JRAC2-004

Dual Remote Audio Controller

Installation and Operating Manual

Rev. A

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IMPORTANT:

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www.jupiteravionics.com

RECORD OF REVISIONS			
Revision	**Rev Date**	**Description**	**ECR**
A	Apr 2019	Initial release, Serial number 1001 and higher.	4815

Prepared:	Checked:	Approved:
MPB	JAC 05-03-19 MB	JAC 05-08-19 KDV

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SECTION 1 - DESCRIPTION

1.1 System Overview

The JRAC2-004 Dual Remote Audio Controller is part of an aircraft audio system consisting of two control devices and the dual remote audio controller.

The dual remote audio controller distributes and controls all transceiver and receiver audio in an aircraft. It routes microphone audio to a selected transceiver and distributes all intercom audio.

The user operates the dual remote audio controller via the user control device where control commands are sent to the remote audio controller via a serial data signal. The control commands manage all user selectable functions of the dual remote audio controller.

The dual remote audio controller is used in a stand-alone configuration (one remote audio controller and two control devices). An emergency operating mode connects USER 1 to the COM1 transceiver, NAV1 receiver and all four Direct Audio sources and connects USER 2 to the COM2 transceiver, NAV2 receiver and all four Direct Audio sources.

The dual remote audio controller is set up on a per-installation basis using a configuration cable and a PC running the product configuration application to download system configuration settings via the configuration connectors. To facilitate future customizations and certification, neither software nor complex electronic devices are used in the JRAC2-004 design.

1.2 Features Overview

The JRAC2-004 provides independent volume control for each radio receive audio, interfaces to the radio receive audio and user phones and to the control device. It provides interfaces to the power, radio microphone and user microphone connections and a 3.5 mm connector for the configuration signal. It provides support for low impedance headsets.

The JRAC2-004 allows adjustment of numerous input and output levels, and several audio paths are selectable using the configuration application ProCS (Product Configuration Software) by writing to the configuration connectors using a configuration cable.

The JRAC2-004 supports up to ten transceivers and four receivers.

The JRAC2-004 supports four Direct Audio inputs.

The JRAC2-004 supports two CVR outputs.

The JRAC2-004 supports transmit access for four users (User 1, User 2, User 3 and User 4).

The JRAC2-004 supports intercom functions for up to eight users.

The JRAC2-004 supports two receive mute inputs.

The JRAC2-004 microphone and headphone impedance can be configured as low or high.

The JRAC2-004 supports two separate music inputs.

1.3 Inputs and Outputs

Refer to the JRAC2-004 connector maps for the mating connector designators and pin assignments for the input and output signals.

1.3.1 Inputs

Name	**Qty**	**Type** (Connector)
COM1 to 10 RX HI/LO, NAV1 to 4 RX HI/LO	14	Audio signal
CONFIG DATA TO AUDIO	2	Data signal (J5, J3)
CONFIG MODE SELECT	4	Multi format signal (J5, J3)
DIRECT 1 to 6 HI/LO	6	Audio signal
ICS ISOLATE MODE	1	Active low discrete
POWER INPUT	1	Power supply
USER 1 to 4 TX PTT	4	Active low discrete
USER 1 to 8 ICS PTT	8	Active low discrete
USER 1 to 8 MIC HI/LO	8	Audio signal
USER 1 & 2 CONTROL DATA TO JRAC2	2	Data signal
USER 2 MUSIC LEFT/RIGHT	2	Audio signal
USER 1 MUSIC LEFT/RIGHT	2	Audio signal
USER 1 & 2 NORM MODE SELECT	2	Active low discrete
USER 1 & 2 RESET INPUT	2	Active low discrete
USER 1 & 2 RX MUTE	2	Active low discrete

1.3.2 Outputs

Name	**Qty**	**Type**
CONFIG DATA FROM AUDIO	2	Data signal (J3, J5)
COM1 to 10 MIC HI/LO	10	Audio signal
COM1 to 10 PTT	10	Active low discrete
USER 1 & 2 CONTROL DATA FROM JRAC2	2	Data signal
USER 1 & 2 CVR HI/LO	2	Audio signal
USER 1 to 8 PHONES HI/LO	8	Audio signal
USER 1 & 2 POWER/GROUND OUTPUT	2	Power output
USER 1 & 2 RX COMP HI/LO	2	Audio signal
USER 1 & 2 RESET OUTPUT	2	Active low discrete (set via ProCS)
USER 1 & 2 TX ACTIVE	2	Active low discrete

1.3.3 Bi-directional Ports

Name	**Qty**	**Type**
ICS TIE HI/LO	1	Audio signal

1.4 Specifications

1.4.1 Electrical Specifications

Transmit Connector Power Input

Primary nominal voltage	28 Vdc
Maximum voltage	32.2 Vdc
Minimum voltage	20.5 Vdc
Emergency voltage	18.0 Vdc
Input current	≤ 1.5 Adc

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 (High impedance)	250 mVrms ±10%
Microphone input level (Low impedance)	250 uVrms ±10%
Intercom Tie Line type 1 input level	340 mVrms ±10%
Intercom Tie Line type 2 input level	1.20 Vrms ±10%

Rated Output Power

Phone high impedance rated output	12.3 Vrms ±10%
Phone low impedance rated output	1.42 Vrms ±10%
Phone high impedance rated output, in emergency mode or with power input ≤15 Vdc	2.10 Vrms ±10%
Phone low impedance rated output, in emergency mode or with power input ≤15 Vdc	2.10 Vrms ±10%
Phone rated output power, with MUSIC input	6.14 Vrms ±10%
COM Mic 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 USER MIC	1.00 Vrms ±10%
CVR rated output, in emergency mode,	500 mVrms ±20%
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

Distortion Characteristics

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

Input Impedance

High impedance Microphone input Impedance	150 Ω ±10%
Low impedance Microphone input Impedance	5 Ω ±10%
Direct Audio input Impedance	1000 Ω ±10%
Receive Audio input Impedance	1000 Ω ±10%
Music input Impedance	1000 Ω ±10%
ICS Tie Line Audio input Impedance	2000 Ω ±10%

Output Load

Headphone High impedance load	600 Ω ±10%
Headphone Low impedance load	8 Ω ±10%
COM 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 Control

Receive Audio control variation	32 ±3 dB
Master Receive Audio control variation	32 ±3 dB
ICS Audio control variation	40 ±3 dB

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
Noise level below the rated output (Low Impedance Mic)	≥ 40 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
High impedance Mic inputs designed for microphone type	amplified dynamic / electret
Low impedance Mic inputs designed for microphone type	dynamic
Microphone inputs bias voltage	15 Vdc ±10%
Microphone inputs circuitry type	single ended
USER 2 MUSIC LEFT / RIGHT audio input circuitry type	differential
USER 1 MUSIC LEFT / RIGHT audio input circuitry type	single ended
MUSIC attenuation	≤ -38 dB
RECEIVE AUDIO input circuitry type	differential
PHONES HI / LO output circuitry type	single ended
COM MIC output circuitry type	differential
RX Composite Audio output circuitry type	differential
ICS TIE HI / LO Circuitry Type	differential
VOX Threshold level range relative to rated MIC input	-28 to +6 dB
VOX Delay Time range	0.5 to 2.0 seconds

1.4.1.3 Discrete Signals

Active low control input, active signal level	≤ +3 Vdc
Active low control input shall be inactive when the signal is	≥ +10 Vdc
Active low control input signals, when active, sources	0.1 to 10 mA
Active low control input signals have an internal pull-up resistor	
Active low control output, active output	≤ +2 Vdc
Active low control output signals, when active, sinks	≤ 1 A

1.4.2 Mechanical Specifications

Height		2.60 in [66.0 mm] max
Depth		6.80 in [172.7 mm] max
Width		6.28 in [159.5 mm] max
Weight		2.45 lb [1.11 kg] max
Connectors (5):	J1 (Receive) J2 (Transmit) J3 (Control) J4 (Ground) J5 (Configuration)	One 62-pin D-Sub male lock posts One 62-pin D-Sub male V5 locks One 26-pin D-Sub male lock posts One 4-40 stud, 0.5 in max One 4 pole 3.5mm stereo jack
Mounting (2 axes)		4 x 10-32 fasteners
Bonding		≤ 2.5 mΩ
Installation kit part number		INST-RAC24

1.4.3 Configuration Connector

The JRAC2-004 configuration connector communication standard for CONFIG DATA TO AUDIO data input signal and CONFIG DATA FROM AUDIO data output signal is RS-232.

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 JRAC2-004 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

This product manufactured by JAC is 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 JRAC2-004 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 JRAC2-004 can be mounted in any attitude and location with sufficient clearance for the connector and wiring harness. It requires no direct cooling.

2.4.4 Post Installation Checks

2.4.4.1 Voltage/Resistance checks.

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

a) Check P1 pin **62** for continuity to ground (less than 0.5 Ω).
b) Check P2 pin **22** for +28 Vdc relative to ground
c) Check P2 pin **43** for continuity to ground (less than 0.5 Ω).
d) Check P2 pins **11** to **19**, **33**, **42** and **54** for continuity to ground (less than 0.5 Ω) when the relevant switch is closed.
e) Check P3 pins **10**, **11** and **18** for continuity to ground (less than 0.5 Ω) when the relevant switch is closed.
f) Check P3 pins **3** and **21** for continuity to ground (less than 0.5 Ω) when NORMAL mode is selected.
g) Check all pins for shorts to ground or adjacent pins.

2.4.4.2 Configuration

Ensure that the JRAC2-004 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.

2.4.4.3 Power on Checks.

Power up the aircraft's systems and confirm normal operation of all functions of the JRAC2-004. Refer to Section 3 (Operation) for specific operational details.

a) Begin with only the User 1 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 User 2 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 configuration 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 JRAC2-004 internal adjustments are set from the Product Configuration Software ProCS™. Configuration data is sent to the JRAC2-004 via the configuration connector, 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 JRAC2-004, 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 JRAC2-004 are not included with the unit.

Cabling option 1:

Quantity	Description	JAC Part #
1	USB A to Dsub 9-Pin Cable	CAB-USB-0002
1	Dsub 9-Pin to 3.5 mm 4 pole and 3 pole, Cable	JA99-001

Cabling option 2:

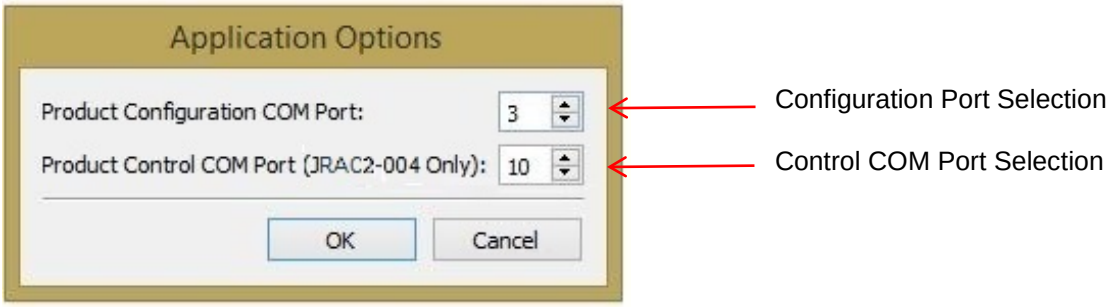
Quantity	Description	JAC Part #
1	USB A to 3.5 mm 4 pole	CAB-USB-0006

2.5.2 ProCS™ Setup

The ProCS™ JRAC2-004 menu item 'ProCS Setup' provides Setup drawings showing the cabling arrangement for connecting the JRAC2-004 to a computer running the ProCS™.

2.5.3 JRAC2-004 ProCS™ Connection

2.5.3.1 Selecting COM ports:



JRAC2-004 configuration requires one COM port connected to a configuration connector via the JA99-001 Configuration cable. The COM ports are selected from Edit > Options in the main ProCS menu. The Application Options window will open.

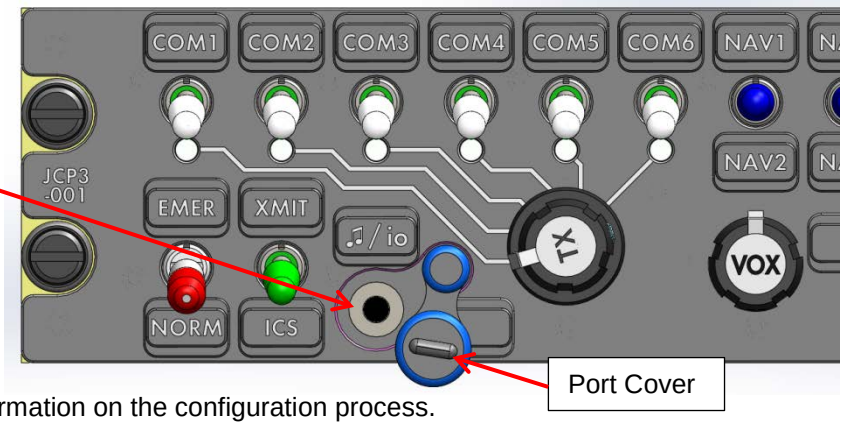
The designated Product Configuration COM Port confirmed during ProCS installation (see ProCS Installation and Operation Manual section 2.4.2) can be selected through this window.

The Product Control COM Port is also set from this window.

2.5.3.2 In a System with a JAC Control Panel

If the JRAC2-004 is installed in a system with a Jupiter Avionics Corporation JCPx-xxx Control Panel, the JRAC2-004 may be configured via the front panel ♬/io connector on the control panel.
Refer to **ProCS Setup – JCP3-001**.

The connector is located under a port cover which may be lifted clear or rotated to one side, as shown.



Refer to the ProCS™ manual for complete information on the configuration process.

2.5.3.3 In a System without a JAC Control Panel

If there is no JAC Control Panel in the system, configuration is carried out by connecting a computer running ProCS™ to the J5 rear connector of the JRAC2-004, as shown in the JRAC2-004 ProCS Setup lines.

Note: It is important to be aware that some of the screens shown may appear slightly differently, depending on whether or not a JRAC2-004 is connected.

2.5.4 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 JRAC2-004, power must be applied to the unit.

