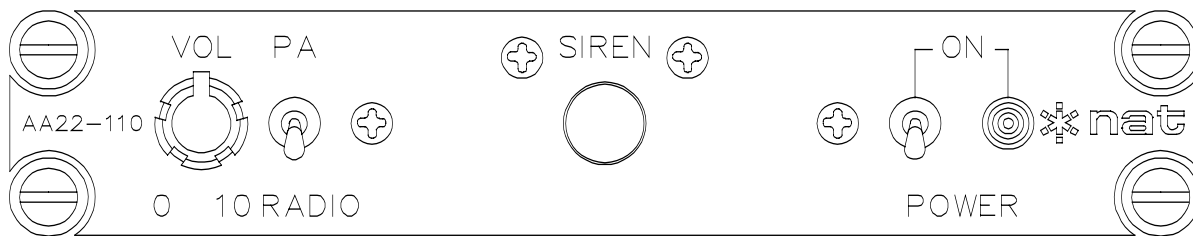




Part of **SM33**

**AA22 Series  
PA/Siren Control**



## **INSTALLATION AND OPERATION MANUAL**

**REV 4.00 November 19, 2003**

**Northern Airborne Technology Ltd.  
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Kelowna BC, Canada  
V1Y 4N7**

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## IMPORTANT INFORMATION

This manual has been produced to provide information unique to the AA22 Series PA/Siren Control. Some of this information has been published previously in the SM02 Service manual (AA20/22/23 PA110/220 Series Loudhailer / PA systems).

Earlier versions of the AA22 may not be covered by the information in this manual. Please refer to SM02, or contact the Technical Support Department at NAT Ltd.

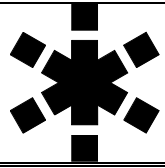


Periodically NAT will release manual amendments. In order to maintain the most accurate and up to date manual these amendments should be carried out immediately upon receipt and recorded on the following amendment record.

AMENDMENT RECORD				
Amendment Number	Amendment Date	Section(s) Changed	Date Entered	Entered By
1	Jul 5, 2004	1		<b>Performed at Factory</b>
2	May 12/05	1		<b>Performed at Factory</b>

Insert any Amendment Instruction sheets after this page.





**nat**

**INSTALL\_OPS  
MANUAL AMENDMENT**

**Manual: SM33 (AA20/AA22)**

**Amendment #: 2**

**Document # SM22\AA22\Install\_Ops\809-0002**

**Amendment Date: May 12, 2005**

The purpose of this amendment is to correct an Electrical Specification.

Amendment Instructions:

1	Remove Pages	Replace With Pages
	1-1 and 1-2 Rev 4.00 Amendment # 1	1-1 and 1-2 Rev 4.00 Amendment # 2

**Note:** Ensure that all drawings are inserted in the order shown on the latest drawing lists.

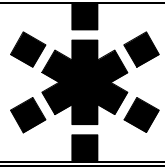
2 Update the Amendment Record sheet at the front of the manual.

3 Insert this page into the manual after the Amendment Record sheet (page ii).

Manual Amendment ends after the following amended pages







**nat**<sup>®</sup>

**MANUAL AMENDMENT**

**Manual: SM33 AA22**  
**Document # SM33\809-0001**

**Amendment #: 1**  
**Amendment Date: Jul 5, 2004**

The purpose of this amendment is to insert specifications for the AA22-110 and AA22-492 into the manual.

Amendment Instructions:

1	Remove Pages	Replace With Pages
	1-1, 1-2, 1-3 Rev 4.00	1-1, 1-2, 1-3, 1-4 Rev 4.00 Amendment #1

- 2 Update the Amendment Record sheet at the front of the manual.
- 3 Insert this page into the manual after the Amendment Record sheet (page ii).

Manual Amendment ends after the following amended pages



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## Section 1 Description

### 1.1 Introduction

This manual contains information on the AA22 Series PA Driver/Siren Control. All derivatives will be covered by manual supplements, which can be obtained from NAT as required.

Information in this section consists of purpose of equipment, features and specifications.

### 1.2 Purpose of Equipment

The AA22 Series PA Driver/Siren Control is a compact, self-contained, Dzus-mounted unit. The AA22 is a line driver for remote mounted power amplifiers. The AA22-110 or AA22-160 is typically used with the PA110 or PA220, while the AA22-492 or AA22-493 is typically used with the PA250 or PA700.

### 1.3 Features

Microphone interfacing is accomplished from either an AA9x/AMS4x series audio controller, or a 'carbon equivalent' microphone. A radio audio input is provided to allow for radio 'rebroadcast' operation. The siren is adjustable for tone, rate and level. Provision is made for external power switching to activate PA110/220 power amplifiers.

All external connectors, switches and relay contacts 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) and dry nitrogen filled.

### 1.4 Specifications

#### 1.4.1 Electrical Specifications

Power	+22 to 32 Vdc (28 Vdc nom) at 250 mA max (excl. lamps). Internally grounded case.
Panel Lamps	2 ea. type #387 for 28 Vdc operation Maximum lamp load 80 mA
Inputs:	
Mic	0.25 Vrms at 150 $\Omega$
PA and Radio Circuitry	2.5 Vrms at 3.3 k $\Omega$ Single-ended

Microphone	Industry standard 'carbon equivalent' or amplified dynamic microphone preferred Min. 200 mV output required into 150 $\Omega$ David Clark M1/DC, M4, M7 recommended
Impedance	1 k $\Omega$
Output: Circuitry	6 Vrms @ 1 kHz into 600 $\Omega$ ground referenced Single-ended
Power Key	Switched +28 Vdc available to activate remote amplifiers
Key Logic	Ground-seeking inputs for all lines

### 1.4.2 Physical Specifications

---

Height	1.11 inches (29.2 mm)
Depth behind panel	6.32 inches (160.5 mm) excluding mating connector
Width	5.75 inches (146.1 mm) front panel 4.96 inches (126.0 mm) rear enclosure
Mounting	Standard Dzus Mounting (4 fasteners)
Weight	1.00 lb (0.45 kg.) excluding mating connector

### 1.4.3 Environmental Specifications

---

Temperature	-20 $^{\circ}$ C to +55 $^{\circ}$ C (Ambient)
Altitude	25,000 ft. Maximum
Humidity	95%
Shock	12g (any axis)
Qualification	DO-160C Env. Cat. B1-BA[MN]XXXXXXABBBBXXXXX

## 1.5 Unit Nomenclature

---

AA22-110	<p>Standard swept siren, adjustable rate/tone  Mode select switch, PA/Radio monitor  &gt;50 mW output into 150 Ohms  6 Vrms nominal siren output into 600 Ohms  70 mA nominal current consumption  PA and Siren override at all times  +28 Vdc switched power output  Use with PA110 and PA220 series amplifiers</p>
AA22-160	<p>Wail/Yelp swept siren, adjustable rate/tone  Mode select switch, PA/Radio monitor  6 Vrms nominal audio output into 600 Ohms  6 Vrms nominal siren output into 600 Ohms  70 mA nominal current consumption  +28 Vdc switched power output  Use with PA110 and PA220 series amplifiers  Can be selected as a radio with keyline serving as siren key</p>
AA22-163*	<p>Same as AA22-160, but with locking PA/RADIO select switch</p>
AA22-165*	<p>Same as AA22-160, but with 28 Vdc NVG-suitable lighting</p>
AA22-167*	<p>Same as AA22-160, but with 5 Vdc NVG-suitable lighting</p>
AA22-170*	<p>Same as AA22-163, but with 28 Vdc NVG-suitable lighting</p>
AA22-492	<p>Wail/Yelp swept siren, adjustable rate/tone  Mode select switch, PA/Radio monitor  500 mVrms nominal audio output into 600 Ohms  450 mVrms nominal siren output into 600 Ohms  Siren override at all times  70 mA nominal current consumption  Used with PA250 and PA700 series amplifiers  Can be selected as a radio with keyline serving as siren key</p>

AA22-493	Wail/Yelp swept siren, adjustable rate/tone Mode select switch 100 mVrms nominal audio output into 600 Ohms 90 mVrms nominal siren output into 600 Ohms Siren override at all times 80 mA nominal current consumption Used with PA250 and PA700 series amplifiers Can be selected as a radio with keyline serving as siren key
AA22-495*	Same as AA22-492, but with 28 Vdc NVG-suitable lighting
AA22-592*	Same as AA22-492, but with 5 Vdc lighting
AA22-594*	Same as AA22-492, but with 5 Vdc NVG-suitable lighting

\* These products are included in this section for reference only. For more detailed information on these and other AA22 products, contact the Product Support Department at NAT Ltd.

