JA94-001

Dual Audio Controller

Installation and Operating Manual

Rev. B

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RECORD OF REVISIONS

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A	Jun 2015	Initial release, Serial number 1001 and higher.	1750
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SECTION 1 - DESCRIPTION

1.1 System Overview

The JA94-001 dual audio controller is a centralized management system for two independent users that distributes and controls all transceiver, receiver and warning source audio in an aircraft. It enables the selected transmission of microphone audio to one or more transceivers and distributes all intercom audio. The JA94-001 dual audio controller can be used in a standalone configuration or a star configuration to prevent the loss of the entire system due to the failure of one controller. It provides a passive emergency mode that directs the Right User to the COM1 transceiver and NAV1 receiver, and the Left User to COM2 transceiver and NAV2 receiver.

The JA94-001 is set up on a per-installation basis using a configuration cable and a PC running the product configuration tool to download system configuration settings via the front panel music / configuration connector. To facilitate future customizations and certification, neither software nor complex electronic devices are used in the JA94-001 design.

1.2 Features Overview

The JA94-001 is comprised of four main subassemblies: the upper (receive) subassembly features a 37 pin D-Min connector, which interfaces to the radio receive audio and user phones. The lower (transmit) subassembly features a 50 pin and 15 pin D-Min connectors which interfaces to the power and passenger headset connections. This layout minimizes crosstalk and follows industry standard interconnect for multi-user single channel audio controllers. The middle (microphone) subassembly has microphone and VOX circuitry. The front (faceplate) subassembly contains the removable legend interface. Numerous input and output levels are adjustable and several audio paths are selectable using the configuration tool ProCS™ (Product Configuration Software) to write configuration commands via a configuration cable to the front panel music / configuration connector. The configuration commands set the level of non-volatile digital control potentiometers to control audio signal levels and to non-volatile expander latches which are connected to audio gates to control the audio signal routing.

The JA94-001 may be configured as a drop-in replacement for the Cobham/NAT AA92, AMS42 & AMS44.

The JA94-001 supports up to 6 transceivers, each selectable from two rotary switches.

The JA94-001 supports up to 4 selectable receivers in two banks of 4 switches.

The JA94-001 provides intercom functions for up to 2 users and up to 6 passengers.

The JA94-001 has individual VOX gating for each user and passenger.

The JA94-001 supports two Direct Audio inputs at a fixed level to two users in Normal and Emergency mode.

The Direct audios may be routed to both Left and Right User phones or Direct Audio 2 routed to Right User and Direct Audio 1 to Left User.

The JA94-001 supports a third Direct Audio input in Normal mode only.

The JA94-001 allows the receive audios to be disconnected from the Passenger Phones.

The JA94-001 supports two CVR outputs.

The JA94-001 allows transmit access for five crew members (Right User, Left User, Passenger 1, Passenger2, and Passenger 6).The JA94-001 allows ICS PTT access for all users and passengers.

The JA94-001 features a Music / Configuration connector on the faceplate for configuration of audio levels and routing. The port can also be used as a music input and is compatible with most music players.

The JA94-001 has three modes of operation: Normal Mode, Emergency Mode and ICS Isolate Mode.

The JA94-001 supports radio simulcast.

The JA94-001 supports a remote transmit select input.

1.3 Inputs and Outputs

Refer to the JA94-001 connector maps for the mating connector designators and pin assignments for the input and output signals.

1.3.1 Inputs

Name	Qty	Type
CONFIG DATA TO JA94-001	1	Data signal
MODE SELECT	1	Multi format signal
DIRECT AUDIO	3	Audio signal
ICS PTT	8	Control signal
LIGHTS INPUT	1	Analog control signal
MIC	8	Audio signal
MUSIC	4	Audio signal
POWER INPUT	1	Power supply
RX HI/LO	10	Audio signal (6 COMs, 4 NAVs)
TX PTT	5	Control signal
COM Remote TX Select	6	Control signal
ICS Isolate Mode	1	Control signal

1.3.2 Outputs

Name	Qty	Type
CVR	2	Audio signal
CONFIG DATA FROM JA94-001	1	Data signal
Headphones	8	Audio signal (Note: 7 outputs for driving 8 phones)
Transceiver MIC	6	Audio signal
Transmit PTT	6	Active low discrete
RX COMP OUT	2	Audio signal

1.3.3 Bi-directional Ports

Name	Qty	Type
ICS TIE	1	Audio signal

1.4 Specifications

1.4.1 Electrical Specifications

Power Input

Primary nominal voltage	28 Vdc
Maximum voltage	32.2 Vdc
Minimum voltage	22.0 Vdc
Emergency voltage	18.0 Vdc
Power Off Voltage	≤ 15.0 Vdc
Input current	0.95 A max

1.4.1.1 Audio Performance

Rated Input Level

Receive audio rated input level	7.75 Vrms ± 10%
Direct audio rated input level	7.75 Vrms ± 10%
Music rated input level	400 mVrms ± 10%
Microphone input level	250 mVrms ± 10%
Intercom Tie Line type 1 input level	340 mVrms ± 10%
Intercom Tie Line type 2 input level	1.20 Vrms ± 10%

Rated Output Level

Phone rated output	12.3 Vrms ± 10% (250 mW into 600 Ω)
Left or Right User Phone rated output in emergency mode	2.10 Vrms ± 20%
Phone rated output level, with MUSIC input	6.14 Vrms ± 10%
COM MIC rated output	250 mVrms ± 10%
CVR rated output	500 mVrms ± 10%
CVR rated output with MUSIC INPUT	250 mVrms ± 10%
CVR rated output with MIC INPUT	1.00 Vrms ± 10%
CVR rated output, in emergency mode,	500 mVrms ± 10%
Receive Composite rated output	2.50 Vrms ± 10%
Intercom Tie Line type 1 rated output	340 mVrms ± 10%
Intercom Tie Line type 2 rated output	1.20 Vrms ± 10%

Audio Frequency Response

Audio output audio frequency response	≤ 3 dB from 300 to 6000 Hz

Distortion Characteristics

Audio output distortion at rated power	≤ 10%

Input Impedance

Microphone input Impedance	150 Ω ± 10%
Direct Audio input Impedance	1000 Ω ± 10%
Receive Audio input Impedance	1000 Ω ± 10%
Music Audio input Impedance	1000 Ω ± 10%
Intercom Tie Line Audio input Impedance	2000 Ω ± 10%

Output Load

Phone load	600 Ω ± 10%
Transceiver Microphone load	150 Ω ± 10%
CVR load	5000 Ω ± 10%

Receive Composite Audio load	600 Ω ± 10%
Intercom Tie Line type 1 rated load	2000 Ω ± 10%
Intercom Tie Line type 2 rated load	2000 Ω ± 10%
Intercom Tie Line type 1 maximum load	666 Ω max (3 loads)
Intercom Tie Line type 2 maximum load	285 Ω max (7 loads)

Volume Controls

Receive Audio control variation	32 ± 3 dB min
ICS Audio control variation	42 ± 3 dB min

Crosstalk Level

Input to Output crosstalk	≤ 55 dB
Input to Input crosstalk	≤ 60 dB
Station to Station crosstalk	≤ 65 dB

Audio Noise Level without Signal

Noise level below the rated output	≥60 dB

1.4.1.2 Audio Performance, Other

CVR HI / LO output circuitry type (Normal)	differential
CVR HI / LO output circuitry type (Emergency)	single ended
Microphone inputs designed for MIC type	amplified dynamic/electret
Microphone inputs bias voltage	12 Vdc ± 10%
Microphone inputs circuitry type	single ended
MUSIC LEFT / RIGHT HI / LO audio input circuitry type	differential
FRONT MUSIC LEFT / RIGHT audio input circuitry type:	single ended
MUSIC attenuation	38 dB max
RECEIVE AUDIO input circuitry type	differential
PHN HI / LO output circuitry type	single ended
MIC output circuitry type	differential
RX Composite Audio output circuitry type	differential
ICS TIE HI / LO Circuitry Type	differential
PHN HI / LO output music fade in duration	2.5 ± 1.0 seconds
VOX Threshold level range relative to rated MIC input	-28 to +6 dB
VOX off Delay Time range	0.5 to 2.0 seconds
Transmit Timeout Timer	90 ± 10 seconds

1.4.1.2 Lights Input

LIGHTS INPUT ranges	0 to 28, 0 to 14 and 0 to 5 Vdc
LIGHTS INPUT current	10 mA max.

1.4.2 Mechanical Specifications

Height		1.875 in [47.63 mm] max
Behind panel depth		5.48 in [139.2 mm] max
Faceplate width		5.75 in [146.1 mm] max
Behind panel width		5.00 in [127 mm] max
Weight		1.99 lbs. [0.91 kg] max
Material		brushed aluminum with conversion coating
Connectors:	J1	One 37-pin D-Sub male, V5 locking
	J2	One 50-pin D-Sub male, V5 locking
	J3	One 15-pin D-Sub male, V5 locking
	J4	One 4 pole 3.5mm stereo jack
	J5	One 4-40, 0.5 in. max
Mounting		4 Dzus fasteners
Bonding		≤ 2.5 mΩ
Installation kit part number		INST-JA94

1.4.3 Flammability of Materials

The JA94-001 complies with the requirements of RTCA/DO-160G Sec 26.3.3 "Flammability", through equivalent flammability testing of materials and the Small Parts Exemption.

SECTION 2 – INSTALLATION

2.1 Introduction

This section contains unpacking and inspection procedures, installation information, and post-installation checks.

2.2 Continued Airworthiness

Maintenance of the JA94-001 is on condition only. Scheduled inspection and/or periodic maintenance of this unit is not required.

2.3 Unpacking and Inspecting Equipment

Unpack the equipment carefully. Check for shipping damage and report any problems to the relevant carrier. Confirm that the Authorized Release Certificate or Certificate of Conformance is included. Complete the on-line warranty card from the Jupiter Avionics Corporation (JAC) website – www.jupiteravionics.com/warranty

2.3.1 Warranty

All products manufactured by JAC are warranted to be free of defects in workmanship or performance for 2 years from the date of installation by an approved JAC dealer or agency. This warranty covers the cost of all materials and labour to repair or replace the unit, but does not include the cost of transporting the defective unit to and from JAC or its designated warranty repair centre, or of removing and replacing the defective unit in the aircraft. This warranty does not cover failures due to abuse, misuse, accident, or unauthorized alteration or repairs.

THIS WARRANTY IS VOID IF THE PRODUCT IS NOT INSTALLED BY AN AUTHORIZED JAC DEALER. If the on-line warranty card is not completed, the product will be warranted from the date of manufacture.

Contact JAC for return authorization, and for any questions regarding this warranty and how it applies to your unit(s). JAC is the final arbiter concerning warranty issues.

2.4 Installation Procedures

WARNING: **Loud noise can cause hearing damage. Set the headset volume to minimum before conducting tests, and slowly increase the volume to a comfortable listening level.**

CAUTION: The power input circuitry of the unit may be damaged if the installation does not conform to the wiring instructions in this manual.

2.4.1 Installation Limitations

Those installing the JA94, on or in a specific type or class of aircraft, must determine that the aircraft installation conditions. The JA94-001 may be installed only by following the applicable airworthiness requirements.

2.4.2 Cabling and Wiring

All wire shall be selected in accordance with the original aircraft manufacturer's maintenance instructions, or AC43.13-1B Change 1, Paragraphs 11-76 through 11-78. Unshielded wire types shall qualify to MIL-W-22759 as specified in AC43.13-1B Change 1, Paragraphs 11-85, 11-86, and listed in Table 11-11. For shielded wire applications, use Tefzel MIL-C-27500 shielded wire with tag ring or equivalent (for shield terminations) to make the most compact and easily terminated interconnect. Follow the Connector Map in Appendix A of this manual.

Allow 3” from the end of the shielded wiring to the shield termination to allow the connector hood to be easily installed. Refer to the Interconnect drawing in Appendix A of this manual for shield termination details. Note that this unit has a ‘clamshell’ hood that is installed after the wiring is complete.

Maintain wire segregation and route wiring in accordance with the original aircraft manufacturer’s maintenance instructions.

Refer to the Interconnect drawing for additional specifications. Check that the ground connection is clean and well secured, and that it shares no path with any electrically noisy aircraft accessories such as blowers, turn-and-bank instruments, or similar loads.

2.4.3 Mechanical Installation

The JA94-001 can be mounted in any attitude and location with adequate space for the front panel and sufficient clearance for the connector and wiring harness. It requires no direct cooling.

Note: During bench test set up, it is normal for the JA94-001 chassis to become warm to the touch.

2.4.4 In-Line PTT Cordsets

If in-line PTT cordsets (drop cords) are used, be aware that incorrectly configured or improperly shielded in-line PTT cordsets can lead to significant audio problems.

2.4.5 Legend Replacement

The JA94-001 illuminated legends are field replaceable. For further information, refer to the ‘Legend Replacement’ document in Appendix A of this manual.

2.4.6 Post Installation Checks

2.4.6.1 Voltage/Resistance checks.

Do not attach this unit until the following conditions are met:

a) Check P1 pin **19** for lights buss voltage +28 Vdc +14 Vdc or +5 Vdc.

b) Check P2 pin **17** for +28 Vdc power relative to ground.

c) Check P2 pin **34** for continuity to ground (less than 0.5 Ω).

d) Check P2 pins **6 thru 10** for continuity to ground (less than 0.5 Ω) when the relevant switch is closed.

e) Check P3 all pins for continuity to ground (less than 0.5 Ω) when the relevant switch is closed or selection made.

f) Check all pins for shorts to ground or adjacent pins.

2.4.6.2 Configuration

Ensure that the JA94-001 contains the correct configuration settings. This may be done at the factory, on the maintenance bench or in the aircraft before or during the power on checks. Refer to section 2.5.1.

2.4.6.3 Power on Checks.

Power up the aircraft’s systems and confirm normal operation of all functions of the JA94. Refer to Section 3 (Operation) for specific operational details.

a) Begin with only the Right user headset attached. Confirm correct ICS and radio operation for both receive and transmit. Check yoke or cyclic switch action. Check the radio selection and inputs. Do not proceed until the radios are functioning correctly.

b) If there is a music source in the system, turn it on and check for proper mute operation.

c) Unusual buzzes, hums or other background audio are symptomatic of multiple grounds, or noisy external systems such as blowers or pumps sharing wiring with the audio system. If a transmitter fails to key or correctly modulate it is often the result of not connecting all required grounds to the radio or external audio system.

d) Check the ICS operation and Emergency operation.

e) Plug in the Left user headset. Check for correct ICS operation. Check yoke or cyclic switch functions.

f) Plug in any remaining headsets, and check for correct ICS operation. Note that an incorrect cordset (drop cord) or improper jack wiring may cause a wide range of problems, from loss of audio to a tone heard in the headset.

g) Check that all configurations settings are correct.

When all performance checks are satisfied, complete the necessary regulatory documentation before releasing the aircraft for service. Refer to Appendix B.

2.5 Adjustments and Configuration using ProCS™

All the JA94-001 internal adjustments are set from the Product Configuration Software ProCS™. Configuration data is sent to the JA94-001 via the front panel connector (♫/io), using the Configuration Cables and a computer running the ProCS™ software. For configuration requirements, see section 2.5.1.

