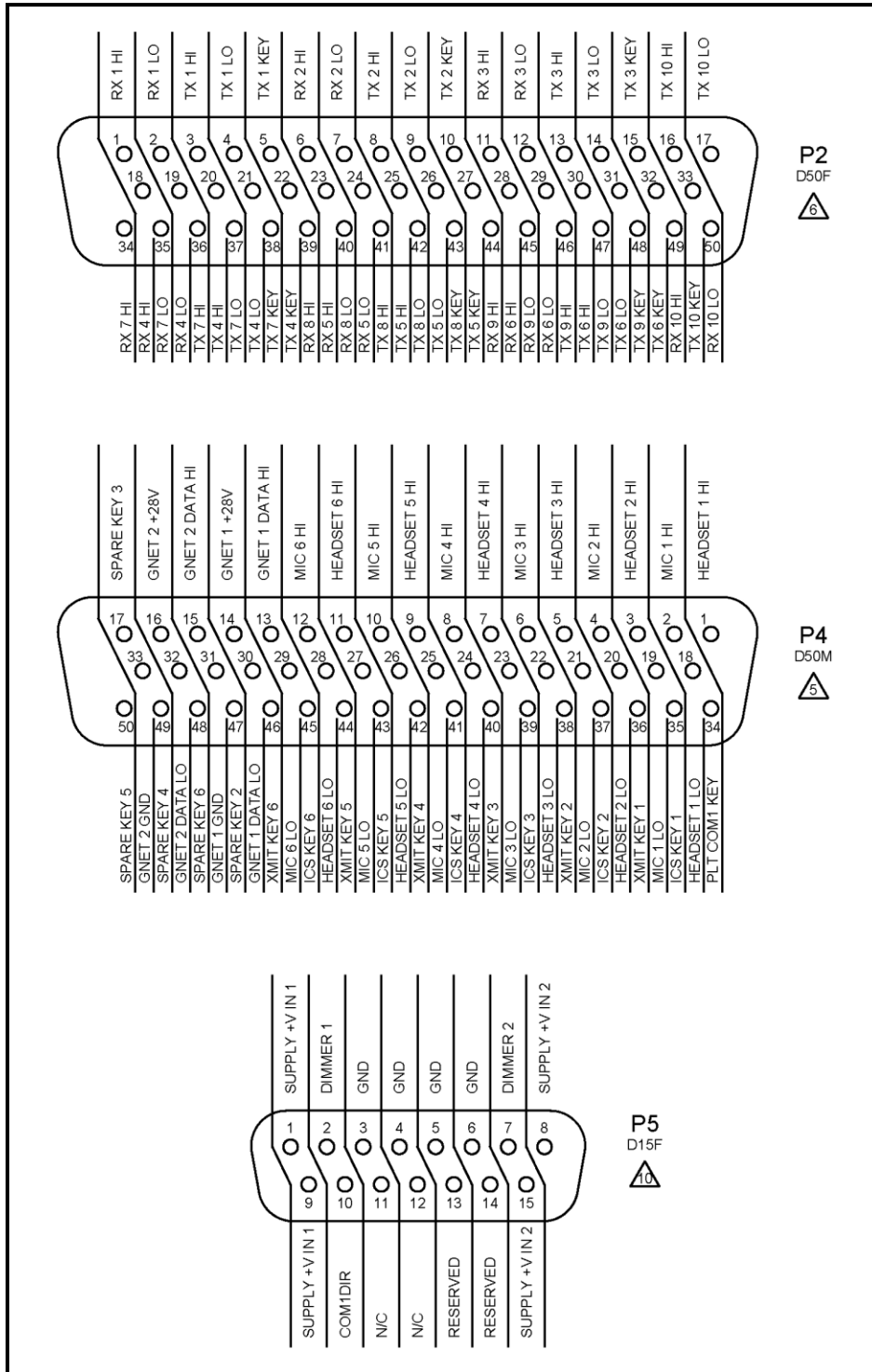


Figure 110: G13004 SHT 8 Single Board Router P2, P4, P5

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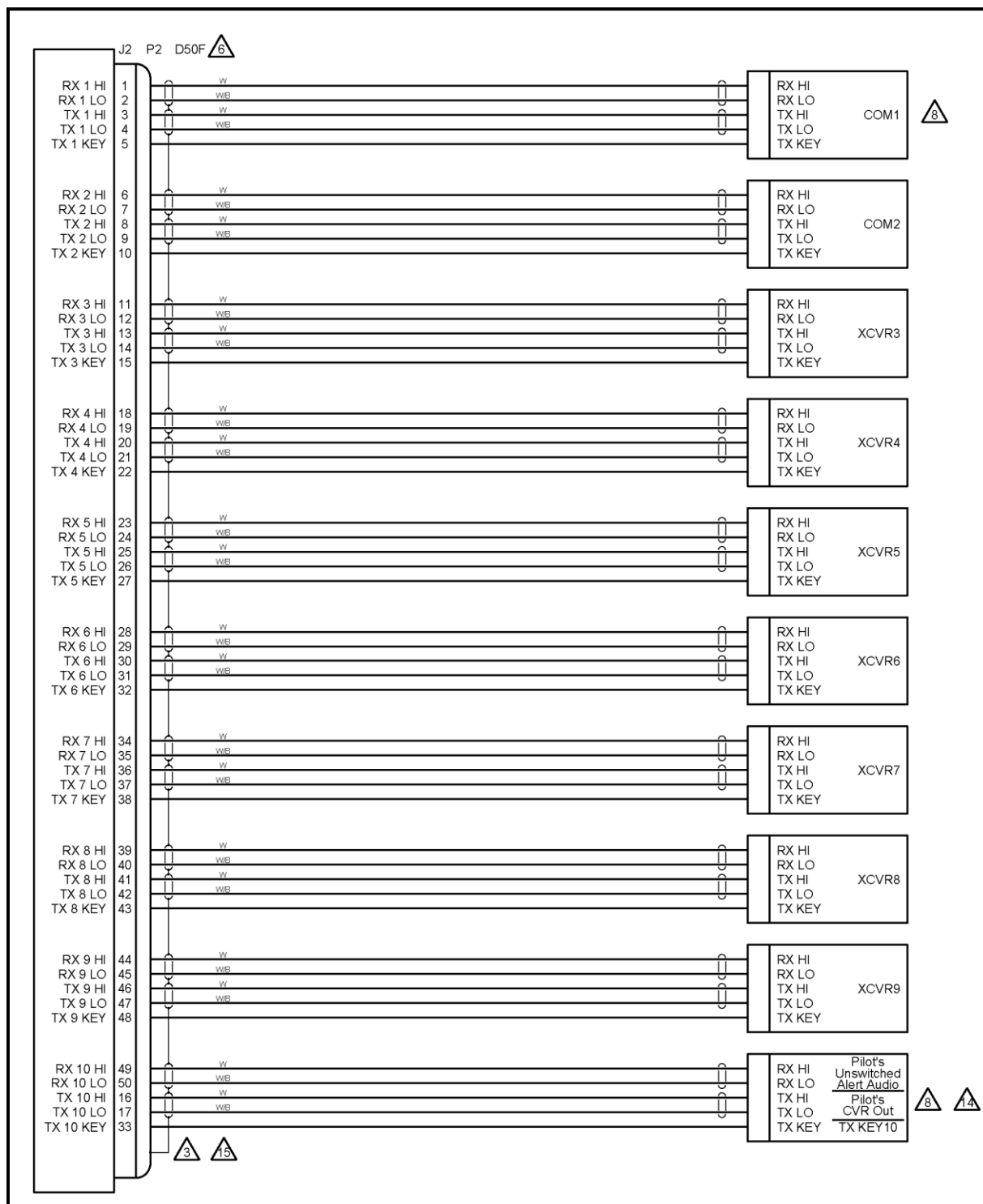


Figure 111: G13004 SHT 9 Single Board Router J2 Connections

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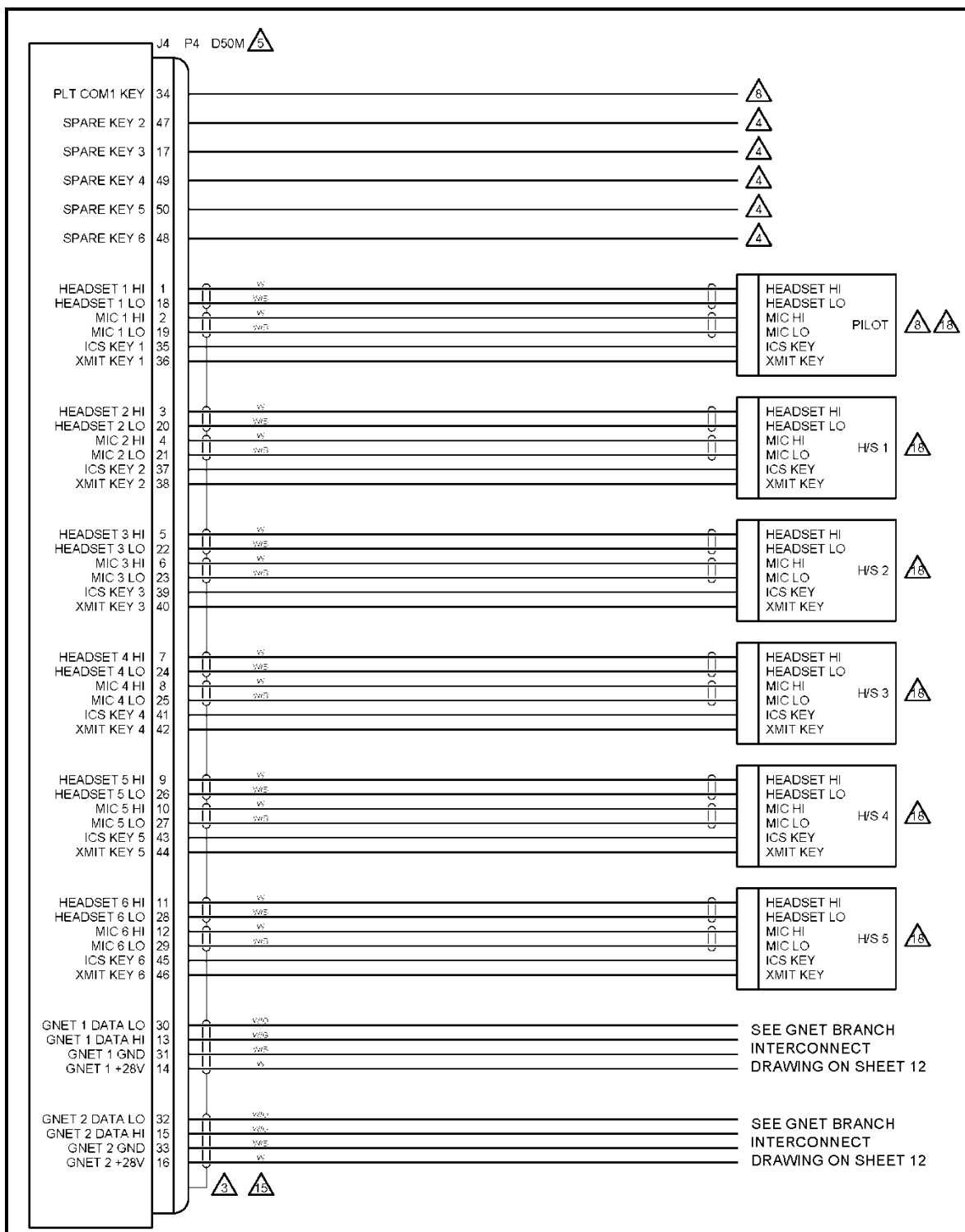