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

2.5.4.1 JRAC2-004 Virtual Control Panel

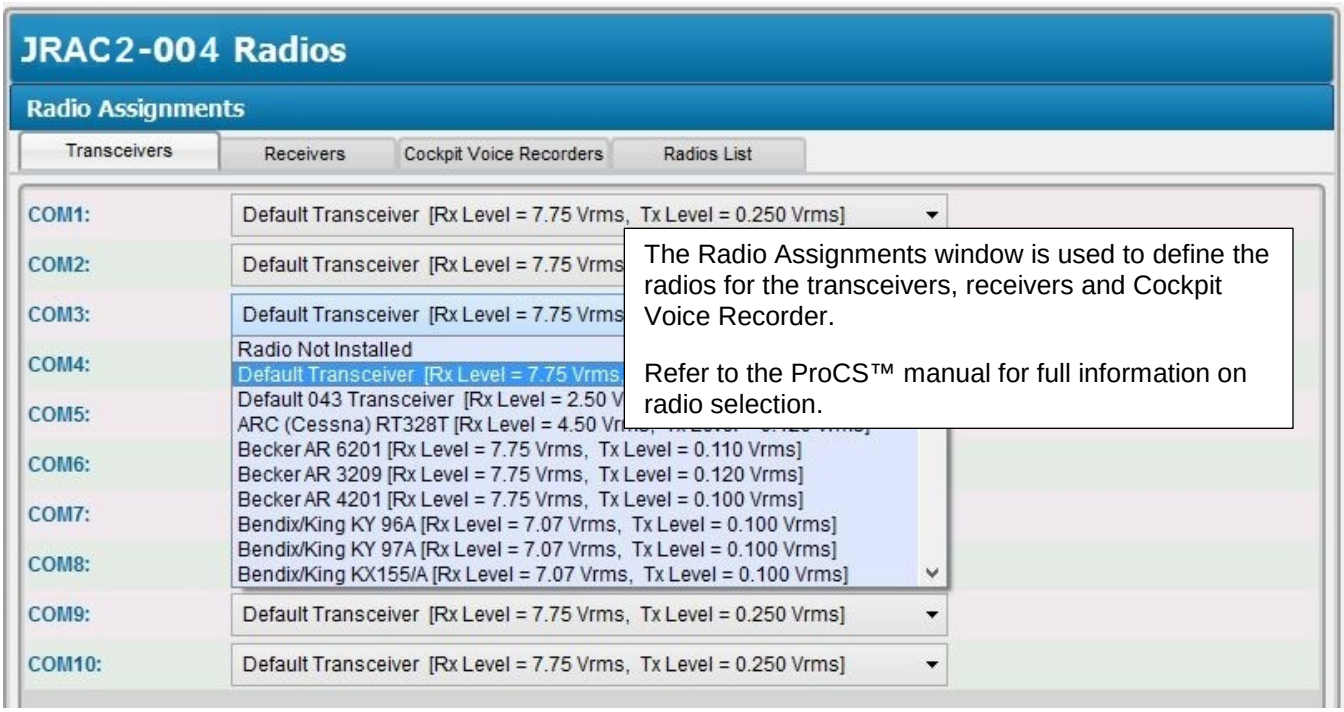
This Virtual Control Panel is used to define the 'names' associated with the control legends. The selected name will be used in all subsequent references to the associated transceiver/receiver, and will be used on the custom-generated Connector Maps and Interconnects.

For complete information on legend assignment, refer to the ProCS™ manual.

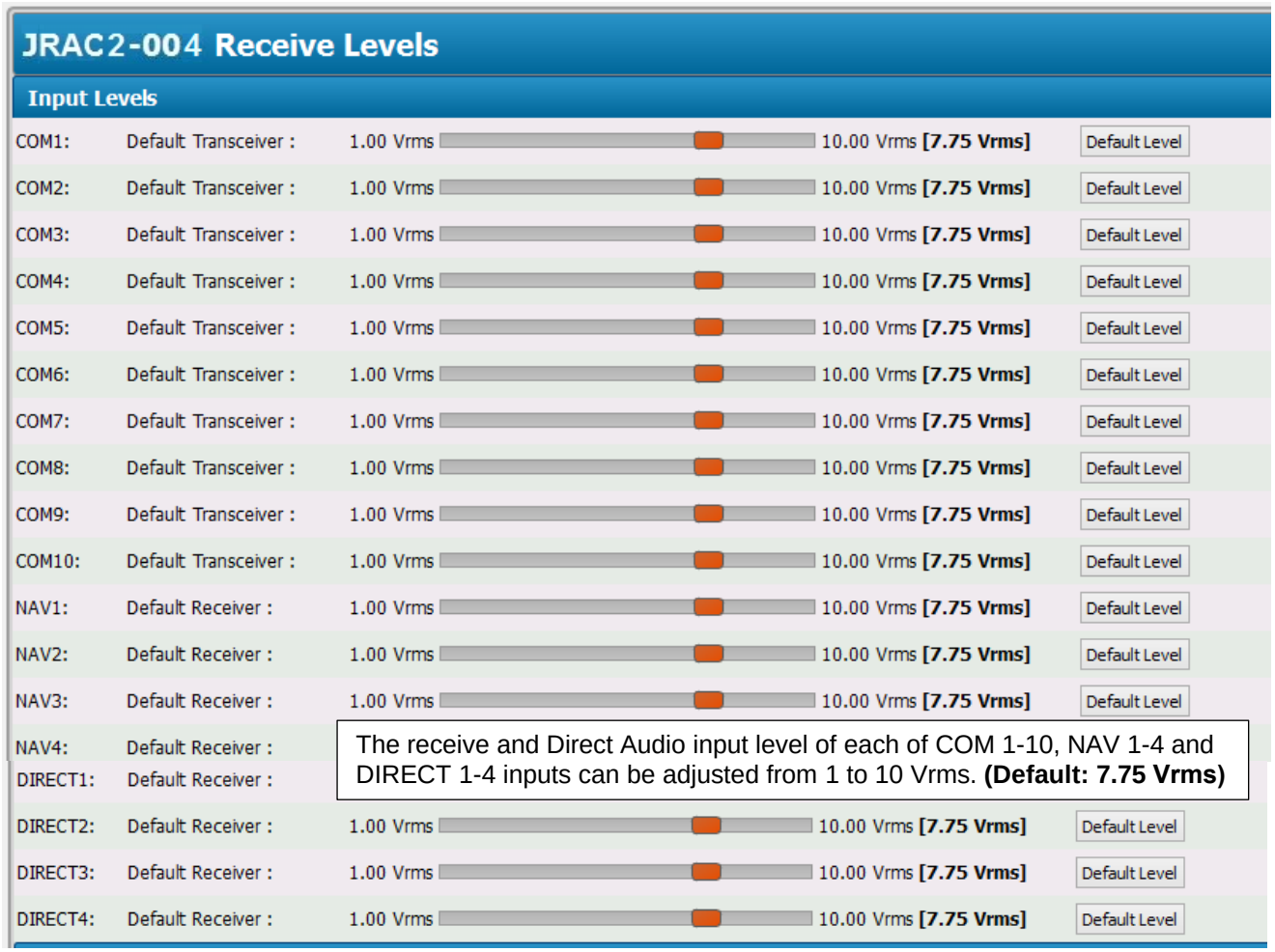
Note: It may be necessary to use the scroll bar to view all parts of this screen.

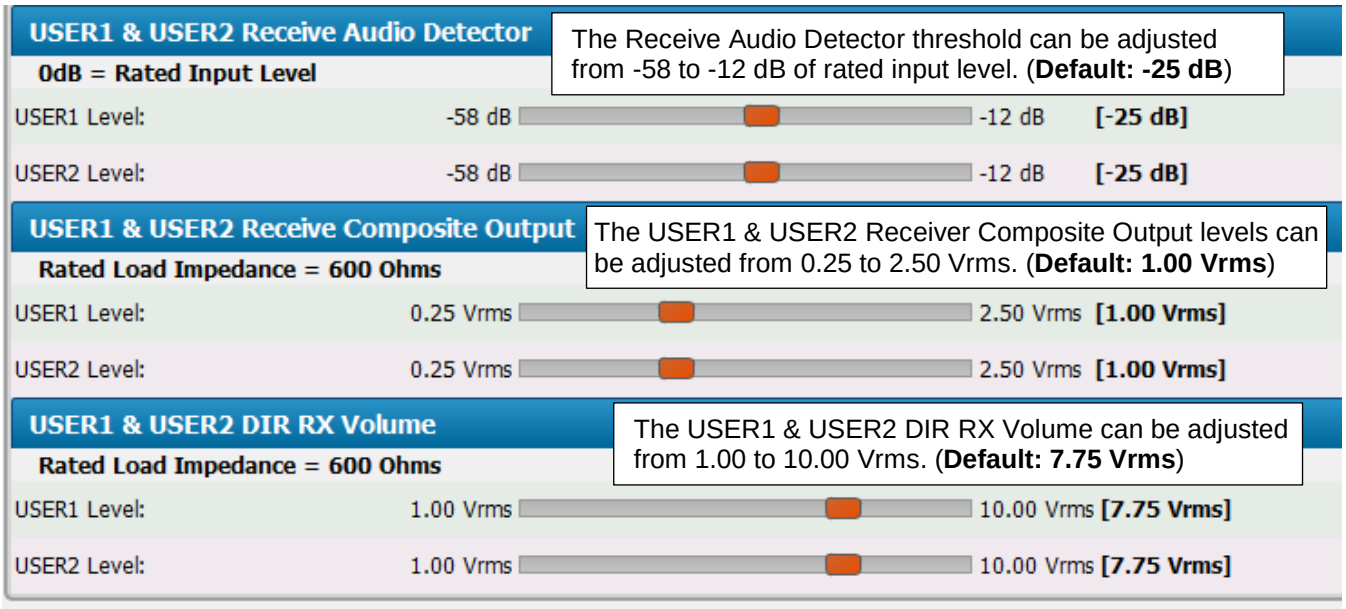
Also see section 2.6 Virtual Control Panel.

