JA95-001

Audio Controller

Installation and Operating Manual

Rev D

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RECORD OF REVISIONS

Revision	Rev Date	Description	ECR
A	Jan 2013	Initial release, Serial number 1001 and higher.	1012
B	Jan 2013	Update, Serial number 1001 and higher.	1981
C	Feb 2018	Revise, Change Certification Statement	2031
D	Jul 2018	Update and Revise	5640

Prepared:	Checked:	Approved:
MPB	JAC 07-31-18 KDV	JAC 07-31-18 MQS

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SECTION 1 - DESCRIPTION

1.1 System Overview

The JA95-001 audio controller is a centralized audio management system that distributes and controls all transceiver, receiver and alert audio in an aircraft. It enables the selected transmission of microphone audio to a transceiver and distributes all intercom audio.

The JA95-001 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 primary user (pilot) to the COM1 transceiver, NAV1 receiver and Direct Audio receiver.

The JA95-001 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 (♫/io) without the necessity of removing the unit from the panel. To facilitate future customizations and certification, no software or complex electronic devices are used in the JA95-001 design.

1.2 Features Overview

The JA95-001 features a 37-pin D-Sub connector, which interfaces with the radio receive audio and crew phones, a 50-pin D-Sub connector which interfaces with the power and passenger headset connections. This layout minimizes crosstalk and follows industry standard interconnect for multi-user Audio Controllers.

Many of the input and output levels are adjustable, several audio paths are selectable, and alert audio analog waveforms can be loaded using the configuration program ProCS™ (**Pro**duct **C**onfiguration **S**oftware) to write configuration commands via the JA99-001 configuration cable to the front panel music / configuration connector. The audio waveforms are stored in non-volatile devices. The alert audio feature is intended for use as a secondary alerting system where another device provides the primary annunciation.

The JA95-001 provides intercom functions for up to seven users. It supports up to 5 transceivers and a PA position, each selectable from a rotary switch, and up to 6 receivers (2 on each of 3 toggle switches).

The JA95-001 features individual VOX gating, and supports one Direct Audio input to provide audio at a fixed level to the users.

The JA95-001 has a CVR output and a three channel Alert Generator. Each alert has a separate key input.

The JA95-001 allows transmit access for four crew members (Pilot, Co-pilot, Passenger 1 and Passenger 2).

A Music / Configuration connector is provided on the faceplate of the JA95 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 JA95-001 has two modes of operation: Normal Mode and Emergency Mode.

1.3 Inputs and Outputs

Refer to the JA95-001 connector maps for the mating connector designators and pin assignments for the input and output signals.

1.3.1 Inputs

Name	Qty	Type
ALERT ENABLE	1	Active high discrete
ALERT KEY	3	Active low discrete (selected via ProCS)
CALL	1	Active low discrete (selected via ProCS)
CONFIG DATA TO JA95	1	Data signal
DIRECT AUDIO	1	Audio signal
FRONT PANEL MUSIC	2	Audio signal
LIGHTS INPUT	1	Analog control signal
MIC	7	Audio signal
MODE SELECT / CONFIG AUDIO	1	Multi format signal
MUSIC	2	Audio signal
PAX 1 and PAX 2 ICS PTT	2	Active low discrete (selected via ProCS)
PAX 1 and PAX 2 TX PTT	2	Active low discrete (selected via ProCS)
PILOT and COPILOT ICS PTT	2	Active low discrete
PILOT and COPILOT TX PTT	2	Active low discrete
POWER INPUT	1	14 to 28 Vdc power supply
RX AUDIO	11	Audio signal

1.3.2 Outputs

Name	Qty	Type
CVR	1	Audio signal
CONFIG DATA FROM JA95	1	Data signal
PHONES	7	Audio signal Note: There are 6 outputs for driving 7 phones.
MF SW (Multifunction Switch)	2	Active low discrete (selected via ProCS)
MIC	6	Audio signal
PTT	6	Active low discrete (PA PTT feature selected from ProCS)
RX COMP OUT	1	Audio signal (selected via ProCS)

1.3.3 Bi-directional Ports

Name	Qty	Type
ICS TIE	1	Audio signal
DIGITAL TIE IN & OUT	1	Not implemented

1.4 Specifications

1.4.1 Electrical Specifications

Power Input

Primary nominal voltage	28 Vdc
Secondary nominal voltage	14 Vdc
Maximum voltage	32.2 Vdc
Minimum voltage	10.2 Vdc
Emergency voltage	9.0 Vdc
Input current at 28 Vdc	≤ 0.7 A
Input current at 14 Vdc	≤ 1.4 A

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%
CONFIG AUDIO input level	400 mVrms ±10%

Rated Output Level

Phone rated output	7.75 Vrms±10%
Pilot Phone rated output, in emergency mode or with power input ≤6 Vdc	2.20 Vrms±10%
Phone rated output power, with MUSIC input	3.88 Vrms±10%
Microphone rated output	250 mVrms±10%
CVR rated output	500 mVrms±10%
CVR rated output with input as MUSIC	250 mVrms±10%
CVR rated output with input as PILOT MIC	1.00 Vrms±10%
CVR rated output, in emergency mode,	500 mVrms ±10%
Receive Composite rated output	2.5 Vrms ±10%
Intercom Tie Line type 1 rated output	340 mVrms ±10%
Intercom Tie Line type 2 rated output	1.2 Vrms ±10%

Audio Frequency Response

Audio output audio frequency response	≤3dB from 300 to 6000 Hz
Alert audio output audio frequency response	≤3dB from 300 to 3000 Hz

Distortion Characteristics

Audio output distortion at rated power	≤10%
Audio output distortion at 10% of rated power	≤3%

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 Impedance

Phone output Impedance	≤ 60 Ω
Transceiver Microphone output Impedance	≤ 80 Ω
CVR output Impedance	≤ 80 Ω
Receive Composite Audio output Impedance	≤ 80 Ω
Intercom Tie Line output Impedance	2000 Ω ±20%

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 ±3dB
ICS Audio control variation	42 ±3dB

Output Regulation

Output Regulation change in voltage level	≤3 dB
Output Regulation distortion	≤10%

Input to output Crosstalk and Bleed-through Level

Input to Output crosstalk	≤55 dB

Input to Input Crosstalk Level

Input to Input crosstalk	≤60 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
Microphone inputs bias voltage	11 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	40 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	-30 to +12 dB
VOX Delay Time range	0.5 to 2.0 seconds
Transmit Timer duration	90 ± 30 seconds

1.4.1.3 Discrete Signals

Active low control input, active signal level	≤ +3 Vdc
Active low control input, inactive signal level	≥ +10 Vdc
Active low control input, current	≤ 10 mAdc
Active low control output, active output	≤ +2 Vdc
Active low control output, active, current	≤ 1 Adc
ALERT ENABLE signal active signal level	≥ +9 Vdc
ALERT ENABLE signal, when active, sinks	≤ 10 mAdc
ALERT ENABLE signal inactive signal level	≤ +3 Vdc

1.4.1.4 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 mm] max
Faceplate width	5.75 in [146 mm] max
Behind panel width	5.00 in [127 mm] max
Weight	1.64 lbs. [0.74 kg] max
Material	brushed aluminum with conversion coating
Connectors (3):	One 4 pole 3.5mm stereo jack One 37-pin D-Sub male One 50-pin D-Sub male
Mounting	4 Dzus fasteners
Bonding	≤ 2.5 mΩ
Installation kit part number	INST-JA95
Faceplate	white legends on black
Faceplate legend colour, luminance	white, 1 ± 0.5 fL

1.4.3 Configuration Connector

The JA95-001 configuration connector communication standard for CONFIG DATA TO JA95 data input signal and CONFIG DATA FROM JA95 data output signal is RS-232.

1.4.4 Product Configuration Software Version

Configuration of the JA95-001 requires the Product Configuration Software (ProCS) version v0.50.3 or later. Refer to the release notes from http://www.jupiteravionics.com/productsoftware.php or contact Jupiter Avionics to ensure the correct version is used.

1.4.5 Flammability of Materials

The JA95-001 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 JA95-001 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/warrantyregistration.

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

The conditions and tests for CAN TSO and FAA TSO approval of the JA95-001 are minimum performance standards. Those installing the JA95-001, on or in a specific type or class of aircraft, must determine that the aircraft installation conditions are within TSO standards. The JA95-001 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.

Unless otherwise noted, all wiring shall be a minimum of 24 AWG, except power and ground lines, which shall be a minimum of 22 AWG. 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 JA95-001 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.

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 JA95-001 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.
b) Check P2 pin **17** for +28 Vdc or +14 Vdc relative to ground.
c) Check P2 pin **34** for continuity to ground (less than 0.5 Ω).
d) Check P2 pins **6 thru 13** for continuity to ground (less than 0.5 Ω) when the relevant switch is closed.
e) Check all pins for shorts to ground or adjacent pins.

2.4.6.2 Configuration

Ensure that the JA95-001 contains the correct configuration settings. This may be done at the factory, on the maintenance bench or in the aircraft before the power on checks are performed. 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 JA95-001. Refer to Section 3 (Operation) for specific operational details.

a) Begin with only the pilot's 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 co-pilot's 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 JA95-001 internal adjustments are set from the Product Configuration Software ProCS™. Configuration data is sent to the JA95-001 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 JA95-001, 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 JA95-001 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™ JA95-001 menu item 'ProCS Setup' provides Setup drawings showing the cabling arrangement for connecting the JA95-001 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 JA95-001, power must be applied to the unit, and the mode (EMER/NORM) switch must be in the NORM position

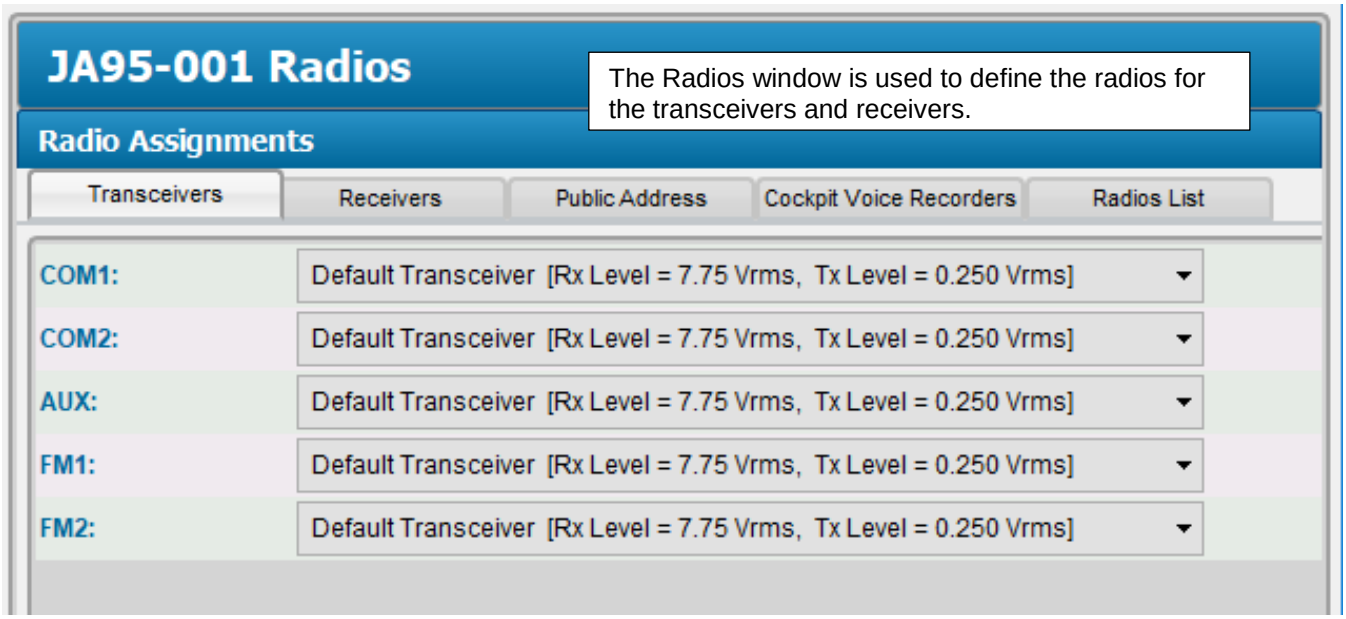
Within ProCS™, the configurable settings are grouped together into the following sections:

2.5.3.1 Front Panel Switches

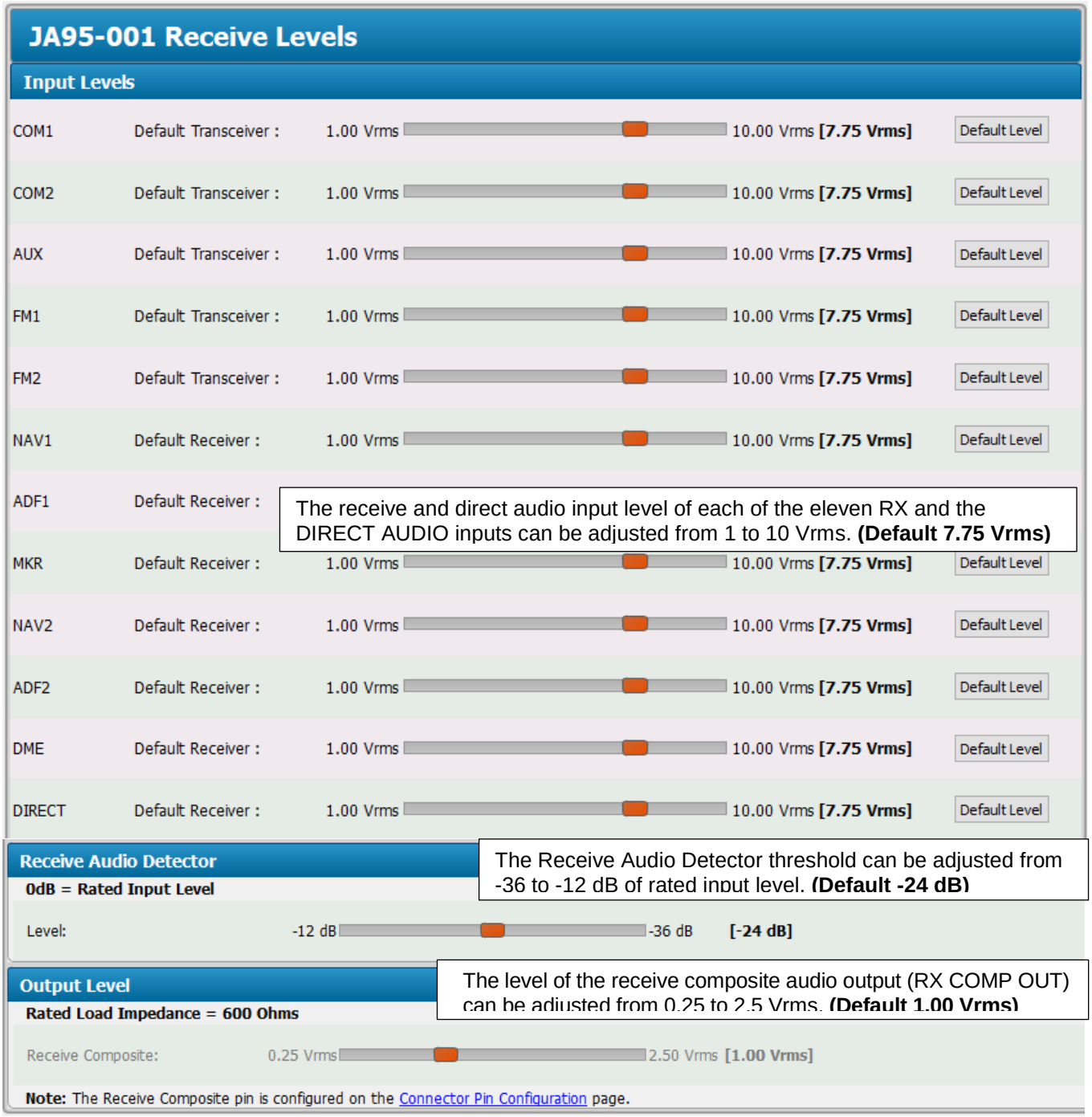
The Front Panel Switches window is used to specify the text for each legend.