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:

- AA22 PA Driver/Siren Control
- Warranty Card
- Operator's Manual
- 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

---

**Never** ground any output line from the AA22 or permanent damage may result. Use of a fully floating audio wattmeter or transformer-coupled meter is recommended. Always check ADF and compass calibration after installing external speakers or "PA" amplifiers. Significant single cycle errors may be caused by the concentration of steel and magnetic material. **Do not** bundle any lines from these units with transmitter coax lines. **Do not** bundle any lines from this unit with 400 Hz synchro wiring, or AC power lines.

### 2.3.2 Cautions

Use shielded cable exactly as shown and **ground as indicated**. All audio installations can be severely degraded by incorrect wiring and shielding. 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.

### 2.3.3 Cabling and Wiring

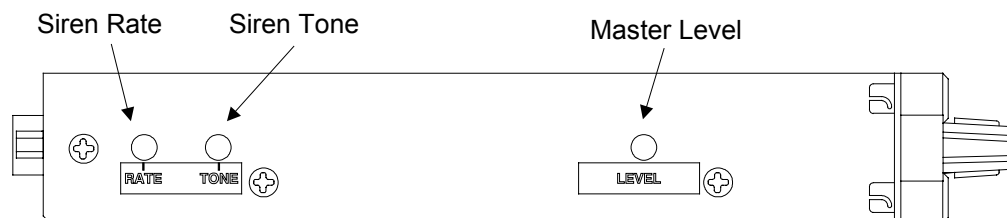
All unshielded wire should be MIL-W-22759 or equivalent. For shielded wire applications, use Tefzel MIL-C-27500 shielded wire with solder sleeves (for shield terminations) to make the most compact and easily terminated interconnect. Follow the wiring diagrams in Section 2.6 as required.

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.

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. To prevent system failure or inadequate equipment protection, power to each component of this system must be supplied from a separate breaker or fuse and not bundled to any other source.

### 2.3.4 Adjustments

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. Complete all required log book entries, electrical load, weight and balance amendments and other paperwork as required by your local regulatory agency.



If the siren does not suit the specific requirements of a given installation, the following adjustments are available:

1. Base tone setting - pot marked TONE.
2. Sweep rate setting - pot marked RATE.

These controls are accessible through holes on the left side of the unit.

### 2.3.5 Post-Installation Checks

---

#### 2.3.5.1 Voltage/Resistance checks

**Do not attach the PA Driver/Siren Control until the following conditions are met.**

Check the following:

- a) P101 pins <1> and <2> for +28 Vdc relative to ground.
- b) P101 pins <14>, <15> and <16> for continuity to ground (below 0.5  $\Omega$ ).
- c) P101 pin <3> for the presence of the lamp dimmer voltage.

AA22-160, AA22-492, and AA22-493 variants only:

- d) P101 pin <10> for continuity to ground (below 0.5  $\Omega$ ). This ground is installation specific and may be a 'hard' ground or supplied by a momentary switch (siren trigger).

#### 2.3.5.2 Operational Checks

The PA system is not intended to be operated in a linear volume manner (i.e., it is not like a stereo system). The PA is designed to provide high levels of audio power under difficult conditions, and does so by sacrificing some of the high fidelity for a higher average power output. The volume control on the AA22 is not intended to provide linear operations from the PA system, and will result in broken and sporadic output from the PA when insufficient levels are delivered to the AA22 and/or to the power amplifier unit from the AA22.

For most RADIO and PA (voice) operations, it is suggested that the AA22 volume control be set to maximum (fully cw). If the system is overdriving, reduce the AA22 volume setting.

To check the system, the aircraft must be moved outside and away from as many reflective surfaces as possible. It is not recommended to operate the PA microphone on the ground, as a high risk exists for audio coupling and feedback. However, if the test is to be conducted on the ground, the aircraft should be positioned on a grassy surface to help reduce the distortion produced by sound reflected from concrete or asphalt. It is also beneficial to stuff the speaker projectors with soft rubberized foam to reduce the risk of feedback and distortion.

**Advise all nearby personnel that PA system tests are to be done.**

Start by checking the Siren Circuit for proper operation and tone/rate adjustment. The Siren always operates at 100% output from the AA22, and should drive the PA's to full output on audio peaks. The Level trimpot of the AA22 will be set at the factory to provide rated output at full front panel volume control adjustment.

Once the siren operation is satisfactory, you may try RADIO operations through the AA22. To achieve full output capability from the AA22, a signal of 2.5 Vrms must be delivered to the AA22 Radio audio input, and the AA22 volume must be set to maximum. Lower levels of input signal or volume settings will result in poor output audio (very broken).

For PA (voice) tests, it is best that the aircraft is flown in an approximately 200 foot hover, and commands are given to a human ground target for visual response to the commands. Remember, the human target should be positioned in the area that the speaker system is designed to project the audio to. This will depend on speaker orientation and the height of the aircraft. **Remove all sound absorbing material from the speakers before flying the aircraft.** To achieve the best operation, all voice commands must be spoken slowly and clearly, with extra emphasis on each word.

To determine the operational capability of the system, put the aircraft in a hover, and with the target properly positioned, provide PA instruction to the target to accomplish a certain task that will give visual cue to the flight crew that the target has understood the instructions (i.e., "touch your head", "sit down", "turn around", etc.)

#### 2.3.5.2 Power On Checks

- a) Install the **PA Driver/Siren Control** and power up the aircraft's systems. Turn on all of the radios and other accessories required for this system. Check that the power **ON** LED on the AA22 illuminates when the power switch is up.
- b) Key the siren using the front panel button or remote siren key. The siren should sound and the level should be at maximum volume (the front panel level control does not affect the siren). If the siren (rate or tone) needs adjustment there are two trimpots on the left side of the AA22.
- c) Select the rest of the audio system as required to allow connection of the pilot's mic to the 'PA' and key the cyclic switch for transmit. The mic audio should be heard on the 'PA' speakers. Adjust the front panel level control for the desired volume. Note that PA audio has priority in the AA22 system, and it will be heard even if the panel switch is selected to 'RADIO'. Check for correct radio operation and note what volume settings will produce a suitable external paging level.

**Note:** A faint audio signal may be heard at the speaker (even when the system is not paging) due to the very high gain of this system and stray coupling in the wiring. It should not be audible in flight.

**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.**

## 2.4 Continued Airworthiness

Maintenance of the AA22 is 'on condition' only. Periodic maintenance of this product is not required.

## 2.5 Accessories Required But Not Supplied

Installation kit p/n AA20-IKC (crimp) or AA20-IKS (solder) is required to complete the installation. They consist of the following:

### AA20-IKC 25-pin D-min Female Crimp Kit (NAT Part No. D25SL-IKC)

Quantity	Description	NAT Part #
1	D-min 25 Socket Housing	20-21-025
25	MS Crimp Socket	20-26-901
1*	Jack Screw Set	20-27-002
1*	Lock Clip Set	20-27-004
1	25 Pin Connector Hood	20-29-026

\* Use as required.

### AA20-IKS 25-pin D-min Female Solder Kit (NAT Part No. D25SL-IKS)

Quantity	Description	NAT Part #
1	D-min 25 Socket Solder Cup	20-20-025
1*	Jack Screw Set	20-27-002
1*	Lock Clip set	20-27-004
1	25 Pin Connector Hood	20-29-026

\* Use as required.