2.5.4.2 JRAC2-004 Radios

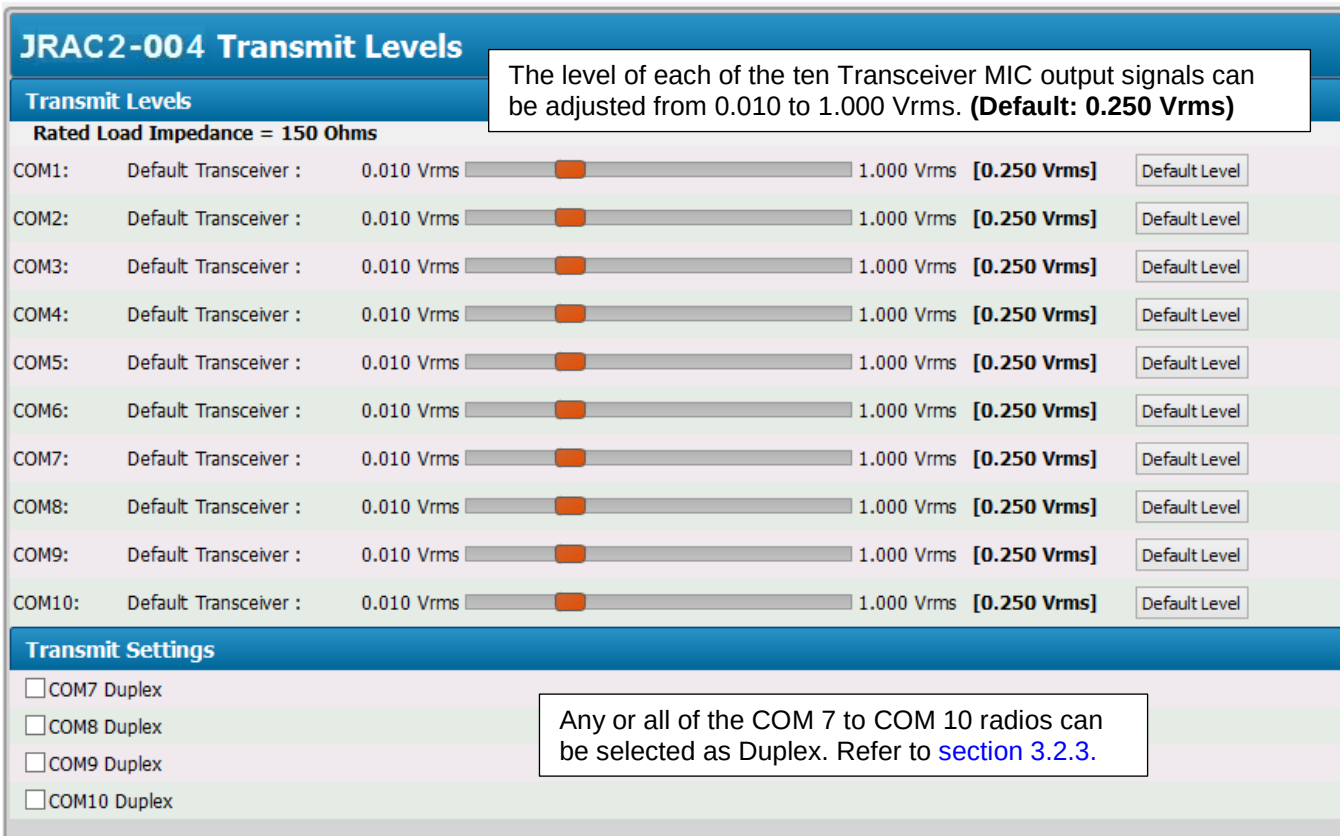


2.5.4.3 JRAC2-004 Receive Levels

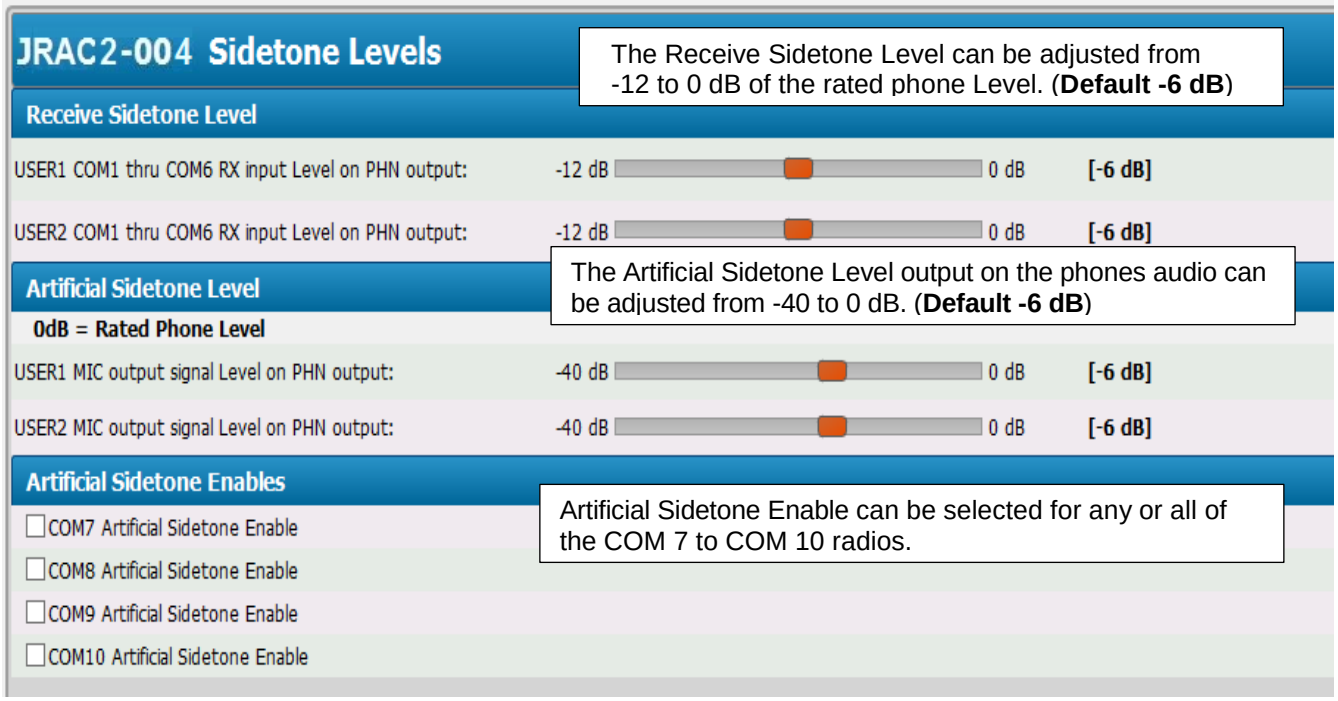




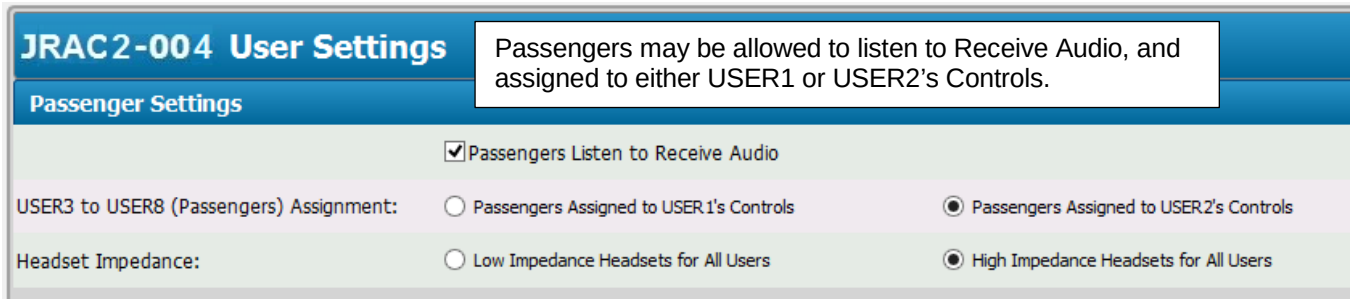
2.5.4.4 JRAC2-004 Transmit Levels



2.5.4.5 JRAC2-004 Sidetone Levels



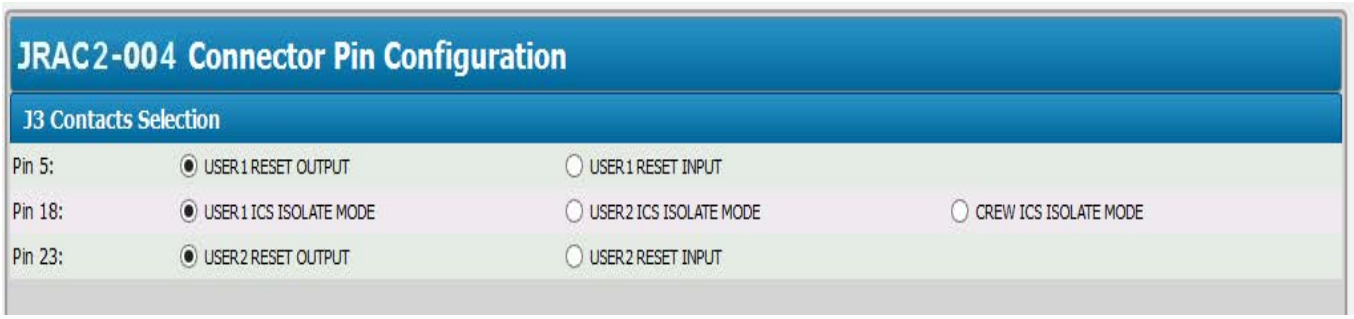
2.5.4.6 JRAC2-004 User Settings



2.5.4.7 JRAC2-004 Connector Pin Configuration

Several of the connector pins can be configured to meet the requirements of specific installations.

Refer to the JRAC2-004 Interconnect.



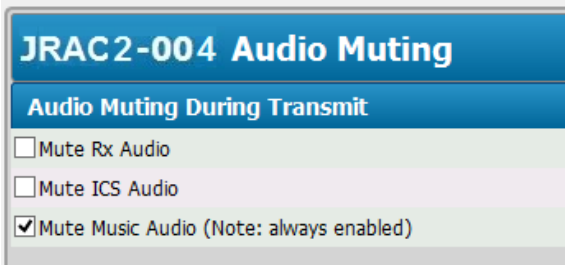
Note: The JRAC2-004 may be configured to allow USER1 ICS Isolate, USER2 ICS Isolate, or Crew (USER1 and USER2) ICS Isolate.

2.5.4.8 JRAC2-004 Audio Muting (During Transmit)

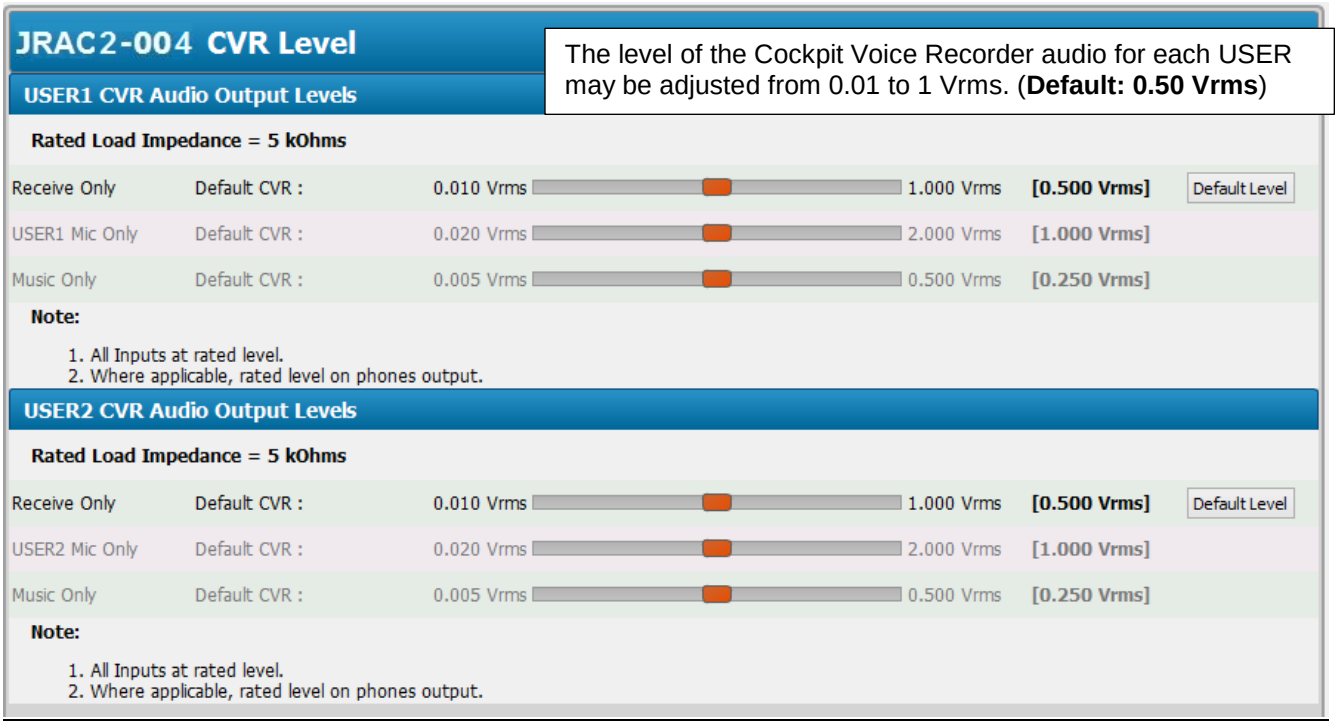
When the Mute RX Audio check box is checked the Receive Audio is muted during transmit (**Default: unchecked**)

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

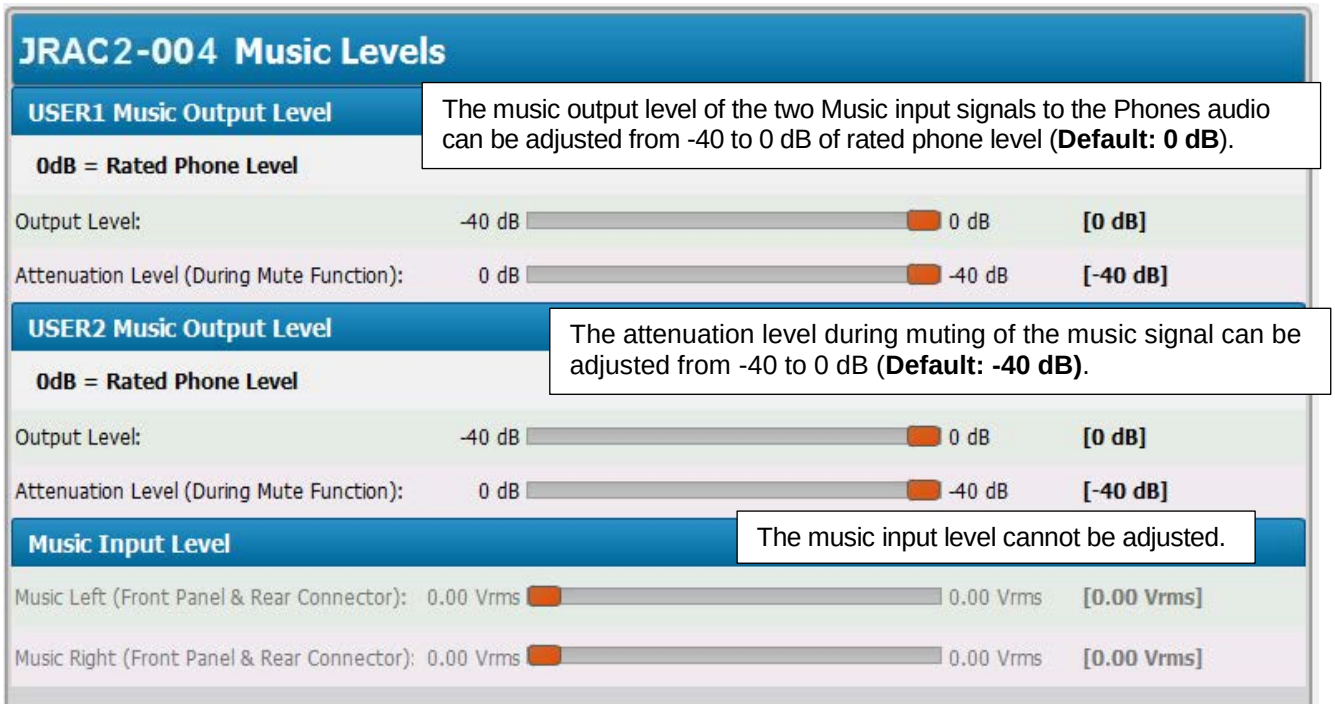
The Mute Music Audio check box is checked and Music Audio is always muted during transmit.



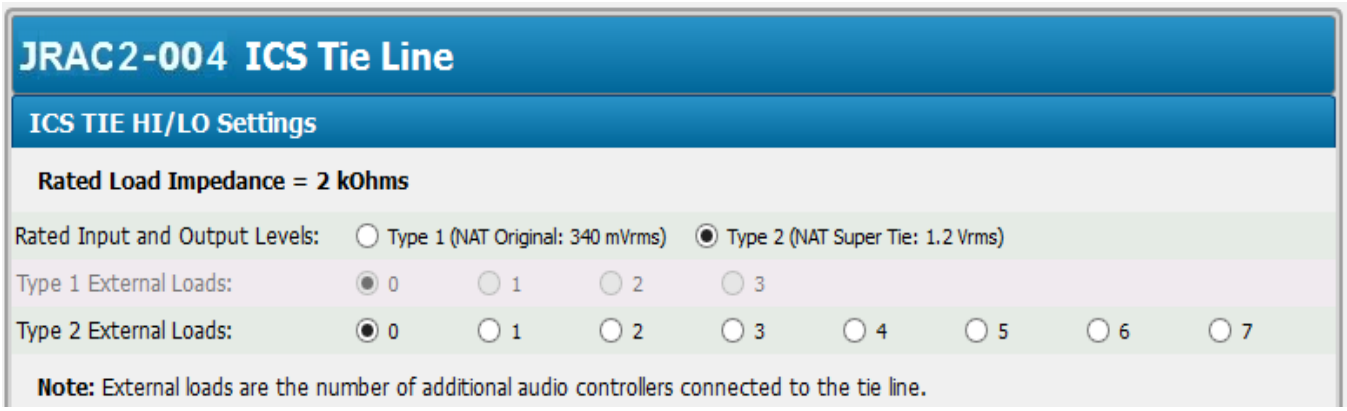
2.5.4.9 JRAC2-004 CVR Level



2.5.4.10 JRAC2-004 Music Levels



2.5.4.11 JRAC2-004 ICS Tie Line

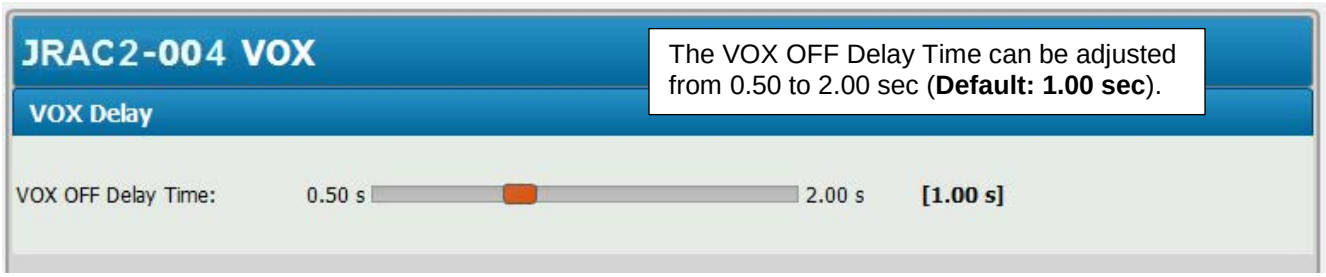


The rated input and output levels of the intercom tie line can be selected as Type 1 or Type 2 (**Default: Type 2**).

