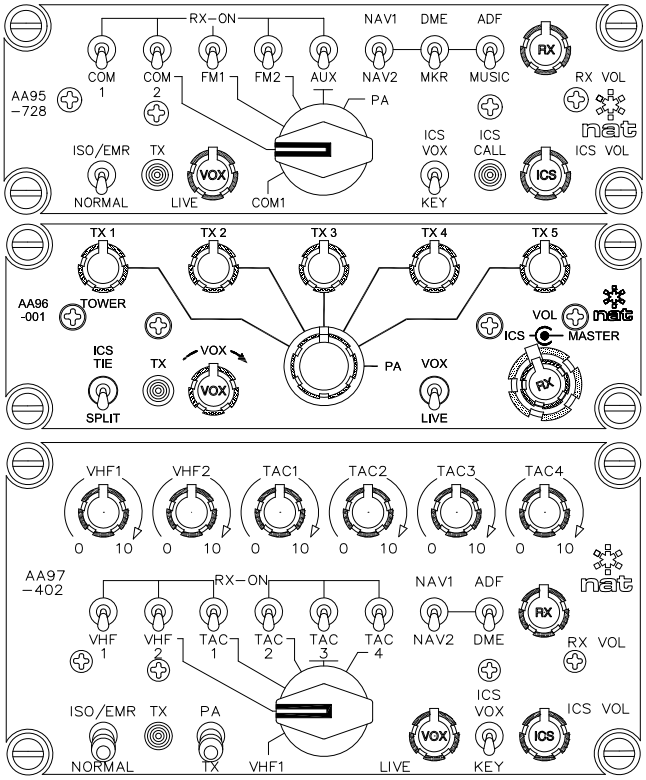
Installation and Operation Manual

AA9x Series
Single Channel Audio Controller



SM56

ISSUE 4.01

Northern Airborne Technology Ltd.
1925 Kirschner Road
Kelowna, BC, Canada.
V1Y 4N7
Telephone (250) 763-2232
Facsimile (250) 762-3374

Issued on the authority of Northern Airborne Technology Ltd.

IMPORTANT INFORMATION

This manual has been produced to provide information unique to the AA9x Series Single Channel Audio Controller. Some of this information has been published previously in the SM01 Service manual (AA90/AMS40 Series Audio Controllers).

The information presented in this manual is for reference purposes only, and is intended to provide general information that can be used by the installer/technician to gain a fundamental understanding of the respective product. It is not intended to cover all variations of the AA9x Series audio controllers. Drawing packages for specific AA95, AA96 and AA97 units can be requested from NAT by contacting the Product Support Department.

Earlier versions of the AA9x Series (prior to Serial number 6000) may not be covered by the information in this manual. Please refer to SM01, or contact the Product Support Department at NAT Ltd.

Prepared By: NAT 226	Checked By: NAT 255	Approved By: NAT 114

The status of this installation and operation manual is controlled by issue shown on the title page. The status of each section is controlled by revision shown in the footer of each page. All revisions affecting sections of this manual have been incorporated into the latest issue.

ISSUE/REVISION RECORD

Manual Issue Number	Section Revision Number	Revision Description	Issue Date
1.00	N/A	Initial Issue	Oct 23, 2002
4.00	N/A	Split Manual	Nov 10, 2003
4.01	Section 1 Rev: 1.00 Section 2 Rev: 1.00 Section 3 Rev: 1.00	Update to current templates.	Sept 05, 2008

Table of Contents

Section 1 Description

1.1 Introduction

Information in this section consists of product description, design features and specifications for the AA9x Series Single Channel Audio Controller. All derivative product information shall be contained in the applicable manual supplement, which may be obtained from NAT as required.

Review all notes, warnings and cautions.

1.2 Product Description

The AA9x series provide control for all aircraft audio, allowing selection of transmit and receive audio, LIVE, KEYED, or VOX intercom, interface for an additional hand held transmit microphone (hand mic), and pilot isolation/emergency operation.

Transmit and PA functions are controlled with a single rotary switch. Receive audio, ICS operations and tape audio are controlled with toggle switches. Receive volume, ICS volume and ICS VOX squelch are individually adjusted with rotary controls. Sidetone (S/T) level is adjustable internally and the AA97 also has an individual RX level control for each transceiver.

1.3 Design Features

The AA9x series are Dzus rail mounted units with lighted faceplates. Transceiver interfacing 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.

Boom mic support is provided for the pilot and co-pilot, with both ICS and XMIT functions via cyclic or yoke switching. In some models, a third ‘transmit capable’ boom mic is added. Live (Hot Mic) and VOX ICS are also provided, with a ‘transparent’ function, allowing immediate transmission via this mode without further control panel switching and immediate return to ICS operation on completion. The ICS (intercom) 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 certain DIRECT AUDIO input signals, 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 (50g shock), dry nitrogen filled units.

1.4 Specifications

1.4.1 Electrical Specifications

Input Power

Nominal	27.5 Vdc Nominal @ 0.50 A Max.
Lighting	27.5 Vdc @ 160 mA
Alert Power	27.5 Vdc Nominal @ 150 mA Max.

Input Signals

Quantity	13 receive channels 7 mic channels 1 ICS tie channel 1 or 2 direct channels
Audio level	2.5 Vrms for receiver inputs 0.25 Vrms for mic inputs 2.5 Vrms for direct audio inputs
Impedance	1 kΩ ±10% for receive inputs 1 kΩ ±10% for mic inputs 1.6 kΩ ±10% for ICS tie input 1.3 kΩ ±10% for Direct Audio1 input 100 Ω ±10% for Direct Audio 2 input
Circuit Type	All are single ended inputs
Coupling	<-40 dB
Keylines	Pilot & copilot transmit PTT Rear hand mic transmit PTT Pilot & copilot ICS PTT 3 Alerts - active low

Output Signals

Quantity	6 Headphone outputs Up to 7 Transmitter mic outputs (incl. PA) Up to 7 Transmitter keyline outputs (incl. PA)
Headphone	7.7 Vrms or 100 mW (20 dBm) into 600 Ω nominal
Direct Audio 1	10 mW (10 dBm) into 600 Ω nominal
Direct Audio 2	0.1mW (-10 dBm) 0.25 Vrms into 600 Ω nominal
Alert	90 mVrms ±10% into 600 Ω nominal
Circuitry Type	Headphones are balanced Mic and ICS Tie are single ended
Distortion	<10% THD @ nominal power output
Audio Noise Level	>50 dB down from rated output (no signal)
Coupling	<-40dB
Output Regulation	<10% distortion @ 3 dB max. of rated output power at 400% and 75% of rated load

Bi-directional Signals

Quantity	1 ICS tie channel
Audio level	0.34 Vrms for NAT ICS tie
Impedance	1.8 kΩ ± 10% for NAT ICS tie input
Circuitry Type	Single ended

Miscellaneous

Annunciators	Green LED will light for transmit operation

1.4.2 Physical Specifications

	AA95	AA96	AA97
Height	1.90" (48.3 mm)	1.90" (48.3 mm)	3.00" (76.2 mm)
Depth	6.82" (173.2 mm)	6.82" (173.2 mm)	6.82" (173.1 mm)
Width	5.00"(127.0 mm)	5.00" (127.0 mm)	5.75" (146.1 mm)
Weight	2.1 lbs. (955 g)	2.1 lbs. (955 g)	2.5 lbs (1.14 kg)
Mounting	Dzus rail		
Faceplate	Engraved acrylic edge lit panel		
Material/Finish	Chassis & cover are 5052-H32 brushed aluminum with chromate conversion finish		
Connectors	Male 50 pin & 37 pin D-submin connectors with slide locks		

1.4.3 Environmental Specifications

Temperature	-20 to +55°C (ambient) -55 to +85°C (survival)
Altitude	25,000 feet max.
Humidity	95% Non-condensing
Vibration/Shock	Conforms to DO-160C Cat. 'N'

1.5 Unit Nomenclature

AA95-512
VHF 1, VHF 2, RT1, RT2, RT3, RT4 XCVRs
NAV, AUX switched Nav-Aids
2 unswitched alerts provided
RX and ICS level controls
ICS Call LED from rear controller
ICS Tie/Split switch

AA95-728
Full pilot and co-pilot support
2 Comm, 2 FM and AUX XCVR positions
5 Nav-Aids plus music input
KEYED, LIVE, VOX ICS with front panel control
3-level alerting
ICS CALL annunciator
Illuminated TX selector knob
1 Direct Audio input

AA95-729 Full support for Doctor, Nurse and Attendant
ICS only for 2 positions plus patient
2 Comm, 2 FM and AUX XCVR positions
ADF, Doppler and music inputs.
1 Direct input
ICS CALL switch, PLT ISO annunciator
5 Nav-Aids plus music input
KEYED, LIVE, VOX ICS with front panel control
Illuminated TX selector knob

AA96-001 TX 1, TX 2, TX 3, TX 4, TX 5 and PA XCVRs
2 NAV and 2 ADF unswitched RX inputs
No internal alerting
VOX/LIVE ICS with squelch adjustment
Pilot/Co-pilot boom mic support with pilot priority
4 PAX ICS only support
Front panel master RX and ICS level controls

AA96-400 Full support for Jumpmaster and observer
VHF 1, VHF 2, FM1, FM2, INT and PA XCVRs
2 NAV and 2 ADF unswitched RX inputs
KEYED/LIVE ICS operation
4 PAX ICS only supported
Front panel RX and ICS level controls
PIL ISO annunciator and ICS CALL pushbutton

AA97-402 VHF 1, VHF 2, TAC1, TAC2, TAC3, TAC4 XCVRs and PA
Each XCVR has independent RX level adjustment
NAV1, NAV2, ADF1 and DME switched Nav-Aids
1 Direct Audio input
3 Audio alerts installed
TX/PA and locking ISO/EMR switches
No hand mic connection
Pilot/co-pilot boom mic support with pilot priority
4 PAX ICS only supported
Front panel RX and ICS level controls

Section 1 ends

Section 2 Installation

2.1 Introduction

Information in this section consists of unpacking and inspection procedures, installation procedures, post-installation checks and installation drawings for the AA9x Series Single Channel Audio Controller.

Note: The AA95, AA96 and AA97 series single channel audio controllers are customized units and may have unique operational features that are different to the options described, or are not covered in this manual. Any questions should be directed to the NAT Product Support Department.

Review all notes, warnings and cautions.

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. Check that all items listed below are present before proceeding and report any shortage immediately to your supplier:

- Warranty Card
- Operators Manual
- Certificate of Conformity or Release Certification

2.2.1 Warranty

All Northern Airborne Technology Ltd. products are warranted for 2 years from date of installation by an authorized NAT dealer, to be free of defects in workmanship or performance. This warranty covers all materials and labour, but is exclusive of any transport to deliver the defective unit to and from NAT or its designated warranty repair center, or any labour to remove or re-install the defective unit in the aircraft. Contact NAT for any questions regarding this warranty, its applicability to your units and/or for return authorization. NAT is the final arbitrator concerning warranty administration. Units which have been physically damaged, burned, immersed in water or otherwise abused beyond the scope of normal use will not be considered for warranty. **WARRANTY IS VOID UNLESS THE PRODUCT IS INSTALLED BY AN AUTHORIZED NAT DEALER**. Product for which a warranty card is not returned shall be warranted from date of manufacture.

2.3 Continued Airworthiness

Maintenance of the AA9x Series Single Channel Audio Controller is ‘on condition’ only. Periodic maintenance of this product is not required.

2.4 Installation Procedures

2.4.1 Warnings

WARNING:
High volume settings can cause hearing damage.
Set the headset volume control to the minimum volume setting prior to conducting tests, and slowly increase the headset volume to a comfortable listening level.

2.4.2 Cautions

CAUTION:
Failure to follow the installation and wiring instructions provided in this manual for power and ground connections, including the rating of the circuit breaker, may lead to damage in the power input circuitry of the unit.

2.4.3 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 solder sleeves (for shield terminations) to make the most compact and easily terminated interconnect. Follow the connector map in Section 2.7 as required.

Allow 3" from the end of the shielded wiring to the shield termination to allow the connector hood to be easily installed. Reference the interconnect drawing in Section 2.7 for shield termination details. Note that the hood is a "clamshell" hood, and is installed after the wiring is complete.

Maintain wire segregation and route wiring in accordance with the original aircraft manufacturers Maintenance Instructions.

Unless otherwise noted, all wiring shall be a minimum of 22 AWG, except power and ground lines, which shall be a minimum of 20 AWG. Reference 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.

2.4.4 In-line PTT Cordsets

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 of the AA9x series, ICS and TX keylines are needed to properly activate the associated PTT circuitry inside the AA9x series. For headsets connected to the PASSENGER inputs/outputs of the AA9x series, 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 AA9x series, 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 at the AA9x series (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 Figure 1 below for details.

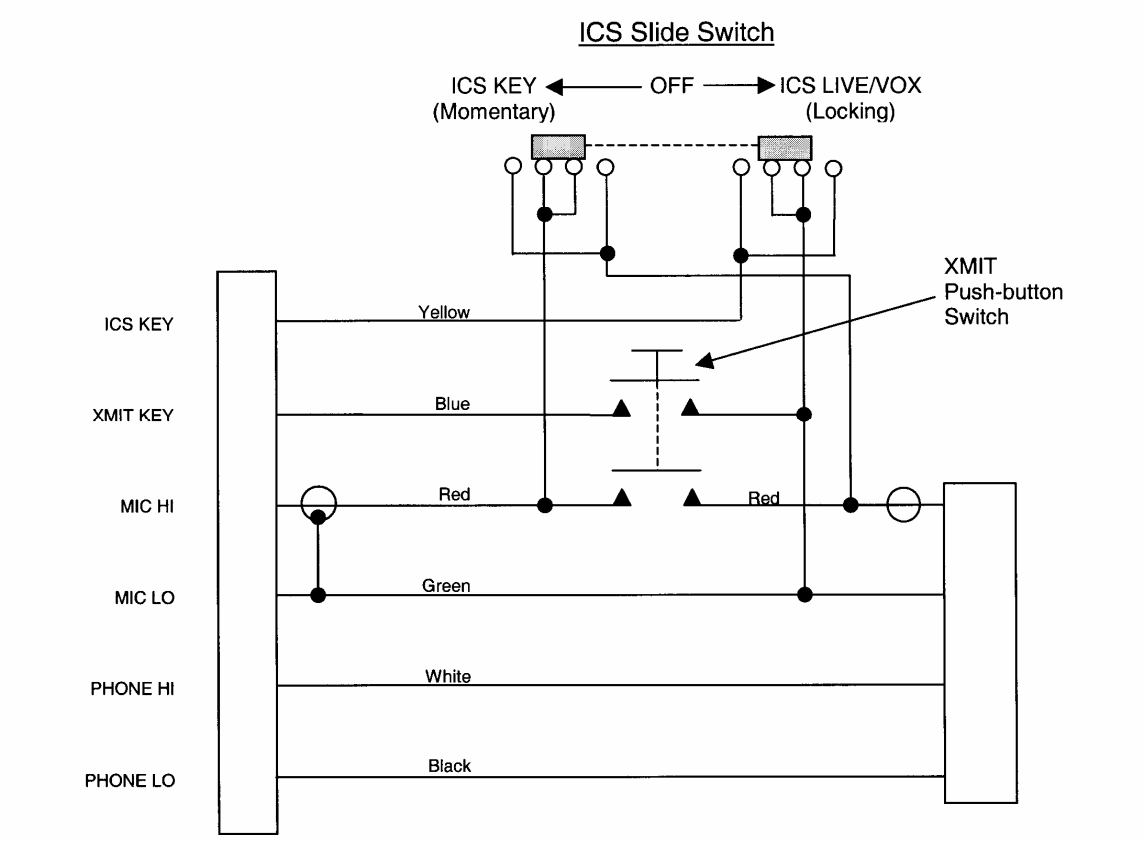


Figure 1: PTT Cord for Use with NAT Audio Controllers (XMIT and ICS)

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.

Although in-line PTT cordsets can be used to conveniently 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 AA9x series 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 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.

2.4.5 Post Installation Checks

2.4.5.1 Voltage/Resistance Checks

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

Check the following:

a) Check P101, pins <16> and <17> for +28 Vdc relative to ground.
b) Check P101 pin <34> for continuity to ground (less than 0.5Ω).
c) Check P102 pin <19> for lights buss voltage.
d) Check all Mic, phone, music and key lines for shorts to ground or adjacent pins.

