



WORLDWIDE FLEET MANAGEMENT

Eagle Copters USA, Inc.
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Eugene, OR 97402

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

FOR

P139-HD DIGITAL AUDIO SYSTEM

MDL GA212

FOR

MODEL BELL 204/205/212/214/412 SERIES HELICOPTERS

Report No.: ICA212-1

STC No.: SR02270SE

APPROVED BY: G. Andrews

Rev. B DATE: 11/7/17

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DETAILS OF REVISIONS

REV.	DATE	PAGE	DESCRIPTION	APPROVED
N/C	03/25/13	All	Initial Release	C. Bonar
A	5/12/14	All	Updated to add G13160 3-Board Router and wiring; Added Audio Mixer G13120	C. Bonar
B	11/7/17	9 34-59 61 ALL	Added note on 'NS' panels 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
GA212-1	Rotorcraft Flight Manual Supplement (Bell 204/205/212/214/412 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 the P139-HD Digital Audio System.

1.2 **Purpose**

The purpose of this manual is to maintain the P139-HD Digital Audio System 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-HD Digital Audio System for Bell 204/205/212/214/412 Series 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

The Eagle Copters P139-HD Digital Audio System provides a communication system for aircraft crew members and passengers.

1.9.1 The P139-HD Digital Audio System Includes the Following:

- a. 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 “Three 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 4 different configurations P/Ns G13115, G13115NS, G13116, and G13116NS as shown in Figure 4 and Figure 5. The Audio Control Panels can be used interchangeably, depending on the 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.

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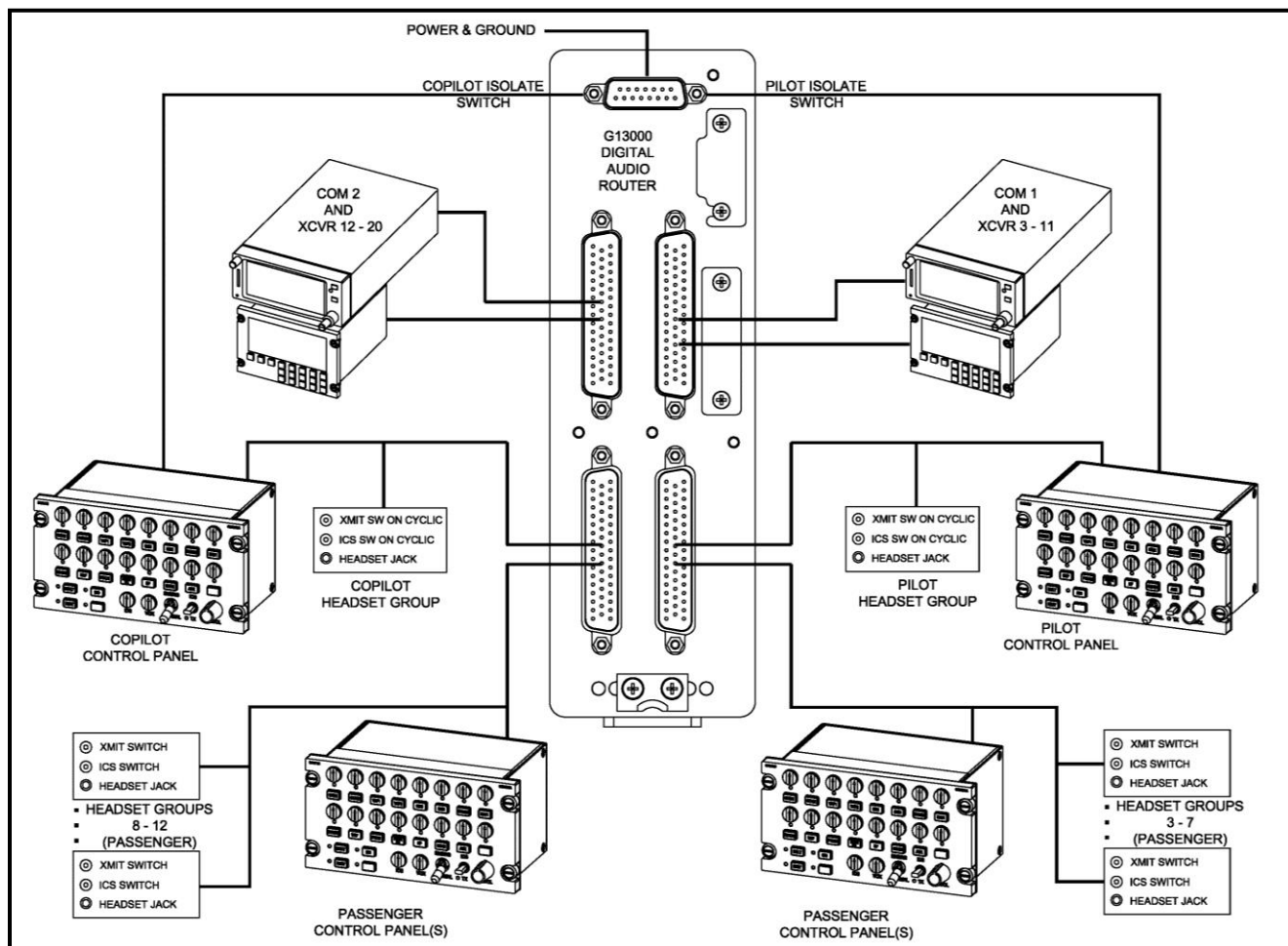


Figure 1: Digital Audio System Overview

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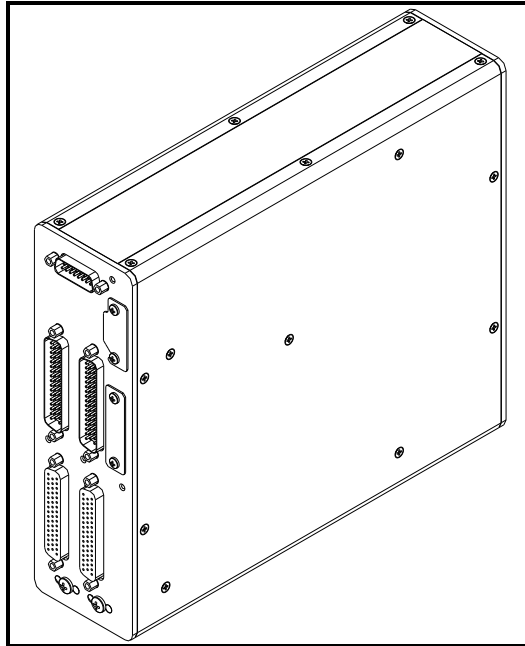


Figure 2: G13000 Digital Router

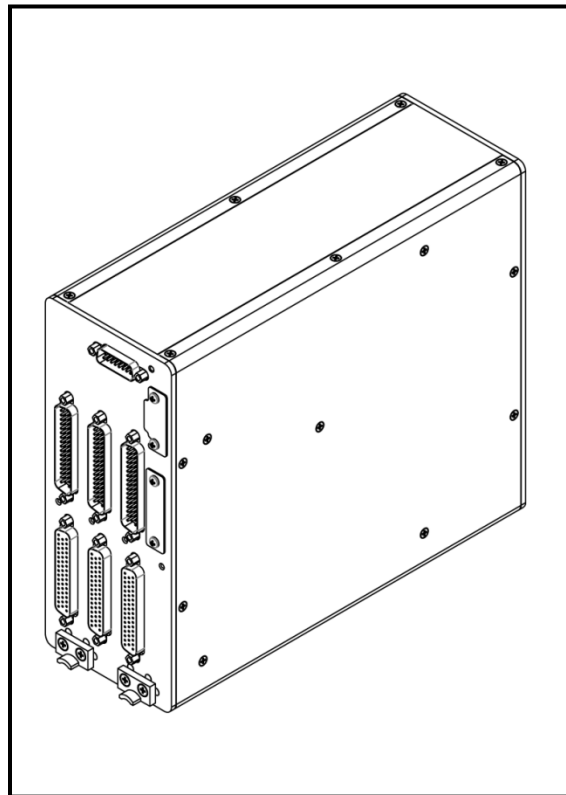


Figure 3: G13160 3-Board Router

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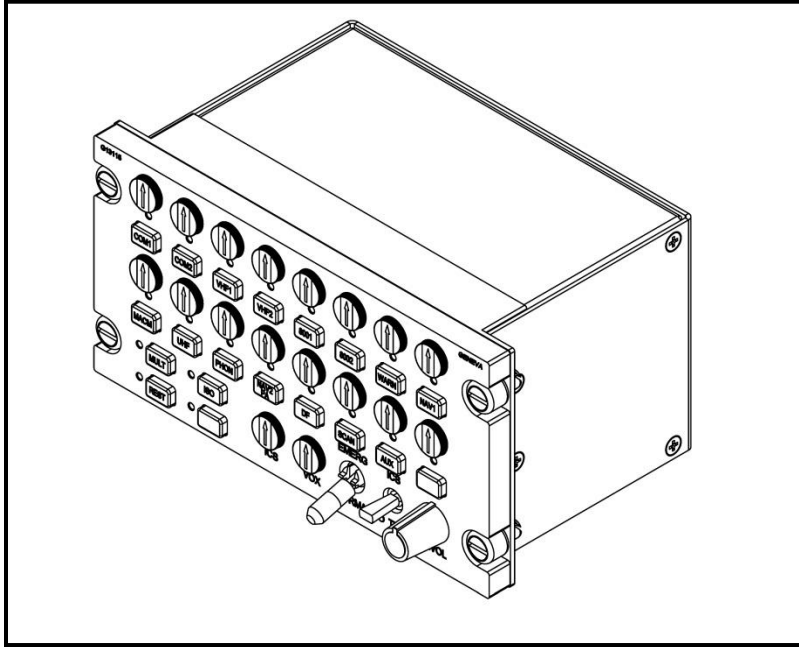


Figure 4: G13115 and G13115NS Control Panel

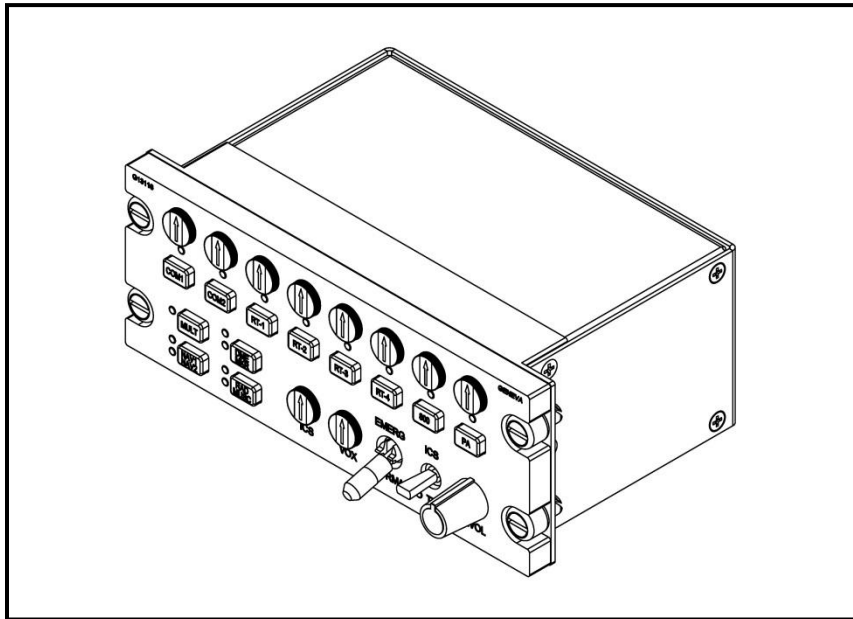


Figure 5: G13116 and G13116NS Control Panel



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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 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 from the mounting tray. See Section 4.0.
- c. Inspect all sheet metal components for damage and corrosion. If damage or excessive corrosion is found replace parts per Section 4.0. 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 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 Digital Audio Router Removal, Inspection and Re-Installation

4.1 Digital Router Removal

- a. Disconnect all cables from the router.
- b. Loosen the thumb screw securing the router into the tray and slide the router out of the tray shown in Figure 6.

NOTE

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

- c. Remove the (4) MS24693S276 Screws and (2) Shims connecting the Tray to the avionics bay shelf as shown in Figure 6.
- d. The #10 inserts in avionics bay shelf (I/N 4) are replaced only if damaged. This is done in accordance with the Bell Maintenance Manual.

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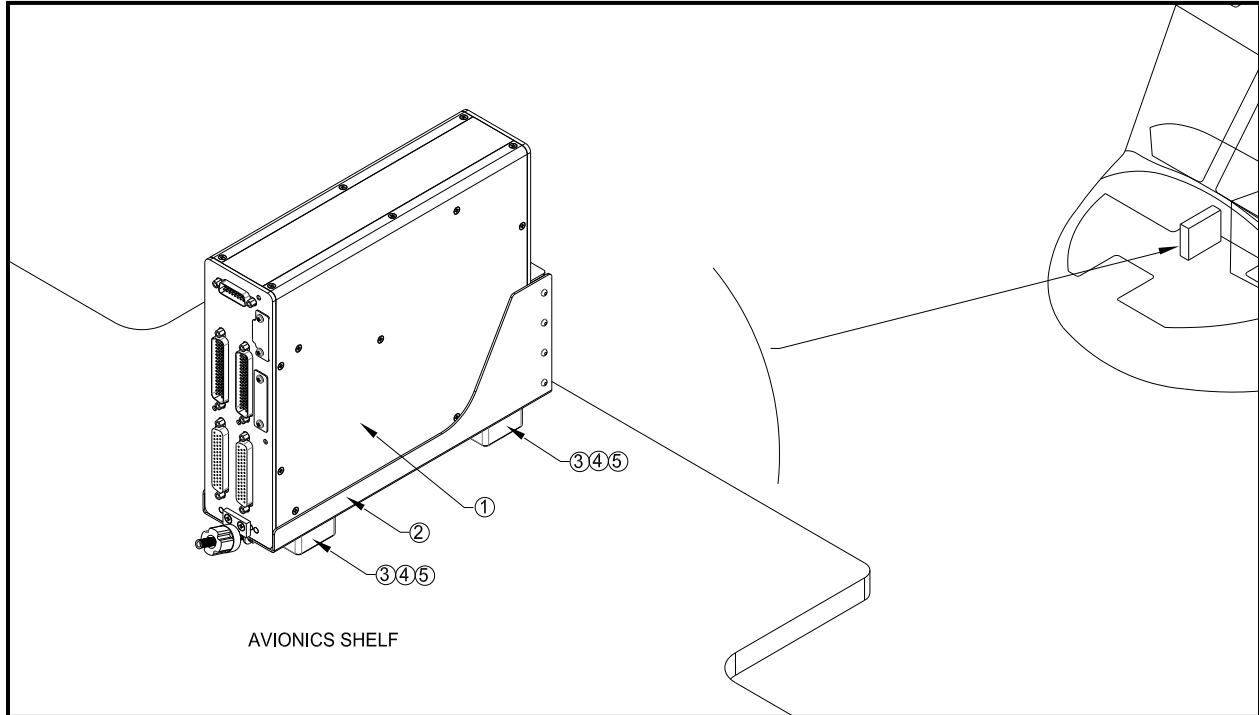


Figure 6: Bell 204/205/212/214/412 Series Digital Router Installation Overview

Parts List for Figure 6: For Router G13000 Installation

I/N	QTY	PART NUMBER	DESCRIPTION
1	1	G13000	P139-HD Router
2	1	G13009-1	Tray
3	2	G13009-3	Shim
4	4	80-004-2-12 or 80-005-2-12	Insert, #10-32
5	4	MS24693S276	Screw, #10-32 x 1.0 Flat Head

Parts List for Figure 6: For Router G13160 Installation

I/N	QTY	PART NUMBER	DESCRIPTION
1	1	G13160	P139-HD Router
2	1	G13161	Tray
3	2	G13161-3	Shim
4	4	80-004-2-12 or 80-005-2-12	Insert, #10-32
5	4	MS24693S276	Screw, #10-32 x 1.0 Flat Head

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4.2 Digital Router and Support Tray 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 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.

4.3 Digital Router Re-Installation

NOTE

This installation provides mounting provisions for the Digital Audio Router in the avionics bay shelf area for the Bell 204/205/212/214/412 Series. The location is shown for reference only. The exact placement of the Router is dependent on the other pre-existing installed equipment. Orientation of the tray is at the installer's discretion.

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. Locate and install (4) #10-32 inserts (I/N 4) in accordance with Bell Repair Manual.
- c. Mount Tray to shelf using (2) Shims and (4) MS24693S276 Screws.
- d. Slide router into tray so that clip on base of router engages slot on rear of tray. Be sure router is seated fully down. Secure router to tray using attached thumb screw.
- e. Reconnect all applicable cables to the Digital Router. Reference Figure 7 and Figure 8 for all Digital Router Connection Ports.