Figure 112: G13004 SHT 10 Single Board Router J4 Connections

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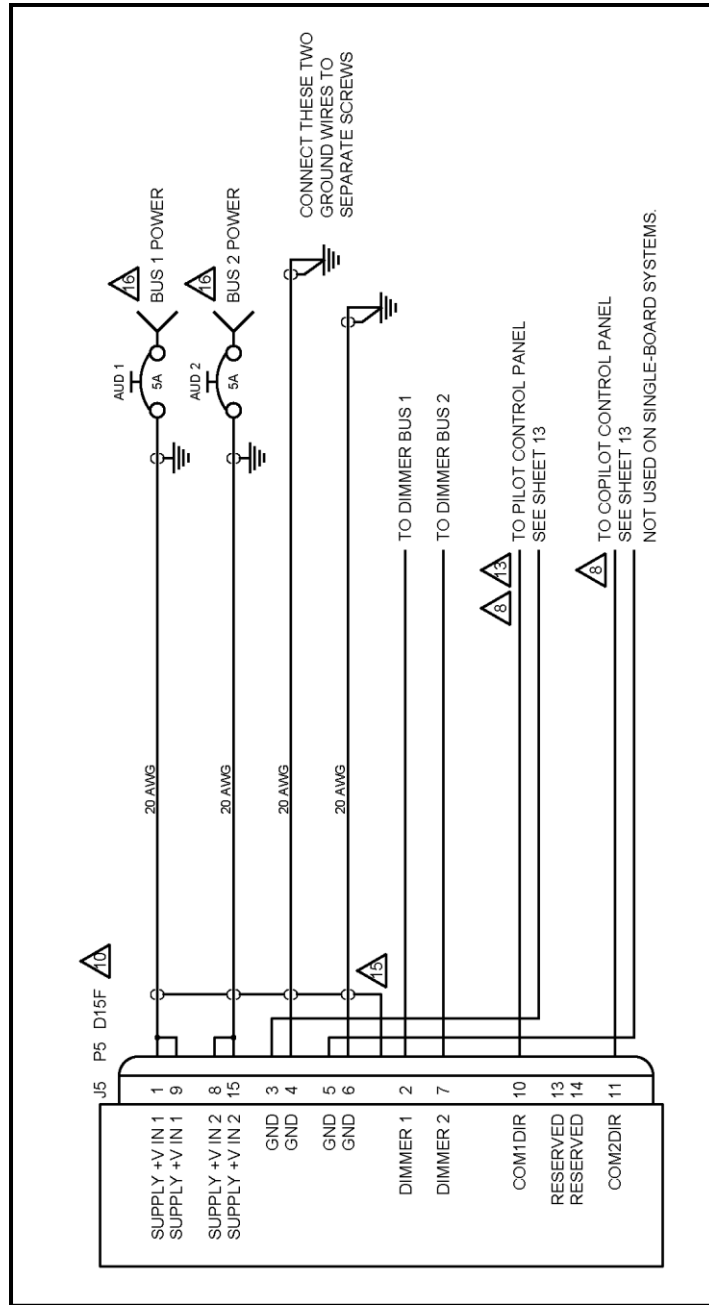


Figure 113: G13004 SHT 11 J5 Connections

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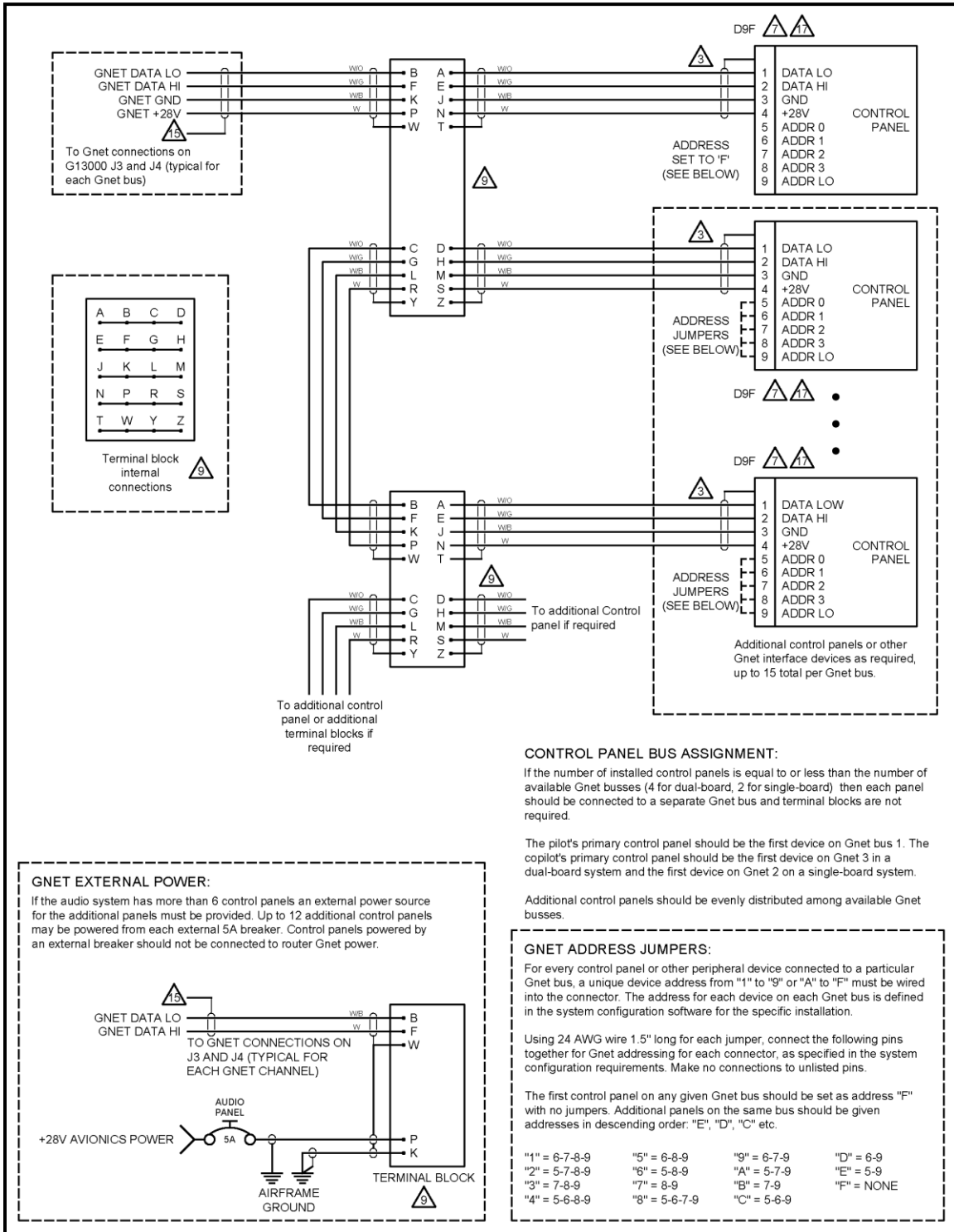


Figure 114: G13004 SHT 12 GNET Interconnects

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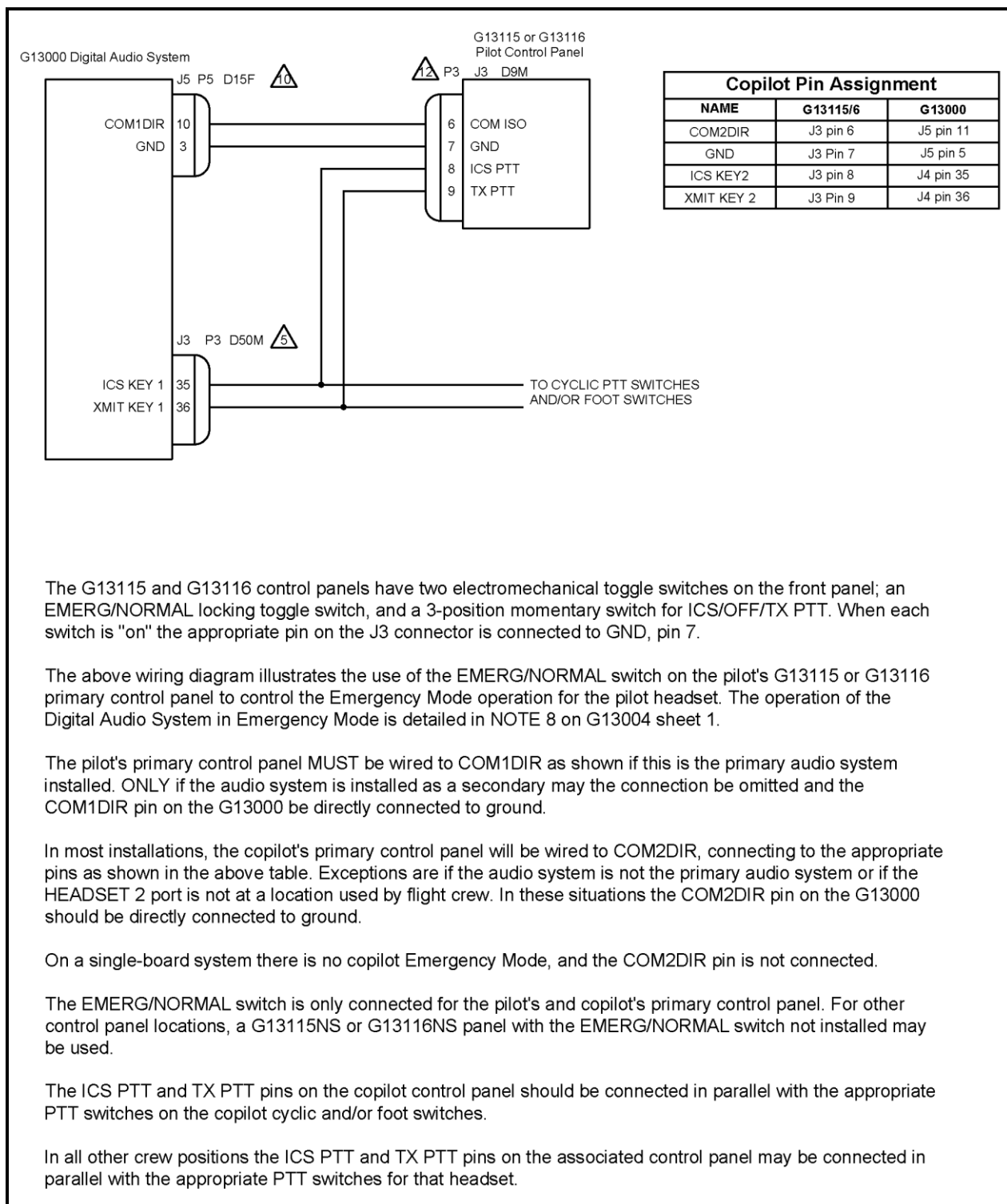
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The G13115 and G13116 control panels have two electromechanical toggle switches on the front panel; an EMERG/NORMAL locking toggle switch, and a 3-position momentary switch for ICS/OFF/TX PTT. When each switch is "on" the appropriate pin on the J3 connector is connected to GND, pin 7.

The above wiring diagram illustrates the use of the EMERG/NORMAL switch on the pilot's G13115 or G13116 primary control panel to control the Emergency Mode operation for the pilot headset. The operation of the Digital Audio System in Emergency Mode is detailed in NOTE 8 on G13004 sheet 1.

The pilot's primary control panel MUST be wired to COM1DIR as shown if this is the primary audio system installed. ONLY if the audio system is installed as a secondary may the connection be omitted and the COM1DIR pin on the G13000 be directly connected to ground.

In most installations, the copilot's primary control panel will be wired to COM2DIR, connecting to the appropriate pins as shown in the above table. Exceptions are if the audio system is not the primary audio system or if the HEADSET 2 port is not at a location used by flight crew. In these situations the COM2DIR pin on the G13000 should be directly connected to ground.

On a single-board system there is no copilot Emergency Mode, and the COM2DIR pin is not connected.

The EMERG/NORMAL switch is only connected for the pilot's and copilot's primary control panel. For other control panel locations, a G13115NS or G13116NS panel with the EMERG/NORMAL switch not installed may be used.

The ICS PTT and TX PTT pins on the copilot control panel should be connected in parallel with the appropriate PTT switches on the copilot cyclic and/or foot switches.

In all other crew positions the ICS PTT and TX PTT pins on the associated control panel may be connected in parallel with the appropriate PTT switches for that headset.

Figure 115: G13004 SHT 13 G13115 Control Head Wiring

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AUDIO BOARD OPTIONS:

This drawing set applies to the G13160 3-board Audio Router.
It is not compatible with the G13000 Dual-Board or Single-Board Audio Routers.