2.4.5.2 Power On Checks

Power up the aircraft's systems and confirm normal operation of all functions of the AA9x Series. Refer to Section 3 (Operation) for specific operational details.

a) Begin with only the Pilot's headset installed, no hand mic. Confirm correct radio operation, both receive and transmit. Check yoke (or cyclic) switch action. Check radio audio inputs and selection of same.
b) If there is a music source in the system turn it on and verify that music is muted in the CREW mode and removed in the PLT ISO mode. Check for proper mute 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 AA9x series in Pilot ISO mode; then adjust the AA9x series front panel RX master volume control level in NORMAL mode.
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. Failure to key or correctly modulate a transmitter is often the result of forgetting to connect all required grounds to the radio or external audio system.
d) Check the ICS Modes (ALL, CREW, PLT ISO), and the manual Fail-safe operation.
e) Plug in the Co-pilot's headset. Check for correct ICS and SPLIT transmit operation. Check that the Co-pilot loses transmit capability during PLT ISO. Check yoke switch functions.
f) Plug in the hand mic, if installed, and test for correct operation in all modes. (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.
g) 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. For further information, see section 2.4.4 above.
i) To verify proper operation, all functions and levels shall be checked in-flight.
j) Check preset adjustments are completed before aircraft departure.

Upon satisfactory completion of all performance checks, make all required log book entries, electrical load, weight and balance amendments and other documentation as required by your local regulatory agency before releasing the aircraft for service.

2.5 Adjustments and Connections

The unit is shipped 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 shown in Figure 2 and Figure 3.

2.5.1 Left Side Panel Adjustments

The trimpots on the left side panel shown in Figure 2 are used to adjust the levels of audio in the user's headphones. Rotating the trimpots clockwise (cw) increases the level and counter clockwise (ccw) reduces it.

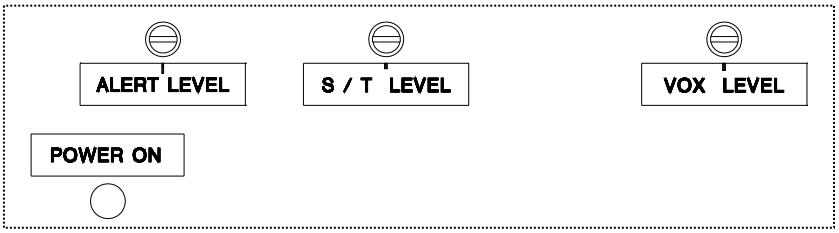


Figure 2: Left Side Panel Adjustments

2.5.1.1 ALERT LEVEL

The ALERT LEVEL trimpot is used to adjust the level for the internally generated Alert signals. Other parameters relating to these signals are adjusted from the right side panel.

2.5.1.2 S/T LEVEL

The S/T LEVEL trimpot adjusts the overall sidetone level of all selected transceivers (from the front panel).

2.5.1.3 VOX LEVEL

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

2.5.1.4 POWER ON

The POWER ON LED will illuminate to indicate that the unit is connected to the power supply.

2.5.2 Right Side Panel Adjustments

A variety of different signals can be selected to trigger the internal Alert signals. The trimpots on the right side panel shown in Figure 3 are used to adjust the characteristics of the audible signals that the user will hear.

Figure 3: Right Side Panel Adjustments

2.5.2.1 DIR AUD LEVEL

The DIR AUD LEVEL trimpot is used to adjust the audio level of the devices connected to the DIR AUD 1 input.

2.5.2.2 AUDIO ALERTS

AUDIO ALERT 1 is a single tone signal and AUDIO ALERTS 2 and 3 are two-tone signals.

2.5.2.3 TIME

The duration of AUDIO ALERT 3 can be adjusted from one to three seconds using the TIME trimpot.

2.5.2.4 TONE

The pitch of the signals can be adjusted using the relevant TONE trimpot.

2.5.2.5 RATE

The cycling rate of the two-tone signals can be adjusted using the RATE trimpots.

Note: The number and type of adjustments is dependent on the features specific to the particular AA95, AA96 or AA97 configuration.

2.6 Accessories Required But Not Supplied

Installation kit p/n AA90-IKC (crimp) (NAT Part No. D50S37SL-IKC) is required to complete the installation. The kit consists of one 50-Pin D-min Female Crimp Kit (D50SL-IKC) and one 37-Pin D-min Female Crimp Kit (D37SL-IKC):

D50SL-IKC consists of

Quantity	Description	NAT Part No.
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

D37SL-IKC consists of

Quantity	Description	NAT Part No.
1	D-min 50 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.

2.7 Installation Drawings

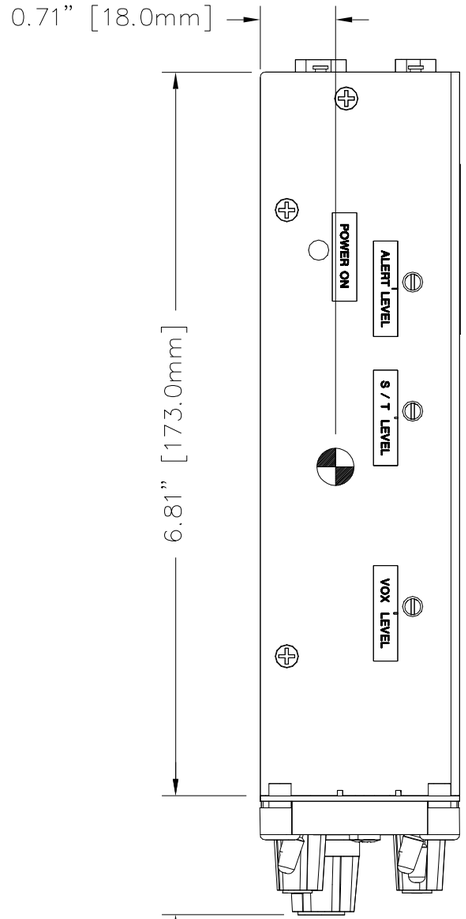
Note: There are multiple versions of the AA95, AA96 and AA97. For this reason, the documents listed below are supplied for reference only for units with Serial numbers 6000 and above. If specific model information is required, please contact the Product Support Department at NAT.

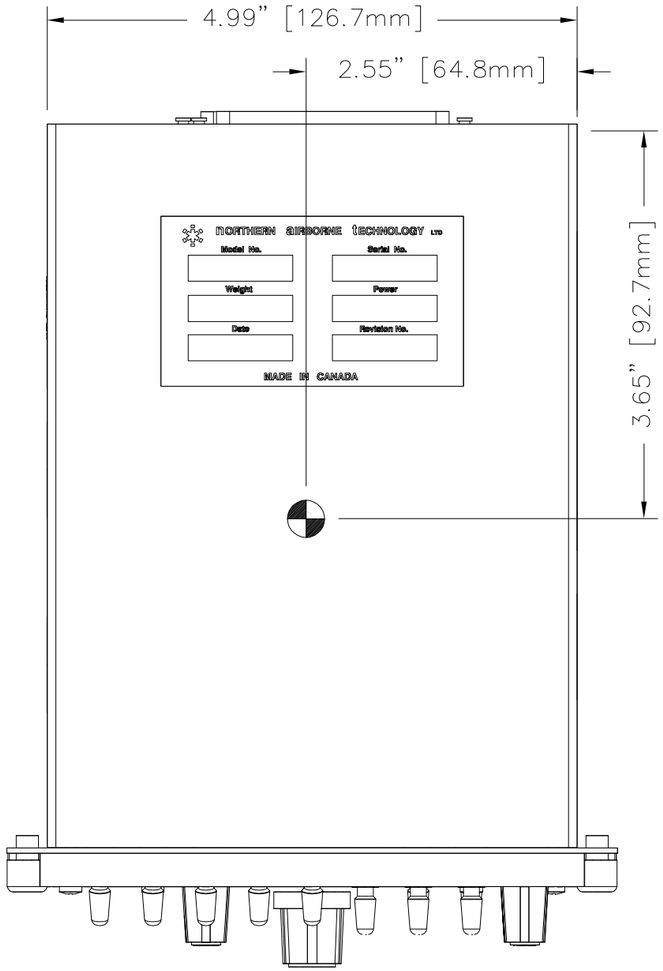
DOCUMENT	REV.	DESCRIPTION	TYPE
AA95 and AA96 (All versions)			
AMS43\922-0	1.01	Audio Controller	Mechanical Installation
AA95-728			
AA95\728\403-0	1.01	Audio Controller	Interconnect
AA95\728\403-1	1.01	Audio Controller	Interconnect
AA95\728\403-2	1.01	Audio Controller	Interconnect
AA95\728\405-0	1.01	Audio Controller	Connector Map
AA95\728\905-0	1.02	Audio Controller	Faceplate
AA95-729			
AA95\729\403-0	1.00	Audio Controller	Interconnect
AA95\729\403-1	1.02	Audio Controller	Interconnect
AA95\729\403-2	1.01	Audio Controller	Interconnect
AA95\729\405-0	1.02	Audio Controller	Connector Map
AA95\729\905-0	1.02	Audio Controller	Faceplate
AA96-001			
AA96\001\403-0	1.00	Audio Controller	Interconnect
AA96\001\403-1	1.00	Audio Controller	Interconnect
AA96\001\403-2	1.00	Audio Controller	Interconnect
AA96\001\405-0	1.00	Audio Controller	Connector Map
AA96\001\905-0	1.11	Audio Controller	Faceplate

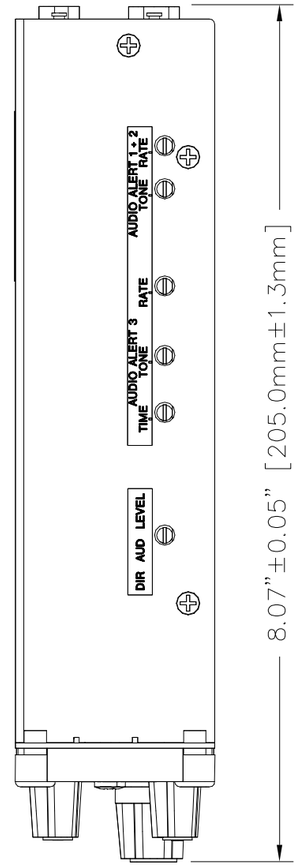
DOCUMENT	REV.	DESCRIPTION	TYPE
AA96-400			
AA96\400\403-0	1.01	Audio Controller	Interconnect
AA96\400\403-1	1.01	Audio Controller	Interconnect
AA96\400\403-2	1.01	Audio Controller	Interconnect
AA96\400\405-0	1.01	Audio Controller	Connector Map
AA96\400\905-0	1.11	Audio Controller	Faceplate
AA97-402			
AA97\402\403-0	1.02	Audio Controller	Interconnect
AA97\402\403-1	1.02	Audio Controller	Interconnect
AA97\402\403-2	1.02	Audio Controller	Interconnect
AA97\402\405-0	1.01	Audio Controller	Connector Map
AA97\402\905-0	1.11	Audio Controller	Faceplate
AA97\402\922-0	1.00	Audio Controller	Mechanical Installation

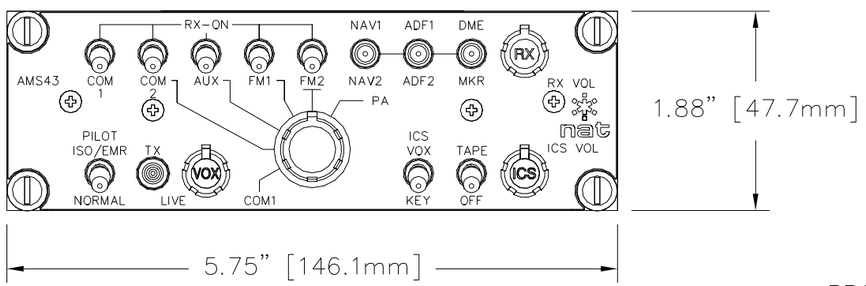
Section 2 ends following the above documents

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	ECR #787 – DRAWING WAS 910–0100.DWG, FORMAT CHANGES.	MAR 9/99	TAT









CENTER OF GRAVITY
WEIGHT: 2.1 lbs. (1.0 kg)

TOLERANCES UNLESS STATED OTHERWISE 0.X=+/–0.030 0.XX=+/–0.010 0.XXX=+/–0.005 0.XXXX=+/–0.002 ANGLE=+/– 0.5 DEG.	DIMENSIONS IN INCHES THIRD ANGLE PROJECTION	DESIGNED: KV DRAWN: TB DATE: JAN 27/94 CHECKED: NAT 200 / NAT 214 APPROVED: NAT 107	NORTHERN AIRBORNE TECHNOLOGY LTD. TITLE: AUDIO CONTROLLER
MATERIAL FINISH		FILE 922–0101.DWG	SIZE B · CAGE CODE 3AB01 · PART NO. AMS43 · REV. 1.01 · SHEET 1/1 DWG. TYPE MECH. INSTALLATION · DWG. NO. AMS43\922–0

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	UPDATED TO CURRENT NAT STANDARDS.	JUL 7/00	TAT

AA95-728 INSTALLATION NOTES

NOTES:

1. ALL WIRES SHOULD BE 22 AWG UNLESS OTHERWISE NOTED. USE TEFZEL M27500 OR SPEC44 (M81044) SHIELDED WIRE WITH SOLDER SLEEVES.

2. HEADSET, 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 HEADSET LO CONNECTIONS TO AIRFRAME.

4. ADJUSTABLE LEVEL DIRECT AUDIO INPUT, AMPLIFIED.

5. AIRCRAFT ENTERTAINMENT SYSTEM (MUSIC) MUST BE GROUND REFERENCED. IF NOT, A FLOATING GROUND ADAPTER BETWEEN THE AUDIO CONTROLLER AND ENTERTAINMENT SYSTEM WILL BE REQUIRED.

5. TO BE USED FOR EXPANSION OF INTERCOM SYSTEM ONLY. REFER TO INSTALLATION MANUAL FOR DETAILS.

DEFINITIONS:

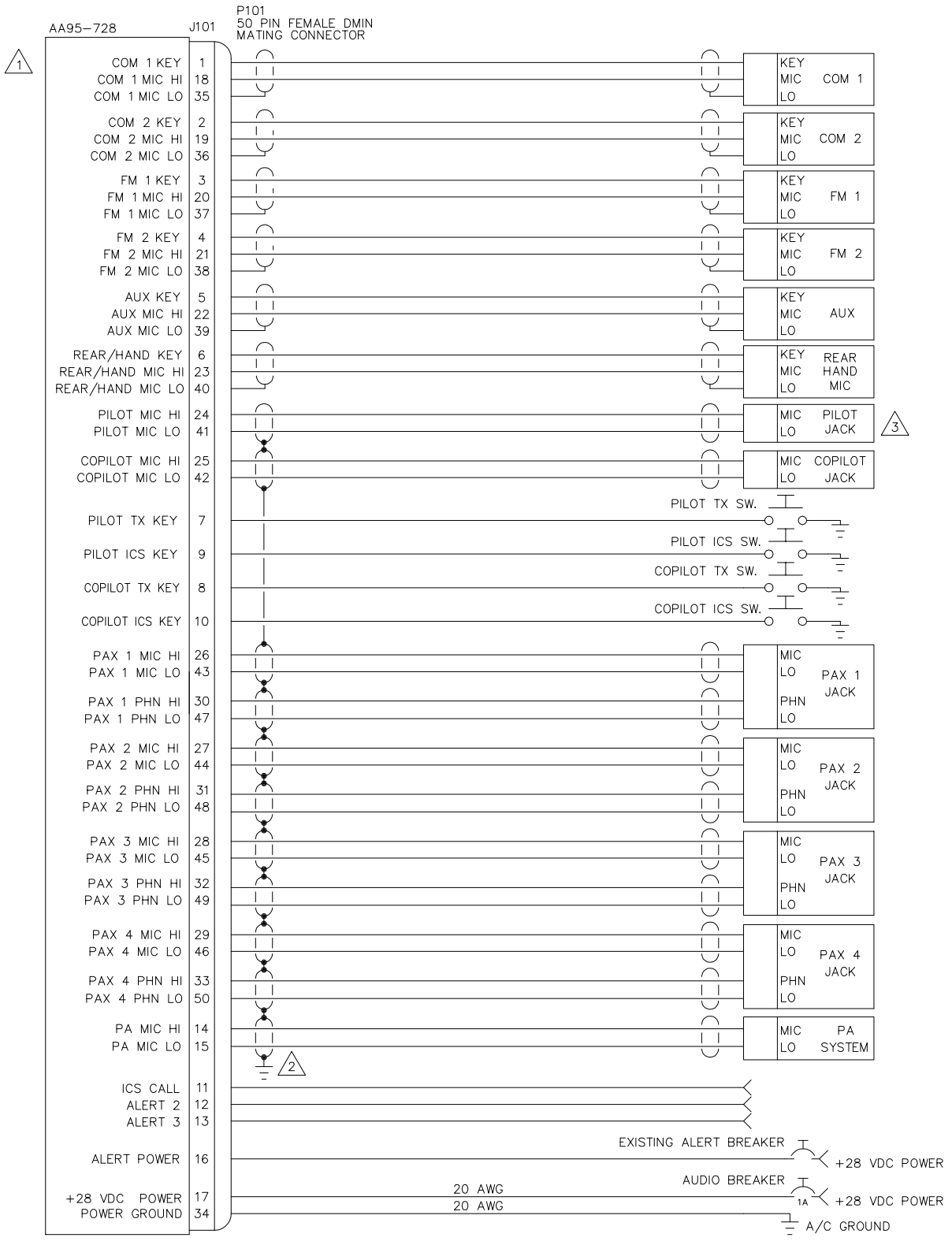
N/C: NO CONNECTION. THE PIN IS NOT CONNECTED TO ANYTHING INTERNALLY, AND THEREFORE SHALL HAVE NO CONNECTION EXTERNALLY.

