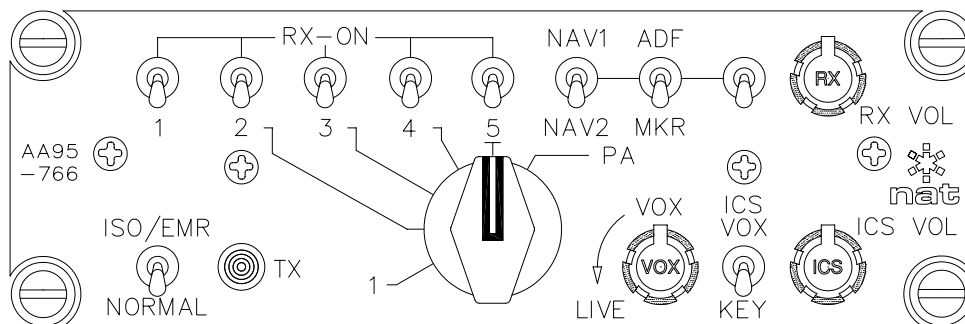




SM95-766

**AA95-766
Single Channel Audio Controller
Manual**



INSTALLATION AND OPERATION MANUAL

REV 2.00 December 6, 2004

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Section 1 Description

1.1 Introduction

This manual contains information on the AA95-766 Single Channel Audio Controller. Information in this section consists of purpose of equipment, features and specifications.

1.2 Purpose of Equipment

The AA95-766 is a Dzus mounted audio panel with built in intercom and lighted faceplate. The unit provides full headset transmit (TX), receive (RX) and intercom (ICS) functions for the pilot and co-pilot users. Only intercom and receiver audio are provided for passengers. The front panel controls permit user adjustment of frequently needed signals.

The users have control of five transceiver positions, six receiver inputs, and one PA output. The unswitched inputs are direct audio and tape player.

The AA95-766 supports only one lo-z mic input and five hi-z mic inputs per box. All phone outputs are hi-z. Connection to other stations in the system is made through the ICS Tie line. The AA95-766 is plug compatible with most AA95 and AMS40 series NAT audio panels.

The small size and extensive radio and ICS functions make this unit an excellent choice for multi-station aircraft.

1.3 Features

Transceiver interfacing for the AA95-766 is accomplished through directly switched microphones. To ensure maximum radio compatibility, it has a ground-referenced keyline that incorporates no diodes or other steering components.

Independent control is provided for each audio channel within the controller, allowing sidetone, ICS audio, and RX audio to be independently set.

The ICS tie line is fully compatible with other NAT systems including the AA80, AA82, AMS4X and AA9X series units.

Boom mic support is provided for the pilot and co-pilot, with both ICS and TX functions via cyclic or yoke switching. The AA95-766 has a built-in dynamic microphone amplifier for an M87-type mic. The Live (Hot Mic) and VOX ICS functionality allow immediate transmission via these modes without further control panel switching, and immediate return to ICS operation on completion. The ICS function is achieved using dynamic noise reduction and active filtering. This provides the clearest possible ICS audio under

high ambient noise conditions by rejecting airframe and wind noise, and passing only voiceband information.

All audio, except the S/T of the radio in use and the DIRECT AUDIO input signal, is muted during transmit for clarity. ICS operation allows transmit during any ICS mode by using the transmit PTT switch.

All switches, relay contacts and external connections are gold plated for maximum reliability. Switches and relays are sealed. G10-FR flame retardant circuit boards are postcoated for maximum moisture resistance and corrosion prevention. Relays are sealed, high vibration rated (50 g shock), dry nitrogen filled units.

1.4 Specifications

1.4.1 Electrical Specifications

Input Power Reverse and over-voltage protection provided.

Voltage	27.5 Vdc Nominal 0.50 A Max.
Lighting	27.5 Vdc @ 160 mA

Input Signals

Channels	5 aircraft transceiver radio inputs 6 navigational receiver inputs 1 direct audio input (Type 'E') 2.5 Vrms/10 mW input signal for full headset output 1 k Ω input impedance
Type 'E' Input	
Direct channel	Freq. Response ± 6 dB from 370 to 2800 Hz
Distortion	1% THD max
Isolation/crosstalk	65 db min
Rated Level	Direct Audio 10 mW (10 dBm) into 600 Ω
Signal/noise ratio	67 db min. or less than 5 mV into 600 Ω
Quantity	13 receive channels 7 mic channels
Audio level	2.5 Vrms for receiver inputs 0.25 Vrms for copilot and passenger mic inputs 0.25 mVrms for pilot mic input 2.5 Vrms for direct audio input

Impedance	1 k Ω \pm 10% for receive inputs 1 k Ω \pm 10% for copilot and passenger mic inputs (150 Ω amplified dynamic Industry standard 'carbon equivalent' type. 250 mVrms for rated output) 5 \pm 1 Ω for pilot mic input (5 Ω dynamic Military M87 or equivalent, 0.1 to 1.0 mVrms 250 uVrms for rated output) 1.3 k Ω \pm 10% for Direct Audio input
Circuitry Type	All are single ended inputs.
Coupling	<-50 dB
Key lines	Pilot & copilot transmit PTT Rear hand mic transmit PTT Pilot & copilot ICS PTT

Output Signals:

Quantity	6 Headphone outputs 6 Transmitter mic outputs 5 Transmitter keyline outputs
Headset Rated level	12.3 Vrms or 250 mW (24 dBm) into 600 Ω
Circuitry Type	Single-ended, except for phones, which are balanced.
Freq. Response	
Sidetone	<6 dB from 370 Hz to 2800 Hz
Receive inputs	<6 dB from 370 Hz to 2800 Hz
Intercom	<6 dB from 350 Hz to 2000 Hz
Distortion	<10% THD @ rated power output
Audio Noise Level	>50 dB down from rated output (no signal)
Coupling	<-50 dB
Output Regulation at 400% and 75% of rated load.	<10% distortion / Δ 3 dB max of rated output power
Keylines	Transmit key is active low Intercom keyline is active low

Bi-directional Signals:

Quantity	One NAT ICS tie channel
Audio level	0.34 Vrms
Impedance	1.8 k Ω \pm 10%
Circuitry Type	Single ended

Miscellaneous:

Annunciators	Green LED will light for transmit operation
--------------	---

1.4.2 Physical Specifications{tc "7.2 Physical Specifications"}

Height	1.91" (48.5 mm)
Depth	7.05" (179.1 mm) behind panel
Width	5.78" (146.8 mm)
Weight	2.1 lbs (1.0 kg) excluding harness and mating connectors
Mounting	Standard Dzus rails
Connectors	One male 50-pin and one male 37-pin D-min connector

1.4.3 Environmental Specifications{tc "7.3 Environmental Specifications"}

Operating Temp	-40° C to +70° C
Survival Temp	-55° C to +85° C
Vibration/Shock	DO-160B category "P", panel mounting 6g.
Humidity	95% Non-condensing
Altitude	35,000 ft

End of section 1

Section 2 Installation

2.1 Introduction

Information in this section consists of: unpacking and inspection procedures, installation procedures, post-installation checks, and installation drawings.