NOTES:

- | | |
|---|---|
| <p>1. Unless otherwise noted: All wires are 22 awg; all shielded wire is MIL-DTL-27500; all unshielded wire is MIL-W-22759/16.</p> <p>2. All Grounding and Bonding will be I/AW AC 43.13-1B, Chapter 11, Section 15.</p> <p> 3. Ground the shield return to the metal connector backshell if used, or otherwise to the metal connector housing.</p> <p> 4. SPARE KEY line function and connections are installer defined and depend on the specific system configuration.</p> <p> 5. D50M connector assembly consists of: Connector M24308/4-5F; Cinch backshell DD-24661-34; 2ea. Cinch Screwlocks D20420-42. Alternate Backshell: Conec 165X10179X.</p> <p> 6. D50F connector assembly consists of: Connector M24308/2-5F; Cinch backshell DD-24661-34; 2ea. Cinch Screwlocks D20420-42. Alternate Backshell: Conec 165X10179X.</p> <p> 7. D9F connector assembly consists of: Connector M24308/2-1F; Cinch backshell DE-24657-30; 2ea. Cinch Screwlocks D20419-46. Alternate Backshell: Conec 165X10139X.</p> <p> 8. When COM1DIR (P7, Pin 10) is not grounded, the Pilot headset is in EMERGENCY mode and the following lines are diverted:</p> <ul style="list-style-type: none"> • HEADSET 1 connects directly to RX 1, RX 11 (Unswitched Alert Tones) and the emergency intercom. • MIC 1 connects directly to TX 1 and the emergency Intercom. • XMIT KEY 1 and PLT COM1 KEY connect to TX KEY 1. • ICS KEY 1 keys the emergency intercom, if at least one Power Input Circuit Breaker to the G13160 Audio Router has power. • TX 11 (CVR) transmits HEADSET 1, MIC 1 and Emergency Intercom if at least one Power Input Circuit Breaker to the G13160 Audio Router has power. <p>When COM2DIR (P7, Pin 11) is not grounded, the Copilot headset and Headset 13 are in EMERGENCY mode and the following lines are diverted:</p> <ul style="list-style-type: none"> • HEADSET 2 connects directly to RX 2, RX 20 (Unswitched Alert Tones) and the emergency intercom. • MIC 2 connects directly to TX 2 and the emergency Intercom. • XMIT KEY 2 and CPLT COM2 KEY connect to TX KEY 2. • ICS KEY 2 keys the emergency intercom, if at least one Power Input Circuit Breaker to the G13160 Audio Router has power. • TX 20 (CVR) transmits HEADSET 2, MIC 2 and Emergency Intercom if at least one Power Input Circuit Breaker to the G13160 Audio Router has power. <ul style="list-style-type: none"> • HEADSET 13 connects directly to RX21, RX30 and the emergency intercom. • MIC 13 connects directly to TX21 and the emergency Intercom. • XMIT KEY 13 and HS13 TX21 KEY connect to TX KEY 21. • ICS KEY 13 keys the emergency intercom, if at least one Power Input Circuit Breaker to the G13160 Audio Router has power. • TX30 transmits HEADSET 13, MIC 13 and Emergency Intercom if at least one Power Input Circuit Breaker to the G13160 Audio Router has power. <p> 9. TERMINAL BLOCK assembly consists of: Deutsch block CTJ122E05E; Deutsch socket contacts CTS-S22/22 or M39029/22-191. A Gnet bus that is connected to only one control panel or other device may be wired directly without using a terminal block.</p> | <p> 10. D15F connector preferred assembly consists of: Connector M24308/2-2F; Cinch backshell DA-24658-31; 2ea. Cinch Screwlocks D20419-46. Alternate Backshell: Conec P/N: 165X10149X. Splices on 20 AWG wire shall also be 20 AWG, length 3 inches maximum. Alternate assembly consists of: Kobiconn Solder-Cup Connector 156-1315T-E and Cinch backshell DA-24658-31; 2ea. Cinch Screwlocks D20419-46. Alternate Backshell: Conec P/N: 165X10149X. Conductors shown with splices may be implemented by soldering the supply wire to both pins after soldering and insulating the adjacent connections.</p> <p> 12. D9M connector assembly consists of: Connector M24308/4-1F; Cinch backshell DE-24657-30; 2ea. Cinch Screwlocks D20419-46. Alternate Backshell: Conec 165X10139X.</p> <p> 13. The COM1DIR pin MUST be wired to an appropriate switch to control Emergency Mode for the pilot headset. Emergency Mode is mandatory when the G13160 Audio Router is used as the primary audio system. See notes on sheet 13.</p> <p> 14. For EC135 connect alert tone ports to TB9 of factory wiring. See Eurocopter Maint Manual WDM for detail.
For EC145 connect alert tone ports to TB55028 of factory wiring. See Eurocopter Maint. Manual WDM for detail.
For Bell 204, 205, 214 and 412 connect alert tone ports to 8Z1P3. See Bell Maint. Manual BHT-xx-MM for detail.</p> <p> 15. SHIELDING: For shielded wire, the shield must be connected to airframe ground or connector ground as follows:</p> <ul style="list-style-type: none"> • For wire carrying audio signals, the shield must be grounded at one end ONLY. Grounding both ends may lead to audio noise. • Audio shield ground connections should be made at the G13160 connectors but may be made at the other end at the installers discretion. • For all other shielded wire, e.g. Gnet and power, the shield must be grounded at both ends. <p> 16. BUS CONNECTIONS: Breakers should be connected to two separate busses for redundancy. Consult installation instructions to determine appropriate bus assignments.</p> <p> 17. CONTROL PANEL CONNECTIONS: Control panel J1 is the default Gnet connection. J2 is used for expansion in specific configurations only.</p> <p> 18. HEADSET LO is NOT a power ground and MUST NOT be used as a ground for powered devices. MIC LO may be used as a ground for low-powered devices or use an external ground connection.</p> |
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Figure 116: G13162 SHT 1 NOTES

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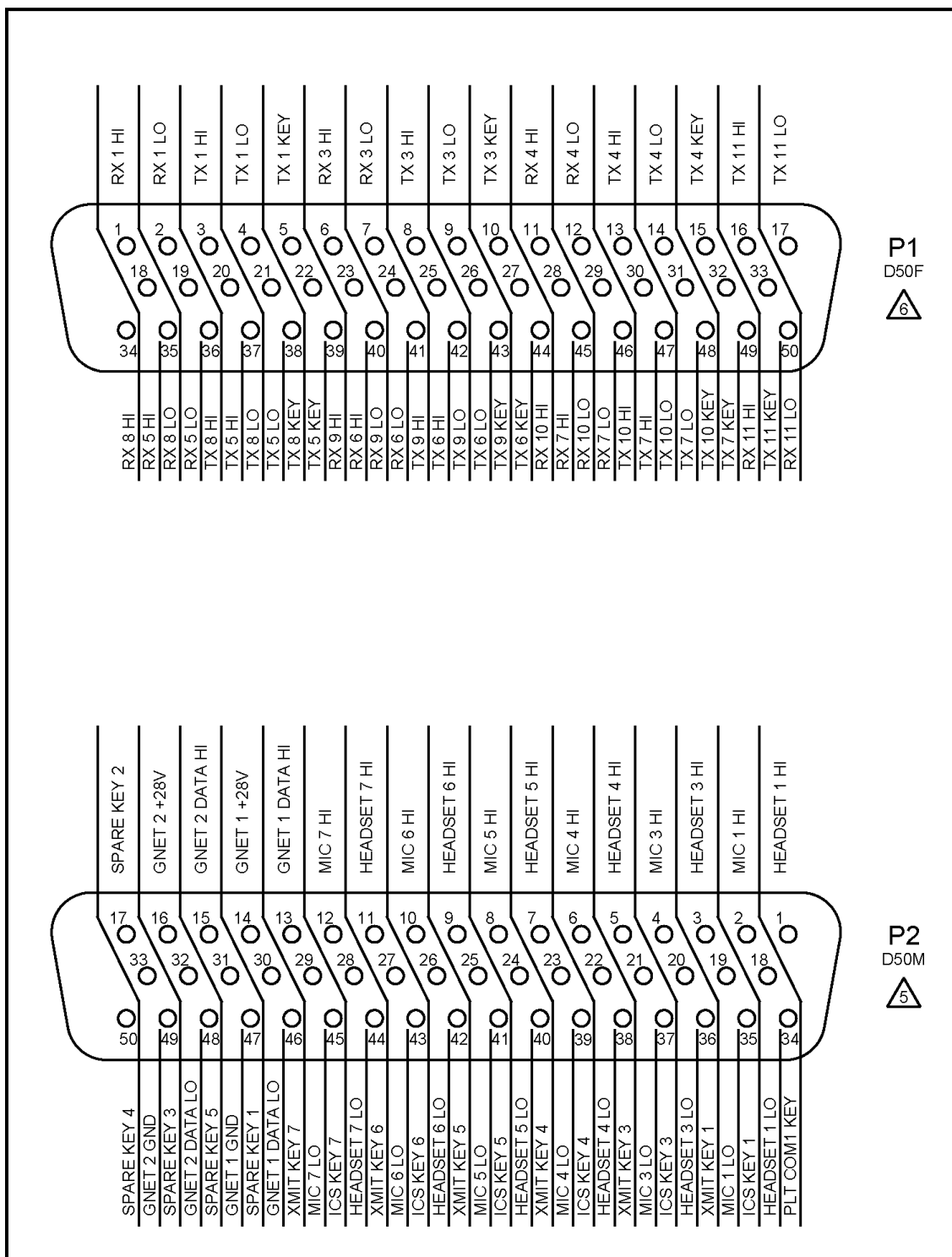


Figure 117: G13162 SHT 2 Map for P1, P2

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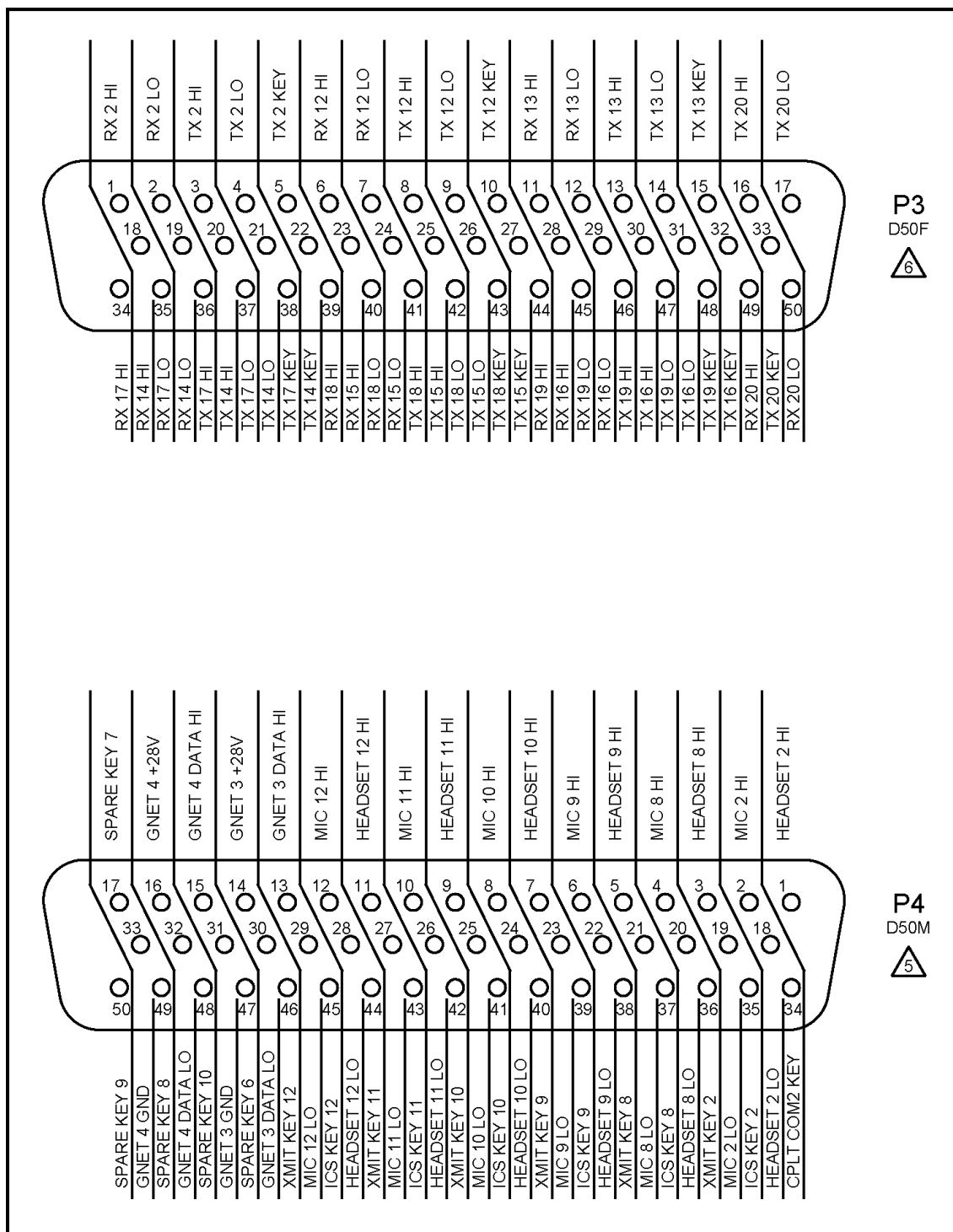