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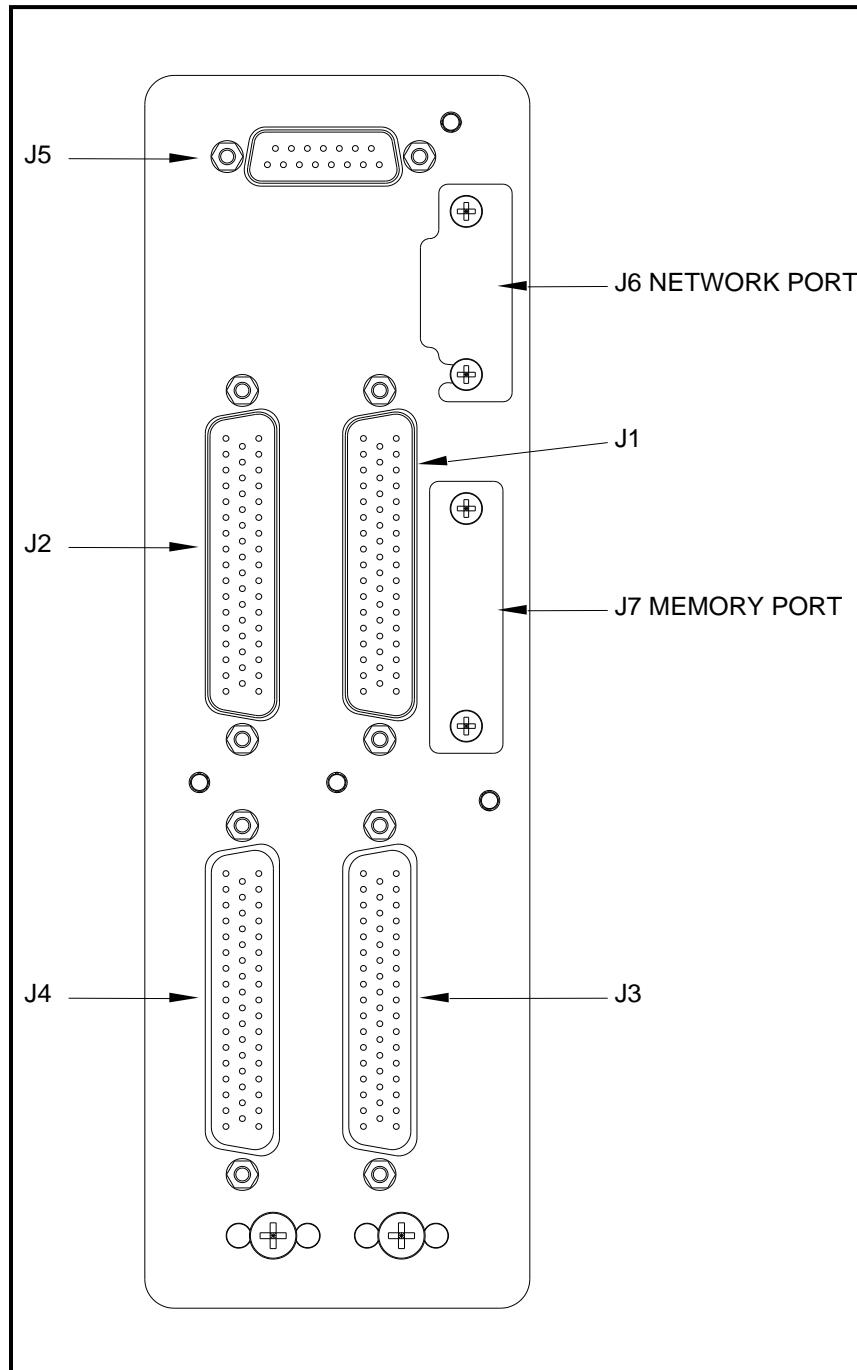


Figure 7: G13000 Digital Router Connector Layout



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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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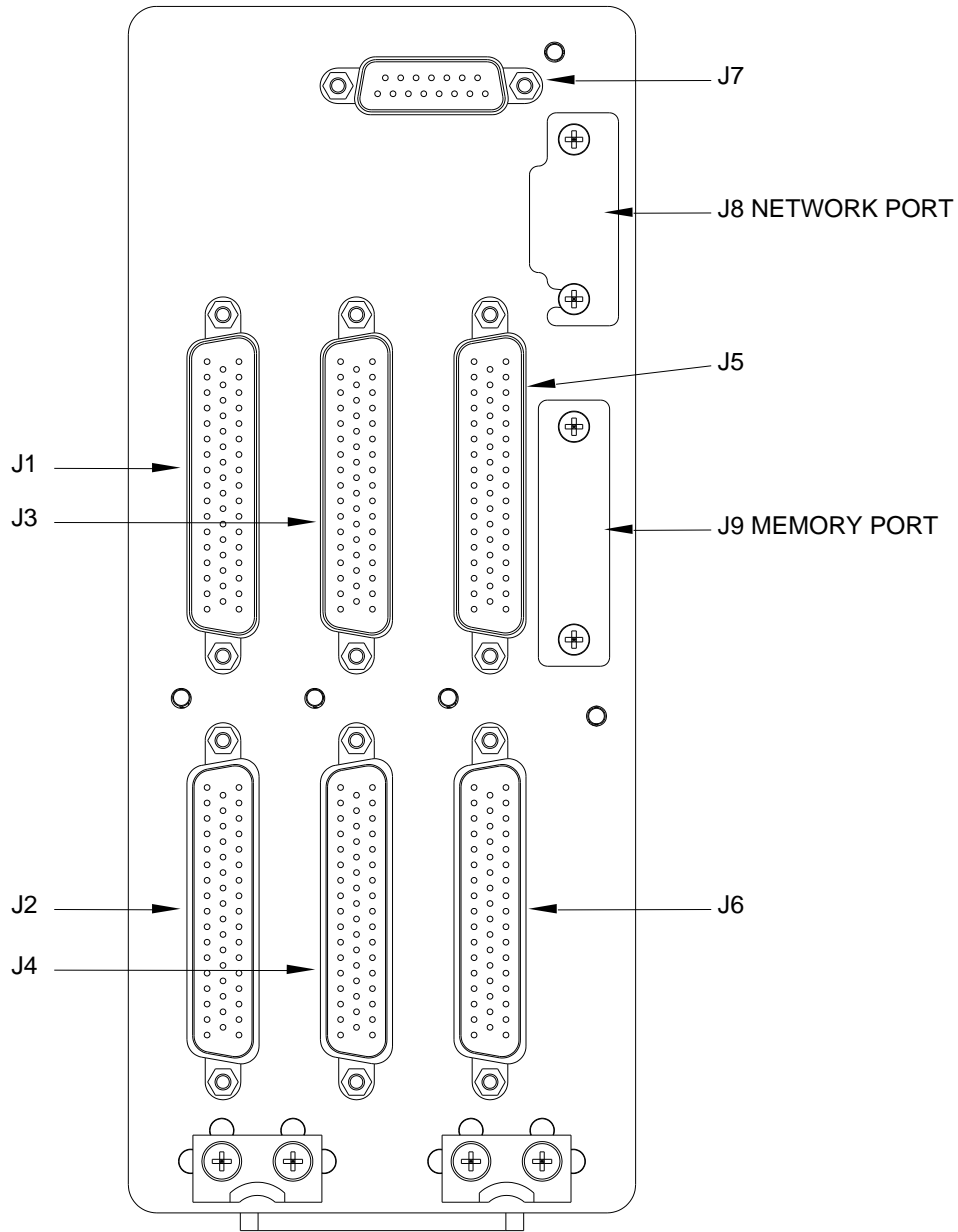


Figure 8: G13160 Digital Router Connector Layout



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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 5.0 G13120 Audio Mixer Removal, Inspection and Re-Installation

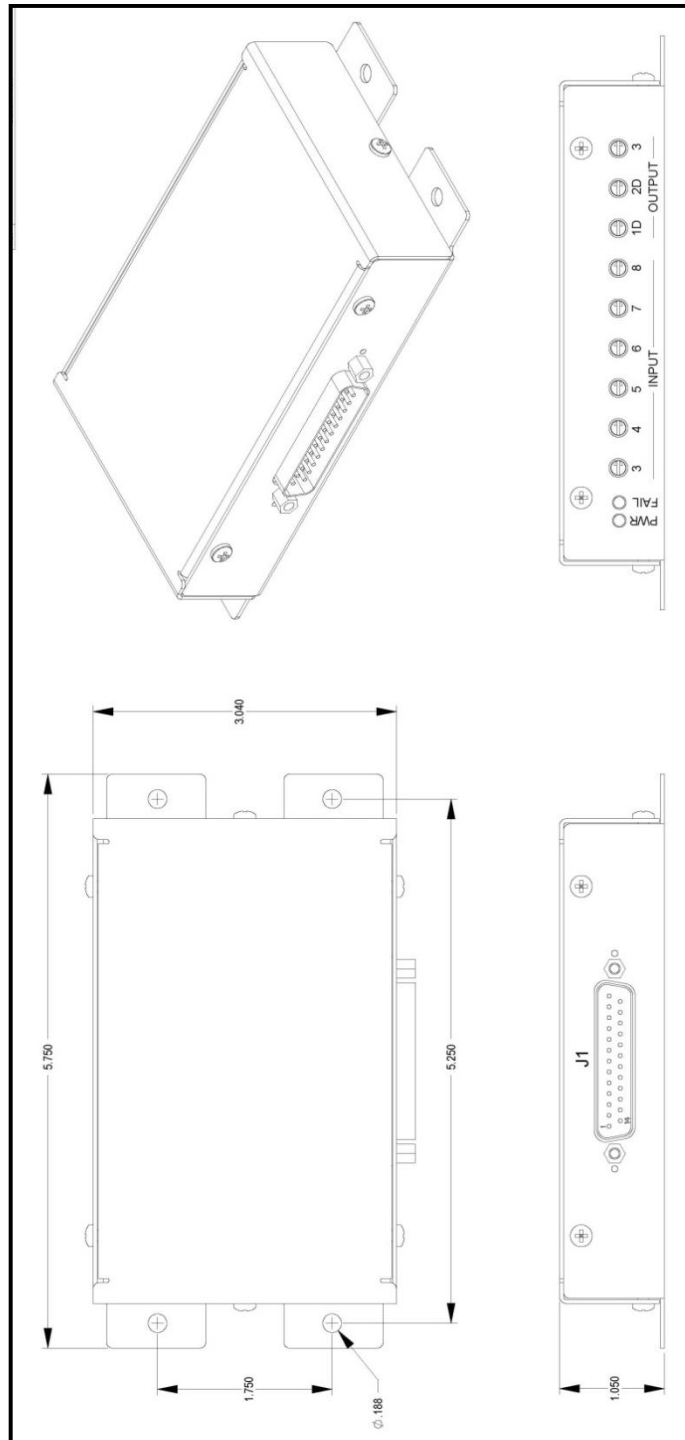


Figure 9: G13120 Audio Mixer



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5.1 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.

5.2 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.

5.3 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 9 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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5.4 G13120 Audio Mixer Cable Maintenance

- a. Refer to Figure 10 and Figure 11 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.

5.5 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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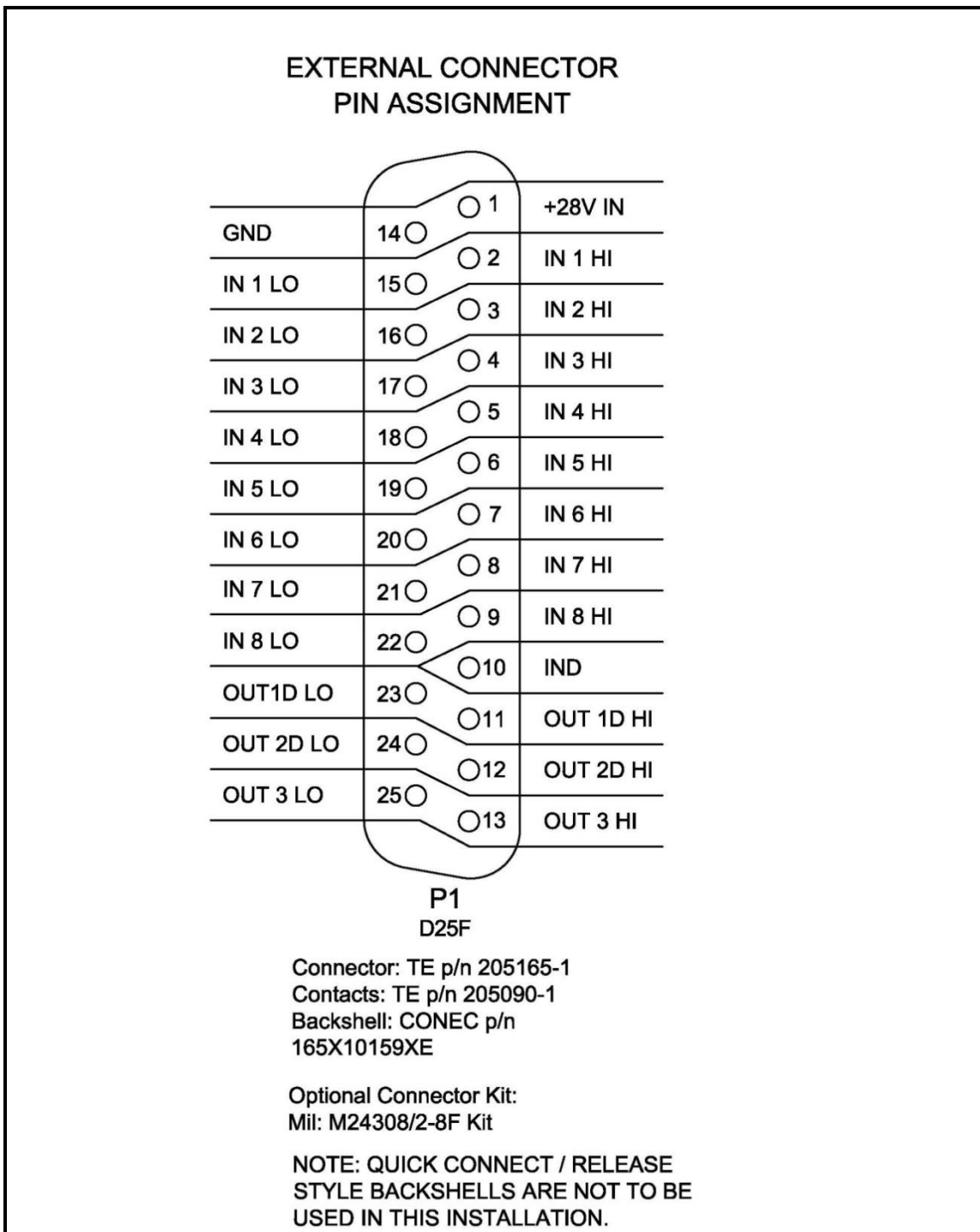


Figure 10: G13120 Audio Mixer Wiring

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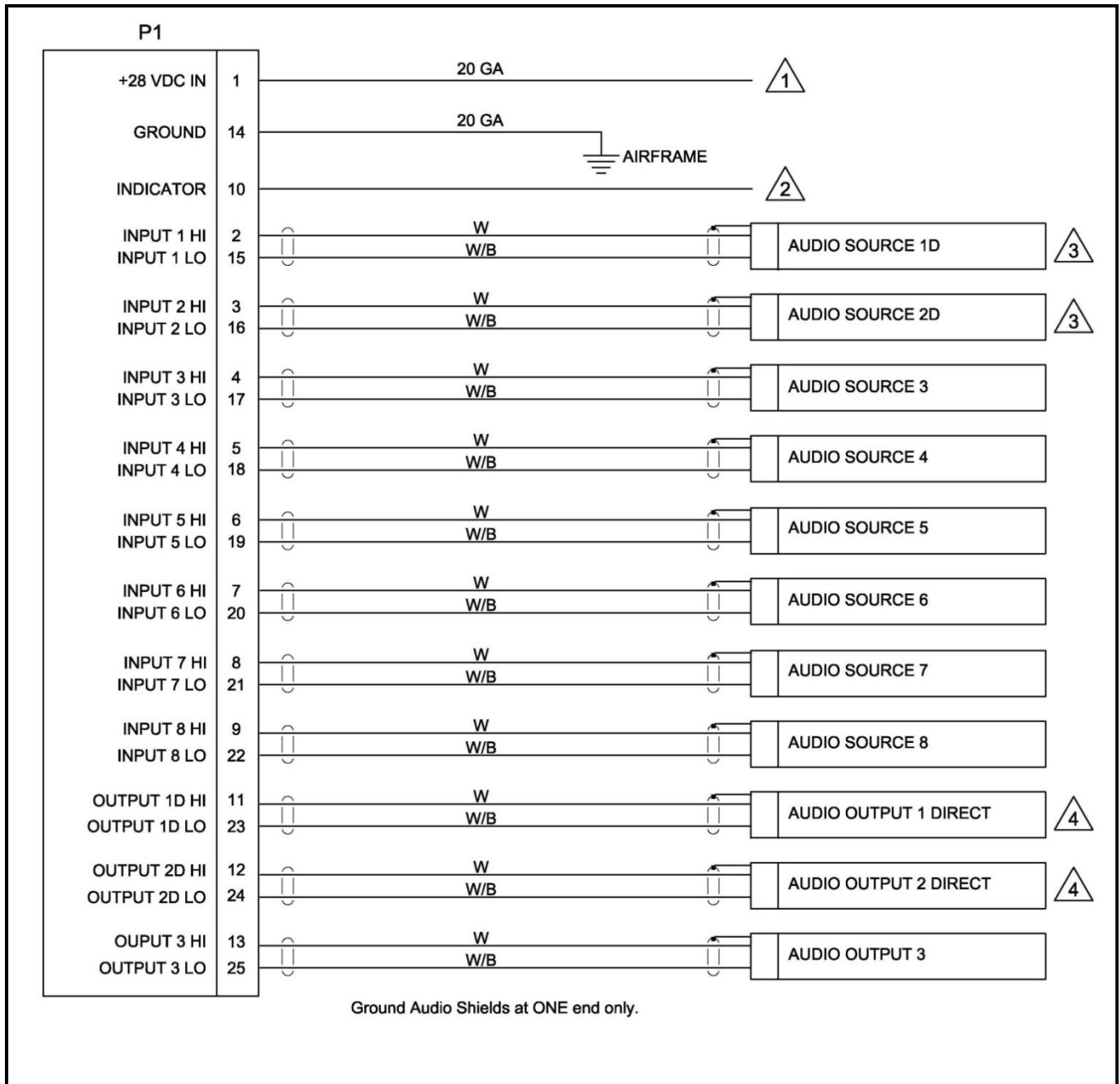


Figure 11: G13120 Audio Mixer Wiring

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5.6 G13120 Audio Mixer Setup and Adjustment

- a. Notes listed below apply to Figure 10 and Figure 11.