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.

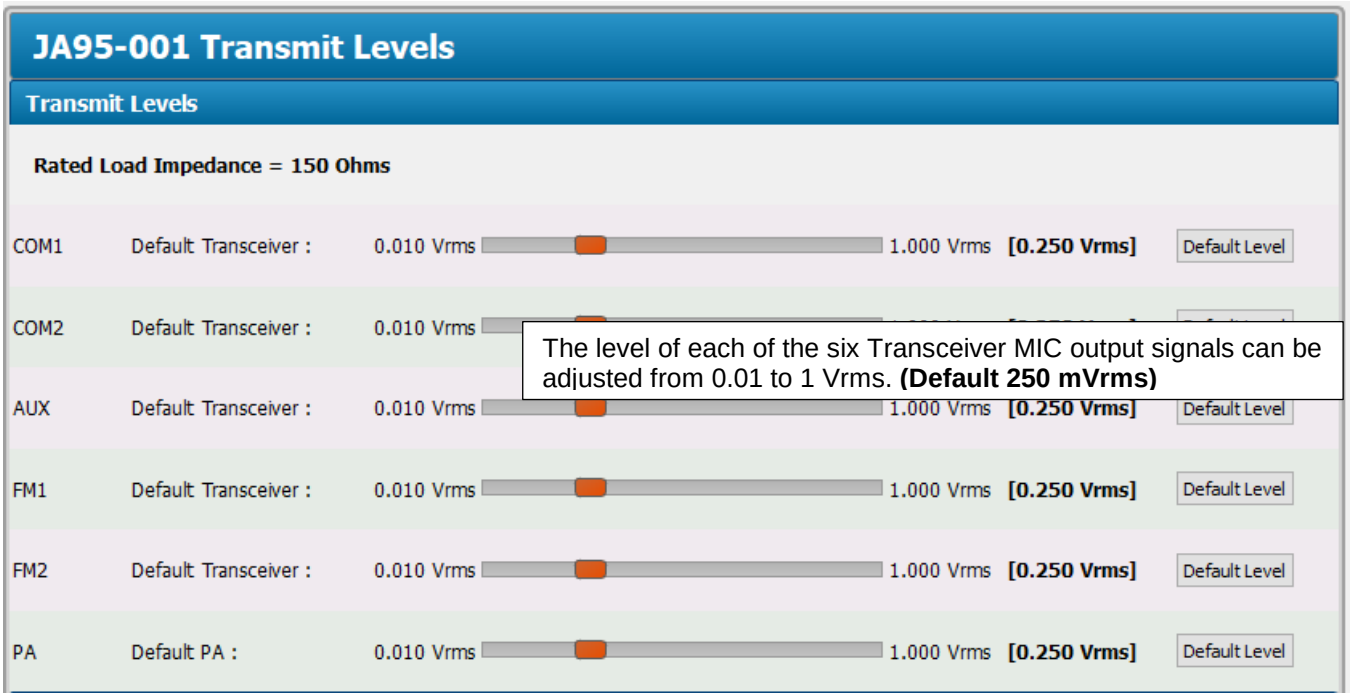
2.5.3.2 Radios



2.5.3.3 Receive Levels

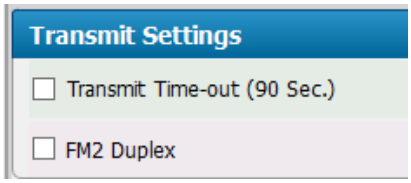


2.5.3.4 Transmit Levels

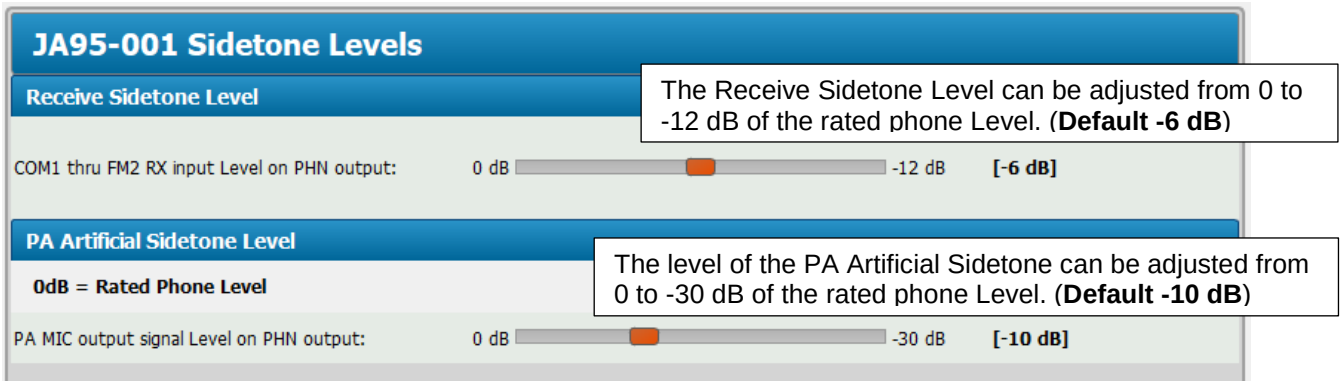


When the Transmit Timeout check box is checked the transmit time-out is enabled (**Default not checked)**

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



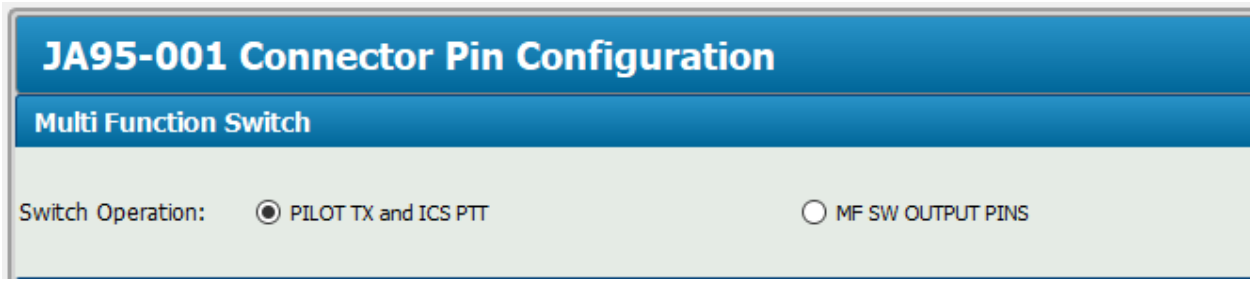
2.5.3.5 Sidetone Levels



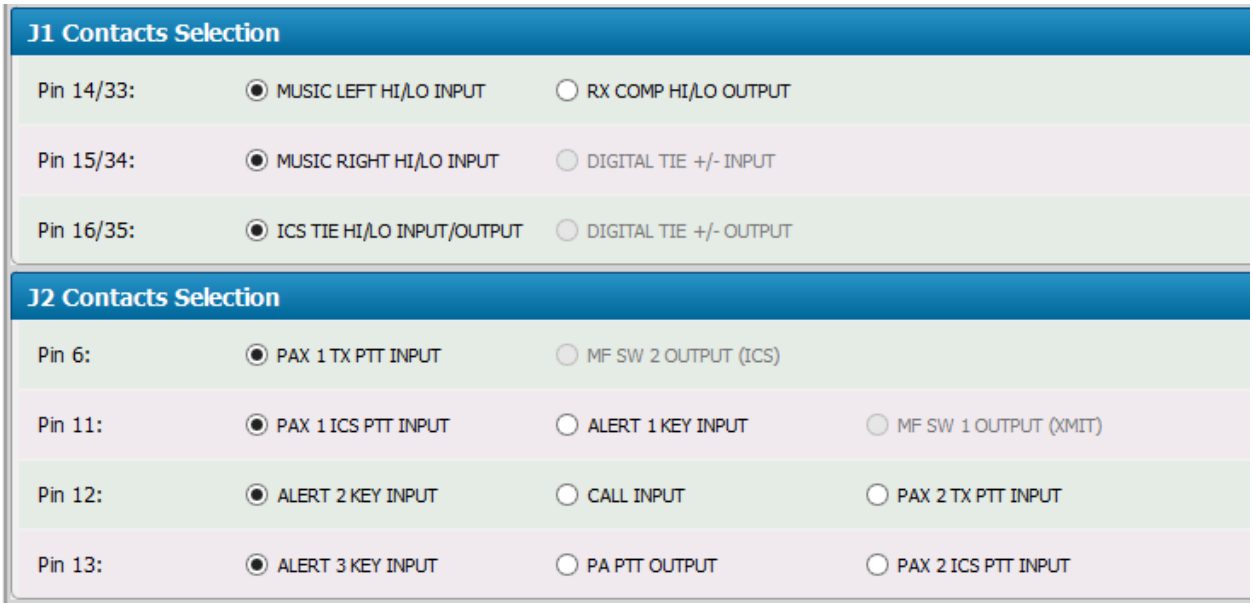
2.5.3.6 Connector Pin Configuration

Multi-Function Switch

The front panel multi-function switch is a green two-position momentary centre-off switch. Its default configuration is as the **pilot's PTT switch**, with '**XMIT**' in the up position, and '**ICS**' in the down position. However, it may be configured to provide a ground to operate different circuitry to suit the needs of the user, and an appropriate legend can be inserted.



Several of the connector pins can be configured to meet the requirements of specific installations. Refer to JA95-001 Interconnect sheets 5/6 of 6.



2.5.3.7 Alerts

Warning: The internal audio alerts are intended only to supplement, **not** replace, airframe alerts such as 'low rotor RPM', 'engine out' or 'decision height alerting'. The alert audio feature is intended for use as a secondary alerting system where another device provides the primary annunciation.

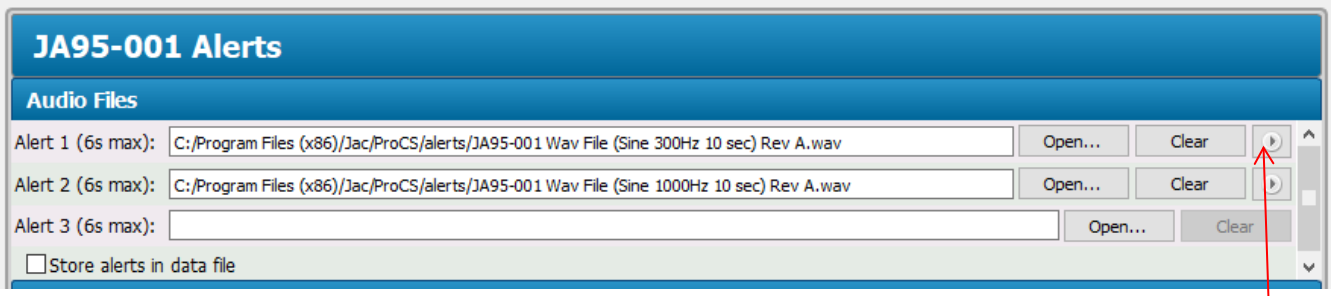
Audio Files

The JA95-001 has standard audio signals for each of the three alerts, and the audio files window allows these signals to be customized with other recordings during the configuration process.
The default Alert signals loaded into the unit at the factory are:

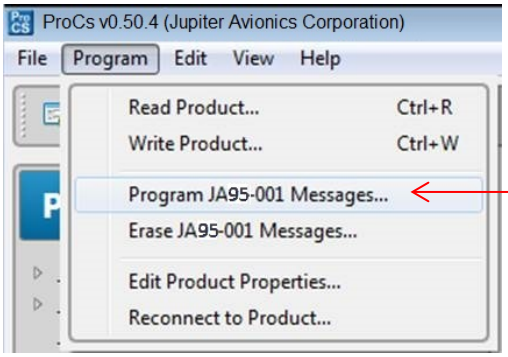
JA95-001 Wav File (Sine 300Hz 10 sec) Rev A.WAV

JA95-001 Wav File (Sine 1000Hz 10 sec) Rev A.WAV

JA95-001 Wav File (Sine 3000Hz 10 sec) Rev A.WAV



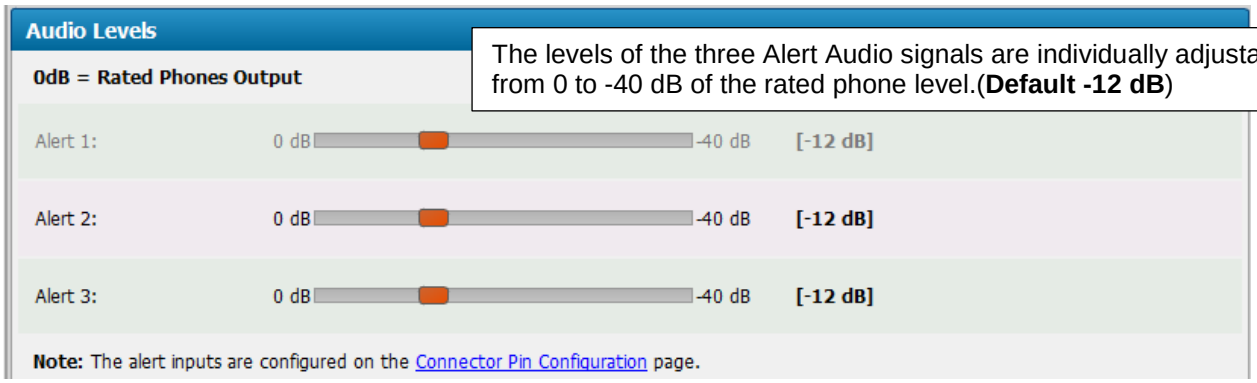
Saving new Audio Files



If a new audio file is selected, it may be played using the arrow to the right of the Message line.