Figure 118: G13162 SHT 3 Map for P3, P4

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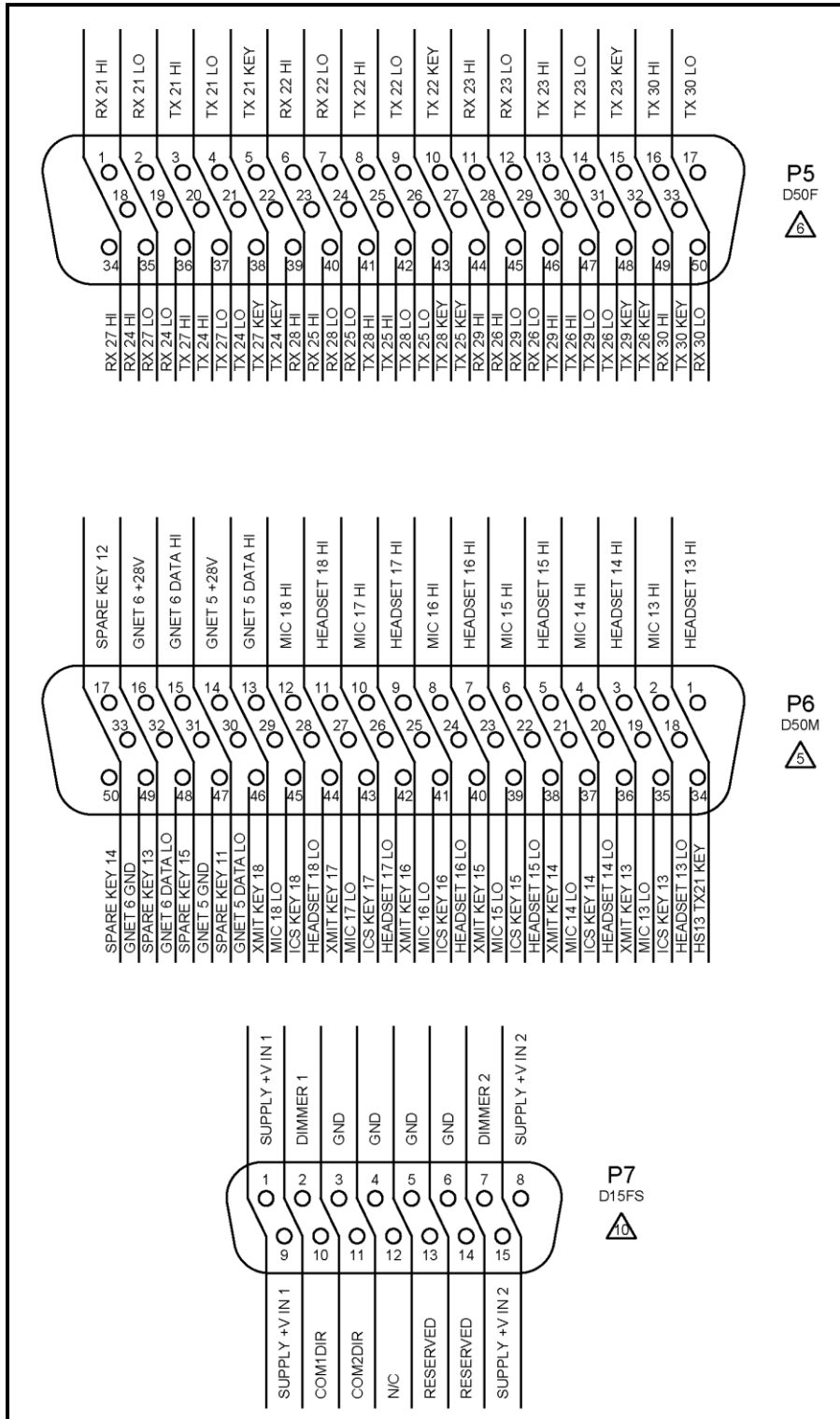


Figure 119: G13162 SHT 4 Map for P5, P6, P7

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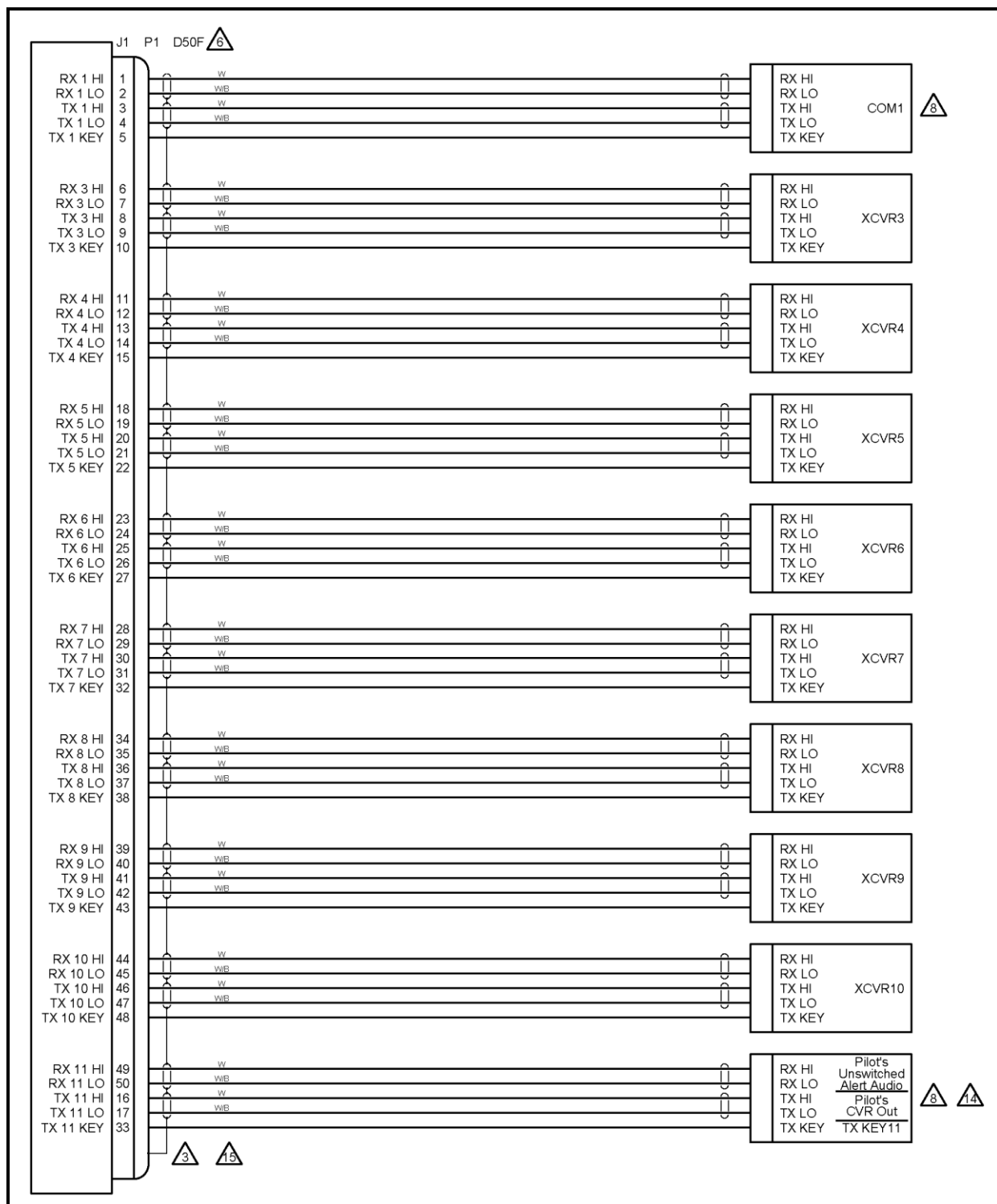


Figure 120: G13162 SHT 5 J1 Connections

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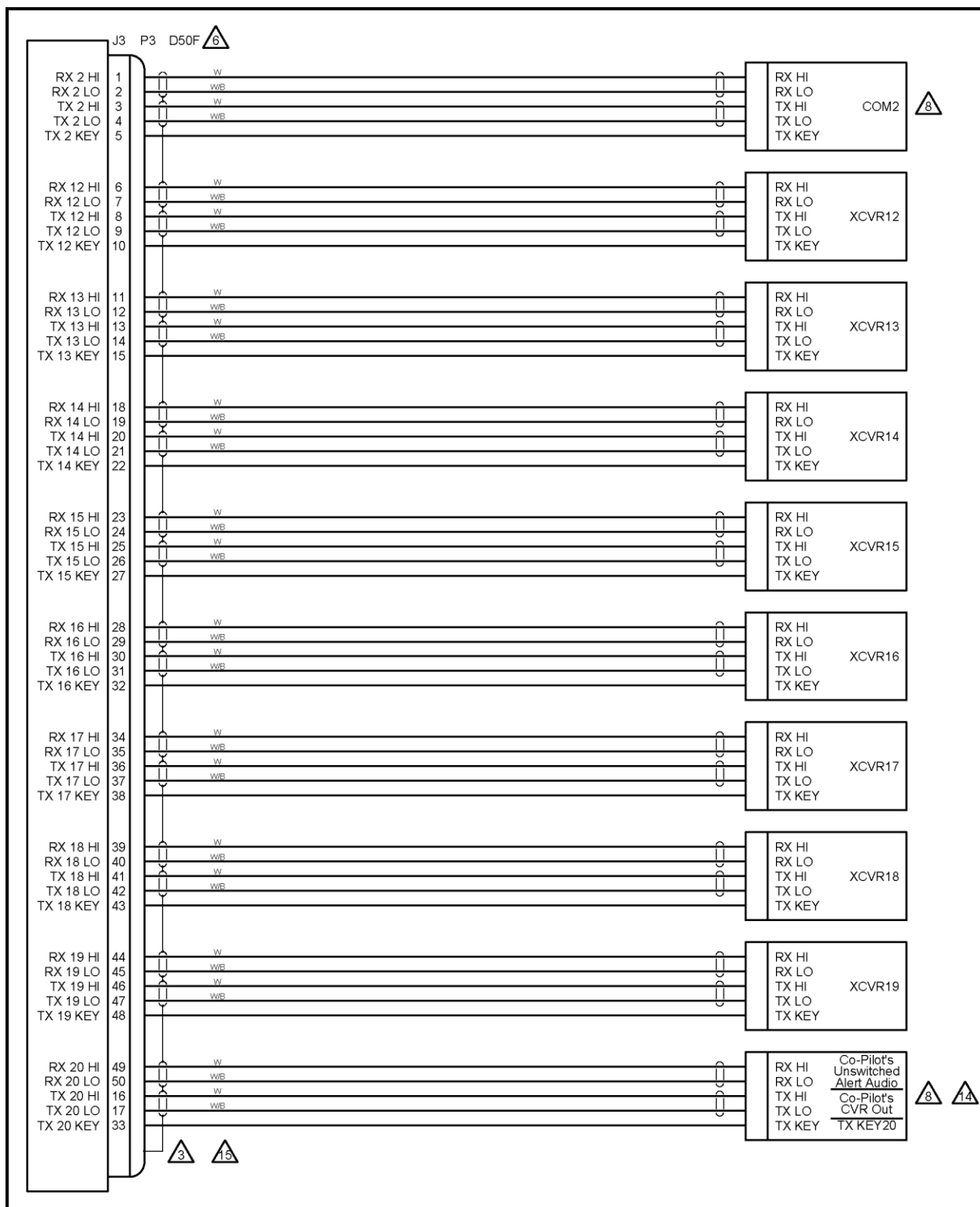