2.2 Unpacking and Inspection

Unpack the equipment carefully and locate the warranty card. Inspect the unit visually for damage due to shipping and report all such claims immediately to the carrier involved. Note that each unit should have the following:

- AA95-766 Single Channel Audio Controller
- Warranty Card
- Release certification

Verify that all items are present before proceeding and report any shortage immediately to your supplier.

2.2.1 Warranty

Complete the warranty card information and send it to NAT when the installation is complete. If you fail to complete the warranty card, the warranty will be activated on date of shipment from NAT.

Note: An appropriately rated facility, e.g. Certified Aircraft Repair Station, must install this equipment in accordance with applicable regulations. NAT Ltd's warranty is not valid unless the equipment is installed by an authorized NAT Dealer. Failure to follow any of the installation instructions, or installation by a non-certified individual or agency will void the warranty, and may result in a non-airworthy installation.

2.3 Installation Procedures

2.3.1 Warnings

Do not bundle any lines from this unit with transmitter coax feed lines. Do not bundle any logic, audio, or DC power lines from this unit with 400 Hz synchro wiring or AC power lines. Do not position this unit next to any device with a strong alternating magnetic field such as an inverter, motor or blower, or significant audio interference will result.

2.3.2 Cautions

In all installations, use shielded cable exactly as shown, and ground only as indicated. Significant problems may result from not following these guidelines.

All audio installations can be seriously degraded by incorrect wiring and shielding, which may result in abnormal cross-talk, hum and ground-loop noise. Be particularly careful with all microphone wiring and tie line wiring, as these lines carry the lowest level signals in the aircraft.

2.3.3 Cabling and Wiring

All unshielded wire shall be selected in accordance with AC43.13-1B Change 1, Paragraphs 11-76 through 11-78. Wire types should be 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 solder sleeves (for shield terminations) to make the most compact and easily terminated interconnect. Follow the wiring diagrams in Section 2.6 as required.

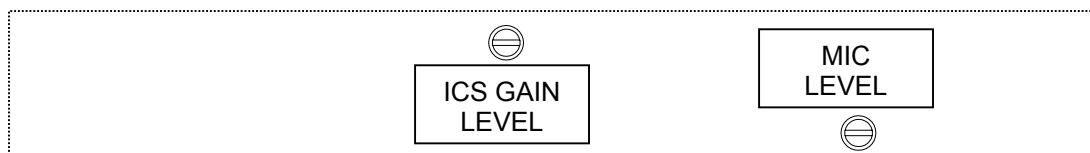
Allow 3 inches from the end of the wire to the shield termination to allow the hood to be easily installed. Note that the hood is a 'clamshell' hood, and is installed after the wiring is complete. Aircraft harnessing should permit the unit to be lowered from the panel for easy access to all side adjustments. Do NOT mount the unit until all adjustments have been carried out.

All wiring should be at least 22 AWG, except power and ground lines, which should be at least 20 AWG. Ensure that all ground connections are clean and well secured, and that the unit shares no path with any electrically noisy aircraft accessories such as blowers, turn and bank instruments or similar loads. Power to this unit must be supplied from a separate breaker (1 A) and not attached to any other existing breaker without additional protection.

2.3.4 Adjustments

The unit ships from the factory with all internal adjustments set to the normal test levels. Once installed in the aircraft, it may be desirable to change some of these settings to best suit the local operating environment. The internal adjustments are located on the sides of the unit and are as follows:

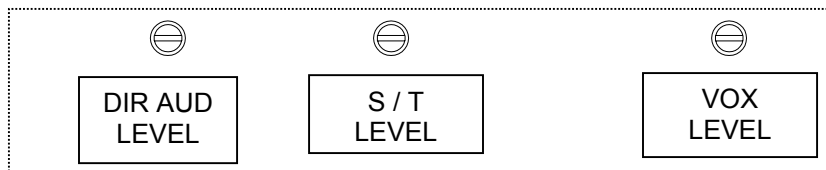
2.3.4.1 Right Side Panel Adjustments



The **ICS GAIN LEVEL** trimpot adjusts the internal gain of the intercom.

The **MIC LEVEL** trimpot is used to adjust the audio level of the pilot microphone.

2.3.4.2 Left Side panel adjustments



The trimpots on the left side panel are used to adjust the levels of audio in the user's headphones. Rotating the trimpots clockwise (cw) increases the level, and counterclockwise (ccw) reduces it.

The **DIR AUD LEVEL** trimpot is used to adjust the level for the Direct Audio signal.

The **S/T LEVEL** trimpot adjusts the internal gain of the sidetone of the selected transceiver (from the front panel).

The **VOX LEVEL** trimpot sets the sensitivity level for the front panel VOX control (the level of audio required to activate microphones).

2.3.5 Mechanical Mounting

The AA95-766 may be mounted vertically or horizontally in standard Dzus rails.

Before the unit is mounted, make all functional tests and trimpot adjustments. Be sure the harness has enough clearance to permit the unit to be pulled out for re-adjustment, if needed later. Make sure unit is securely fastened to the Dzus rail, and that the connector locks are tightened **before any flight is attempted**.

2.3.6 Post-Installation Checks

If any preset requires adjustment, be sure this is carried out before the aircraft leaves, and that the unit and its mating connector are secured before departure.

2.3.6.1 Voltage/Resistance Checks

Do not attach the AA9x series until the following conditions are met.

Check the following:

- a) P101 pin <17> for +28 Vdc relative to ground.
- b) P101 pin <34> for continuity to ground (less than 0.5 Ω).
- c) P101 pins <7> <8> <9> and <10> for continuity to ground (less than 0.5 Ω) when the relevant switches are keyed.
- d) P102 pin <19> for lights bus voltage (+28 Vdc) relative to ground.
- e) Check all Mic, phone, music and key lines for shorts to ground or adjacent pins.

2.3.6.2 Power On Checks

Power up the aircraft's system with the unit installed, and turn on the radios and accessories required for the system. Refer to Section 3 for operation and set-up information.

Start with only the pilot's headset installed (lo-z mic, hi-z phones). Check for correct ICS, radio, and transmit operation. Do not proceed until the radios are functioning correctly. The S/T (sidetone) trimpot accessible through the left side of the controller and the transceiver internal trimpot may have to be adjusted for correct balance for the pilot. Adjustment of the individual radio RX levels should be set first with the AA95-766 in Pilot ISO mode, then adjust the AA95-766 front panel RX master volume control level in NORMAL mode.

Unusual buzzes, hums or other background audio are symptomatic of multiple grounds or noisy external systems sharing the same wire bundle. Note that incorrect jack wiring is a common fault, especially for passenger stations, and may cause loss of audio, a tone on the headset lines, or other problems. Failure to key or correctly modulate a transceiver may be caused by missing grounds on the radio or audio controller.

