ANODYNE ELECTRONICS MANUFACTURING CORP.

SPECIAL NOTICE

This product is now licensed to Anodyne Electronics Manufacturing (AEM) from Northern Airborne Technology (NAT). AEM is responsible for all matters related to this product, including sales, support and repair services.

Please note the transition to convert product manuals and supporting documentation is an ongoing process and is being addressed on an ‘as needed’ basis.

All references to NAT product part numbers (and associated images) are equivalent to AEM product part numbers.

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V1Y 4N7

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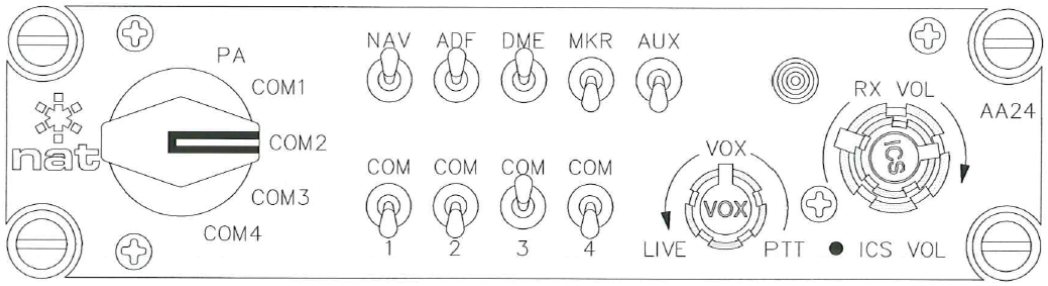
Phone: 1-250-763-1088

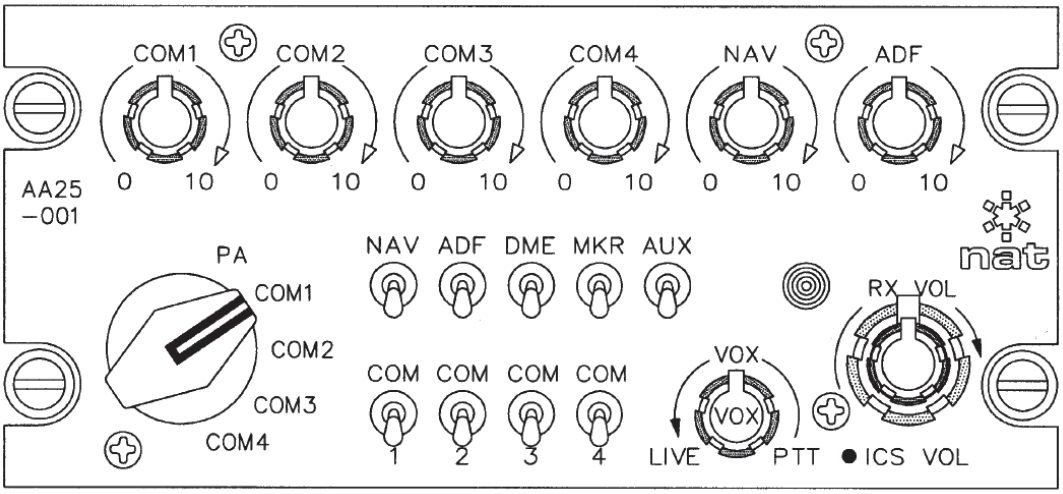
Fax: 1-250-763-1089

www.aem-corp.com

SM18

AA24/AA25 Series
Single User Audio Controller





INSTALLATION AND OPERATION MANUAL

REV 5.00 April 14, 2012

Anodyne Electronics Manufacturing Corp.
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Prepared By:	Checked By:	Approved By:
Tony Pearson Designer Apr 14, 2012	Loen Clement Designer May 25/12	Tom Betzelt Product Support Manager May 28, 2012

The status of this installation and operation manual is controlled by the revision 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.

AEM MANUAL REVISIONS

Section	Revision Number	Revision Description	Date
All	Rev: 5.00	Updated drawings and template	April 14, 2012

Table of Contents

Section 1.0 Description

1.1 Introduction

This manual contains information on the AA24/AA25 Series Single User Audio Controllers. All derivatives will be covered by manual supplements which can be obtained from AEM as required. Information in this section consists of purpose of equipment, features and specifications.

1.2 Purpose of Equipment

The AA24/AA25 series single-user Audio Controllers support one headset per box. Connection to other users in the system is made through the ICS Tie line. The small size and extensive radio and ICS functions make this unit an excellent choice for multi-station aircraft.

The AA24/AA25 series systems provide full boom-mic transmit and ICS functions for the user. The front panel controls permit user adjustment of frequently needed signals, such as intercom audio level, VOX threshold, and individual radio receive levels. Internal adjustments set default values for direct audio level and artificial side tone.

1.3 Features

The AA24/AA25 series single-user Audio Controllers support one headset per box. Connection to other users in the system is made through the ICS Tie line. The small size and extensive radio and ICS functions make this unit an excellent choice for multi-station aircraft.

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1.4 Specifications

1.4.1 Electrical Specifications

Power Supply:

Voltage	28Vdc (reverse and over voltage protection)
Current	400 mA Max
Lighting	28 Vdc @ 160 mA

Headset Power Phone output is nominal 600 Ω load
Short circuit protected
Typical 200 mW into headset
David Clark H10-30/40 series recommended

Microphone	Industry standard 'carbon equivalent' type 250 mVrms for full output Amplified dynamic microphone preferred David Clark M1DC, M3, M4 recommended (For low Z microphones, AA24-801 or AA25-801 are recommended)
Indicators	Transmit (green LED) VOX ICS triggered by ICS Tie Line (red LED)

Input Signals:

4 aircraft transceiver radio inputs
5 navigational receiver inputs
2.5 V rms for full output
4.7 kΩ input impedance

1 bi-directional ICS tie line
1 Vpp for full output
2.2 kΩ input impedance

Keylines	Transmit key is active low (33 mA of current) Intercom key is active low (1 mA of current)
Intercom line	NAT ICS tie line compatible 2 kΩ input impedance (340 mVrms level)

Output Signals:

Transmitter audio lines	Non-adjustable, microphone connected directly to radio. (mic bias supplied by radio)
Transmitter key lines	Hard ground output (relay contacts 1 A Max) Green LED annunciator
Intercom line	340 mVrms into 2 kΩ (freq. Response +/- 6 dB from 250 to 4000 Hz)
Headset output	200 mW max. Into 600 ohms (floating output) 300 mW max. Into 150 ohms
Receive channel	freq. Response +/- 6 dB from 300 to 5000 Hz
Intercom channel	freq. Response +/- 6 dB from 225 to 5000 Hz
Direct input	freq. Response +/- 6 dB from 275 to 3100 Hz
Distortion	<2% THD
Isolation /crosstalk	>60 dB min
Signal/noise ratio	70 dB min

1.4.2 Physical Specifications

	AA24		AA25	
Height	1.49”	37.8mm	2.62”	66.7mm
Depth (max)	7.55”	191.8mm	7.44”	188.8mm
Depth behind panel	5.84”	148.3mm	5.83”	148.0mm
Width (max)	5.75”	146.0mm	5.75”	146.0mm
Width behind panel	4.9”	124.5mm	4.9”	124.5mm
Weight	1.2 lbs	500g	1.5 lbs	680g
Mounting	Standard Dzus rails		Standard Dzus rails	

1.4.3 Environmental Specifications

Temperature:	-40° C. to +70° C (operating) -55° C. to + 85° C (survival)
Altitude	25,000 feet max
Humidity	95% Non-condensing
Shock	12 g (any axis)
Vibration	DO-160B category ‘P’, panel mounting 6g.

1.5 Unit Nomenclature

Model	Description / Distinction
AA24-001	COM1, COM2, COM3, COM4 + PA NAV, ADF, DME, MKR, & AUX receive switches +28 Vdc lights and +28 Vdc power High impedance headset and mic ICS, RX volume and VOX sq. Controls.
AA25-001	COM1, COM2, COM3, COM4 + PA NAV, ADF, DME, MKR, & AUX receive switches +28 Vdc lights and +28 Vdc power High impedance headset and mic ICS, RX volume and VOX sq. Controls.

End of Section 1.0

Section 2.0 Installation

2.1 General

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. Inspect the unit visually for damage due to shipping and report all such claims immediately to the carrier involved. Note that each complete unit should have the following:

- AA24-001 or AA25-001 Audio Controller
- Product Information Card
- Release certification

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

2.2.1 Warranty

All Anodyne Electronics Manufacturing Corp. (AEM) products are warranted for 2 years. See the website www.aem-corp.com/warranty for complete details.

2.3 Installation Procedures

2.3.1 Warnings ←IMPORTANT!

Do not bundle any lines from this unit with transmitter coax lines. Do not bundle any logic, audio or DC 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 interference to operation will result.

2.3.2 Cautions

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

Do not ground the microphone or headphone jacks.

Do not connect the microphone and headphone shields together.

Use caution when routing microphone and ICS Tie Line wiring, as they are low level signals prone to coupling form other sources.

Do not take a ground from the instrument panel or similar location that shares a ground return with a turn and bank, horizon or other motor driven instrument. This may cause the InterVox unit to pick up the sound of the motor as ground loop interference.

For best results, all headsets/microphones in the system should be of the same type to avoid VOX problems and uneven volume.

2.3.3 Cable and Wiring

All unshielded wire should be Tefzel MIL-M-22759/16 or equivalent. For shielded wire applications, use Tefzel MIL-M-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" from the end of the wire to the shield termination to allow the connector hood to be easily installed. Note that the hood is a "clamshell" hood, and is installed after the wiring is complete.

All wiring should be at least 22 AWG, except power and ground lines, which should be at least 20 AWG. Ensure that the ground connection is clean and well secured.

2.3.4 Fuses and Breakers

Power protection should be provided through a 1.0 A breaker, and not attached to any other existing breaker without additional protection.

2.3.5 Adjustments

See 3D drawing AA24\001\903-0 at the end of this section of the manual for the adjustment locations.

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 Direct Audio level (DIR AUD LEVEL) and sidetone level (S/T LEVEL) can be adjusted at the time of installation. The adjustment pots are accessed through holes in the upper cover, and can be rotated clockwise to increase the level, and counterclockwise to decrease it.

2.3.6 Post-Installation Checks

2.3.6.1 Resistance Checks

Do not attach the AA24 or AA25 until the following conditions are met.

Check the following:

a) Check J101, pin <1> for +28 Vdc relative to ground.
b) Check J101, pin <9> for continuity to ground (less than 0.5Ω).

2.3.6.2 Power On Checks

Install the AA24 or AA25 and power up the ship's systems. Verify normal operation of all functions. Refer to Section 3 for specific operation details.

a) Run through all installed functions, and check the ICS and TX functions for all users.

b) Different headsets models may have significantly different mic characteristics, which will affect 'VOX' squelch settings. The David Clark M-7 mic is much more active than the M-4 or M-1 mics, and may aggravate headset imbalance if used in a mixed system.

Note: 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.

c) To verify proper operation, all functions and levels should be checked in-flight.

If the unit functions satisfactory, make the required log entries and complete the required MOT/FAA paperwork, before releasing the aircraft for service.

2.4 Continued Airworthiness

Maintenance of the AA24-001 or AA25-001 Single User Audio Controller is 'on condition' only. Periodic maintenance of this product is not required.

2.5 Accessories Required But Not Supplied

Both the AA24 and the AA25 Seies Audio Controllers require Installation kit p/n AA24-IKC (crimp) or AA24-IkS (solder) to complete the installation. They consist of the following:

AA24-IKC 37-pin and 15-pin D-min Female Crimp Kit (AEM Part No. D37S15SL-IKC)

Quantity	Description	AEM 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
1	D-min 15 Socket Housing	20-21-015
15	MS Crimp Socket	20-26-901
1*	Jack Screw Set	20-27-002
1*	Lock Clip Set	20-27-004
1	15 Pin Connector Hood	20-29-015

*Use as required.