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 6.0 Cable Maintenance

6.1 General Notes

- a. The installation of the Eagle Copters P139-HD Digital Audio System 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 P139-HD Digital 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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6.2 Model Specific Notes

Table 1 Model Specific Notes

Model	Condition and Interconnect Method	Reference Attachment
Bell 204B	Does not exceed current limits of existing factory configuration. Verify Compliance using Section 1.3	BHT-204B-M&O ELA Chart 9-8 and Graph 9-6.
S/N: 2001-2060	Remove Existing ICS Amplifier and Speaker Amplifier 5 Amp Circuit Breakers. Install single 5 Amp CB for Eagle Audio System to the existing 28V DC Bus.	BHT-204B-M&O Page 11-38 and 11-46.
S/N: 2061-Sub	Remove Existing AirComm Audio System 5 Amp Circuit Breakers. Install single 5 Amp CB for Eagle Audio System to the existing 28V DC Bus.	BHT-204B-M&O Page 11-38 and 11-46.
Bell 205	Does not exceed current limits of existing factory configuration. Verify Compliance using Section 1.3	BHT-205A1-MM-2 Section 96 Page 9-13 and Figure 9-2.
S/N: All	Use Existing Pilot Audio Panel 5 Amp Circuit Breaker on 28V DC Bus #2. Connect Power #1 of Eagle Audio System to this Breaker. Use Existing Co-Pilot Audio Panel 5 Amp Circuit Breaker on 28V DC Bus #1. Connect Power #2 of Eagle Audio System to this Breaker. Note: This configuration provides redundant power from 2 separate buses.	BHT-205A1-MM-2 Section 98. Figure 98-7 Sht 1.
Bell 212	Does not exceed current limits of existing factory configuration. Verify Compliance using Section 1.3	BHT-212-MM-10 Chapter 96. Para. 96-1, 96-1A, 96-2A, 96-2B. BHT-212-MM-10 Chapter 98. Figure 98-7.
S/N: 30504-30553	Remove Existing Pilot Intercom 1 Amp Circuit Breaker and Cabin Intercom 1 Amp Circuit Breaker on 28V DC Bus #1. Install a single 5 Amp Circuit Breaker. Connect Power #1 of Eagle Audio System to this Breaker. Remove Existing Co-Pilot Intercom 1 Amp Circuit Breaker and Speaker Amplifier 3 Amp Circuit Breaker on 28V DC Bus #2. Install single 5 Amp Circuit Breaker. Connect Power #2 of Eagle Audio System to this Breaker.	BHT-212-MM-10 Chapter 98. Figure 98-8 Sht 4.



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Model	Condition and Interconnect Method	Reference Attachment
S/N: 30554-Sub.	Remove Existing Pilot Intercom 1 Amp Circuit Breaker and Cabin Intercom 1 Amp Circuit Breaker on 28V DC Bus #1. Install a single 5 Amp Circuit Breaker. Connect Power #1 of Eagle Audio System to this Breaker. Remove Existing Co-Pilot Intercom 1 Amp Circuit Breaker on 28V DC Bus #2. Install single 5 Amp Circuit Breaker. Connect Power #2 of Eagle Audio System to this Breaker. Note: This configuration provides redundant power from 2 separate buses.	BHT-212-MM-10 Chapter 98. Figure 98-9 Shts 8 & 9.
Bell 214	Does not exceed current limits of existing factory configuration. Verify Compliance using Section 1.3	BHT-214ST-FM Page 1-16. BHT-214ST-MM-10 Chapter 96. Figure 96-1.
S/N: All	Use Existing Pilot ICS 5 Amp Circuit Breaker on 28V DC Emergency Bus #2. Connect Power #1 of Eagle Audio System to this Breaker. Use Existing Co-Pilot ICS 5 Amp Circuit Breaker on 28V DC Essential Bus #1. Connect Power #2 of Eagle Audio System to this Breaker. Note: This configuration provides redundant power from 2 separate buses.	BHT-214ST-MM-10 Chapter 98. Figure 98-29 Shts 5 & 7.
Bell 412	Does not exceed current limits of existing factory configuration. Verify Compliance using Section 1.3	BHT-412-MM-12 Chapter 98. Section 98-08. Figure 98-8.
S/N: All	Use Existing Pilot ICS 5 Amp Circuit Breaker on 28V DC Emergency Bus #2. Connect Power #1 of Eagle Audio System to this Breaker. Use Existing Co-Pilot ICS 5 Amp Circuit Breaker on 28V DC Essential Bus #1. Connect Power #2 of Eagle Audio System to this Breaker. Note: This configuration provides redundant power from 2 separate buses.	BHT-412-MM-11 Chapter 97. Figure 97-7. Sheet 1. Figure 97-8. Sheet 2.



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6.3 Cable Maintenance

- a.** For the installation of a Digital Audio System using a G13000 Digital Router, refer to Figure 12 thru Figure 24 for detailed wiring schematic drawings G13004 (Sheets 1 -13).
- b.** For the installation of a Digital Audio System using a G13160 3-board Router, refer to Figure 25 thru Figure 37 for detailed wiring schematic drawings G13162 (Sheets 1-13).
- c.** 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.
- d.** If a cable needs to be repaired or replaced due to damage, refer to the appropriate cable drawing in Section 6.0. All cables should be built utilizing proper aviation practices.

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Cable Construction

AUDIO BOARD OPTIONS:

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-W-22759/16.</p> <p>2. All Grounding and Bonding will be IAW AC 43 13-1B, Chapter 1, 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. D9M 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 (P5, Pin 10) is not grounded, the Pilot headset is in EMERGENCY mode and the following lines are diverted: <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: <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> <p>9. 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>	<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 G13000 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: <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> <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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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 12: G13004 SHT 1 NOTES

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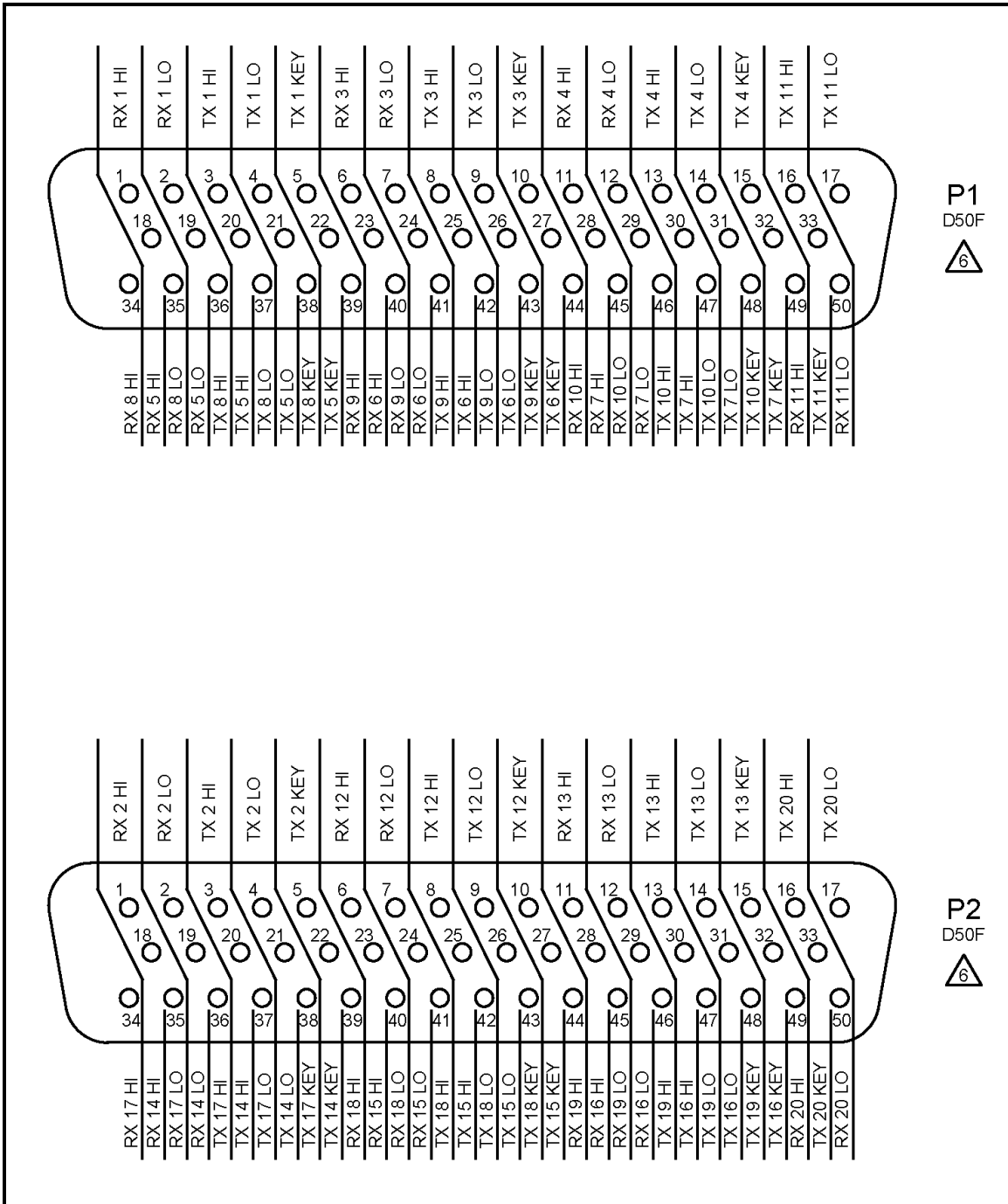


Figure 13: G13004 SHT 2 Map for P1, P2

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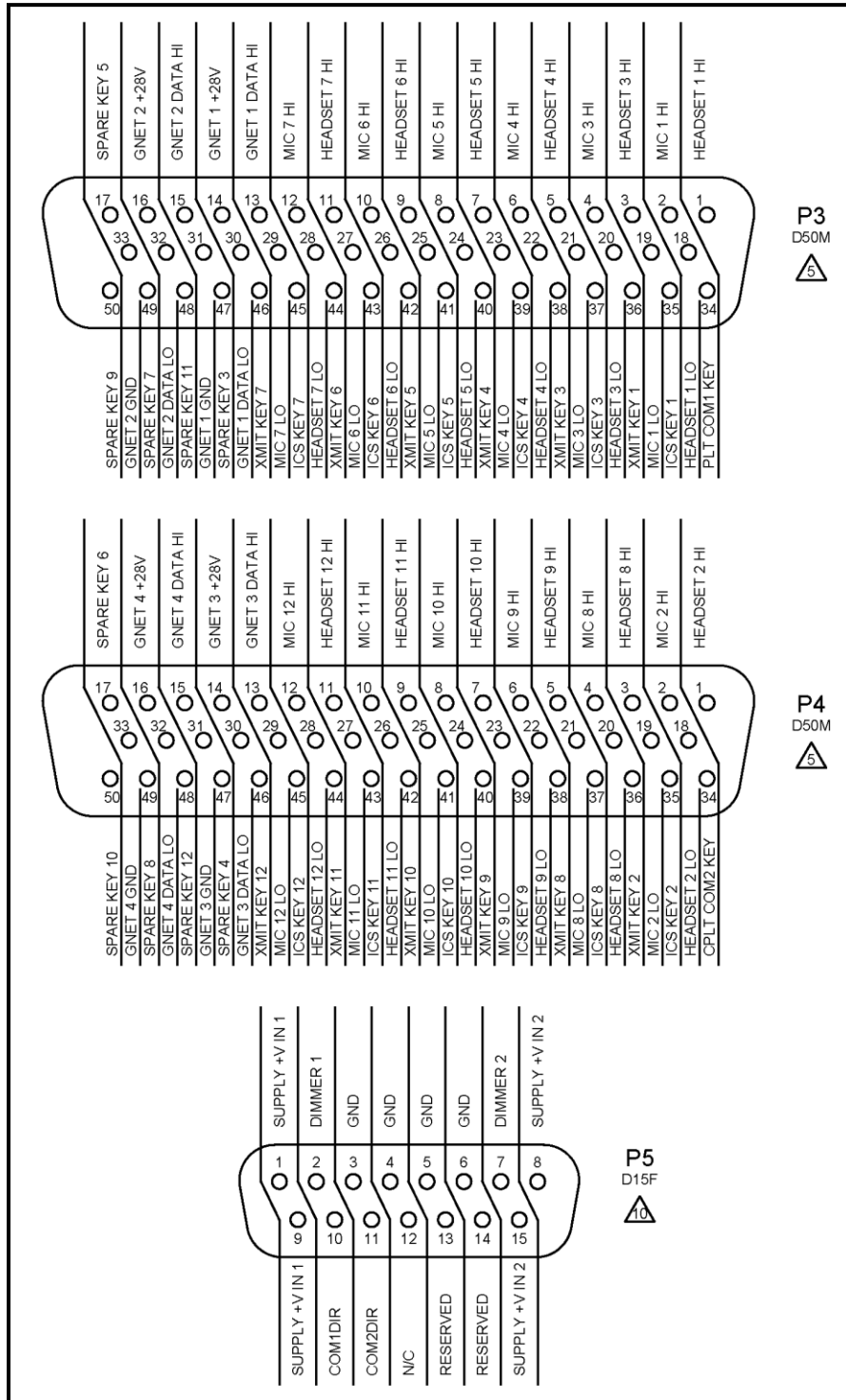