Plug in the hand mic (if installed) and test for correct operation. (Hand mic activation does **not** illuminate the TX light.) Note that wiring faults for this accessory may cause peculiar loss of ICS or TX functions because it has over-riding priority in the system.

Plug in the remaining headsets (hi-z mic, hi-z phones) and check for proper 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. For further information, see section 2.3.7 below.

Note: Different headsets may have significantly different mic characteristics, which will affect VOX squelch settings.

Check levels and operation of all functions in flight to ensure proper adjustments and settings have been made.

Upon satisfactory completion of all performance checks, make the required log entries and complete the necessary Regulatory Agency paperwork before releasing the aircraft for service.

2.3.7 In-line PTT Cordsets

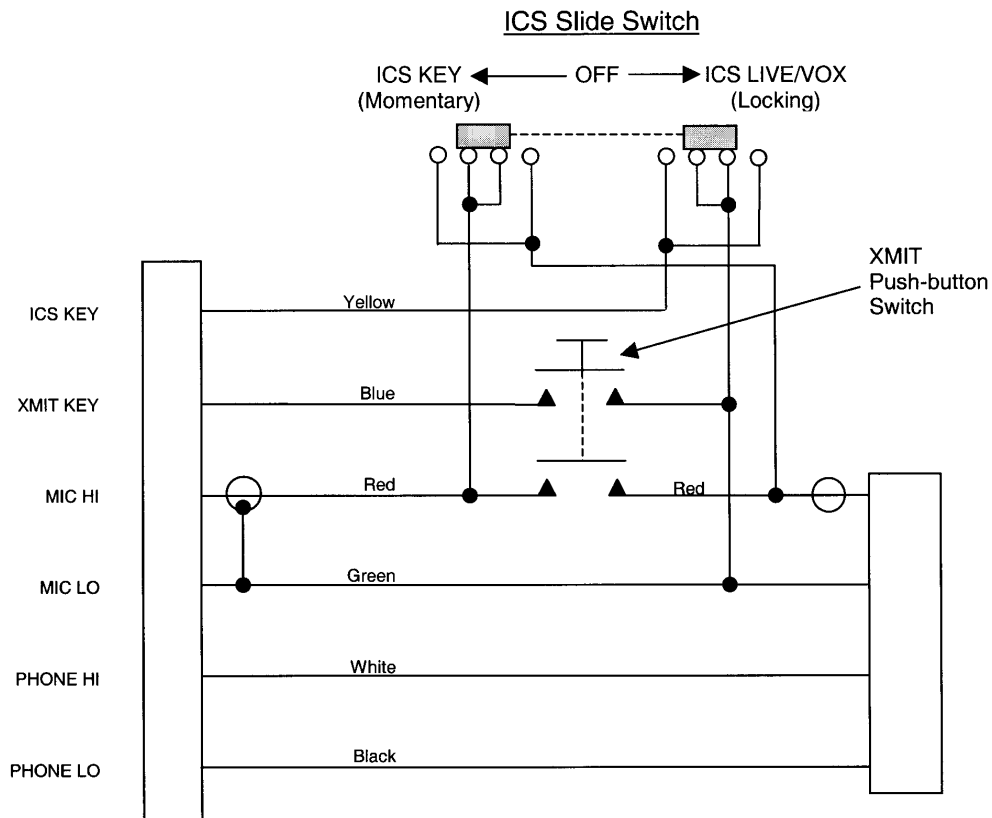
2.3.7.1 General

In-line, push-to-talk (PTT) cordsets (also known as drop cords) can be used to create/provide PTT capability for the user headsets that do not have yoke or cyclic mounted PTT switches. For headsets connected to the PILOT or COPILOT inputs/outputs, ICS and TX keylines are needed to properly activate the associated PTT circuitry inside the AA95-766. For headsets connected to the PASSENGER

inputs/outputs of the AA95-766, a method of controlling the microphone on the headset is needed because of the 'hot mic' circuitry. This is best accomplished with a 'mic interrupt' switch in the PTT cordset.

There are numerous manufacturers of in-line PTT cordsets, offering many 'electrical' variations to accomplish different functions. To meet the operational requirements for headset stations supported by the AA95-766, NAT recommend the dual switch type: a 3-position (momentary/center-off/locking) slider switch for the ICS functions, and a momentary, push-button switch for the Transmit functions. Both switches provide a 'mic interrupt' function. The 3-position ICS switch will allow the user to change the switch settings to match the operational intercom mode that has been selected (e.g., LIVE, KEYED or VOX). The cable should have 6 conductors, with the MIC and PHONE pairs shielded (MIC wires must be shielded as a minimum). To ensure proper shielding, the shield(s) should be terminated to the MIC LO connection at the airframe connector of the PTT cordset. See the drawing below for details.

PTT Cord for Use with NAT Audio Controllers
(XMIT and ICS)



To avoid complications in the aircraft, it is recommended that the same type of PTT cordsets be used for all headset locations in the aircraft. It is not good practice to create a situation where a specific cordset is needed for the copilot, which might cause operational errors if moved to a passenger location.

2.3.7.2 Cautions

Although in-line PTT cordsets can be used conveniently to address a number of requirements for microphone and PTT control, they can also be a source of trouble if incorrectly configured, or improperly shielded.

Many in-line PTT cordsets use the PHONE LO connection as the ground reference for the ICS and TX PTT keylines. The PHONE LO connection in the AA95-766 is floating, which will lead to incorrect keying of the intercom and radio systems if this type of cordset is used.

In-line PTT cordsets can be a very real source for crosstalk, if the MIC wire pair in the cordset is not shielded. The source of the crosstalk is the high level Phones audio being coupled on to the MIC HI/LO pair in the in-line PTT cordset, because of the lack of shielding for this wire pair. Once the mic line is contaminated, the undesired audio can be sent into the audio system as 'mic audio', then processed and distributed to all other audio controllers via the ICS Tie Line.

2.4 Continued Airworthiness

Maintenance of the AA95-766 Single Channel Audio Controller is 'on condition' only. Periodic maintenance of this product is not required.

2.5 Accessories Required But Not Supplied

Installation kit AA90-IKC (Nat Part # D50S37SL-IKC) is required to complete the installation. It consists of one 50-Pin D-min Female Crimp Kit (D50SL-IKC) and one 37-Pin D-min Female Crimp Kit (D37SL-IKC)

NAT Part #: D50SL-IKC

Quantity	Description	NAT Part #
1	D-min 50 Socket Housing	20-21-050
50	MS Crimp Socket	20-26-901
1*	Jack Screw Set	20-27-002
1*	Lock Clip Set	20-27-004
1	50 Pin Connector Hood	20-29-051

NAT Part #: D37SL-IKC

Quantity	Description	NAT Part #
1	D-min 37 Socket Housing	20-21-037
37	MS Crimp Socket	20-26-901
1*	Jack Screw Set	20-27-002
1*	Lock Clip Set	20-27-004
1	37 Pin Connector Hood	20-29-038

* Use as required.