AA25-IKC 37-pin and 15-pin D-min Female solder Kit (AEM Part No. D37S15SL-IKS)

Quantity	Description	AEM Part #
1	D-min 37 Socket Housing	20-21-037
1*	Jack Screw Set	20-27-002
1*	Lock Clip Set	20-27-004
1	37 Pin Connector Hood	20-29-038
1	D-min 15 Socket Housing	20-21-015
1*	Jack Screw Set	20-27-002
1*	Lock Clip Set	20-27-004
1	15 Pin Connector Hood	20-29-015

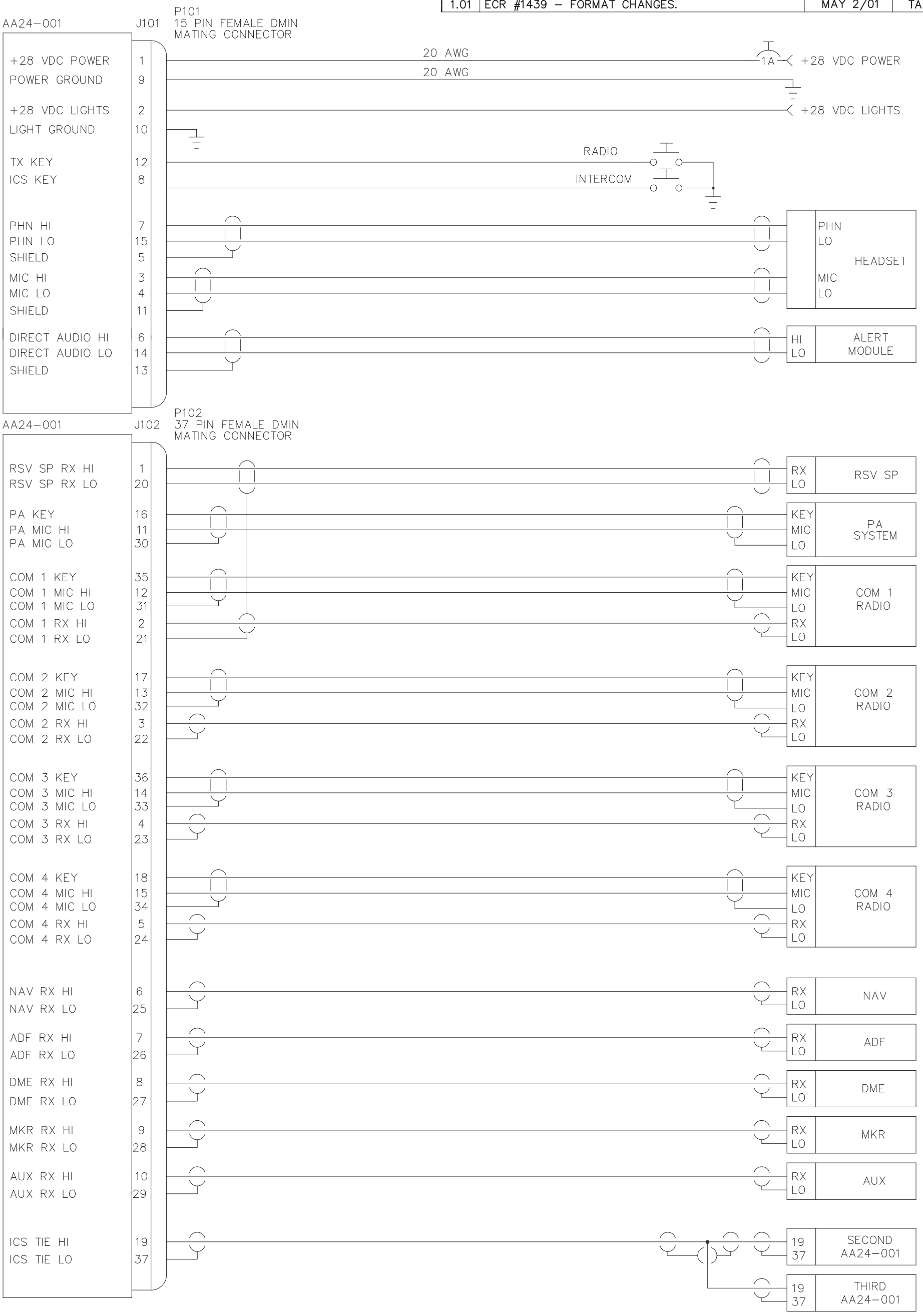
*Use as required.

2.6 Installation Drawings

DRAWING	REV	DESCRIPTION	TYPE	SERIAL #
AA24-001				
AA24-001\403-0	1.01	Single User Audio Controller	Interconnect	1128 and up
AA24-001\405-0	1.02	Single User Audio Controller	Connector Map	All
AA24-001\905-0	2.00	Single User Audio Controller	Faceplate	All
AA24-001\922-0	1.02	Single User Audio Controller	Mech. Installation	All
AA25-001				
AA25-001\403-0	1.10	Single User Audio Controller	Interconnect	1057 and up
AA25-001\405-0	1.02	Single User Audio Controller	Connector Map	All
AA25-001\905-0	1.01	Single User Audio Controller	Faceplate	All
AA25-001\922-0	1.01	Single User Audio Controller	Mech. Installation	All

Section 2.0 ends following the above drawings

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	ECR #1439 – FORMAT CHANGES.	MAY 2/01	TAT



NOTE: UNLESS OTHERWISE SPECIFIED.
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.

DEFINITION:

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	KV						
DATE	JUN 10/93	TITLE	SINGLE USER AUDIO CONTROLLER				
CHECKED	NAT 114 / NAT 223						
APPROVED	NAT 107	SIZE B	CAGE CODE 3AB01	PART NO. AA24–001		REV. 1.01	SHEET 1/1
FILE 403–0101.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AA24\001\403–0			