For full information on the configuration process, and for installation of ProCS™ on your computer, refer to the ProCS™ manual on the Jupiter Avionics website - www.jupiteravionics.com/productsoftware.

2.5.1 Configuration Cabling Requirements

To configure the JA94-001, it is necessary to load the Product Configuration Software ProCS™ onto a Windows-based computer as described in the ProCS™ manual.

The cables required to configure the JA94-001 are not included with the unit.

Cabling option 1:

Quantity	Description	JAC Part #
1	USB A to RS232 9-Pin Cable	CAB-USB-0002
1	Configuration Cable	JA99-001

Cabling option 2:

Quantity	Description	JAC Part #
1	USB A Male to RS232 3.5mm Plug	CAB-USB-0006

2.5.2 ProCS™ Setup

The ProCS™ JA94-001 menu item 'ProCS Setup' provides Setup drawings showing the cabling arrangement for connecting the JA94-001 to a computer running the ProCS™.

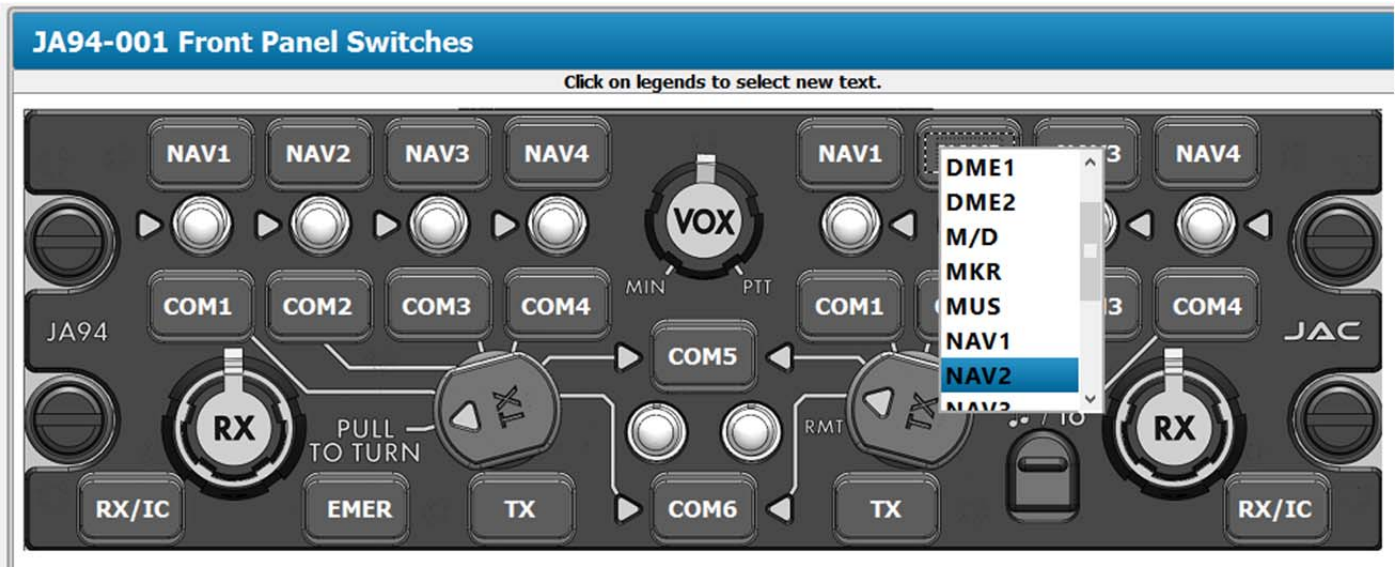
2.5.3 Configurable Settings

A standard unit is shipped from the factory with all internal adjustments configured to the default levels. At installation, it may be desirable to change some of these settings to suit the local operating environment.

Note: To properly configure the JA94-001, power must be applied, and the left TX Select switch must be in the COM1 to COM6 position.

Within ProCS™, the configurable settings are grouped together into the following sections:

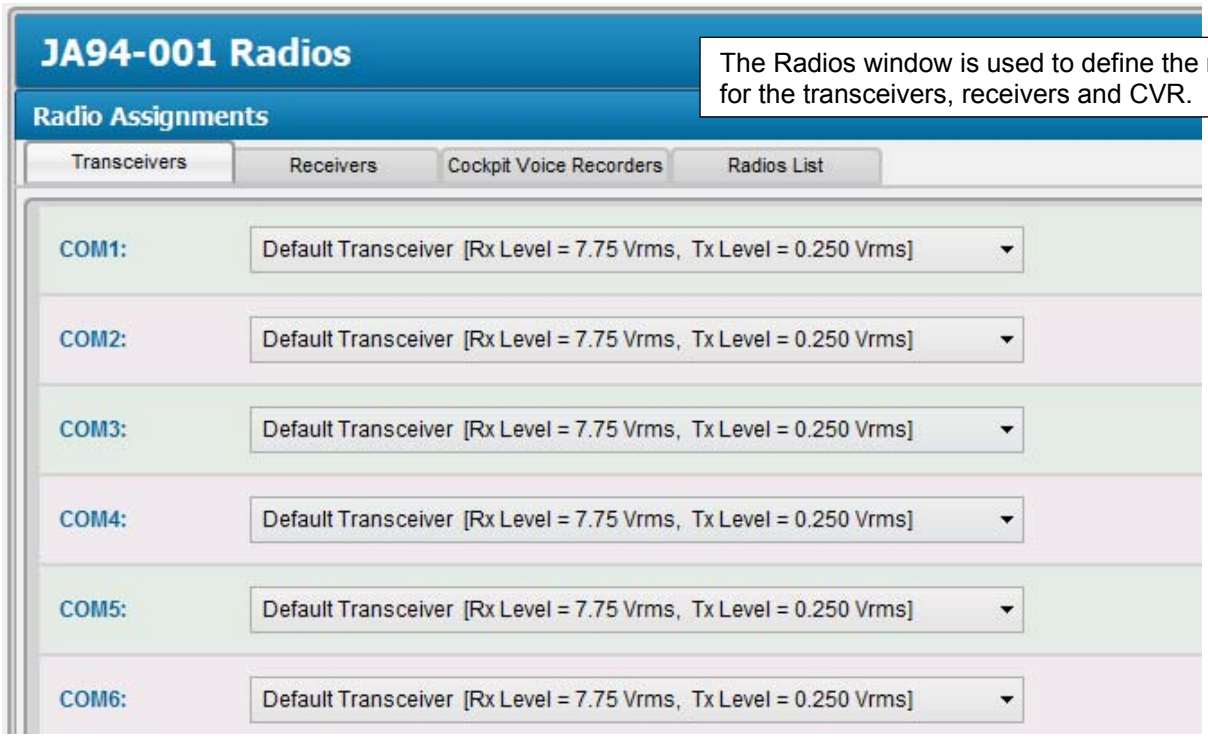
2.5.3.1 Front Panel Switches



The Front Panel Switches window is used to specify the text for each legend.

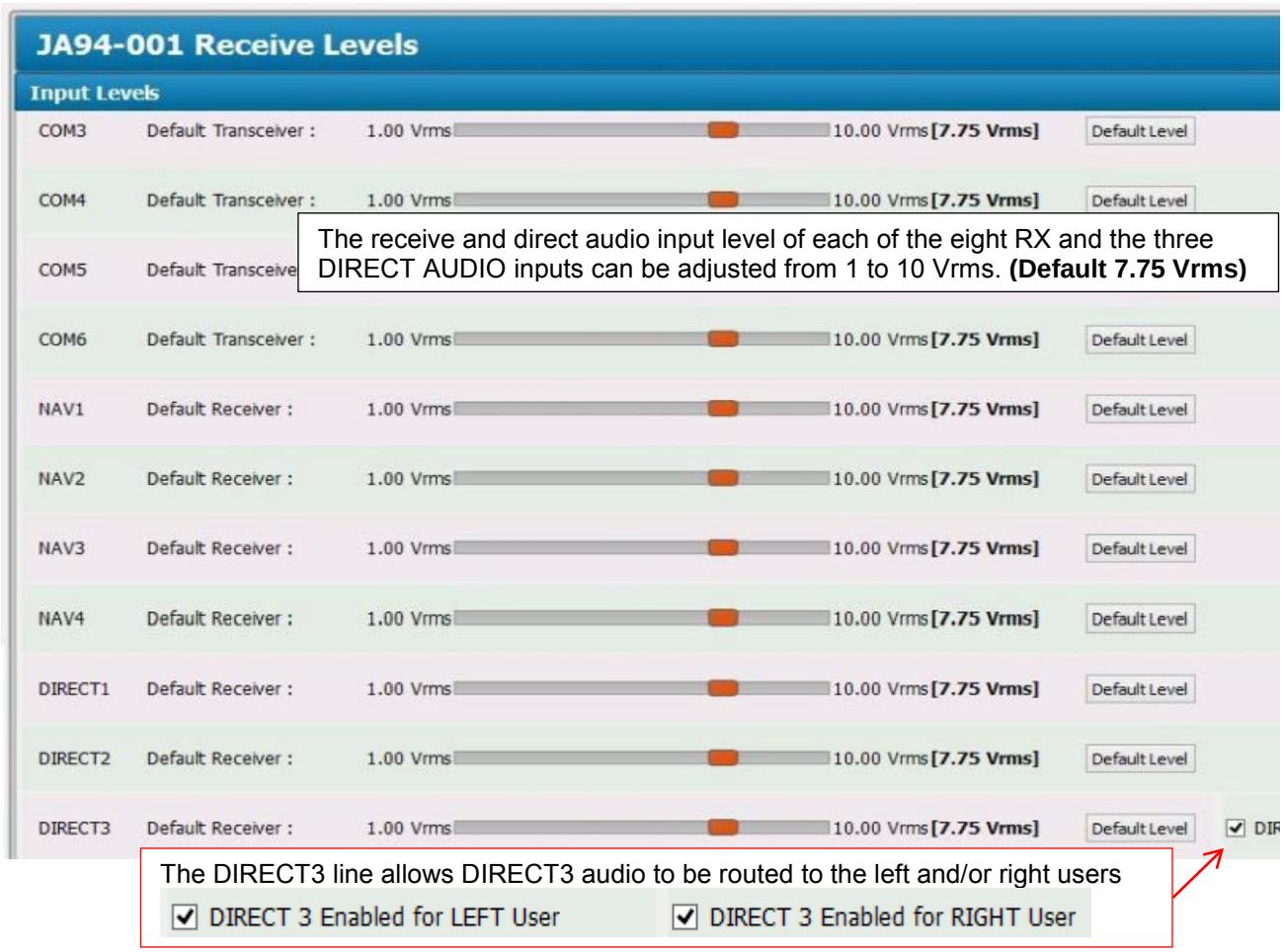
Note: If the name of a front panel switch is changed using this software, the change will be incorporated in every other section that refers to that switch name, including the connector maps, to give truly customized installation diagrams.

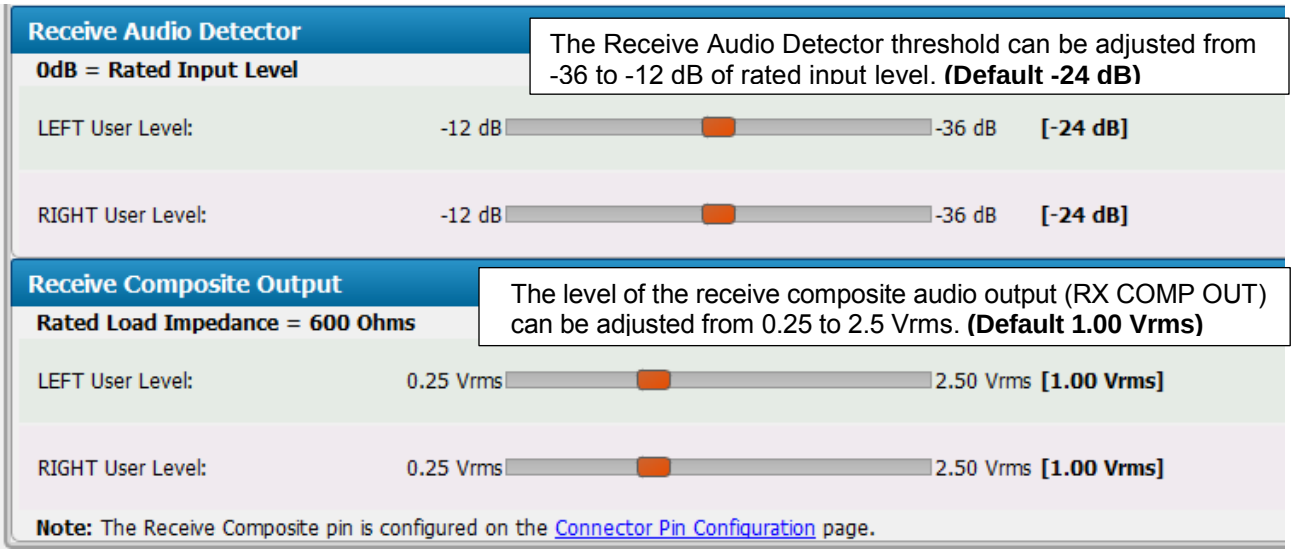
2.5.3.2 Radios



The Radios window is used to define the radios for the transceivers, receivers and CVR.