Figure 121: G13162 SHT 6 J3 Connections

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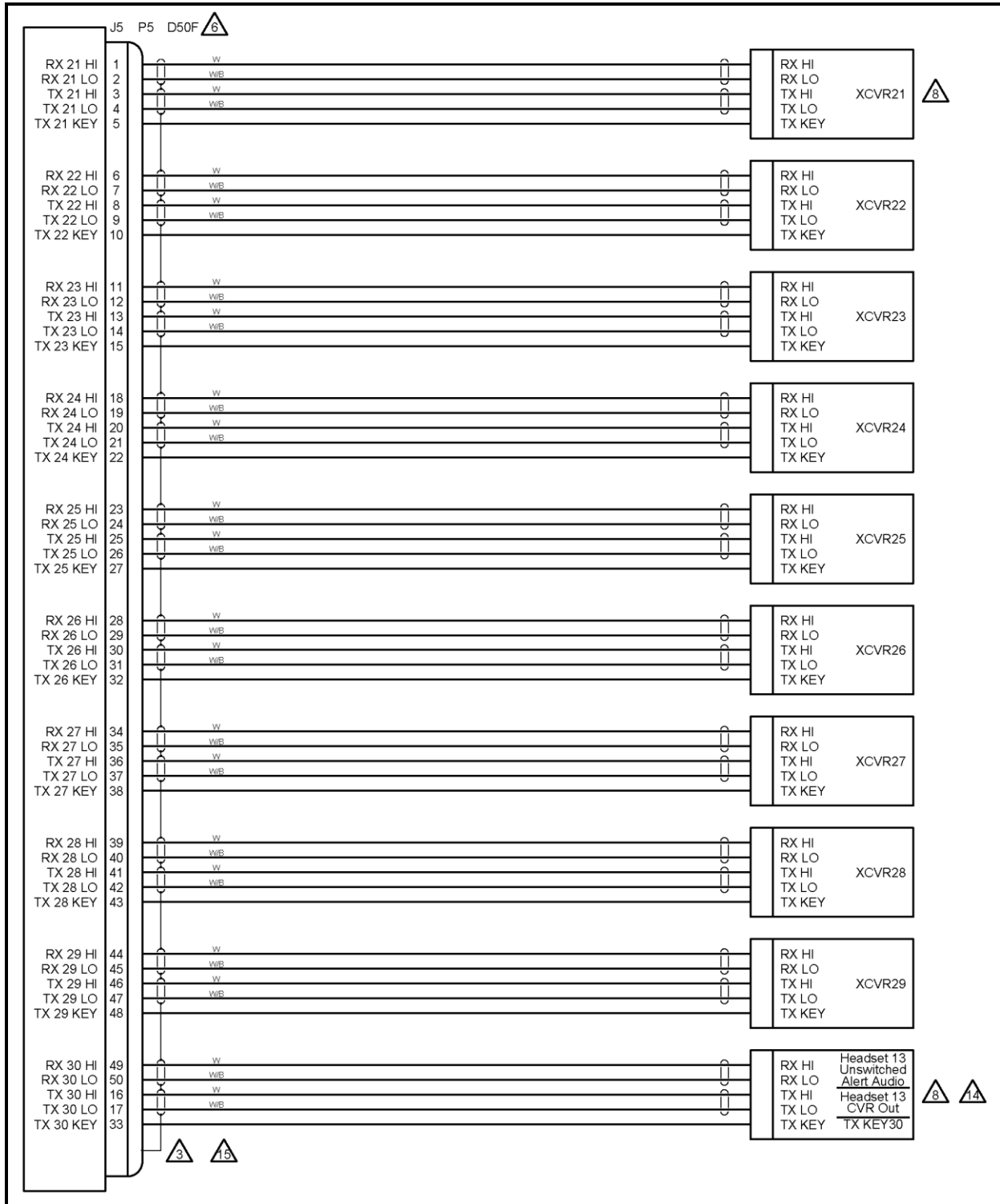


Figure 122: G13162 SHT 7 J5 Connections

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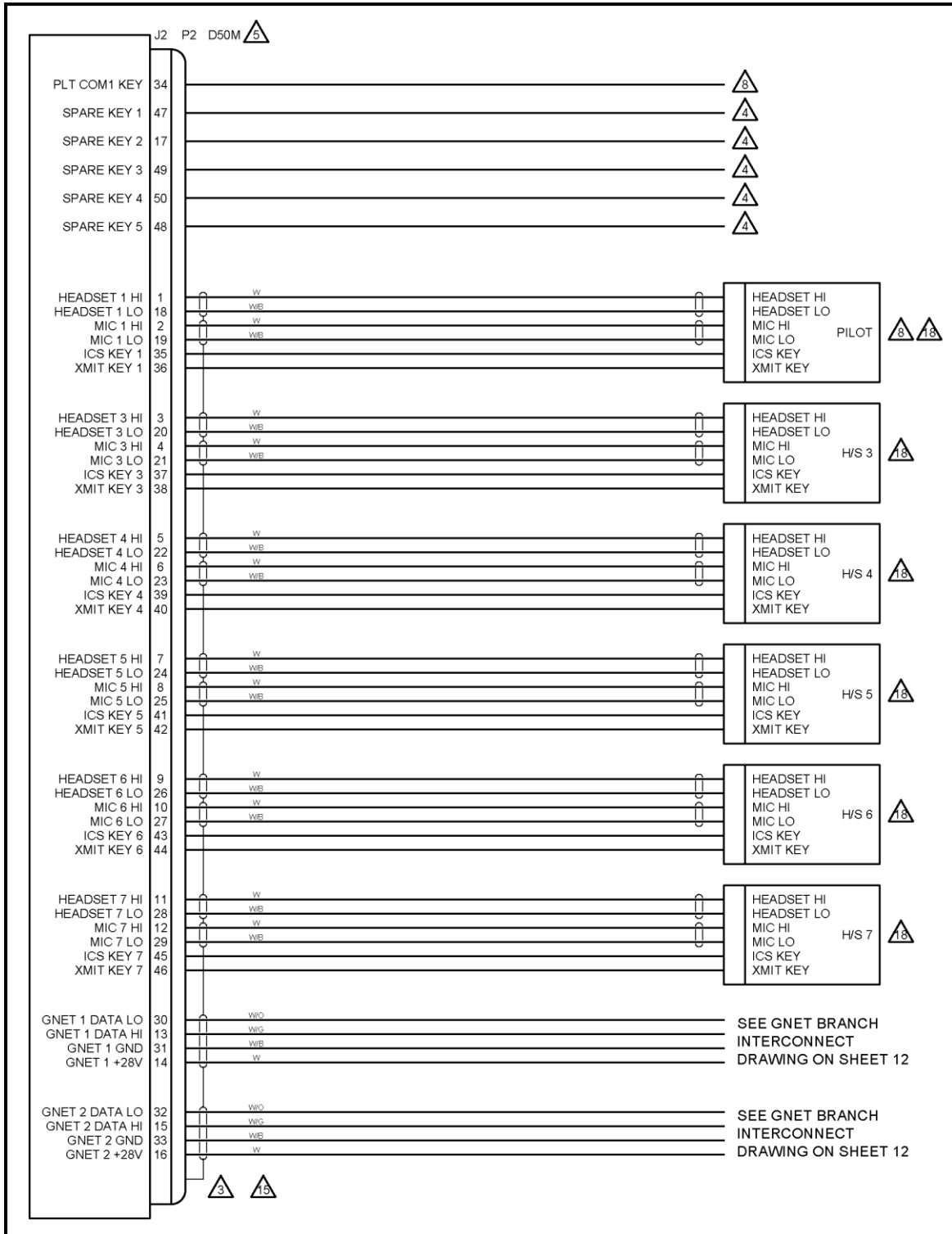


Figure 123: G13162 SHT 8 J2 Connections

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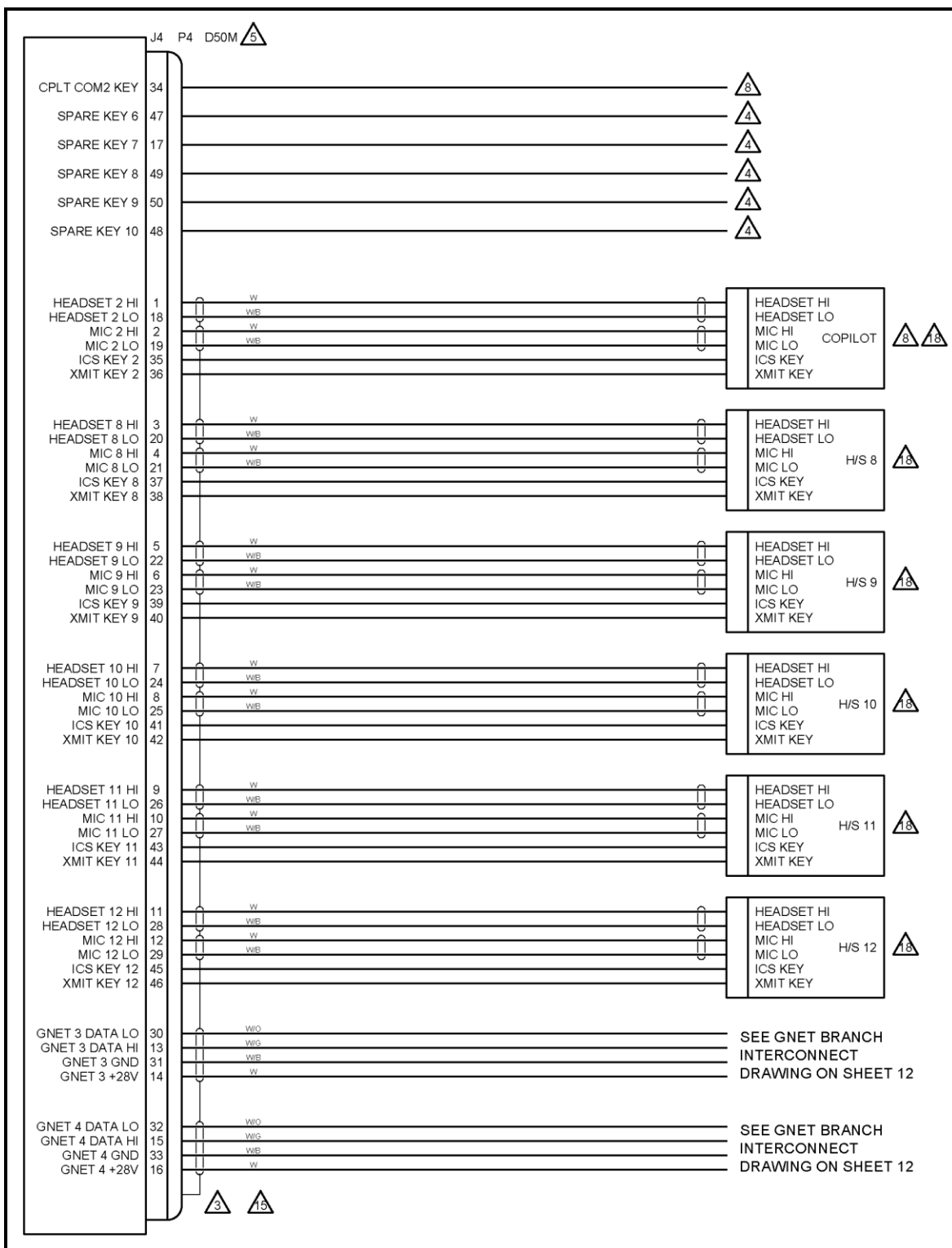