REVISIONS			
REV	DESCRIPTION	DATE	BY
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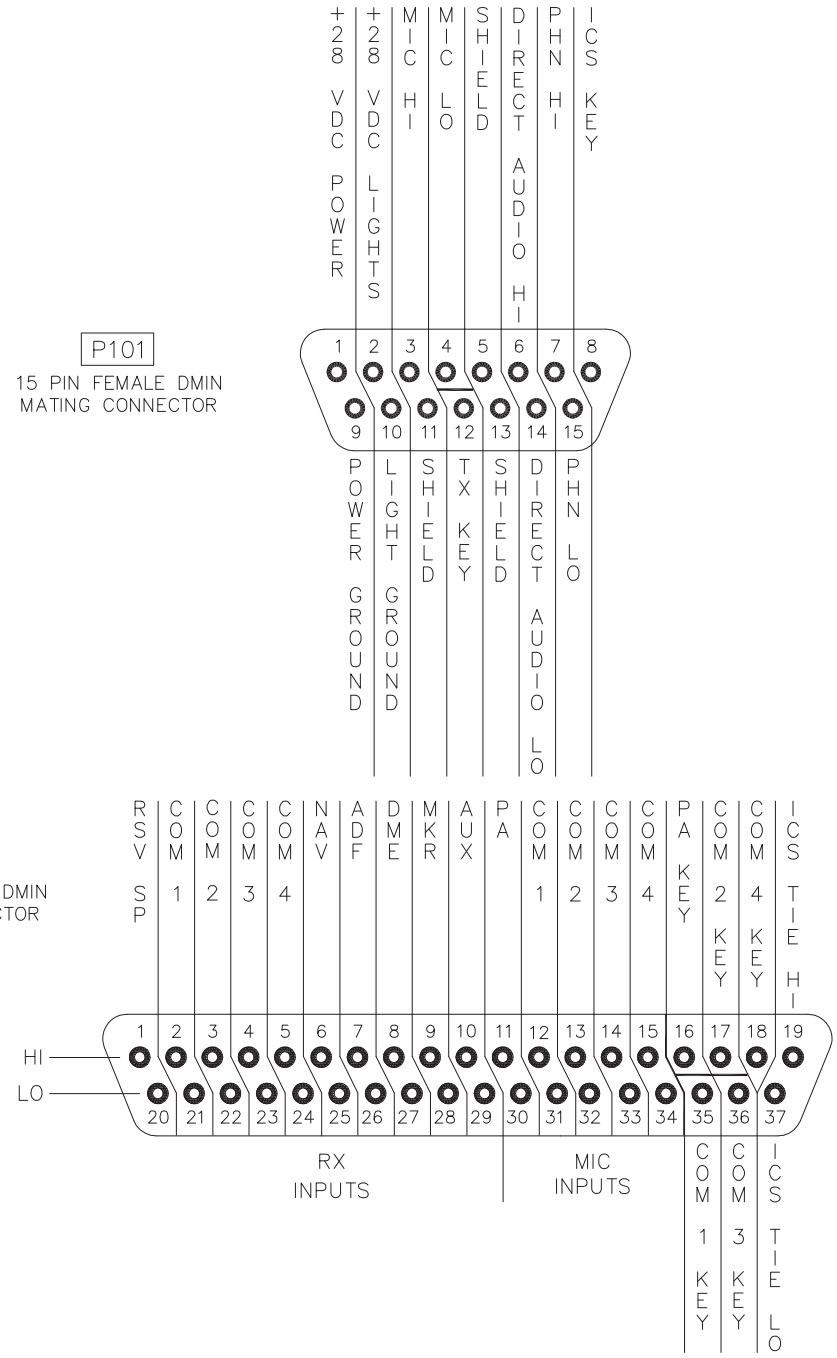
1.02	DOCCR01492 – CORRECTED SPELLING ERROR.	JAN 6/06	TAT



VIEW IS FROM REAR OF AIRFRAME CONNECTOR

DESIGNED	KV	NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	KV					
DATE	APR 14/94	TITLE	SINGLE USER AUDIO CONTROLLER			
CHECKED	NAT 255					
APPROVED	NAT 131	SIZE A	CAGE CODE 3AB01	PART NO. AA24–001	REV. 1.02	SHEET 1/1
FILE 405–0.DWG		DWG. TYPE CONNECTOR MAP		DWG. NO. AA24\001\405–0		

REVISIONS			
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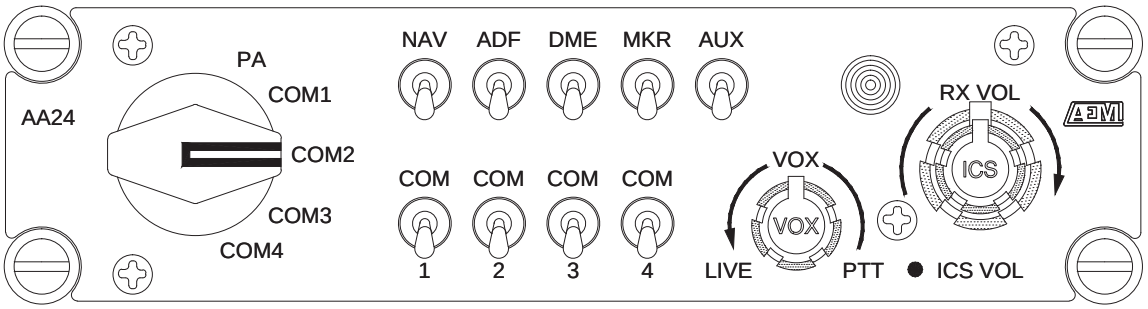


	NAME	DATE
DRAWN	MWS	Jun 10/93
CHECKED		29 Dec. 11
APPROVED		Dec 29/11

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 0.5 Deg
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ± 0.01
THREE PLACE DECIMAL ± 0.005
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL N/A
FINISH N/A
DO NOT SCALE DRAWING