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**).

2.5.4.12 JRAC2-004 VOX



2.5.4.13 JRAC2-004 Connector Maps

The Connector Maps section is used to generate custom Connector Maps and Interconnects for use by the installing agency.

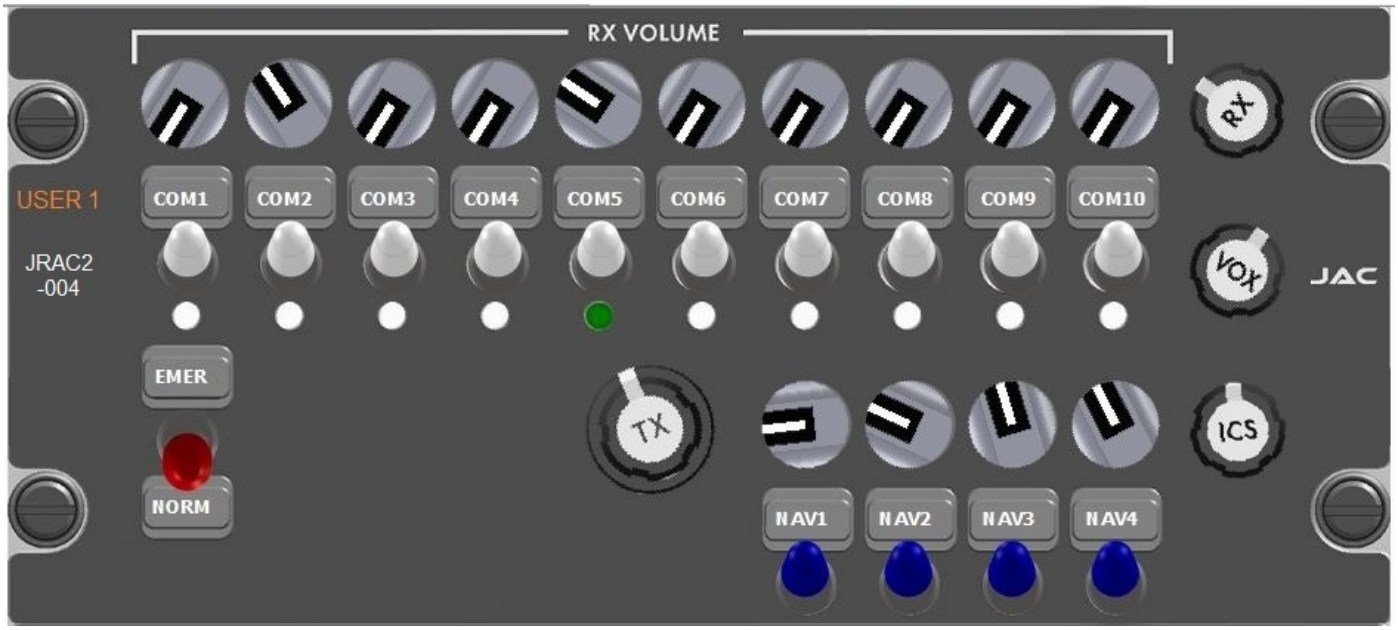
2.5.5 Other Configuration Features

In the JRAC2-004 Product Information Window, the model number, serial number, MOD status and check sum of the JRAC2-004 audio panel can be stored and viewed.

2.6 Virtual Control Panel

The Virtual Control Panel for the JRAC2-004 is a computer application that is part of the ProCS™. The JRAC2-004 Virtual Control Panel can be used to control an attached JRAC2-004 for test or demonstration purposes. The Virtual Control Panel communicates with the JRAC2-004 via the Product Control serial Communication Port (see section 2.5.2). Control data is sent to the JRAC2-004 via the control connectors using cable CAB-USB-0010. (See the ProCS application's page JRAC2-004 > ProCS Setup - Product Control)

2.6.1 Virtual Controls



From the Virtual Control Panel the operator may use the mouse pointer to change the position of the virtual switches and rotary controls; and observe the status of the Transmit Select Annunciators and the Transmit Annunciator.

The JRAC2-004 Virtual Control Panel controls either the USER 1 or the USER 2 portion of the JRAC2. To control both USERS simultaneously, launch two instances of the ProCS application and configure the serial communication port for one instance as USER 1 and the other instance as USER 2.

The operating instructions that follow are written of the USER 1 Virtual Control Panel. When using the virtual control panel connected to the USER 2 portion of the JRAC2 all operating instructions are for USER 2.

2.6.1.1 Transceiver and Receiver Controls

The COM Transceivers and NAV receivers can be selected for receiving by placing the associated receive select switch in the up position. This is done by clicking the switch with the mouse pointer. (All toggle switches operate this way unless otherwise described).

The COM and NAV individual receive volume controls are adjusted by clicking and holding the knob and then dragging the mouse pointer until the knob is at the required position. (All rotary controls operate this way)

2.6.1.2 Transmit Selection Control and Annunciators

To select a transceiver for transmit, rotate the TX transmit select rotary control. The transceiver that is selected for transmit (COM5 shown) has the associated Transmit Select Annunciator's color change to green.

2.6.1.3 EMER / NORM Mode Selection

To put the JRAC2 in to emergency operating mode, place the EMER / NORM mode switch of either USER 1 or USER 2 virtual control panel in the EMER position. To put the JRAC2 in normal operating mode both the USER 1 virtual control panel and the USER 2 virtual control panel must have the EMER / NORM mode switches in the NORM position.

2.6.1.4 Master RX Volume control

To adjust the receive audio level of all receive sources in the headphones, adjust the master RX volume control.

2.6.1.5 VOX Control

To adjust the microphone audio level required to route the microphone to the ICS audio, adjust the VOX level control.

2.6.1.6 ICS Volume control

To adjust the ICS audio level in the head phones, adjust the ICS volume control.

2.6.1.7 XMIT / ICS switch

To have the USER 1 microphone transmit on the transceiver selected for transmit, click and hold on the upper portion of the XMIT / ICS switch.

To have the USER 1 microphone routed to the ICS audio signal, click and hold on the lower portion of the XMIT / ICS switch.

2.6.1.8 TX Annunciator

The TX Annunciator's colour is green when any transceiver is transmitting.

2.7 Installation Kit

CON-5150-0440
CON-5300-0115
CON-5300-0137
CON-5500-0375
CON-5500-0625
WIR-HTSK-1000

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

The installation kit (Part # INST-RAC24) consists of the following:

Qty	Description	JAC Part #
88	Machined 22 AWG wire size - Mil Spec, D-Subminiature - Crimp Socket	CON-3320-0354
1	62 pin D-sub connector with hood and crimp sockets, Crimp Socket Connector Assy	CON-3430-0062
1	26 Socket Positions, Zinc Plated, D-Sub - High Density - Crimp Socket Housing	CON-3470-0026
1	62 Socket Positions, Zinc Plated, D-Sub - High Density - Crimp Socket Housing	CON-3470-0062
2	D-Sub 4-40, Hardware - Jack Screws	CON-5150-0440
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	0.375" Inside Diameter, Hardware - Tag Ring	CON-5500-0375
2	0.625" Inside Diameter, Hardware - Tag Ring	CON-5500-0625
2	1" Inside Diameter, Heat Shrink Tube	WIR-HTSK-1000
1	3/4" Inside Diameter - Black, Heat Shrink Tube	WIR-HTSK-0750

2.7.1 Recommended Crimp tools

Standard D-Sub Crimp Tool Chart			
Tool Type	**Hand crimping tool**	**Positioner**	**Insertion/extractor tool**
POSITRONIC	9507-0-0-0	9502-5-0-0	4711-2-0-0
DANIELS	AFM 8	K13-1	91067-2
MIL-SPEC	M22520/2-01	M22520/2-08	M81969/1-02

2.8 Installation Drawings

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

2.8.1 Generation of Custom Drawings

The interconnect and connector maps in Appendix A of this manual are generic drawings based on the standard version of the JRAC2-004. However, if a unit has been configured using JAC's ProCS™ software, 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 JRAC2-004.

Note: The JRAC2-004 has no operator controls.

The JRAC2-004 is a remotely mounted audio controller. The operator controls the functions of the JRAC2-004 with a control device, such as a Jupiter Avionics JCPx-xxx Control Panel or a Multi-Function Display (**MFD**), via a serial data bus.

For selection of receivers, transceivers and other controls, refer to the control device manual.

3.2 Normal Mode of Operation

The JRAC2-004 is in Normal mode when aircraft electrical power is applied to the unit, Normal Mode has been selected on **both** the USER1 **and** USER2 control devices, and any external EMERGENCY/NORMAL select switch is in the NORMAL position.

3.2.1 Receiving

The control device determines which transceivers and receivers are selected for receive operation. When receive audio is input to the JRAC2-004 on a transceiver or receiver that has been selected, the incoming audio is directed to the user's phones unless the user is transmitting and muting of receive audio during transmit has been enabled.

The control device is used to select the receive volume level. When the configuration setting Mute RX Audio is enabled, the receive audio is muted during transmit.

3.2.2 Transmit Operation

The control device determines which transceiver is selected for transmit. When the user's TX PTT is activated, the unit will key the selected transceiver. The user's mic audio is routed to the selected transceiver, sidetone audio is routed to the user's phones, and music is muted for the duration of the transmission.

3.2.3 COM 7 through COM 10 PTT Operation

Note: If any of the COM 7 through COM 10 transceivers 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 the appropriate COM (7-10) has been selected for transmit, momentarily activating the relevant TX PTT will start the COM transmitting. A second momentary activation of the same TX PTT or selecting a different Transceiver from the control device will stop the transmission.

Transmit timeout operation does not operate for any of COM 7-10 when its transmit mode is set to duplex.

3.2.4 VOX Operation

The VOX threshold is set from the control device.

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 after the MIC audio level falls below the VOX threshold for 0.5 to 2 seconds.

3.2.5 ICS Operation

ICS audio routed to the PHONES 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 routed to the PHONES also includes the audio input on the ICS TIE from other audio controllers.

The sum of all the MIC audio from users with ICS KEY active or with MIC audio level exceeding the VOX Threshold level is output on the ICS TIE line.

The ICS audio is muted during transmit (if selected at installation - confirm with your installing agency).

The ICS audio level at the phones is controlled by the ICS volume control as selected from the control device.

3.2.6 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.

3.3 Emergency Operation Mode

The JRAC2-004 is in emergency mode when aircraft electrical power is lost, Emergency Mode has been selected on the control device, or the external EMERGENCY/NORMAL select switch is in the EMERGENCY position.

3.3.1 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 receiver, and DIRECT 1 to 4 is routed to the USER 1 PHONES and USER 1 CVR. The USER 1 MIC and USER 1 TX PTT key are connected to the COM 1 transceiver.

The sum of the COM2 transceiver, NAV 2 receiver, and DIRECT 1 to 4 is routed to the USER 2 PHONES and USER 2 CVR. The USER 2 MIC and USER 2 TX PTT key are connected to the COM 2 transceiver.

No other functions in the JRAC2-004 will operate when power is lost.

3.3.2 Selected Emergency Mode

If Emergency mode has been selected from the control device or from an external emergency/normal switch, and sufficient power is applied to the JRAC2-004, the JRAC2-004 is considered to be in Selected Emergency Mode.

In Selected Emergency Mode the sum of the COM 1 receive, NAV 1 receive, and DIRECT 1 to 4 audio is routed to the USER 1 PHONES and the USER 1 CVR. The USER 1 MIC and USER 1 TX PTT are connected to the COM 1 transceiver. USER 1 is disconnected from the ICS.

In Selected Emergency Mode, the sum of the COM 2 receive, NAV 2 receive and DIRECT 1 to 4 audio is routed to the USER 2 PHONES and USER 2 CVR. The USER 2 MIC and USER 1 TX PTT are connected to the COM 2 transceiver. USER 2 is disconnected from the ICS.

The COM 1 and COM 2 transceiver, NAV 1 and NAV 2 receiver and DIRECT 1 to 4 are not available to the USER 3 to 8. All other functions of the JRAC2-004 will operate.

Installation and Operating Manual

Appendix A - Installation Drawings

A1 Introduction

The drawings necessary for installation and troubleshooting of the JRAC2-004 Dual Remote 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.