2.5.3.3 Receive Levels

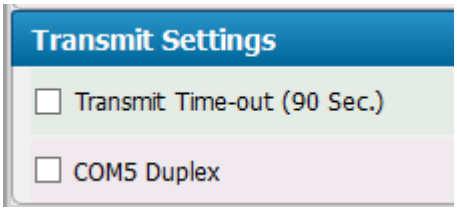




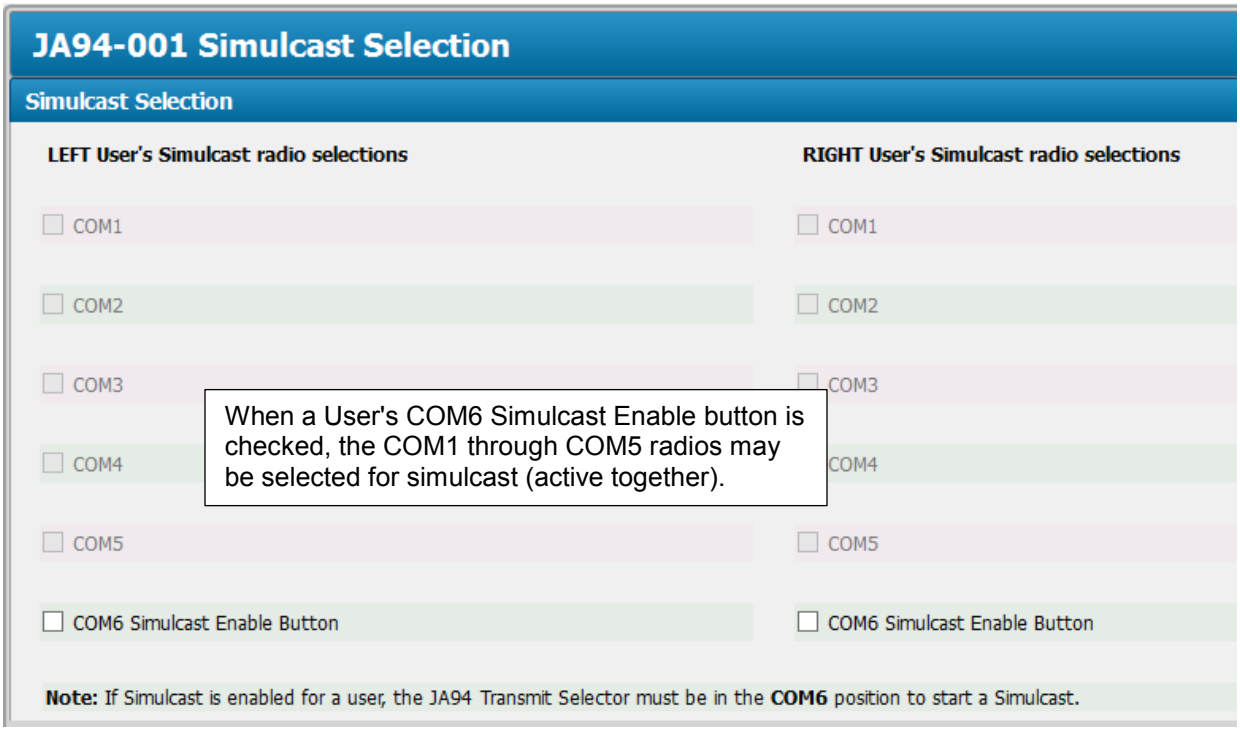
2.5.3.4 Transmit Levels

When the Transmit Timeout check box is checked the transmit time-out is enabled (**Default not checked)**

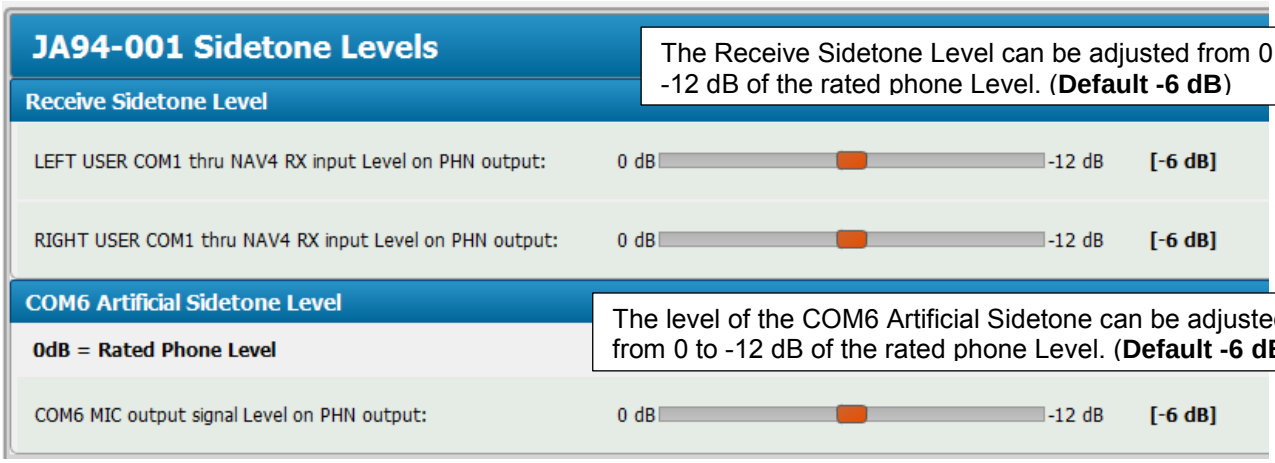
When the COM5 Duplex check box is checked the COM5 (FM2) radio is set to duplex operation (**Default not checked)** (see section 3.3.4)



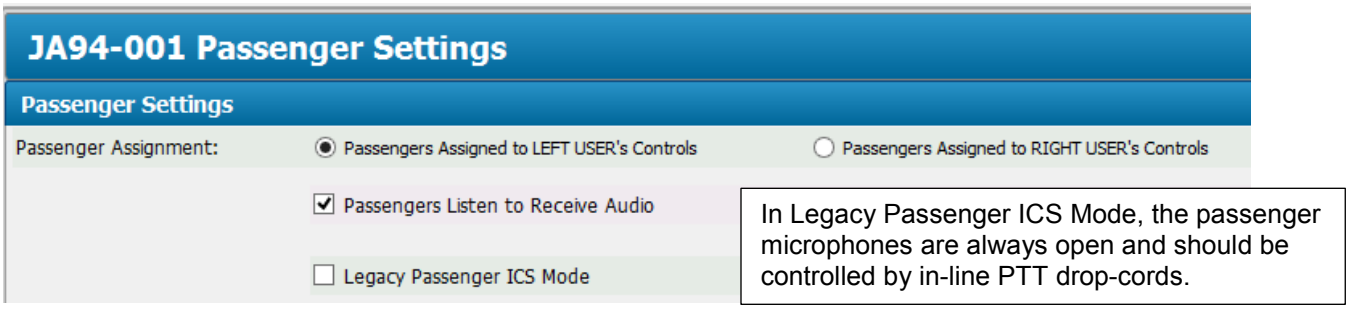
2.5.3.5 Simulcast Selection



2.5.3.6 Sidetone Levels



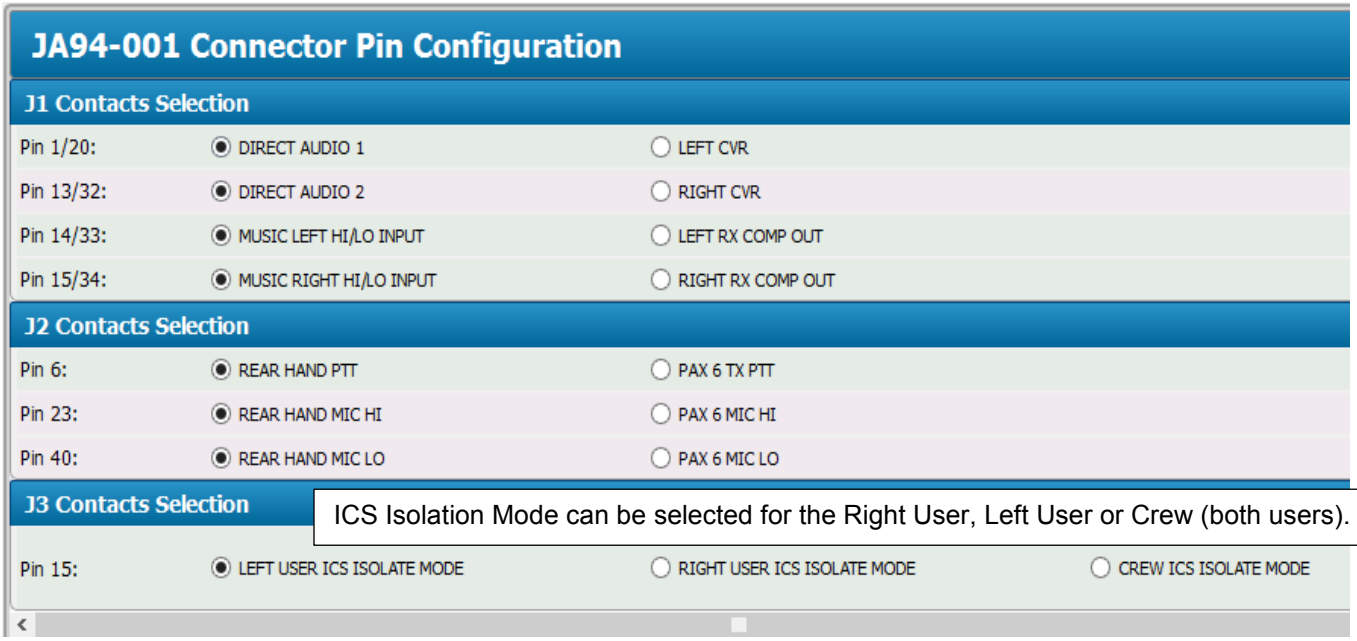
2.5.3.7 Passenger Settings

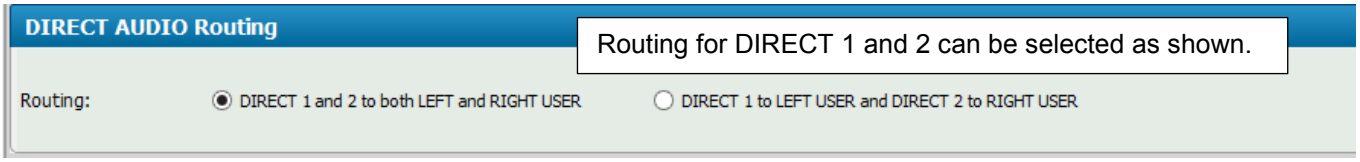


This window is used to assign the passengers to either the RIGHT USER or LEFT USER controls. By checking the box, passengers will hear the assigned user's Receive Audio.

2.5.3.8 Connector Pin Configuration

Several of the connector pins can be configured to meet the requirements of specific installations. Refer to JA94-001 Interconnect sheet 5 of 6. Direct Audio routing can also be selected in this section.



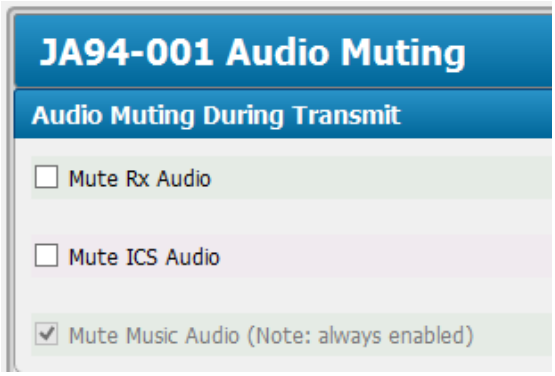


2.5.3.9 Audio Muting (During Transmit)

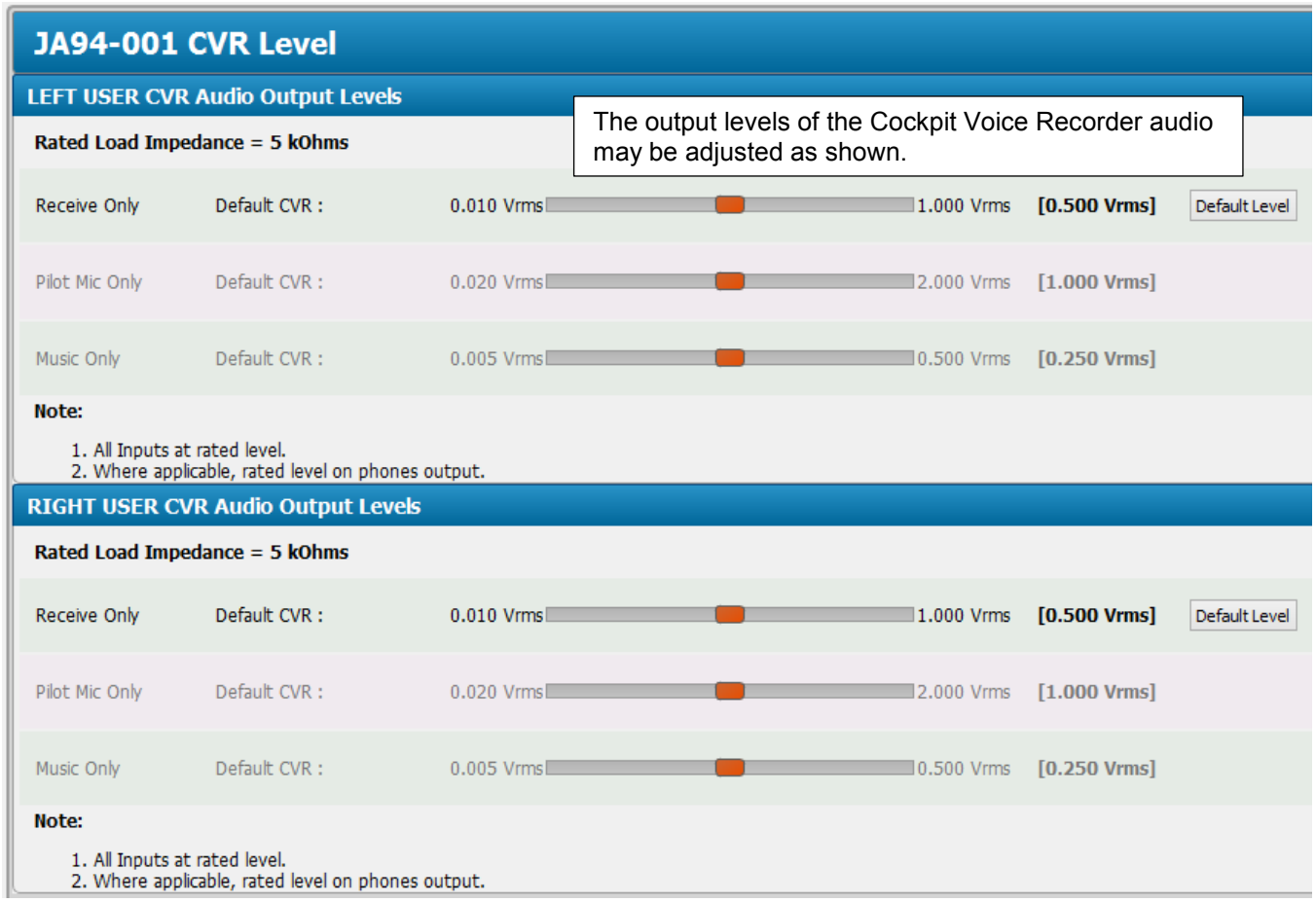
When the Mute RX Audio check box is checked the Receive Audio is muted during transmit (**Default checked**)

When the Mute ICS Audio check box is checked the ICS Audio is muted during transmit (**Default checked**)

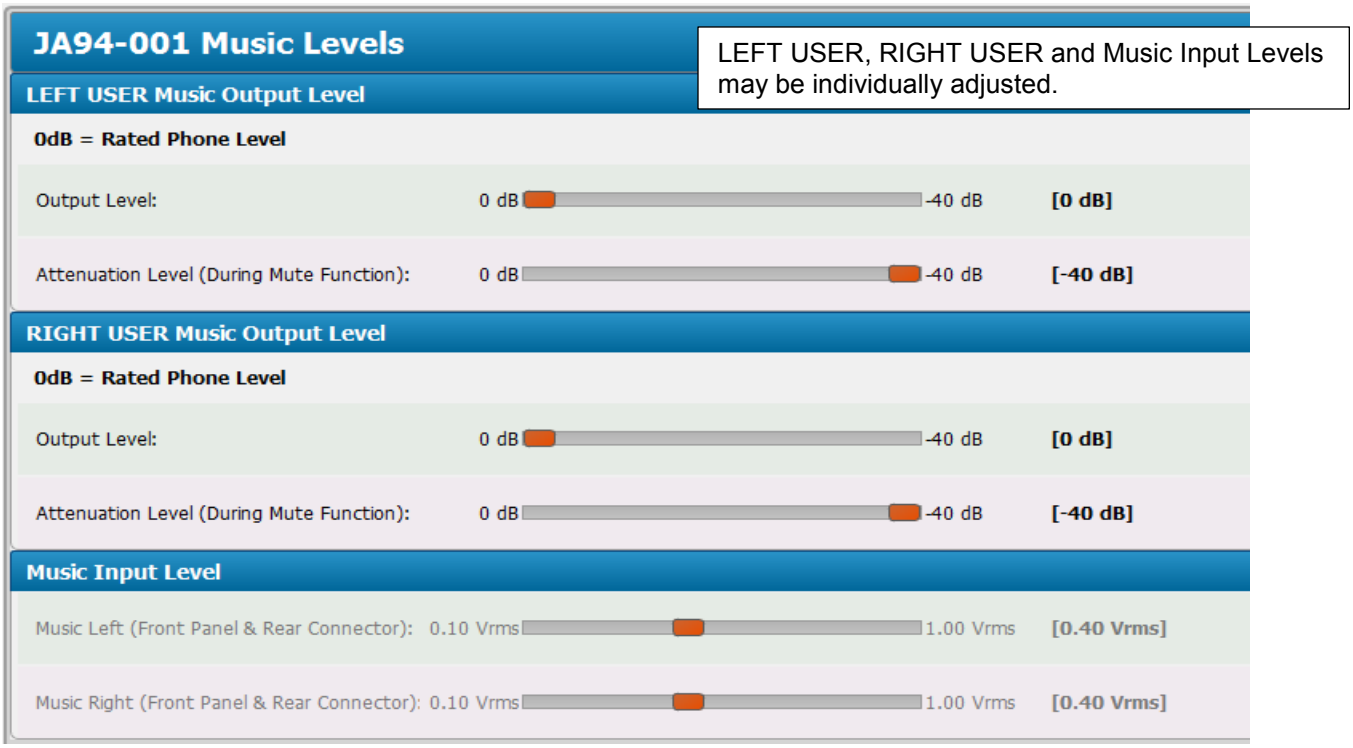
The Mute Music Audio check box is always checked (i.e. Mute Music Audio is always enabled.)