ANODYNE ELECTRONICS MANUFACTURING CORP.
KELOWNA BC CANADA
(250)-763-1088
WWW.AEM-CORP.COM

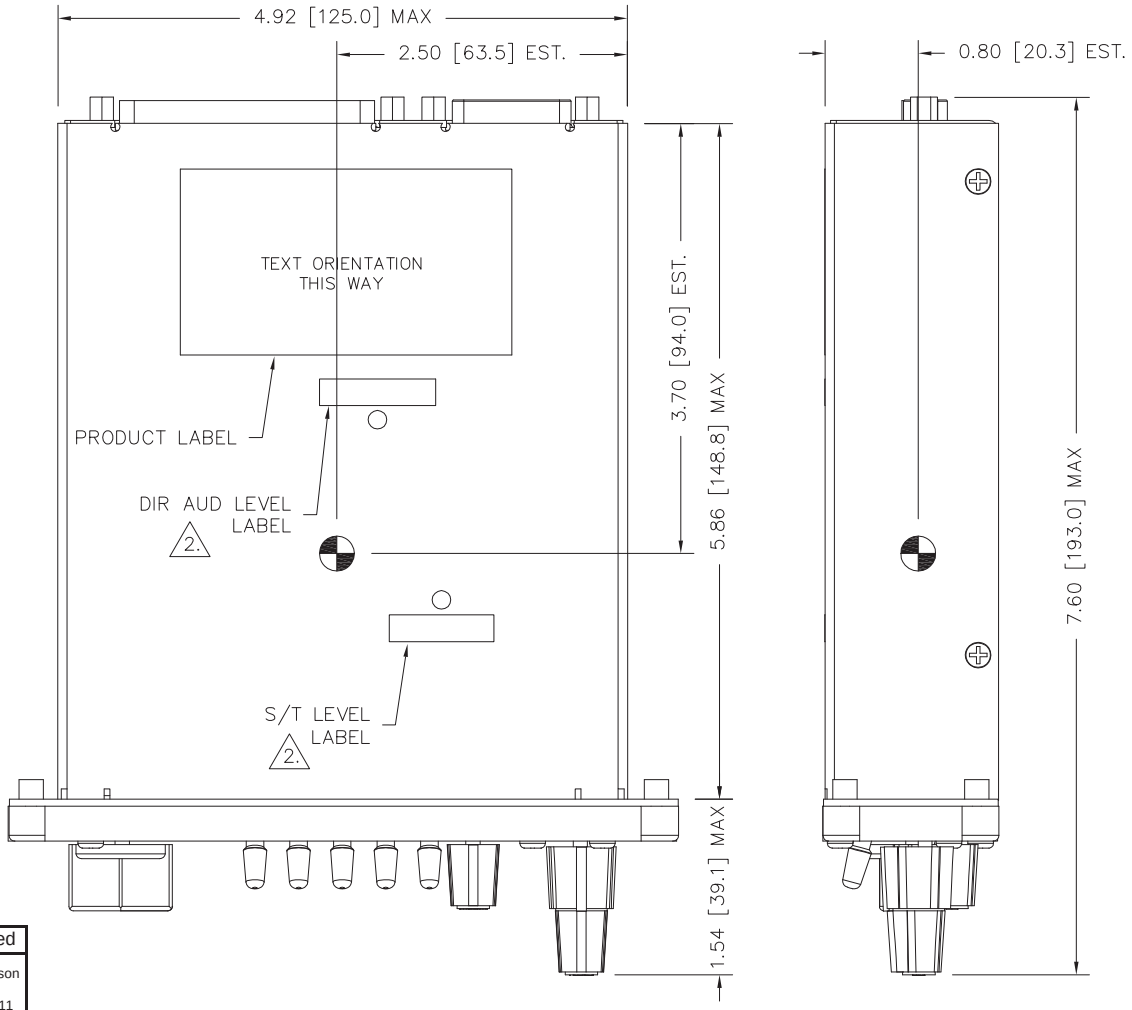
TITLE:

SINGLE USER AUDIO CONTROLLER

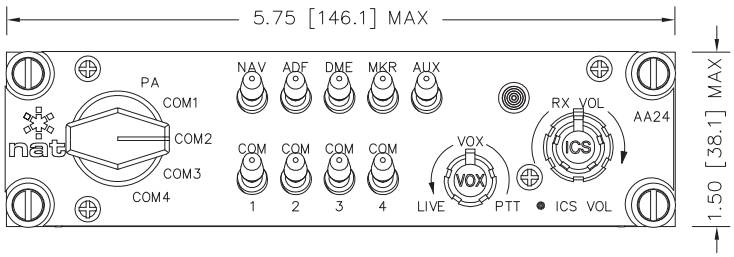
SIZE	CAGE CODE	PART No.	REV
A	L9015	AA24-001	2.00

SCALE: 1:1 | DRAWING No.: 905-0 | SHEET 1 of 3

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	ECR #1439 – DWG NO. WAS 90324001, ADDED WEIGHT AND COG, REMOVED 'TX' FROM NEAR LED, FORMAT CHANGES.	MAY 2/01	TAT
1.02	DOCCR02559 – LABEL PLACEMENT CORRECTED.	JUL 14/08	TAT



Reviewed/Approved
Tony Pearson
Designer
Jun 22, 2011



NAT LOGO REMOVED

CENTER OF GRAVITY

NOTES:
1. DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ASME Y14.5M–1994
2. TEXT ORIENTATION SAME AS PRODUCT LABEL.

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	nat NORTHERN AIRBORNE TECHNOLOGY LTD.			
		DRAWN	PL				
		DATE	SEP 1/95	TITLE	SINGLE USER AUDIO CONTROLLER		
		CHECKED	NAT 255				
MASS: 1.32 lbs. (0.6 Kg) MAX		APPROVED	NAT 131	SIZE A	CAGE CODE 3AB01	PART NO. AA24–001	REV. 1.02 / SHEET 1/1
MATERIAL: –							
FINISH: –		FILE	922–0.DWG	DWG. TYPE	MECH. INSTALLATION	DWG. NO.	AA24\001\922–0