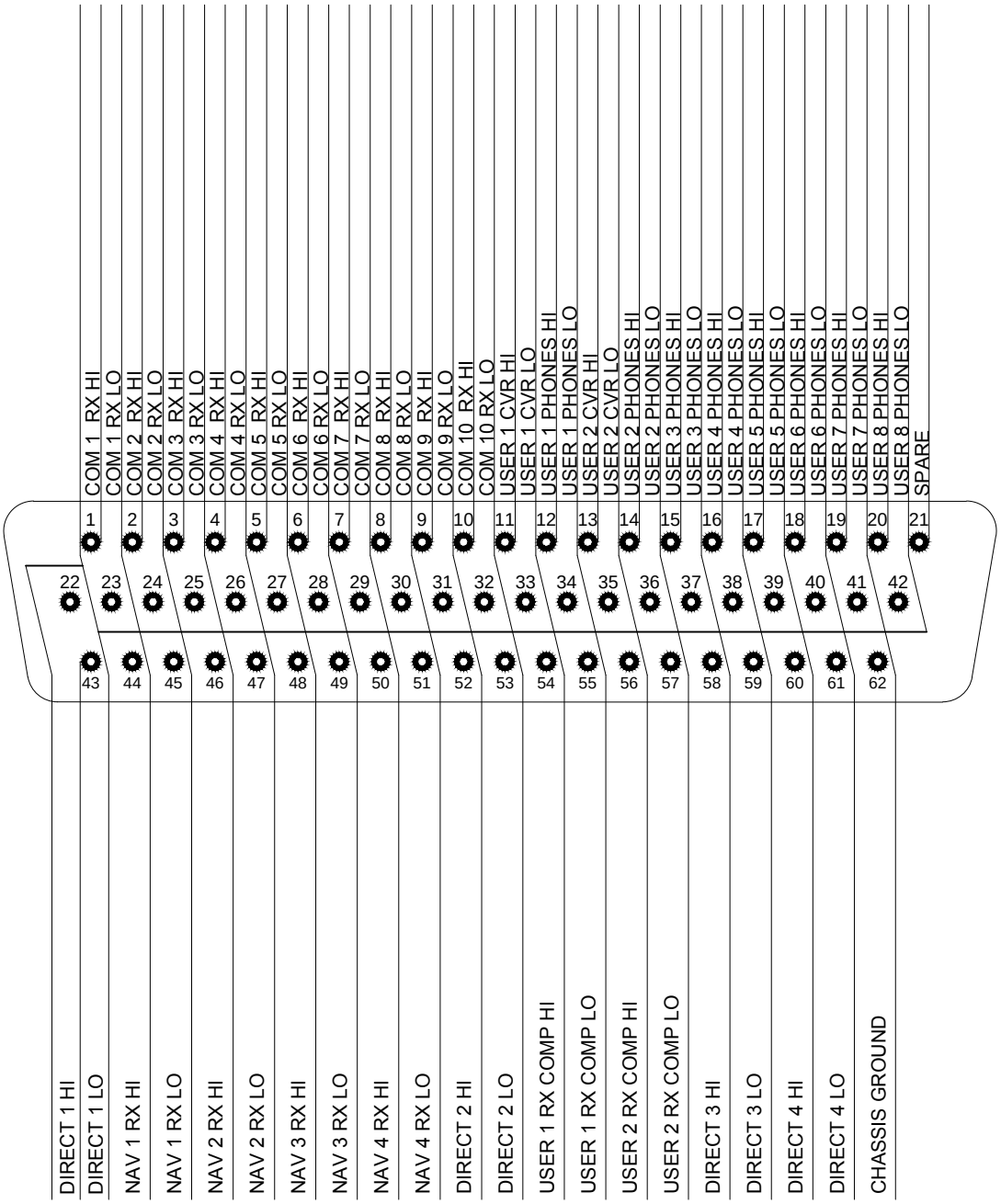
A2 Installation Drawings

DOCUMENT	Rev
JRAC2-004 Connector Map	A
JRAC2-004 Equipment Block Diagram	A
JRAC2-004 Interconnect	A
JRAC2-004 Mechanical Installation	B

RECEIVE CONNECTOR

J1

62 PIN FEMALE DMIN
MATING CONNECTOR



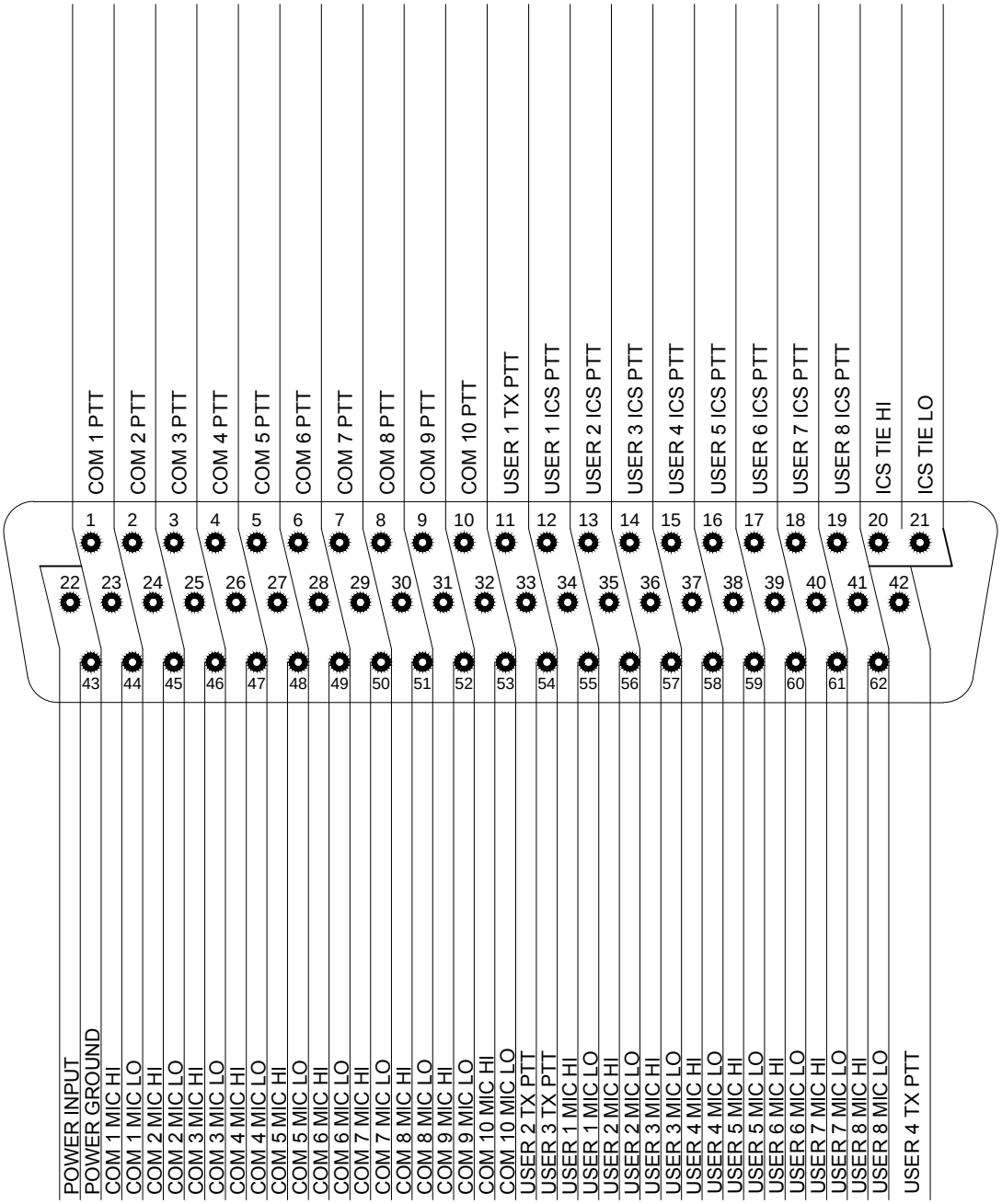
VIEW IS FROM REAR OF MATING CONNECTOR

PREPARED	KV	JUPITER AVIONICS CORPORATION	
CHECKED	JAC 03-05-19 SRM	TITLE	Dual Remote Audio Controller P1 - Receive Connector
APPROVED	JAC 03-19-19 KDV	NCAGE CODE: L00N3	PART NO.: JRAC2-004 / SHEET: 1/5
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.	JRAC2-004 Connector Map Rev A.pdf

TRANSMIT CONNECTOR

J2

62 PIN FEMALE DMIN
MATING CONNECTOR



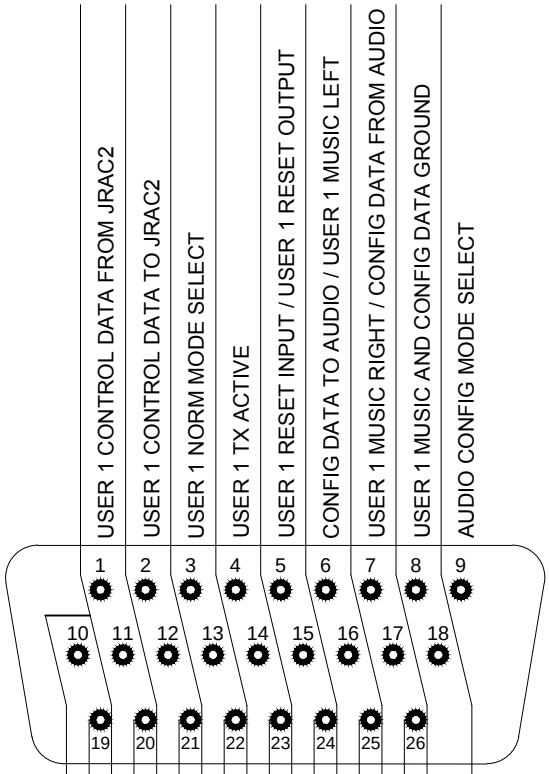
VIEW IS FROM REAR OF MATING CONNECTOR

PREPARED	KV	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 03-05-19 SRM	TITLE: Dual Remote Audio Controller P2 - Transmit Connector		
APPROVED	JAC 03-19-19 KDV	NCAGE CODE: L00N3	PART NO.: JRAC2-004	SHEET: 2/5
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JRAC2-004 Connector Map Rev A.pdf		

CONTROL CONNECTOR

J3

26 PIN FEMALE DMIN
MATING CONNECTOR



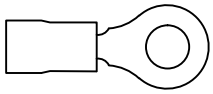
VIEW IS FROM REAR OF MATING CONNECTOR

PREPARED	KV	JUPITER AVIONICS CORPORATION	
CHECKED	JAC 03-05-19 SRM	TITLE	Dual Remote Audio Controller P3 - Control Connector
APPROVED	JAC 03-19-19 KDV	NCAGE CODE: L00N3	PART NO.: JRAC2-004 — SHEET: 3/5
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.	JRAC2-004 Connector Map Rev A.pdf

CHASSIS GROUND CONNECTOR

J4 CHASSIS GROUND CONNECTOR

#4 RING TERMINAL
MATING CONECTOR



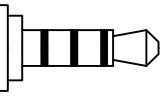
PREPARED	KV	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 03-05-19 SRM	TITLE: Dual Remote Audio Controller P4 -Chassis Ground Connector		
APPROVED	JAC 03-19-19 KDV	NCAGE CODE: L00N3	PART NO.: JRAC2-004	SHEET: 4/5
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JRAC2-004 Connector Map Rev A.pdf		

AUDIO CONFIGURATION CONNECTOR

J5

ACCEPTS THE FOLLOWING PLUG FORMATS

JA99 CONFIGURATION CABLE
4 POLE MALE 3.5MM STEREO



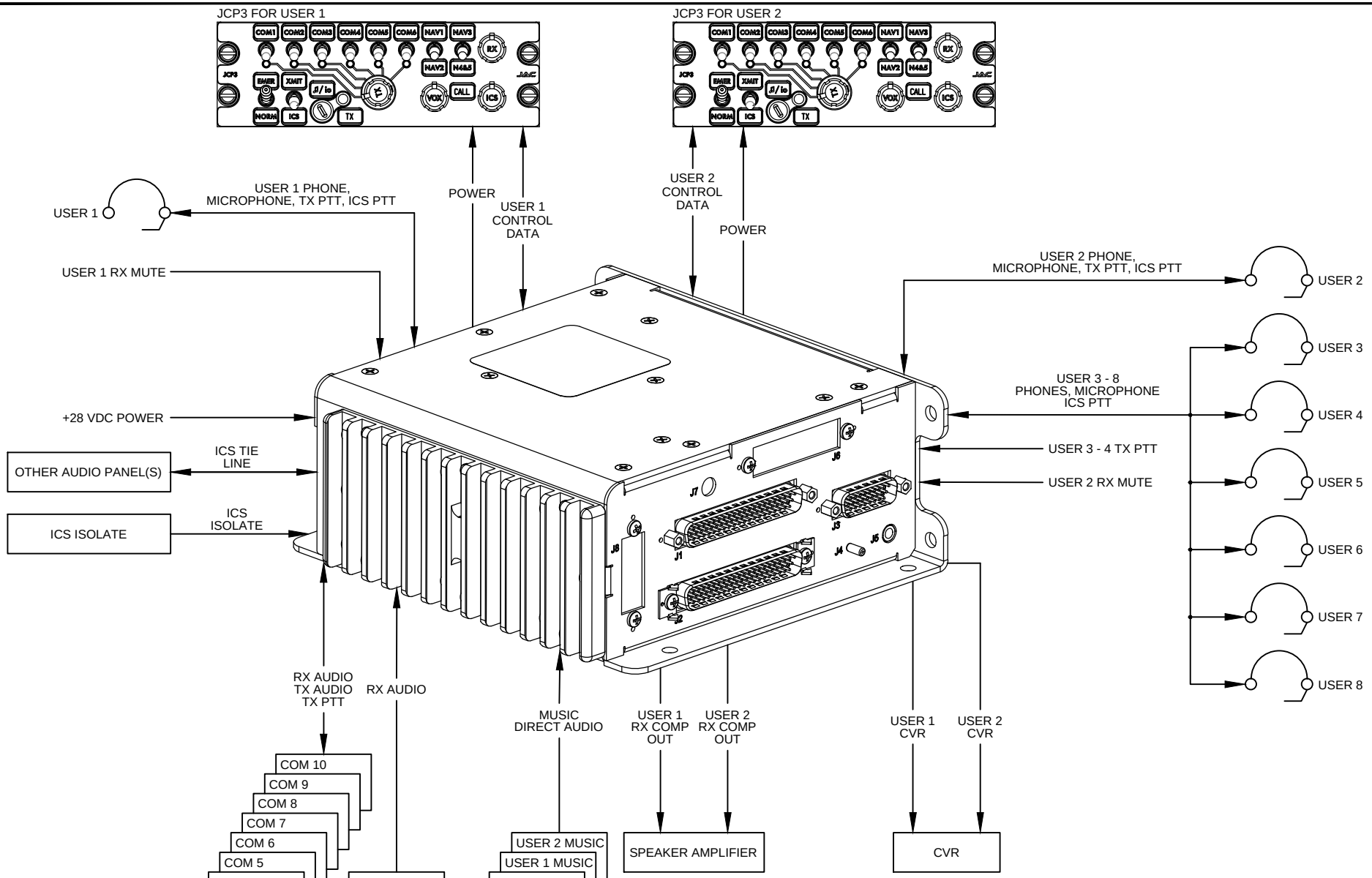
MATING PLUG NAMES

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

UNIT SIGNAL NAMES

CONFIG DATA TO AUDIO
CONFIG DATA FROM AUDIO
AUDIO CONFIG DATA GROUND
AUDIO CONFIG MODE SELECT

PREPARED	KV	JUPITER AVIONICS CORPORATION	
CHECKED	JAC 03-05-19 SRM	TITLE	Dual Remote Audio Controller P5 - Audio Configuration Connector
APPROVED	JAC 03-19-19 KDV	NCAGE CODE: L00N3	PART NO.: JRAC2-004 / SHEET: 5/5
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.	JRAC2-004 Connector Map Rev A.pdf