It may be uploaded to the JA95-001 using the 'Program' menu and selecting 'Program JA95-001 Messages…'.

Note that this pane will have different content if a JA95-001 is not connected.



The levels of the three Alert Audio signals are individually adjustable from 0 to -40 dB of the rated phone level.(**Default -12 dB**)

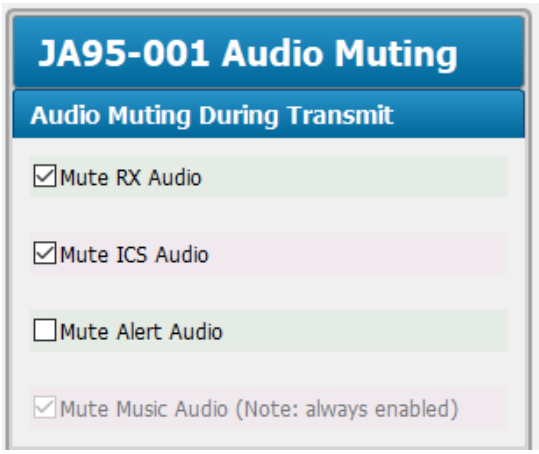
2.5.3.8 Audio Muting (During Transmit)

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**)

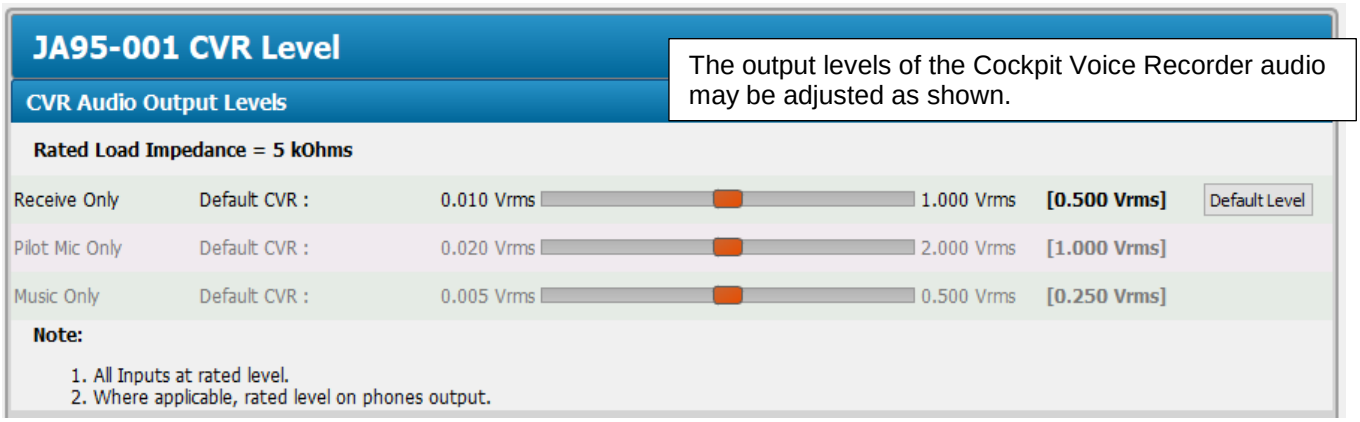
When the Mute Alert Audio check box is checked the Alert Audio is muted during transmit (**Default not checked**)

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



2.5.3.9 CVR Level

The output levels of the Cockpit Voice Recorder audio may be adjusted as shown.



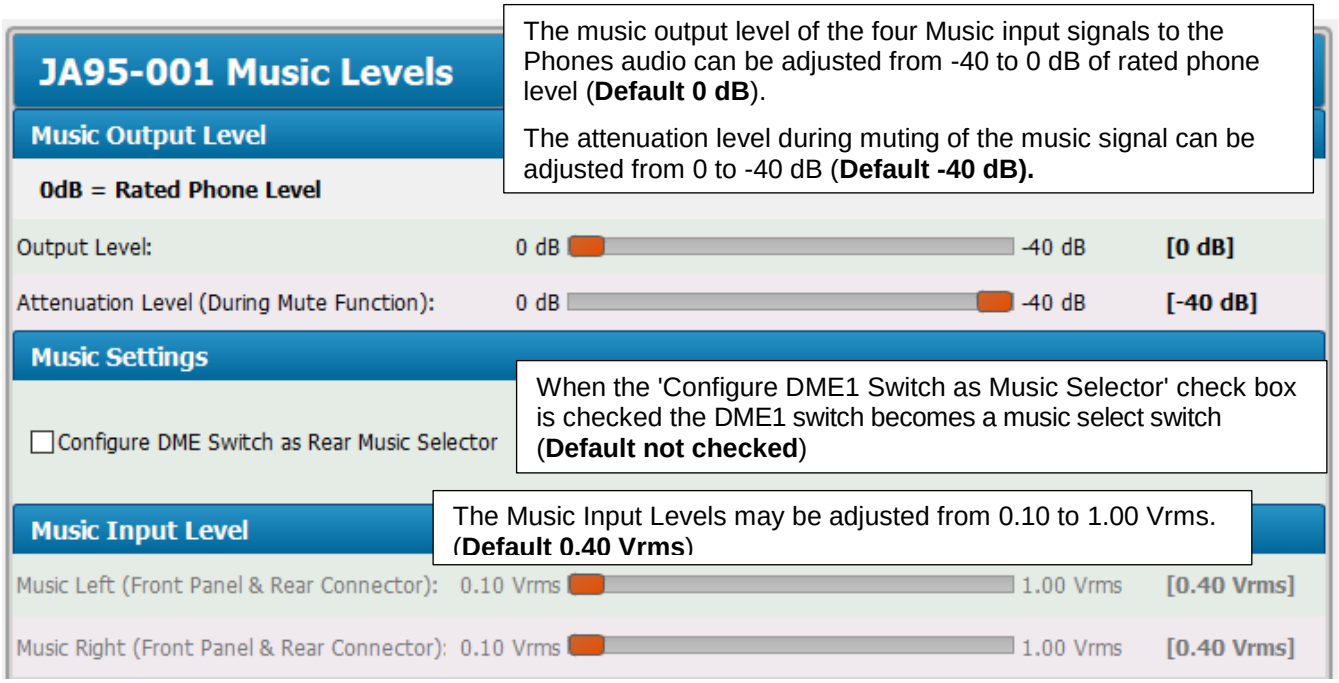
2.5.3.10 Music Levels

The music output level of the four Music input signals to the Phones audio can be adjusted from -40 to 0 dB of rated phone level (**Default 0 dB**).

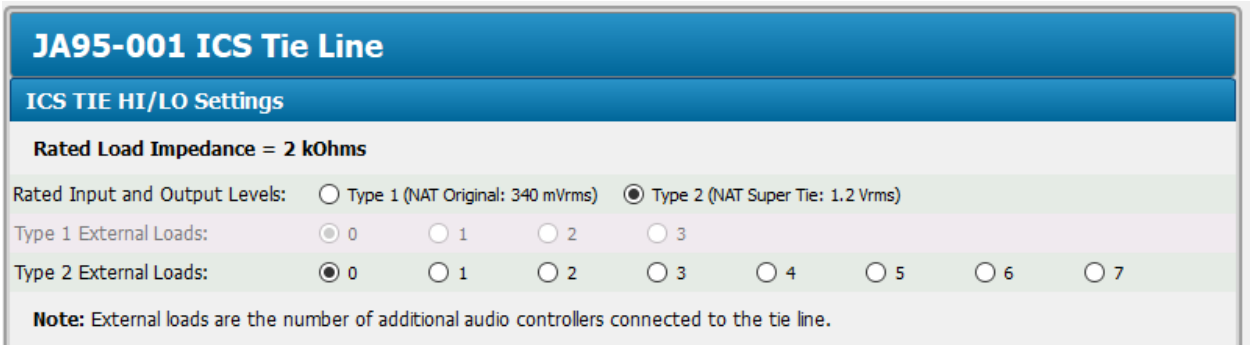
The attenuation level during muting of the music signal can be adjusted from 0 to -40 dB (**Default -40 dB).**

When the 'Configure DME1 Switch as Music Selector' check box is checked the DME1 switch becomes a music select switch (**Default not checked**)

The Music Input Levels may be adjusted from 0.10 to 1.00 Vrms. (**Default 0.40 Vrms**)



2.5.3.11 ICS Tie Line

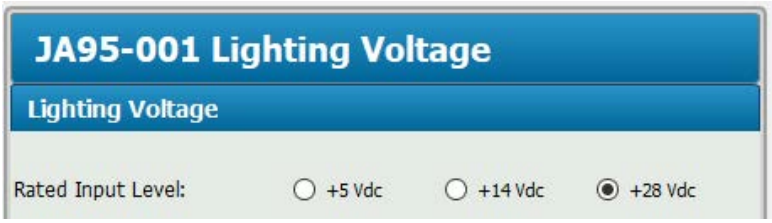


The rated input and output levels of the intercom tie line can be selected as Type 1 or Type 2 (**Default Type 2**).

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**).

2.5.3.12 Lighting Voltage Selection

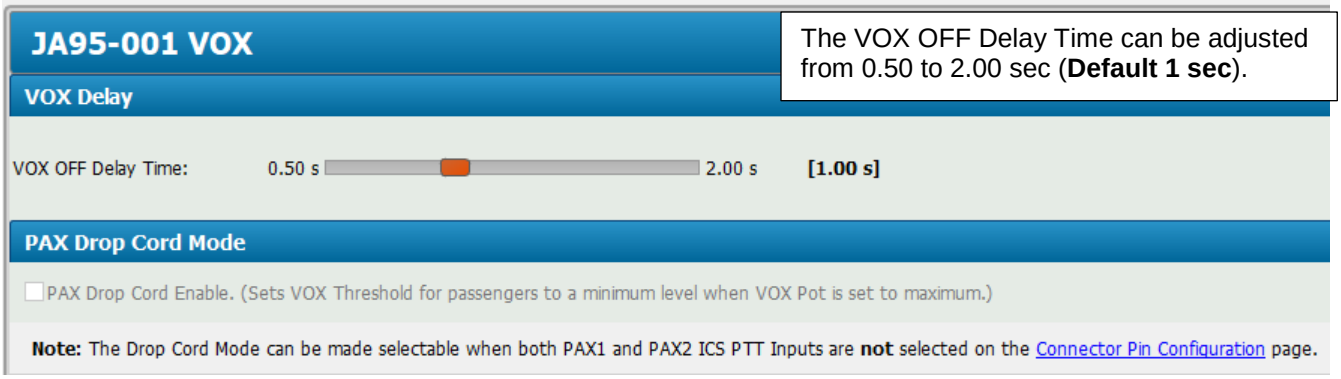


The rated input level for the lighting voltage may be selected from

+5 Vdc, +14 Vdc or +28Vdc

(**Default +28 Vdc**).

2.5.3.13 VOX



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

When the PAX Drop Cord Enable check box is checked, the VOX circuits for the passenger microphones are configured for use with drop cords (**Default not checked**)

2.5.3.14 Connector Maps

This section contains connector maps and interconnects that are automatically generated to show changes that affect the installation of the JA95-001, such as switch labels and voltages. See section 2.7.1.

2.5.4 Other Configuration Features

The model number, serial number and check sum of the JA95-001 Audio Controller can be entered and viewed in the Comments pane of the JA95-001 Product Information Window for future reference.

2.6 Installation Kit

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

The installation kit (Part # INST-JA95) consists of the following:

Quantity	Description	JAC Part #
2	TAG ring	CON-5500-0625
1	D-Sub 37-pin connector, hood and 37 crimp pins	CON-3420-0037
1	D-Sub 50-pin connector, hood and 50 crimp pins	CON-3420-0050
2	Heat Shrink Tubing	WIR-HTSK-1000

2.6.1 Recommended Crimp tools

Connector Type	Hand crimp tool	Positioner	Insertion/extraction tool
Positronic	9507	9502-3	M81969/1-04
Positronic	AFM8 (Daniels)	M22520/2.08 KB-1	

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 JA95-001. 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.