N/C SPARE: NO CONNECTION INTERNALLY, BUT A SPARE WIRE SHALL BE INSTALLED IN THE WIRE HARNESS.

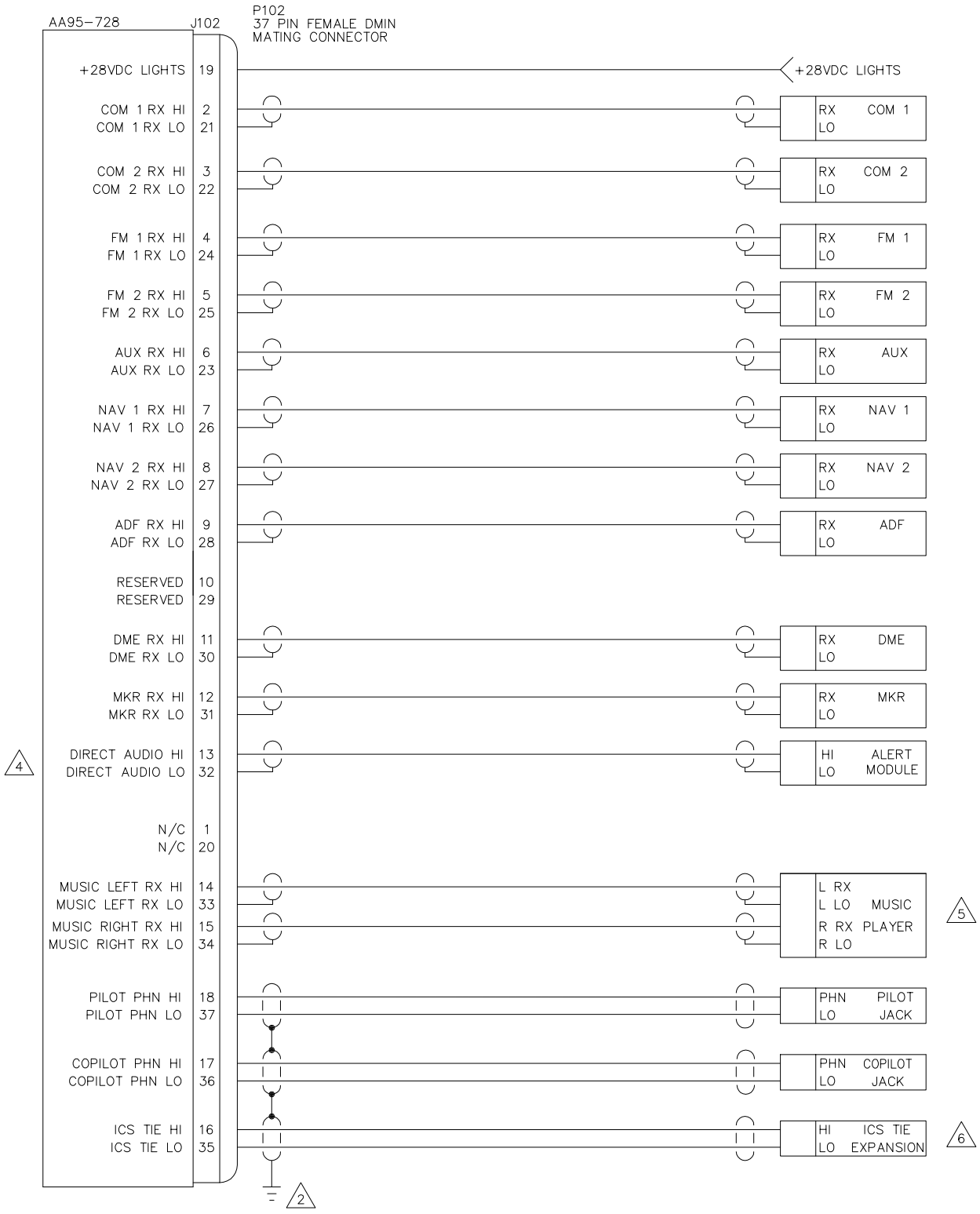
RESERVED: MAY BE CONNECTED AND USED IN THE FUTURE. THE CIRCUITRY MAY BE PRESENT OR ADDED TO ACTIVATE THE FUNCTION. THE PIN MAY BE USED FOR TEST PURPOSES. THERE IS NO EXTERNAL CONNECTION.

RESERVED SPARE (RSV SP): RESERVED, BUT INSTRUCTIONS SHALL BE FOLLOWED TO ACTIVATE THE CIRCUITRY. A SPARE WIRE SHALL BE INSTALLED IN THE WIRE HARNESS.

DESIGNED	KV	NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TGM					
DATE	FEB 3/95	TITLE: AUDIO CONTROLLER				
CHECKED	NAT 223 NAT PROD. 105					
APPROVED	NAT 113	SIZE: A	CAGE CODE: 3AB01	PART NO.: AA95-728	REV.: 1.01	SHEET: 1/3
FILE: 403-0101.DWG		DWG. TYPE: INTERCONNECT		DWG. NO.: AA95\728\403-0		



DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	TGM						
DATE	MAR 17/95	TITLE	AUDIO CONTROLLER				
CHECKED	NAT 223 NAT PROD. 105						
APPROVED	NAT 113	SIZE A	CAGE CODE 3AB01	PART NO. AA95-728		REV. 1.01	SHEET 2/3
FILE 403-0101.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AA95\728\403-1			

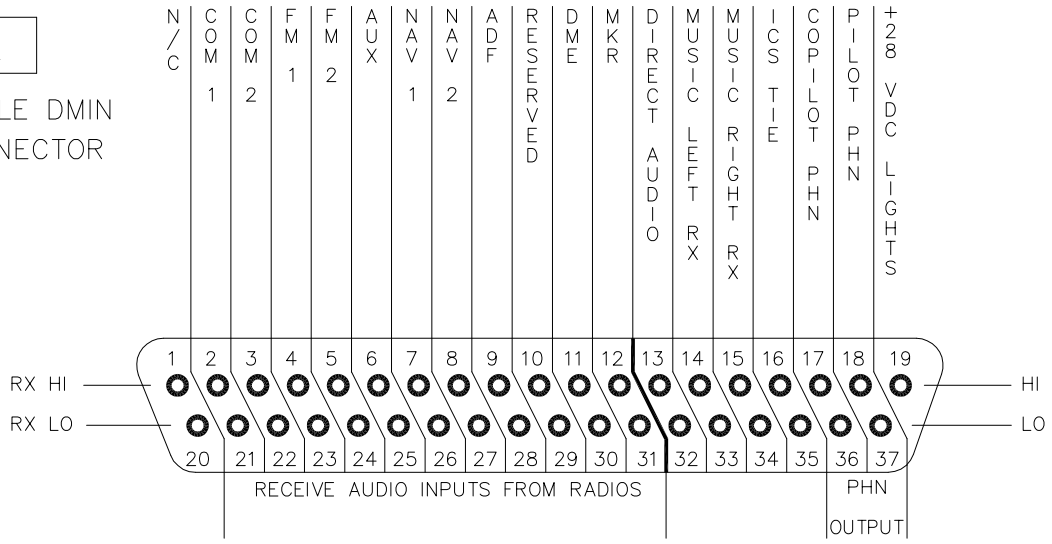


DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	TGM						
DATE	FEB 3/95	TITLE AUDIO CONTROLLER					
CHECKED	NAT 223 NAT PROD. 105						
APPROVED	NAT 113	SIZE A	CAGE CODE 3AB01	PART NO. AA95-728		REV. 1.01	SHEET 3/3
FILE 403-0101.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AA95\728\403-2			

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	UPDATED TO CURRENT NAT STANDARDS.	JUN 21/00	TAT

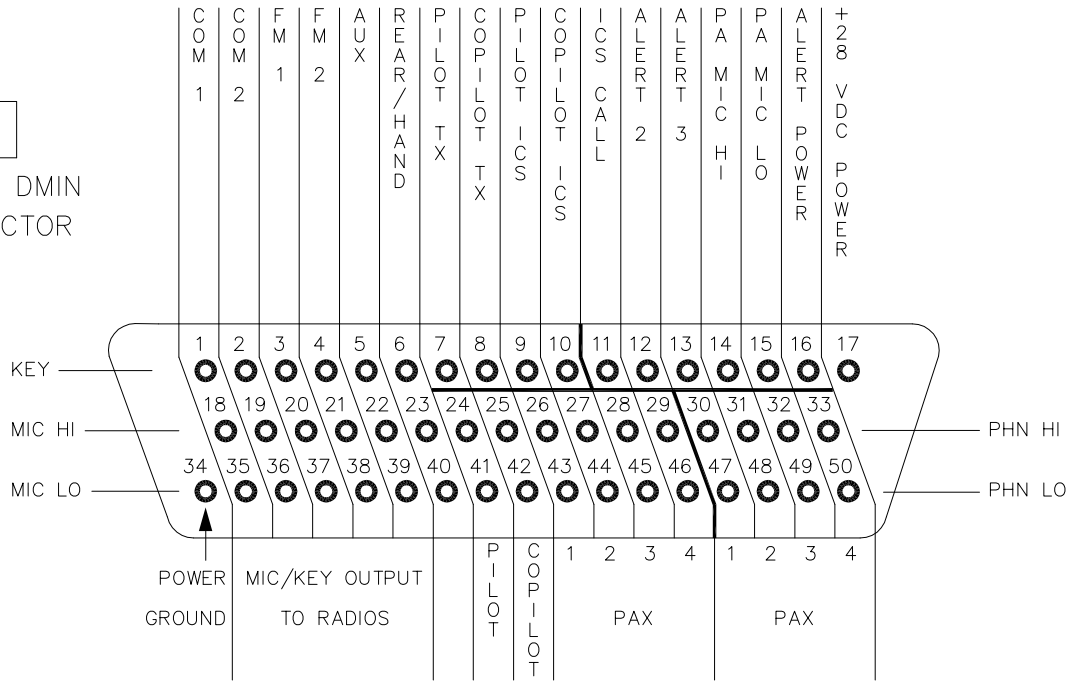
P102

37 PIN FEMALE DMIN
MATING CONNECTOR



P101

50 PIN FEMALE DMIN
MATING CONNECTOR

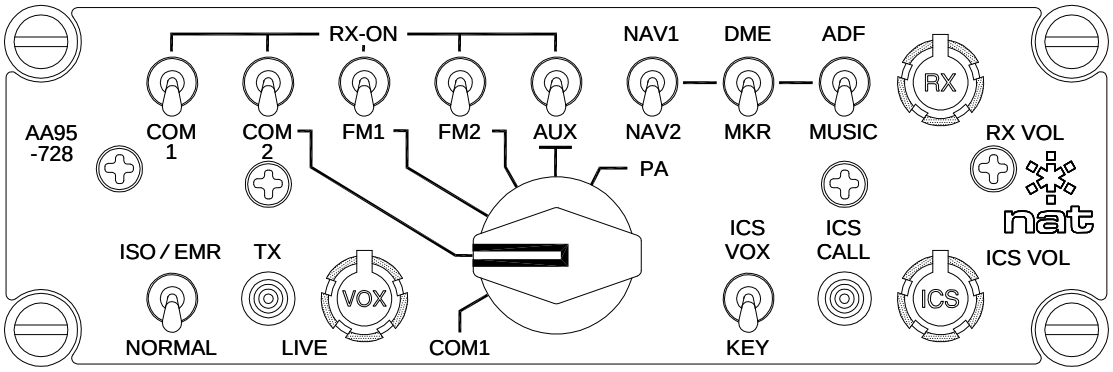


NOTE: DO NOT GROUND HEADSET COMMONS

VIEW IS FROM REAR OF AIRFRAME CONNECTOR

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TGM					
DATE	MAR 17/95	TITLE	AUDIO CONTROLLER			
CHECKED	NAT 223 NAT PROD. 133					
APPROVED	NAT 113	SIZE A	CAGE CODE 3AB01	PART NO. AA95-728	REV. 1.01	SHEET 1/1
FILE 405-0101.DWG		DWG. TYPE CONNECTOR MAP		DWG. NO. AA95\728\405-0		

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	ADDED SHEET 2, FORMAT CHANGES.	JUL 15/96	MWS
1.02	DOCCR01074 – UPDATED TO CURRENT STANDARDS.	FEB 7/05	TAT



CONFIDENTIAL AND PROPRIETARY TO NAT LTD.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TGM					
DATE	MAR 1/95	TITLE	AUDIO CONTROLLER			
CHECKED	NAT 255					
APPROVED	NAT 131	SIZE A	CAGE CODE 3AB01	PART NO. AA95–728	REV. 1.02	SHEET 1/2
FILE	905–0.DWG	DWG. TYPE	FACEPLATE	DWG. NO.	AA95\728\905–0	

ENG–FORM: \905's\AA95–xxx.905–0110.DWT

AA95–729 INSTALLATION NOTES

NOTES:

1. ALL WIRES SHOULD BE 22 AWG UNLESS OTHERWISE NOTED. USE TEFZEL M27500 OR SPEC44 (M81044) SHIELDED WIRE WITH SOLDER SLEEVES.

2. HEADSET, 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 HEADSET LO CONNECTIONS TO AIRFRAME.

4. ADJUSTABLE LEVEL DIRECT AUDIO INPUT, AMPLIFIED.

5. AIRCRAFT ENTERTAINMENT SYSTEM (MUSIC) MUST BE GROUND REFERENCED. IF NOT, A FLOATING GROUND ADAPTER BETWEEN THE AUDIO CONTROLLER AND ENTERTAINMENT SYSTEM WILL BE REQUIRED.

DEFINITIONS:

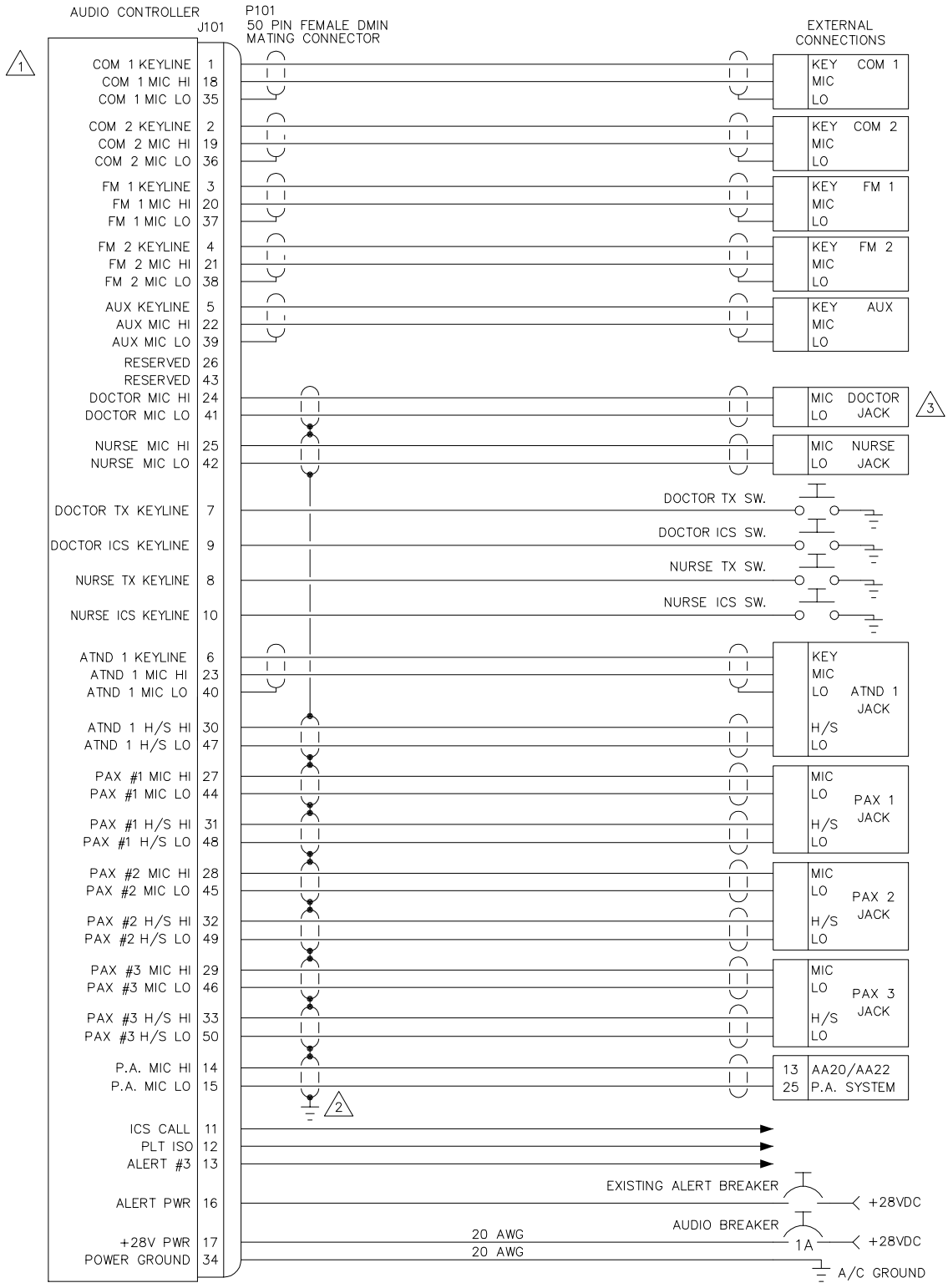
N/C:	NO CONNECTION. THE PIN IS NOT CONNECTED TO ANYTHING INTERNALLY, AND THEREFORE SHALL HAVE NO CONNECTION EXTERNALLY.
N/C SPARE:	NO CONNECTION INTERNALLY, BUT A SPARE WIRE SHALL BE INSTALLED IN THE WIRE HARNESS.
RESERVED:	MAY BE CONNECTED AND USED IN THE FUTURE. THE CIRCUITRY MAY BE PRESENT OR ADDED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

REVISION	DATE
1.00	FEB 3/95

*nat NORTHERN AIRBORNE TECHNOLOGY LTD.