Figure 124: G13162 SHT 9 J4 Connections

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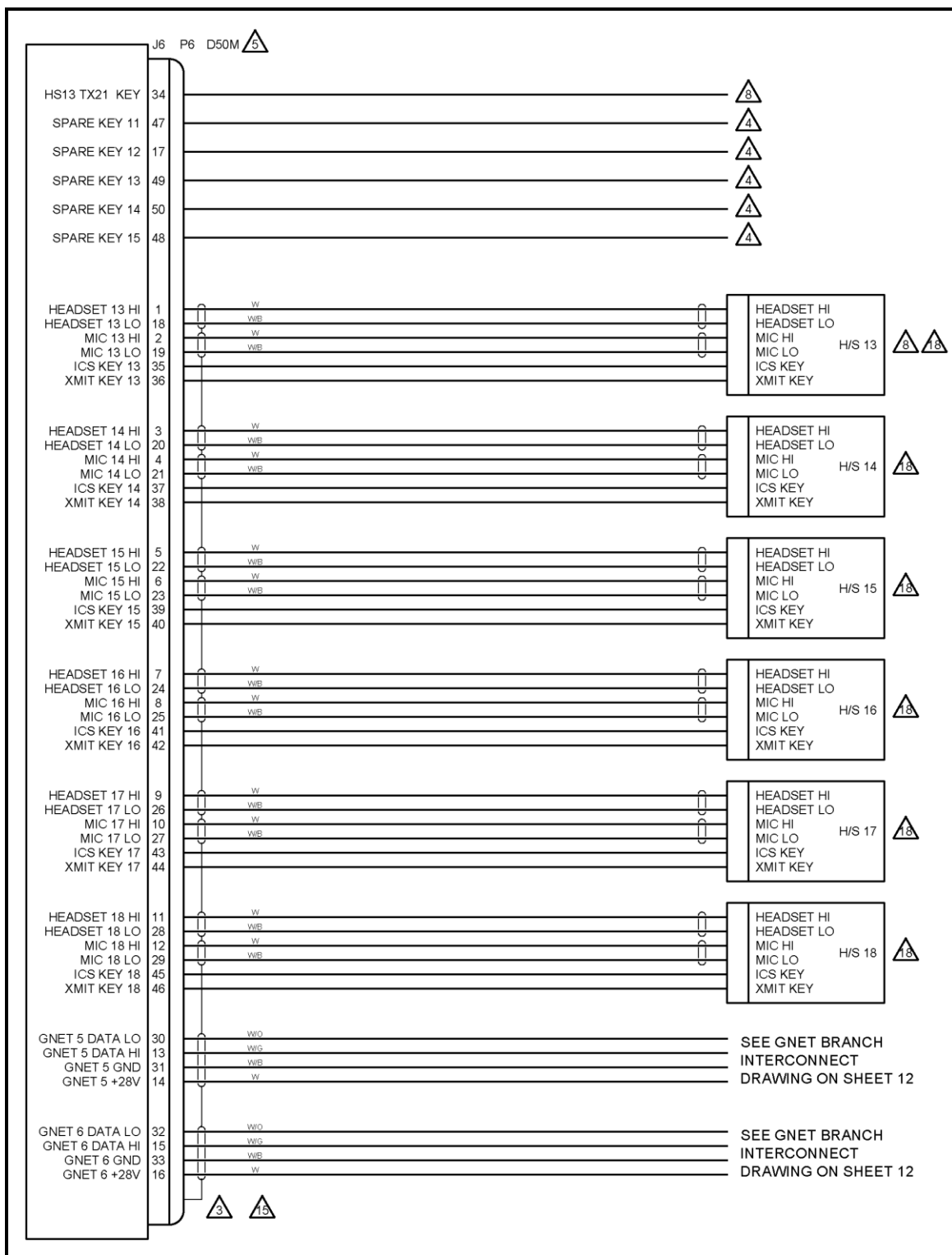


Figure 125: G13162 SHT 10 J6 Connections

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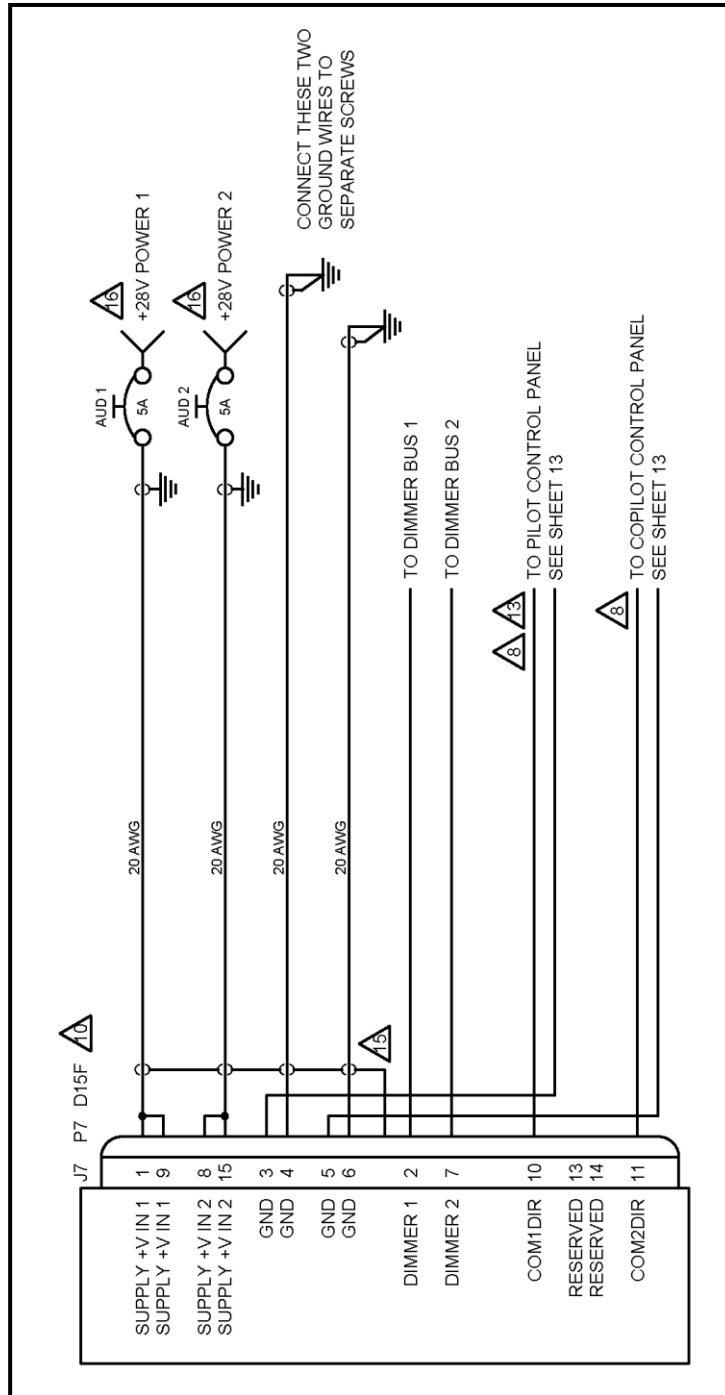


Figure 126: G13162 SHT 11 J7 Connections

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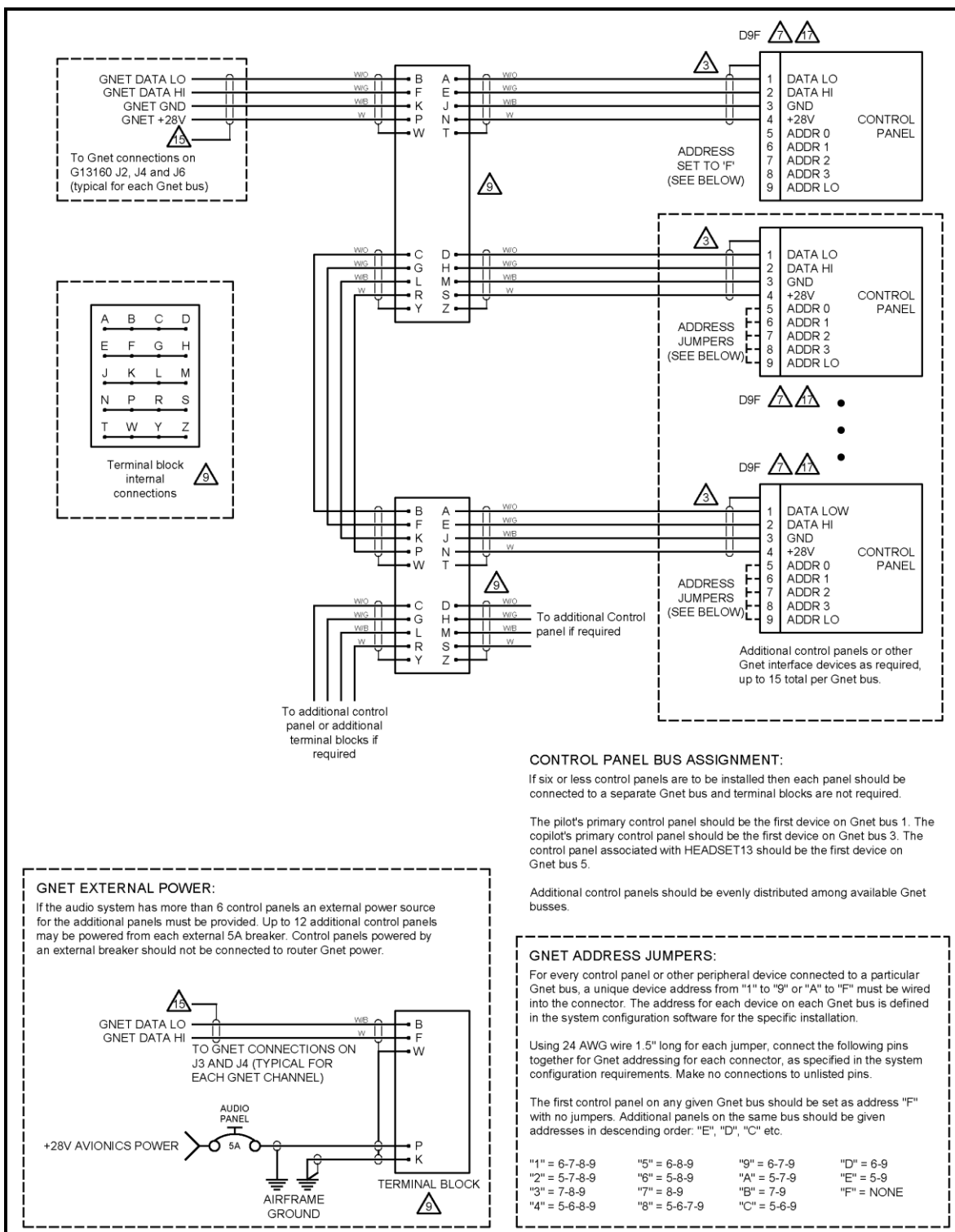


Figure 127: G13162 SHT 12 GNET Interconnects

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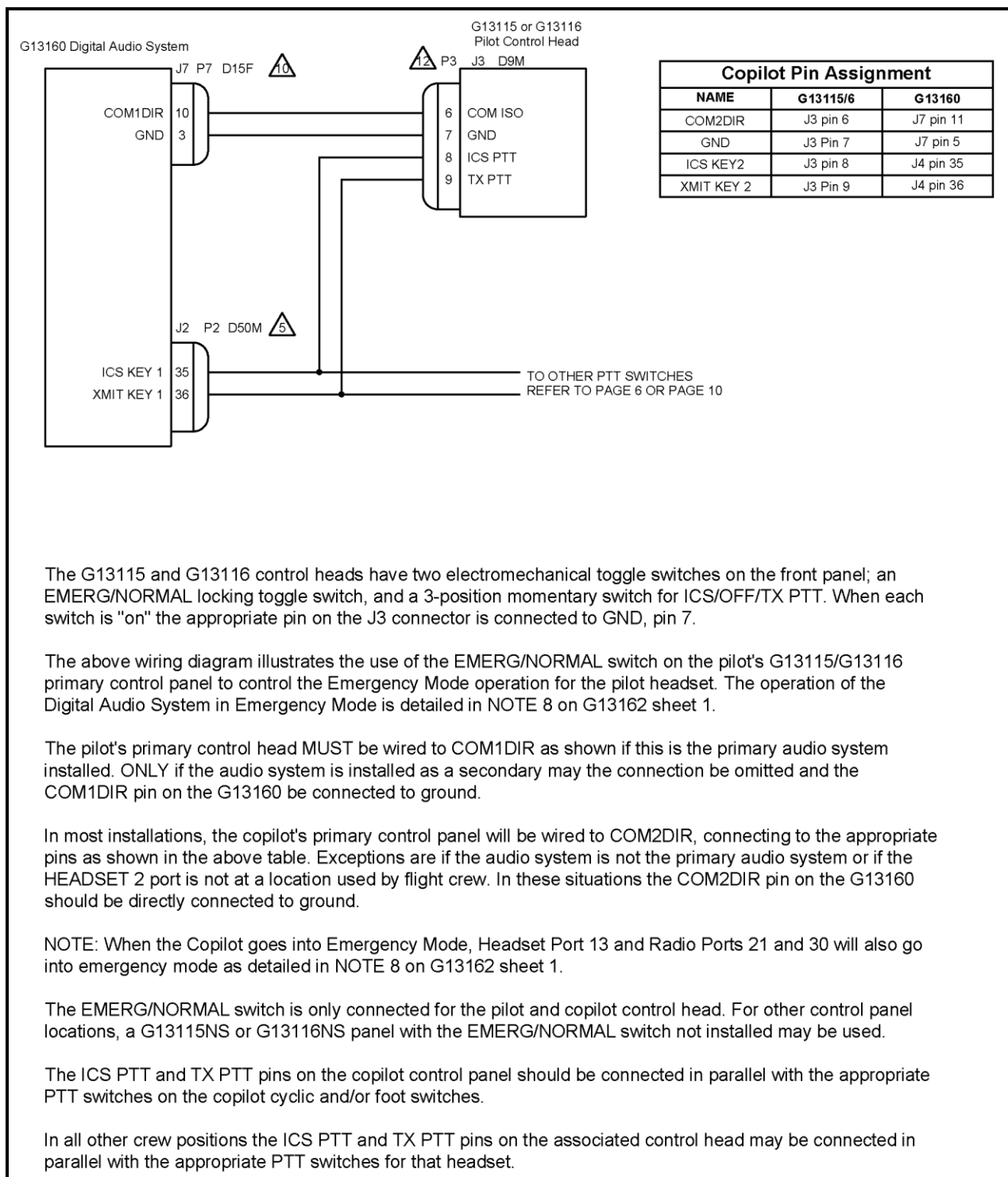


Figure 128: G13162 SHT 13 G13115 Control Head Wiring

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Section 8.0 Audio System Testing

NOTE

Anytime a Router or Control Panel has been replaced complete a full Audio System Load Analysis, Audio System Functional Check and a Final Inspection as described in Section 8.0.