REVISIONS			
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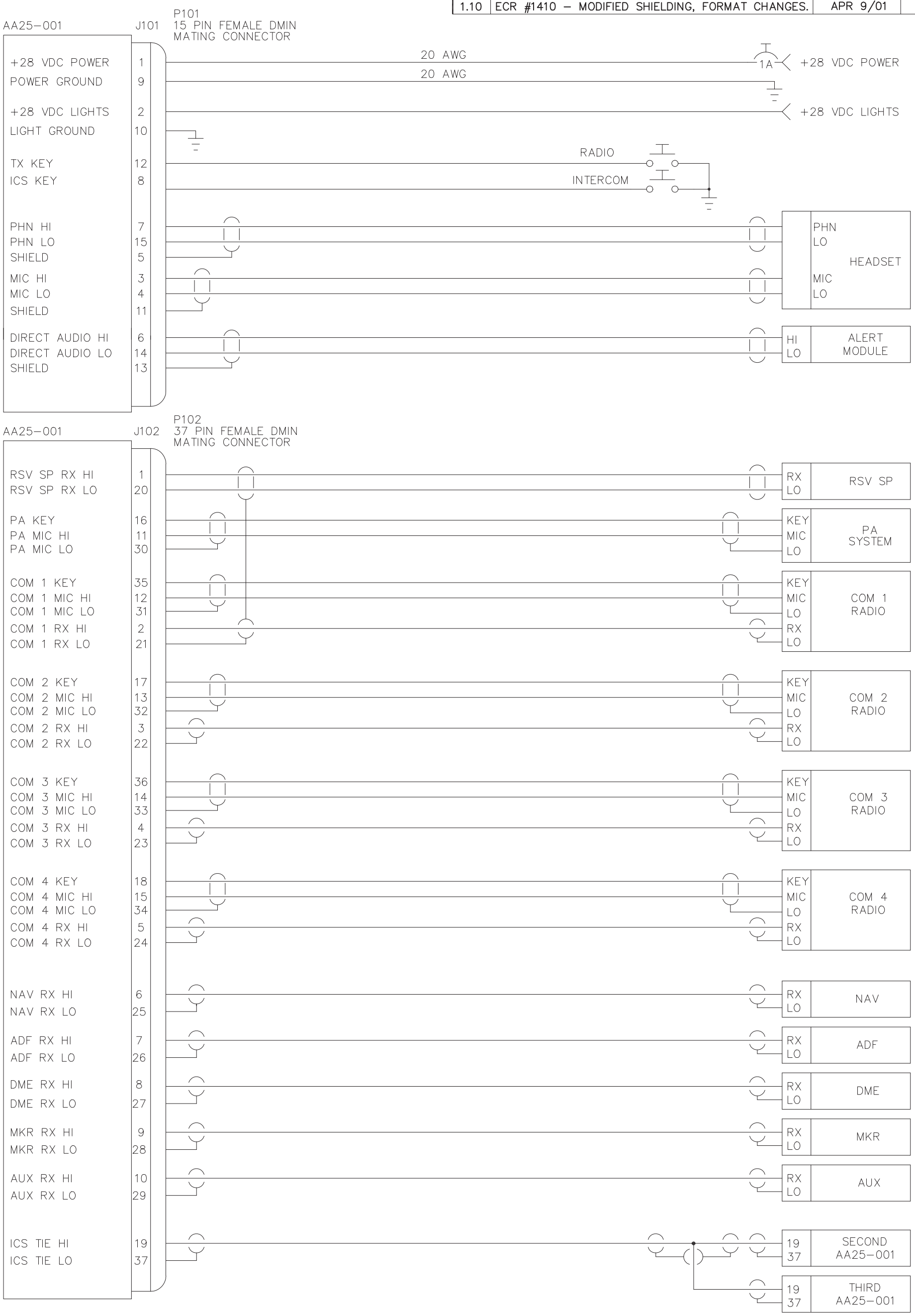


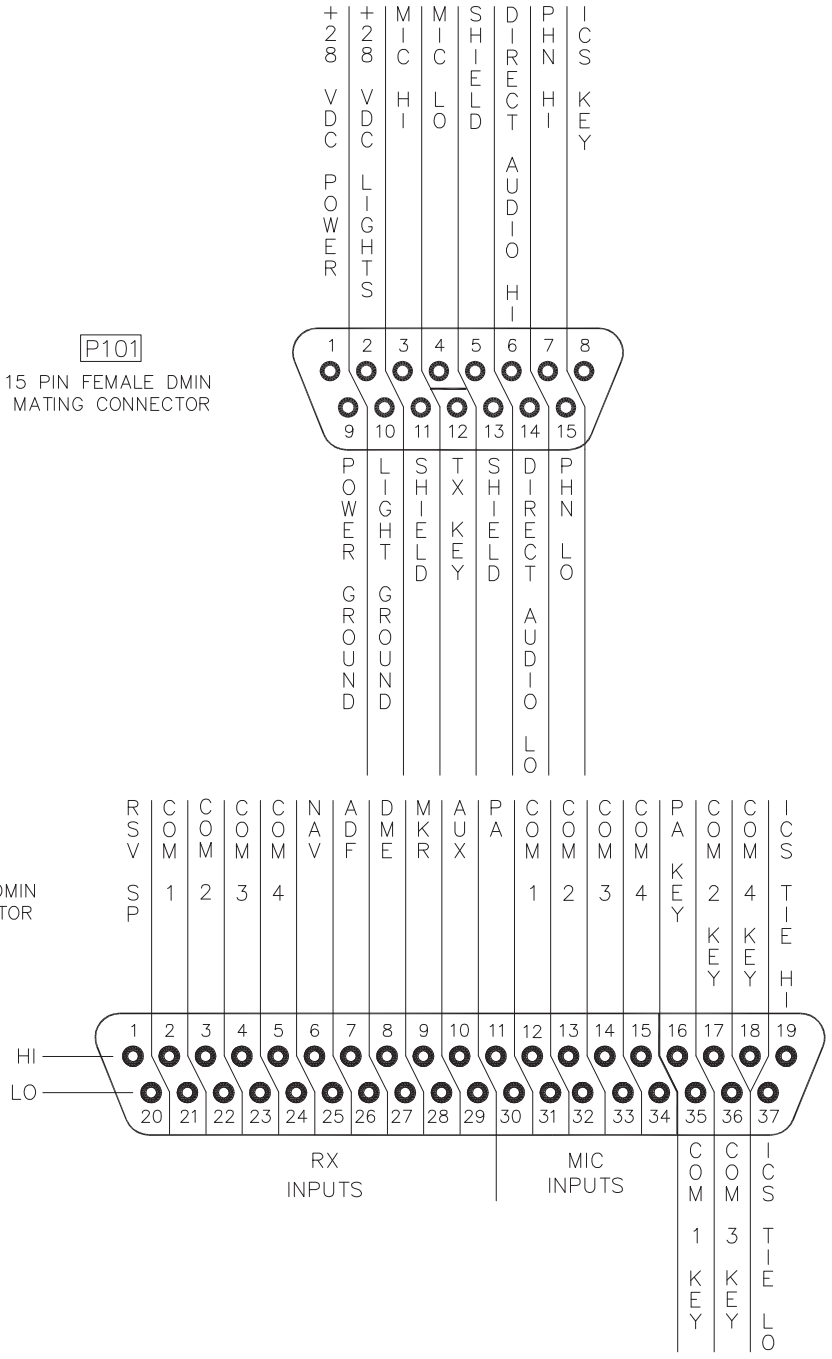
NOTE: UNLESS OTHERWISE SPECIFIED.
ALL WIRES SHOULD BE 22 AWG. ALL WIRE SHOULD BE IN ACCORDANCE WITH MIL–W–22759. ALL SHIELDED WIRE/CABLE SHOULD BE IN ACCORDANCE WITH MIL–C–27500.