Figure 14: G13004 SHT 3 Map for P3, P4, P5

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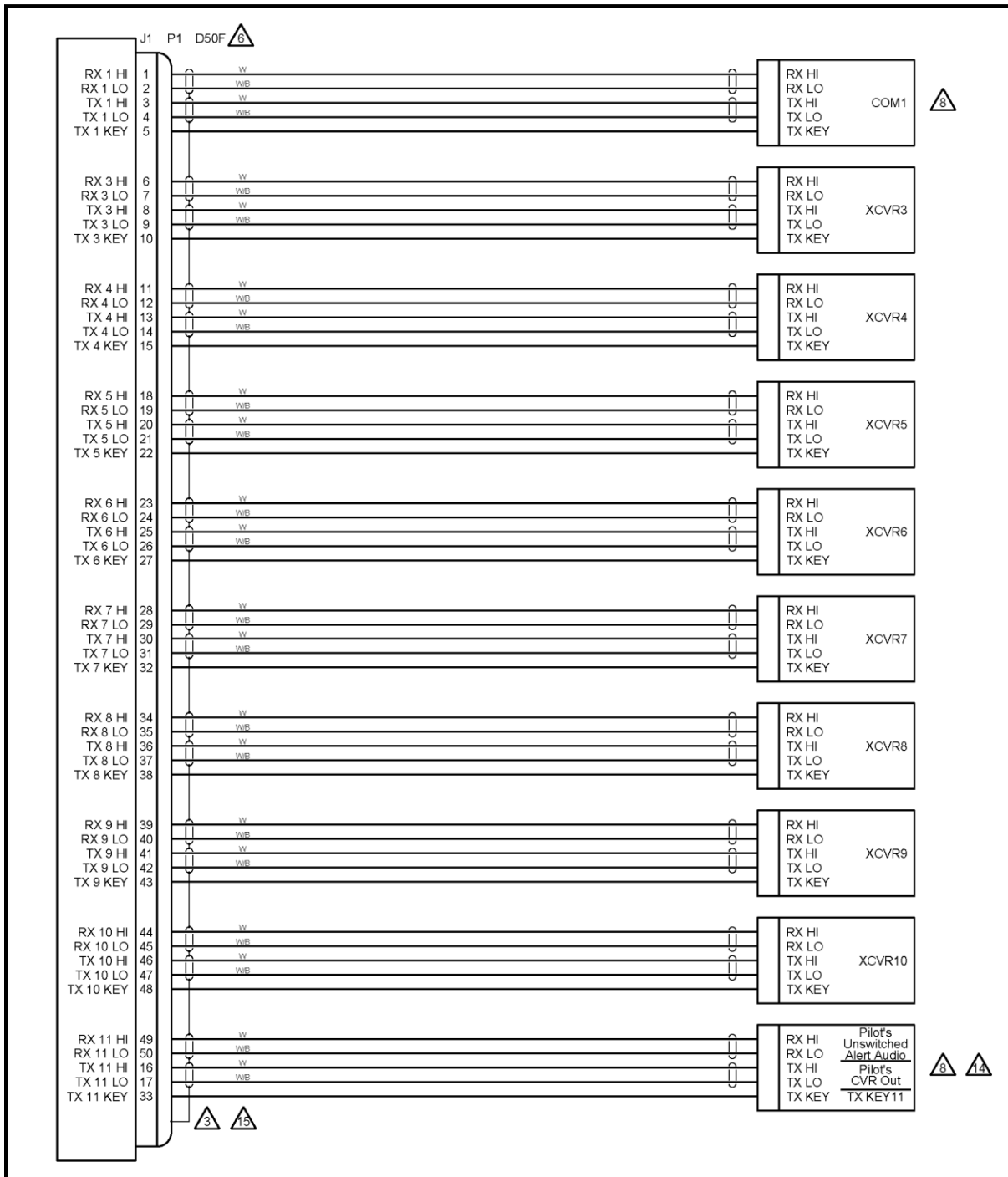


Figure 15: G13004 SHT 4 J1 Connections

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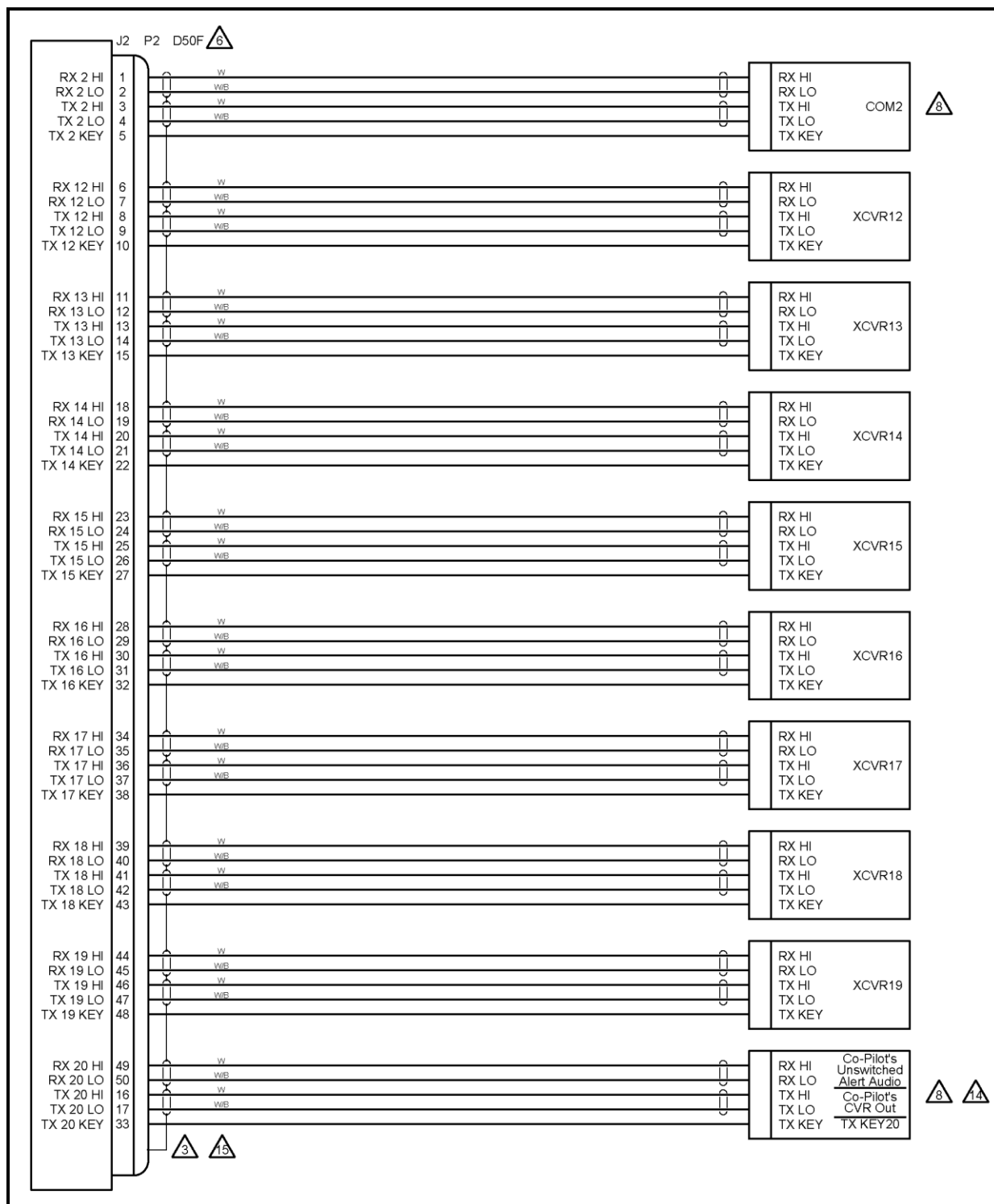


Figure 16: G13004 SHT 5 J2 Connections

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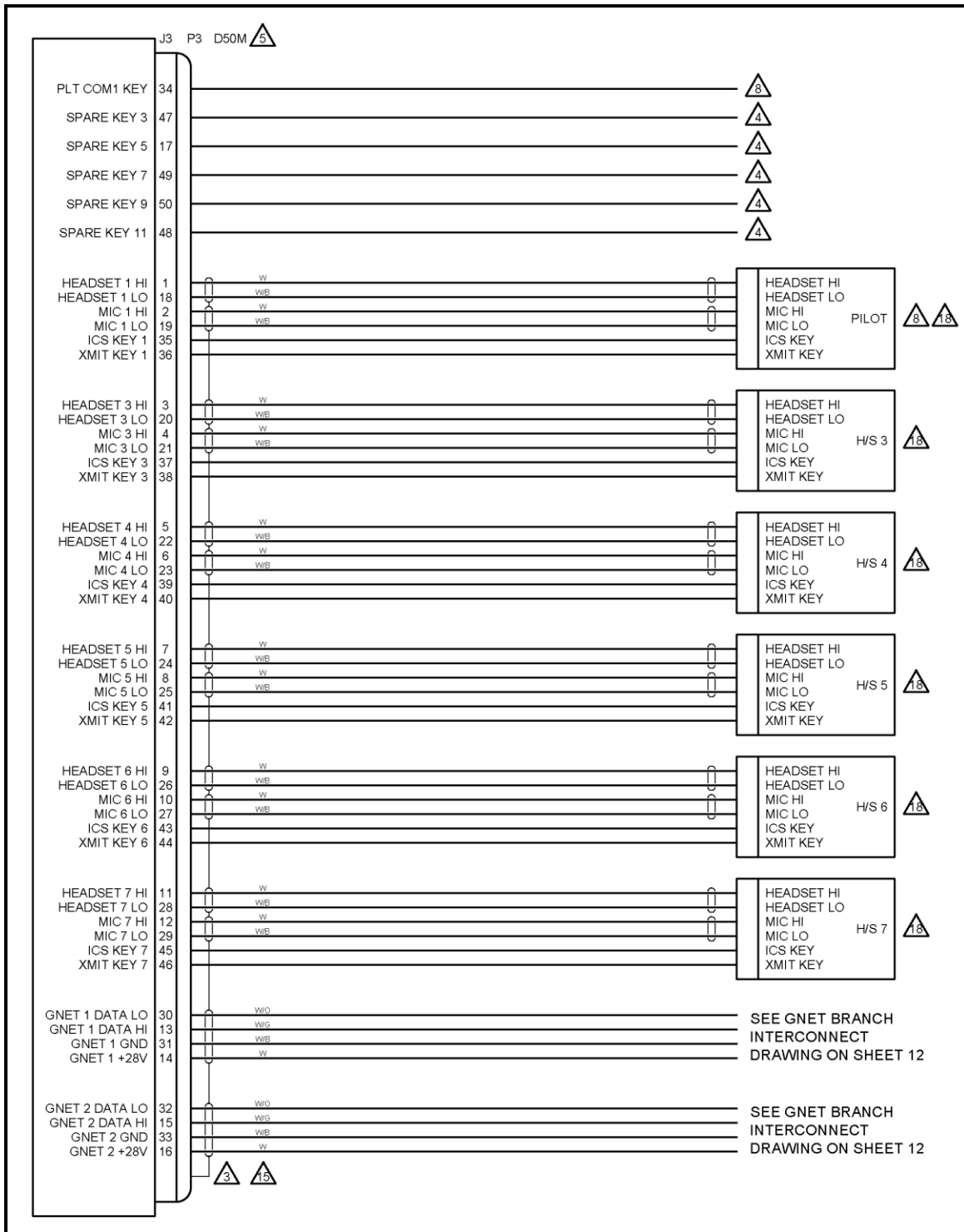


Figure 17: G13004 SHT 6 J3 Connections

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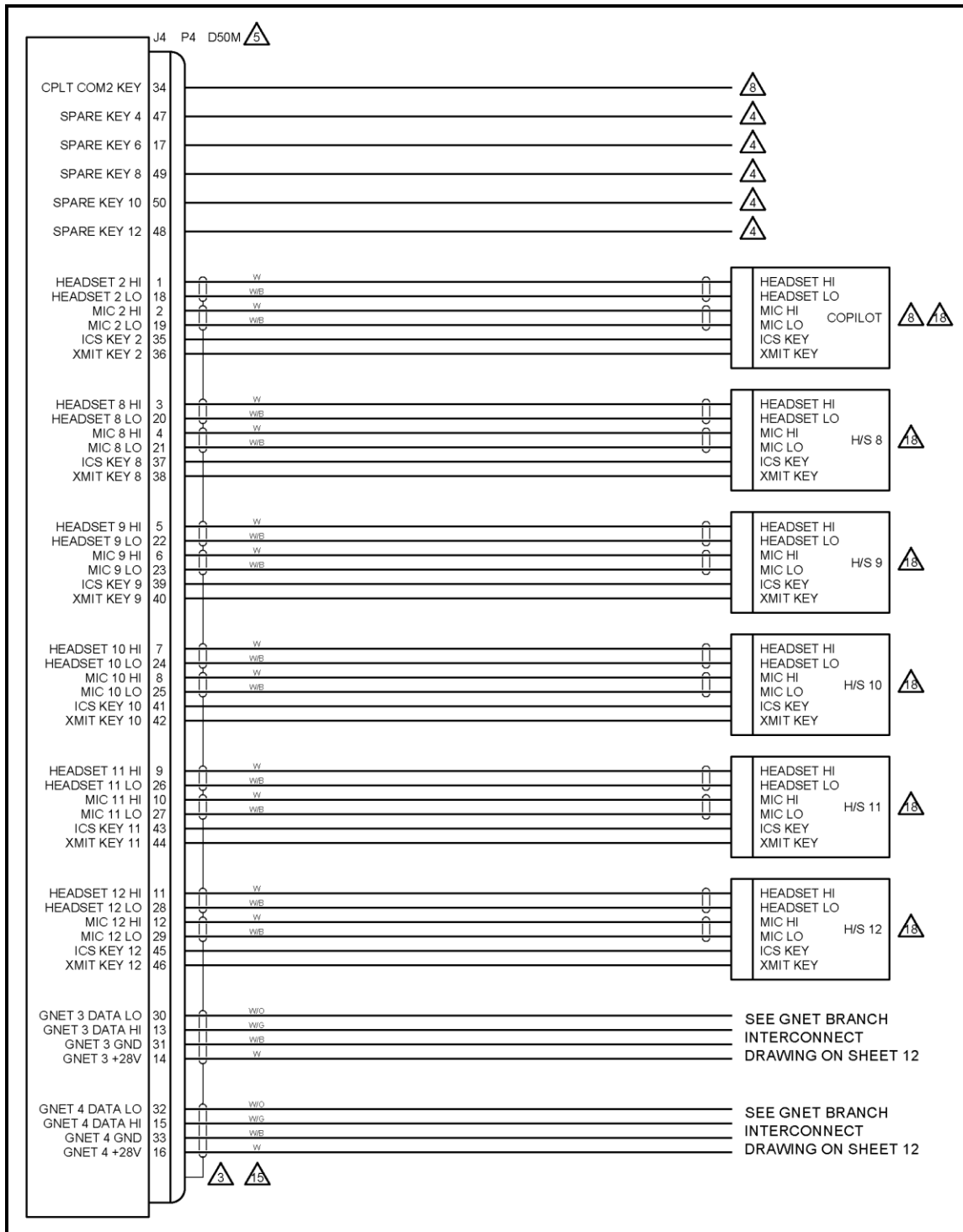


Figure 18: G13004 SHT 7 J4 Connections

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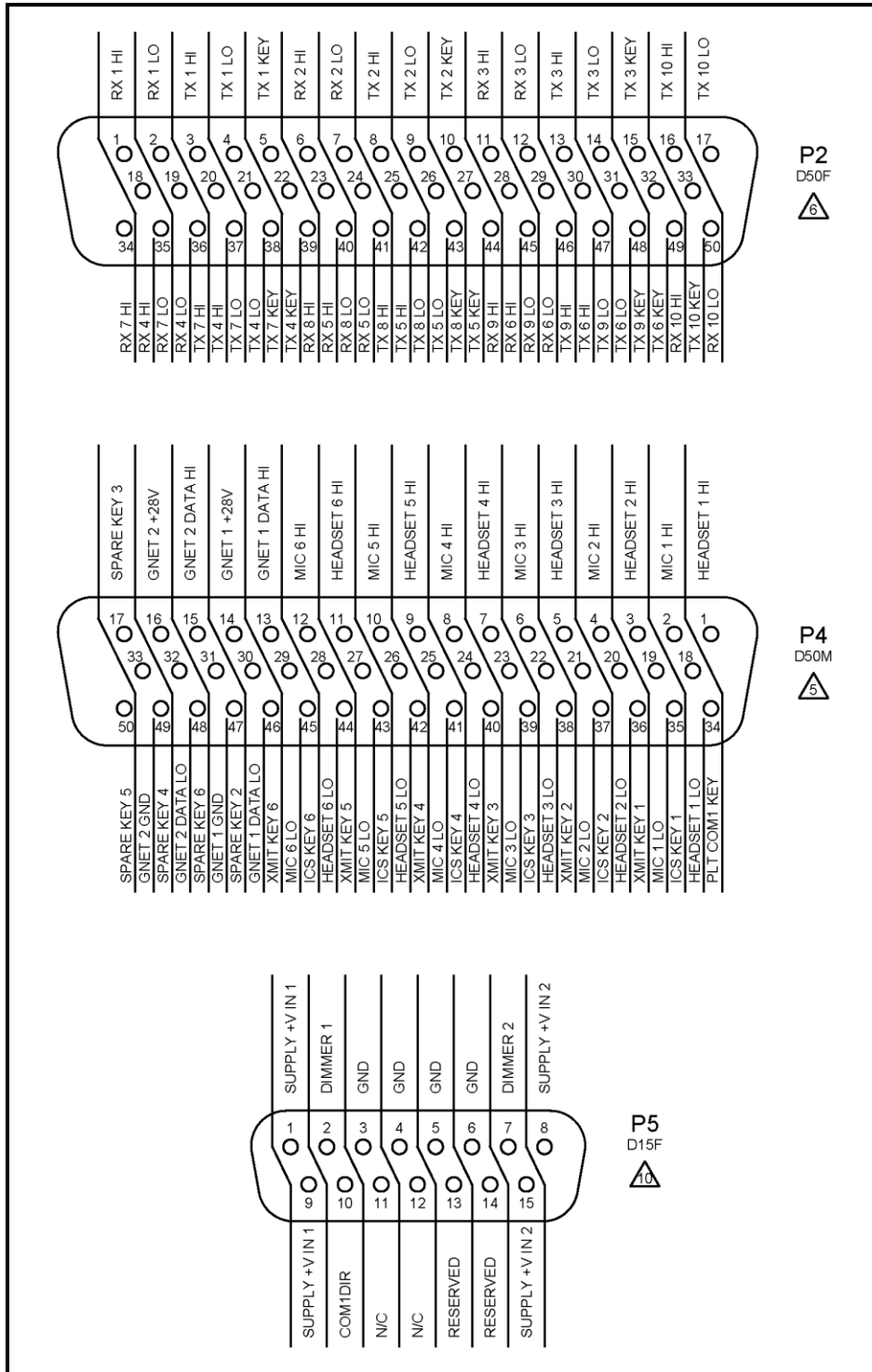