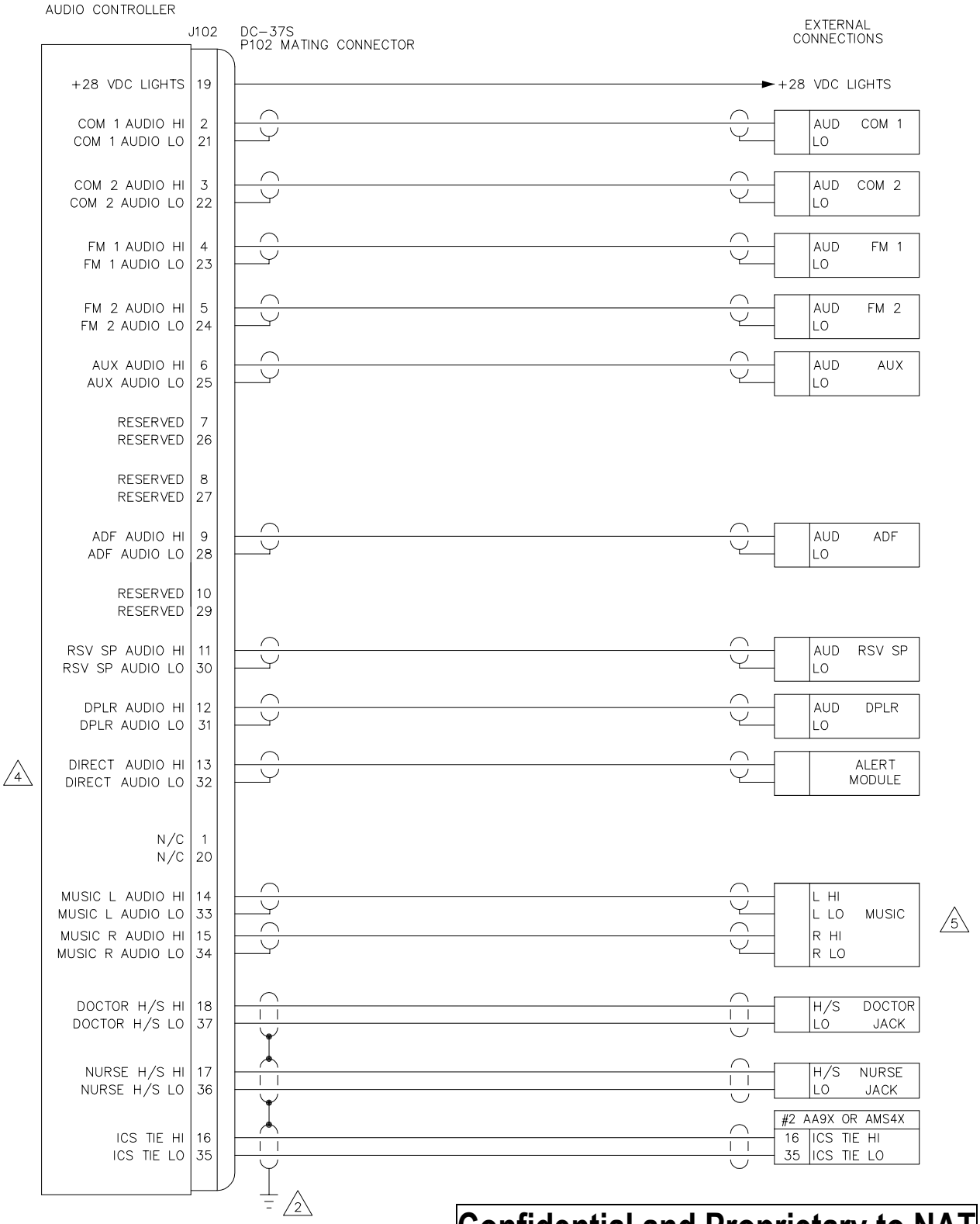
DESIGNED BY	DESCRIPTION		
K. VEITCH	AUDIO CONTROLLER		
DRAWN BY	PART NUMBER	DRAWING TYPE	SHEET
T. MASTERS	AA95–729	INTERCONNECT	1/3
APPROVED BY	DRAWING NUMBER		FILE NUMBER
NAT R&D 101	AA95\729\403–0		AA95\729\403–0100

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	ECR #600 FORMAT CHANGES, DRAWING CORRECTIONS	OCT 17/96	MWS
1.02	ECR #779 PINS 26,43 WERE LABELED ATND 1	MAY 7/97	MWS



DESIGNED	KV	NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TGM					
DATE	MAR 30/95	TITLE	AUDIO CONTROLLER			
CHECKED	NAT PROD. 105					
APPROVED	NAT 107	SIZE A	CAGE CODE 3AB01	PART NO. AA95-729	REV. 1.02	SHEET 2/3
FILE 403-1102.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AA95\729\403-1		

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	ECR #600 FORMAT CHANGES, DRAWING CORRECTIONS	OCT 17/96	MWS



DESIGNED	KV
DRAWN	TGM
DATE	MAR 27/95
CHECKED	NAT PROD. 105
APPROVED	NAT 107

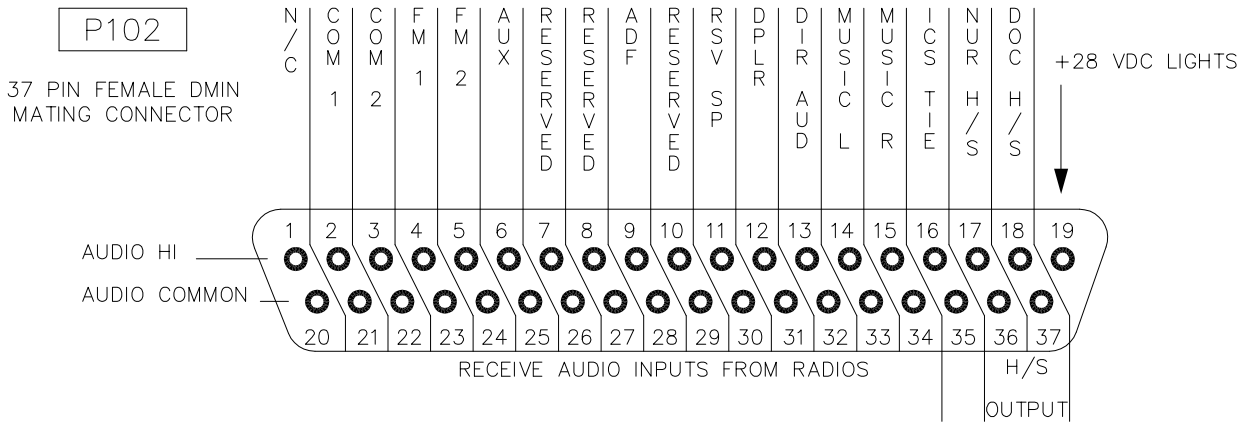
NORTHERN AIRBORNE TECHNOLOGY LTD.

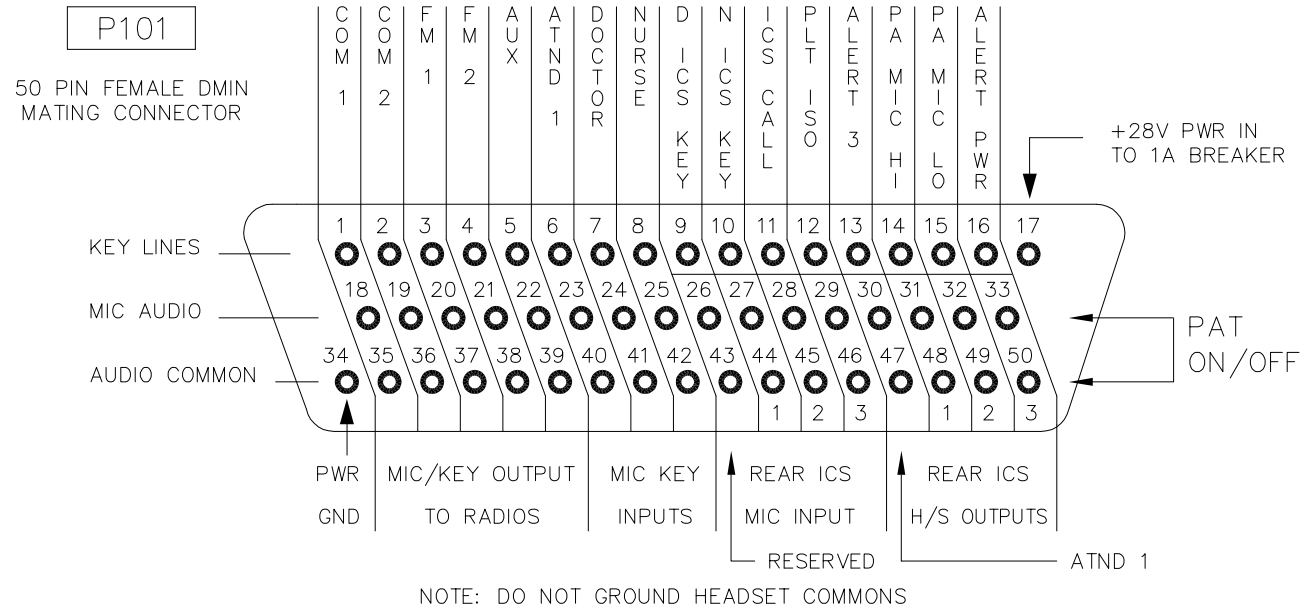
TITLE: AUDIO CONTROLLER

SIZE	CAGE CODE	PART NO.	REV.	SHEET
A	3AB01	AA95-729	1.01	3/3

FILE 403-2101.DWG	DWG. TYPE INTERCONNECT	DWG. NO. AA95\729\403-2

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	ECR #600 FORMAT CHANGES, DRAWING CORRECTIONS	OCT 18/96	MWS
1.02	ECR #779 PINS 26,43 WERE LABELED ATND 1	MAY 8/97	MWS



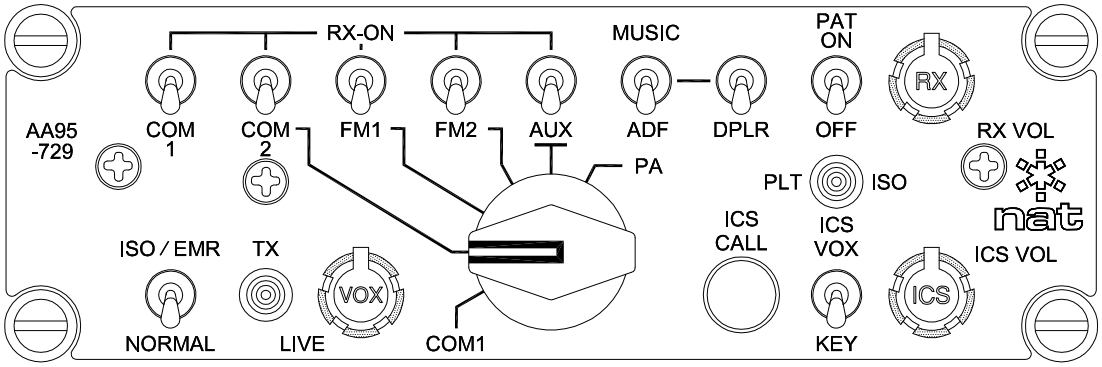


NOTE: DO NOT GROUND HEADSET COMMONS

VIEW IS FROM REAR OF AIRFRAME CONNECTOR

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TGM					
DATE	MAR 30/95	TITLE	AUDIO CONTROLLER			
CHECKED	NAT PROD. 105					
APPROVED	NAT 107	SIZE A	CAGE CODE 3AB01	PART NO. AA95–729	REV. 1.02	SHEET 1/1
FILE 405–0102.DWG		DWG. TYPE CONNECTOR MAP		DWG. NO. AA95\729\405–0		

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES,SHEET 2, ENGRAVE LAYER ADDED	OCT 15/96	MWS
1.02	DOCCR02024 – UPDATED TEMPLATE.	APR 3/07	TAT



DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	TGM						
DATE	MAR 30/95	TITLE	AUDIO CONTROLLER FRONT VIEW				
CHECKED	NAT PROD. 105 / NAT 255						
APPROVED	NAT 131	SIZE A	CAGE CODE 3AB01	PART NO. AA95–729		REV. 1.02	SHEET 1/3
FILE	905–0.DWG	DWG. TYPE	FACEPLATE	DWG. NO.	AA95\729\905–0		

ENG–FORM: \905's\AA95–xxx.905–0120.DWT

AA96–001 INSTALLATION NOTES

NOTES:

1. ALL WIRES SHOULD BE 22 AWG UNLESS OTHERWISE NOTED. USE TEFZEL M27500 OR SPEC44 (M81044) SHIELDED WIRE WITH SOLDER SLEEVES.

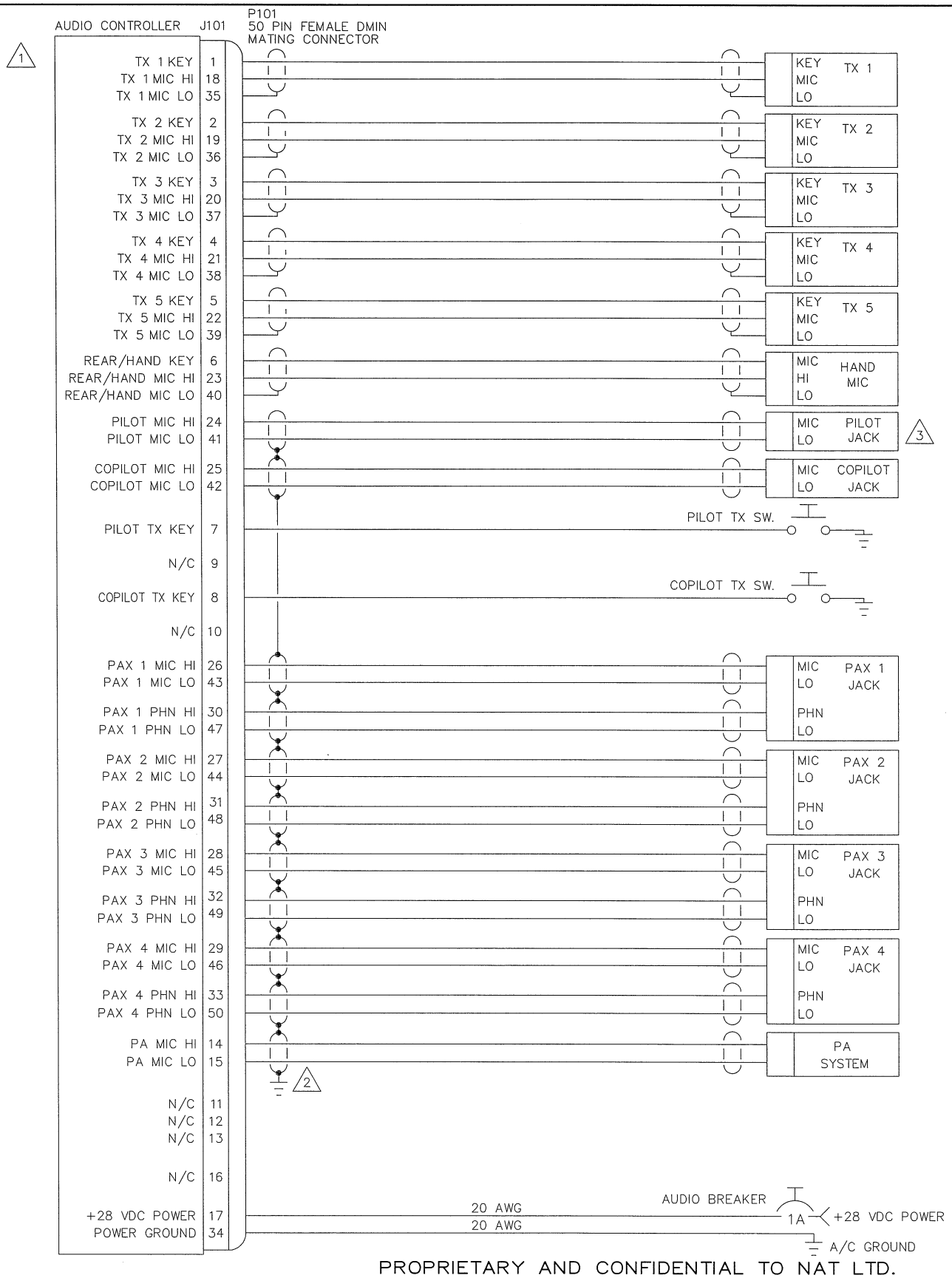
2. HEADPHONE, MICROPHONE AND ICS TIE LINES USE TWISTED SHIELDED PAIR. CONNECT SHIELDS TOGETHER AND GROUND TO CLEAN AIRCRAFT GROUND. GROUND POINT SHOULD BE THE SAME AS AIRCRAFT AUDIO SYSTEM POWER GROUND.