2.6 Installation Drawings

DRAWING	REV.	DESCRIPTION	TYPE
AA95\766\403-0	1.03	Audio Controller	Interconnect
AA95\766\403-1	1.03	Audio Controller	Interconnect
AA95\766\403-2	1.03	Audio Controller	Interconnect
AA95\766\405-0	1.02	Audio Controller	Connector Map
AA95\766\905-0	1.02	Audio Controller (sheet 1 of 2)	Faceplate
AA95\766\922-0	1.00	Audio Controller	Mechanical Installation

Section 2 ends after these Drawings

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES.	SEP 25/95	TGM
1.02	FORMAT CHANGES AND NOTE 6 ADDED	JAN 24/97	TGM
1.03	ECR #2414 - FORMAT CHANGES.	OCT 21/04	TAT

AA95-766 INSTALLATION NOTES



NOTES:

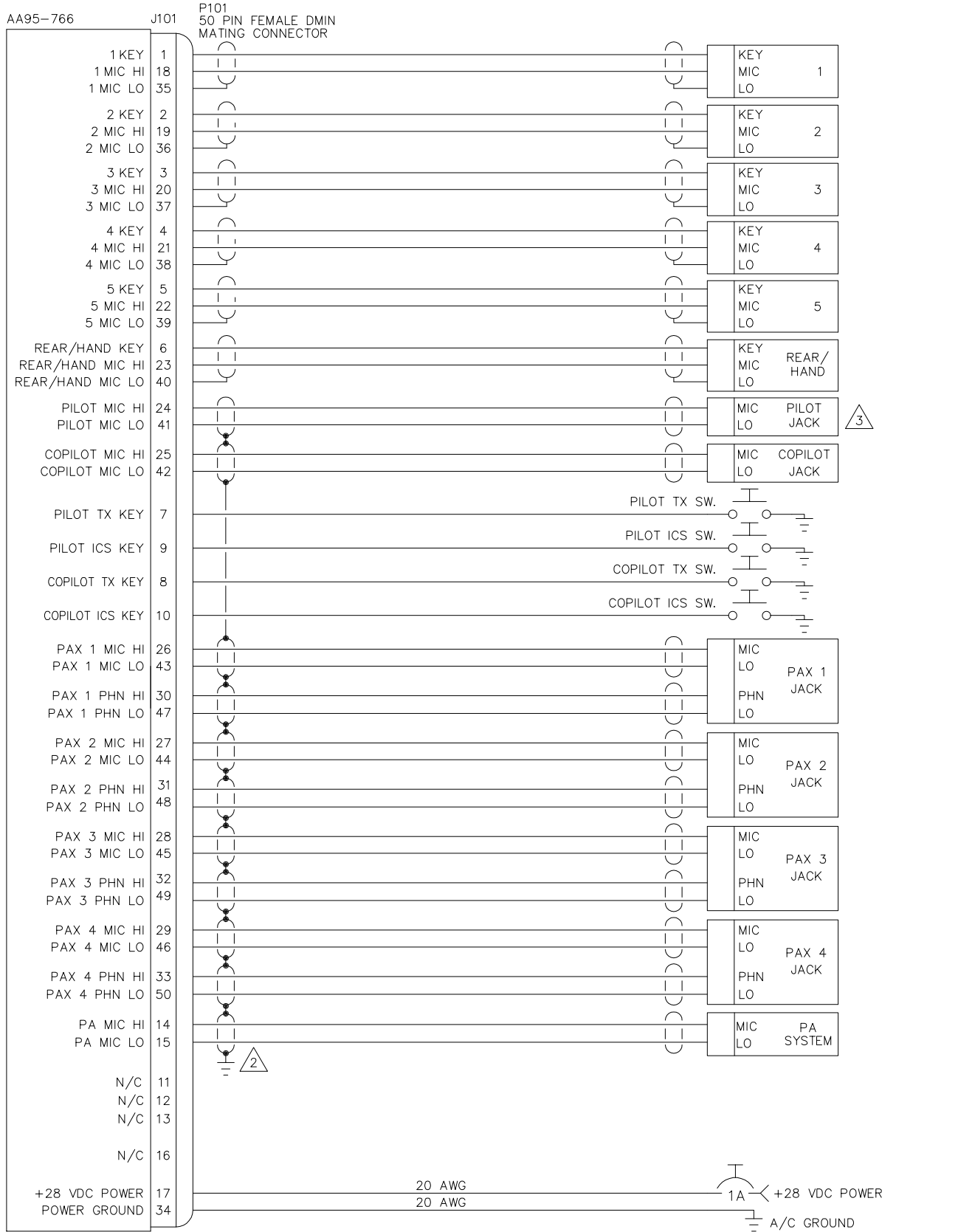
1. ALL WIRES SHOULD BE 22 AWG UNLESS OTHERWISE SPECIFIED. ALL WIRE SHOULD BE IN ACCORDANCE WITH MIL-W-22759. ALL SHIELDED WIRE/CABLE SHOULD BE IN ACCORDANCE WITH MIL-C-27500.
- △2 HEADPHONE, MICROPHONE AND ICS TIE LINES USE TWISTED SHIELDED PAIR. CONNECT SHIELDS TOGETHER AND GROUND TO CLEAN AIRCRAFT GROUND. GROUND POINT SHOULD BE THE SAME AS AIRCRAFT AUDIO SYSTEM POWER GROUND.
- △3 DO NOT GROUND MICROPHONE OR HEADPHONE LO CONNECTIONS TO AIRFRAME.
- △4 ADJUSTABLE LEVEL DIRECT AUDIO INPUT, AMPLIFIED.
- △5 N/A
- △6 AIRCRAFT ENTERTAINMENT SYSTEM (TAPE) MUST BE GROUND REFERENCED. IF NOT, A FLOATING GROUND ADAPTER BETWEEN THE AUDIO CONTROLLER AND ENTERTAINMENT SYSTEM WILL BE REQUIRED.
- △7 TO BE USED FOR EXPANSION OF INTERCOM SYSTEM ONLY. REFER TO INSTALLATION MANUAL FOR DETAILS.
- △8 LOW IMPEDANCE MICROPHONE.

DEFINITIONS:

- N/C: NO CONNECTION. THE PIN IS NOT CONNECTED TO ANYTHING INTERNALLY, AND THEREFORE SHALL HAVE NO CONNECTION EXTERNALLY.
- N/C SPARE: NO CONNECTION INTERNALLY, BUT A SPARE WIRE SHALL BE INSTALLED IN THE WIRE HARNESS.
- RESERVED: MAY BE CONNECTED AND USED IN THE FUTURE. THE CIRCUITRY MAY BE PRESENT OR ADDED TO ACTIVATE THE FUNCTION. THE PIN MAY BE USED FOR TEST PURPOSES. THERE IS NO EXTERNAL CONNECTION.
- RESERVED SPARE: RESERVED, BUT INSTRUCTIONS SHALL BE FOLLOWED TO ACTIVATE THE CIRCUITRY. A SPARE WIRE SHALL BE INSTALLED IN THE WIRE HARNESS.