## 2.6 Installation Drawings

DRAWING	REV.	DESCRIPTION	TYPE	SERIAL #
<b>AA22-110</b>				
AA22\110\403-0	1.02	PA Driver/Siren System	Interconnect	All
AA22\110\405-0	1.02	PA Driver/Siren System	Connector map	All
AA22\110\905-0	1.02	PA Driver/Siren System (1 of 2)	Faceplate	All
Refer to AA22\160\922-0	1.00	PA Driver/Siren System	Mechanical Installation	All
<b>AA22-160</b>				
AA22\160\403-0	1.01	PA Driver/Siren System	Interconnect	Up to 2900
AA22\160\403-0	1.10	PA Driver/Siren System	Interconnect	2901 and up
AA22\160\405-0	1.02	PA Driver/Siren System	Connector map	All
AA22\160\905-0	1.02	PA Driver/Siren System (1 of 2)	Faceplate	All
AA22\160\922-0	1.00	PA Driver/Siren System	Mechanical Installation	All

**AA22-492**

AA22\492\403-1	1.00	PA Driver/Siren System 250 W	Interconnect	All
AA22\492\403-2	1.01	PA Driver/Siren System 700 W	Interconnect	All
AA22\492\405-0	1.11	PA Driver/Siren System	Connector map	All
AA22\492\905-0	1.02	PA Driver/Siren System	Faceplate	All
Refer to AA22\160\922-0	1.00	PA Driver/Siren System	Mechanical Installation	All

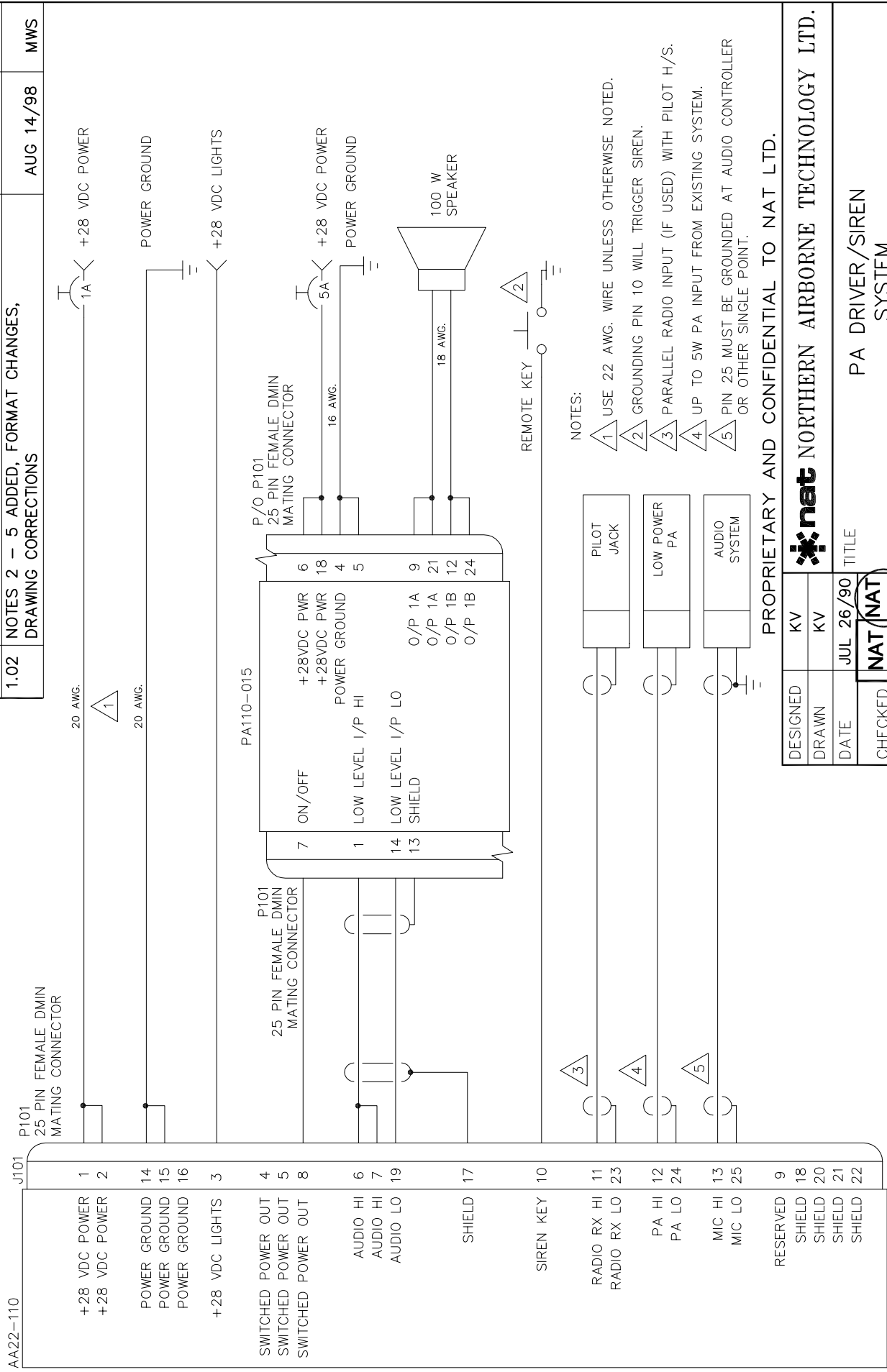
**AA22-493**

Refer to AA22\492\403-x		PA Driver/Siren System	Interconnect	All
AA22\493\405-0	1.01	PA Driver/Siren System	Connector map	All
AA22\493\905-0	1.00	PA Driver/Siren System (1 of 2)	Faceplate	All
Refer to AA22\160\922-0	1.00	PA Driver/Siren System	Mechanical Installation	All

Section 2 ends after these Drawings

REVOLUTIONS

REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES	APR 4/95	LH
1.02	NOTES 2 - 5 ADDED, FORMAT CHANGES, DRAWING CORRECTIONS	AUG 14/98	MWS



NOTES:

- 1 USE 22 AWG. WIRE UNLESS OTHERWISE NOTED.
- 2 GROUNDING PIN 10 WILL TRIGGER SIREN.
- 3 PARALLEL RADIO INPUT (IF USED) WITH PILOT H/S.
- 4 UP TO 5W PA INPUT FROM EXISTING SYSTEM.
- 5 PIN 25 MUST BE GROUNDED AT AUDIO CONTROLLER OR OTHER SINGLE POINT.

PROPRIETARY AND CONFIDENTIAL TO NAT LTD.

DESIGNED	KV	TITLE	
DRAWN	KV	PA DRIVER/SIREN SYSTEM	
DATE	JUL 26/90	CAGE CODE	PART NO.
CHECKED	<b>NAT 214 106</b>	3AB01	AA22-110
APPROVED	<b>NAT 107</b>	DWG. TYPE	INTERCONNECT
FILE	403-0102.DWG	DWG. NO.	AA22\110\403-0



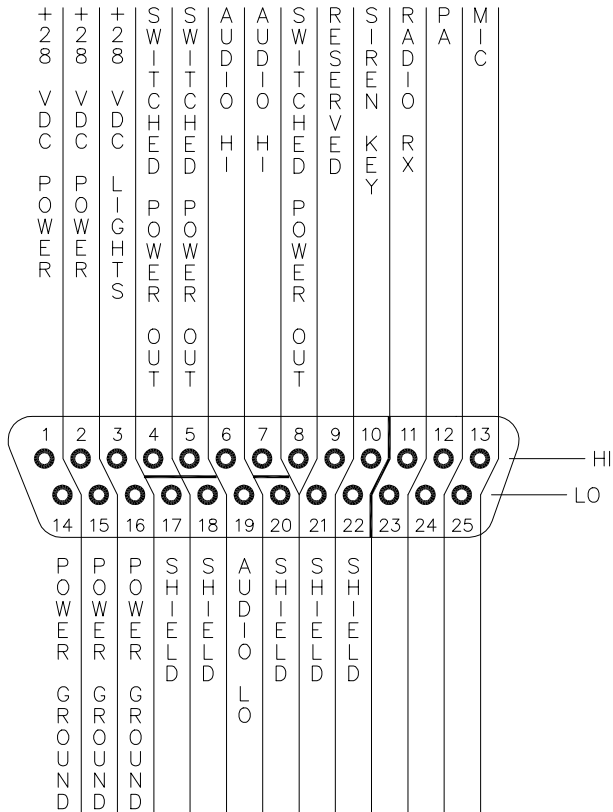
**nat** NORTHERN AIRBORNE TECHNOLOGY LTD.









REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES	FEB 14/96	MWS
1.02	NOTES REMOVED, FORMAT CHANGES, DRAWING CORRECTIONS.	AUG 14/98	MWS

P101  
25 PIN FEMALE D-MIN  
MATING CONNECTOR



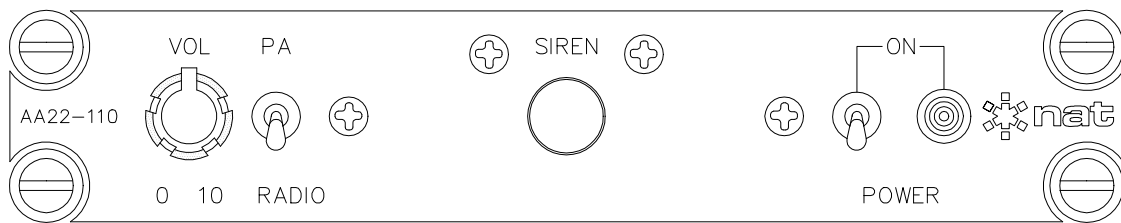
VIEW IS FROM REAR OF AIRFRAME CONNECTOR

PROPRIETARY AND CONFIDENTIAL TO NAT LTD.