3. DO NOT GROUND MICROPHONE OR HEADPHONE LO CONNECTIONS TO AIRFRAME.

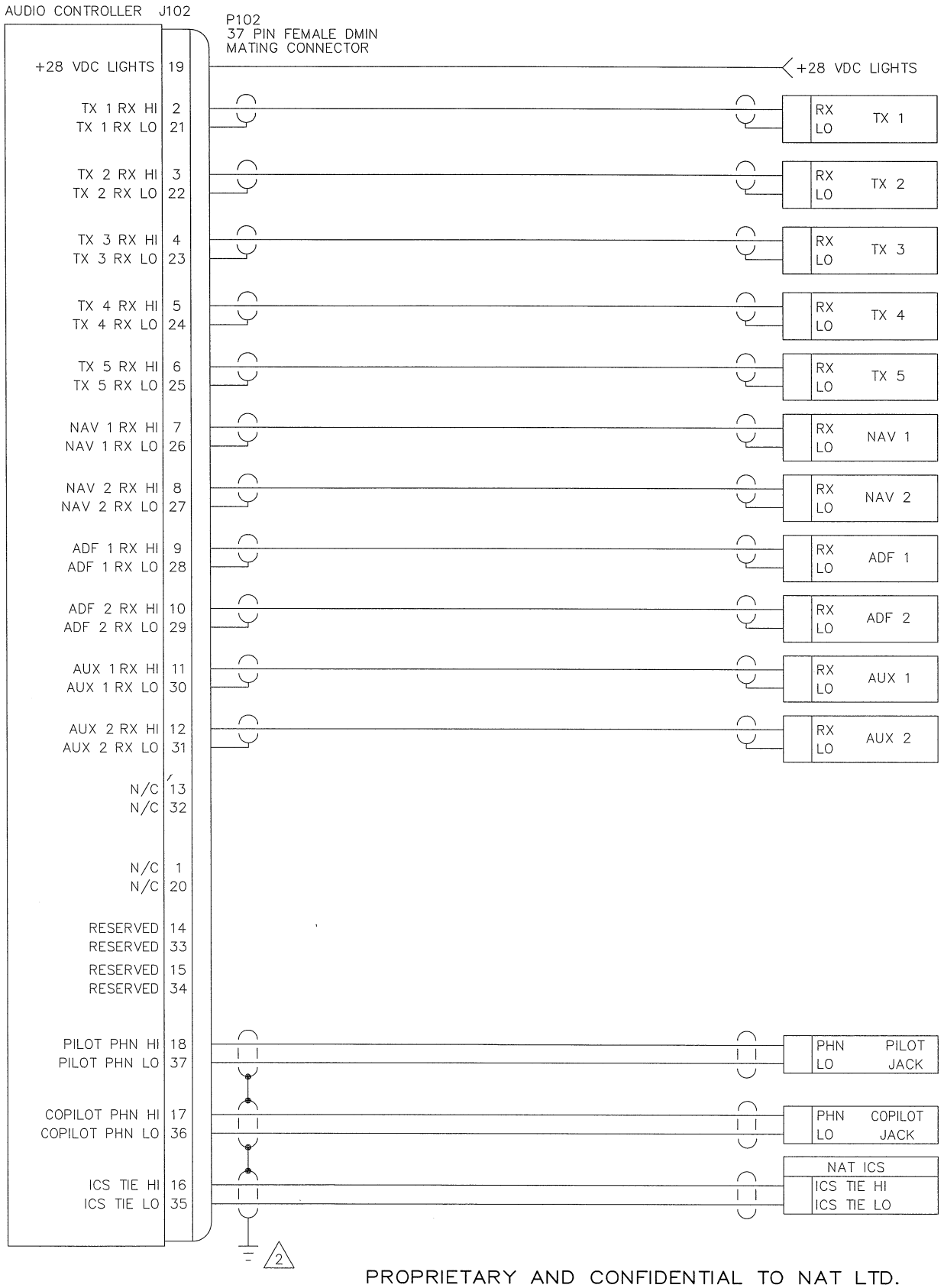
DEFINITIONS:

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: (RSV SP)	RESERVED, BUT INSTRUCTIONS SHALL BE FOLLOWED TO ACTIVATE THE CIRCUITRY. A SPARE WIRE SHALL BE INSTALLED IN THE WIRE HARNESS.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TGM					
DATE	APR 21/98	TITLE AUDIO CONTROLLER				
CHECKED	NAT PROD. 105					
APPROVED	NAT 107	SIZE A	CAGE CODE 3AB01	PART NO. AA96–001	REV. 1.00	SHEET 1/3
FILE 403–0100.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AA96\001\403–0		



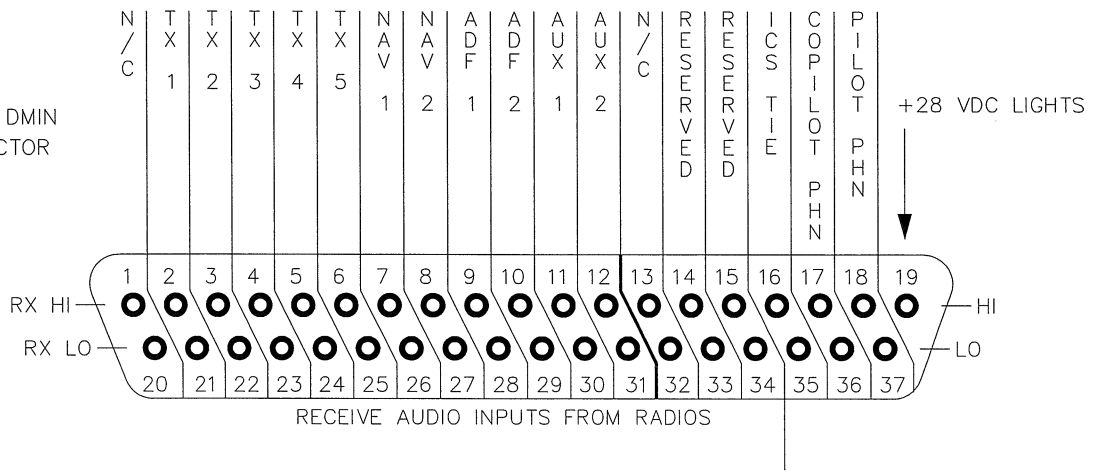
DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TGM					
DATE	APR 21/98	TITLE AUDIO CONTROLLER				
CHECKED	NAT PROD. 105					
APPROVED	NAT 107	SIZE A	CAGE CODE 3AB01	PART NO. AA96-001	REV. 1.00	SHEET 2/3
FILE 403-1100.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AA96\001\403-1		



DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TGM					
DATE	APR 22/98	TITLE AUDIO CONTROLLER				
CHECKED	NAT PROD. 105					
APPROVED	NAT 107	SIZE A	CAGE CODE 3AB01	PART NO. AA96-001	REV. 1.00	SHEET 3/3
FILE 403-2100.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AA96\001\403-2		

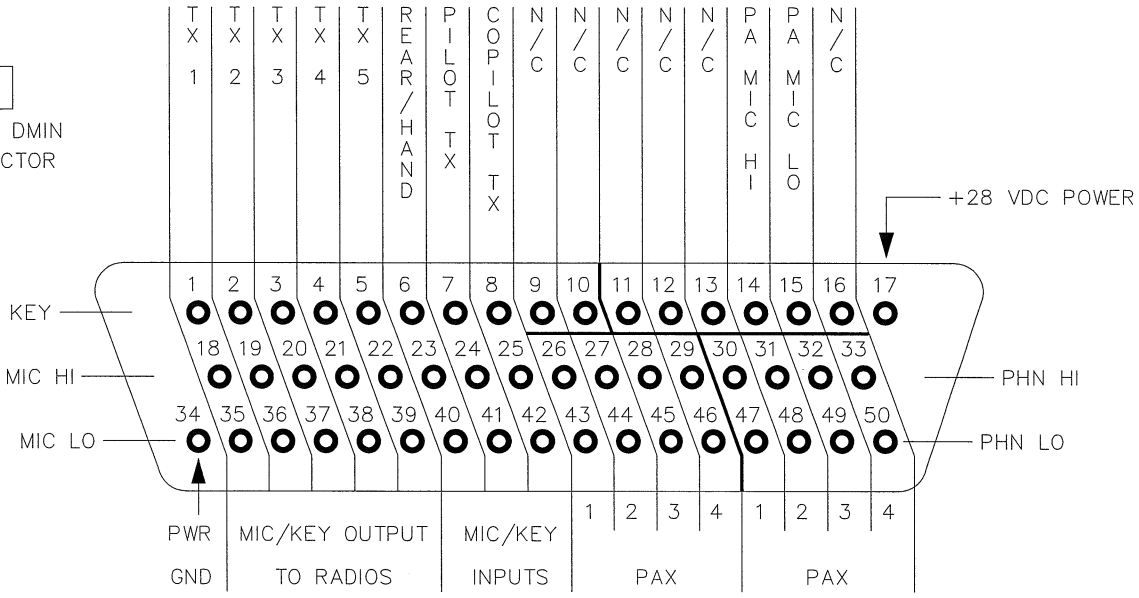
P102

37 PIN FEMALE DMIN
MATING CONNECTOR



P101

50 PIN FEMALE DMIN
MATING CONNECTOR

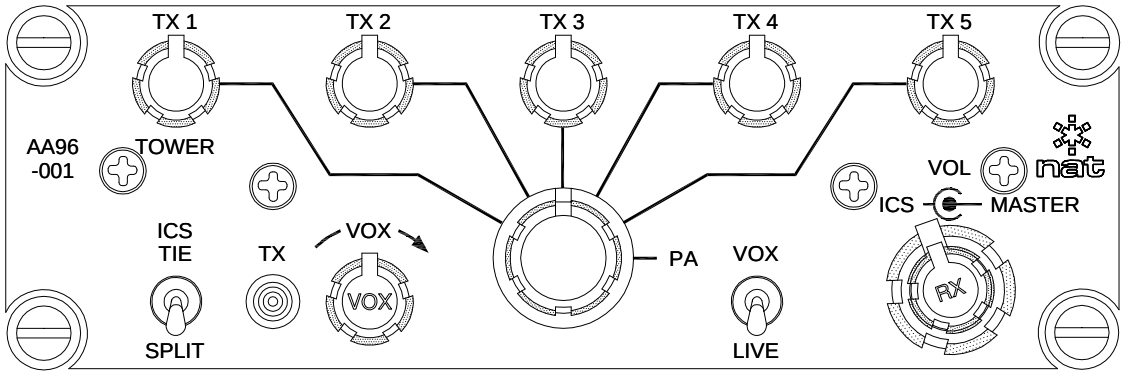


NOTE: DO NOT GROUND HEADSET COMMONS

VIEW IS FROM REAR OF AIRFRAME CONNECTOR

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TGM					
DATE	APR 27/98	TITLE	AUDIO CONTROLLER			
CHECKED	NAT PROD. 105					
APPROVED	NAT 107	SIZE A	CAGE CODE 3AB01	PART NO. AA96-001	REV. 1.00	SHEET 1/1
FILE 405-0100.DWG		DWG. TYPE CONNECTOR MAP		DWG. NO. AA96\001\405-0		

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES ONLY	APR 14/98	TGM
1.10	ECR #1693 – 'G' HOLE WAS 0.375 DIA WITH COUNTERSINK DIA OF 0.60.	APR 17/01	TAT
1.11	DOCCR01847 – UPDATED TO CURRENT STANDARDS.	NOV 14/06	TAT



DESIGNED	–	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	–					
DATE	JAN 25/91	TITLE	AUDIO CONTROLLER FRONT VIEW			
CHECKED	NAT PROD: 105 / NAT 255					
APPROVED	NAT 131	SIZE A	CAGE CODE 3AB01	PART NO. AA96–001	REV. 1.11	SHEET 1/3
FILE	905–0.DWG	DWG. TYPE	FACEPLATE	DWG. NO.	AA96\001\905–0	

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	ECR #1185 – FORMAT CHANGES.	JUNE 2/98	TGM

AA96–400 INSTALLATION NOTES

NOTES:

1. ALL WIRES SHOULD BE 22 AWG UNLESS OTHERWISE NOTED. USE TEFZEL M27500 OR SPEC44 (M81044) SHIELDED WIRE WITH SOLDER SLEEVES.

2. HEADSET, 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 HEADSET LO CONNECTIONS TO AIRFRAME.

DEFINITIONS:

N/C: NO CONNECTION. THE PIN IS NOT CONNECTED TO ANYTHING INTERNALLY, AND THEREFORE SHALL HAVE NO CONNECTION EXTERNALLY.

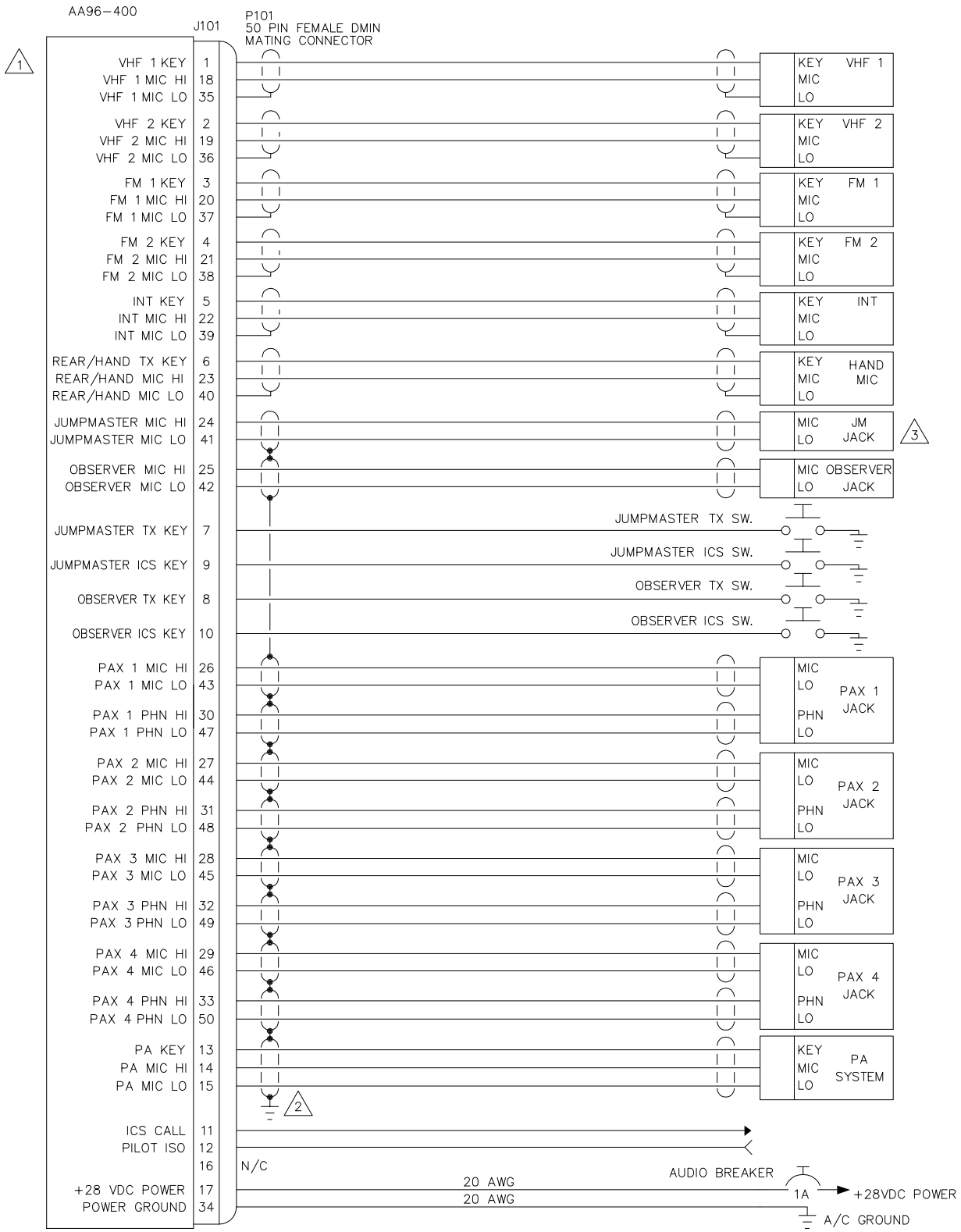
N/C SPARE: NO CONNECTION INTERNALLY, BUT A SPARE WIRE SHALL BE INSTALLED IN THE WIRE HARNESS.