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DESIGNED	KV	 NAT NORTHERN AIRBORNE TECHNOLOGY LTD.			
DRAWN	KEH				
DATE	JUN 15/93	TITLE			
CHECKED	NAT 200	NAT 255	AUDIO CONTROLLER		
APPROVED		SIZE A	CAGE CODE 3AB01	PART NO. AA95-766	REV. SHEET 1.03 1/3
FILE	403-0.DWG	DWG. TYPE	INTERCONNECT	DWG. NO.	AA95\766\403-0



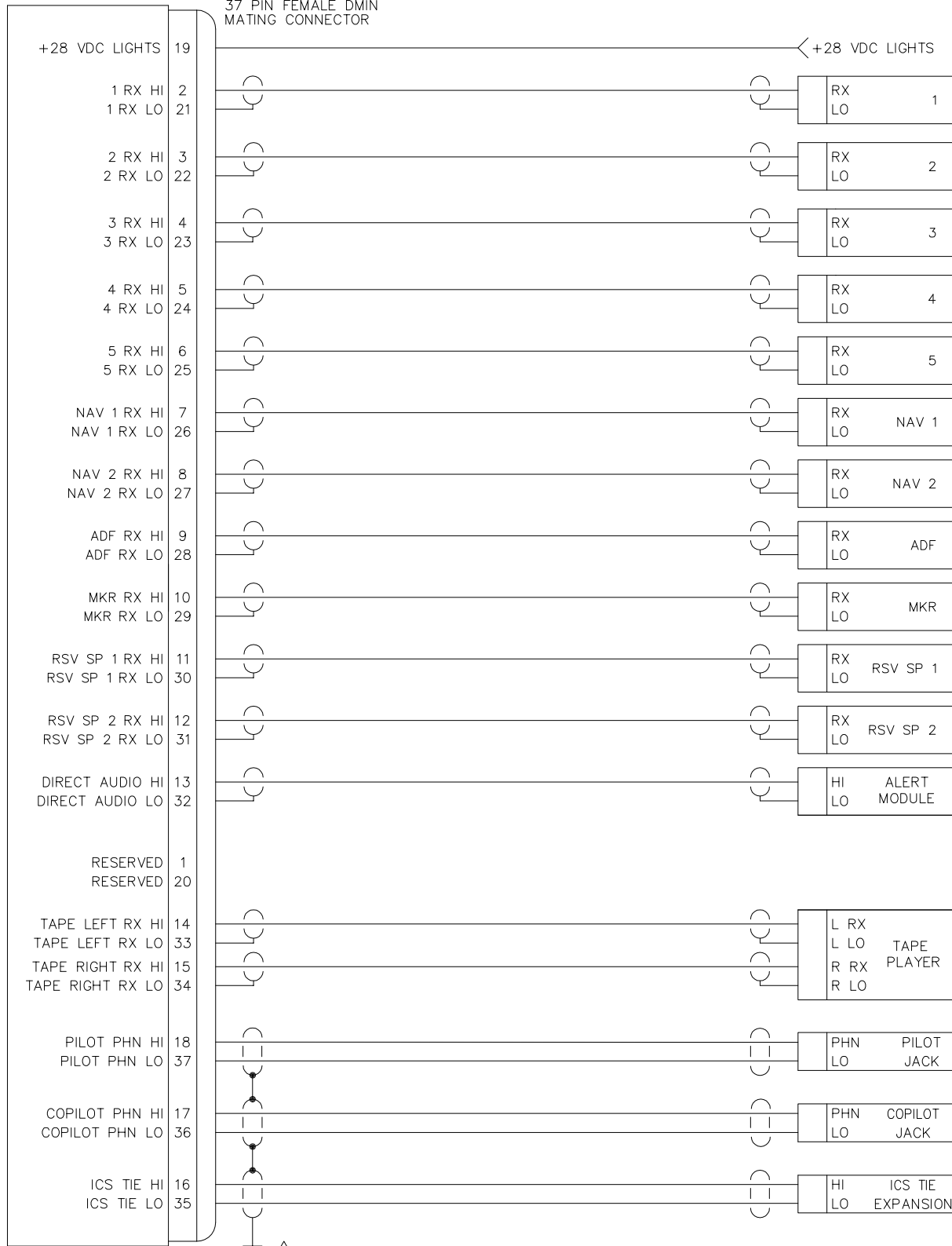
CONFIDENTIAL AND PROPRIETARY TO NAT LTD.

DESIGNED	KV	NAT NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	KEH					
DATE	JUN 15/93	TITLE AUDIO CONTROLLER				
CHECKED	NAT 200 NAT 255					
APPROVED	NAT 114	SIZE A	CAGE CODE 3AB01	PART NO. AA95-766	REV. 1.03	SHEET 2/3
FILE	403-0.DWG	DWG. TYPE	INTERCONNECT	DWG. NO.	AA95\766\403-1	

AA95-766

J102

P102
37 PIN FEMALE DMIN
MATING CONNECTOR





4

6

7

2

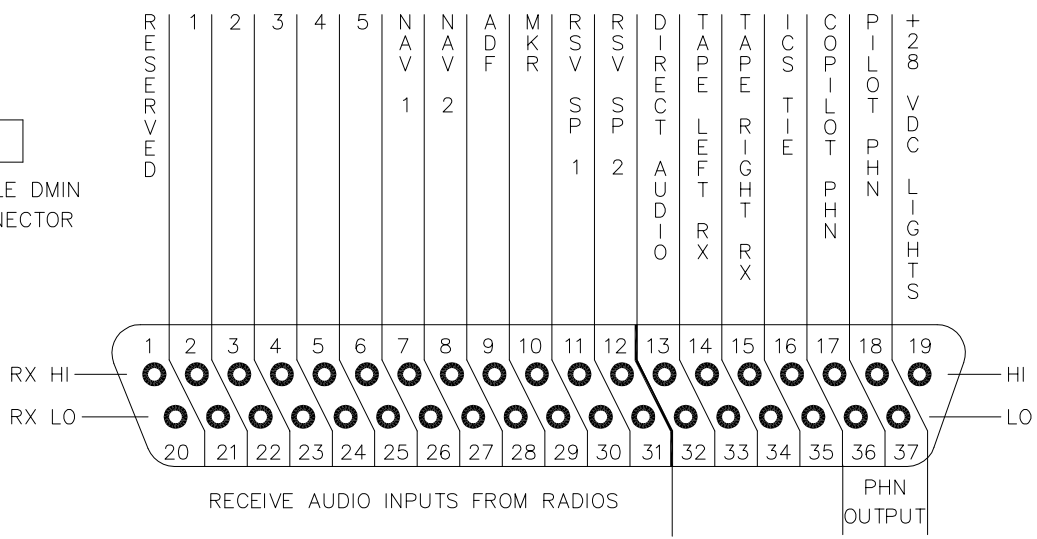
CONFIDENTIAL AND PROPRIETARY TO NAT LTD.