DESIGNED	KV	 <b>NAT</b> NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	MWS					
DATE	NOV 29/90	TITLE PA DRIVER/SIREN SYSTEM				
CHECKED	 					
APPROVED		SIZE A	CAGE CODE 3AB01	PART NO. AA22-110	REV. 1.02	SHEET 1/1
FILE	405-0102.DWG	DWG. TYPE	CONNECTOR MAP	DWG. NO.	AA22\110\405-0	



REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES	FEB 26/96	TGM
1.02	ADDED SHEET 2, FORMAT CHANGES	AUG 5/98	MWS



PROPRIETARY AND CONFIDENTIAL TO NAT LTD.

DESIGNED	KV	 <b>NORTHERN AIRBORNE TECHNOLOGY LTD.</b>				
DRAWN	KV					
DATE	JAN 25/90	TITLE				PA DRIVER/SIREN SYSTEM
CHECKED	 					
APPROVED		SIZE	CAGE CODE	PART NO.	REV.	SHEET
		A	3AB01	AA22-110	1.02	1/2
FILE	905-0102.DWG	DWG. TYPE	FACEPLATE	DWG. NO.	AA22\110\905-0	



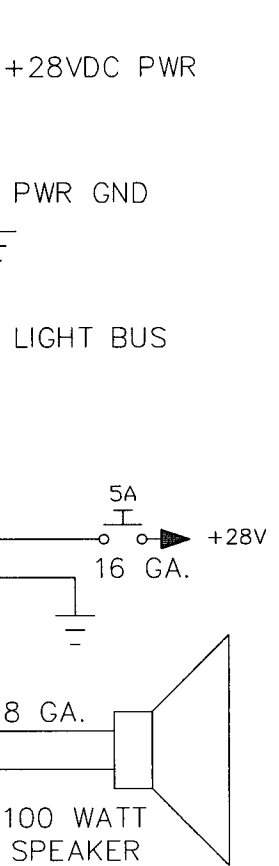
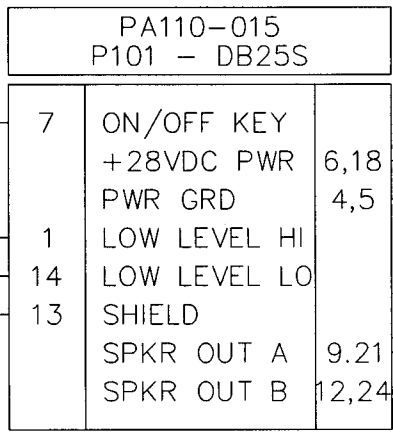
AA22-160 EXTERNAL CONNECTIONS

AIRFRAME CONNECTIONS

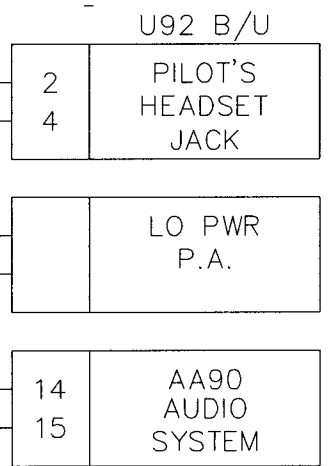
AA22-160  
P101 - DB25S

- +28VDC POWER 1
- +28VDC POWER 2
- POWER GROUND 14
- POWER GROUND 15
- POWER GROUND 16
- +28V LIGHT DIM 3
- SW. POWER OUT (FOR OLDER UNITS USE PINS 4 AND 5) 8
- AUDIO OUT HI 6
- AUDIO OUT LO 19
- SIREN KEYLINE 10
- RADIO INPUT HI 11
- RADIO INPUT LO 23
- HI LEVEL MIC IN RETURN 12 24
- LO LEVEL MIC IN RETURN 13 25

**Confidential and Proprietary to NAT**



SUITABLE SPEAKER IS FEDERAL SIGNAL TS-100 (11 OHMS, 100 WATTS)



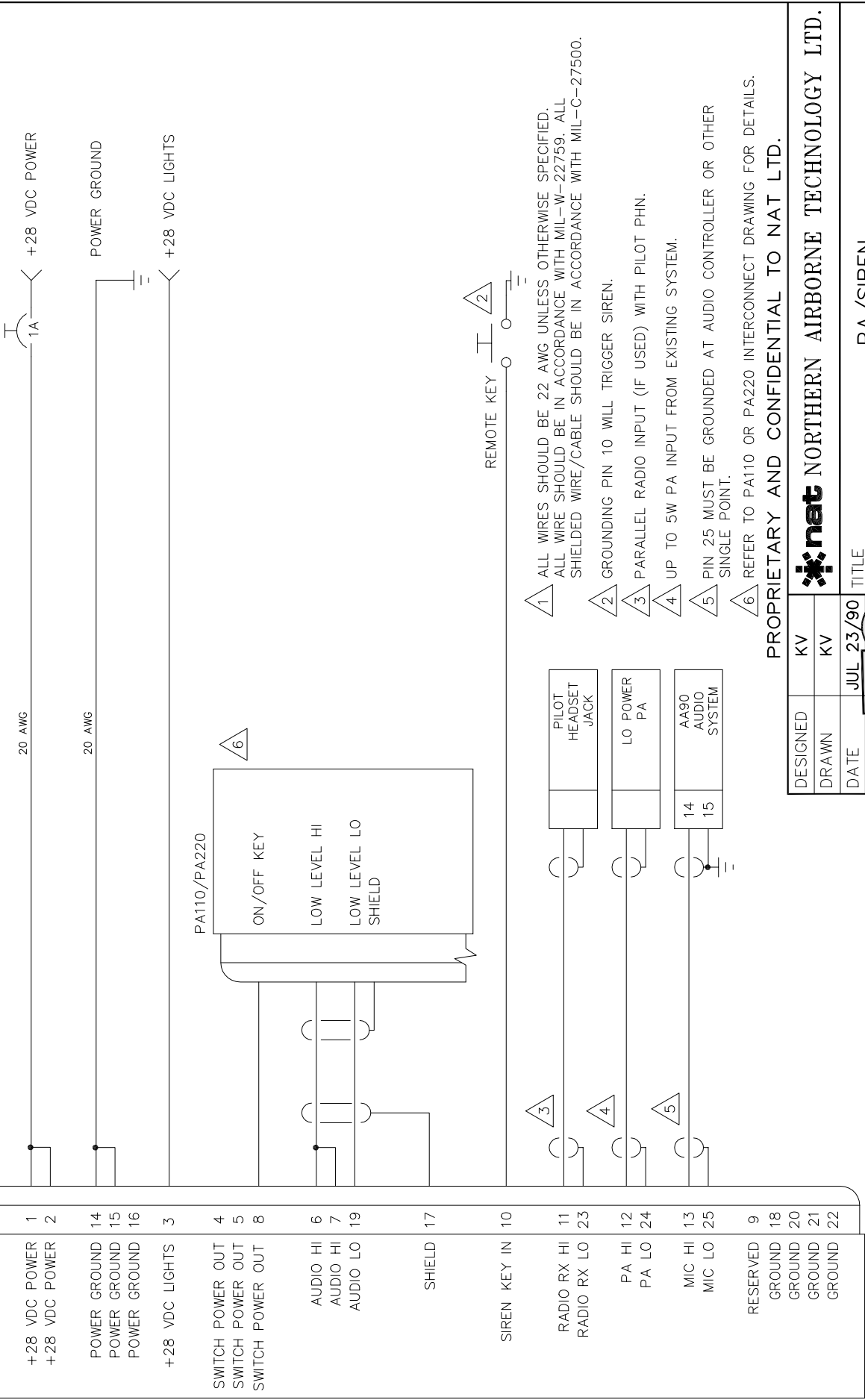
\* ALL WIRE 22 GA. EXCEPT AS NOTED

REVISION		DATE	*nat NORTHERN AIRBORNE TECHNOLOGY LTD.			
1.00		JULY 23/90	DESIGNED BY	DESCRIPTION		
1.01		APR 4/95	K. VEITCH	PA/SIREN SYSTEM		
			DRAWN BY	PART NUMBER	DRAWING TYPE	SHEET
			KV/LH	AA22-160	INTERCONNECT	1/1
			APPROVED BY	DRAWING NUMBER	FILE NUMBER	
				AA22\160\403-0	AA22\160\403-0101	



REVISIONS

REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES.	APR 4/95	LH
1.10	ECR #1475 - REFER TO ECR.	APR 25/00	TAT



PROPRIETARY AND CONFIDENTIAL TO NAT LTD.