DEFINITION:

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	KV					
DATE	APR 14/94	TITLE	SINGLE USER AUDIO CONTROLLER			
CHECKED	NAT 223 / NAT 114					
APPROVED	NAT 107	SIZE B	CAGE CODE 3AB01	PART NO. AA25–001	REV. 1.10	SHEET 1/1
FILE 403–0110.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AA25\001\403–0		

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	ECR #1410 – FORMAT CHANGES.	APR 2/01	TAT
1.02	DOCCR01492 – CORRECTED SPELLING ERROR.	JAN 6/06	TAT

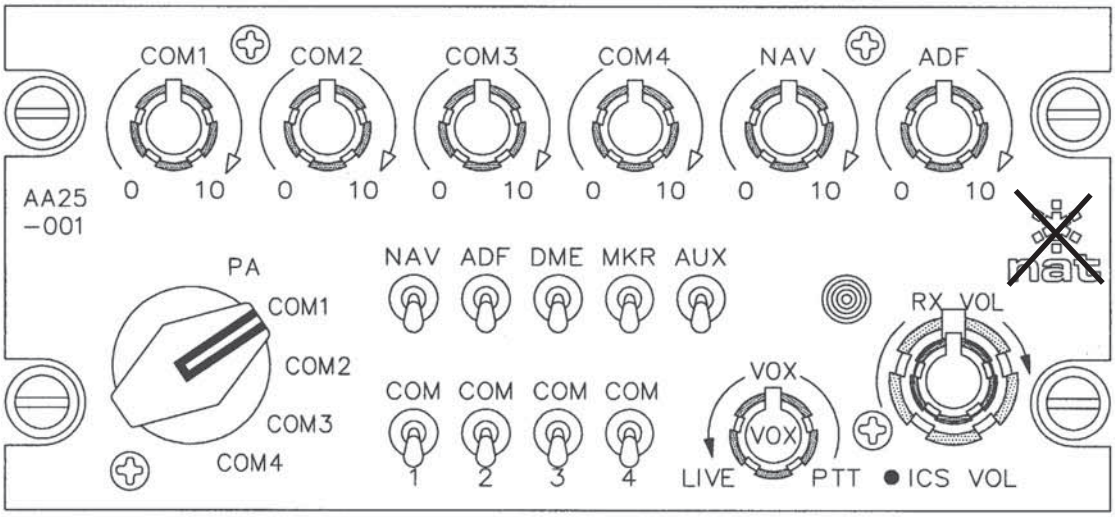


VIEW IS FROM REAR OF AIRFRAME CONNECTOR

DESIGNED	KV	NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	KV					
DATE	APR 14/94	TITLE: SINGLE USER AUDIO CONTROLLER				
CHECKED	NAT 255					
APPROVED	NAT 131	SIZE: A	CAGE CODE: 3AB01	PART NO.: AA25–001	REV.: 1.02	SHEET: 1/1
FILE: 405–0.DWG		DWG. TYPE: CONNECTOR MAP		DWG. NO.: AA25\001\405–0		

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	ECR #1410 – "TX" REMOVED FROM NEAR LED, FORMAT CHANGES.	FEB 8/01	TAT

Reviewed/Approved
Tony Pearson
Designer
Jul 4, 2011



REMOVE NAT LOGO

PROPRIETARY AND CONFIDENTIAL TO NAT LTD.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	KV						
DATE	MAR 31/94	TITLE	SINGLE USER AUDIO CONTROLLER				
CHECKED	NAT APROD. 2205						
APPROVED	NAT 107	SIZE A	CAGE CODE 3AB01	PART NO. AA25–001		REV. 1.01	SHEET 1/2
FILE 905–0101.DWG		DWG. TYPE FACEPLATE		DWG. NO. AA25\001\905–0			

REVISIONS			
REV	DESCRIPTION	DATE	BY
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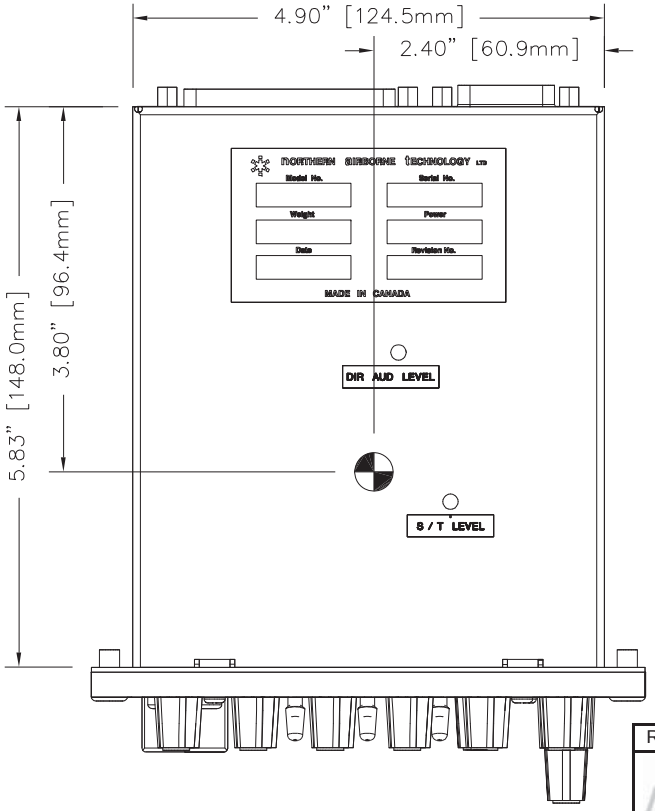
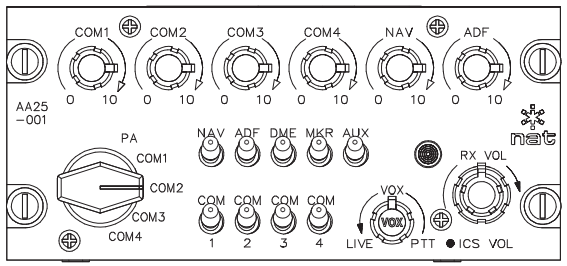


WEIGHT: 1.5 ±0.08 lbs. (0.68 ±0.03 kg)