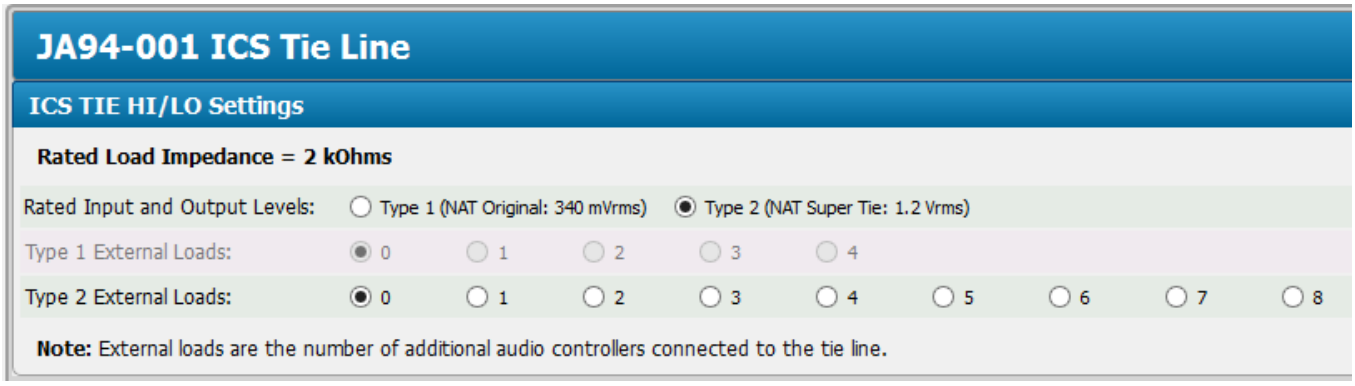
2.5.2.10 **CVR Level**



2.5.3.11 Music Levels



2.5.3.12 ICS Tie Line



The rated input and output levels of the intercom tie line can be selected as Type 1 or Type 2 (**Default Type 2**).

The quantity of external loads for a type1 intercom tie line can be selected from 0 to 3 (**Default 0**).

The quantity of external loads for a type 2 intercom tie line can be selected from 0 to 7 (**Default 0**).

2.5.3.13 Lighting Voltage Selection

The rated input level for the lighting voltage may be selected from

+5 Vdc, +14 Vdc or +28Vdc

(**Default +28 Vdc**).

2.5.3.14 VOX

The VOX OFF Delay Time can be adjusted from 0.50 to 2.00 sec (**Default 1 sec**).

2.5.3.15 Connector Maps

This section contains connector maps and interconnects that are automatically generated to show changes that affect the installation of the JA95-N32, such as switch labels and voltages. See section 2.7.1.

2.5.4 Other Configuration Features

In the JA94-001 Product Information Window, the model number, serial number and check sum of the JA94-001 audio panel can be viewed.

2.6 Installation Kit

The kit required to install this unit is not included with the unit.

The installation kit (Part # INST-JA94) consists of the following:

Quantity	Description	JAC Part #
1	15 Socket Positions, Zinc Plated, D-Subminiature - Crimp Socket Housing	CON-3460-0115
1	37 Socket Positions, Zinc Plated, D-Subminiature - Crimp Socket Housing	CON-3460-0137
1	50 Socket Positions, Zinc Plated, D-Subminiature - Crimp Socket Housing	CON-3460-0150
1	15 Pin Clamshell, Hardware - Plastic D-Sub Hoods	CON-5300-0115
1	37 Pin Clamshell, Hardware - Plastic D-Sub Hoods	CON-5300-0137
1	50 Pin Clamshell, Hardware - Plastic D-Sub Hoods	CON-5300-0150
102	Machined 20 to 24 AWG wire size range, MIL spec, D-Submin - Crimp Socket	CON-3320-2024
3	For Any D-sub Connector, Hardware - Slide Locks - Vertical	CON-5275-0050
2	0.625" Inside Diameter, Hardware - Tag Ring	CON-5500-0625
2	1" Inside Diameter, Heat Shrink Tube	WIR-HTSK-1000

2.6.1 Recommended Crimp tools

Tool Type	Hand crimp tool	Positioner	Insertion/extraction tool
Positronic	9507-0-0-0	9502-5-0-0	4711-2-0-0
Daniels	AFM8	K13-1	91067-2
MIL-SPEC	M22520/2-01	M22520/2-08	M81969/1-02

2.7 Installation Drawings

The drawings and documents required for Installation can be found in Appendix A of this manual.

2.7.1 Generation of Custom Drawings

The interconnects and connector maps in Appendix A of this manual are generic drawings based on the standard version of the JA94-001. However, if a unit has been configured using JAC's ProCS™ software to change switch legends or lighting voltages, the software can be used to generate fully customized interconnects and connector maps for use by the installer.

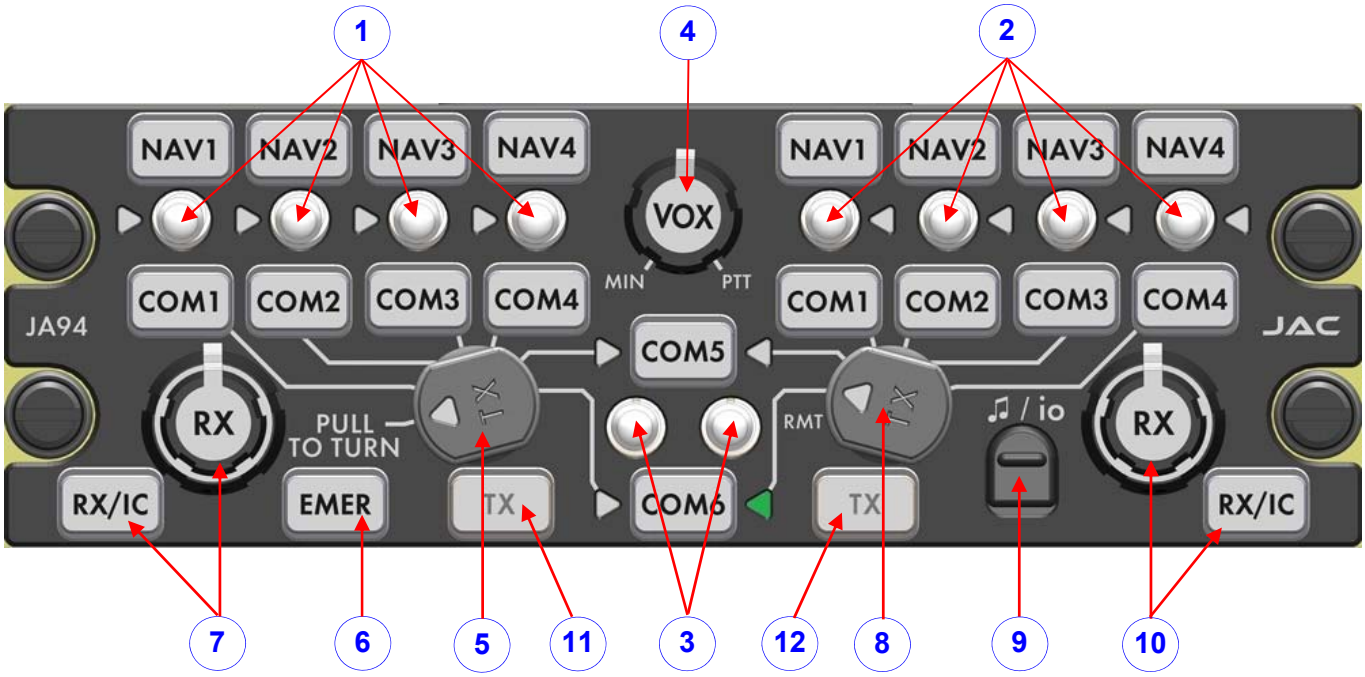
SECTION 3 – OPERATION

3.1 Introduction

This section contains the operating instructions for the JA94-001.

3.2 Front Panel Controls

Note: The 21 legends and 2 deadfront annunciators are removable and may be replaced with custom ordered parts. For the purpose of this manual the controls will be referred to by the default legend and annunciator names as shown below.



1. Left User Receive select switches, TX select annunciators and associated legends
2. Right User Receive select switches, TX select annunciators and associated legends
3. Left and Right User COM5/COM6 receive select switches, TX select annunciators and associated legends
4. VOX threshold control
5. Left User Transmit Selector Switch and Emergency Switch
6. EMER (Emergency) Legend
7. Left User ICS/RX Volume control and legend
8. Right User Transmit Selector Switch
9. Music/configuration input connector cover (♫ /io)
10. Left User ICS/RX Volume control and legend
11. Left User Transmit Deadfront Annunciator
12. Right User Transmit Deadfront Annunciator

(1) (2) NAV1- COM4 Receive Select Switches and Legends

Each User has four white two-position centre-off toggle switches for the NAV1/COM1 to NAV4/COM4 receivers/transceivers. When a left or right switch is set to the 'up' position, audio from the receiver associated with the legend above the switch is routed to the phones of that side's user (and passengers if configured.) In the 'down' position, audio from the transceiver associated with the legend below the switch is routed to the phones of that side's user (and passengers if configured.)

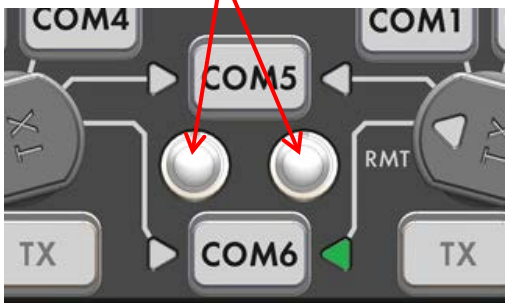
The backlit legends are interchangeable to allow customization. The default legends are NAV1, NAV2, NAV3 and NAV4 above the switches, and COM1, COM2, COM3 and COM4 below the switches.

(3) COM5/COM6 Receive Select Switches and Legends

The COM5/COM6 switches are two white two-position centre-off toggle switches. The left-hand switch is associated with the Left User, and the right-hand switch is for the Right User.

To select COM5, the appropriate switch is set to the 'up' position, and for COM6 it is in the 'down' position. Audio from the associated receiver is routed to the phones of that side's user (and passengers if configured).

The backlit legends are interchangeable to allow customization. The default legends are COM5 above the switches and COM6 below the switches.



(4) VOX Threshold Control

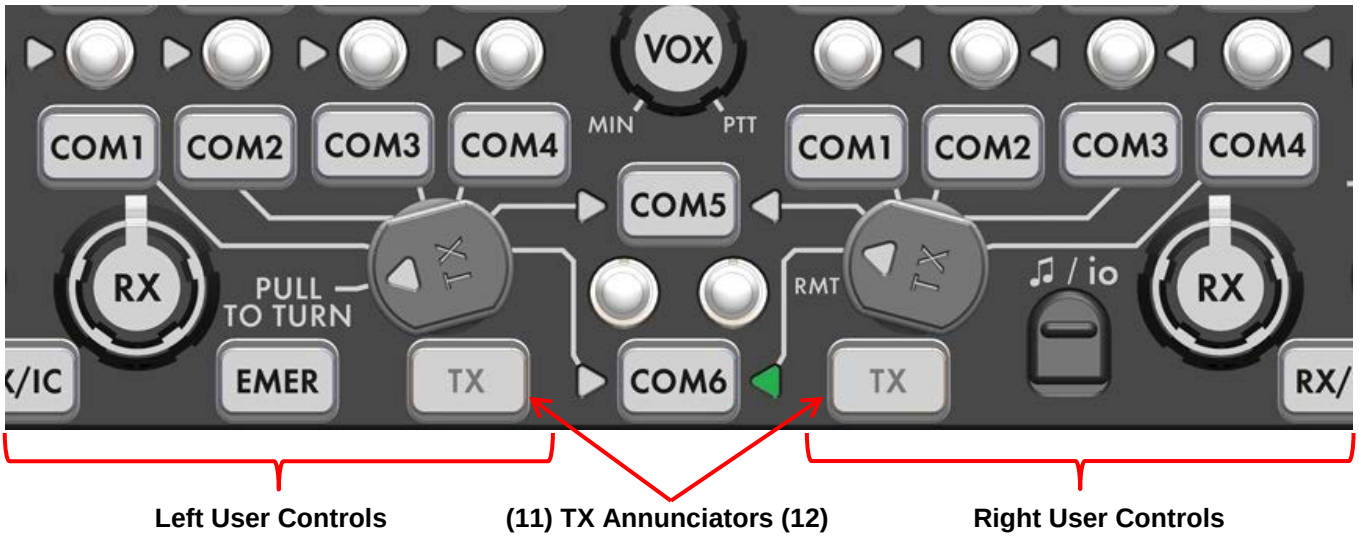
The VOX Threshold Control is an unlit rotary knob in the centre top of the panel that is used to set the VOX threshold level of the unit for all users and passengers.

When rotated fully clockwise (cw), the threshold will be at maximum, VOX ICS operation is disabled and ICS PTT input is required for ICS operation.

When rotated fully counterclockwise (ccw), the threshold will be at minimum (almost live).