**nat** NORTHERN AIRBORNE TECHNOLOGY LTD.

DESIGNED	KV	TITLE	PA/SIREN SYSTEM
DRAWN	KV	PART NO.	AA22-160
DATE	JUL 23/90	SIZE	A
CHECKED	<b>NAT 214 104</b>	CAGE CODE	3AB01
APPROVED	<b>NAT 107</b>	DWG. TYPE	INTERCONNECT
FILE	403-0110.DWG	DWG. NO.	AA22\160\403-0

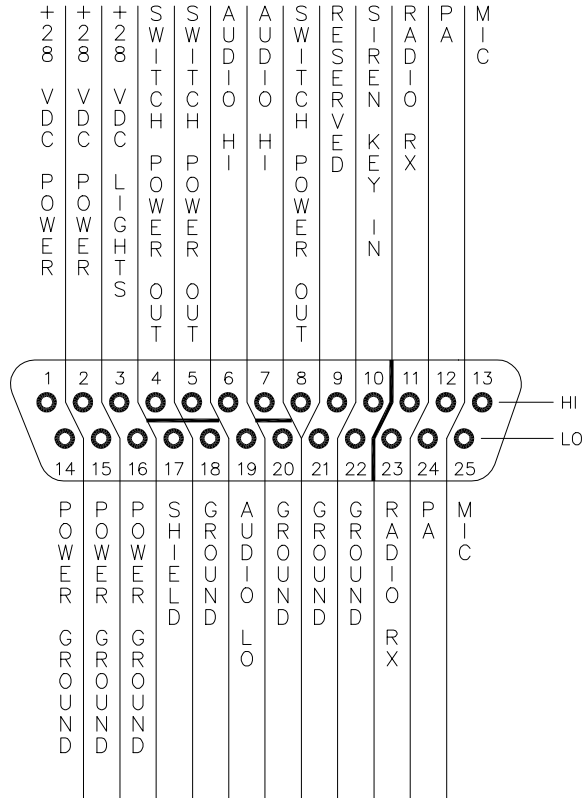
DEFINITION:  
RESERVED: MAY BE CONNECTED AND USED IN THE FUTURE. THE CIRCUITRY MAY BE PRESENT OR ADDED TO ACTIVATE THE FUNCTION. THE PIN MAY BE USED FOR TEST PURPOSES. THERE IS NO EXTERNAL CONNECTION.





REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES.	FEB 14/96	MWS
1.02	ECR #1475 - NOTES MOVED TO INTERCONNECT DWG, FORMAT CHANGES.	MAY 9/00	TAT

P101  
 25 PIN FEMALE D-MIN  
 MATING CONNECTOR



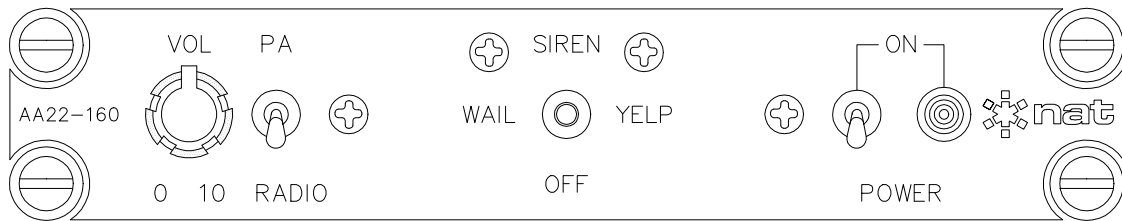
VIEW IS FROM REAR OF AIRFRAME CONNECTOR

PROPRIETARY AND CONFIDENTIAL TO NAT LTD.



DESIGNED	KV	<b>NAT</b> NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	MWS					
DATE	NOV 29/90	TITLE PA/SIREN SYSTEM				
CHECKED	<b>NAT 223</b>					
APPROVED	<b>NAT 107</b>	SIZE A	CAGE CODE 3AB01	PART NO. AA22-160	REV. 1.02	SHEET 1/1
FILE	405-0102.DWG	DWG. TYPE	CONNECTOR MAP	DWG. NO.	AA22\160\405-0	



REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES	APR 4/95	LH
1.02	ECR #873, KNOB TYPE, ENGRAVED TEXT CHANGED	JUL 4/97	MWS



**Confidential and Proprietary to NAT**

DESIGNED	KV	 <b>NAT</b> NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	KV					
DATE	JUL 25/90	TITLE	PA DRIVER/SIREN SYSTEM			
CHECKED	<b>NAT PROD.</b> 133					
APPROVED		SIZE	CAGE CODE	PART NO.	REV.	SHEET
		A	3AB01	AA22-160	1.02	1/2
FILE	905-0102.DWG	DWG. TYPE	FACEPLATE	DWG. NO.	AA22\160\905-0	





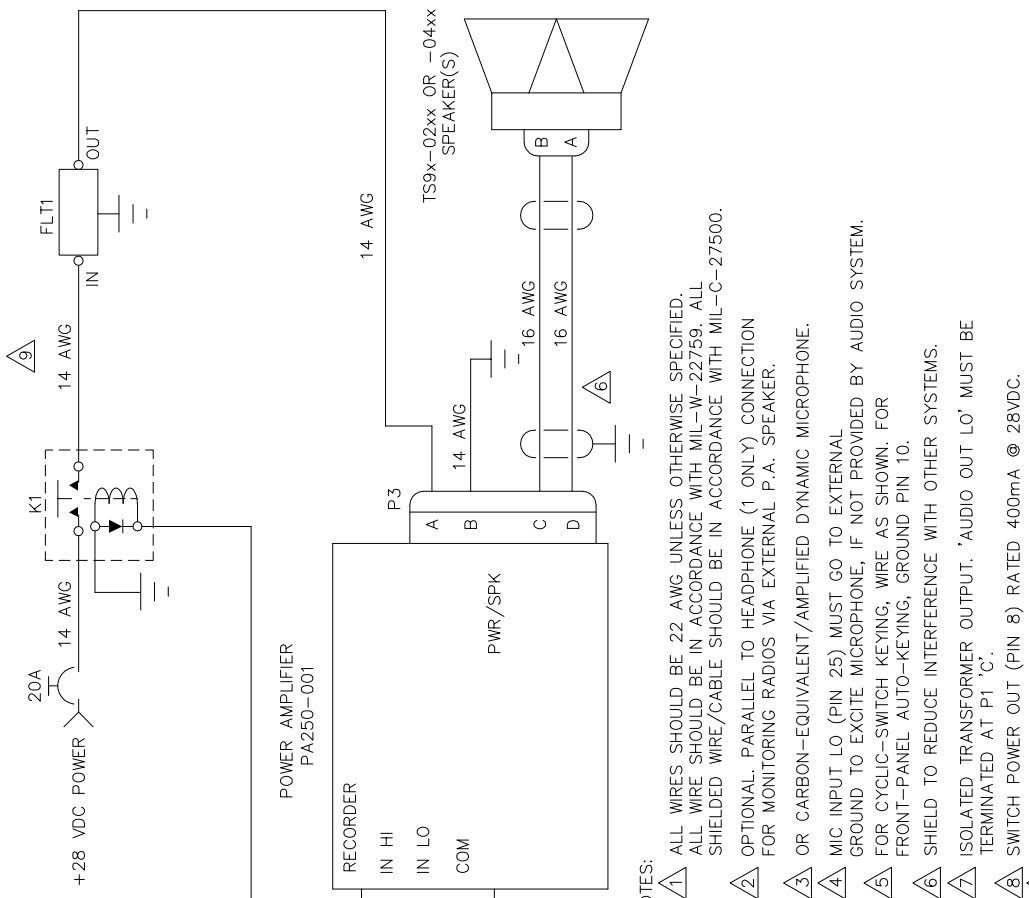
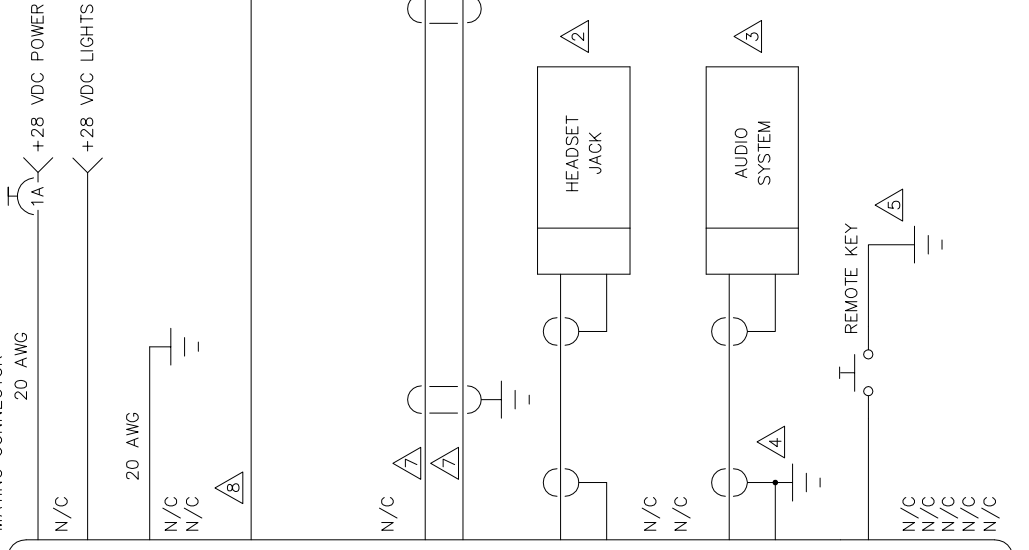