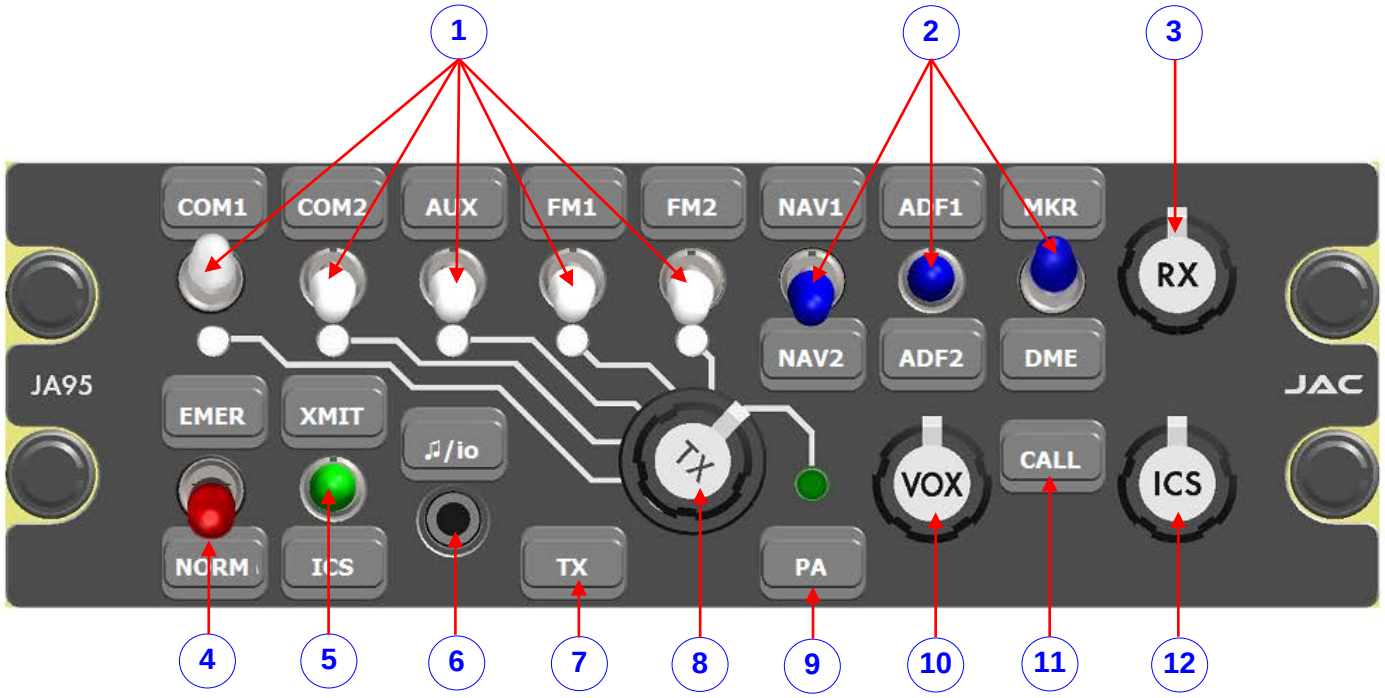
SECTION 3 – OPERATION

3.1 Introduction

This section contains the operating instructions for the JA95-001.

3.2 Front Panel Controls

Note: The legends and 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. Transceiver switches and associated legends
2. Receiver switches and associated legends
3. Receive volume control
4. Mode switch
5. Pilot's Transmit/ICS (Multi-function) switch
6. Music/configuration input connector and legend
7. Transmit annunciator (deadfront)
8. Transmit selector
9. PA legend
10. VOX threshold control
11. CALL annunciator (deadfront)
12. ICS volume control

(1) Transceiver Switches

These are five white two-position toggle switches. When a switch is set to the 'up' position, audio from the associated transceiver is routed to the phones.

The legends (above the switches) are interchangeable to allow customization. (Default – COM1, COM2, AUX, FM1, FM2, PA.)

(2) Receiver Switches

These are three blue three-position centre-off toggle switches. When a switch is set to the 'up' or 'down' position audio from the selected receiver is routed to the phones.

The legends (three above and three below the switches) are interchangeable to allow customization. (Default – NAV1, NAV2, ADF1, ADF2, MKR, DME.)

(3) Receive Volume Control

This is a rotary knob that adjusts the phones volume of the receive audio from minimum (CCW) to maximum (CW). Individual radio volume controls should be set to a nominal level, and then adjusted for changing flight conditions using this control.

(4) Mode Switch

This is a red two-position locking toggle switch. When set to the 'up' position, the unit is Emergency mode, and when set to the 'down' position, the unit is in Normal mode. The legends are interchangeable to allow customization. (Default – EMER, NORM.)

The switch is lockable to prevent accidental changing of the mode. The switch must be lifted to release the lock.

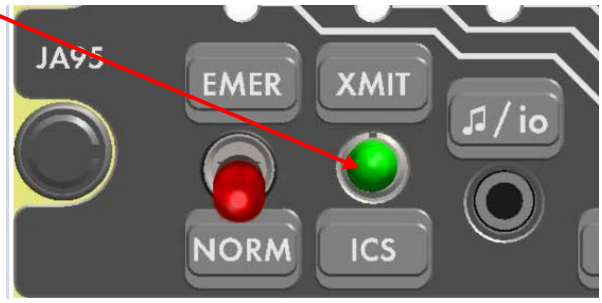
For full information on Emergency and Normal Mode operation, see sections 3.3 and 3.4 below.

(5) Multi-function (Transmit/ICS) Switch

This is a green two-position centre-off momentary toggle switch.

When in the default XMIT/ICS configuration, this switch acts as the pilot's 'Press-to-talk' (PTT) button. The unit will transmit on the selected transceiver when the switch is held in the 'up' position, and when held in the 'down' position, it will transmit on the intercom.

See section 3.3.7 below for Multi-function Switch operation.

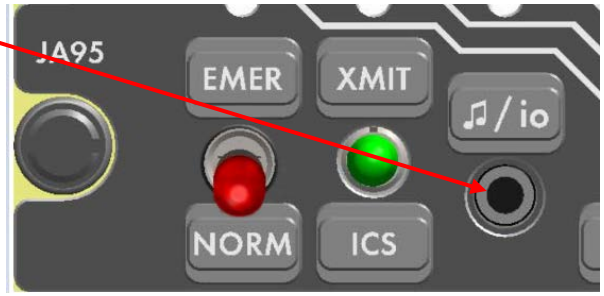


Note: At installation, this switch may be configured to operate in default or alternative mode. Check with your installing agency for confirmation of the operation of this switch. The legends are interchangeable to allow customization.

(6) Music/Configuration Connector (♫/io)

This is a music input that is compatible with most music players. It 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.)

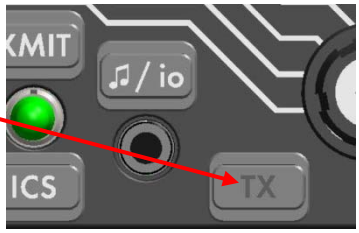


CAUTION: If an unapproved connector or cable is used, damage to the unit or to any attached device may occur. If in doubt, contact JAC for a list of approved cables, music sources and devices.

(7) Transmit Annunciator - TX

This is a deadfront annunciator that will illuminate when the JA95-001 is transmitting.

The default legend is 'TX', but it is interchangeable to allow customization.



(8) Transmit Selector

This is a rotary six-position control that is used to select transmission via one of the five transceivers or the public address system (PA).

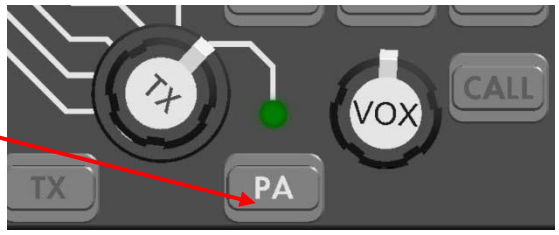
Each of the transmit selector positions is linked by a white line to the corresponding transmit select annunciator, transceiver switch and legend.

The appropriate annunciator will light green to show which transceiver is selected for transmit - 'PA' in this example.

(9) PA Legend

This is a customizable legend to mark the PA position for the transmit selector.

The interchangeability allows an appropriate name for this legend to be selected.

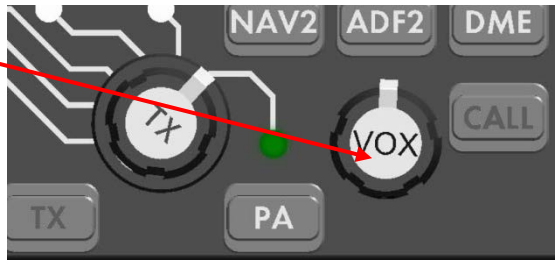


(10) VOX Threshold Control

This is a rotary knob that is used to select the VOX threshold of the unit. See below.

When rotated fully clockwise (cw), the threshold will be at maximum and 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 should be adjusted for proper operation according to the ambient noise.

(11) CALL Annunciator

This is a customizable deadfront annunciator activated by an external switch.

When enabled, it will illuminate when a ground is applied to the CALL input from another user's audio controller or by a remote 'call' button within the aircraft.

Note: Check with your installing agency for confirmation of the operation of this annunciator. The legends are interchangeable to allow customization.

(12) ICS Volume Control

This is a rotary control used to adjust the volume of all ICS audio to suit the ambient conditions. Rotating the control completely cw gives rated level, and completely ccw reduces the output to minimum level.

3.3 Normal Operation Mode

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

The JA95-001 is in Normal mode when the front panel EMER / NORM switch (**4**) is in the NORM position and suitable electrical power is supplied to the unit.

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 JA95-001 receives an incoming transmission on a transceiver or receiver that has been selected, either by the white transceiver receive switches (**1**) or the transmit selector (**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 front panel RX volume control (**3**). It will be muted if the unit is transmitting and muting of receive audio during transmit is enabled.

3.3.3 Transmitting (Transmit Operation)

To select a transceiver, rotate the Transmit Select Switch until it aligns with the line leading to the Transceiver Select switch legend (see **1**) - default legends COM 1, COM 2, AUX, FM 1, FM 2, or PA. The corresponding Transmit Select annunciator will illuminate.

When the user's TX PTT is activated, the unit will transmit on the selected transceiver, and the deadfront Transmit Annunciator (**7**) will illuminate 'TX'. All MIC and sidetone audio will be routed to the user's phones, and any music will be muted for the duration of the transmission.

3.3.4 FM2 PTT Operation

Note: If the FM2 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 FM2 has been selected for transmit, momentarily activating the TX PTT (either from the faceplate or by some other method) will keep the FM 2 transmitting. A second momentary activation of the TX PTT, or moving the Transmit Selector away from FM 2, will stop the FM 2 from transmitting.

3.3.5 VOX Operation

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

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.

3.3.6 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.

The ICS audio level at the phones is controlled by the ICS volume control (**12**).

3.3.7 Multi-Function (XMIT / ICS) Switch Operation

Note: At installation, this switch may be configured to operate in default or alternative mode. Check with your installing agency for confirmation of the operation of this switch.

Default Operation

When in the default XMIT/ICS configuration, this switch acts as the pilot's 'Press-to-talk (PTT) button. The unit will transmit on the selected transceiver when the switch is set to the 'up' position, and when set to the 'down' position, it will transmit on the intercom.

Alternative Operation

This switch may be configured to provide a ground signal to operate other equipment.

3.3.8 Music Operation

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

3.4 Emergency Operation Mode

Emergency mode can be selected by the Mode switch on the front panel, or entered automatically if power to the unit is lost.

3.4.1 Auto Emergency Mode

If the unit is in emergency mode because power has been lost to the unit, the sum of the COM 1 transceiver, NAV 1 receive, and DIRECT AUDIO will be routed to the pilot's phones and the CVR. The pilot's microphone and transmit key are connected to the COM 1 transceiver. No other function in the JA95-001 will operate when power is lost. All indicator LEDs, legends and annunciators will be dark.

3.4.2 Selected Emergency Mode

If the unit is in emergency mode because the EMER / NORM switch is in the EMER position and sufficient power is applied to the JA95-001, the sum of the COM 1 receive, NAV 1 receive, DIRECT AUDIO and Alert audio will be routed to the pilot's phones and the CVR. The pilot's microphone and transmit key are connected to the COM 1 transceiver. The pilot is disconnected from the ICS. The COM 1 transceiver and NAV 1 receiver and DIRECT AUDIO are not available to the other users. All other functions of the JA95-001 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 JA95-001 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

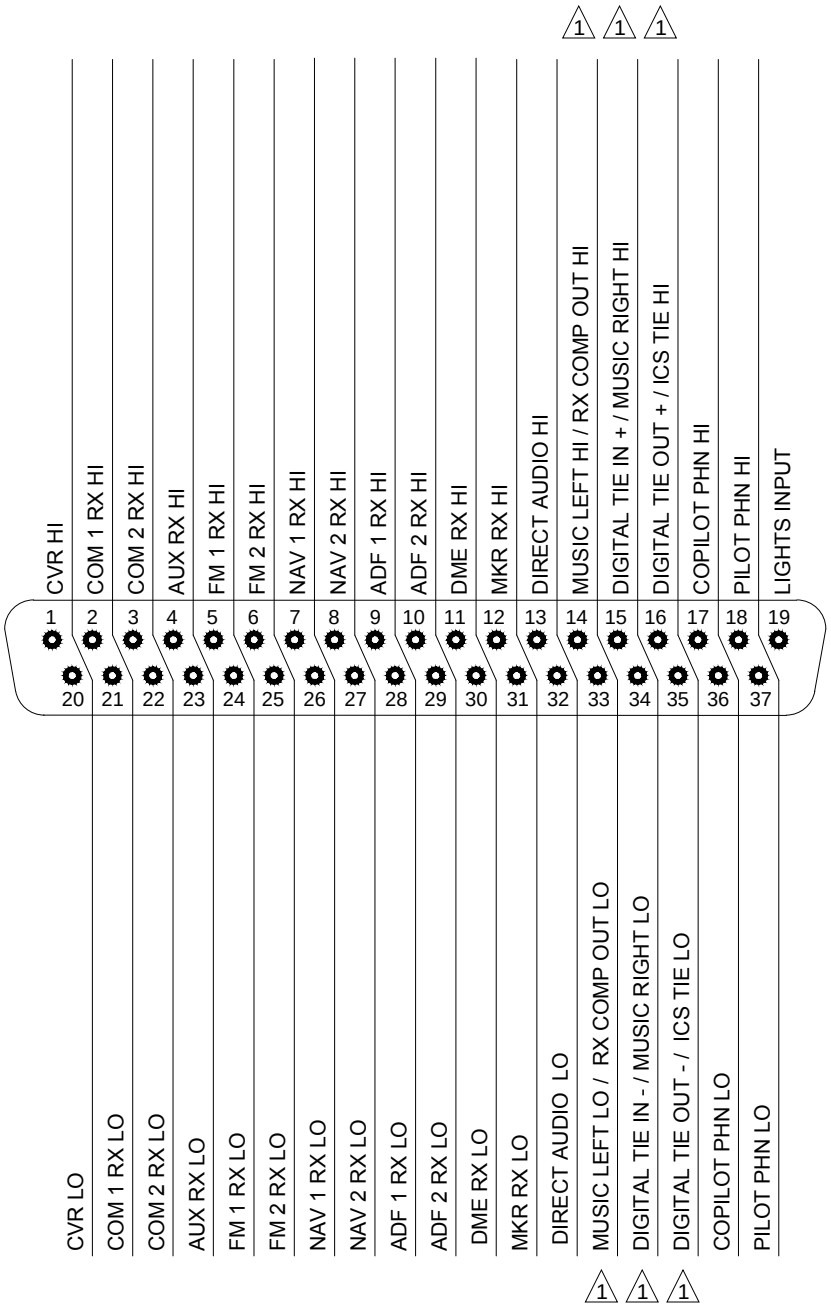
DOCUMENT	Rev
JA95-001 Connector Map	C
JA95-001 Interconnect	D
JA95-001 Mechanical Installation	G
JA95-001 Block Diagram (Two Audio Controller System)	A
JA95-001 Equipment Block Diagram	B