To adjust the unit for **VOX** (Voice activated) use, the VOX control should be set fully ccw and then slowly rotated cw to the point where no intercom audio can be heard. The VOX control may require adjustment for proper operation as ambient noise changes.

(5) (8) Transmit Selector



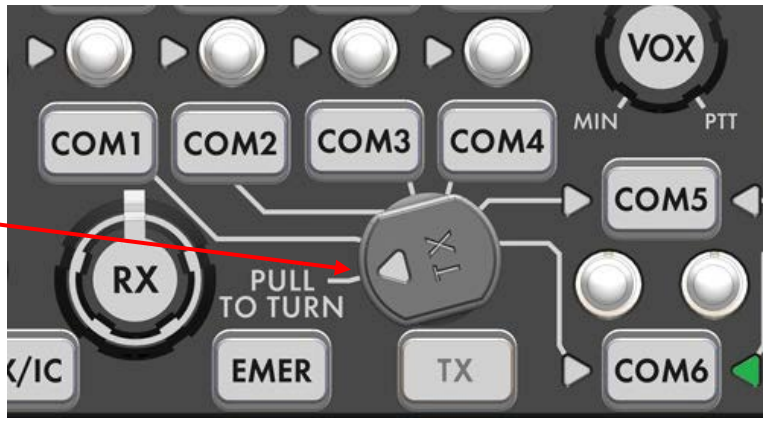
The **Right User** TX selector is an unlit rotary seven-position knob that is used to select transmission for one of the six transceivers, or the RMT (remote) position. Below the knob is a 'TX' deadfront annunciator (**12**) which will illuminate during transmission. For Remote operation, refer to section 3.3.11.

Each of the transmit selector positions is linked by a white line to the corresponding transceiver switch and legend, and each transceiver has a transmit select annunciator pointing to the associated switch or legend. The appropriate annunciator will light green to show which transceiver is selected for transmit (right user COM6 in the example above).

The **Left User** TX selector is an unlit rotary seven-position knob that operates in the same manner as the Right User selector, except that position 7, marked PULL TO TURN (extreme ccw) is used to select Emergency (EMER) mode.

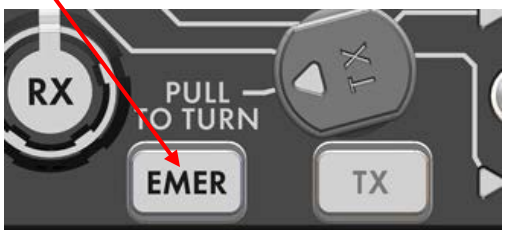
Below the knob is a 'TX' deadfront annunciator (**11**) which will illuminate during transmission.

For full information on Emergency mode see section 3.4.



Note: To prevent accidental selection of Emergency mode, the knob must be pulled towards the user before it can be rotated to the EMER position.

(6) EMER legend



The backlit EMER (Emergency) legend is associated with the Left User TX control only. For full information on Emergency mode see section 3.4.

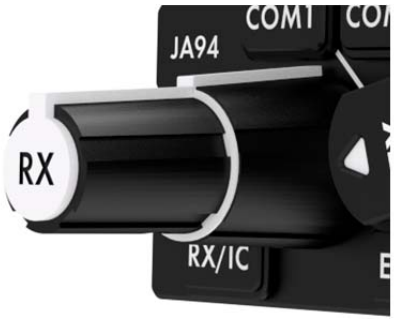
(7) (10) RX/ICS Volume control and legend

These are two unlit dual rotary knobs that adjust the receive (RX) volume ((the smaller, top knob marked RX) and the ICS volume (the larger, bottom knob).

Each user can adjust the volumes individually. Rotating the knobs clockwise (cw) will increase the volume, and counterclockwise (ccw) will reduce it

Individual radio volume controls should be set to a nominal level, and then adjusted for changing flight conditions using this control.

Legend



Side View

(9) Music/Configuration Connector cover (♫/io)

This cover is located between the Right User RX/ICS and TX controls. It protects a music input port compatible with most music players, and accepts a 3 pole 3.5mm stereo plug with a slim diameter connector housing.

(This connector is also used during installation to change configuration settings.)

CAUTION: If an unapproved connector or cable is used, damage to the unit or to any attached device may occur. If in doubt, contact JAC for a list of approved cables, music sources and devices.

3.3 Normal Operation Mode

The JA94-001 is in Normal mode unless EMER mode has been selected via the Left User TX control, or if the power input is off.

Note: Numbers in parentheses refer to the front panel controls shown in section 3.2.

3.3.1 Panel Lighting

The legends and annunciators will be illuminated (when appropriate) and dim through the aircraft lighting buss.

3.3.2 Receiving

When the JA94-001 receives an incoming transmission on a transceiver or receiver that has been selected, either by the white transceiver receive switches (**1**) (**2**) or (**3**) or a transmit selector (**5**) or (**8**), the incoming audio will be directed to the user's phones.

The audio level of any incoming transmission will depend upon the level selected by the user's front panel RX volume control – (**7**) or (**10**). It will be muted if the unit is transmitting and muting of receive audio during transmit is enabled.

ProCS™ can be configured to route no receive audio, Right User receive audio, or Left User receive audio to passengers.

3.3.3 Transmitting (Transmit Operation)

To select a transceiver, rotate the Transmit Select Switch (**5**) or (**8**) until it aligns with the line leading to the Transceiver Select switch legend (**1**) (**2**) or (**3**) - default legends COM1, COM2, COM3, COM4, COM5 or COM6. The corresponding Transmit Select annunciator will illuminate green.

When the user's TX PTT is activated, the unit will transmit on the selected transceiver, and the deadfront Transmit Annunciator will illuminate 'TX'. All MIC and sidetone audio will be routed to the user's phones, and any music (and RX and/or ICS audio if selected by ProCS™) will be muted for the duration of the transmission.

Passengers 1, 2 and 6 (designated at installation) will transmit on the radio selected by either the Right User or Left User, as configured by ProCS™.

3.3.3.1 Simulcast Operation

Note: It is important to be aware of the Simulcast configuration of the aircraft.

The ProCS™ configuration program allows the selection of Simulcast Mode. This can be for the left user or the right user or both, and for each user the simulcast radio selections can be selected separately.

If simulcast has been enabled via ProCS™ and the user's Transmit Selector Switch is set to COM 6 (simulcast position), the user will transmit on multiple radios as configured by ProCS™.

3.3.3.2 Transmit Timeout Operation

Note: It is important to be aware of the Transmit Timeout configuration of the aircraft.

The ProCS™ configuration program allows the selection of Transmit Timeout. If selected, transmissions will timeout after 90 seconds.

3.3.3.3 COM5 PTT Operation

Note: If the COM5 transceiver has been configured as duplex, it can be used with a cellphone or sat-phone. Check your configuration with the installing agency.

If the unit has been configured for cellphone or sat-phone use and COM5 has been selected for transmit, momentarily activating the TX PTT (either from the faceplate or by some other method) will keep COM5 transmitting. A second momentary activation of the TX PTT, or moving the Transmit Selector away from COM5, will stop COM5 from transmitting.

3.3.4 VOX Operation

A user's MIC audio is routed to the ICS when the MIC audio level exceeds the VOX threshold (**3**).

A user's MIC audio is disconnected from the ICS when the MIC audio level falls below the VOX threshold for 0.5 to 2 seconds.

3.3.5 ICS Operation

ICS audio is the sum of all the MIC audio from users with ICS KEY active or with MIC audio level exceeding the VOX Threshold level.

The ICS audio also includes the audio input on the ICS TIE from other audio controllers.

The ICS audio is output on the phones of each user.

The ICS audio is muted during transmit as configured by ProCS™.

The ICS audio level at the phones is controlled by the ICS volume control (**7**) or (**10**).

Note: If **Legacy Passenger ICS Mode** has been selected via ProCS™ for compatibility with a previously installed unit, the passenger microphones are always open when the VOX control is set to PTT and should be controlled by in-line PTT drop-cords.

3.3.6 ICS Isolation Operation

Note: It is important to be aware of the ICS Isolation configuration of the aircraft.

When the external control signal ICS ISOLATE is active: the LEFT or RIGHT User, as configured by ProCS™, are isolated from the ICS signal of the passengers and the other User; when configured as both the LEFT and RIGHT user, the LEFT and RIGHT Users will be connected to each other via an ICS but are isolated from the Passengers ICS.

In Isolate Mode, the selected user's MIC audio input is disconnected from the ICS TIE output, the user's phones are disconnected from the ICS TIE input circuit, and the music to the user's PHN output will be muted.

3.3.7 Direct Audio Operation

DIRECT AUDIO 1 and, when configured by ProCS™, the DIRECT AUDIO 2 & 3, are routed to the LEFT USER Phones.

DIRECT AUDIO 2 and, when configured by ProCS™, the DIRECT AUDIO 1 & 3 are routed to the RIGHT USER Phones.

3.3.8 Music Operation

Music to the phones will be muted by incoming audio (ICS, Receive, or Direct Audio) or if the unit is transmitting. When the incoming audio has ended, the music will gradually return to the previous level.

3.3.9 Rear Hand Mic Operation

When configured by ProCS™, the Rear Hand MIC audio and PTT signal are connected to the Transceiver as selected by the left or right TX Select switch. The Rear Hand MIC is assigned to left or right user's controls by ProCS™ in the Passenger and Rear Hand MIC settings.

3.3.10 Cockpit Voice Recorder (CVR) Operation

The RIGHT CVR output consists of the sum of the RIGHT USER MIC input (independent from VOX control setting) and the RIGHT USER PHONE output, and the LEFT CVR output is the sum of the LEFT USER MIC input (independent from VOX control setting) and the LEFT USER PHONE output.

3.3.11 Remote RMT Operation

A remote transmit selector may be linked to the JA94-001 to allow remote selection for transmission via the right user controls. (This remote selector could be on the right user's cyclic control.) When a remote transmit selector is installed and the RIGHT USER TX SELECT switch is in the RMT position, then the RIGHT USER will transmit on the radio or radios as selected by the remote transmit selector.

Note: It is important to be aware of the Remote Operation configuration of the aircraft.

3.4 Emergency Operation Mode

The JA94-001 operates in Emergency Mode automatically (**Auto Emergency Mode**) when the power to the unit is off, or when the left Transmit Selector Switch is in the EMER position (**Selected Emergency Mode**).

3.4.1 Left User Emergency Mode

In emergency mode, the Left User phone and MIC signals are connected by mechanical relay contacts to the COM2 transceiver and the NAV2 receiver. Left User PTT is routed directly to COM2 PTT and the LEFT USER MIC is routed to the COM 2 MIC.

The sum of COM 2 RX, NAV 2 RX and Direct Audio 1 (and Direct Audio 2 if configured by ProCS™) is routed to the LEFT USER PHN output. The LEFT USERPHN is routed to the LEFT CVR output.

3.4.2 Right User Emergency Mode

In emergency mode, the Right User phone and MIC signals are connected by mechanical relay contacts to the COM1 transceiver and the NAV1 receiver. Right User TX PTT is routed directly to COM1 PTT, and the RIGHT USER MIC is routed to the COM 1 MIC. The Right User is disconnected from the ICS.

The sum of COM 1 RX, NAV 1 RX and Direct Audio 2 (and Direct Audio 1 if configured by ProCS™) is routed to the RIGHT USER PHN output. The RIGHT USERPHN is routed to the RIGHT CVR output.

3.4.3 Auto Emergency Mode

The unit will enter emergency mode automatically if power to the unit is off.

Other than Emergency operation described above, no functions of the JA94-001 will operate when power is lost. Legends and annunciators will not be illuminated.

3.4.4 Selected Emergency Mode

If the JA94-001 retains power, the unit can be placed into emergency mode by rotating the Left User TX control to the EMER position (pull to turn).

Emergency mode conditions will apply (see above) but all other functions of the JA94-001 will operate. The LEDs, legends and annunciators will retain normal functionality

.

Installation and Operating Manual

Appendix A - Installation Drawings

A1 Introduction

The drawings necessary for installation and troubleshooting of the JA94-001 Audio Controller are in this Appendix, as listed below.

Note: A fully customized set of Connector Maps and Interconnects can be created using the ProCS™ software. Refer to the ProCS™ manual for further information.

A2 Installation Drawings

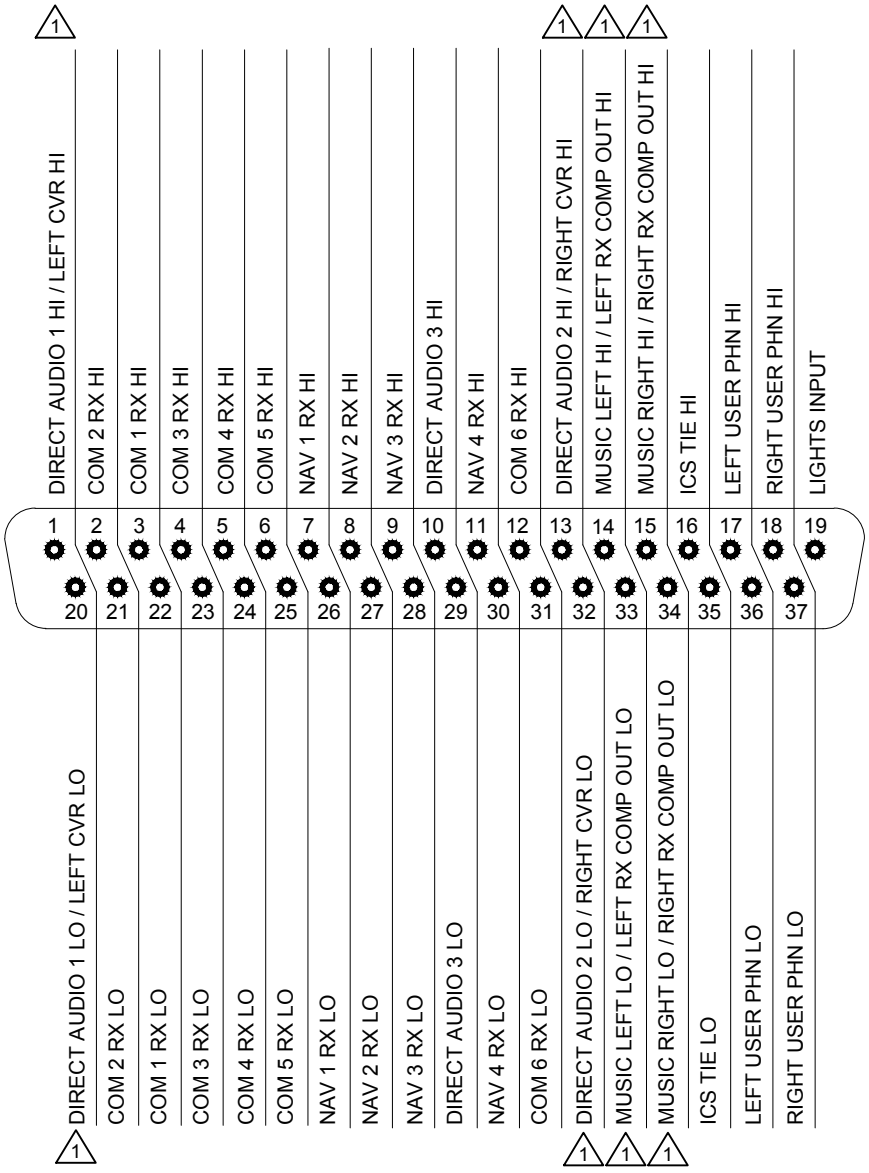
DOCUMENT	Rev
JA94-001 Connector Map	A
JA94-001 Interconnect	B
JA94-001 Mechanical Installation	C