Figure 19: G13004 SHT 8 Single Board Router P2, P4, P5

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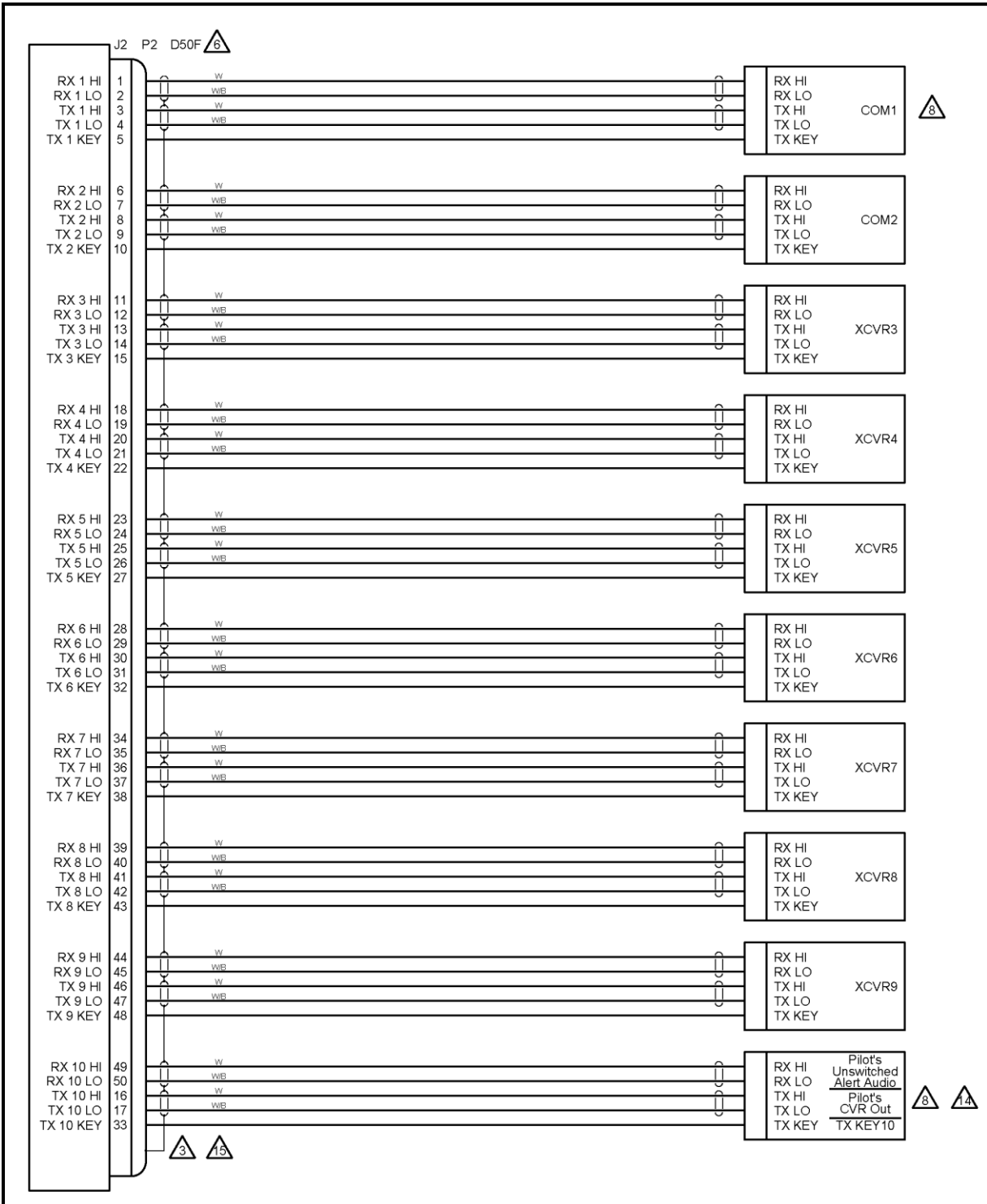


Figure 20: G13004 SHT 9 Single Board Router J2 Connections

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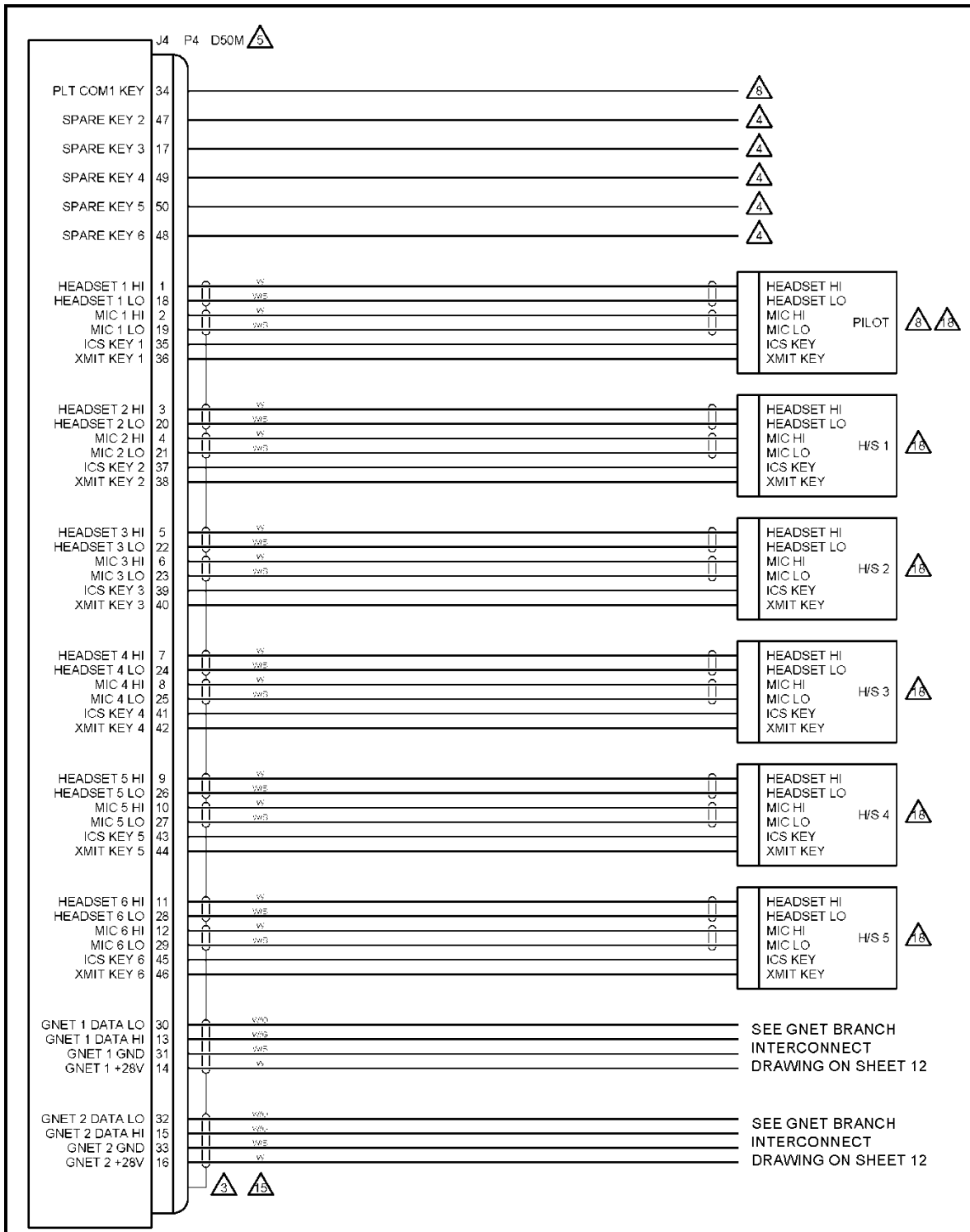


Figure 21: G13004 SHT 10 Single Board Router J4 Connections

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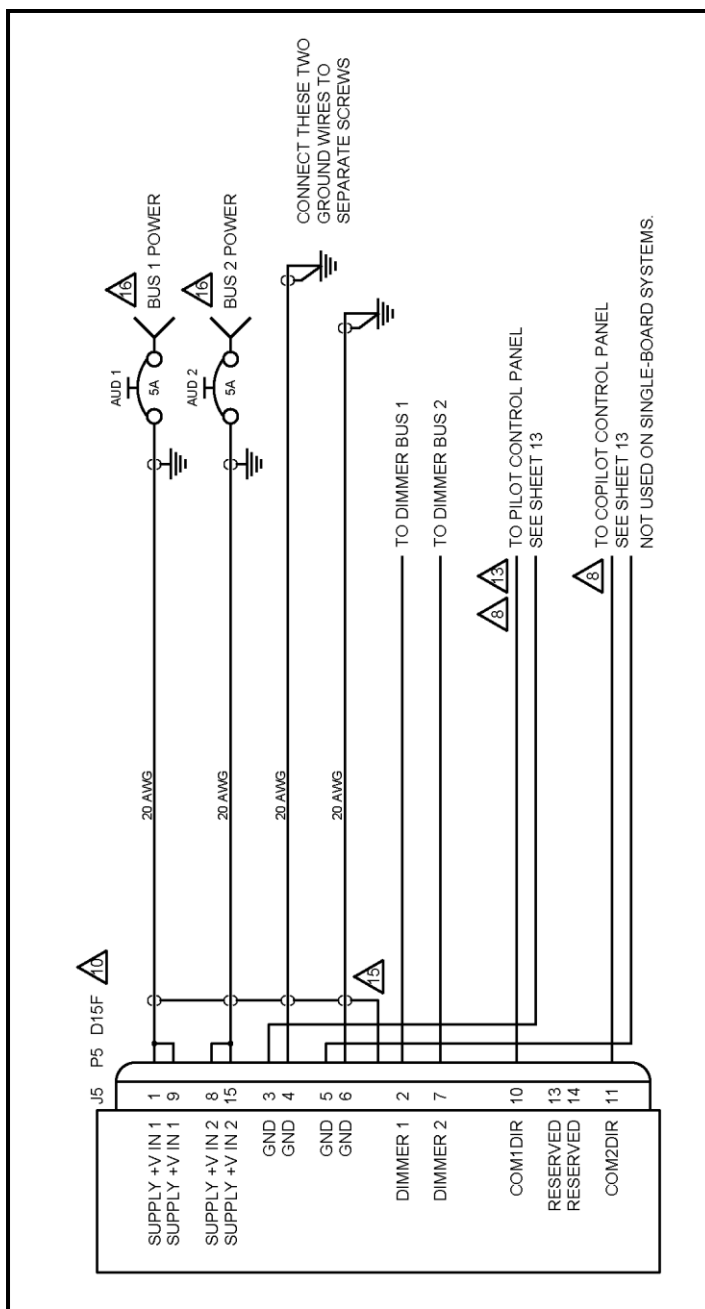


Figure 22: G13004 SHT 11 J5 Connections

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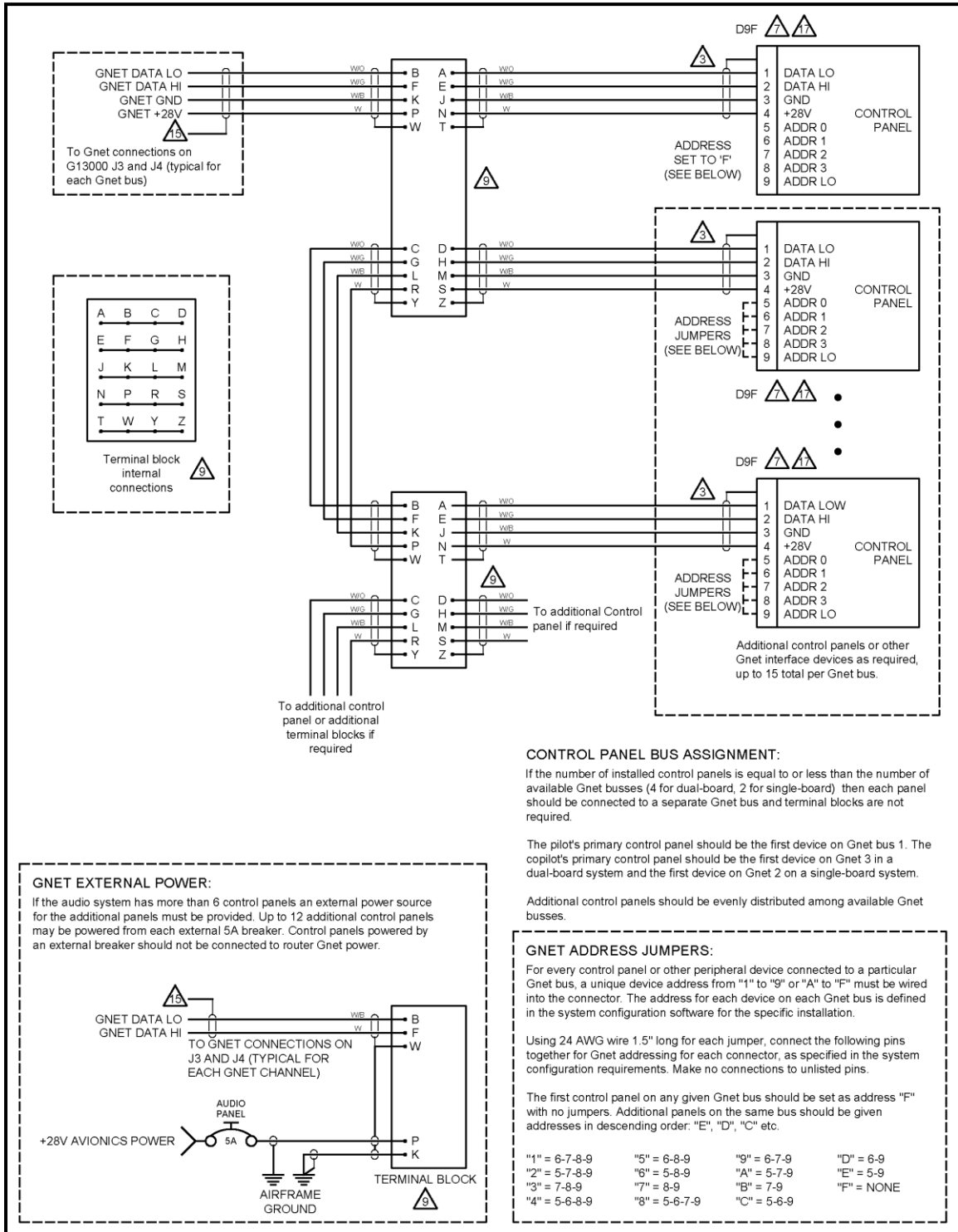