PREPARED	TAT	JUPITER AVIONICS CORPORATION
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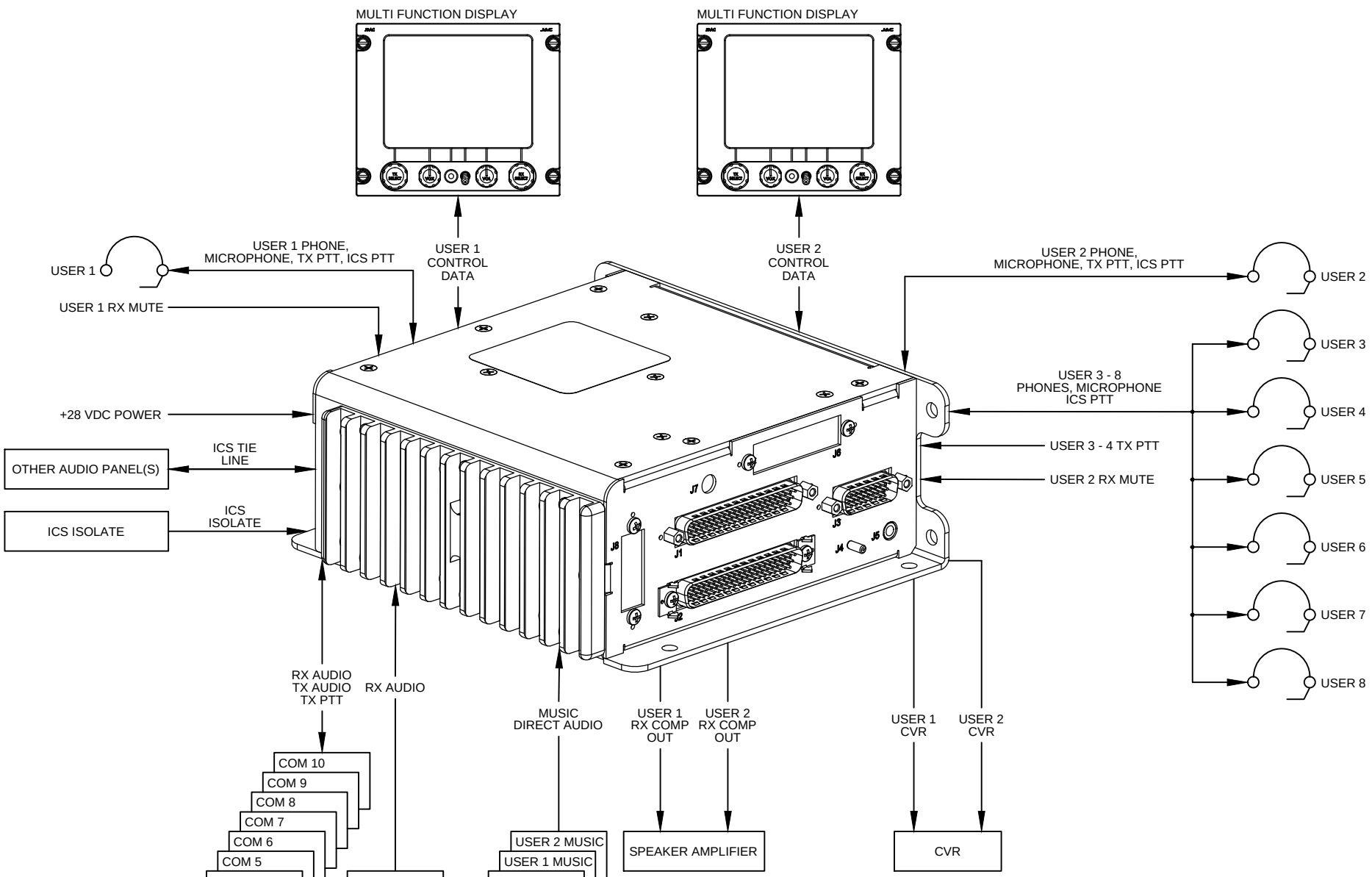
APPROVED	JAC 04-29-19 KDV	NCAGE CODE: L00N3 / PART NO.: JRAC2-004 / SHEET: 1/2
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JRAC2-004 Equipment Block Diagram Rev A.dwg



PREPARED	TAT
CHECKED	JAC 04-29-19 SRM
APPROVED	JAC 04-29-19 KDV
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.	

JUPITER AVIONICS CORPORATION

TITLE: Dual Remote Audio Controller Equipment Block Diagram

NCAGE CODE	PART NO.	SHEET
L00N3	JRAC2-004	2/2

DOC NO. JRAC2-004 Equipment Block Diagram Rev A.dwg

JRAC2-004 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 22 AWG WIRE UNLESS OTHERWISE SPECIFIED. LENGTH NOT TO EXCEED 3 FT (0.91 M).

△3 CABLE SHIELDS AT THE 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 ALTERNATIVE INTERCONNECT WIRING.

△5 IF NOT CONNECTED TO JCP CONTROL PANEL, GROUND PIN FOR NORMAL OPERATION OR LEAVE UNCONNECTED FOR EMERGENCY OPERATION.

△6 RESET OUTPUT PIN OUTPUTS A MOMENTARY GROUND WHEN CONTROL DATA TO AUDIO IS INVALID. OUTPUT IS OPEN COLLECTOR.

△7 TX ACTIVE PIN OUTPUTS A GROUND WHEN USER TX PTT IS ACTIVE. OUTPUT IS OPEN COLLECTOR.

△8 ISOLATE MODE.

△9 GROUND PIN TO MUTE ALL RECEIVE AUDIO EXCEPT FROM THE TRANSCEIVER SELECTED TO TRANSMIT.

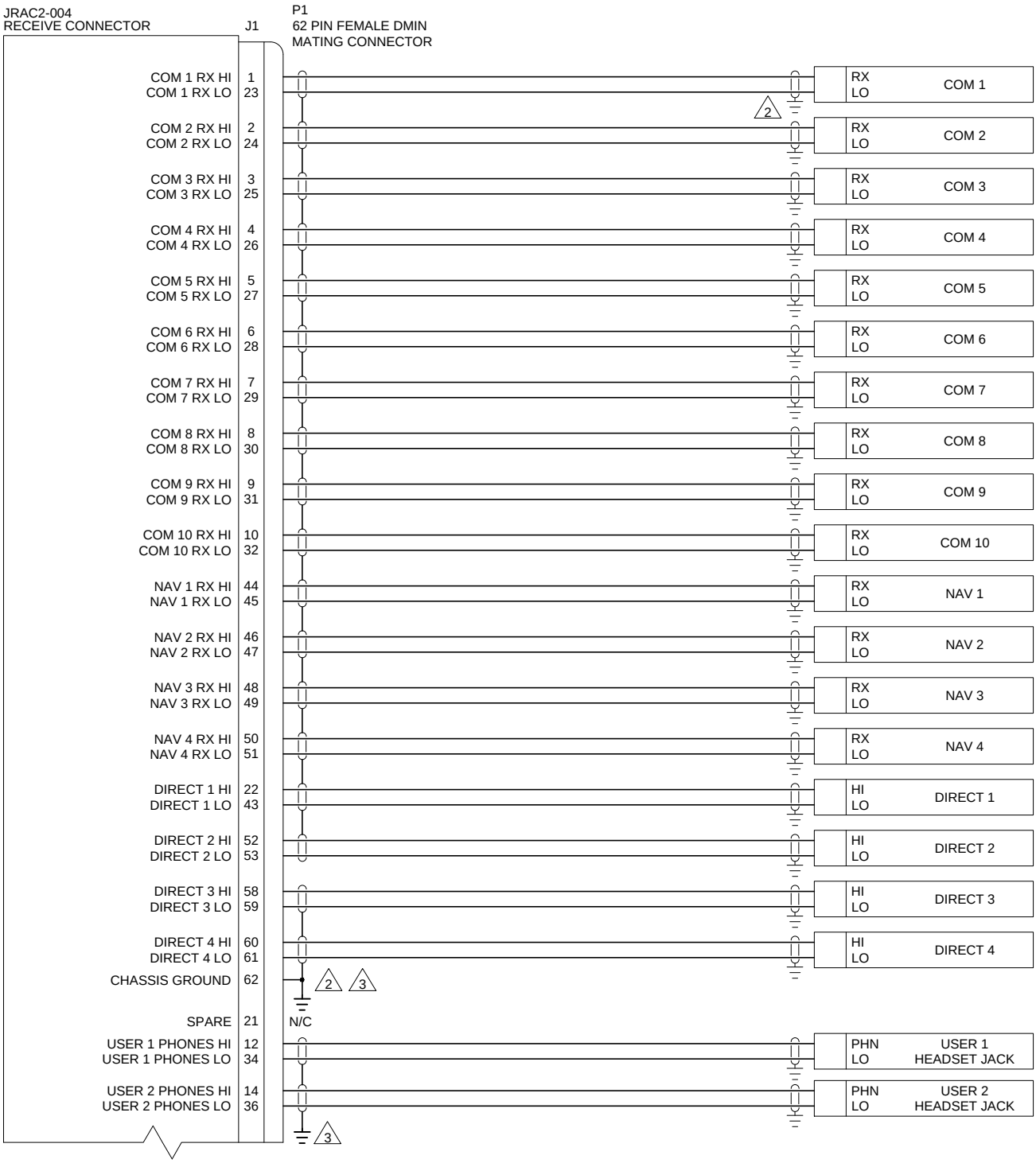
△10 MOMENTARILY GROUND PIN TO RESET DUAL REMOTE AUDIO CONTROLLER.

CONNECTOR PIN LEGENDS

LEGEND

SPARE	INTERNAL CIRCUITS MAY EXIST AND MAY BE ACTIVATED FOR FUTURE USE. NO EXTERNAL WIRE CONNECTION.
N/C	NO CONNECTION

PREPARED	TAT	JUPITER AVIONICS CORPORATION	
CHECKED	JAC 03-05-19 SRM	TITLE: Dual Remote Audio Controller Interconnect Notes	
APPROVED	JAC 03-19-19 KDV	NCAGE CODE: L00N3	PART NO.: JRAC2-004 / SHEET: 1/7
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JRAC2-004 Interconnect Rev A.dwg	