Reference Documents	
TOL-CUST-EXTR Legend Replacement	A

RECEIVE CONNECTOR

P1

37 PIN FEMALE DMIN
MATING CONNECTOR



VIEW IS FROM REAR OF MATING CONNECTOR

NOTE:

1 CONFIGURABLE CONTACT

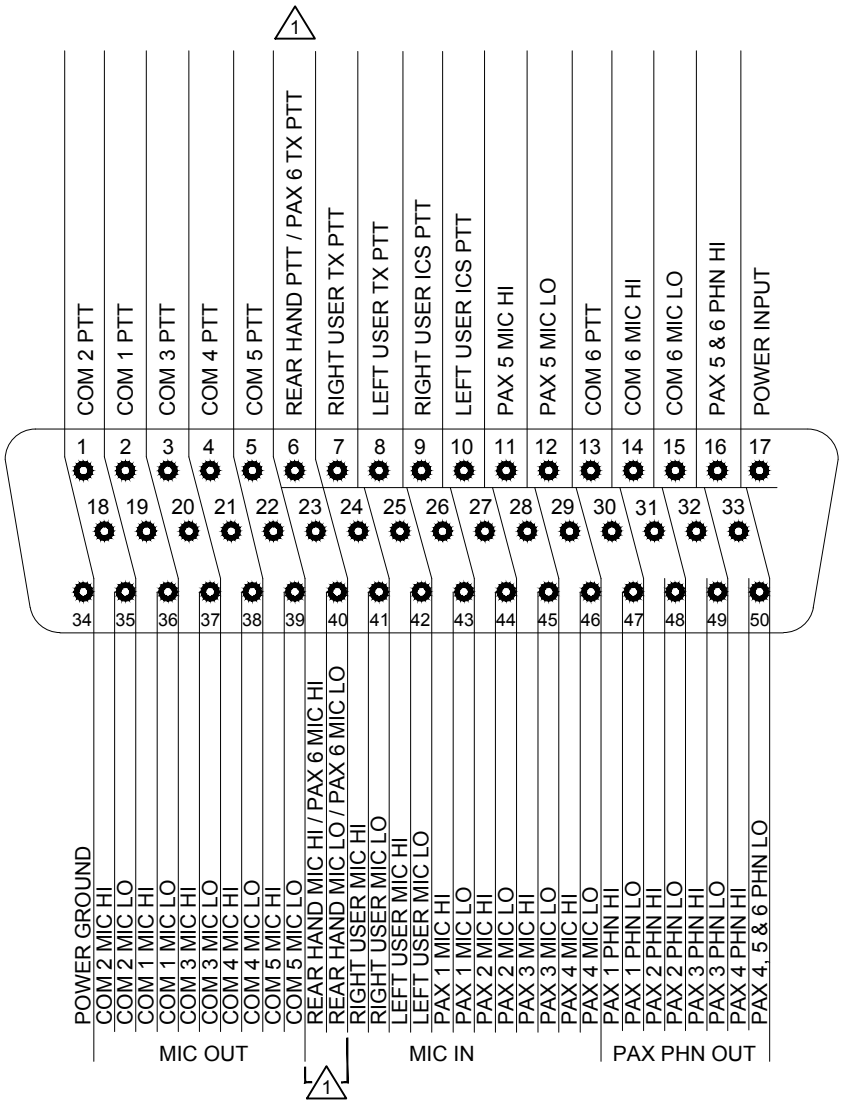
PREPARED	TAT	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 07-28-15 SRM	TITLE: Dual Audio Controller P1 Connector Map		
APPROVED	JAC 07-28-15 KDV	NCAGE CODE: L00N3	PART NO.: JA94-001	SHEET: 1/3
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA94-001 Connector Map Rev A.DWG		

JUPITER AVIONICS TEMPLATE AUTOCAD PORTRAIT SIZEA REV B.DWT

TRANSMIT CONNECTOR

P2

50 PIN FEMALE DMIN
MATING CONNECTOR



VIEW IS FROM REAR OF MATING CONNECTOR

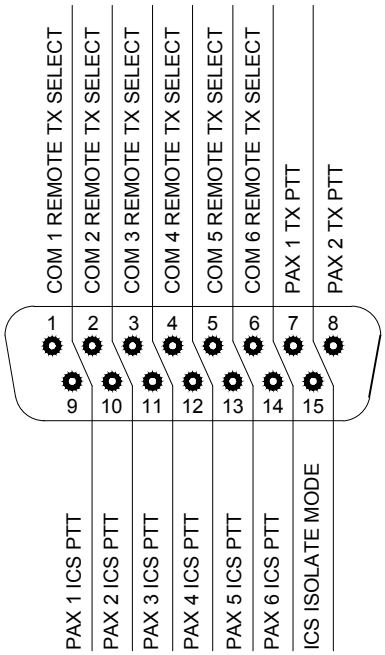
PREPARED	TAT	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 07-28-15 SRM	TITLE: Dual Audio Controller P2 Connector Map		
APPROVED	JAC 07-28-15 KDV	NCAGE CODE: L00N3	PART NO.: JA94-001	SHEET: 2/3
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA94-001 Connector Map Rev A.DWG		

JUPITER AVIONICS TEMPLATE AUTOCAD PORTRAIT SIZEA REV B.DWT

REMOTE TX SELECTOR CONNECTOR

P3

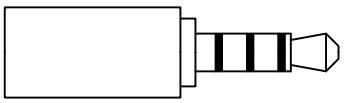
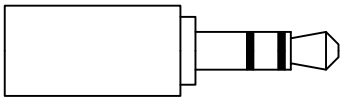
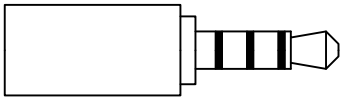
15 PIN FEMALE DMIN
MATING CONNECTOR



VIEW IS FROM REAR OF MATING CONNECTOR

FRONT PANEL MUSIC/CONFIGURATION CONNECTOR

P4 ACCEPTS THE FOLLOWING PLUG FORMATS

		MATING PLUG NAMES	JA94-001 SIGNAL NAMES
JA99 CONFIGURATION CABLE 4 POLE MALE 3.5MM STEREO		TIP: TX DATA 1ST RING: RX DATA 2ND RING: GROUND 3RD RING: CONFIG AUDIO	CONFIG DATA TO JA94-001 CONFIG DATA FROM JA94-001 GROUND MODE SELECT
MP3 STEREO PLAYER 3 POLE MALE 3.5MM STEREO		TIP: LEFT MUSIC 1ST RING: RIGHT MUSIC 2ND RING: GROUND	FRONT PANEL MUSIC LEFT FRONT PANEL MUSIC RIGHT GROUND
IPHONE 4 POLE MALE 3.5MM STEREO		TIP: LEFT MUSIC 1ST RING: RIGHT MUSIC 2ND RING: GROUND 3RD RING: MICROPHONE	FRONT PANEL MUSIC LEFT FRONT PANEL MUSIC RIGHT GROUND MODE SELECT

PREPARED	TAT	JUPITER AVIONICS CORPORATION	
CHECKED	JAC 07-28-15 SRM	TITLE: Dual Audio Controller P3, P4 Connector Map	
APPROVED	JAC 07-28-15 KDV	NCAGE CODE: L00N3	PART NO.: JA94-001 / SHEET: 3/3
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA94-001 Connector Map Rev A.DWG	

JUPITER AVIONICS TEMPLATE AUTOCAD PORTRAIT SIZEA REV B.DWT

JA94-001 INTERCONNECT WIRING NOTES

NOTES

1. ALL WIRE SIZE SHOULD BE 24 AWG MIN UNLESS OTHERWISE SPECIFIED. UNSHIELDED WIRE SHOULD BE SELECTED PER FAA AC43.13-1B CHANGE 1 PARA 11-76 TO 11-78. WIRE TYPES SHOULD BE IN ACCORDANCE WITH MIL-W-22759 AS DESCRIBED IN FAA AC43.13-1B CHANGE 1 PARA 11-85 AND 11-86 AND LISTED IN TABLE 11-11 OR 11-12. ALL SHIELDED CABLE SHOULD BE IN ACCORDANCE WITH MIL-DTL-27500 (REVISION H OR LATER).

△2 CONNECTION TO AIRFRAME GROUND SHOULD BE MADE WITH 20 AWG WIRE. LENGTH NOT TO EXCEED 3 FT (0.91 M).

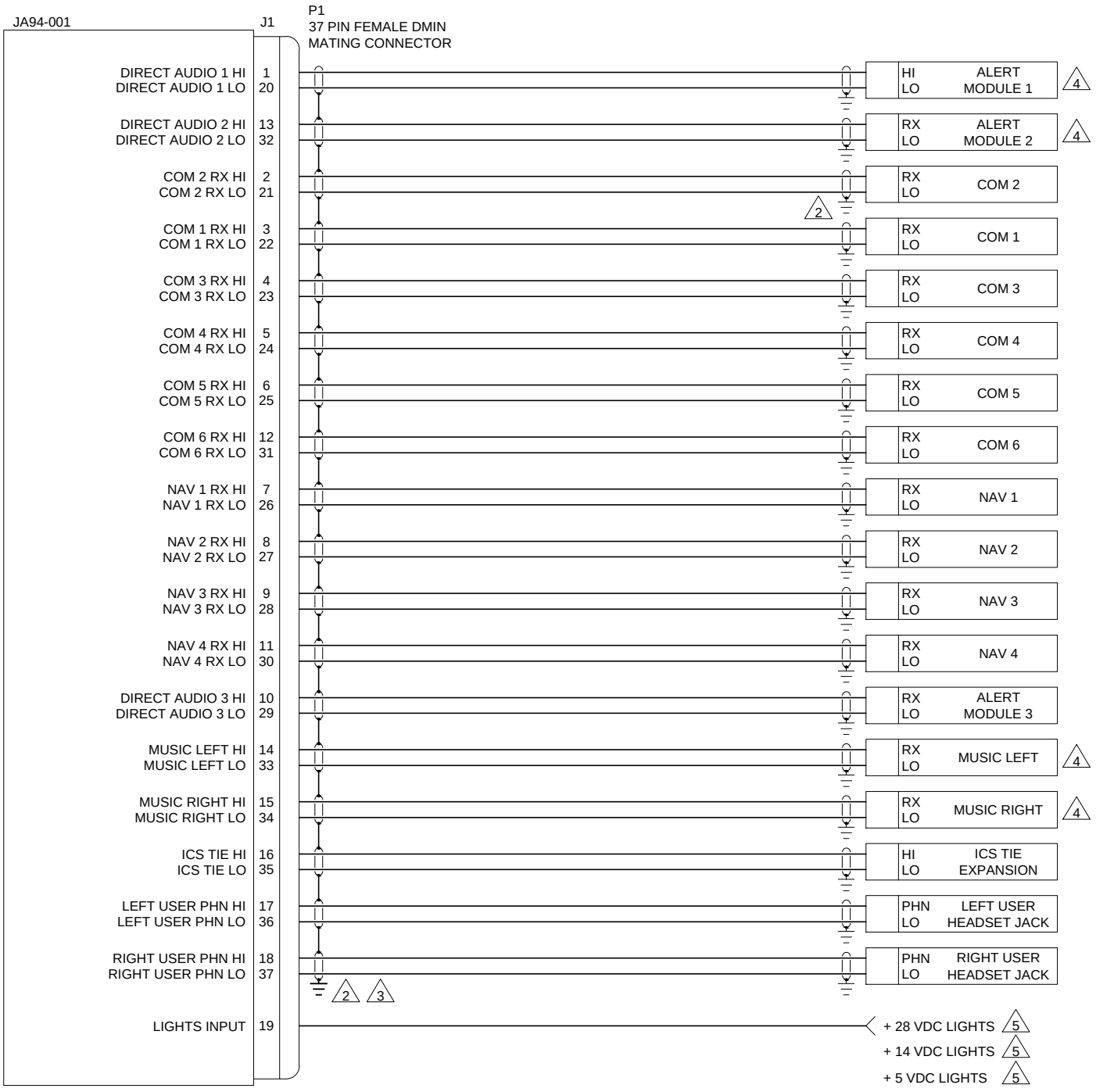
△3 CABLE SHIELDS AT THE JA94-001 CONNECTOR PINS SHOULD BE TERMINATED TO AIRFRAME GROUND USING A TAG RING P/N: MS27741-5 OR EQUIVALENT.

△4 CONNECTOR PIN HAS MORE THAN ONE FUNCTION. SEE THE OPTIONS SECTION OF THIS DRAWING FOR ALTERNATE INTERCONNECT WIRING.

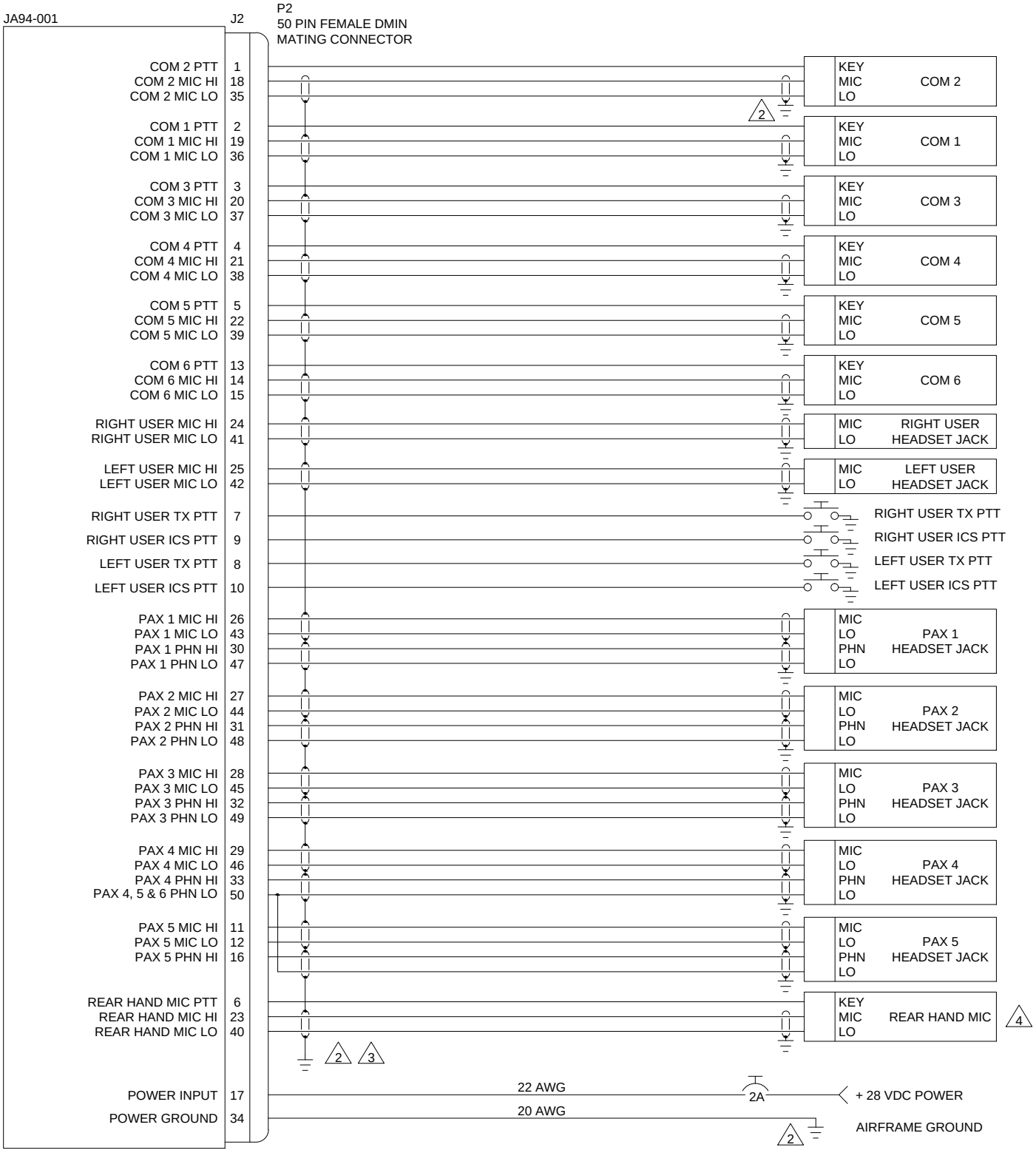
△5 ONLY +28 VDC OR +14 VDC OR +5 VDC LIGHTS INPUT VOLTAGE MAY BE APPLIED AT ONE TIME.