Figure 23: G13004 SHT 12 GNET Interconnects

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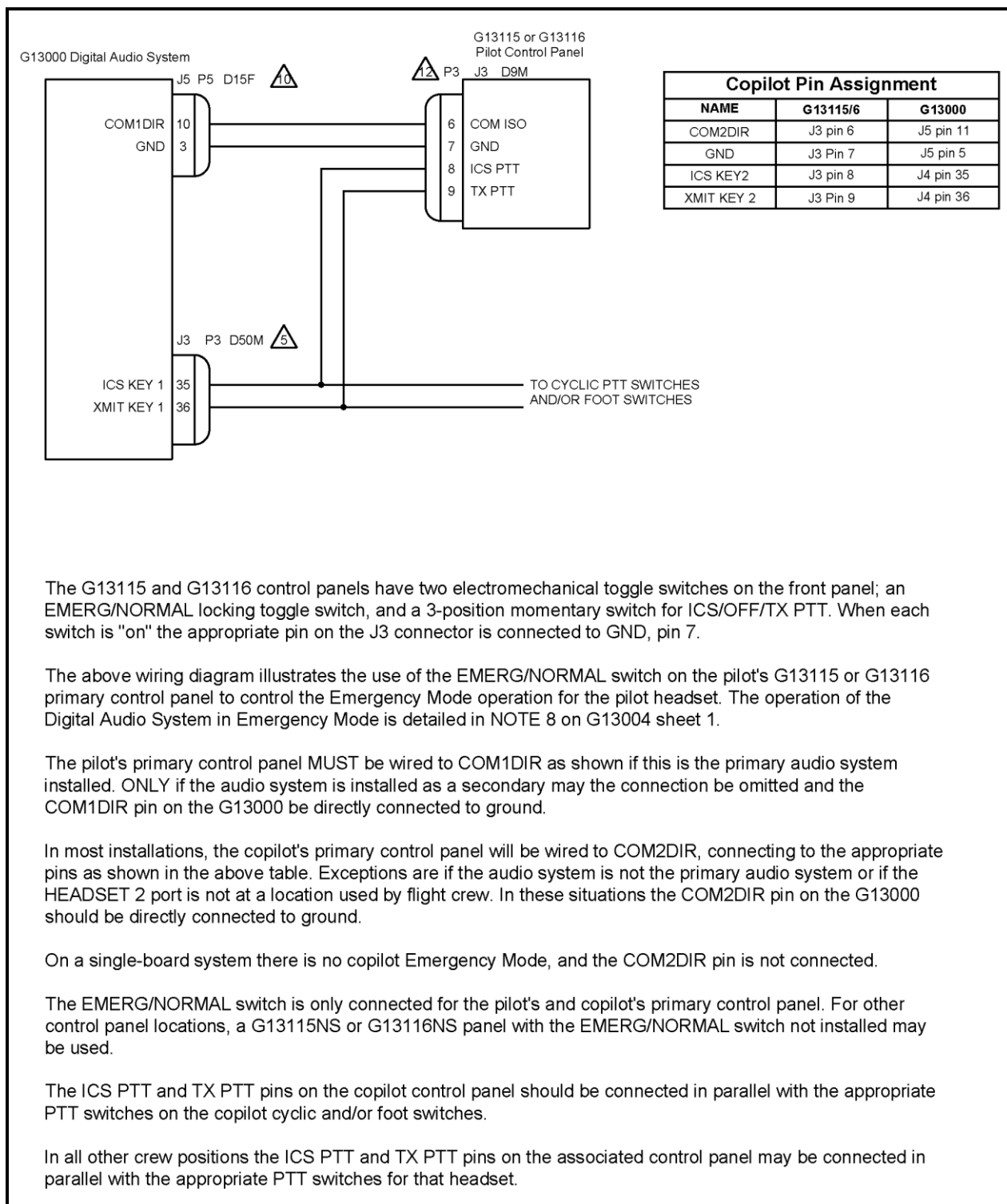


Figure 24: G13004 SHT 13 G13115 Control Head Wiring

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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 25: G13162 SHT 1 NOTES

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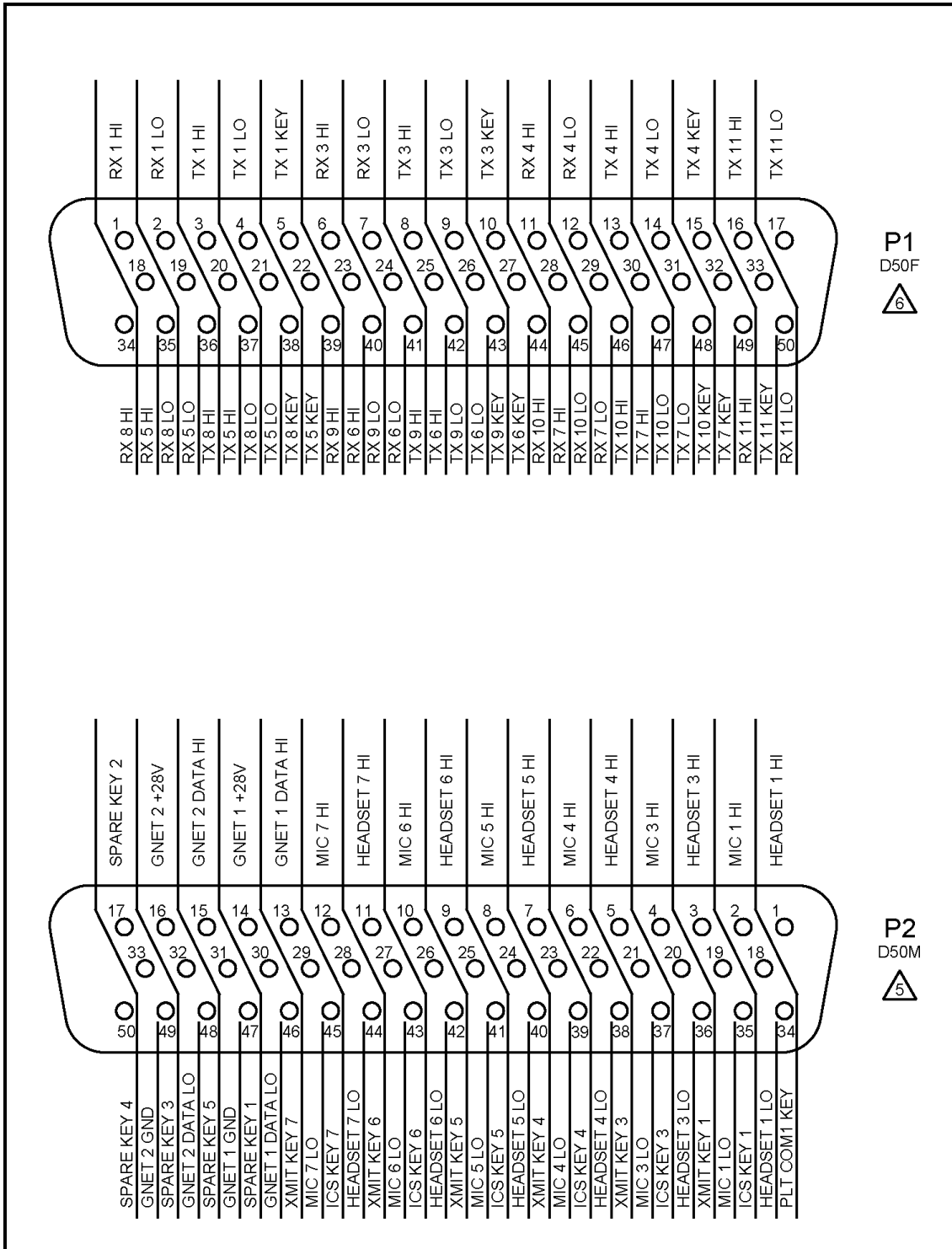


Figure 26: G13162 SHT 2 Map for P1, P2

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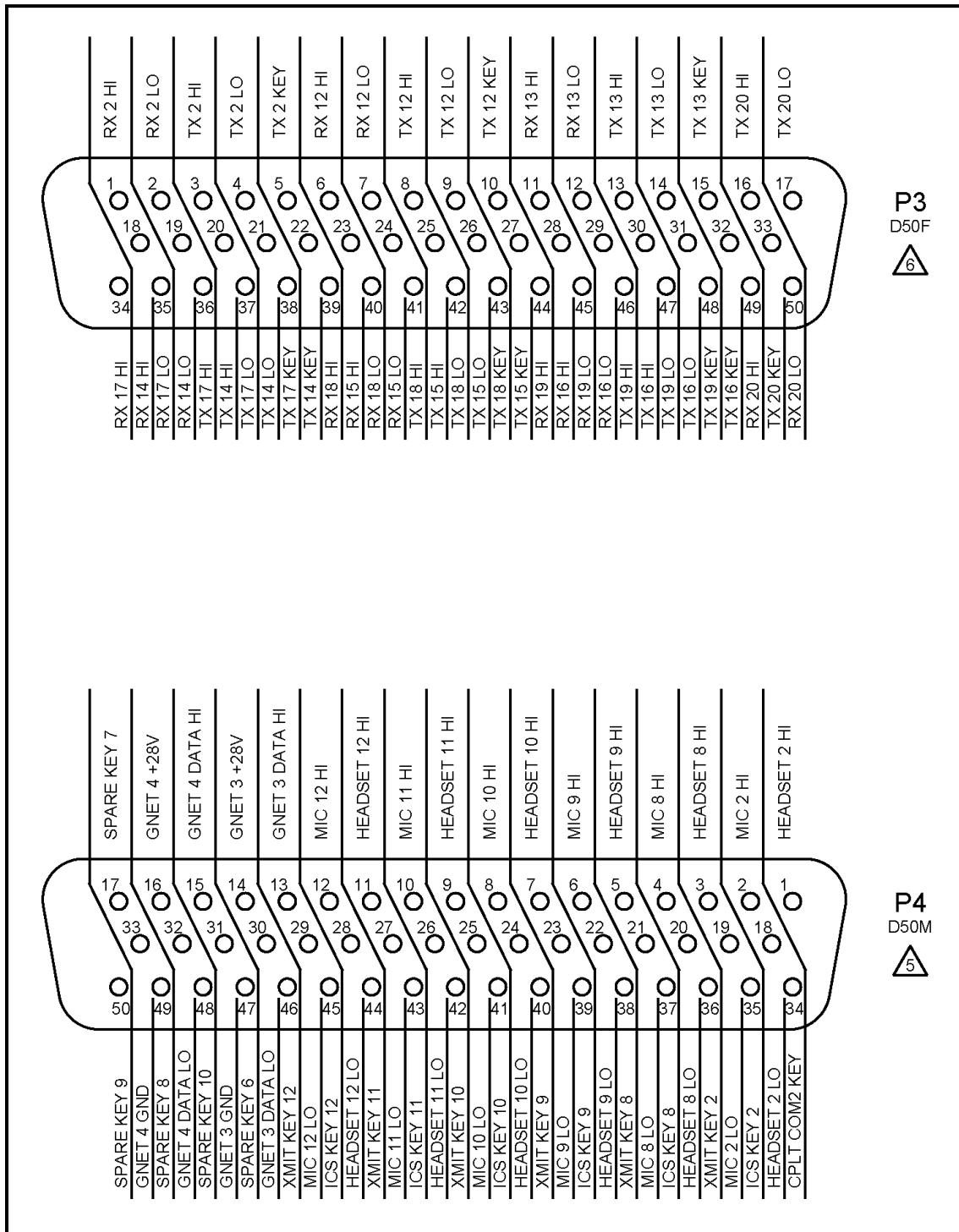


Figure 27: G13162 SHT 3 Map for P3, P4

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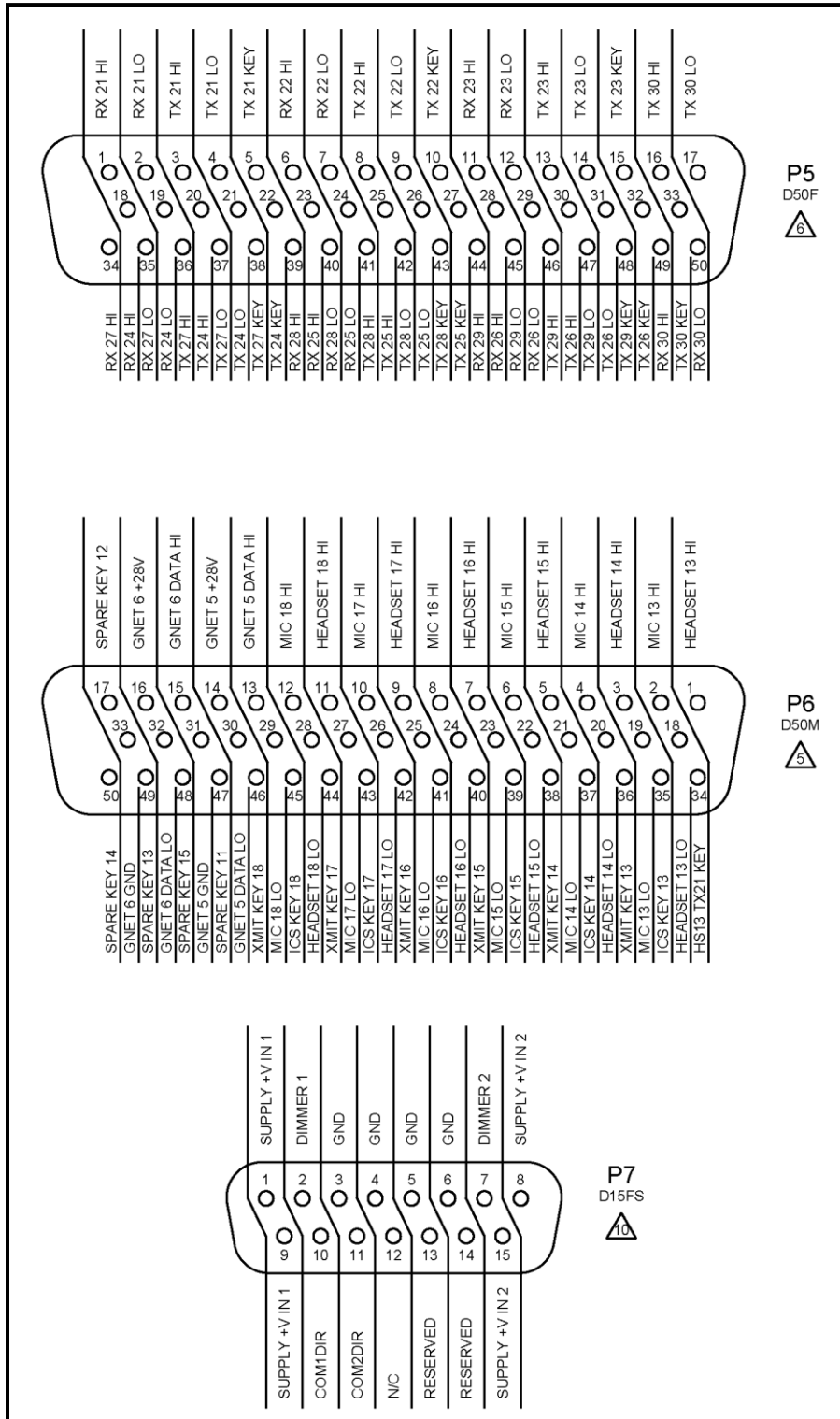


Figure 28: G13162 SHT 4 Map for P5, P6, P7

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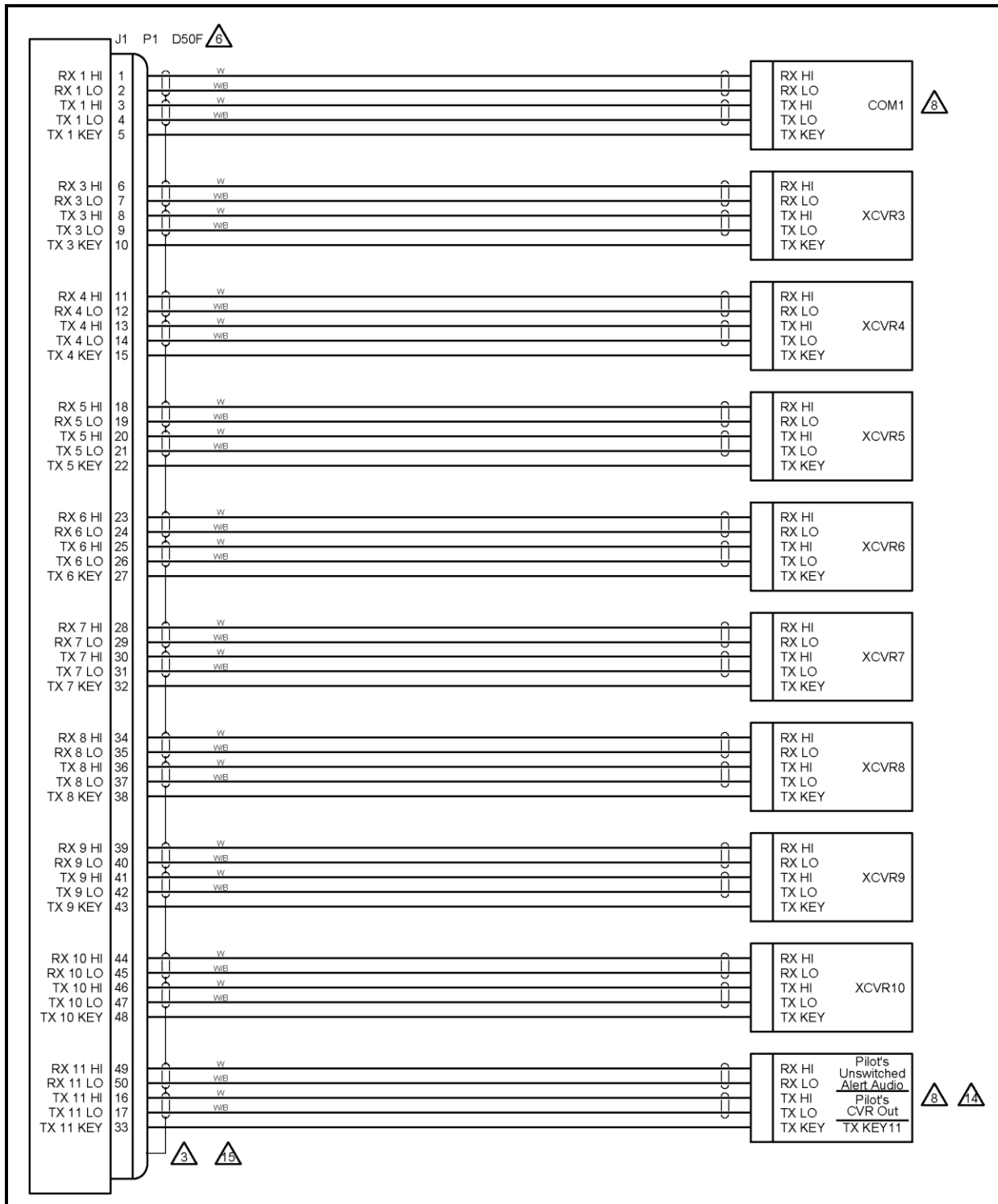