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 (RSV SP): RESERVED, BUT INSTRUCTIONS SHALL BE FOLLOWED TO ACTIVATE THE CIRCUITRY. A SPARE WIRE SHALL BE INSTALLED IN THE WIRE HARNESS.

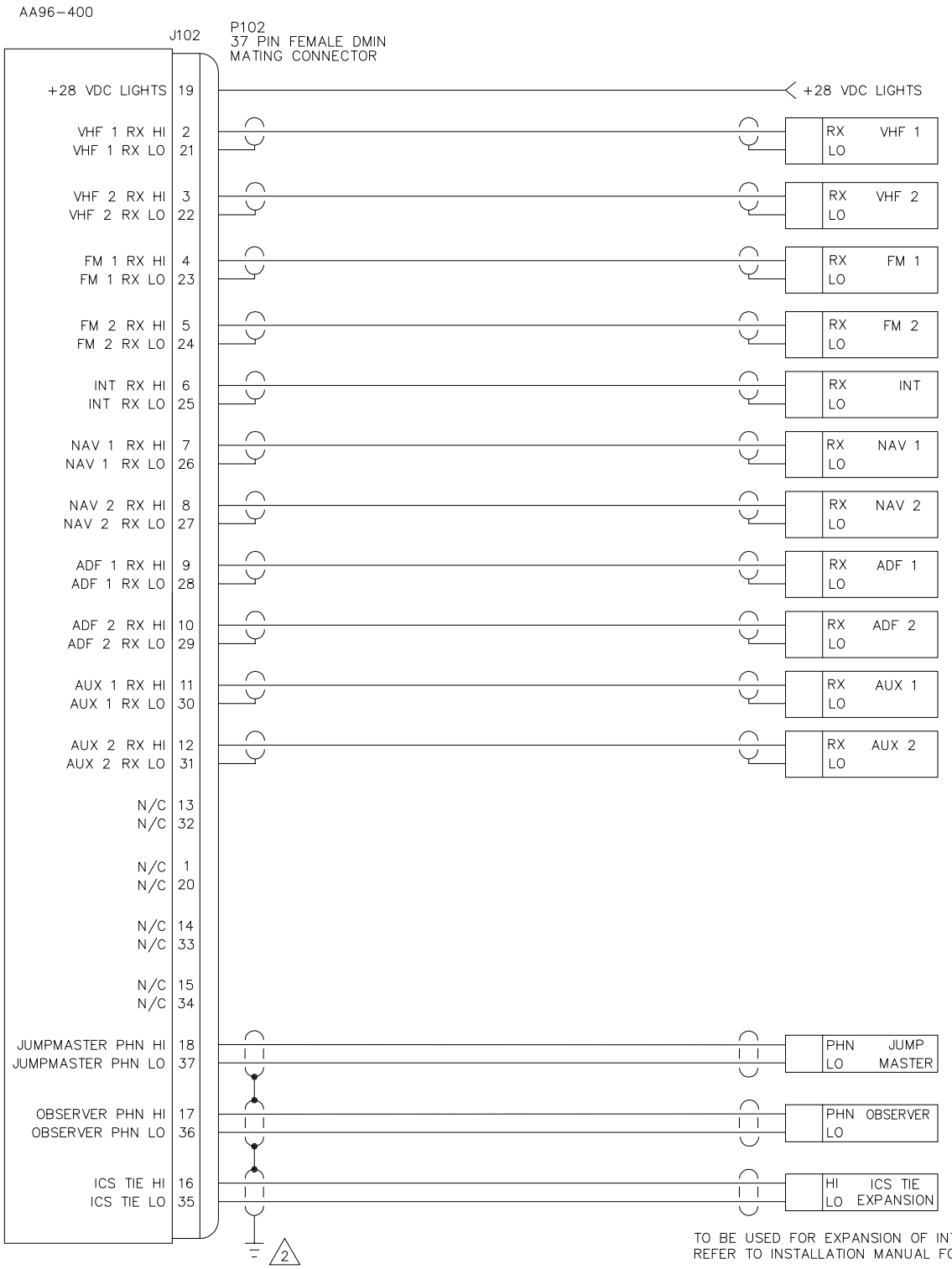
DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	TGM						
DATE	FEB 28/95	TITLE	AUDIO CONTROLLER				
CHECKED	NAT PROD. 105 NAT 214						
APPROVED	NAT 107	SIZE A	CAGE CODE 3AB01	PART NO. AA96–400		REV. 1.01	SHEET 1/3
FILE 403–0101.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AA96\400\403–0			

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	ECR #1185 – FORMAT CHANGES.	JUNE 2/98	TGM



DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TGM					
DATE	FEB 28/95	TITLE	AUDIO CONTROLLER			
CHECKED	NAT 214 NAT PROD. 105					
APPROVED	NAT 107	SIZE A	CAGE CODE 3AB01	PART NO. AA96–400	REV. 1.01	SHEET 2/3
FILE 403–1101.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AA96\400\403–1		

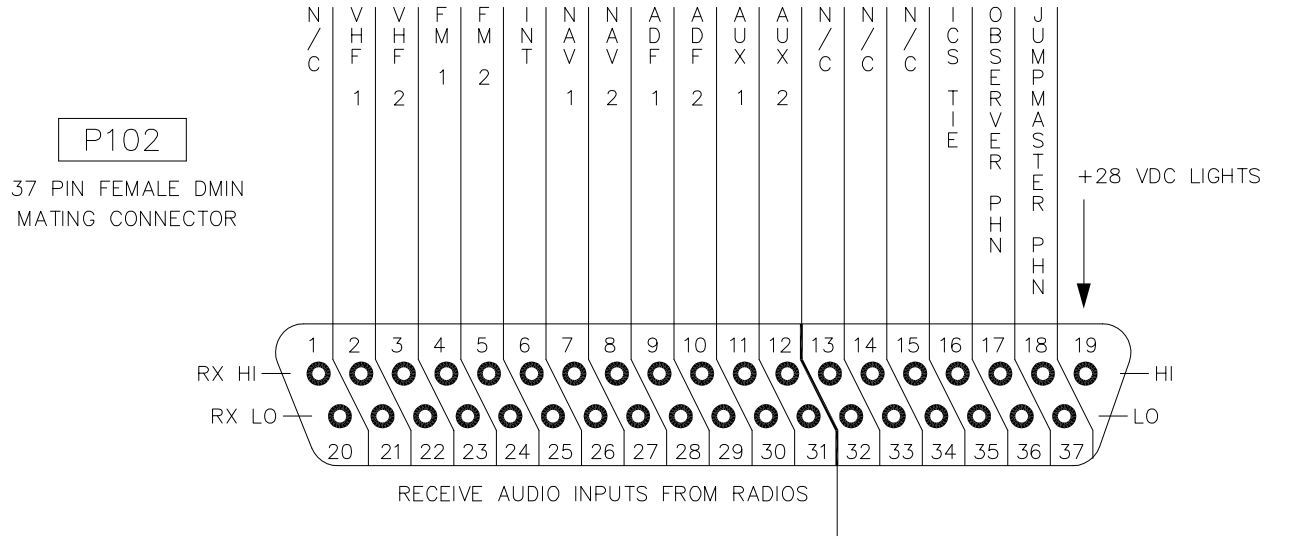
REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	ECR #1185 – FORMAT CHANGES.	JUNE 3/98	TGM

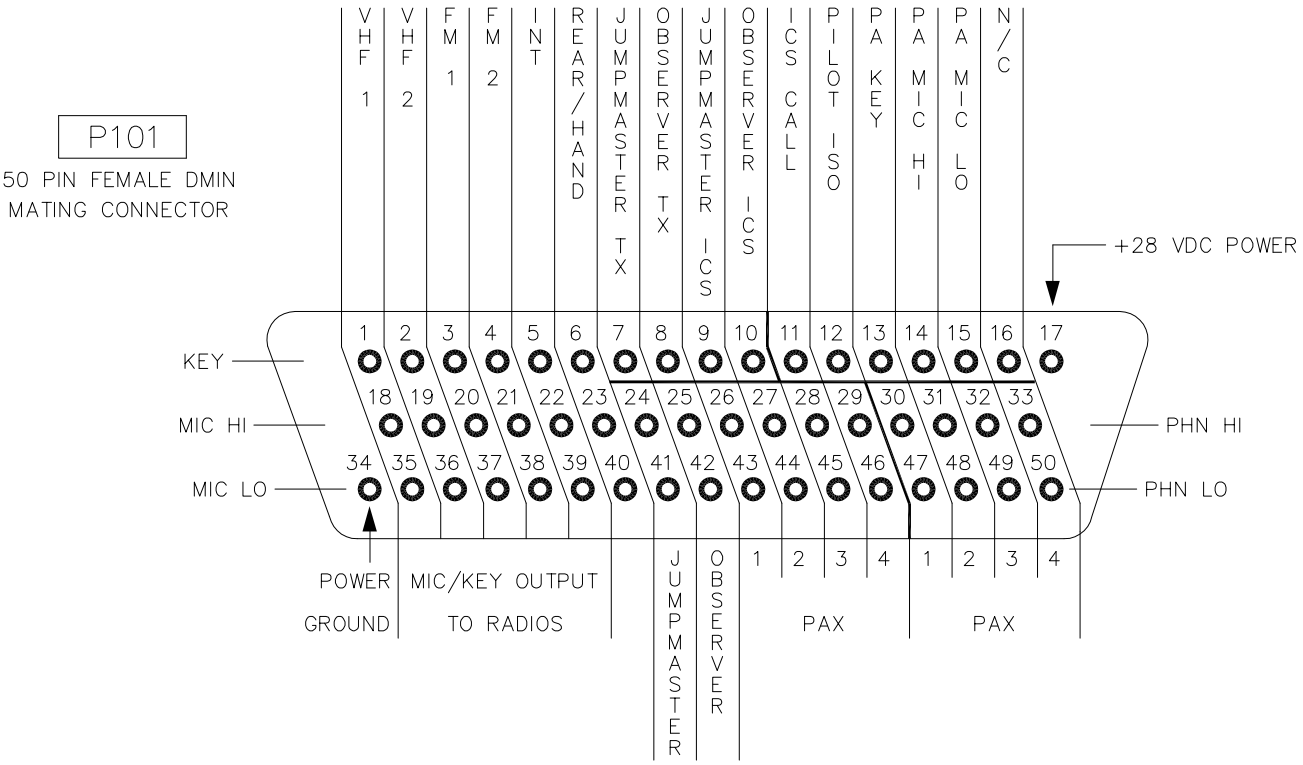


TO BE USED FOR EXPANSION OF INTERCOM SYSTEM ONLY.
REFER TO INSTALLATION MANUAL FOR DETAILS.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	TGM						
DATE	FEB 28/95	TITLE	AUDIO CONTROLLER				
CHECKED	NAT 214 NAT PROD. 105						
APPROVED	NAT 107	SIZE A	CAGE CODE 3AB01	PART NO. AA96–400		REV. 1.01	SHEET 3/3
FILE 403–2101.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AA96\400\403–2			

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	ECR #1185 – FORMAT CHANGES.	JUNE 2/98	TGM



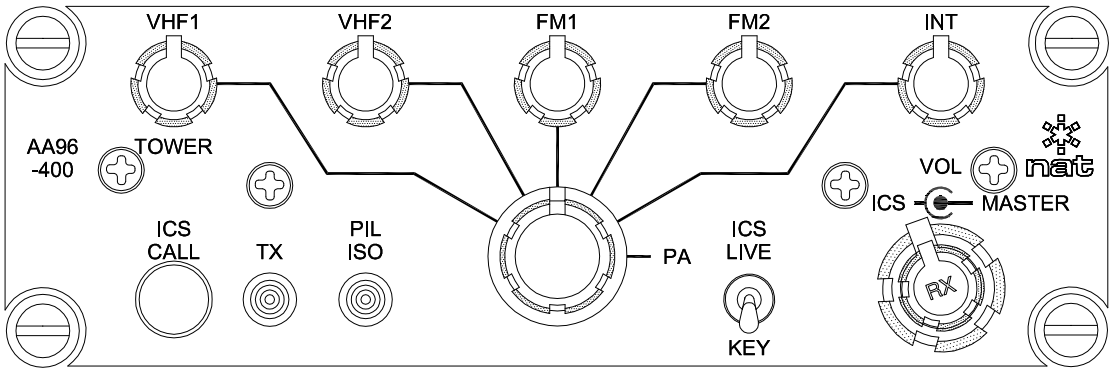


NOTE: DO NOT GROUND HEADSET COMMONS

VIEW IS FROM REAR OF AIRFRAME CONNECTOR

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TGM					
DATE	FEB 28/95	TITLE	AUDIO CONTROLLER			
CHECKED	NAT 214 NAT PROD. 105					
APPROVED	NAT 107	SIZE A	CAGE CODE 3AB01	PART NO. AA96–400	REV. 1.01	SHEET 1/1
FILE 405–0101.DWG		DWG. TYPE CONNECTOR MAP		DWG. NO. AA96\400\405–0		

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES ONLY	MAR 2/95	TGM
1.02	ECR # 1185 – UPDATED, RX ADDED TO KNOB.	MAY 29/98	TGM
1.10	ECR #1693 – 'G' HOLE WAS 0.375 DIA WITH COUNTERSINK DIA OF 0.60.	APR 17/01	TAT
1.11	DOCCR02060 – ADDED SHEET 3/3, UPDATED TO CURRENT STANDARDS.	MAY 14/07	TAT



DESIGNED	–	NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	MD					
DATE	JAN 15/93	TITLE: AUDIO CONTROLLER FRONT VIEW				
CHECKED	NAT 255					
APPROVED	NAT 131	SIZE: A	CAGE CODE: 3AB01	PART NO.: AA96–400	REV.: 1.11	SHEET: 1/3
FILE	905–0.DWG	DWG. TYPE	FACEPLATE	DWG. NO.	AA96\400\905–0	

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	EXTERNAL CONECTIONS TO RESERVED PINS REMOVED FROM SHEET 3.	FEB 20/96	MWS
1.02	UPDATED TO CURRENT NAT STANDARDS.	MAY 31/00	TAT

AA97-402 INSTALLATION NOTES

NOTES:

1. ALL WIRES SHOULD BE 22 AWG UNLESS OTHERWISE NOTED. USE TEFZEL M27500 OR SPEC44 (M81044) SHIELDED WIRE WITH SOLDER SLEEVES.

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. TO BE USED FOR EXPANSION OF INTERCOM SYSTEM ONLY. REFER TO INSTALLATION MANUAL FOR DETAILS.