△6 THE FRONT PANEL MUSIC INPUT SHALL NOT BE CONNECTED TO ANY OTHER AUDIO INPUT.

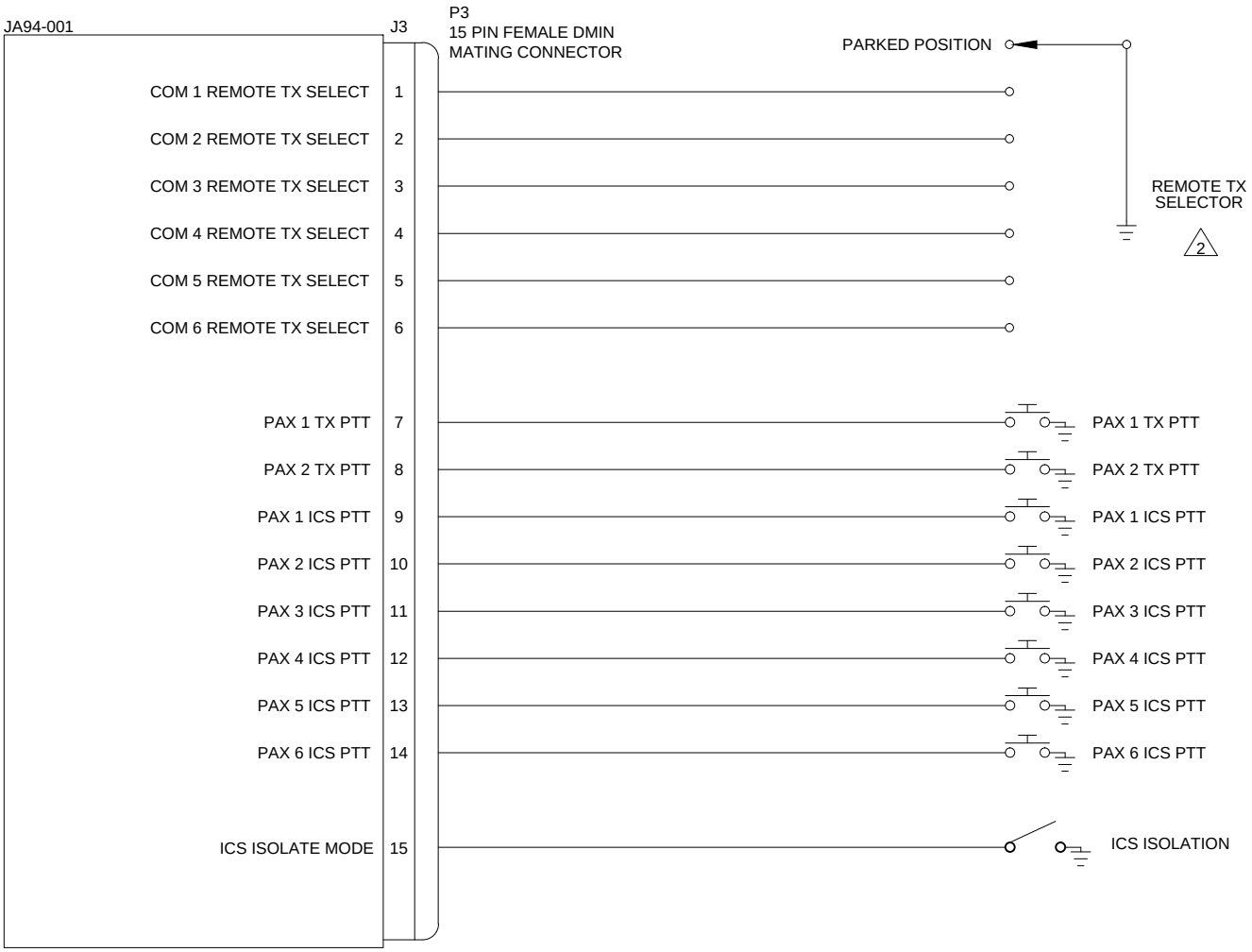
PREPARED	TAT	JUPITER AVIONICS CORPORATION
CHECKED	JAC 01-26-16 SRM	TITLE: Dual Audio Controller Interconnect Notes
APPROVED	JAC 01-26-16 KDV	NCAGE CODE: L00N3 / PART NO.: JA94-001 / SHEET: 1/6
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA94-001 Interconnect Rev B.dwg



PREPARED	TAT	JUPITER AVIONICS CORPORATION
CHECKED	JAC 01-26-16 SRM	TITLE: Dual Audio Controller J1 Interconnect
APPROVED	JAC 01-26-16 KDV	NCAGE CODE: L00N3 / PART NO.: JA94-001 / SHEET: 2/6
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA94-001 Interconnect Rev B.dwg

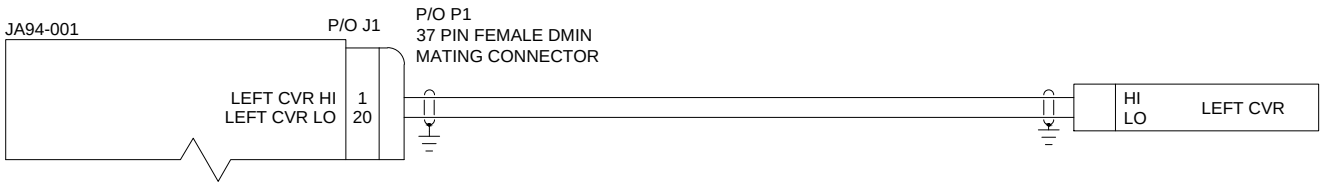


PREPARED	TAT	JUPITER AVIONICS CORPORATION
CHECKED	JAC 01-26-16 SRM	TITLE: Dual Audio Controller J2 Interconnect
APPROVED	JAC 01-26-16 KDV	NCAGE CODE: L00N3 / PART NO.: JA94-001 / SHEET: 3/6
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA94-001 Interconnect Rev B.dwg

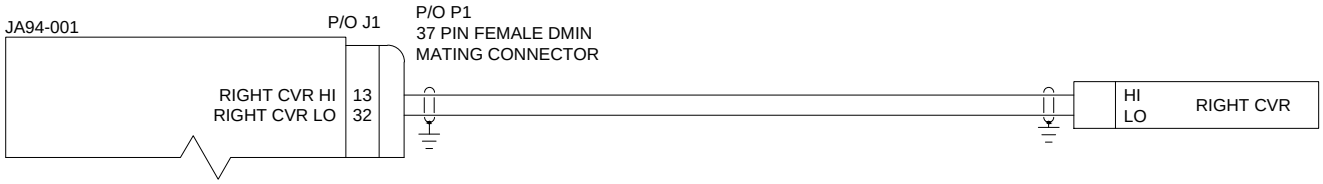


PREPARED	TAT	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 01-26-16 SRM	TITLE: Dual Audio Controller J3 Interconnect		
APPROVED	JAC 01-26-16 KDV	NCAGE CODE: L00N3	PART NO.: JA94-001	SHEET: 4/6
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA94-001 Interconnect Rev B.dwg		

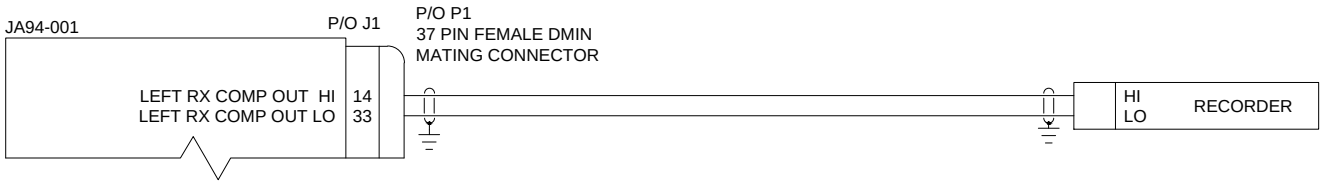
OPTION: LEFT CVR



OPTION: RIGHT CVR



OPTION: LEFT RX COMPOSITE OUT



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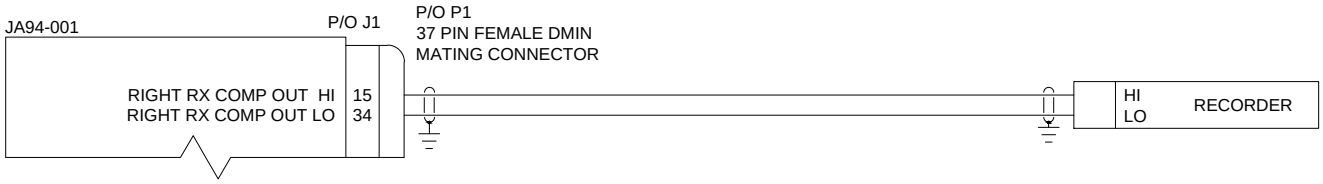
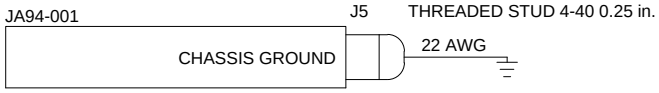
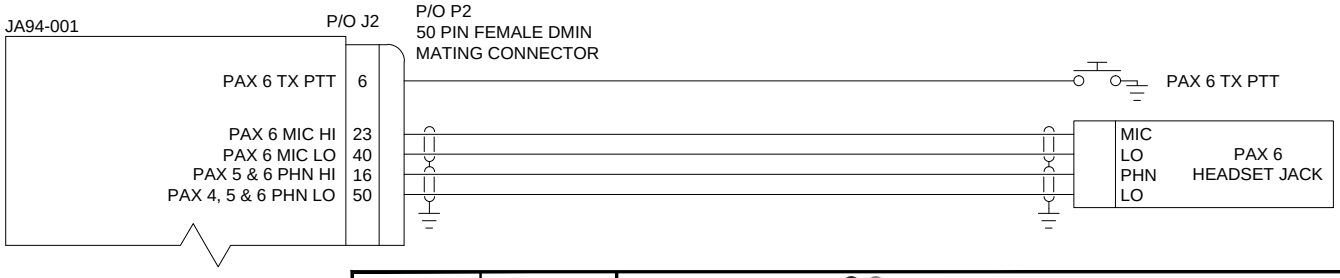


OPTION: CHASSIS GROUND

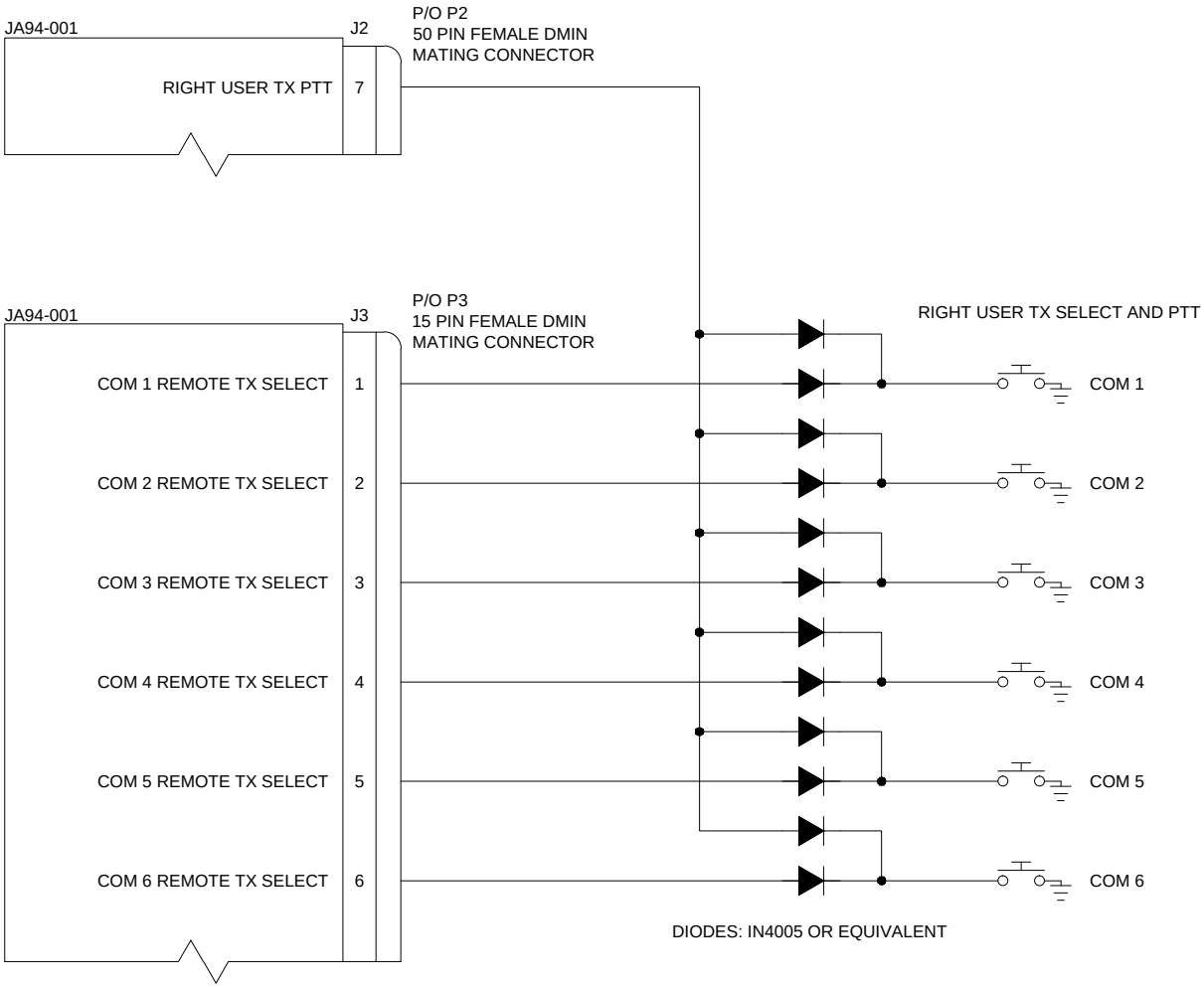


OPTION: PAX 6 HEADSET

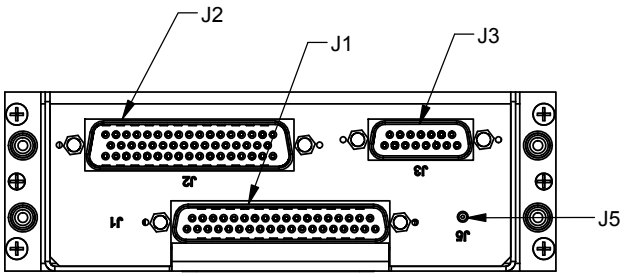


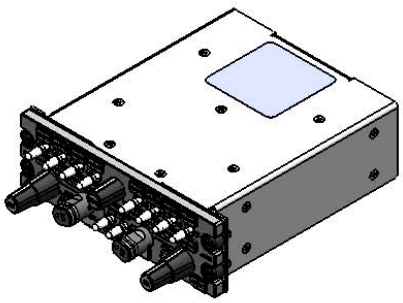
PREPARED	TAT	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 01-26-16 SRM	TITLE: Dual Audio Controller Interconnect Options		
APPROVED	JAC 01-26-16 KDV	NCAGE CODE: L00N3	PART NO.: JA94-001	SHEET: 5/6
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA94-001 Interconnect Rev B.dwg		