Figure 29: G13162 SHT 5 J1 Connections

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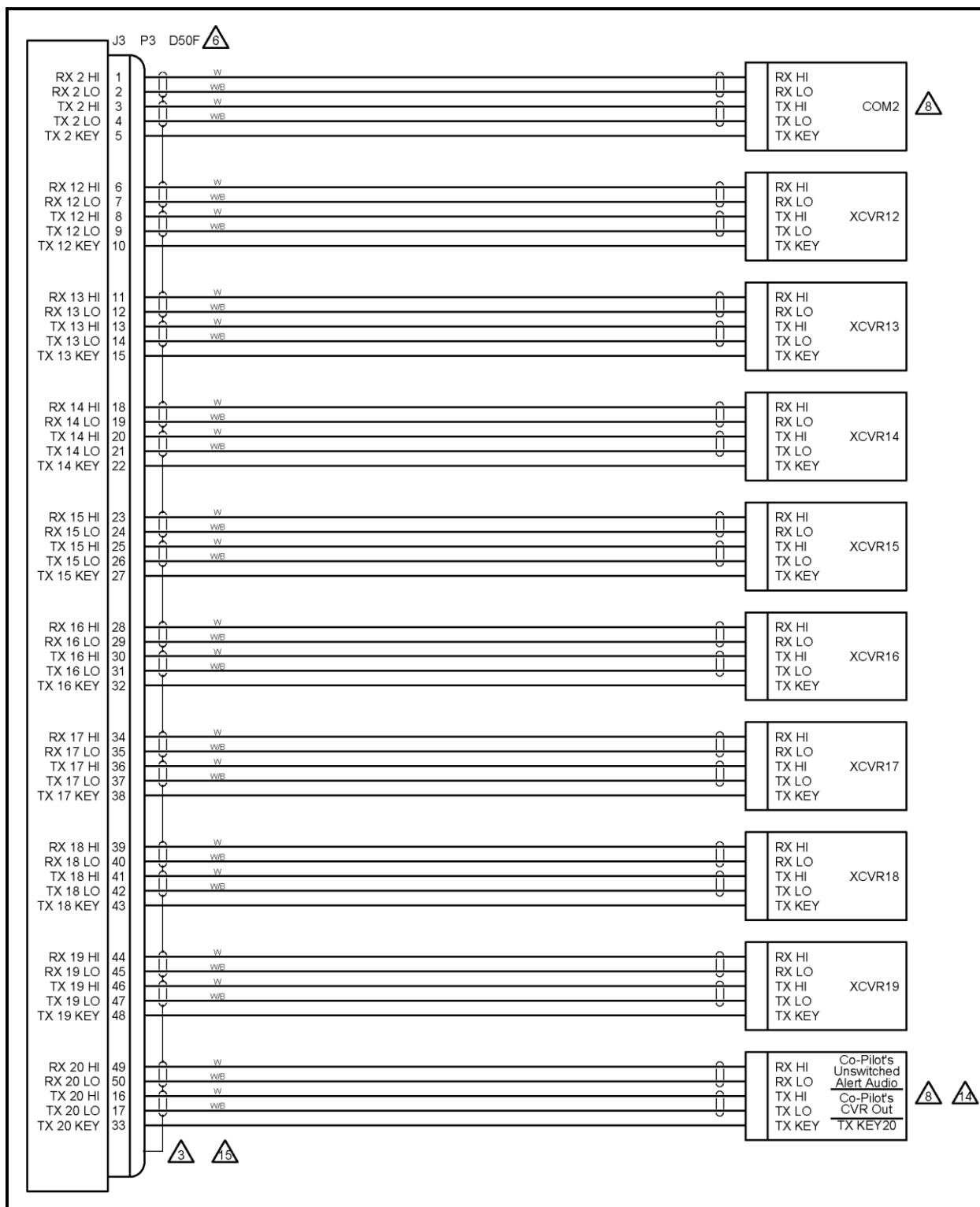


Figure 30: G13162 SHT 6 J3 Connections

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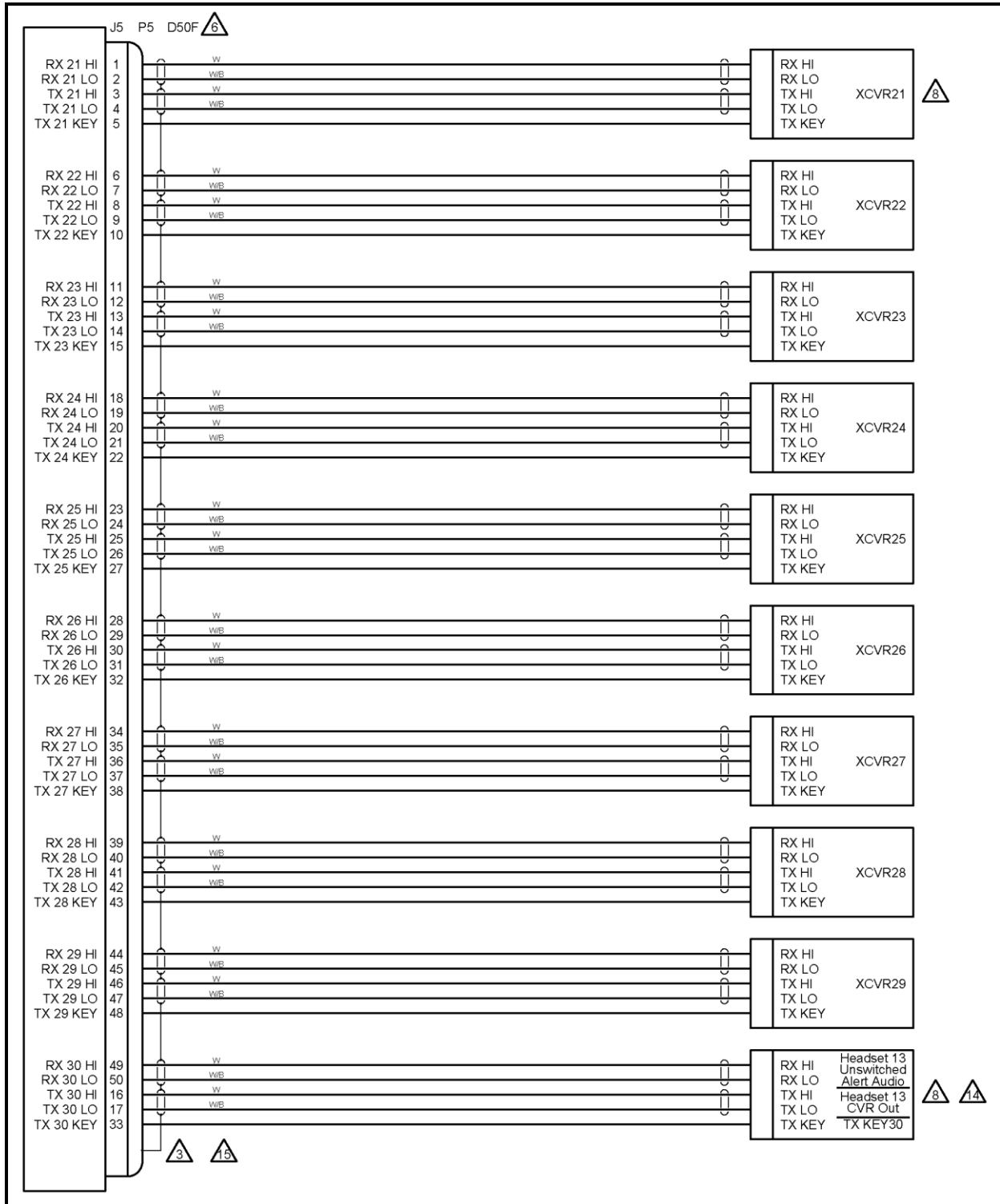


Figure 31: G13162 SHT 7 J5 Connections

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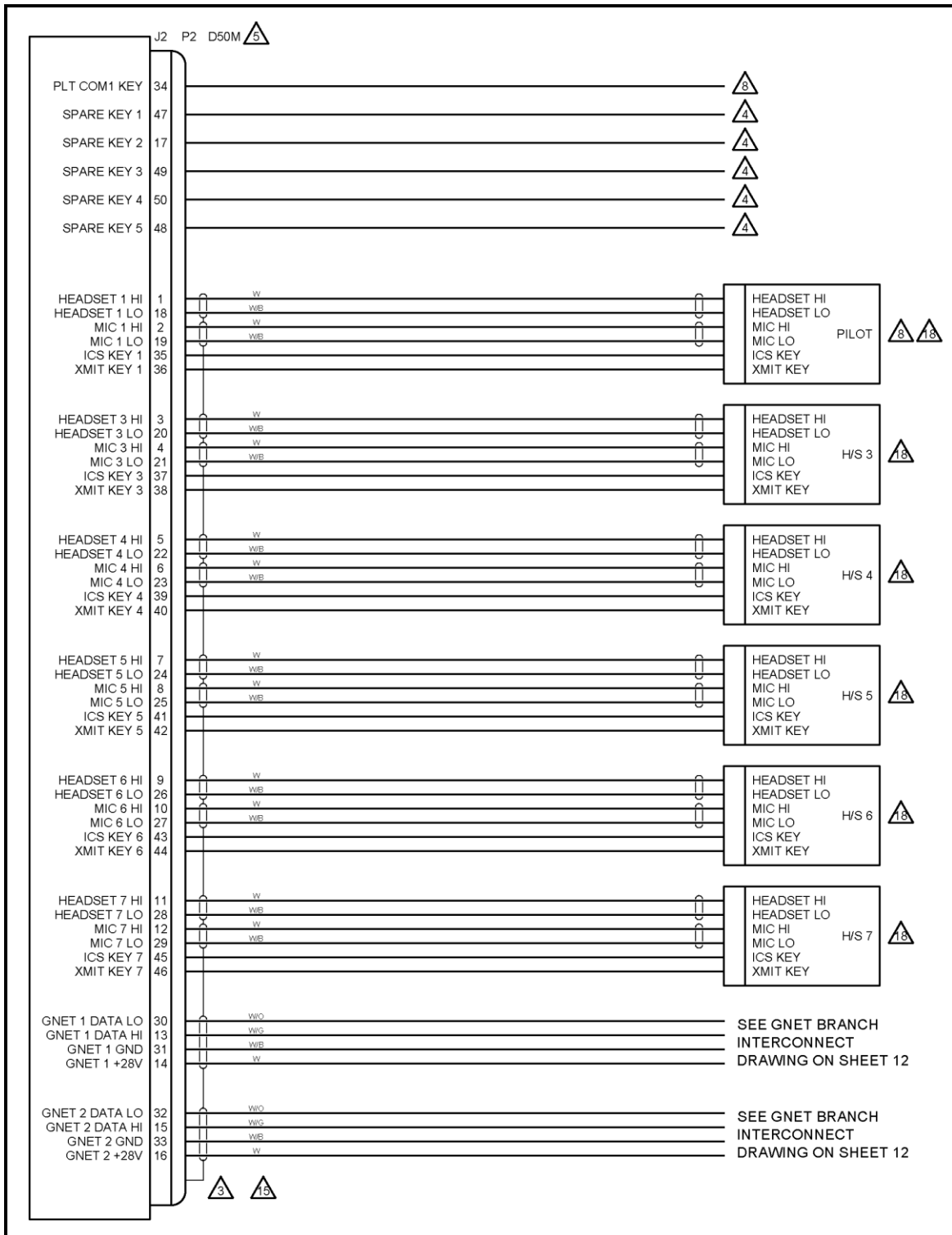


Figure 32: G13162 SHT 8 J2 Connections

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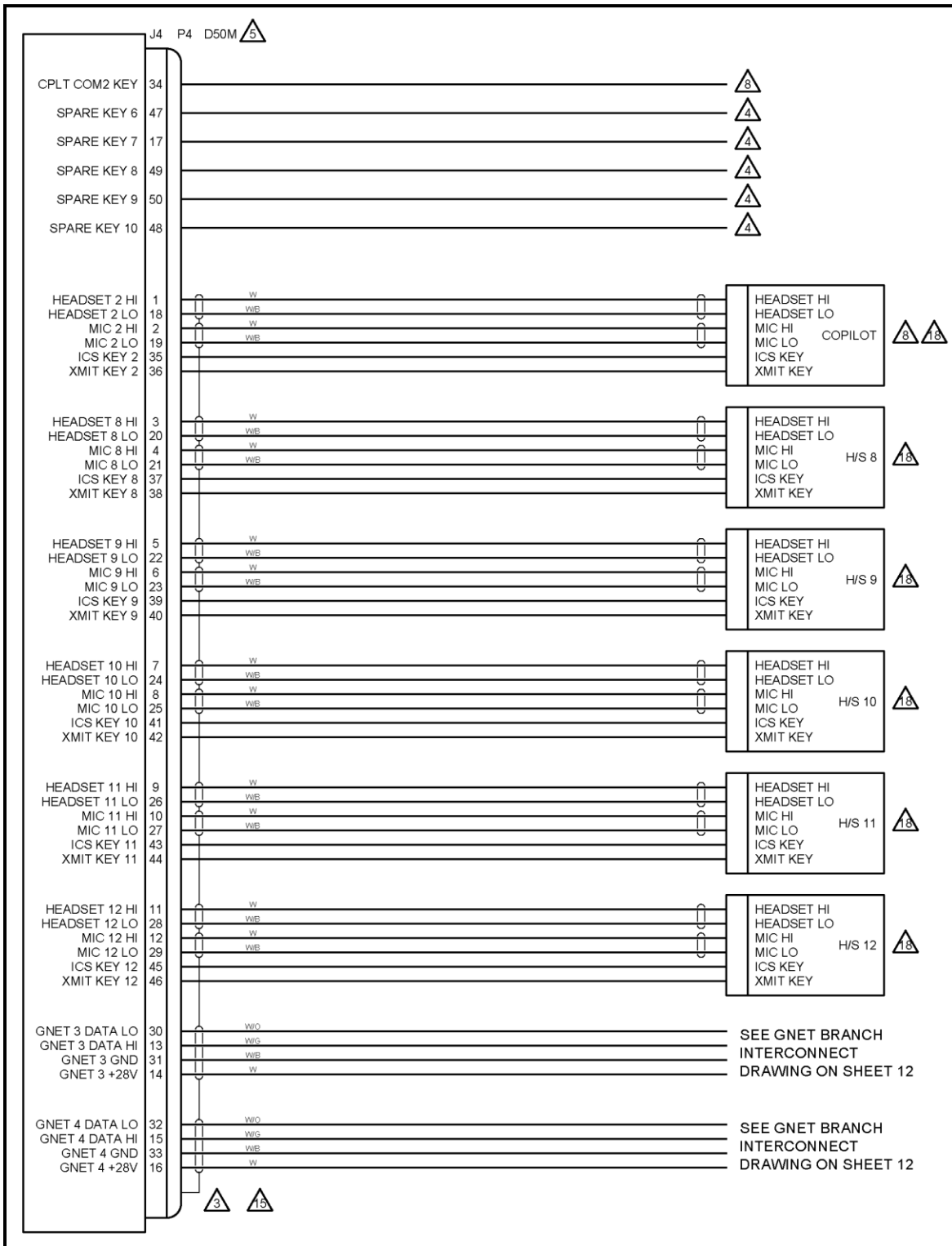