PREPARED	TAT	JUPITER AVIONICS CORPORATION		
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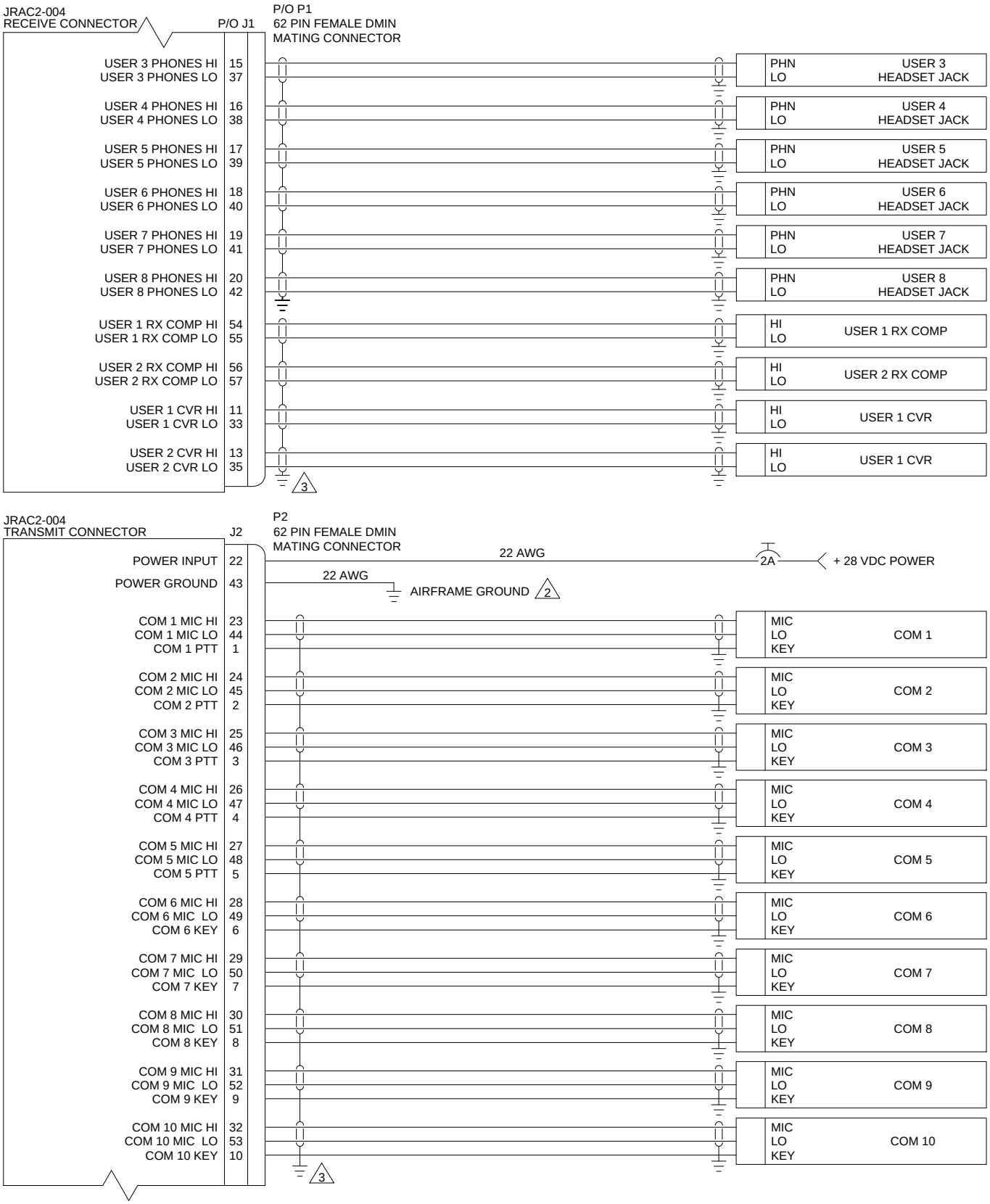
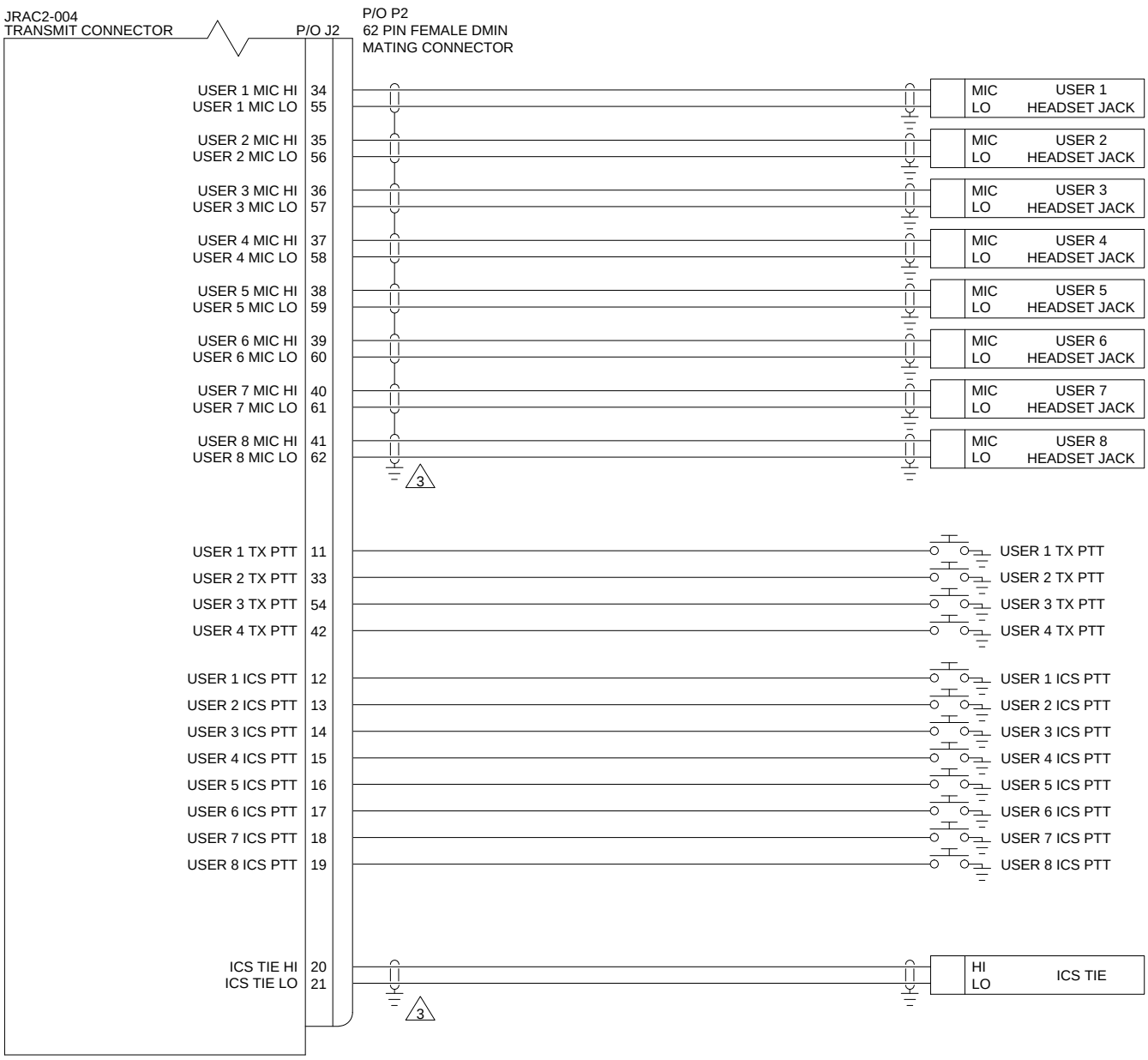
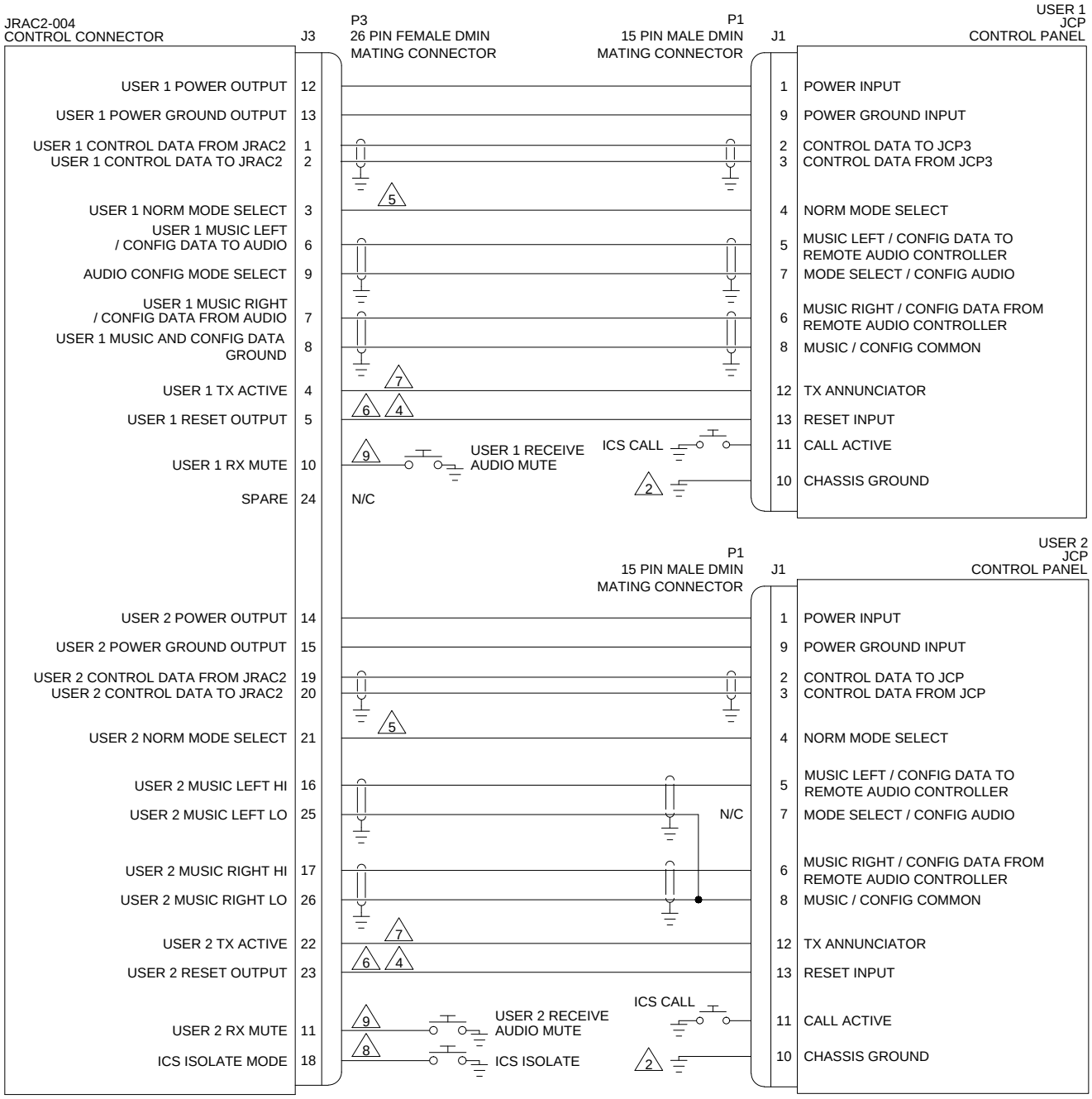
APPROVED	JAC 03-19-19 KDV	NCAGE CODE: L00N3	PART NO.: JRAC2-004	SHEET: 2/7
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JRAC2-004 Interconnect Rev A.dwg		



PREPARED	TAT	JUPITER AVIONICS CORPORATION
CHECKED	JAC 03-05-19 SRM	TITLE: Dual Remote Audio Controller P/O J1 & P/O J2 Interconnect
APPROVED	JAC 03-19-19 KDV	NCAGE CODE: L00N3 / PART NO.: JRAC2-004 / SHEET: 3/7
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JRAC2-004 Interconnect Rev A.dwg

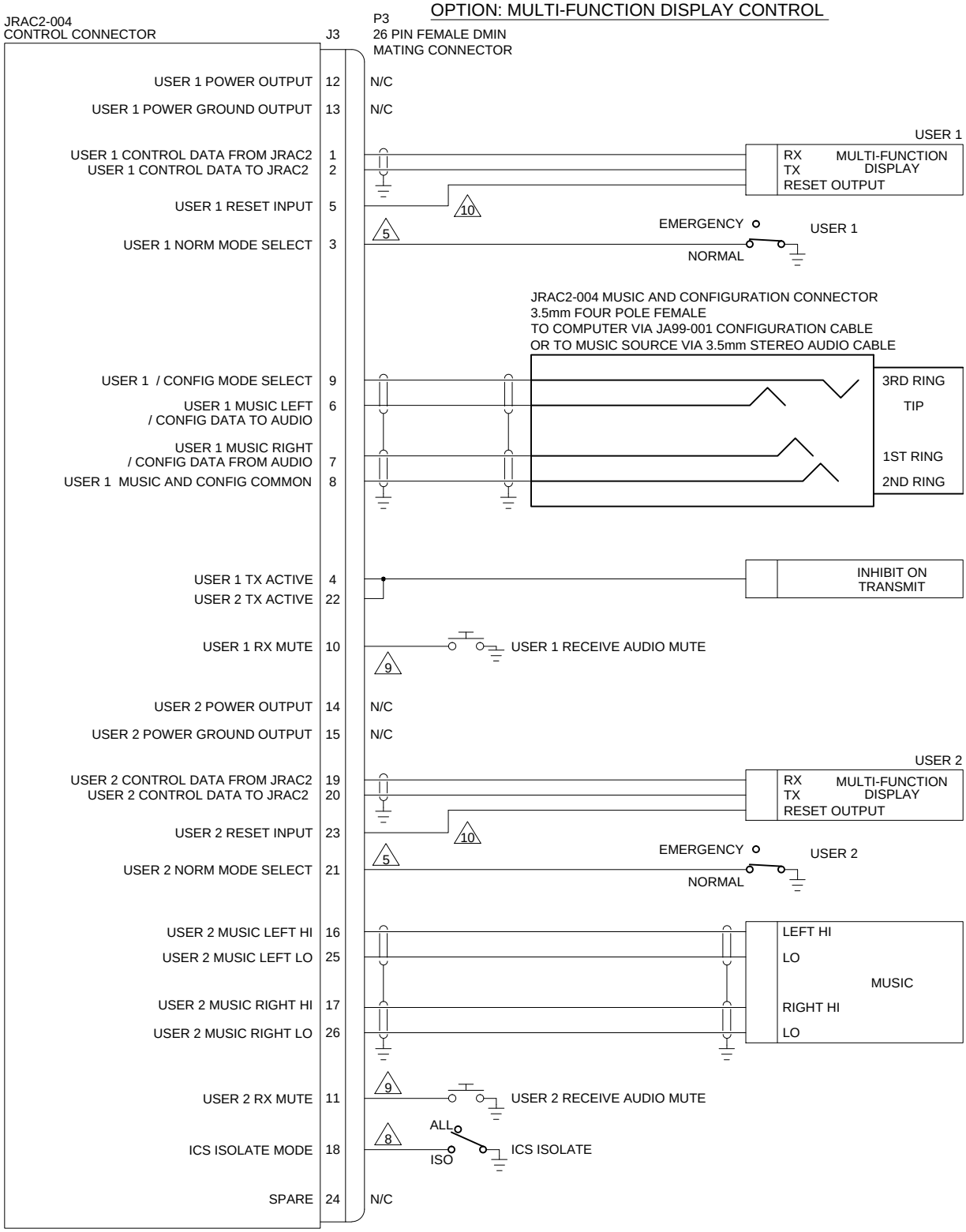


PREPARED	TAT	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 03-05-19 SRM	TITLE: Dual Remote Audio Controller P/O J2 Interconnect		
APPROVED	JAC 03-19-19 KDV	NCAGE CODE: L00N3	PART NO.: JRAC2-004	SHEET: 4/7
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JRAC2-004 Interconnect Rev A.dwg		