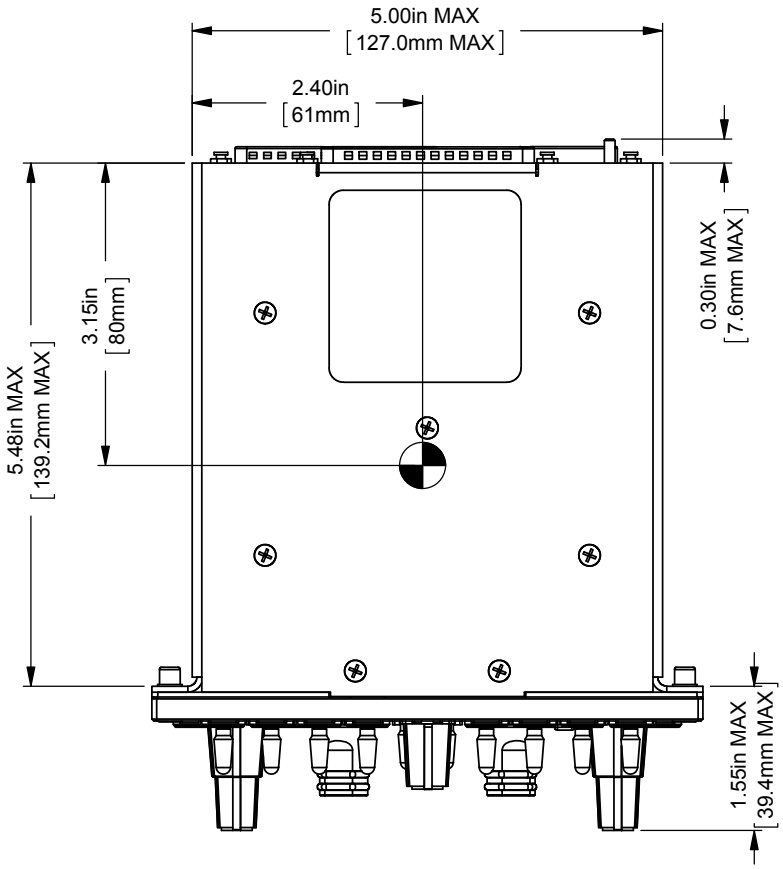
OPTION: MULTIPLE DISCRETE TX SELECT AND PTT

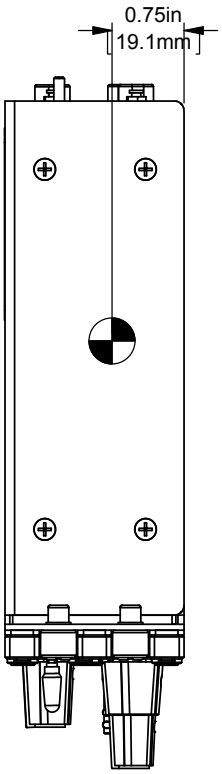


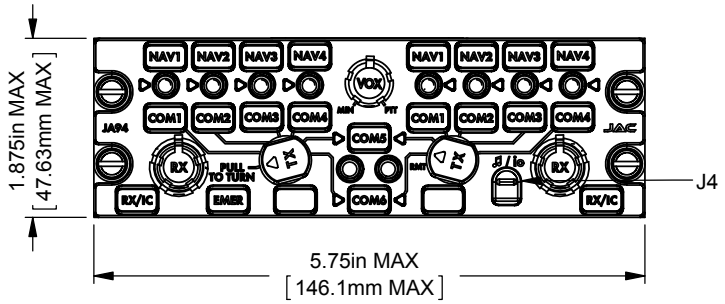
PREPARED	TAT	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 01-26-16 SRM	TITLE: Dual Audio Controller Interconnect Options		
APPROVED	JAC 01-26-16 KDV	NCAGE CODE: L00N3	PART NO.: JA94-001	SHEET: 6/6
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA94-001 Interconnect Rev B.dwg		











CENTER OF GRAVITY
±0.03in [0.8mm]

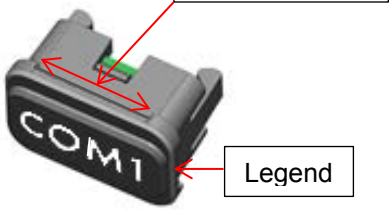
WEIGHT: 1.99 lbs [0.91 kg] MAX.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES ANGLES ARE IN DEGREES TOLERANCES: 1 DEC PLACE: ± 0.1 2 DEC PLACE: ± 0.01 3 DEC PLACE: ± 0.005 ANGLES: ± 0.5 DEG	PREPARED	TAT	JUPITER AVIONICS CORPORATION
	CHECKED	JAC 07-28-15 DS	TITLE: Dual Audio Controller
	APPROVED	JAC 07-28-15 KDV	NCAGE CODE: L00N3 / PART NO.: JA94-001 / SHEET: 1/1
MATERIAL: N/A	CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC. NO. JA94-001 Mechanical Installation Rev C.SLDDRW
FINISH: N/A	DRAWING NOT TO SCALE		

Field-Replaceable Legends

Jupiter Avionics Corporation (JAC) products have field-replaceable illuminated legends. This permits easy customization, and allows the same units to be used in multiple different configurations with only minimal changes.

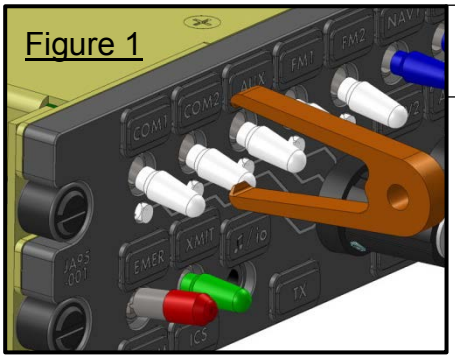
The internal circuitry ensures that, although the legends are individually illuminated, the illumination is consistent and uniform throughout all legends, and never needs to be balanced. This means that if it is a requirement to change the labelling due to damage or for a different project, there is no need for costly and time-consuming illumination checks.



Legend Removal

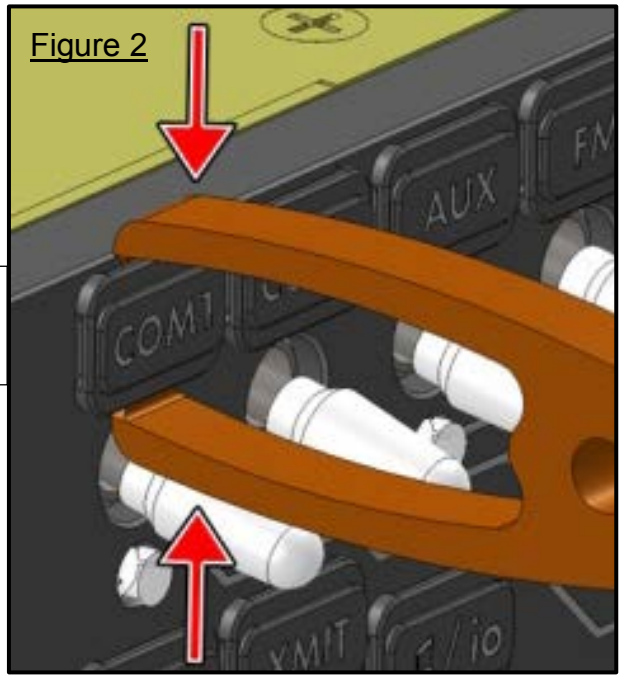
Caution: Take care not to scratch or otherwise damage the faceplate or the legend.

Figure 1



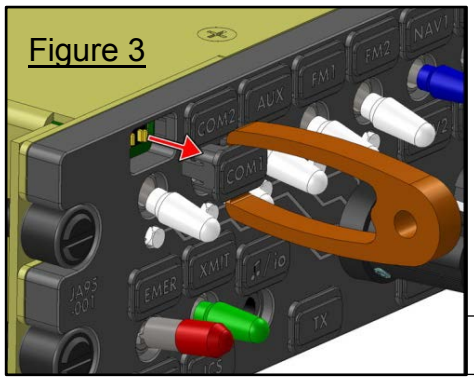
To facilitate legend removal, JAC provides a legend extractor tool - part # TOL-CUST-EXTR (figure 1) that fits into the recesses on the legend.

Figure 2



To remove a legend, hold the extractor firmly between the forefinger and thumb, and use a tweezer-like action to grip the legend (figure 2).

Figure 3



Pull the legend away from the faceplate as shown in figure 3.

Legend Replacement

To replace a legend, align the text correctly, and then apply gentle pressure until the body of the legend support seats firmly into the faceplate.

Once the new legend is in place, ensure that it has seated correctly by checking that it illuminates. The unit is now ready for use.

Installation and Operating Manual

Appendix B - Installation Documents

B1 Airworthiness Approval

Airworthiness approval of the JA94-001 may require completion of a TCCA Major Modification Report per CAR STD (AWM) 571 Appendix L, or a FAA Form 337. The sample wording for a description of the work is provided to assist the Installing Agency in preparing Instructions for Continued Airworthiness (ICA) when replacing an existing audio panel with a Jupiter Avionics JA94-001 Audio Controller. This sample may be modified appropriately for new installations. It is the installer's responsibility to determine the applicability of the method used. Installations performed outside Canada must follow the applicable aviation authority's regulations.

Sample Wording:

Removed the existing [model] audio panel and replaced with a Jupiter Avionics JA94-001 Audio Controller in [aircraft location].

Installed in accordance with the JA94-001 Installation Manual, Revision [ ], and AC 43.13-2, Chapters 2, and 3.

The JA94-001 interfaces with existing aircraft systems per the Installation Manual instructions.

The JA94-001 Installation Manual provides detailed installation instructions and wiring diagrams (Section 2, and Appendices A and B).

Power is supplied to the JA94-001 through a 2-Amp circuit breaker.

Aircraft equipment list, weights and balance amended. Compass compensation checked and found to conform to applicable regulations.

B2 Instructions for Continued Airworthiness

Maintenance of the JA94-001 Audio Controller is "on condition" only. Refer to the JA94-001 Maintenance Manual. Periodic maintenance of the JA94-001 is not required.

The following sample Instructions for Continued Airworthiness (ICA) provides assistance in preparing ICA for the Jupiter Avionics JA94-001 unit installation as part of a Type Certificate (TC) or Supplemental Type Certificate (STC) project to comply with CAR STD (AWM) 523/527/525/529.1529 or FAR 23/25/27/29.1529 "Instructions for Continued Airworthiness".

Items that may vary by aircraft make and model are shown in brackets ("[ ]") and should be filled in as appropriate. Some of the checklist items do not apply, in which case they should be marked "N/A" (Not Applicable).

Instructions for Continued Airworthiness, Jupiter Avionics JA94-001 Audio Controller in an [Aircraft Make and Model]

1. Introduction

[Aircraft that has been altered: Registration number, Make, Model and Serial Number]

Content, Scope, Purpose and Arrangement: This document identifies the Instructions for Continued Airworthiness for a Jupiter Avionics JA94-001 installed in an [aircraft make and model].

Applicability: Applies to a Jupiter Avionics JA94-001 installed in an [aircraft make and model].

Definitions/Abbreviations: None, N/A.

Precautions: None, N/A.

Units of Measurement: None, N/A.

Referenced Publications: JA94-001 Installation and Operating Manual
JA94-001 Maintenance Manual
JA94-001 Operating Manual
STC/TC # [applicable STC/TC number for the specific aircraft installation]

Distribution: This document should be a permanent aircraft record.

2. Description of the System/Alteration

Jupiter Avionics JA94-001 Audio Controller with interface to external transceivers and [include other equipment/systems as appropriate]. Refer to Appendix A of this manual for interconnect information. Refer to aircraft manufacturer approved interconnect for actual installation.

3. Control, Operation Information

Refer to section 3 of this manual or to the Jupiter Avionics JA94-001 Operating Manual.

4. Servicing Information

N/A

5. Maintenance Instructions

Maintenance of the JA94-001 is 'on condition' only. Periodic maintenance is not required. Refer to the JA94-001 Maintenance Manual.

6. Troubleshooting Information

Refer to the JA94-001 Maintenance Manual.

7. Removal and Replacement Information

Refer to Section 2 of this manual - the JA94-001 Installation and Operating Manual. If the unit is removed and reinstalled, a functional check of the equipment should be conducted.

8. Diagrams

Refer to Appendix A of this manual - the JA94-001 Installation and Operating Manual - for installation drawings and interconnect examples.

9. Special Inspection Requirements

N/A

10. Application of Protective Treatments

N/A

11. Data: Relative to Structural Fasteners

JA94-001 and appropriate mounting hardware installation, removal and replacement should be in accordance with applicable provisions of AC 43.13-1B and AC 43.13-2A.

12. Special Tools

N/A

13. This Section is for Commuter Category Aircraft Only

A. **Electrical loads**: Refer to Section 1 of the JA94-001 Installation and Operating Manual.
B. **Methods of balancing flight controls**: N/A.
C. **Identification of primary and secondary structures**: N/A.
D. **Special repair methods applicable to the airplane**: N/A.

14. Overhaul Period

No additional overhaul time limitations.

15. Airworthiness Limitation Section

N/A