AA22-492

J101

P101  
25 PIN FEMALE DMIN  
MATING CONNECTOR

1	+28 VDC POWER
2	+28 VDC POWER
3	+28 VDC LIGHTS
14	POWER GROUND
15	POWER GROUND
16	POWER GROUND
8	SWITCH POWER OUT
4	RESERVED
5	RESERVED
9	RESERVED
7	AUDIO OUT HI
6	AUDIO OUT HI
19	AUDIO OUT LO
11	RADIO INPUT HI
23	RADIO INPUT LO
12	PA INPUT HI
24	PA INPUT LO
13	MIC INPUT HI
25	MIC INPUT LO
10	SIREN KEY IN
17	SHIELD
18	N/C
20	N/C
21	N/C
22	N/C



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 OPTIONAL. PARALLEL TO HEADPHONE (1 ONLY) CONNECTION FOR MONITORING RADIOS VIA EXTERNAL P.A. SPEAKER.
- 3 OR CARBON-EQUIVALENT/AMPLIFIED DYNAMIC MICROPHONE.
- 4 MIC INPUT LO (PIN 25) MUST GO TO EXTERNAL GROUND TO EXCITE MICROPHONE, IF NOT PROVIDED BY AUDIO SYSTEM.
- 5 FOR CYCLIC-SWITCH KEYING, WIRE AS SHOWN. FOR FRONT-PANEL AUTO-KEYING, GROUND PIN 10.
- 6 SHIELD TO REDUCE INTERFERENCE WITH OTHER SYSTEMS.
- 7 ISOLATED TRANSFORMER OUTPUT. 'AUDIO OUT LO' MUST BE TERMINATED AT P1 'C'.
- 8 SWITCH POWER OUT (PIN 8) RATED 400mA @ 28VDC.
- 9 K1 RELAY NAT P/N 65-80-200 OR EQUIVALENT. FLT1 RF FILTER NAT P/N 22-00-003A OR EQUIVALENT.

PROPRIETARY AND CONFIDENTIAL TO NAT LTD.

DESIGNED	RL			
DRAWN	TAT			
DATE	SEP 25/00	TITLE	PA/SIREN SYSTEM 250 WATT	
CHECKED	NAT 114 113	SIZE	A	CAGE CODE
APPROVED	NAT 107	PART NO.	AA22-492	REV.
FILE	403-1100.DWG	DWG. TYPE	INTERCONNECT	DWG. NO.
				AA22\492\403-1

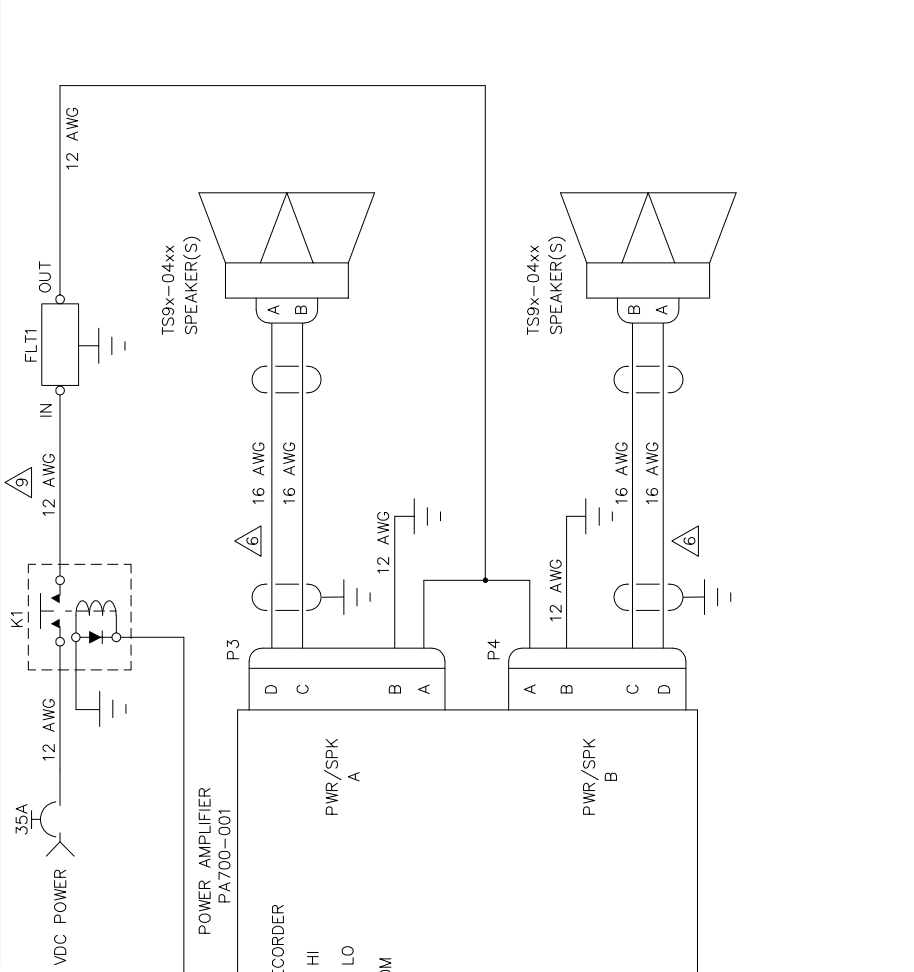
**nat** NORTHERN AIRBORNE TECHNOLOGY LTD.

SHEET  
1/1





REV	DESCRIPTION	DATE	BY
1.01	ECR #1481 - CHANGED NOTES 1, 3 & 7; ADDED NOTES 8 & 9; FORMAT CHANGES.	SEP 26/00	TAT



AA22-492	J101	P101
1	+28VDC POWER	25 PIN FEMALE DMIN MATING CONNECTOR
2	+28VDC POWER	20 AWG
3	+28VDC LIGHTS	N/C
14	POWER GROUND	
15	POWER GROUND	20 AWG
16	POWER GROUND	N/C
8	SWITCH POWER OUT	
4	RESERVED	
5	RESERVED	
9	RESERVED	
7	AUDIO OUT HI	
6	AUDIO OUT HI	
19	AUDIO OUT LO	
11	RADIO INPUT HI	
23	RADIO INPUT LO	
12	PA INPUT HI	
24	PA INPUT LO	
13	MIC INPUT HI	
25	MIC INPUT LO	
10	SIREN KEY IN	
17	SHIELD	
18	GROUND	
20	GROUND	
21	GROUND	
22	GROUND	

AA22-492	J101	P101
1	+28VDC POWER	25 PIN FEMALE DMIN MATING CONNECTOR
2	+28VDC POWER	20 AWG
3	+28VDC LIGHTS	N/C
14	POWER GROUND	
15	POWER GROUND	20 AWG
16	POWER GROUND	N/C
8	SWITCH POWER OUT	
4	RESERVED	
5	RESERVED	
9	RESERVED	
7	AUDIO OUT HI	
6	AUDIO OUT HI	
19	AUDIO OUT LO	
11	RADIO INPUT HI	
23	RADIO INPUT LO	
12	PA INPUT HI	
24	PA INPUT LO	
13	MIC INPUT HI	
25	MIC INPUT LO	
10	SIREN KEY IN	
17	SHIELD	
18	GROUND	
20	GROUND	
21	GROUND	
22	GROUND	

DESIGNED	RL
DRAWN	TGM
DATE	JAN 12/98
CHECKED	<b>NAT/NAT</b> 114/113
APPROVED	<b>NAT</b> 107
FILE	403-2101.DWG
	INTERCONNECT
	DWG. NO. AA22-492
	REV. 1.01
	SHEET 1/1

PROPRIETARY AND CONFIDENTIAL TO NAT LTD.