8.1 Audio System Load Analysis

- a. At the completion of the installation of the audio system, the installer shall perform a load analysis test of the electrical branch circuit (buss) that powers the audio system, and also the entire aircraft electrical load, to confirm that the addition of the audio system will not cause an overload to the electrical branch circuit or the aircraft generator.
- b. The current shall be measured using a properly calibrated clamp on ammeter, Amprobe Instrument model number ACDC-600A, or equivalent.
- c. Perform the branch circuit load analysis test by powering up all equipment that is intended to be operated at the same time on the branch circuit that the audio system is connected to. Additionally, key the three highest power communication transmitters at the same time, if possible, while the current measurements are being taken.
- d. Measure the current of the branch circuit powering the audio system, by clamping the meter around the branch circuit wire near its origin at the aircraft master electrical distribution box. Confirm that the current draw during the above described test conditions is less than the current limiter (fuse or circuit breaker) rating for that branch circuit.
- e. If the current draw is greater than the current limiter rating, it becomes the installer's responsibility to re-distribute enough of the other equipment powered by this branch circuit to another suitable branch circuit, in order to reduce the load on the audio system's branch circuit to less than the current limiter rating.

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- f. Once the branch circuit loads are within limits, test the current load for the entire aircraft while all power for the aircraft is being supplied by the aircraft generator. Perform this load analysis test by powering up all equipment on the aircraft that is intended to be operated at the same time as the audio system. Additionally, key the three highest power communication transmitters at the same time, if possible, while the current measurements are being taken. Clamp the ammeter around the generator output wire near the point that it enters the aircraft master electrical distribution box. Confirm that the current draw during the above described test is less than the generator system rating.

8.2 Audio System Functional Check

- a. Perform a check of all power and ground leads to confirm they are connected properly before applying power to the system. Incorrect wiring may cause damage to the units.
- b. Connect headset adapter cables, headsets and switches. Apply power to audio system, radios and related accessories. Activate ICS and confirm proper operation. Place 'PILOT ISOLATE/NORMAL' switch in 'PILOT ISOLATE' or 'EMERG' position.
 1. Confirm clear reception of COM1 audio in pilot headset.
 2. Key transmit switch and confirm proper operation of COM1.
 3. If installed, key COM1 direct transmit switch and confirm proper operation of COM1.
 4. Confirm aircraft native alert tones are heard in the pilot headset.
 5. If testing a Digital Audio System, confirm Pilot mic audio to the CVR or other always-on output (if installed).
- c. If a Co-Pilot COM2 Isolate switch is installed, repeat step b. for the Co-Pilots installation with COM2.
- d. If testing the three-board Digital Audio System, repeat step b. for Headset Port #13 with the Co-Pilot 'EMERG/NORMAL' switch in the 'EMERG' position. The connections to Headset Port #13 are not standardized, so check system configuration documents for connection information.
- e. If testing any Digital Audio System except the single-board system, place both Pilot and Co-Pilot's 'EMERG/NORMAL' switches in the

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'EMERG' position and confirm the emergency mode intercom is operational between pilot, copilot and Headset Port #13 (if installed).

- f. Place the 'PILOT ISOLATE' switch in 'NORMAL' position and check all transceivers, receivers and audio devices. Repeat this process for the Co-Pilots COM2 Isolate switch if installed.
- g. Check all pilot, copilot and passenger audio control panels for proper operation
- h. Perform run-up of aircraft to verify proper operation of all control heads, radios, and headset locations. Perform test of aircraft alert tones and verify their presence, proper threshold, and proper audio level. Do not test fly aircraft if any aircraft native alert tone is not performing properly. Correct any defects noted and re-test prior to any test flight.

8.3 Final Inspection

Perform final inspection of installation confirming:

- a. There are no chafing issues.
- b. There are no mechanical interference issues.
- c. Security of fasteners.
- d. Removal of all tools.
- e. Chips, shavings and other debris are removed.
- f. Proper reassembly of aircraft.
- g. Aircraft is airworthy prior to returning to service



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Section 9.0 Weight and Balance

Refer to helicopter equipment list for updated weight and balance information.

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Section 10.0 Typical Analog Audio System Wiring Configurations

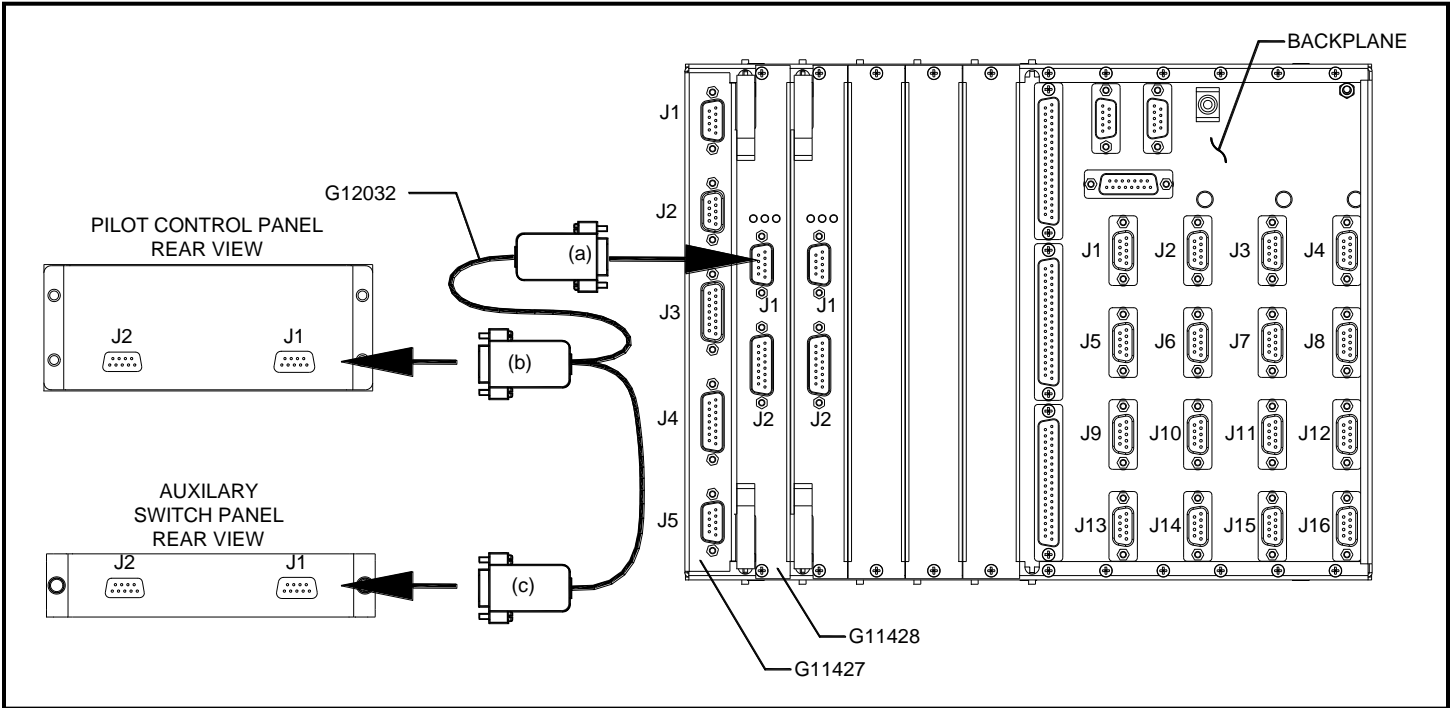


Figure 129: Auxiliary Switch Panel Wiring

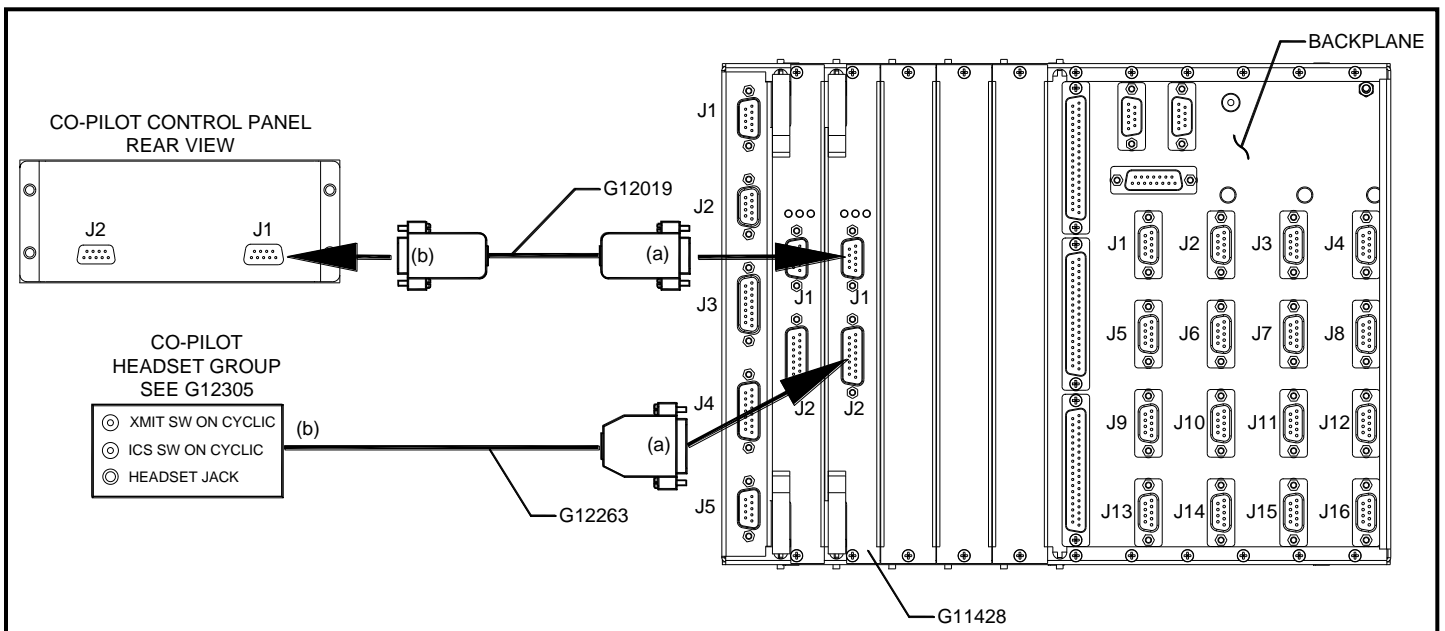


Figure 130: Copilot's Control Panel Wiring

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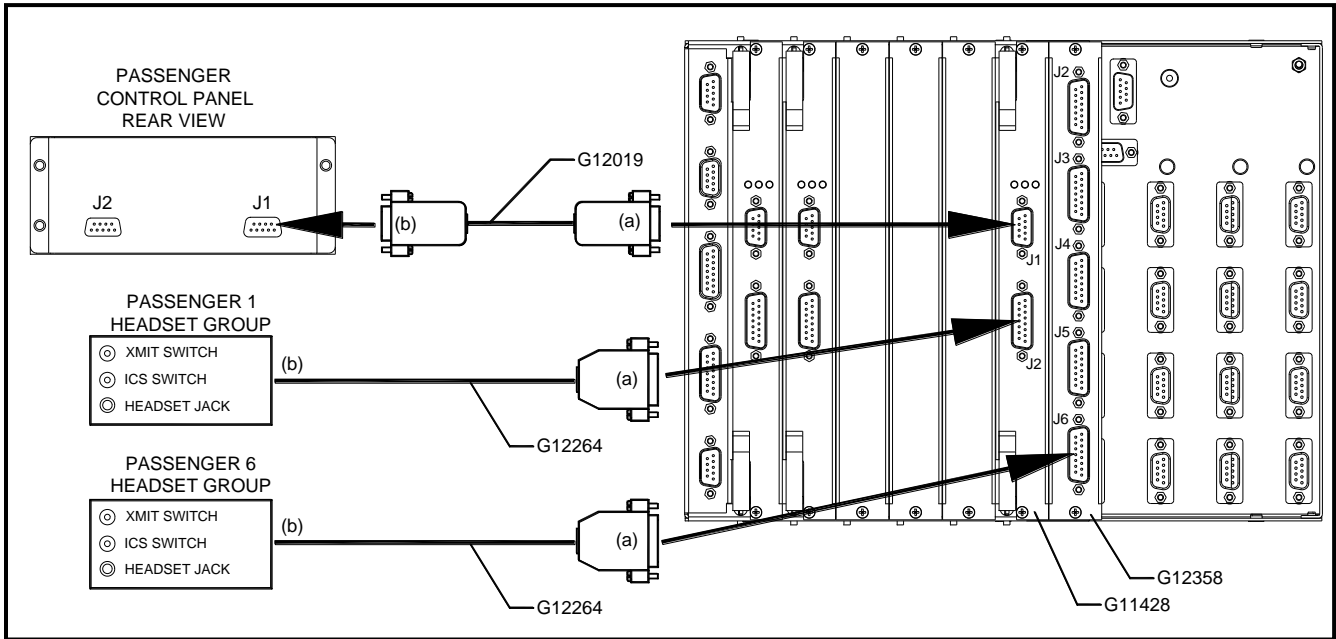