Figure 33: G13162 SHT 9 J4 Connections

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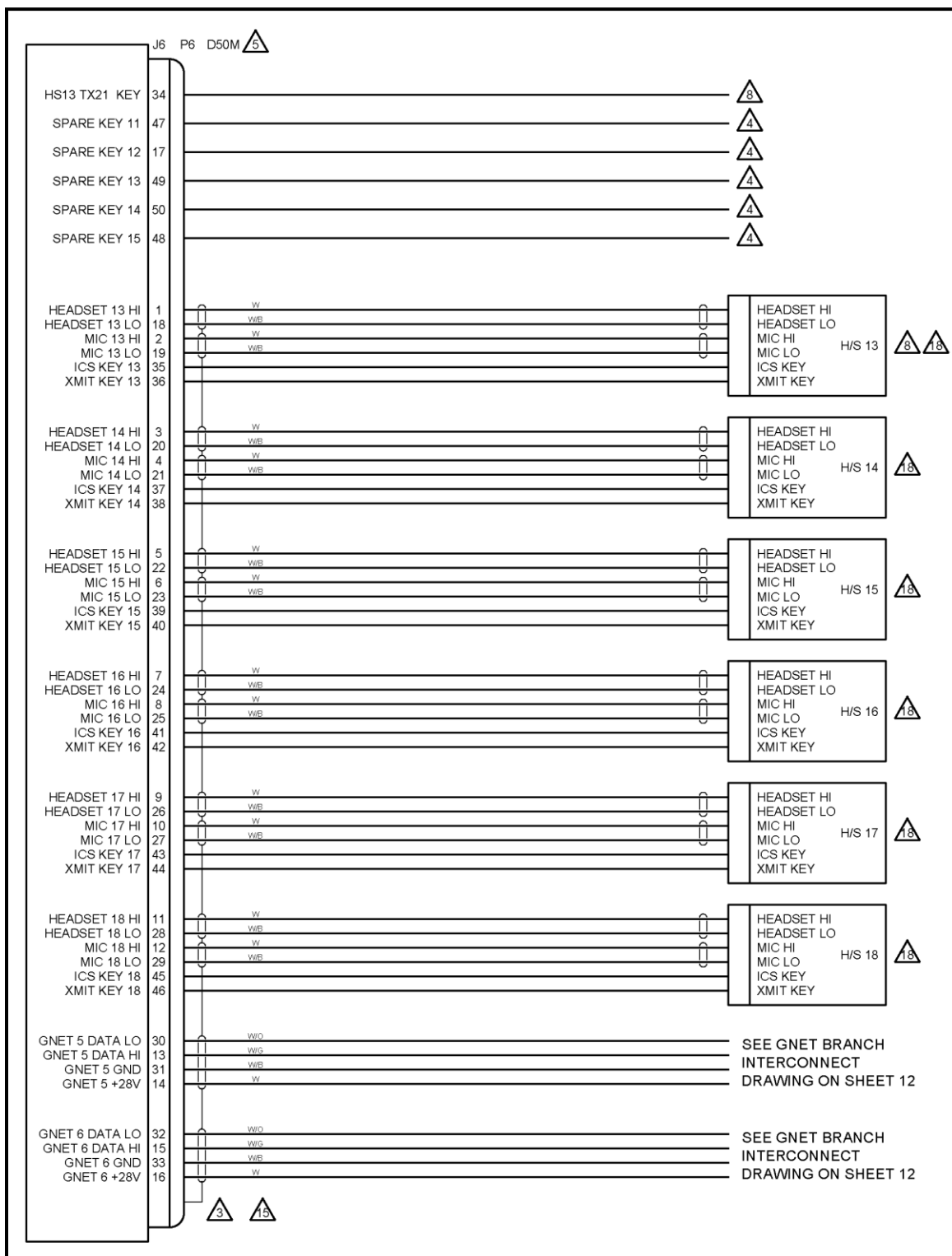


Figure 34: G13162 SHT 10 J6 Connections

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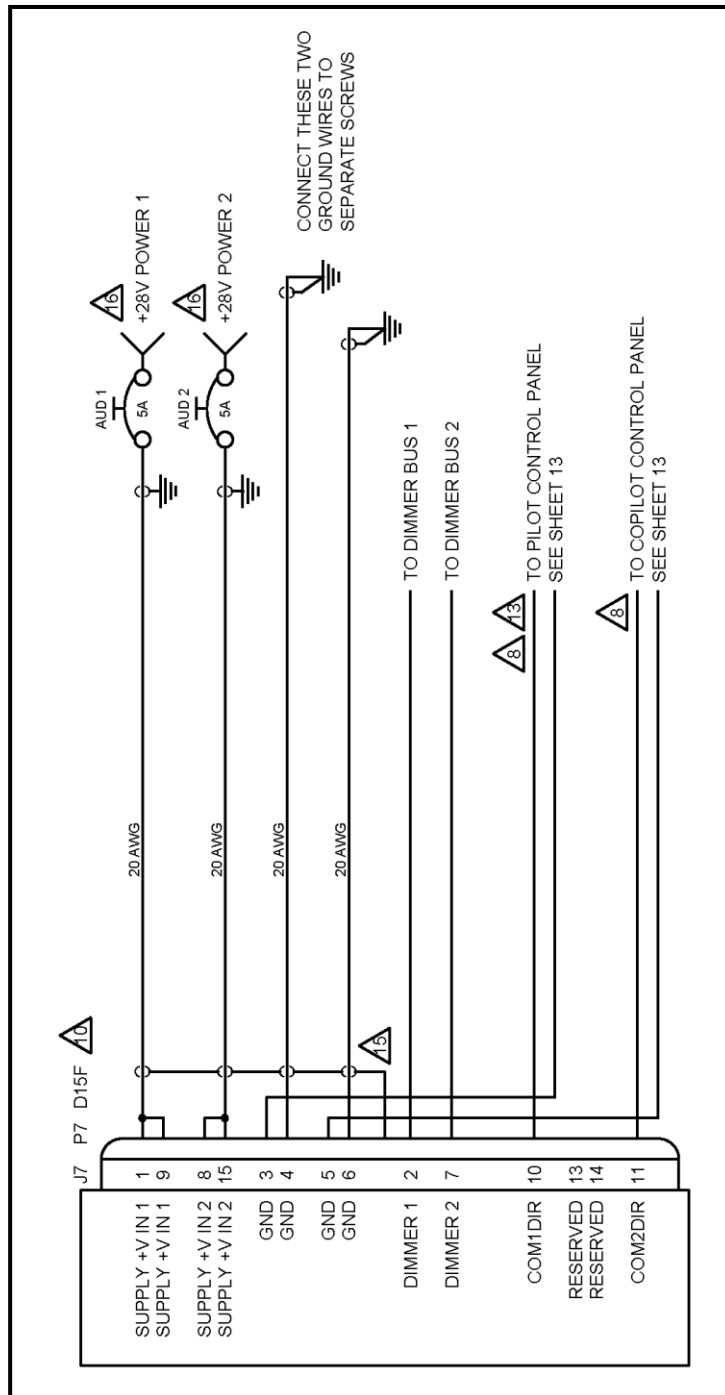


Figure 35: G13162 SHT 11 J7 Connections

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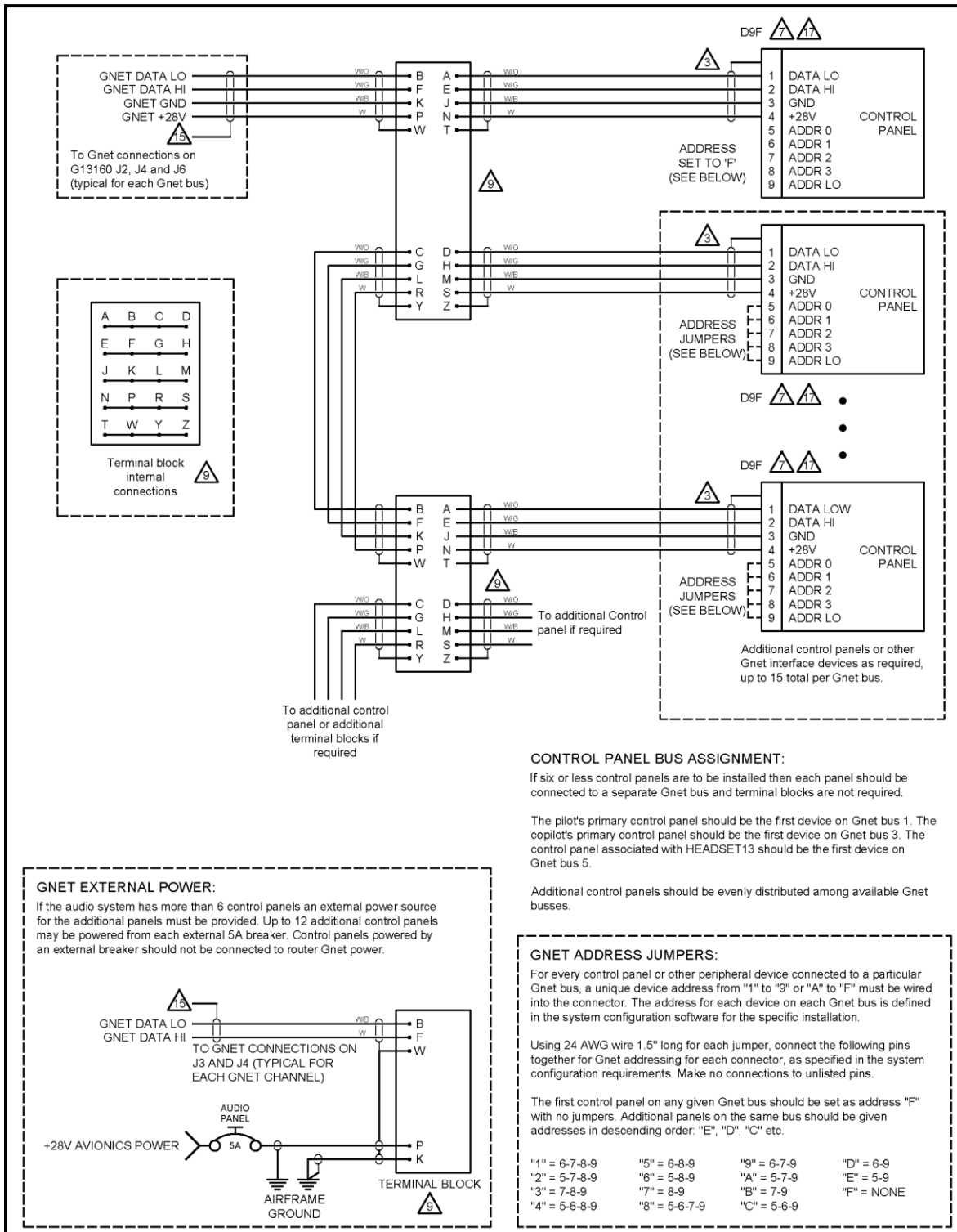


Figure 36: G13162 SHT 12 GNET Interconnects

SUBJECT

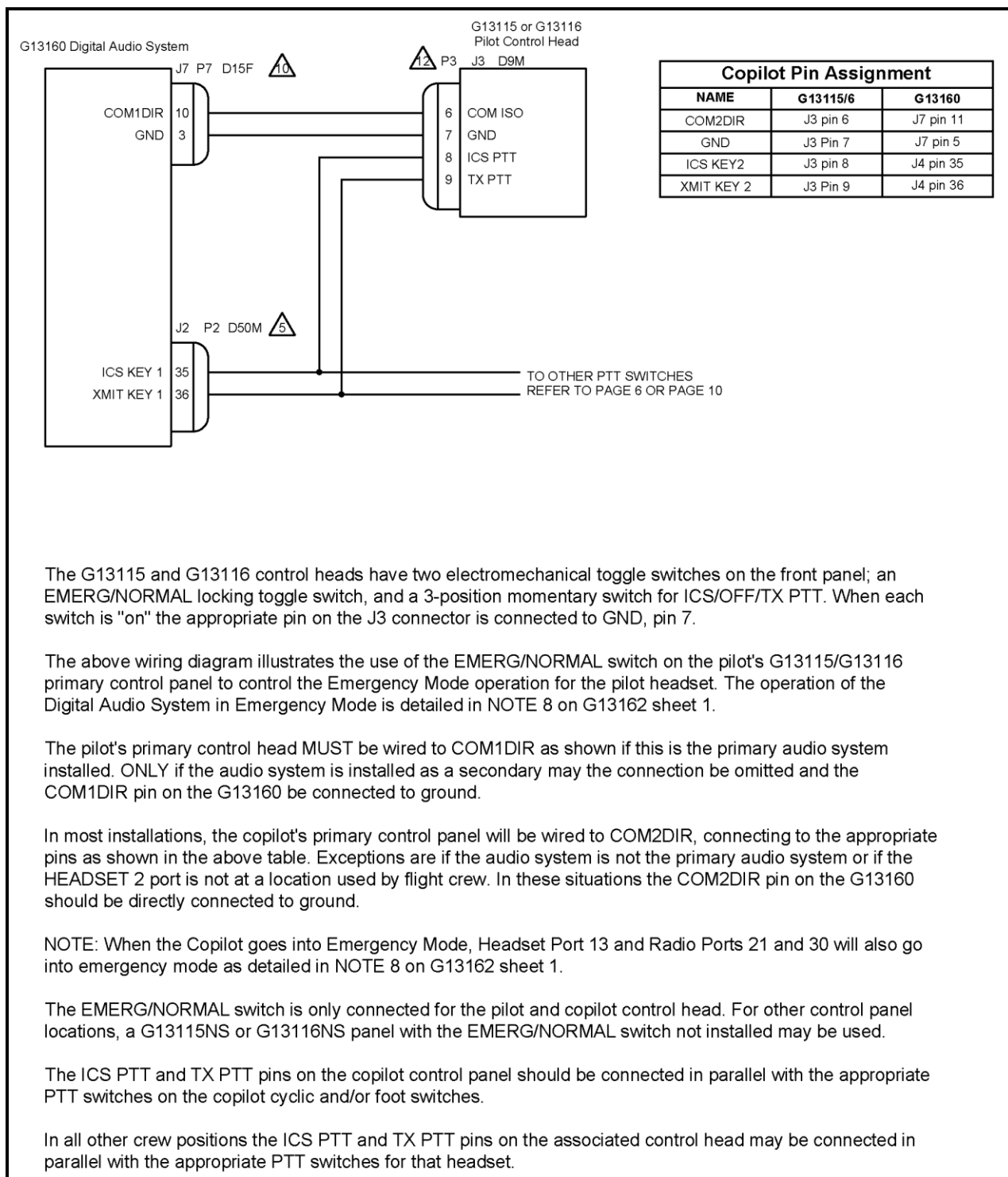
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The G13115 and G13116 control heads have two electromechanical toggle switches on the front panel; an EMERG/NORMAL locking toggle switch, and a 3-position momentary switch for ICS/OFF/TX PTT. When each switch is "on" the appropriate pin on the J3 connector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

The above wiring diagram illustrates the use of the EMERG/NORMAL switch on the pilot's G13115/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 G13162 sheet 1.

The pilot's primary control head 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 G13160 be 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 G13160 should be directly connected to ground.

NOTE: When the Copilot goes into Emergency Mode, Headset Port 13 and Radio Ports 21 and 30 will also go into emergency mode as detailed in NOTE 8 on G13162 sheet 1.

The EMERG/NORMAL switch is only connected for the pilot and copilot control head. 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 head may be connected in parallel with the appropriate PTT switches for that headset.

Figure 37: G13162 SHT 13 G13115 Control Head Wiring

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Section 7.0 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 7.0.

7.1 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.

7.2 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 the Pilot 'EMERG/NORMAL' switch in the '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. Confirm Pilot mic audio to the CVR or other always-on output (if installed).
- c. Place Co-Pilot 'EMERG/NORMAL' switch in the 'EMERG' position, 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.

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- e. Place both Pilot and Co-Pilot 'EMERG/NORMAL' switches in the 'EMERG' position and confirm the emergency mode intercom is operational between pilot, copilot and Headset Port #13 (if installed).
- f. Place the Pilot 'EMERG/NORMAL' switch in 'NORMAL' position and check all transceivers, receivers and audio devices. Repeat this process for the Co-Pilots 'EMERG/NORMAL' switch.
- 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.

7.3 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 8.0 Weight and Balance

Router G13000 = 5.0 lbs @ STA 20.0

Router G13160 = 6.0 lbs @ STA 20.0

Mounting Tray G13009 and Hardware = 0.5 lbs @ STA 20.0

Mounting Tray G13161 and Hardware = 0.5 lbs @ STA 20.0

Control Panel G13115 = 1.5 lbs @ STA 57.5

Control Panel G13115NS = 1.5 lbs @ STA 57.5

Control Panel G13116 = 1.3 lbs @ STA 57.5

Control Panel G13116NS = 1.3 lbs @ STA 57.5

Refer to the helicopter's installed equipment list for the recorded location.