**nat** NORTHERN AIRBORNE TECHNOLOGY LTD.

TITLE: PA/SIREN SYSTEM  
700 WATT

DESIGNED: RL  
DRAWN: TGM  
DATE: JAN 12/98  
CHECKED: NAT/NAT 114/113  
APPROVED: NAT 107  
FILE: 403-2101.DWG  
INTERCONNECT  
DWG. NO. AA22-492  
REV. 1.01  
SHEET 1/1

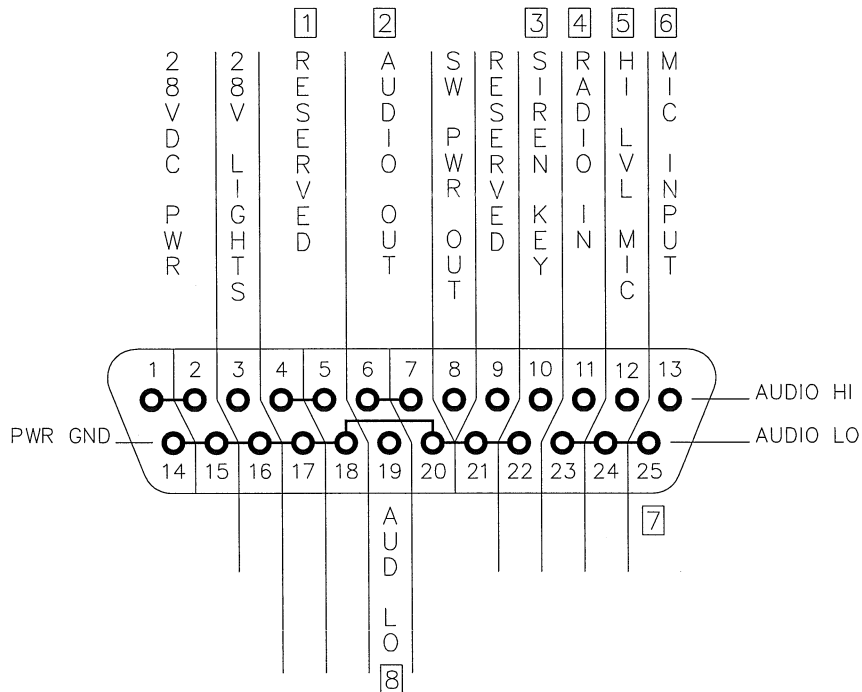
NOTES:

- 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.
- OPTIONAL PARALLEL TO HEADPHONE (1 ONLY) CONNECTION FOR MONITORING RADIOS VIA EXTERNAL P.A. SPEAKER.
- OR CARBON-EQUIVALENT/AMPLIFIED DYNAMIC MICROPHONE.
- MIC INPUT LO (PIN 25) MUST GO TO EXTERNAL GROUND TO EXCITE MICROPHONE, IF NOT PROVIDED BY AUDIO SYSTEM.
- FOR CYCLIC-SWITCH KEYING, WIRE AS SHOWN. FOR FRONT-PANEL AUTO-KEYING, GROUND PIN 10.
- SHIELD TO REDUCE INTERFERENCE WITH OTHER SYSTEMS.
- ISOLATED TRANSFORMER OUTPUT. 'AUDIO OUT LO' MUST BE TERMINATED AT P1 'C'.
- SWITCH POWER OUT (PIN 8) RATED 400mA @ 28VDC.
- K1 RELAY NAT P/N 65-80-200 OR EQUIVALENT.
- FLT1 RF FILTER NAT P/N 22-00-003A OR EQUIVALENT.



REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01		APR. 5/95	LH
1.11	PIN 19 ISOLATED	FEB 14/96	MWS

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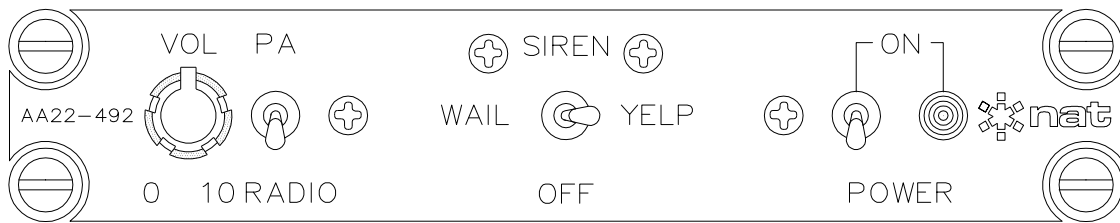


- 1 PINS 4 AND 5 HAVE NO CONNECTION.
- 2 FULL AUDIO OUTPUT TYP. 100mV INTO 100 OHMS.
- 3 GROUND AT PIN 10 WILL TRIGGER SIREN.
- 4 RADIO INPUT TYP. 2.5V FOR FULL OUTPUT.
- 5 UP TO 5W PAGE INPUT.
- 6 MIC INPUT TYP. 250mV FOR FULL OUTPUT. BIASED.
- 7 MUST GO TO EXTERNAL GROUND TO EXCITE MIC.
- 8 ISOLATED TRANSFORMER OUTPUT. MUST PROVIDE GROUND AT P.A. END.

DESIGNED	-	<b>NAT</b> NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	KEH					
DATE	JAN 10/89	TITLE PA/SIREN SYSTEM				
CHECKED	NAT 201					
APPROVED	NAT 107	SIZE	CAGE CODE	PART NO.	REV.	SHEET
		A	3AB01	AA22-492	1.11	1/1
FILE	405-0111.DWG	DWG. TYPE	CONNECTOR MAP	DWG. NO.	AA22\492\405-0	



REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	FORMAT CHANGES.	APR 5/95	LH
1.02	UPDATED TO CURRENT NAT FORMAT.	NOV 16/98	TAT



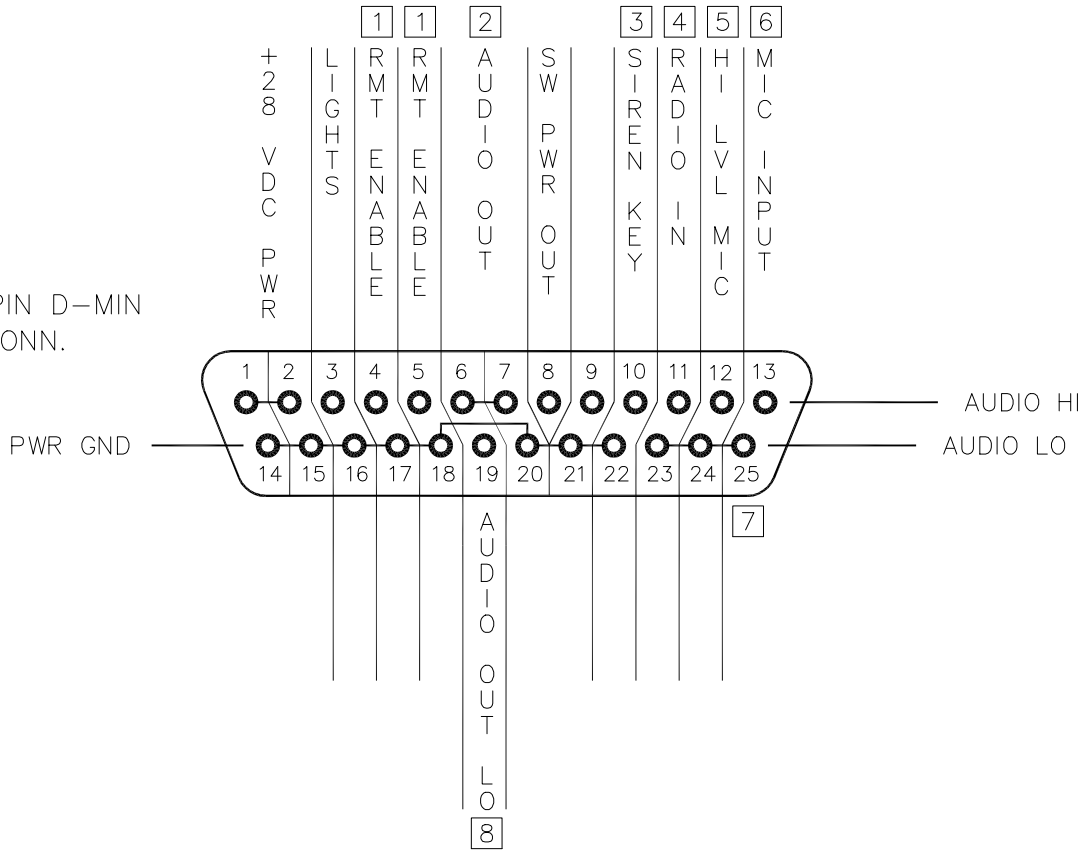
PROPRIETARY AND CONFIDENTIAL TO NAT LTD.