DESIGNED	KV	 nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	KEH					
DATE	JUN 15/93	TITLE				
CHECKED	NAT 200	NAT 255	AUDIO CONTROLLER			
APPROVED		SIZE	CAGE CODE	PART NO.	REV.	SHEET
FILE	403-0.DWG	A	3AB01	AA95-766	1.03	3/3
DWG. TYPE		INTERCONNECT		DWG. NO. AA95\766\403-2		

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES	OCT 2/95	MS
1.02	ECR #2414 - FORMAT CHANGES.	MAY 4/04	TAT

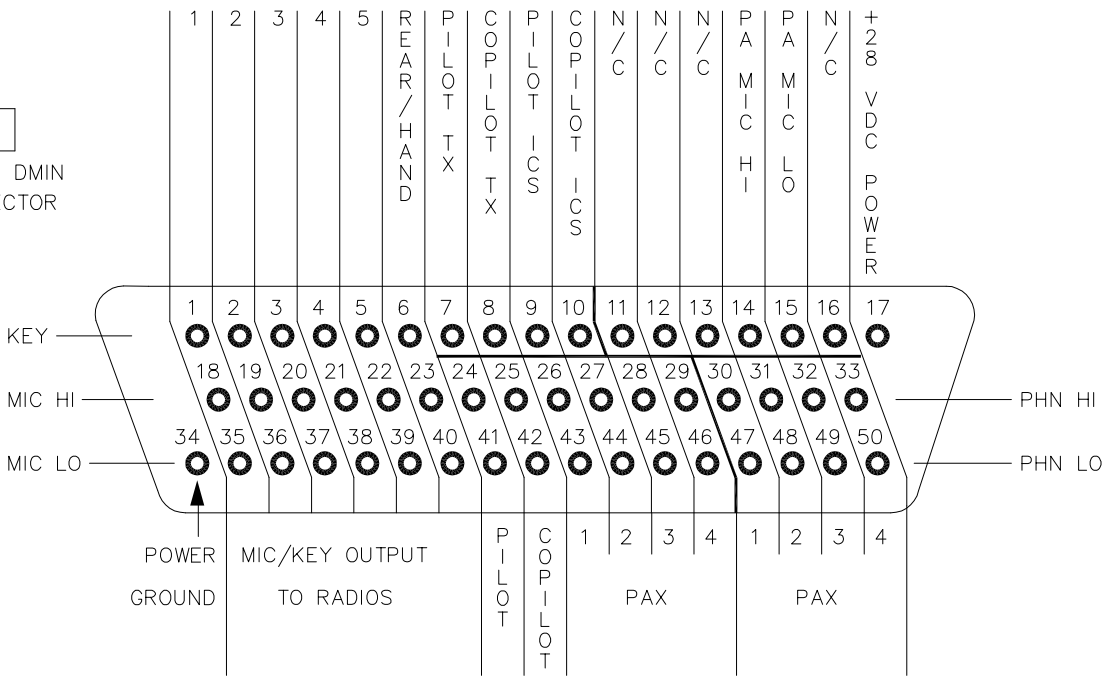
P102

37 PIN FEMALE DMIN MATING CONNECTOR



P101


50 PIN FEMALE DMIN MATING CONNECTOR



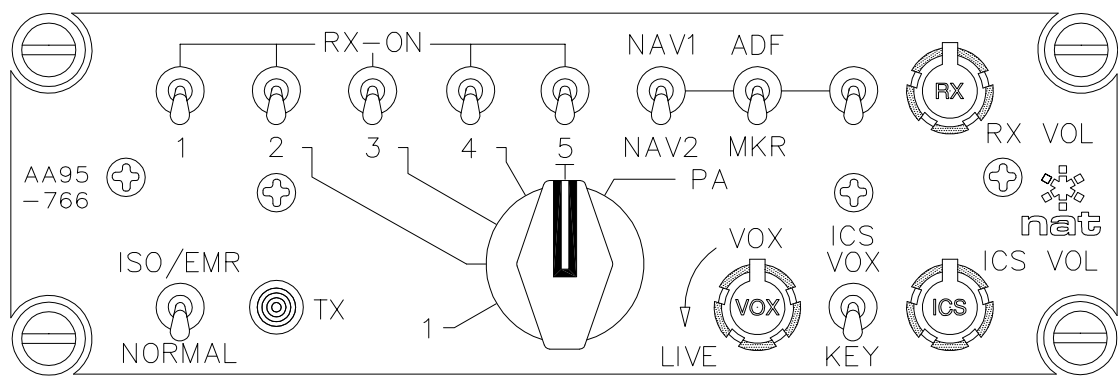
VIEW IS FROM REAR OF AIRFRAME CONNECTOR

NOTE: DO NOT GROUND HEADSET COMMONS

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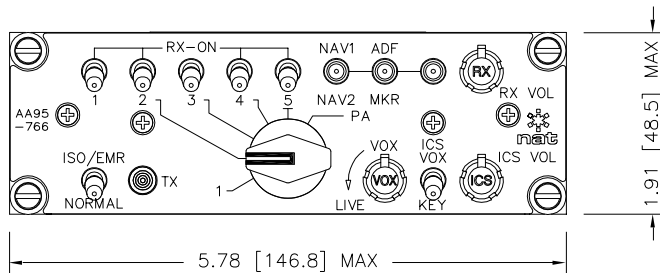
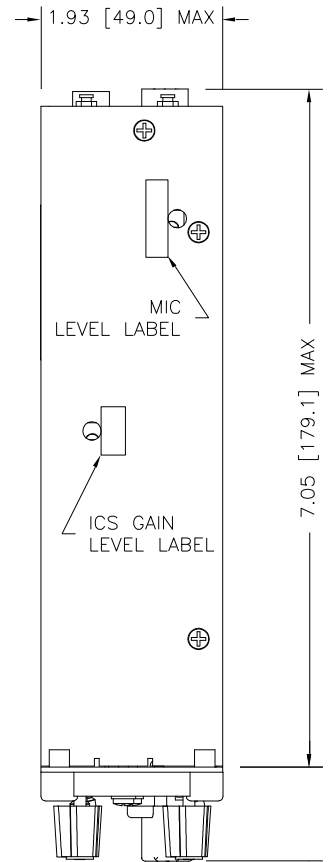
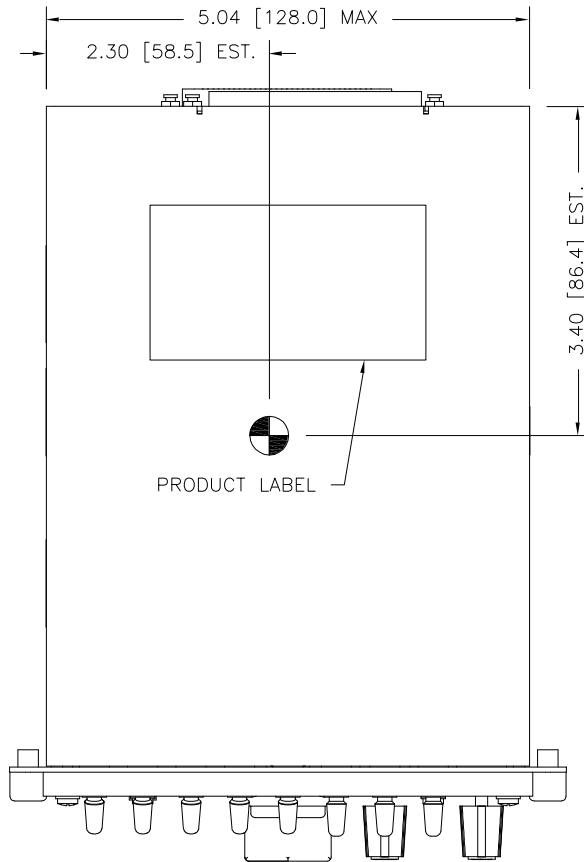
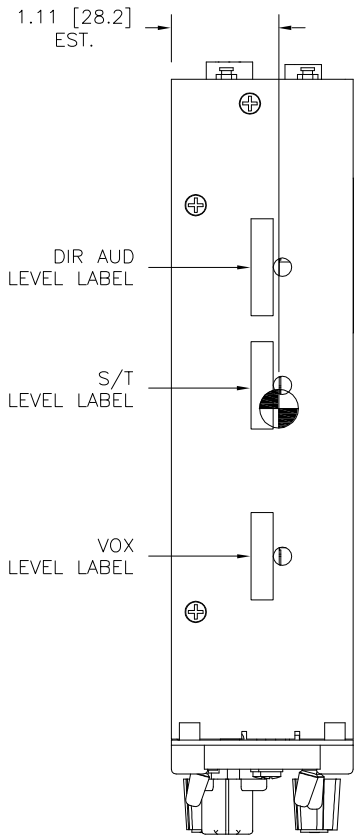
DESIGNED	KV	 NAT NORTHERN AIRBORNE TECHNOLOGY LTD.	TITLE AUDIO CONTROLLER			
DRAWN	KH					
DATE	JUN 15/93	REV. SHEET 1.02 1/1				
CHECKED	NAT 200 NAT 255					
APPROVED	NAT 114	SIZE A	CAGE CODE 3AB01	PART NO. AA95-766	FILE 405-0.DWG	
DWG. TYPE CONNECTOR MAP		DWG. NO. AA95\766\405-0				

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES	OCT 2/95	MWS
1.02	FORMAT CHANGES AND SHEET2 ADDED.	JAN 27/97	TGM



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DESIGNED	KV	NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	KEH					
DATE	JULY 5/93	TITLE				AUDIO CONTROLLER
CHECKED	NAT PROD. 105					
APPROVED		SIZE	CAGE CODE	PART NO.	REV.	SHEET