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:

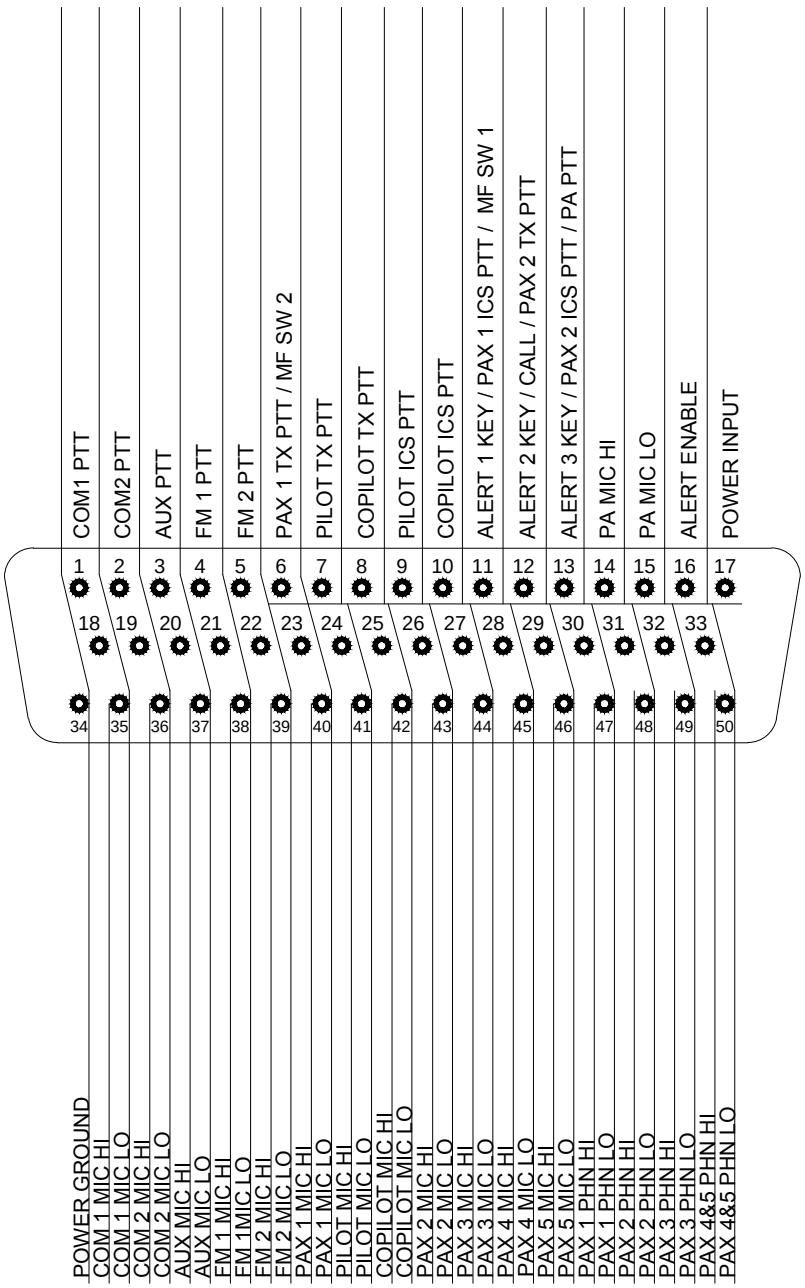
1 CONFIGURABLE CONTACT

PREPARED	KV	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 07-31-18 AH	TITLE: Audio Controller P1 Connector Map		
APPROVED	JAC 07-31-18 KDV	NCAGE CODE: L00N3	PART NO.: JA95-001	SHEET: 1/4
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA95-001 Connector Map Rev C		

TRANSMIT CONNECTOR

P2

50 PIN FEMALE DMIN
MATING CONNECTOR



VIEW IS FROM REAR OF MATING CONNECTOR

NOTE:

1 CONFIGURABLE CONTACT

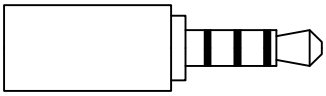
PREPARED	KV	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 07-31-18 AH	TITLE: Audio Controller P2 Connector Map		
APPROVED	JAC 07-31-18 KDV	NCAGE CODE: L00N3	PART NO.: JA95-001	SHEET: 2/4
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA95-001 Connector Map Rev C		

FRONT PANEL MUSIC / CONFIGURATION CONNECTOR

P3 ACCEPTS THE FOLLOWING PLUG FORMATS

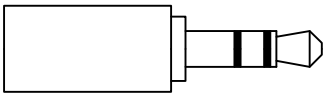
MATING PLUG NAMES

JA99 CONFIGURATION CABLE
4 POLE MALE 3.5MM STEREO



TIP: TX DATA
1ST RING: RX DATA
2ND RING: GROUND
3RD RING: CONFIG AUDIO

MP3 STEREO PLAYER
3 POLE MALE 3.5MM STEREO



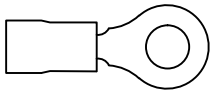
TIP: LEFT MUSIC
1ST RING: RIGHT MUSIC
2ND RING: GROUND

PREPARED	KV	JUPITER AVIONICS CORPORATION
CHECKED	JAC 07-31-18 AH	TITLE: Audio Controller P3 Connector Map
APPROVED	JAC 07-31-18 KDV	NCAGE CODE: L00N3 / PART NO.: JA95-001 / SHEET: 3/4
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA95-001 Connector Map Rev C

CHASSIS GROUND CONNECTOR

P4 CHASSIS GROUND CONNECTOR

#4 RING TERMINAL
MATING CONECTOR



PREPARED	KV	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 07-31-18 AH	TITLE: Audio Controller P4 Connector Map		
APPROVED	JAC 07-31-18 KDV	NCAGE CODE: L00N3	PART NO.: JA95-001	SHEET: 4/4
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA95-001 Connector Map Rev C		

JA95-001 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 (0.9 M).

△3 CABLE SHIELDS AT THE JA95-001 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.

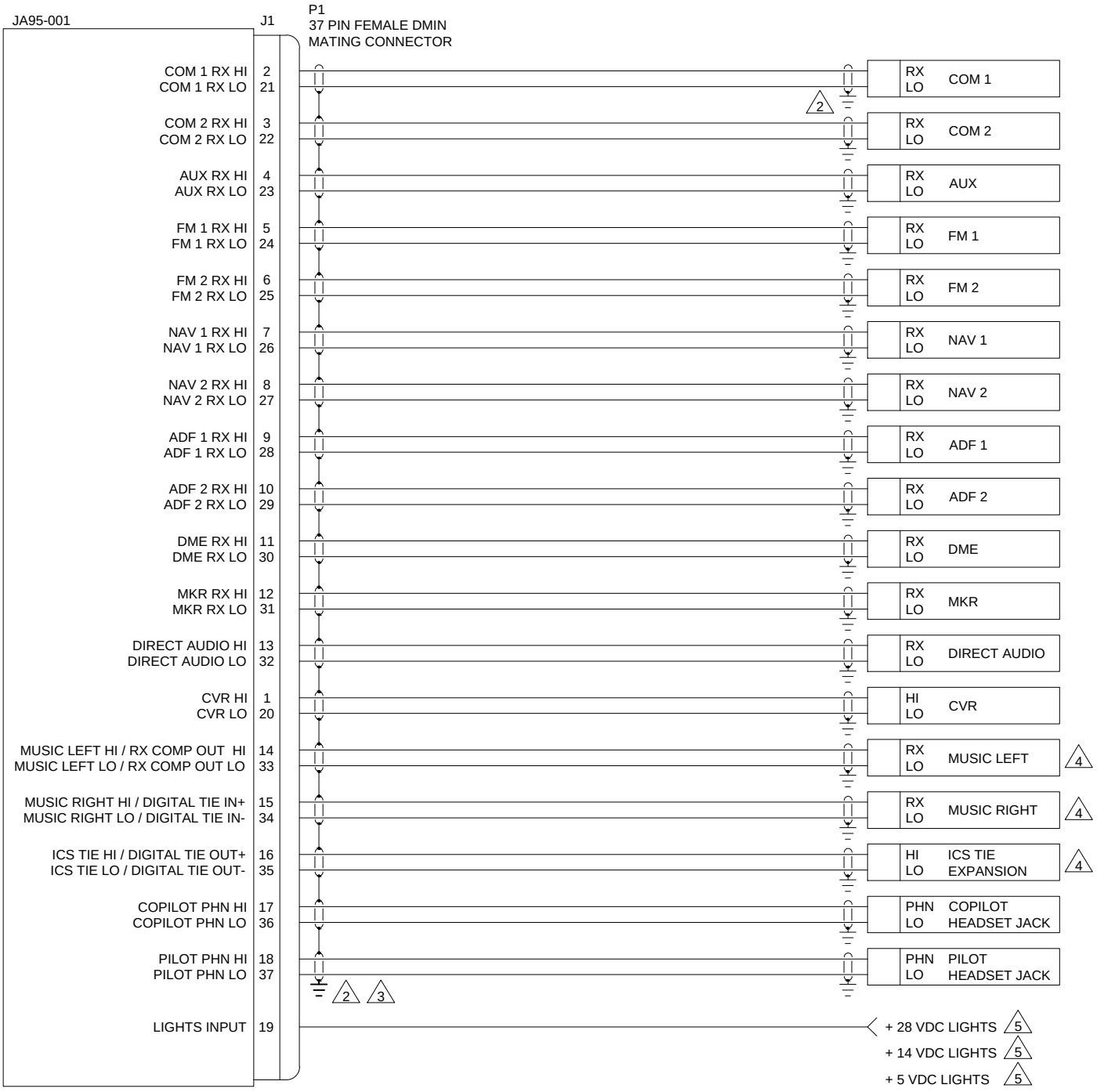
△6 THE FRONT PANEL MUSIC INPUT SHALL NOT BE CONNECTED TO ANY OTHER AUDIO INPUT.

CONNECTOR PIN LEGENDS

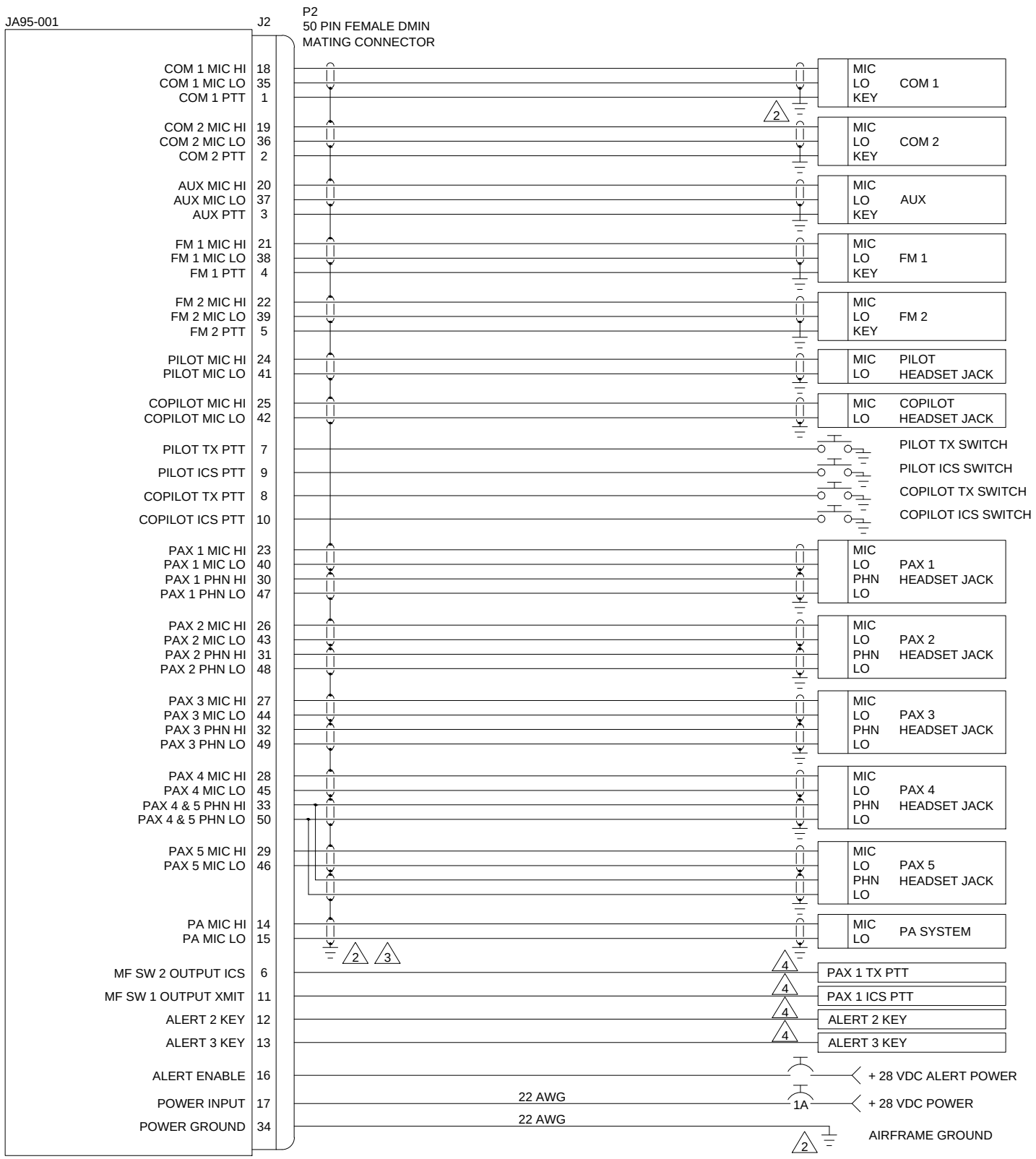
LEGEND

RESERVED	INTERNAL CIRCUITS MAY EXIST AND MAY BE ACTIVATED FOR FUTURE USE. NO EXTERNAL WIRE CONNECTION.