Figure 131: Passenger Audio Wiring

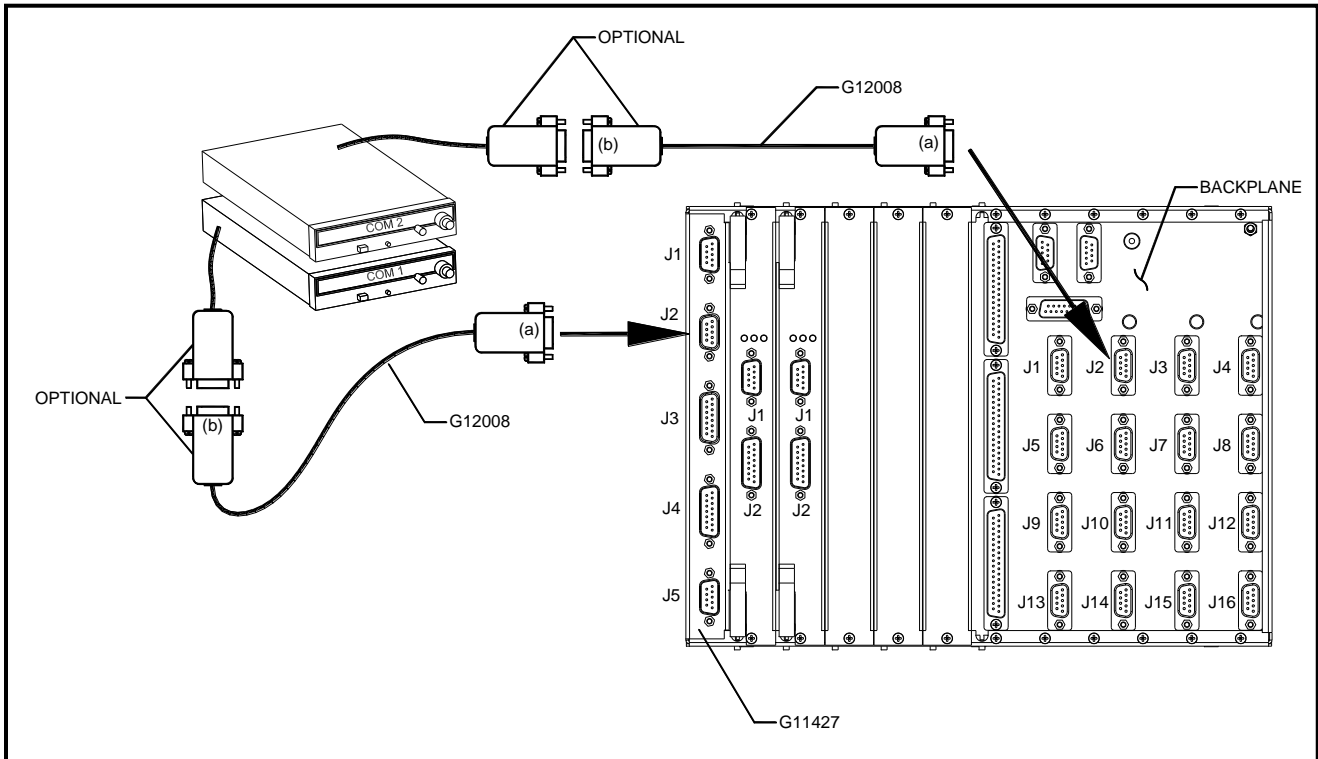


Figure 132: Radios, COM1-COM16

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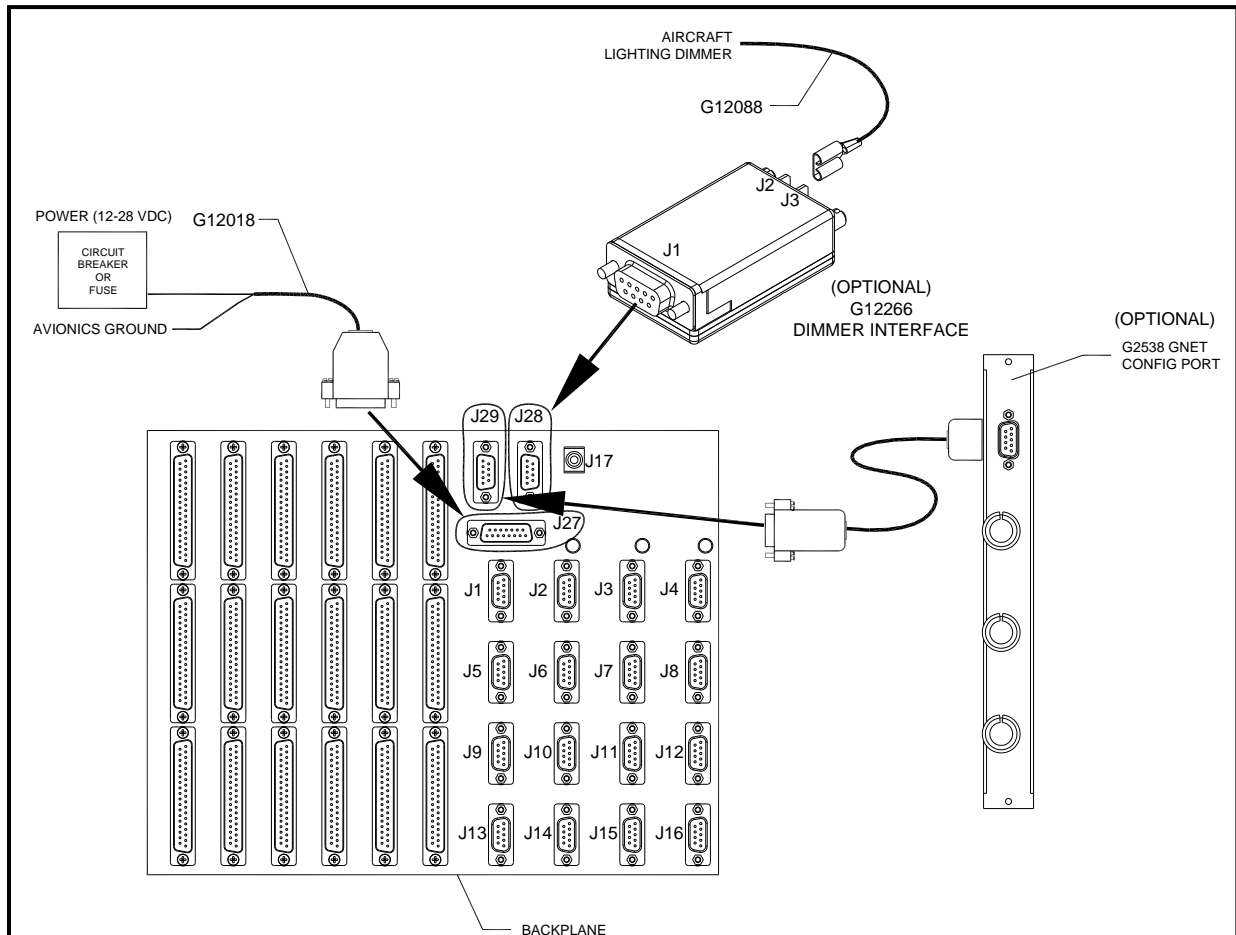


Figure 134: Aircraft Power Supply and Lighting Dimmer Connection

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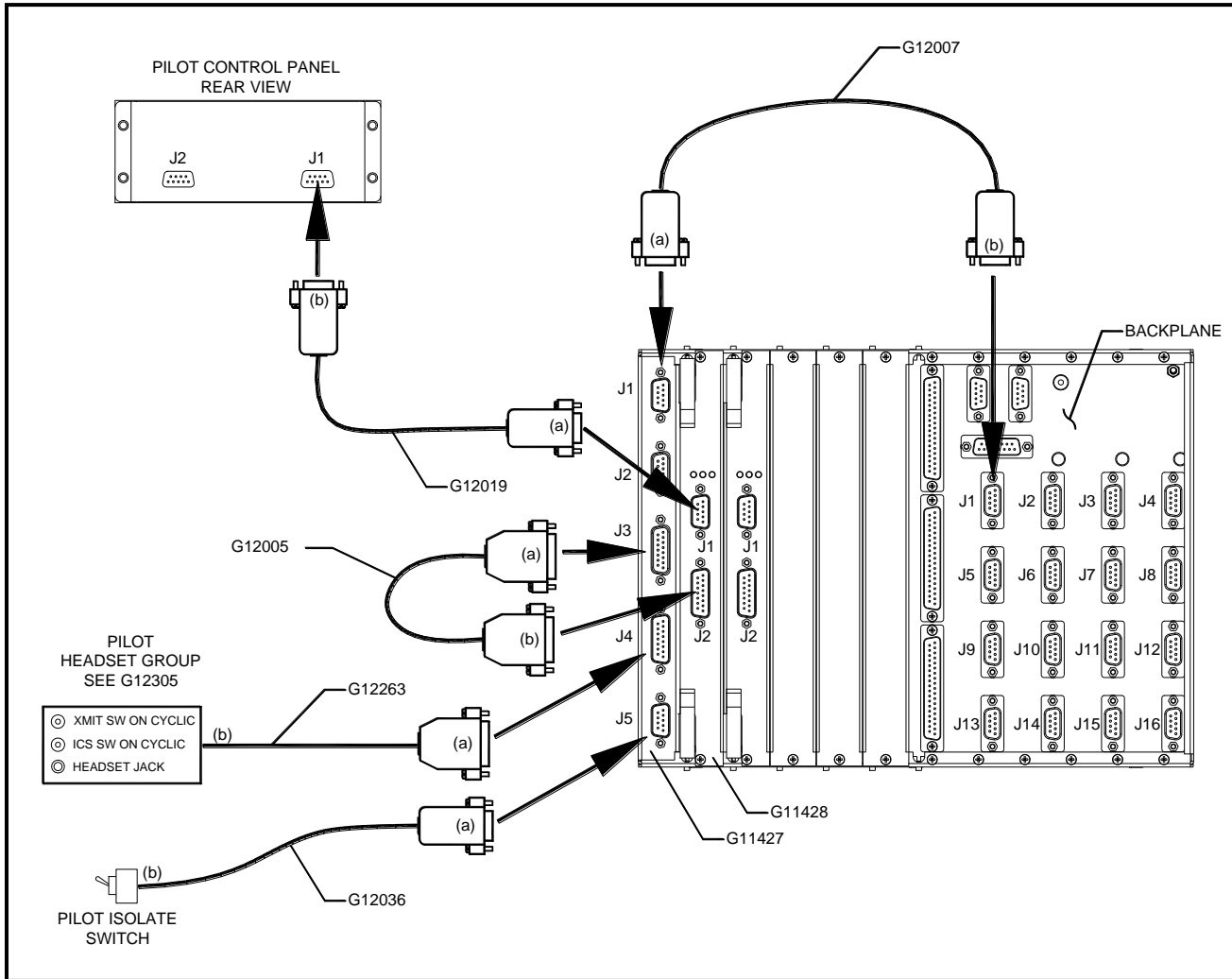


Figure 135: Pilot Control Panel Connection