		A	3AB01	AA95-766	1.02	1/2
FILE	905-0102.DWG	DWG. TYPE	FACEPLATE	DWG. NO.	AA95\766\905-0	



NOTES:
 1. DIMENSIONING AND TOLERANCING
 IN ACCORDANCE WITH ASME Y14.5M-1994



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DIMENSIONS ARE INCHES [mm]	DESIGNED	KV		NAT NORTHERN AIRBORNE TECHNOLOGY LTD.				
	DRAWN	TAT						
THIRD ANGLE PROJECTION	DATE	FEB 25/04		TITLE AUDIO CONTROLLER				
MASS: 2.10 lbs. (1.0 Kg) MAX	CHECKED	NAT 200	NAT 255					
MATERIAL:	APPROVED			SIZE	CAGE CODE	PART NO.	REV.	SHEET
FINISH: CHROMATE CONVERSION	FILE	922-0.DWG	DWG. TYPE	MECH. INSTALLATION	DWG. NO.	AA95\766\922-0	1.00	1/1

Section 3 Operation

3.1 Introduction

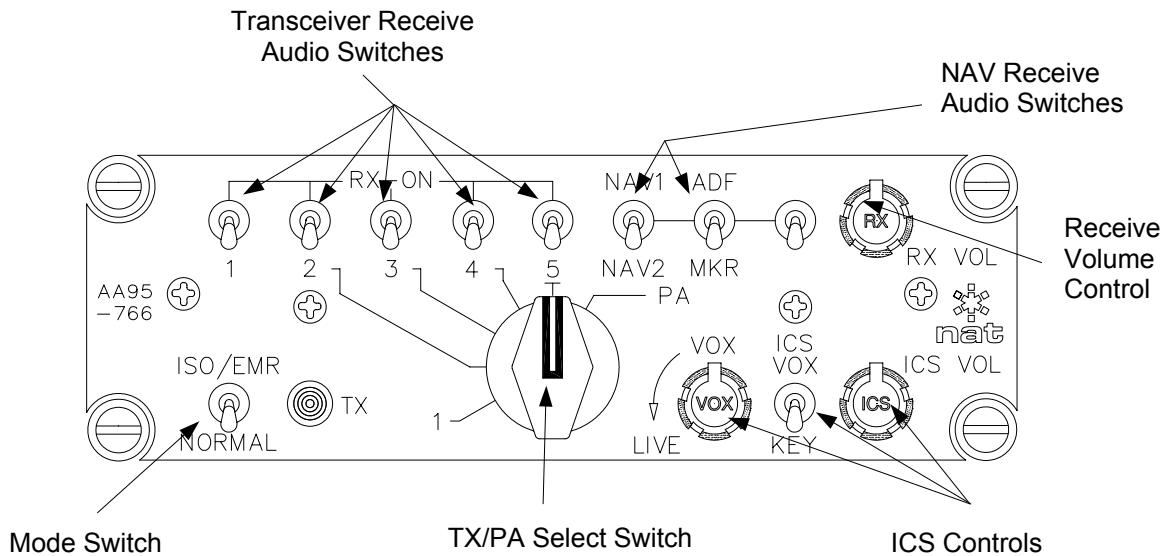
Information in this section consists of the functional and operational procedures for the AA95-766 Single Channel Audio Controller.

3.2 General

The AA95-766 provides central adjustment for all the aircraft audio. It allows selection of transmit and receive audio, live, VOX, or keyed (PTT) intercom, control of a hand microphone, and pilot isolation/emergency operation.

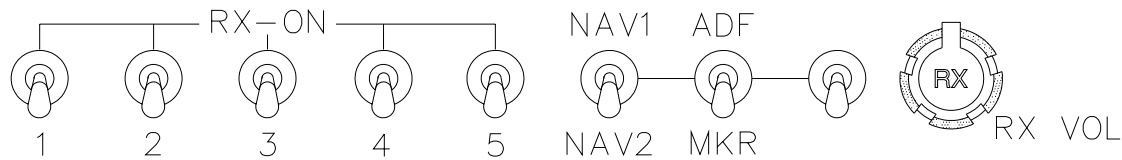
Sidetone level is adjustable internally, while receive (RX) and intercom (ICS) levels are adjustable from the front panel. All audio (except the sidetone of the radio in use) is muted during transmit for clarity. The directly connected DIRECT AUDIO input signal (see Section 3.5) remains un-muted during transmit. ICS operation will allow transmit during any ICS mode by using the PTT switch.