PREPARED	TAT	JUPITER AVIONICS CORPORATION	
CHECKED	JAC 01-31-18 SRM	TITLE: Audio Controller Interconnect Notes	
APPROVED	JAC 01-31-18 KDV	NCAGE CODE: L00N3	PART NO.: JA95-001 / SHEET: 1/6
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA95-001 Interconnect Rev D.dwg	

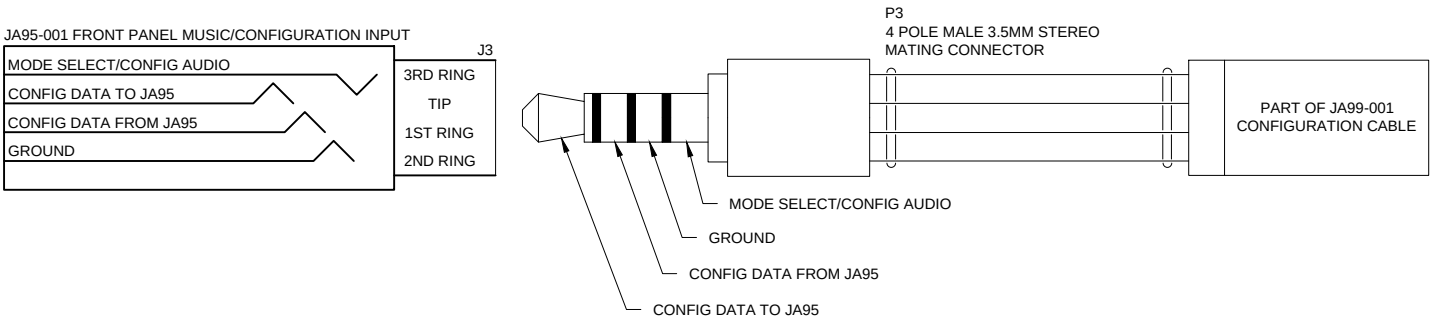


PREPARED	TAT	JUPITER AVIONICS CORPORATION
CHECKED	JAC 01-31-18 SRM	TITLE: Audio Controller J1 Interconnect
APPROVED	JAC 01-31-18 KDV	NCAGE CODE: L00N3 / PART NO.: JA95-001 / SHEET: 2/6
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA95-001 Interconnect Rev D.dwg

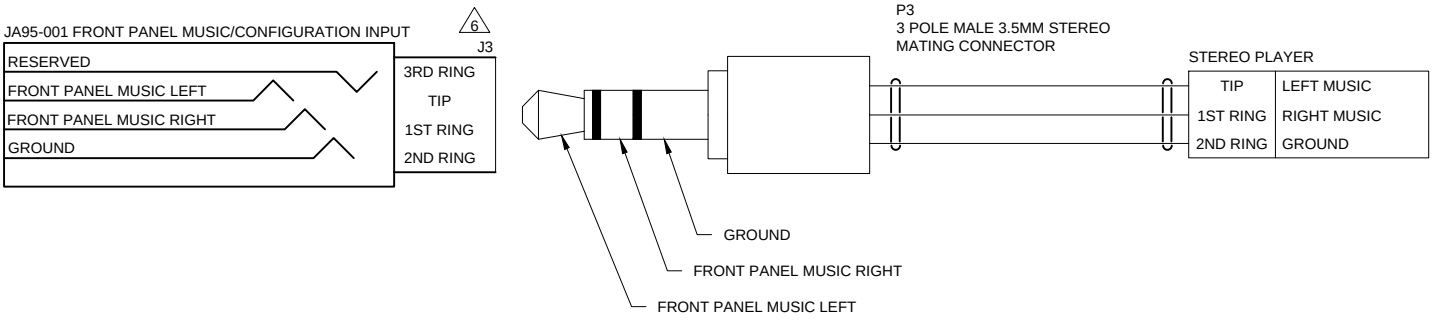


PREPARED	TAT	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 01-31-18 SRM	TITLE: Audio Controller J2 Interconnect		
APPROVED	JAC 01-31-18 KDV	NCAGE CODE: L00N3	PART NO.: JA95-001	SHEET: 3/6
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA95-001 Interconnect Rev D.dwg		

OPTION: PROGRAMMING FROM JA99-001

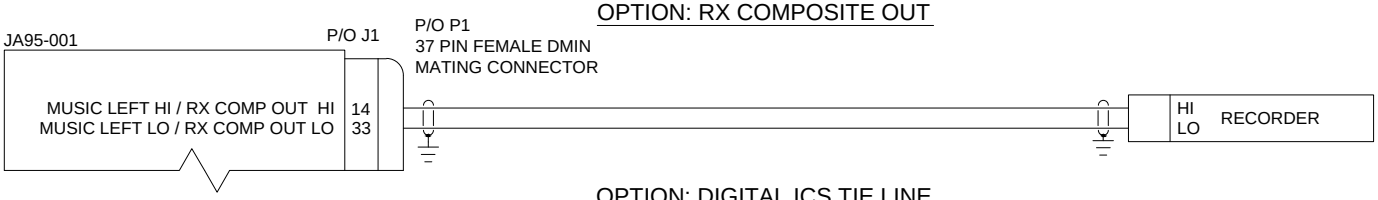


OPTION: STEREO PLAYER

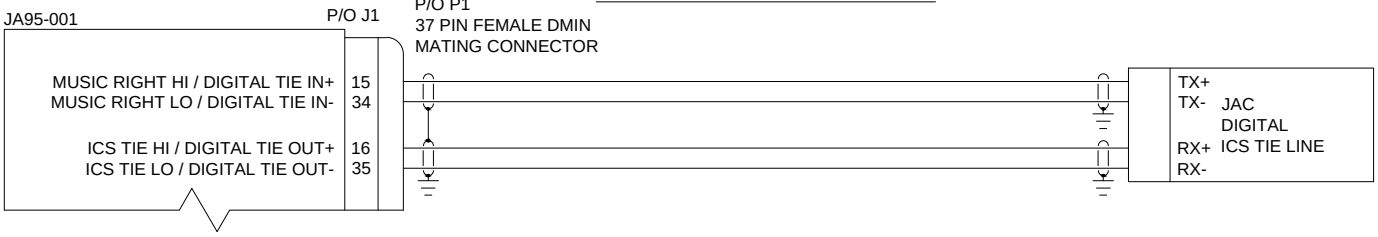


PREPARED	TAT	JUPITER AVIONICS CORPORATION
CHECKED	JAC 01-31-18 SRM	TITLE: Audio Controller Interconnect Options
APPROVED	JAC 01-31-18 KDV	NCAGE CODE: L00N3 / PART NO.: JA95-001 / SHEET: 4/6
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA95-001 Interconnect Rev D.dwg

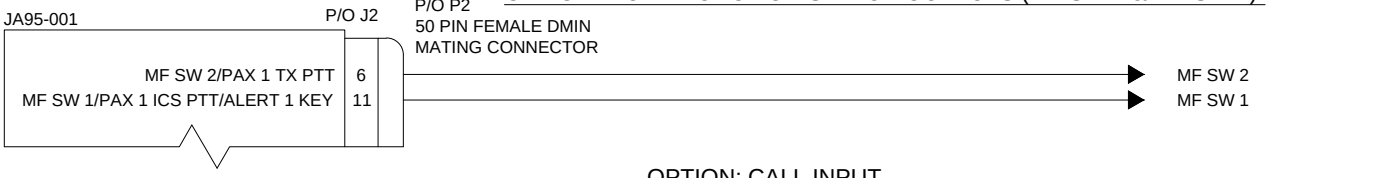
OPTION: RX COMPOSITE OUT



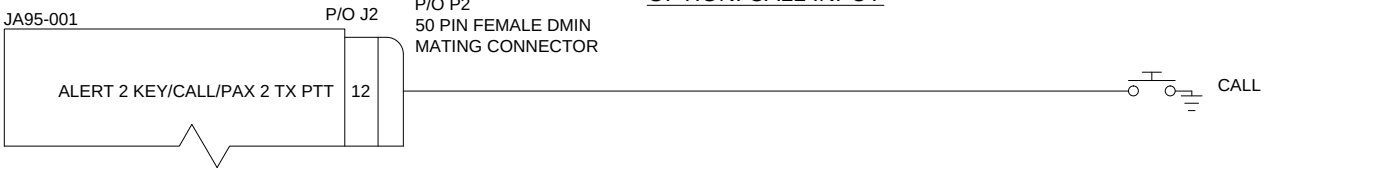
OPTION: DIGITAL ICS TIE LINE



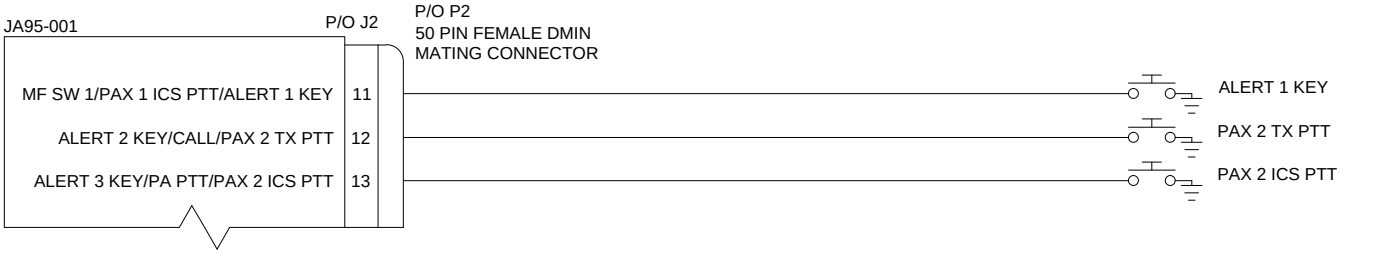
OPTION: MULTI-FUNCTION SWITCH OUTPUTS (MF SW 1 & MF SW 2)



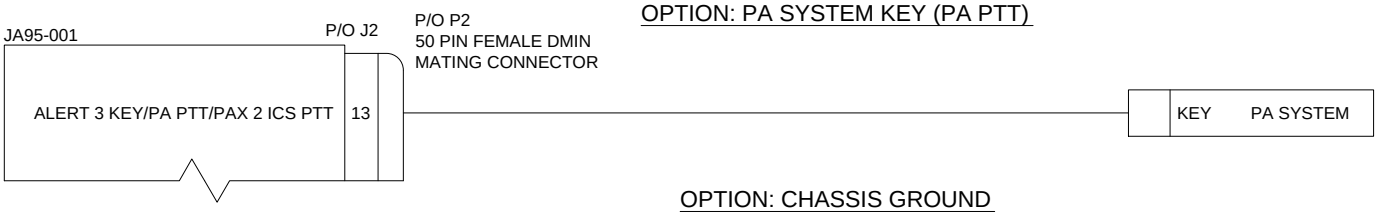
OPTION: CALL INPUT



OPTION: CONFIGURABLE SWITCH INPUTS (ALERT 1 KEY, PAX 2 TX PTT, PAX 2 ICS PTT)