DESIGNED	-	NORTHERN AIRBORNE TECHNOLOGY LTD.			
DRAWN	-				
DATE	JAN 25/91	TITLE PA/SIREN SYSTEM			
CHECKED	<b>NAT 211</b>	<b>NAT 214</b>	<b>PROD. 105</b>		
APPROVED	<b>NAT 107</b>	SIZE A	CAGE CODE 3AB01	PART NO. AA22-492	REV. 1.02 SHEET 1/1
FILE	905-0102.DWG	DWG. TYPE	FACEPLATE	DWG. NO. AA22\492\905-0	



# Confidential and Proprietary to NAT

J101  
MALE 25 PIN D-MIN  
CHASSIS CONN.

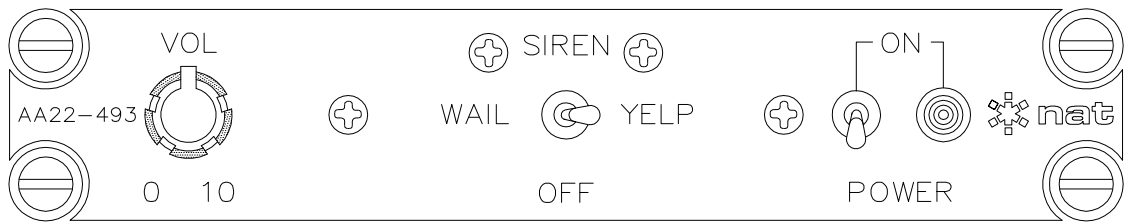


- [1] PINS 4 AND 5 ARE SHORTED ON POWER UP.
- [2] FULL AUDIO OUTPUT TYP. 100mV INTO 100 OHMS.
- [3] GROUNDING PIN 10 WILL TRIGGER SIREN.
- [4] RADIO INPUT TYP. 2.5 V FOR FULL OUTPUT.
- [5] UP TO 5W PA INPUT FROM EXISTING SYSTEM.
- [6] MIC INPUT TYP. 250 mV FOR FULL OUTPUT BIASED.
- [7] MUST GO TO EXTERNAL GROUND TO EXCITE MIC.
- [8] ISOLATED TRANSFORMER OUTPUT. MUST PROVIDE GROUND AT P.A. END.



REVISION	DATE	<b>*nat</b> NORTHERN AIRBORNE TECHNOLOGY LTD.			
1.00	APR 28/95	DESIGNED BY	DESCRIPTION		
1.01	FEB 14/96	KV	PA/SIREN SYSTEM		
		DRAWN BY	PART NUMBER	DRAWING TYPE	SHEET
		M. SAWCHUK	AA22-493	CONNECTOR MAP	1/1
		APPROVED BY	DRAWING NUMBER	FILE NUMBER	
		<b>NAT</b> 107	AA22\493\405-0	AA22\493\405-0101	







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DESIGNED	KV	 <b>NORTHERN AIRBORNE TECHNOLOGY LTD.</b>				
DRAWN	TGM					
DATE	MAR 25/97	TITLE PA/SIREN SYSTEM				
CHECKED	<b>NAT PROD.</b> 105					
APPROVED		SIZE A	CAGE CODE 3AB01	PART NO. AA22-493	REV. 1.00	SHEET 1/2
FILE	905-0100.DWG	DWG. TYPE	FACEPLATE	DWG. NO. AA22\493\905-0		



## Section 3 Operation

### 3.1 Introduction

Information in this section consists of the functional and operational procedures for the AA22 PA Driver/Siren Control.

### 3.2 General

The AA22 PA Driver/Siren Control provides a central adjustment for external aircraft loudhailer functions. The AA22 is only a line driver and must have at least one external amplifier in the system. When turned on, the system is ready for operation and will accept audio feeds or a microphone input. An internally generated siren is also available and adjustable through the side of the controller. When the AA22 is turned on, a 'POWER KEY' signal is generated. This signal is used to turn on the 'PA' amp. The high current DC to operate the PA110/220 is supplied by the aircraft.

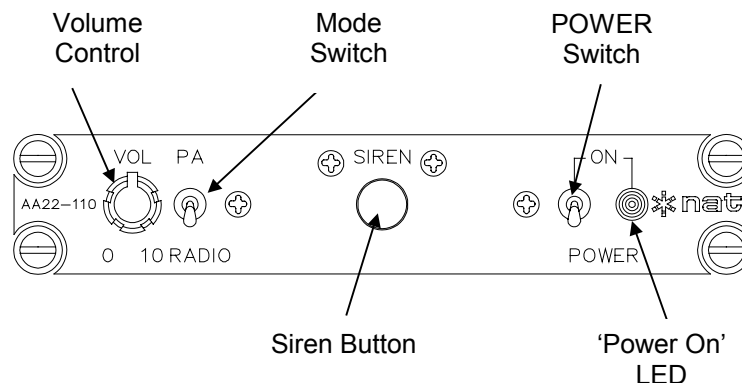
### 3.3 Techniques of Voice Transmission

To successfully project the voice over long distances, it is necessary to develop a microphone technique different from the usual conversational manner. Hold the microphone with the upper lip touching the mouthpiece and talk clearly and distinctly. Separate each word with noticeable pauses and keep the voice level constant. A medium pitched voice is more easily understood and carries further than a bass voice.

### 3.4 Basic Operation

#### 3.4.1 Power up

To activate the AA22 PA Driver/Siren Control, flip the **POWER** toggle switch up, to the **ON** position. The LED adjacent to the switch should illuminate.



### 3.4.2 Mode Switch

---

The Mode switch is a two-position toggle switch used to select between PA and Radio operation.

#### 3.4.2.1 PA Operation

For external loudhailer systems, set the Mode switch on the AA22 to **PA**. Key the microphone through the cyclic switch or hand mic switch, and speak in a firm, clear manner. For best results, over-emphasize each word.

#### 3.4.2.2 Radio Operation

To set the system for radio rebroadcast functions, set the Mode switch on the AA22 to **RADIO**. All audio delivered from the source (typically pilot's or copilot's headset) will be broadcast through the PA system, if provision for this is made at the time of installation.

### 3.4.3 Volume Control

---

The **VOL** control pot on the front of AA22 sets the volume level. For external loudhailer and rebroadcast operations, the volume should always be set between half and full level.

### 3.4.4 Siren Button

---

#### 3.4.4.1 AA22-110

The siren is activated by depressing the momentary push-button **SIREN** control on the front of the AA22, or by using a remote keying switch. The siren will sound only as long as the button is depressed. Level setting is automatic and need not be adjusted.

#### 3.4.4.1 AA22-160, AA22-492, and AA22-493

On these models, the front-panel **SIREN** button is replaced by a **WAIL/OFF/YELP** switch. This allows the operator to disable the siren, or select the required siren mode from the front panel of the AA22.

### 3.4.5 Remote Power Switch

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Remote power switching for the power amplifiers is provided as a switched +28 Vdc output from the AA22.

End of section 3