3.3 Controls and Indicators



The transmit and PA functions are controlled with a single rotary selector switch. The main receive volume, ICS volume and ICS VOX squelch are individually adjusted with rotary controls. The ICS and ISO/EMER / NORM operations are selected using colour-coded toggle switches. Individual receive audio is selected with colour-coded toggle switches.

3.3.1 Receive Audio Select Switches



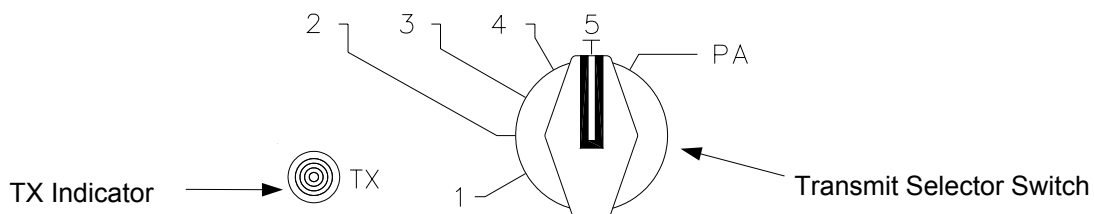
The transceiver receive audio select switches (white switch bats) are two position switches. The relevant transceiver receive audio is selected ON when the switch is set to the 'up' position, and when set to the 'down' position it is selected OFF.

The NAV receive audio select switches (blue switch bats) are three position switches. When set to the 'up' or 'down' position, the relevant NAV receive audio is selected on. When set to the 'centre-off' position, the relevant NAV receive audio is selected off.

The master receive volume control (RX VOL) adjusts all receive audio concurrently from 1% to full. It is important to set the individual radio volume controls to a nominal level, and then use the master receive volume on the audio controller to adjust for changing flight conditions.

When the red mode switch is set to NORMAL, the passengers will hear the radio audio as selected on the controller. The passengers will not hear any radio audio when the red mode switch is in the ISO/EMR position. All receive audio is muted during transmit (normal mode).

3.3.2 Transmit Selector Switch

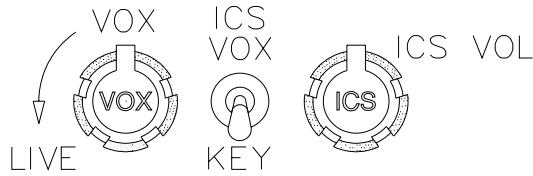


The transmit selector switch is a six-position switch used to select the desired transceiver, and when rotated fully clockwise it selects the PA function. When the hand mic or transmit PTT switch is activated, the mic will be coupled to the radio (or PA) selected. The pilot has priority over the copilot during transmit operations.

Receive audio for the transceiver selected is automatically activated as a function of the rotary selector switch, and no additional switching is needed to establish outside communication. During transmit, all audio selected is muted except the sidetone of the transceiver in use. Direct Audio is also muted during transmit.

The front panel TX indicator will illuminate green when either the pilot or co-pilot transmits. It will not light when the hand mic (if installed) is used.

3.3.3 ICS Functions



The ICS controls consist of the **VOX** and **ICS** controls, which are rotary knobs, and the **ICS VOX / KEY** control, which is an orange two-position toggle switch. The function of these controls is outlined below.

Intercom audio may be implemented in three modes: LIVE (on constantly), VOX (voice activated), or KEYED (active only when switched by ICS PTT cyclic or foot switch).

It is common to use the LIVE mode during ground operations, start-up, etc., and to use VOX or KEYED operation if conditions are so noisy that 'pilot fatigue' will result.

LIVE (Hot Mic Operation)

ICS mode switch (orange switch bat) set to the up (VOX) position and the VOX squelch control set to the full counter-clockwise position.

KEYED ICS (PTT Operation)

ICS toggle switch (orange switch bat) set to the down (KEY) position. Keyed ICS is inherent to the pilot and copilot microphone circuits only. Passenger microphone circuits will be LIVE with this mode selected.

VOX (Voice Activated)

ICS toggle switch (orange switch bat) set to the up (VOX) position. Set the ICS VOX Squelch control fully counter-clockwise and then slowly rotate clockwise until the intercom just becomes quiet. This setting will vary with ambient noise conditions, and the quality and number of microphones connected in the system.

3.3.3.1 General ICS Functions

Passenger ICS audio is LIVE when the controller is in the LIVE or KEYED mode of ICS operation. In the KEYED mode of operation the passenger microphones are LIVE. Utilize drop cord assemblies incorporating microphone circuit interrupt switches for keyed ICS operation. Passenger ICS is VOX triggered when VOX mode is selected.

All ICS audio is controlled by the front panel ICS volume control and may be varied to suit conditions. In multiple station systems, the ICS volume adjusts only the incoming ICS audio level. The ICS VOL control provides adjustment from approximately 1% to full output.

The mode switch (red switch bat) is used to select between NORMAL and ISO/EMR modes. In the NORMAL position (down), all operations of the ICS are functional as described above. When the switch is in the ISO/EMR (pilot isolate/emergency position), the pilot is isolated from the rest of the passengers. If the controller is operated in the ISO/EMR mode, ICS operation will continue (if there is no fault condition) between the passengers and copilot, but will exclude the pilot. See section 3.4 for further details.

3.4 Emergency Operation

When the red mode switch is set to the ISO/EMR position, the pilot is removed from the ICS bus and connected directly to the selected radios. This mode should be selected in the event of a box fault or power failure.

In the ISO/EMR mode, all functions are retained by the pilot, except ICS and possibly boom mic operation. If the box or airframe fault prevents the TX annunciator from lighting during transmit (indicating a failure in the mic keying circuit), then the hand mic should be used. A power fault of any kind will prevent the TX annunciator from lighting, giving an immediate indication of failure. If ICS audio is still available, then the power to the controller has not failed, and loss of the TX light indicates TX switch failure.

In the ISO/EMR mode, all switches work exactly as they do during NORMAL operation, except for the RX and ICS volume controls, which have no effect.

The ISO/EMR function should be tested prior to flight to ensure proper operation, and allow the radio levels to be set adequately for emergency operation.

Any selected receive audio is switched to the primary user (pilot) in the 'emergency' mode, but not to any passengers in the system. Audio level will be lower than in NORMAL operation because the signals are obtained directly from the radios, bypassing the electronics in the controller. This is provided for failure situations that make operation impossible in the NORMAL mode (i.e. loss of power or amplifier failure, etc.)

3.5 Direct Audio

Direct Audio is an audio signal from an existing warning system that is connected 'directly' into the audio system, and is not front-panel selectable. The Direct Audio signal is an amplified input, and can be adjusted at the time of installation (see section 2.3.4.2).

End of Section 3

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