DEFINITIONS:

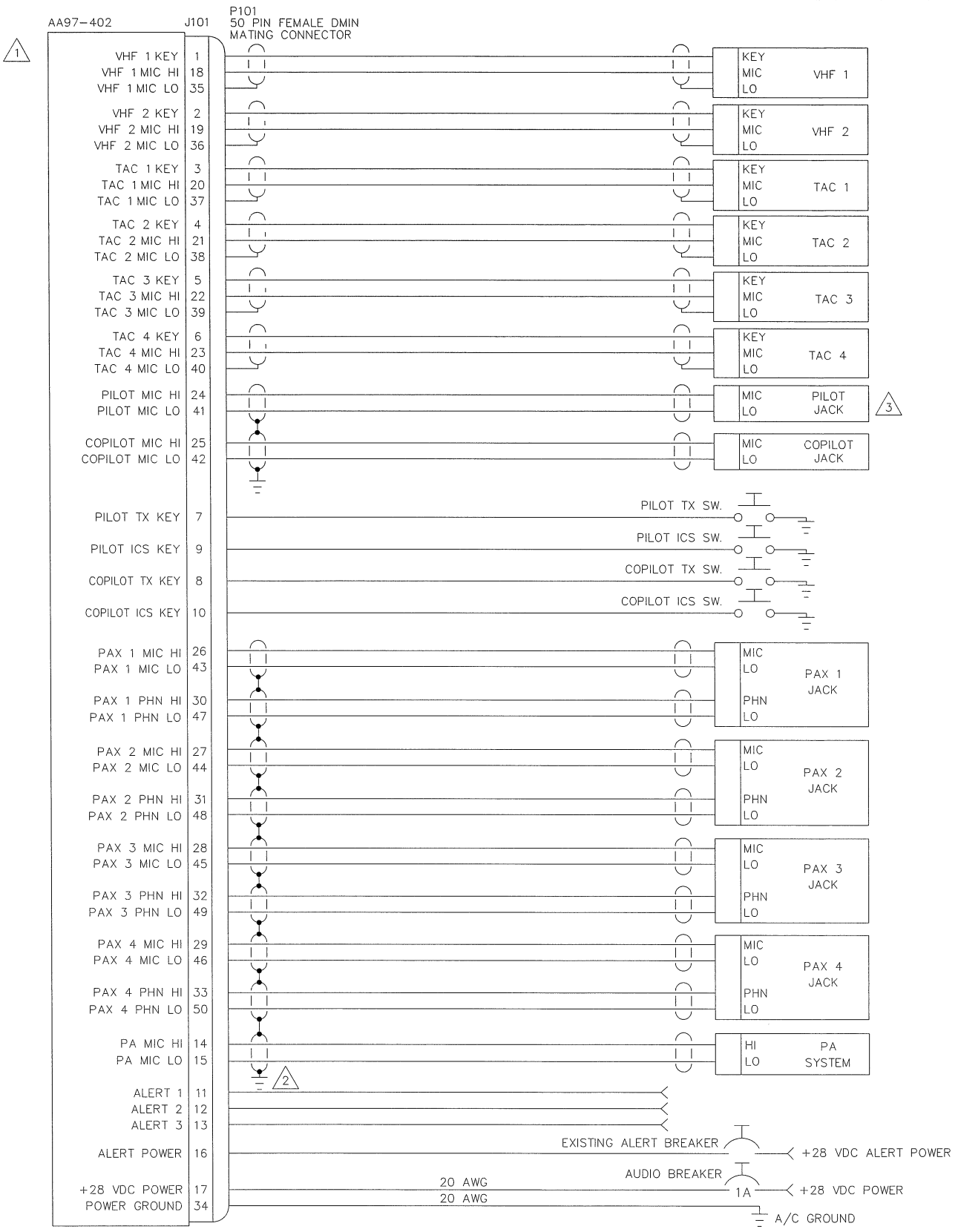
N/C: NO CONNECTION. THE PIN IS NOT CONNECTED TO ANYTHING INTERNALLY, AND THEREFORE SHALL HAVE NO CONNECTION EXTERNALLY.

N/C SPARE: NO CONNECTION INTERNALLY, BUT A SPARE WIRE SHALL BE INSTALLED IN THE WIRE HARNESS.

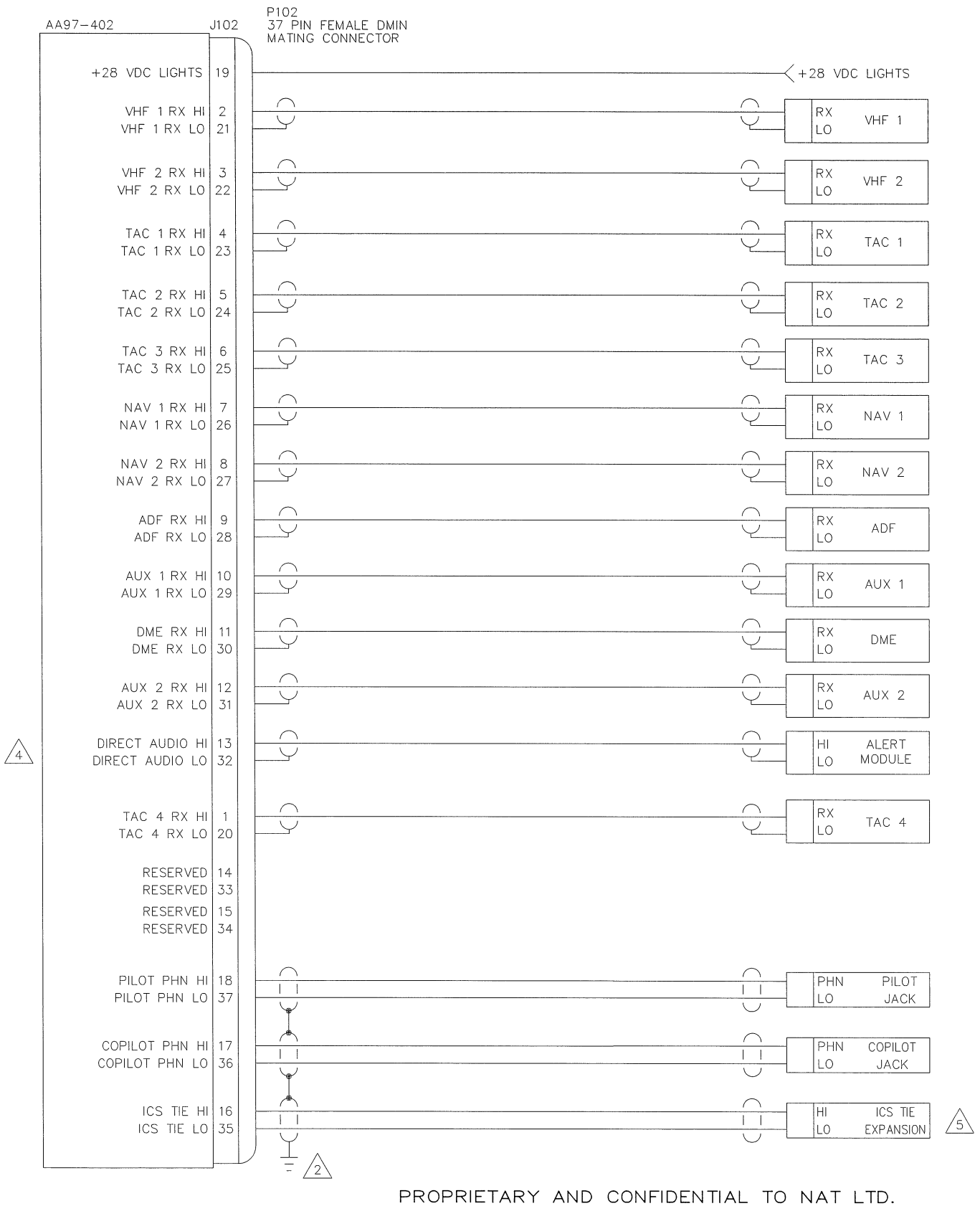
RESERVED: MAY BE CONNECTED AND USED IN THE FUTURE. THE CIRCUITRY MAY BE PRESENT OR ADDED TO ACTIVATE THE FUNCTION. THE PIN MAY BE USED FOR TEST PURPOSES. THERE IS NO EXTERNAL CONNECTION.

RESERVED SPARE: (RSV SP) RESERVED, BUT INSTRUCTIONS SHALL BE FOLLOWED TO ACTIVATE THE CIRCUITRY. A SPARE WIRE SHALL BE INSTALLED IN THE WIRE HARNESS.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TGM					
DATE	JUN 13/95	TITLE	AUDIO CONTROLLER			
CHECKED	NAT PROD. NAT 21433					
APPROVED	NAT 113	SIZE A	CAGE CODE 3AB01	PART NO. AA97-402	REV. 1.02	SHEET 1/3
FILE 403-0102.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AA97\402\403-0		



DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	TGM						
DATE	JUN 14/95	TITLE					
CHECKED	NAT PROD. 214 133	AUDIO CONTROLLER					
APPROVED	NAT 113	SIZE	CAGE CODE	PART NO.		REV.	SHEET
		A	3AB01	AA97-402		1.02	2/3
FILE	403-0102.DWG	DWG. TYPE	INTERCONNECT	DWG. NO.	AA97\402\403-1		

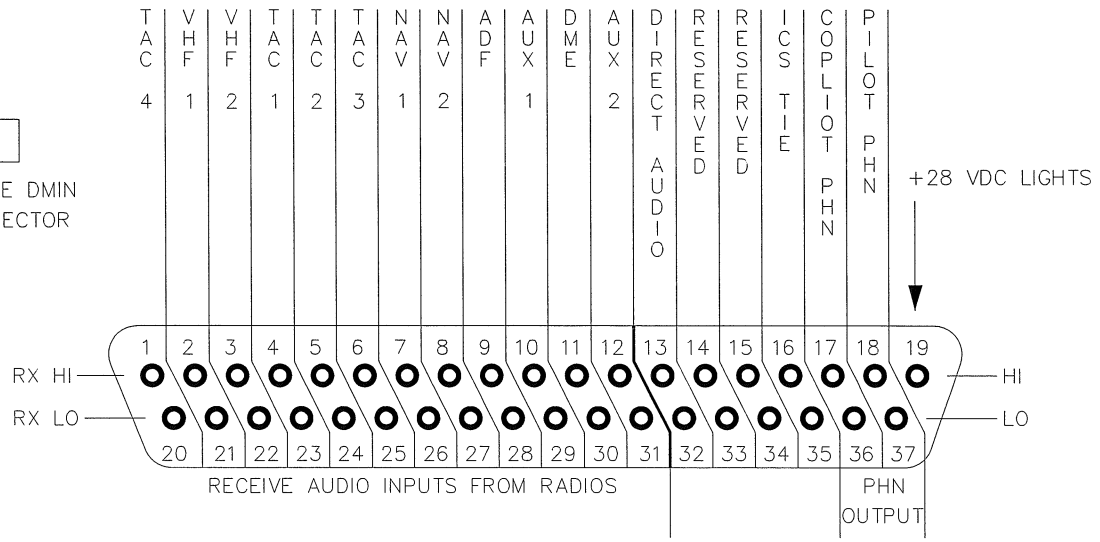


DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TGM					
DATE	JUN 14/95	TITLE				
CHECKED	NAT PROD. NAT 214 33	AUDIO CONTROLLER				
APPROVED	NAT 113	SIZE A	CAGE CODE 3AB01	PART NO. AA97-402	REV. 1.02	SHEET 3/3
FILE 403-0102.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AA97\402\403-2		

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	UPDATED TO CURRENT NAT STANDARDS.	MAY 26/00	TAT

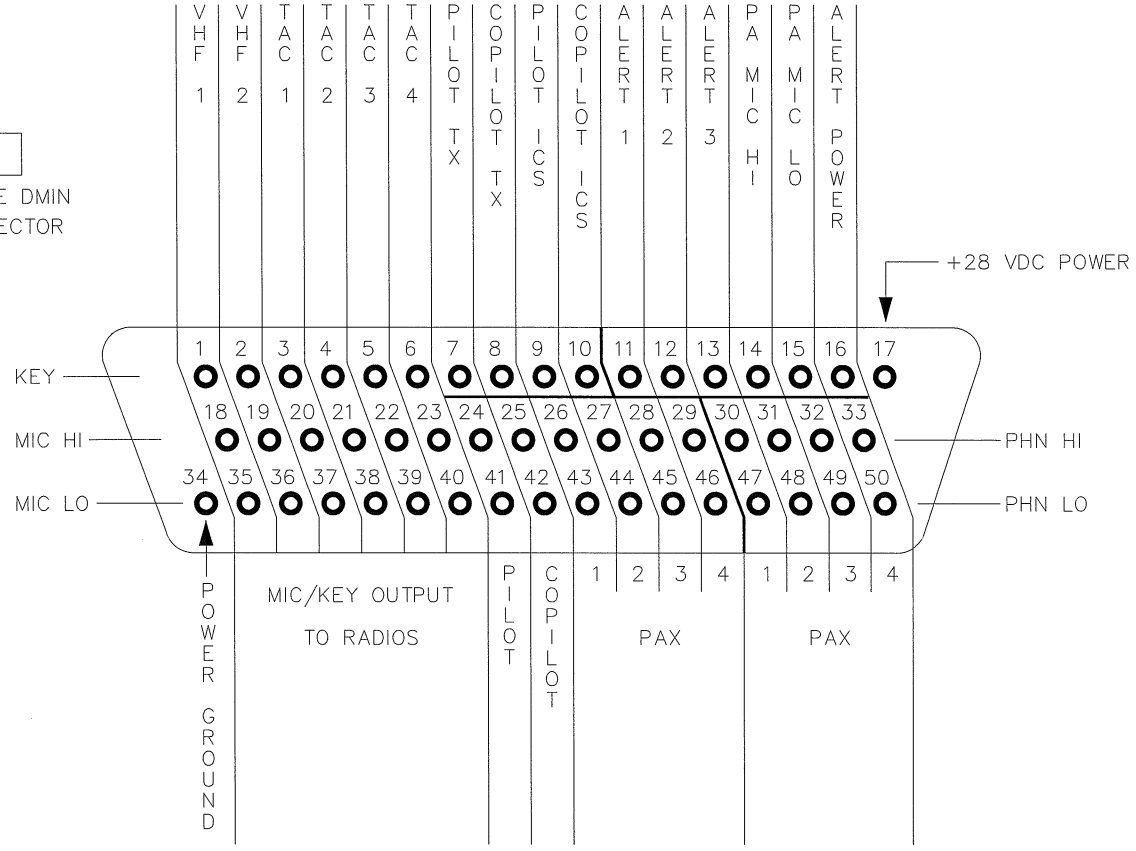
P102

37 PIN FEMALE DMIN
MATING CONNECTOR



P101

50 PIN FEMALE DMIN
MATING CONNECTOR

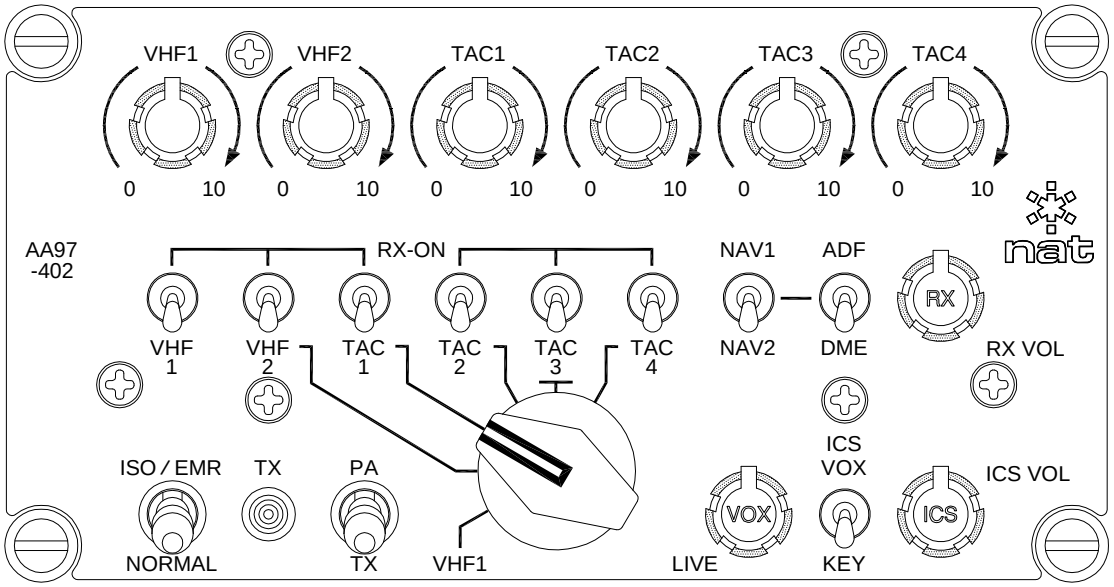


NOTE: DO NOT GROUND HEADSET COMMONS

VIEW IS FROM REAR OF AIRFRAME CONNECTOR

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	TGM					
DATE	JUN 14/95	TITLE	AUDIO CONTROLLER			
CHECKED	NAT PROD 22305					
APPROVED	NAT 113	SIZE A	CAGE CODE 3AB01	PART NO. AA97-402	REV. 1.01	SHEET 1/1
FILE 405-0101.DWG		DWG. TYPE CONNECTOR MAP		DWG. NO. AA97\402\405-0		