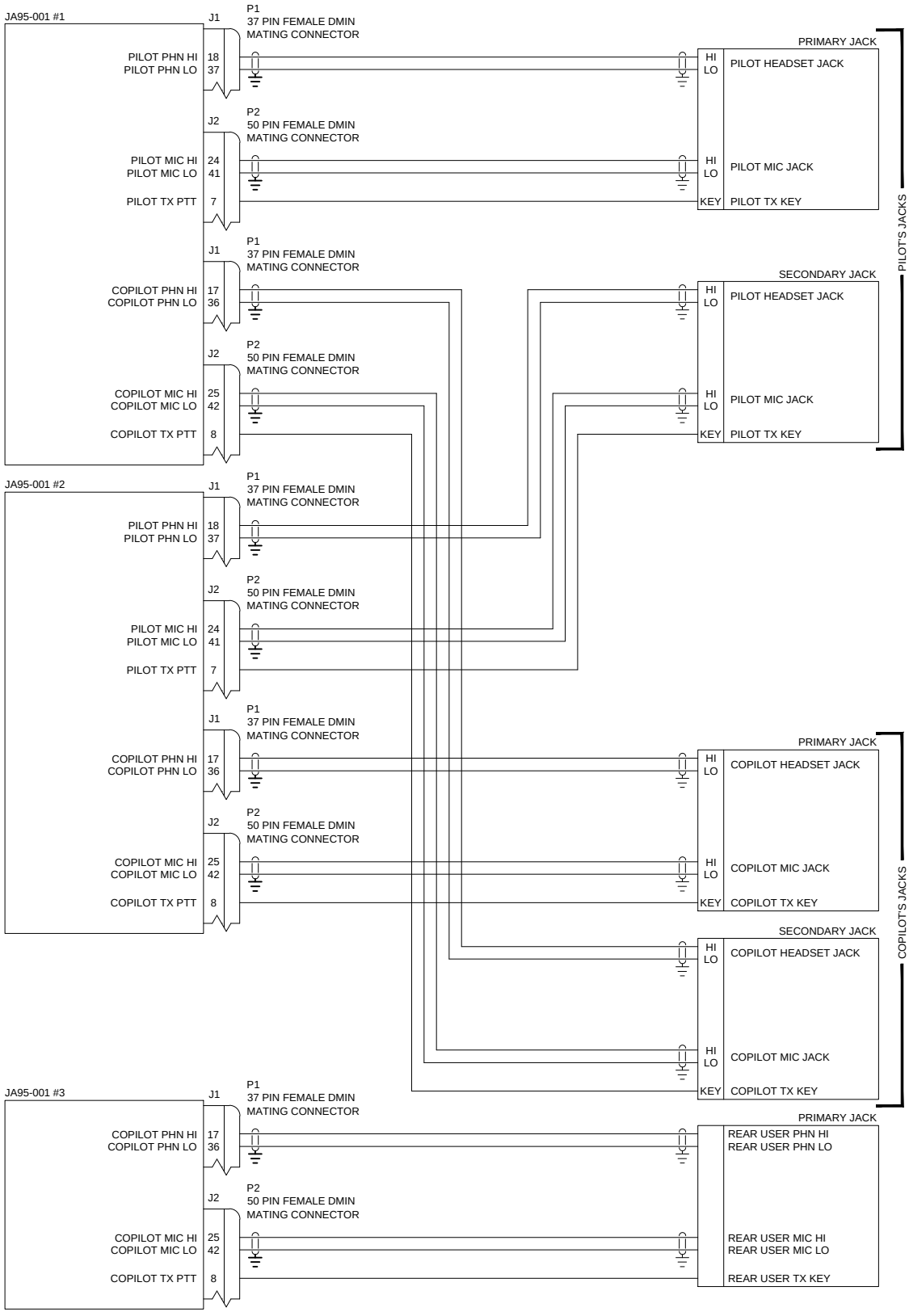
OPTION: PA SYSTEM KEY (PA PTT)



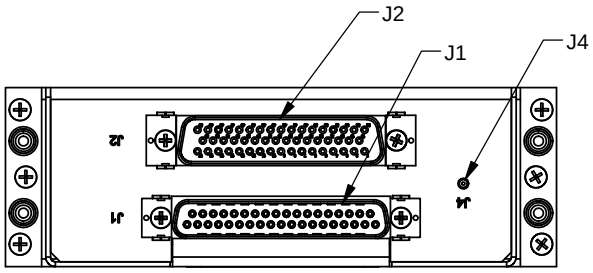
OPTION: CHASSIS GROUND

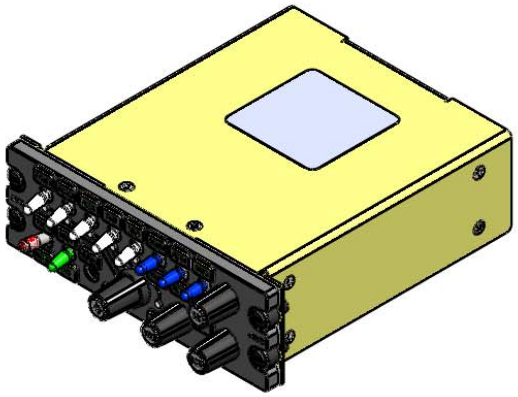
PREPARED	TAT	JUPITER AVIONICS CORPORATION
CHECKED	JAC 01-31-18 SRM	TITLE: Audio Controller Interconnect Options
APPROVED	JAC 01-31-18 KDV	NCAGE CODE: L00N3 / PART NO.: JA95-001 / SHEET: 5/6
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA95-001 Interconnect Rev D.dwg

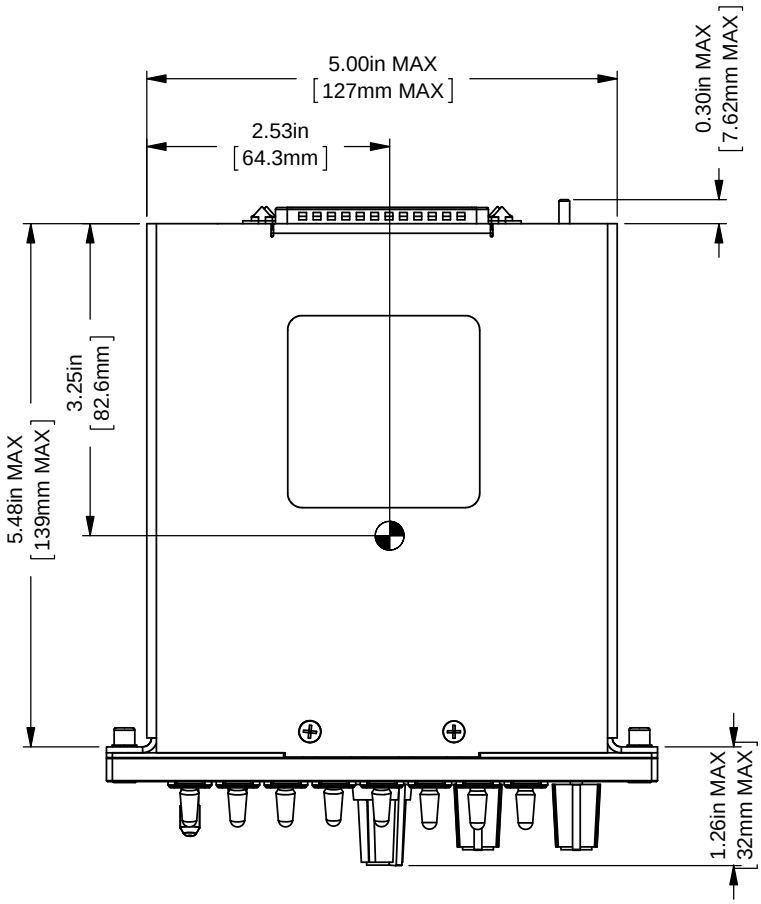
OPTION: MULTIPLE AUDIO CONTROLLER INSTALL

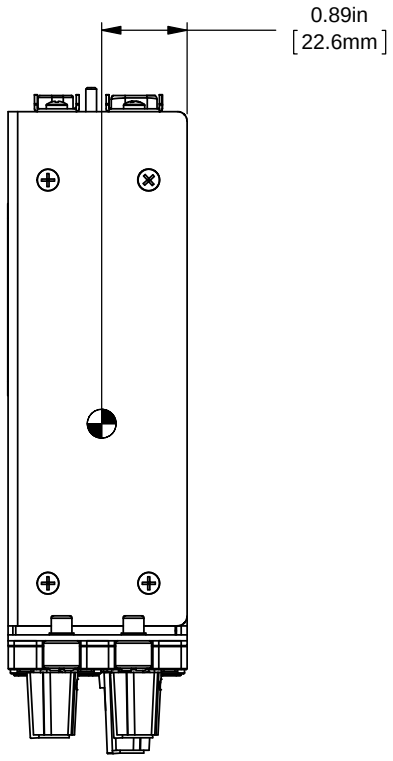


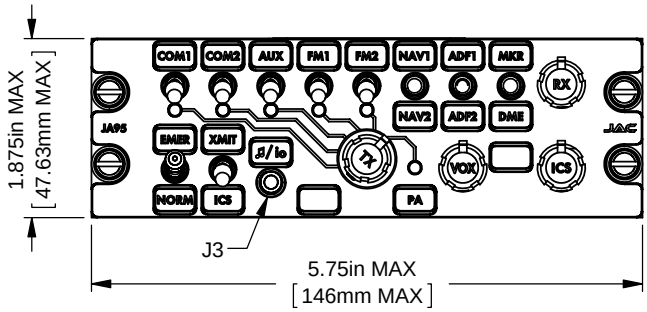
PREPARED	TAT	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 01-31-18 SRM	TITLE: Audio Controller Multiple Audio Controller Option		
APPROVED	JAC 01-31-18 KDV	NCAGE CODE: L00N3	PART NO.: JA95-001	SHEET: 6/6
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JA95-001 Interconnect Rev D.dwg		







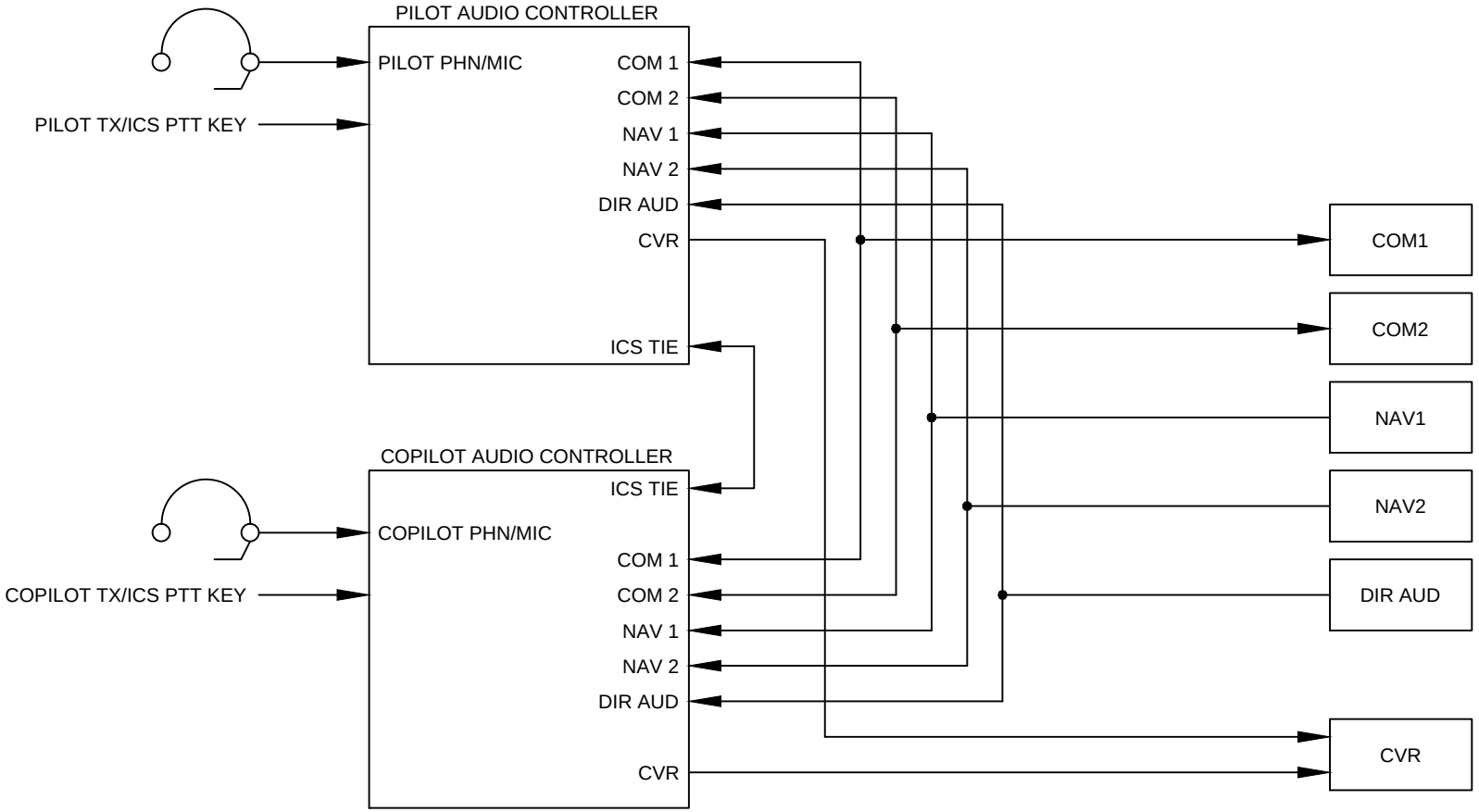




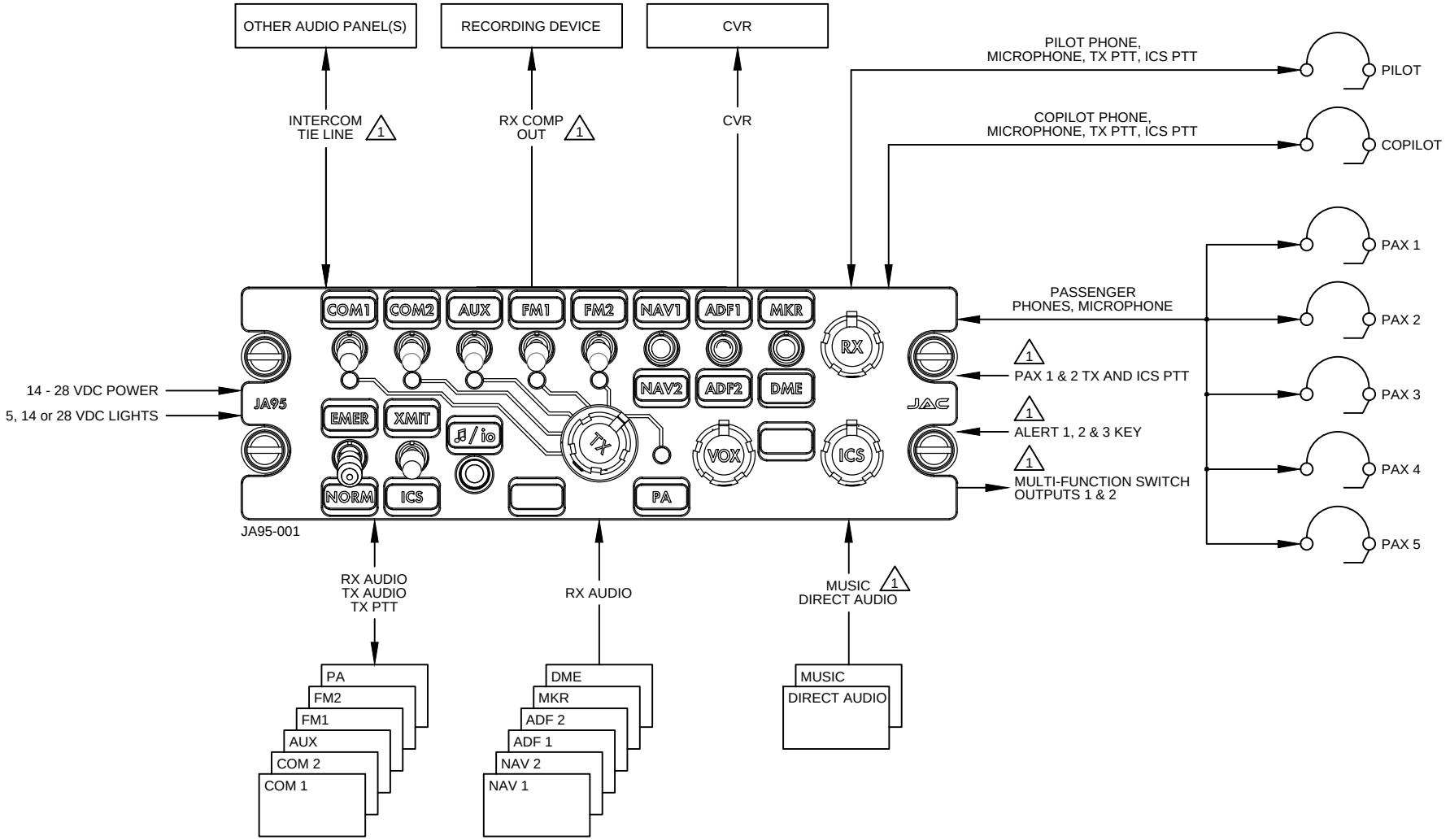
CENTER OF GRAVITY
±0.03in [0.8mm]