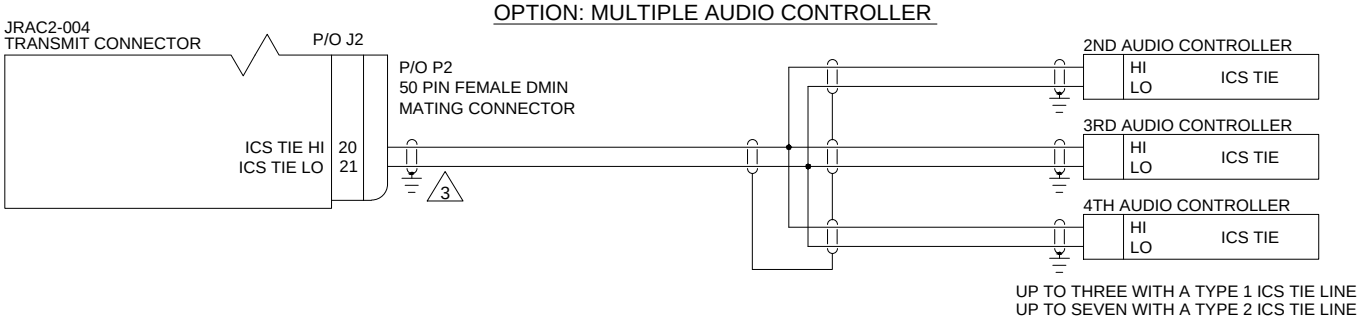
PREPARED	TAT	JUPITER AVIONICS CORPORATION	
CHECKED	JAC 03-05-19 SRM	TITLE: Dual Remote Audio Controller J3 & J5 Interconnect	
APPROVED	JAC 03-19-19 KDV	NCAGE CODE: L00N3	PART NO.: JRAC2-004
			SHEET: 5/7
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JRAC2-004 Interconnect Rev A.dwg	

OPTION: MULTI-FUNCTION DISPLAY CONTROL

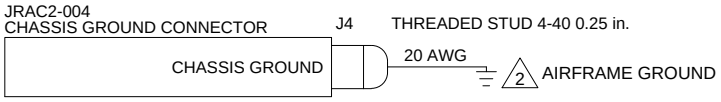


PREPARED	TAT	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 03-05-19 SRM	TITLE: Dual Remote Audio Controller J3 Interconnect Options		
APPROVED	JAC 03-19-19 KDV	NCAGE CODE: L00N3	PART NO.: JRAC2-004	SHEET: 6/7
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JRAC2-004 Interconnect Rev A.dwg		

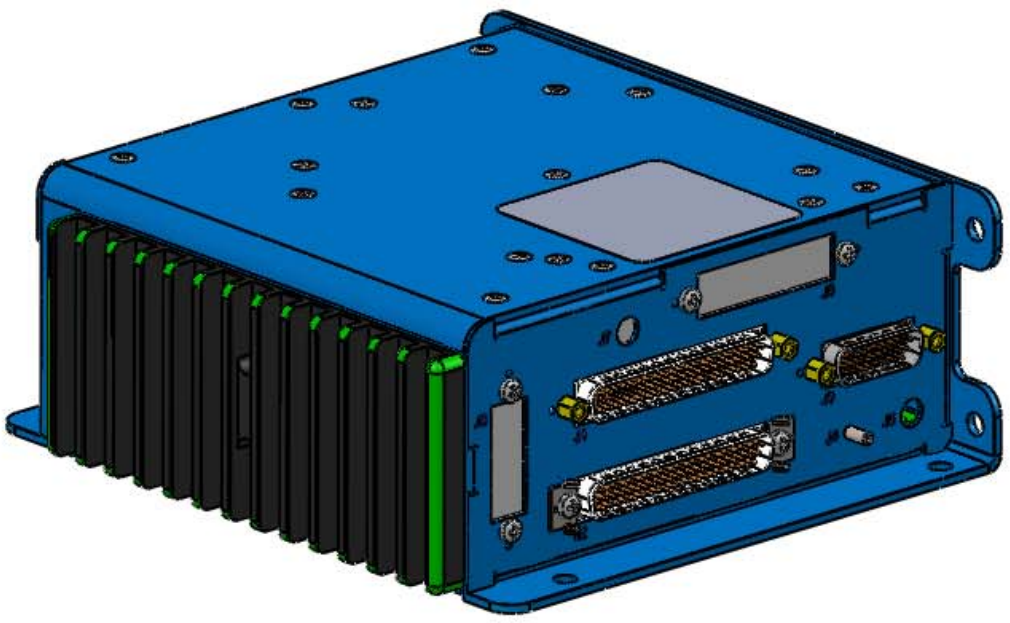
OPTION: MULTIPLE AUDIO CONTROLLER

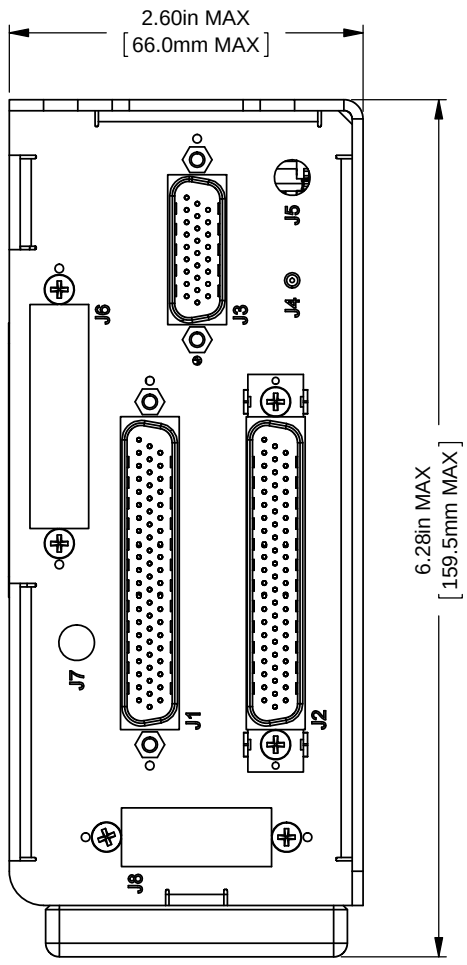


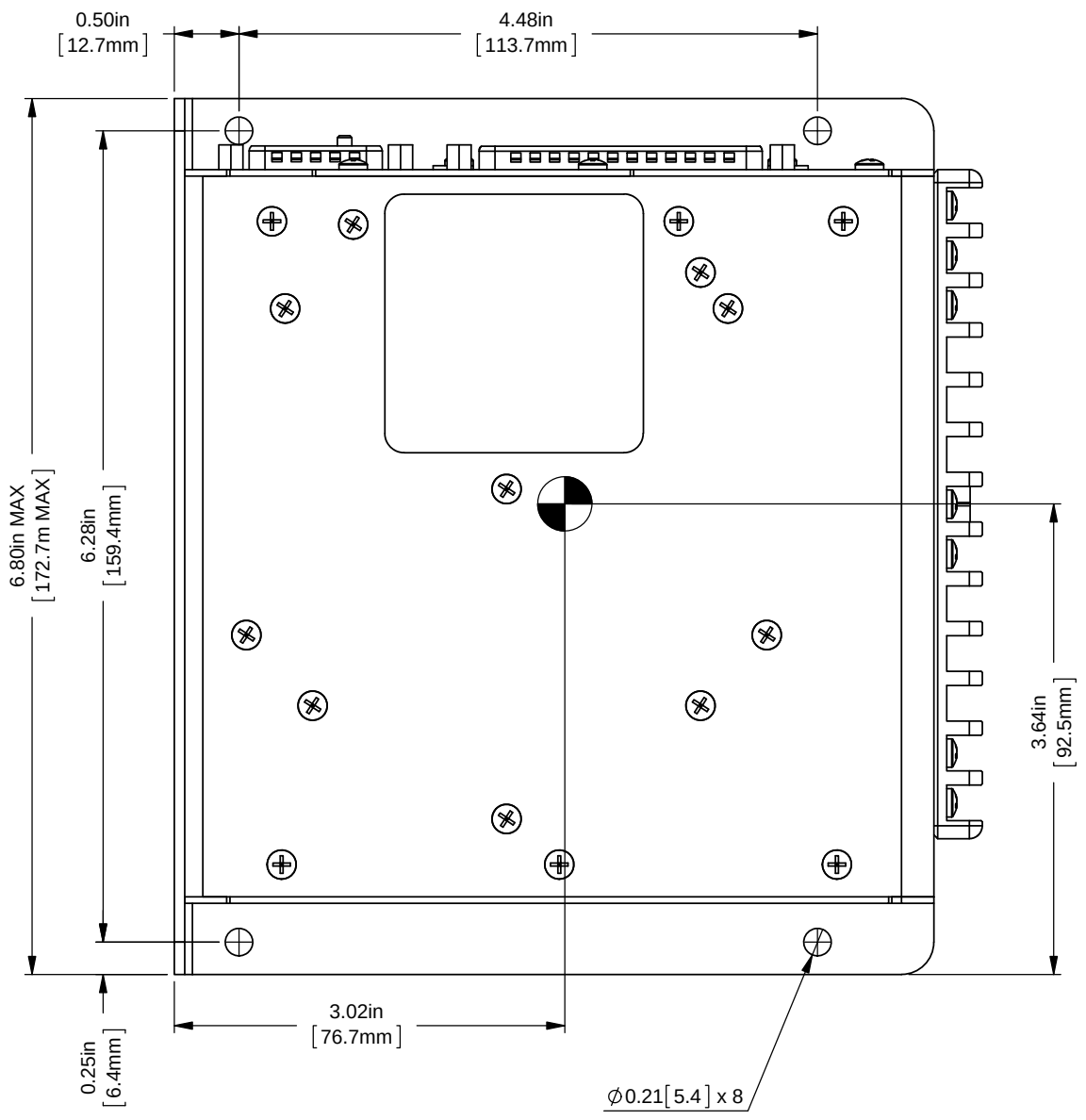
OPTION: CHASSIS GROUND

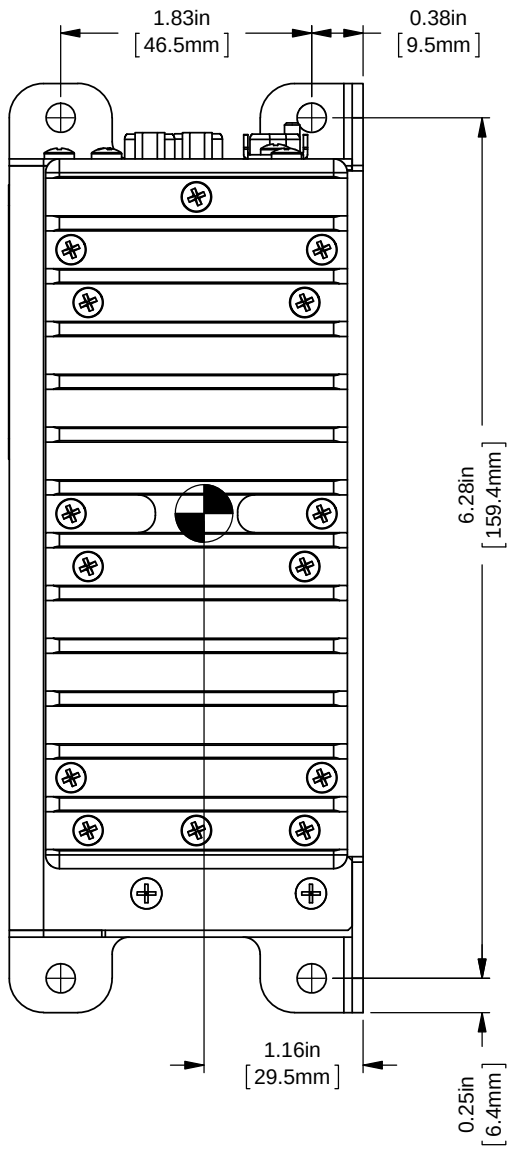


PREPARED	TAT	JUPITER AVIONICS CORPORATION		
CHECKED	JAC 03-05-19 SRM	TITLE: Dual Remote Audio Controller J2, J4 & J8 Interconnect Options		
APPROVED	JAC 03-19-19 KDV	NCAGE CODE: L00N3	PART NO.: JRAC2-004	SHEET: 7/7
CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.		DOC NO.: JRAC2-004 Interconnect Rev A.dwg		









CENTER OF GRAVITY
±0.03in [0.8mm]

WEIGHT: 2.45 lbs [1.11 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
	CHECKED	JAC 05-03-19 AH
	APPROVED	JAC 05-03-19 KDV
MATERIAL: N/A	CONFIDENTIAL & PROPRIETARY TO JUPITER AVIONICS CORP.	
FINISH: N/A	DRAWING NOT TO SCALE	

JUPITER AVIONICS CORPORATION

TITLE: Dual Remote Audio Controller

NCAGE CODE	PART NO.	SHEET
L00N3	JRAC2-004	1/1

DOC. NO. JRAC2-004 Mechanical Installation Rev B.SLDDRW

Installation and Operating Manual

Appendix B - Installation Documents

B1 Airworthiness Approval

Airworthiness approval of the JRAC2-004 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 JRAC2-004 Dual Remote 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 and the USA must follow the applicable aviation authority's regulations.

Sample Wording:

Removed the existing [model] audio controller and replaced with a Jupiter Avionics JRAC2-004 Dual Remote Audio Controller in [aircraft location].

Installed in accordance with the JRAC2-004 Installation Manual, Revision [ ], and AC 43.13-2, Chapters 2, and 3.

The JRAC2-004 interfaces with existing aircraft radios per the Installation Manual instructions.

The JRAC2-004 Installation Manual provides detailed installation instructions and wiring diagrams (Section 2, and Appendices A and B).

Power is supplied to the JRAC2-004 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 JRAC2-004 Dual Remote Audio Controller is "on condition" only. Refer to the JRAC2-004 Maintenance Manual. Periodic maintenance of the JRAC2-004 is not required.

The following sample Instructions for Continued Airworthiness (ICA) provides assistance in preparing ICA for the Jupiter Avionics JRAC2-004 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 JRAC2-004 Dual Remote 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 JRAC2-004 installed in an [aircraft make and model].

Applicability: Applies to a Jupiter Avionics JRAC2-004 installed in an [aircraft make and model].

Definitions/Abbreviations: None, N/A.

Precautions: None, N/A.

Units of Measurement: None, N/A.

Referenced Publications: JRAC2-004 Installation and Operating Manual
JRAC2-004 Maintenance 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 JRAC2-004 Dual Remote 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 JRAC2-004 Operating Manual.

4. Servicing Information

N/A

5. Maintenance Instructions

Maintenance of the JRAC2-004 is 'on condition' only. Periodic maintenance is not required. Refer to the JRAC2-004 Maintenance Manual.

6. Troubleshooting Information

Refer to the JRAC2-004 Maintenance Manual.

7. Removal and Replacement Information

Refer to Section 2 of this manual - the JRAC2-004 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 JRAC2-004 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

JRAC2-004 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 JRAC2-004 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