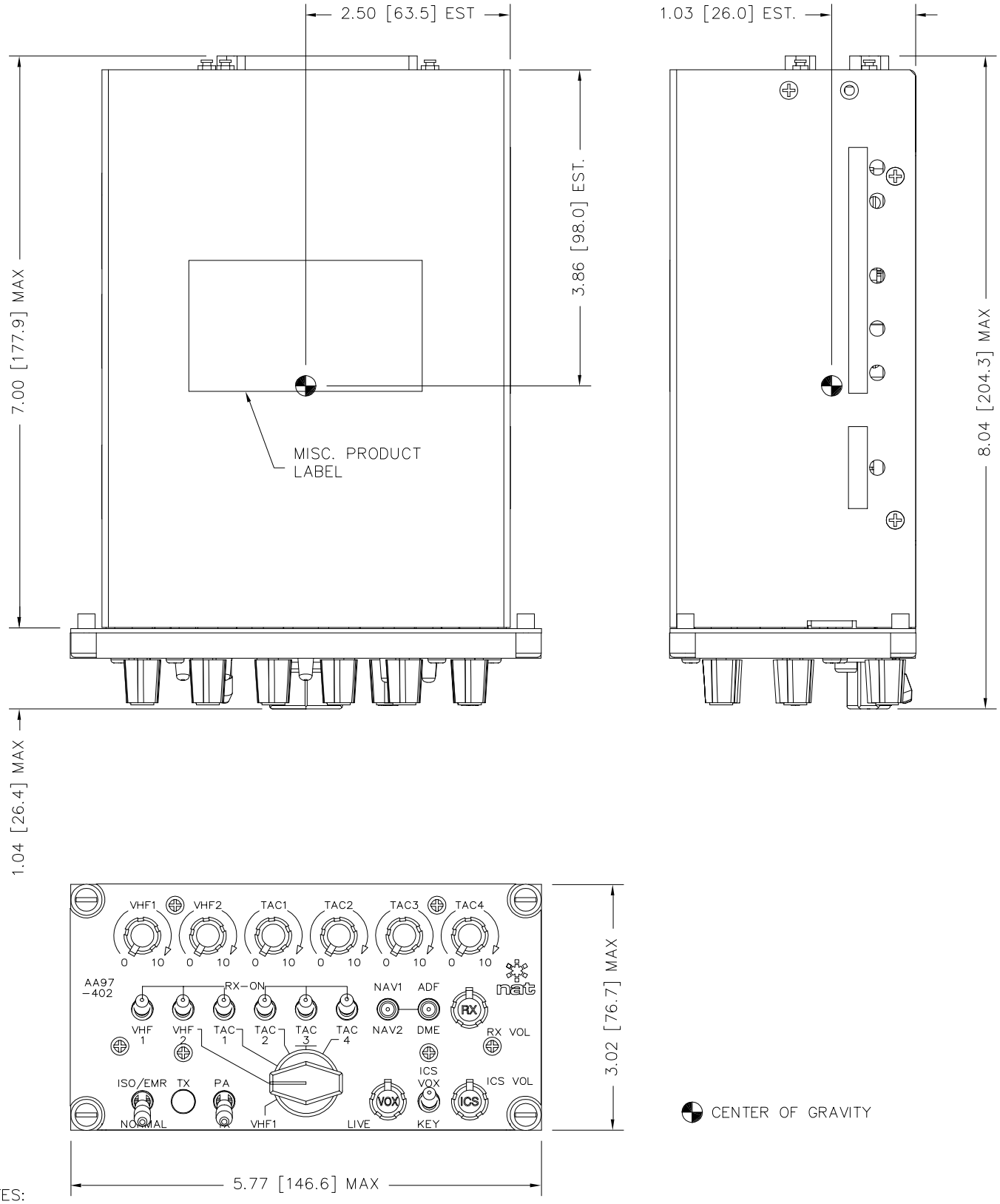
REVISIONS			
REV	DESCRIPTION	DATE	BY
	FOR PREVIOUS REVISIONS SEE REV 1.10		
1.11	DOCCR01695 – UPDATED WITH LATEST TEMPLATE.	JUN 26/06	TAT



CONFIDENTIAL AND PROPRIETARY TO NAT LTD.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	LJ					
DATE	DEC 18/91	TITLE				
CHECKED	NAT PROD 105 / NAT 255	AUDIO CONTROLLER FRONT VIEW				
APPROVED	NAT 131	SIZE A	CAGE CODE 3AB01	PART NO. AA97–402	REV. 1.11	SHEET 1/3
FILE	905–0.DWG	DWG. TYPE	FACEPLATE	DWG. NO.	AA97\402\905–0	

ENG–FORM: \905's\AA97–xxx.905–0110.DWT



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

DIMENSIONS ARE INCHES [mm]	DESIGNED	KV	NORTHERN AIRBORNE TECHNOLOGY LTD.			
THIRD ANGLE PROJECTION	DRAWN	MWS				
	DATE	JUL 26/02	TITLE	AUDIO CONTROLLER		
MASS: 2.75 lbs. (1.25 kg) MAX	CHECKED	NAT 228 / NAT 241				
MATERIAL: –	APPROVED	NAT 114	SIZE A	CAGE CODE 3AB01	PART NO. AA97–402	REV. 1.00 / SHEET 1/1
FINISH: –	FILE 922–0100.DWG		DWG. TYPE MECH. INSTALLATION		DWG. NO. AA97\402\922–0	

Section 3 Operation

3.1 Introduction

Information in this section consists of functional and operational procedures for the AA9x Series Single Channel Audio Controller.

Note: The AA95, AA96 and AA97 series single channel audio controllers are customized units, and may have unique operational features that are different to the options described, or are not covered in this manual. Any questions should be directed to the NAT Product Support Department.

3.2 General Information

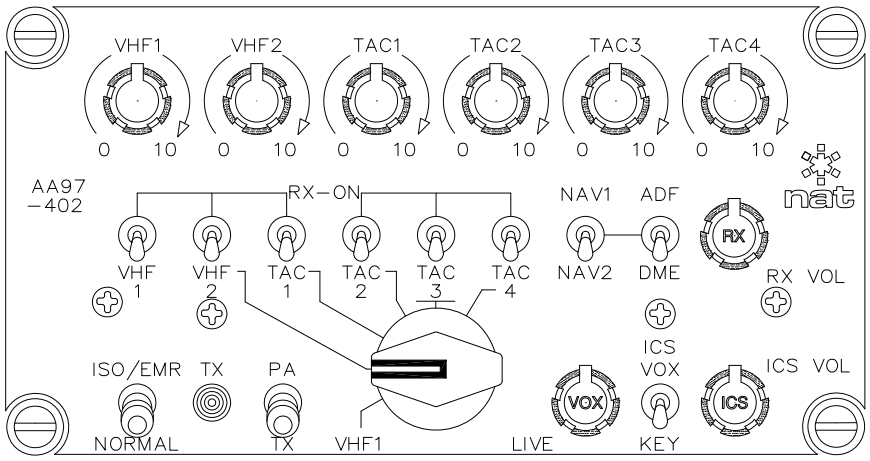


Figure 1: AA9x Operator Accessible Controls

The AA9x provides control for all aircraft audio, allowing selection of transmit and receive audio, LIVE, KEYED, or VOX intercom and interface for an additional hand held transmit microphone (hand mic). The AA95 and AA97 series of audio controllers allow selection of pilot isolation/emergency operation.

Sidetone level is adjustable internally, while receive (RX) and intercom (ICS) levels are adjustable on the front panel. In most AA9x configurations, all audio (except the sidetone of the radio in use) is muted during transmit for clarity. In the AA95 and AA97 series of controllers, the directly connected DIRECT AUDIO 2 input signal (see Section 3.6.1) remains un-muted during transmit. ICS operation will allow transmit during any ICS mode by using the PTT switch.

3.3 Controls and Indicators

In all AA9x controllers, transmit and PA functions are controlled with a single rotary selector switch, or (in some configurations) with the TX/PA Select switch. The main receive volume, ICS volume and ICS VOX squelch are individually adjusted with rotary controls. The ICS operations and receive audios are selected using color-coded toggle switches. In the AA95 and AA97 controllers, individual receive audio is selected with color-coded toggle switches. In the AA96 and AA97 controllers, individual receive volumes are adjusted using rotary controls.

3.3.1 Receive Audio Select Switches

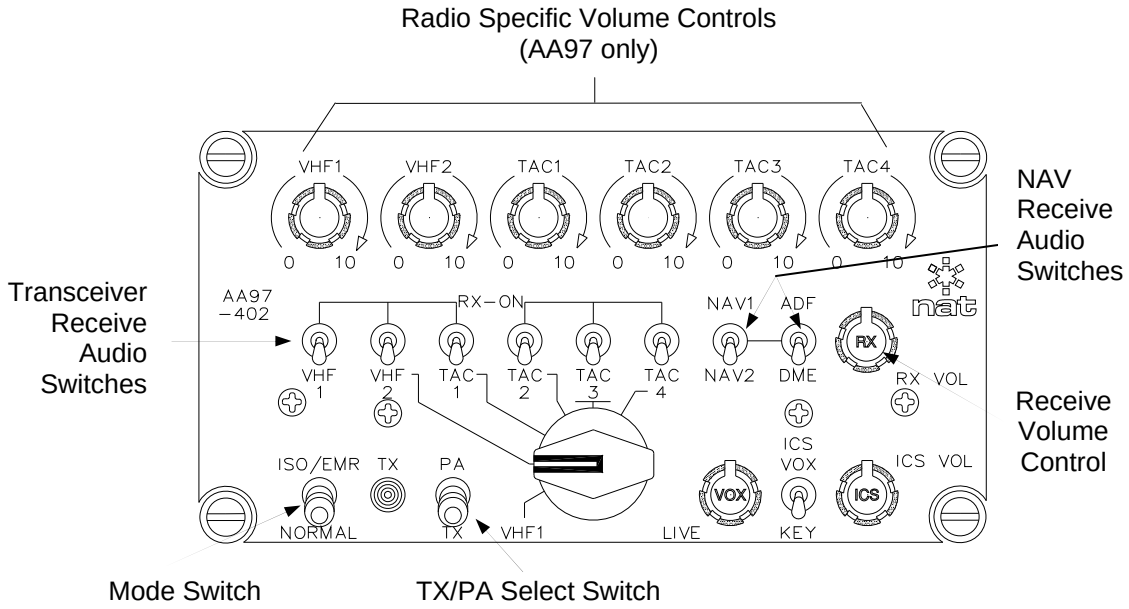


Figure 2: Receive Audio Select Switches

The transceiver receive audio select switches (white switch bats) are two position switches. When set to the ‘up’ position, the respective transceiver receive audio is selected on. When set to the ‘down’ position, the respective transceiver receive audio is selected off.

The NAV receive audio select switches (blue switch bats) are typically three position switches. When set to the ‘up’ or ‘down’ position, the respective NAV receive audio is selected on. When set to the ‘center-off’ position, the respective 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 (AA95 and AA97’s only), 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.

3.3.2 Transmit Selector Switch

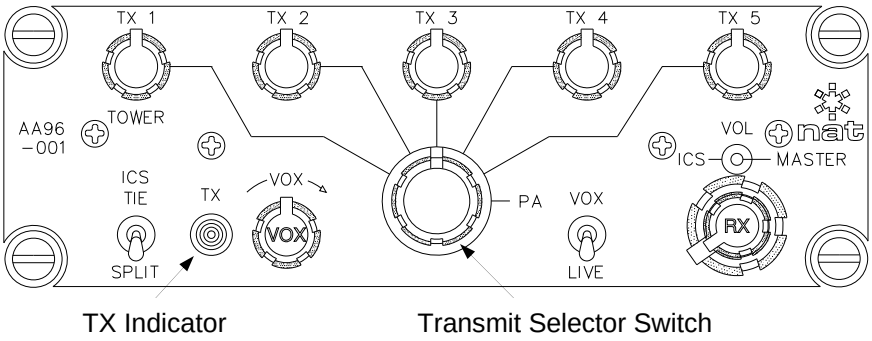


Figure 3: Transmit Select Switch

The transmit selector switch is a six position switch used to select the desired transceiver. For the AA95 and AA96, this switch typically selects the PA function when rotated fully clockwise. 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. In the AA95 and AA97's, Direct Audio 2 also remains un-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

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

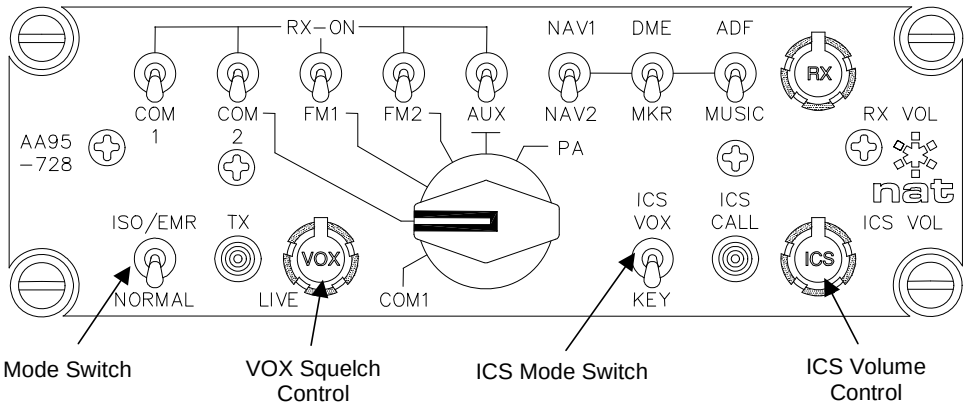


Figure 4: ICS Switches

3.3.3.1 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.

3.3.3.2 KEYED ICS (PTT Operation)

ICS toggle switch (orange switch bat) set to the down (KEY) position. In some models of AA9x audio controllers, set the VOX squelch control to the full clockwise position. Keyed ICS is inherent to the pilot and copilot microphone circuits only. Passenger microphone circuits will be LIVE with this mode selected.

3.3.3.3 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.

3.3.3.4 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. The ICS VOL control provides adjustment from approximately 1% to full output.

In the AA95 and AA97 models the mode switch (red switch bat) is used to select between NORMAL and PILOT ISO/EMR modes. In the NORMAL position (down), all operations of the ICS are functional as described above. When the switch is in the pilot isolate/emergency position (PILOT ISO/EMR), 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 3.5 for further details.

3.4 Optional Features

Some of the more common optional features can be seen on the AA95-728 (shown in Figure 4, section 3.3.3) and Figure 5 below.

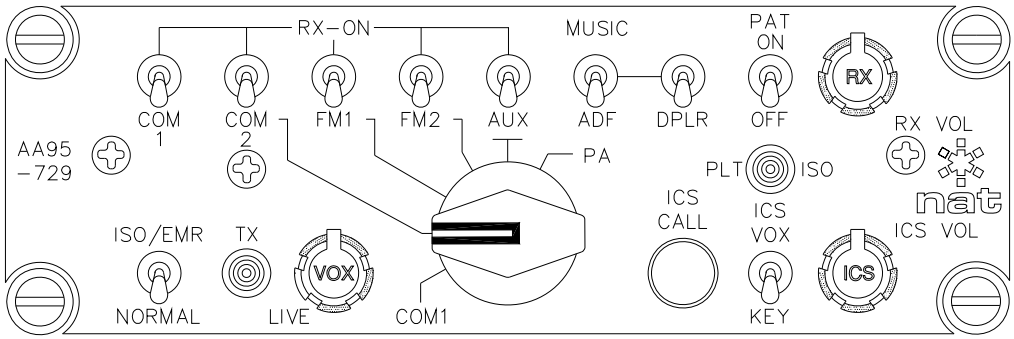


Figure 5: AA95-729

3.4.1 ICS ISO and/or PLT ISO Annunciators

ICS ISO and/or PLT ISO annunciators indicate that the intercom connection to the other audio controllers (typically the pilot's) has been switched off.

3.4.2 ICS CALL Annunciator

ICS CALL annunciator indicates that an ICS CALL switch is active and that the intercom connection between the audio controllers needs to be restored.

3.4.3 ICS CALL Switch

ICS CALL switch used to signal other audio controllers (typically the pilot's) that an 'isolated' station needs to communicate with the pilot(s). The output from the switch is normally used to activate a CALL annunciator and/or a CALL tone.

3.4.4 PAT ON/OFF Switch

PAT ON/OFF (Patient Headphone Audio Select) switch allows the crew to select the patient audio ON or OFF.

3.4.5 ICS TIE/SPLIT Switch

ICS TIE/SPLIT switch allows for local selection of the intercom connection to other audio controllers in the aircraft intercom system. In the TIE position, intercom audio is shared with all other audio controllers. In the SPLIT position, intercom audio to/from all other audio controllers is deselected.

3.5 Emergency Operation (AA95 and AA97 models only)

When the red PILOT ISO EMR/NORMAL 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.).

3.6 Audio Alerting Functions (AA95 and AA97 models only)

Two types of audio alerting are supported, Direct Audio and Internal Alerting. The use of these alerting features should be determined, defined and recorded so that the operator has an opportunity to use these features as they were intended for their specific installation.

3.6.1 Direct Audio

Direct Audio is when an audio signal from an existing warning system is connected ‘directly’ into the audio system and is not front panel selectable. There are usually two Direct Audio inputs on the AA95 and AA97. Typically, Direct Audio 1 is an amplified/adjustable input and Direct Audio 2 input connects directly to the pilot's headset output.

3.6.2 Internal Alerting

Internal Alerting is provided by up to three separate, internal tone generators that are coupled to the headset output. These tones are a function of the AA95 or AA97 itself and can be used to supplement existing warning tones (Low Rotor, Engine Out warnings in a Bell 206) or provide unique alerting capability for functions such as ICS Call, Rad Alt DH warning, etc. The internal alerts are configuration specific and how they will be used is determined at the time of installation. The Internal alerts are not front panel selectable.

Section 3 ends