WEIGHT: 1.64 lbs [0.74 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 07-31-18 AH	TITLE: Audio Controller
	APPROVED	JAC 07-31-18 KDV	NCAGE CODE: L00N3 / PART NO.: JA95-001 / SHEET: 1/1
MATERIAL: N/A	CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC. NO. JA95-001 Mechanical Installation Rev G.SLDDRW
FINISH: N/A	DRAWING NOT TO SCALE		



PREPARED	TAT	JUPITER AVIONICS CORPORATION	
CHECKED	JAC 01-31-18 SRM	TITLE	Audio Controller Two Audio Controller System
APPROVED	JAC 01-31-18 KDV	NCAGE CODE: L00N3	PART NO.: JA95-001 / SHEET: 1/1
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.	JA95-001 Block Diagram (Two Audio Controller System) Rev A



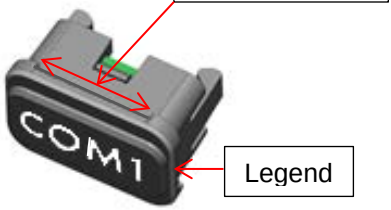
1 CONFIGURABLE FUNCTION

PREPARED	TAT	JUPITER AVIONICS CORPORATION	
CHECKED	JAC 07-31-18 AH	TITLE	Audio Controller Equipment Block Diagram
APPROVED	JAC 07-31-18 KDV	NCAGE CODE L00N3	PART NO. JA95-001 / SHEET 1/1
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.	JA95-001 Equipment Block Diagram Rev B.dwg

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.

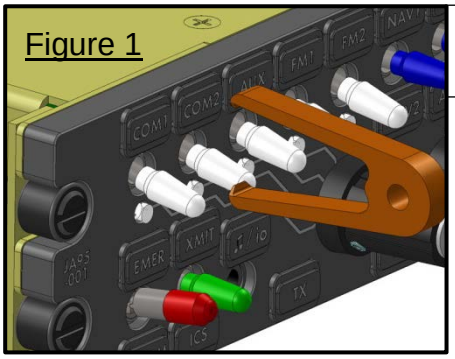
The internal circuitry ensures that, although the legends are individually illuminated, the illumination is consistent and uniform throughout all legends, and never needs to be balanced. This means that if it is a requirement to change the labelling due to damage or for a different project, there is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



Legend Removal

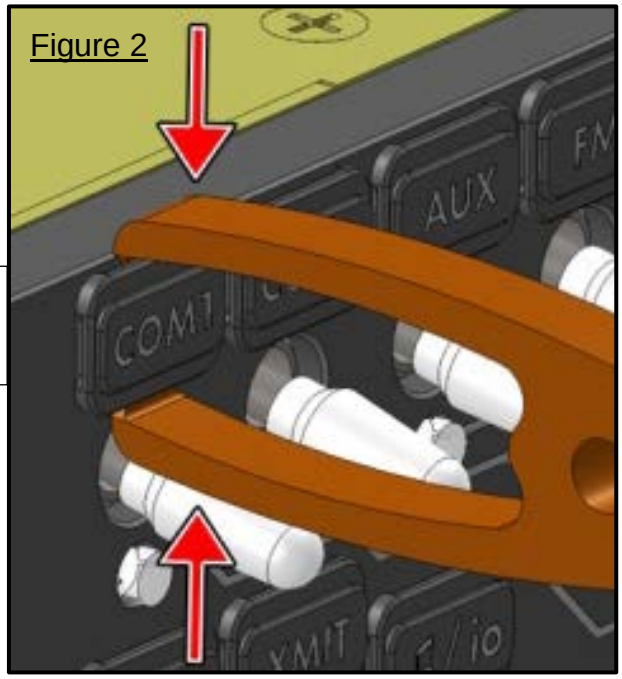
Caution: Take care not to scratch or otherwise damage the faceplate or the legend.

Figure 1



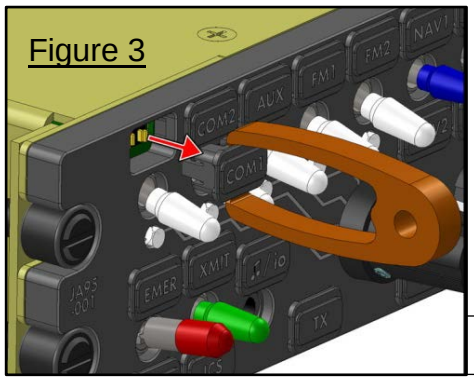
To facilitate legend removal, JAC provides a legend extractor tool - part # TOL-CUST-EXTR (figure 1) that fits into the recesses on the legend.

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 - Certification Documents

B1 Airworthiness Approval

Airworthiness approval of the JA95-001 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 JA95-001 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 JA95-001 Audio Controller in [aircraft location].

The JA95-001 is approved to CAN-TSO-C139 and FAA TSO-C139. The JA95-001 meets RTCA DO-160F environmental qualifications for this installation. See Section 1 of the JA95-001 Installation Manual.

Installed in accordance with the JA95-001 Installation Manual, Revision [ ], and AC 43.13-2, Chapters 2, and 3.

The JA95-001 interfaces with existing aircraft radios per the Installation Manual instructions.

The JA95-001 Installation Manual provides detailed installation instructions and wiring diagrams (Section 2, and Appendices A and B).

Power is supplied to the JA95-001 through an existing [ ]-Amp circuit breaker that was previously used by the original audio panel. The net electrical load is unchanged.

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 JA95-001 Audio Controller is "on condition" only. Refer to the JA95-001 Maintenance Manual. Periodic maintenance of the JA95-001 is not required.

The following sample Instructions for Continued Airworthiness (ICA) provides assistance in preparing ICA for the Jupiter Avionics JA95-001 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 JA95-001 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 JA95-001 installed in an [aircraft make and model].

Applicability: Applies to a Jupiter Avionics JA95-001 installed in an [aircraft make and model].

Definitions/Abbreviations: None, N/A.

Precautions: None, N/A.

Units of Measurement: None, N/A.

Referenced Publications: JA95-001 Installation and Operating Manual
JA95-001 Maintenance Manual
JA95-001 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 JA95-001 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 JA95-001 Operating Manual.

4. Servicing Information

N/A

5. Maintenance Instructions

Maintenance of the JA95-001 is 'on condition' only. Periodic maintenance is not required. Refer to the JA95-001 Maintenance Manual.

6. Troubleshooting Information

Refer to the JA95-001 Maintenance Manual.

7. Removal and Replacement Information

Refer to Section 2 of this manual - the JA95-001 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 JA95-001 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

JA95-001 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 JA95-001 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

B3 Environmental Qualification Form

See next pages.

Prepared:	Checked:	Approved:
KDV	JAC 07-31-18 SRM	JAC 07-31-18 KDV

Nomenclature	Audio Controller		
Type/Model/ Part No.:	JA95-001		
TSO No.:	CAN-TSO-C139; TSO-C139		
Manufacturer's Build Configuration:	*JA95-001 Build Configuration Rev E*		
Manufacturer's Test Report:	*JA95-001 Test Report (Qualification - Final) Rev A*[1] *JA95-001 CAN-TSO Design Change Assessment (BC Rev E) Rev A*[2]		
Manufacturer's Specification and/or Other Applicable Specification:	*JA95-001 Declaration of Design and Performance (BC Rev E) Rev A*		
Manufacturer:	Jupiter Avionics Corporation		
Address:	1959 Kirschner Road, Kelowna, BC, Canada, V1Y 4N7		
Revision & Change No of DO-160:	Rev. F dated December 6, 2007	**Dates Tested:**	Sept 28 - Dec 27, 2012

CONDITIONS	SECTION	DESCRIPTION OF TESTS CONDUCTED
Temperature	4.5	Equipment tested to Category [C4]
Ground Survival Low Temperature	4.5.1	Equipment tested to Category C4, (-55 °C)
Short-Time Operating Low Temperature	4.5.1	Equipment tested to Category C4, (-45 °C)
Operating Low Temperature	4.5.2	Equipment tested to Category C4, (-45 °C)
Ground Survival High Temperature	4.5.3	Equipment tested to Category C4, (+85 °C)
Short-Time Operating High Temperature	4.5.3	Equipment tested to Category C4, (+70 °C)
Operating High Temperature	4.5.4	Equipment tested to Category C4, (+70 °C)
In-Flight Loss of Cooling	4.5.5	Equipment identified as Category X, no test performed
Altitude	4.6	Equipment tested to Category [(A1)(D1)]
Altitude	4.6.1	Equipment tested to Category D1, (50,000 ft)
Decompression	4.6.2	Equipment tested to Category A1, (8,000 to 50,000 ft)
Overpressure	4.6.3	Equipment tested to Category A1, (-15,000 ft)
Temperature Variation	5.0	Equipment tested to Category B (5 °C/min)
Humidity	6.0	Equipment tested to Category A (48 hours)

CONDITIONS	SECTION	DESCRIPTION OF TESTS CONDUCTED
Operational Shock and Crash Safety	7.0	
Operational Shock		Equipment tested to Category B (6 g for 11 ms)
Crash Safety (impulse)		Equipment tested to Category B (20 g for 11 ms)
Crash Safety (sustained)		Equipment tested to Category B (20 g for 3 sec)
Vibration[3]	8.0	Equipment tested to Categories:
Fixed Wing - Sine		SM
Fixed Wing - Random		SB
Helicopter - Random, unknown		U2FF1
Explosive Atmosphere	9.0	Equipment identified as Category X, no test performed
Waterproofness	10.0	Equipment identified as Category X, no test performed
Fluids Susceptibility	11.0	Equipment identified as Category X, no test performed
Sand and Dust	12.0	Equipment identified as Category X, no test performed
Fungus	13.0	Equipment identified as Category X, no test performed
Salt Fog Test	14.0	Equipment identified as Category X, no test performed
Magnetic Effect	15.0	Equipment tested to Category Z (0 < D < 0.3 m)
Power Input	16.0	Equipment tested to Category:
DC Equipment		Z (+28 Vdc equipment), B (+14 Vdc and + 28 Vdc equipment)
DC Current Ripple		X, no test performed
DC Inrush		X, no test performed
Voltage Spike	17.0	Equipment tested to Category A (600Vp, 10 us)
Audio Frequency Susceptibility	18.0	Z (+28 Vdc equipment), B (+14 Vdc equipment)
Induced Signal Susceptibility	19.0	Equipment tested to Category [ZC]
Magnetic Fields into Equipment		20 A at 400Hz
Magnetic Fields into Cables		30 A-m at 400Hz
Electric Fields into Cables		1800V-m at 400Hz
Voltage Spikes into Cables		L=3.0m

CONDITIONS	SECTION	DESCRIPTION OF TESTS CONDUCTED
Radio Frequency Susceptibility[4] Radiated Conducted	20.0	Equipment tested to Category [RR] R (20 V/m CW&SW) and (150 V/m PM) R (30 mA)
Radio Frequency Emission[4]	21.0	Equipment tested to Category H
Lightning Induced Transient Susceptibility[4] Pin Injection Cable Bundle	22.0	Equipment tested to Category [A3J33] Waveform Set A, Test Level 3 Waveform Set J, Test Levels 33
Lightning Direct Effects	23.0	Equipment identified as Category X, no test performed
Icing	24.0	Equipment identified as Category X, no test performed
Electrostatic Discharge	25.0	Equipment identified as Category X, no test performed
Fire, Flammability	26.0	Equipment identified as Category X, no test performed
Other Tests	N/A	N/A

REMARKS

1 Test information can be found in Jupiter Avionics document:
JA95-001 Test Report (Qualification - Final) Rev A

2 All tests were performed on the JA95-001 Build Configuration Rev D (BC Rev D). A similarity analysis between the two products is detailed in the Jupiter Avionics Corp. document:
JA95-001 CAN-TSO Design Change Assessment (BC Rev E) Rev A

3 During exposure to vibration test conditions the following critical resonances changed frequency greater than 2.5%:

Orientation	Initial Freq.	Final Freq.
Horizontal	72.5 Hz	75.0 Hz
Vertical	338 Hz	329 Hz
	203 Hz	208 Hz
Lateral	140 Hz	136 Hz
	156 Hz	168 Hz
	169 Hz	157 Hz
	265 Hz	285 Hz

4 Testing of Radio Frequency Susceptibility, Radio Frequency Emission and Lightning Induced Transient Susceptibility was conducted at CKC Laboratories in Bothell, WA, USA.
Reference report: *JA95-001 Test Report (CKC Labs DO-160F Section 20, 21, 22 – 2012-11-26 to 30) Rev A*