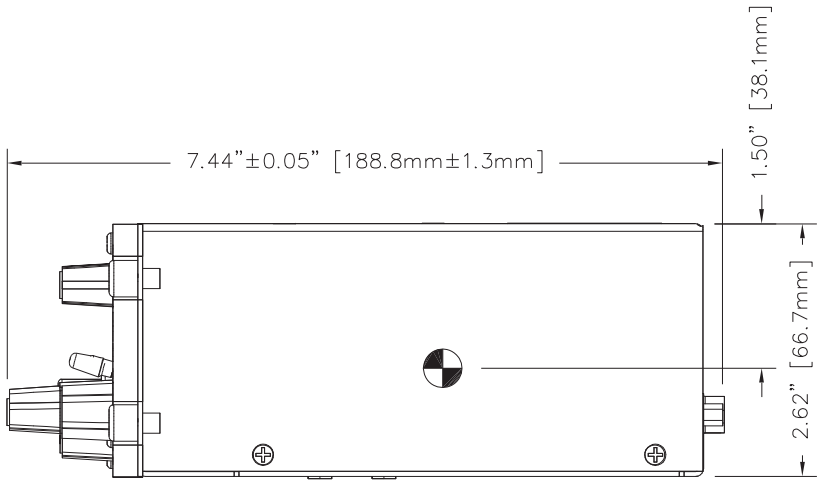
CENTER OF GRAVITY ±0.10" (±2.5mm)

Reviewed/Approved

Tony Pearson
Designer
Jul 4, 2011



NAT LOGO REMOVED



5.75" [146.0mm]

PROPRIETARY AND CONFIDENTIAL TO NAT LTD.

DESIGNED	KV	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	KV						
DATE	APR 19/94	TITLE	SINGLE USER AUDIO CONTROLLER				
CHECKED	NAT 114 / NAT 223						
APPROVED	NAT 107	SIZE A	CAGE CODE 3AB01	PART NO. AA25–001		REV. 1.01	SHEET 1/1
FILE 922–0101.DWG		DWG. TYPE MECH. INSTALLATION		DWG. NO. AA25\001\922–0			

Section 3.0 Operation

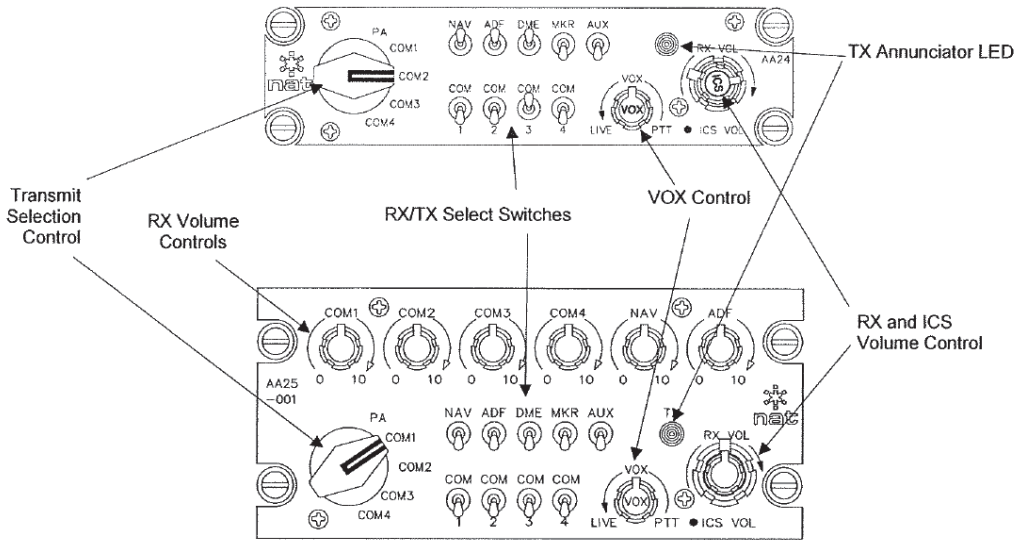
3.1 Introduction

Information in this section consists of the functional and operational procedures for the AA24/AA25 Series Single User Audio Controller.

3.2 General

The AA24/AA25 series single user audio controllers allow selection of transmit and receive audio, and LIVE, VOX or PTT intercom. One direct alerting input is provided to allow emergency alerting audio to pass unmated to the user's headset. After transmitting on the radios the user's microphone automatically reverts back to intercom mode. The AA25 audio controller also provides central volume adjustment for all the aircraft audio.

3.3 Controls and Indicators



3.3.1 Transmit selection

The rotary selector switch at the lower left of the panel selects the desired transmit function. When the radio PTT switch is activated, the microphone will be coupled to the radio or PA channel selected. Receive audio is automatically selected with the transmit selection, and no additional switching is needed to establish outside communication.

During transmission, the TX annunciator LED on the front panel will illuminate green.

3.3.2 Receiver/Transceiver Selection

The Receiver/Transceiver audio is selected from a double row of color-coded toggle switches. Receiver switch bats are blue, and the transceiver switch bats are white. To connect the desired radio to the headphones, the relevant switch is toggled upwards.

On the AA25, independent volume controls are provided for the transceivers and the first two NAV aids.

3.3.3 Volume Control

The Volume control is a dual concentric knob.

3.3.3.1 ICS Volume Control

The inner knob of the dual control is ICS VOL and controls the intercom volume for all headsets. An internal trimpot sets the minimum level. With ICS VOL set fully ccw intercom volume will be at a minimum. As the operator rotates the control cw, intercom volume will increase.

In multiple station systems, the ICS volume adjusts only the local ICS audio level.

3.3.3.2 RX Volume Control

The outer knob of the dual control is RX VOL and controls the RX volume for all selected radios. With RX VOL fully ccw, volume will be at a minimum. As the operator rotates the control cw, volume will increase.

3.3.4 VOX Mode Control

The VOX Control selects the mode of operation of the intercom mic. When the control is in the centre of its range, the intercom is in the VOX mode (voice activated). As the control is rotated counterclockwise, the system becomes more sensitive, until in the fully counterclockwise position it is in LIVE mode (on constantly). As the control is rotated clockwise, the sensitivity decreases, until at the fully clockwise position it is in PTT mode (activated by cyclic or foot switch closure).

3.3.5 Audio Alerting Functions

The user receives audio alerting signals connected to the Direct Audio under all operating conditions of the AA24/AA25.

End of Section 3.0