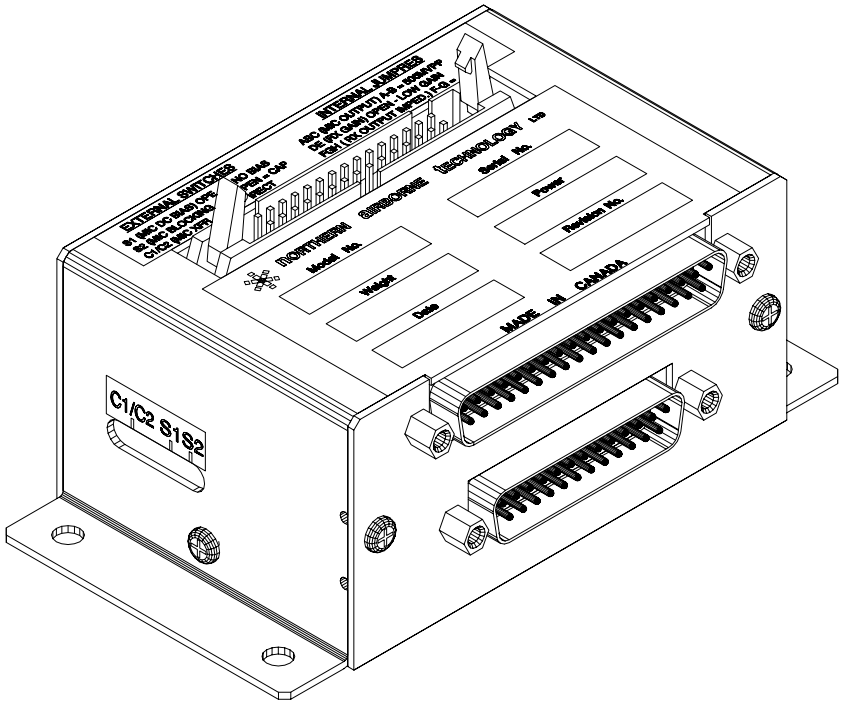
SM29

MI34 Series
Mobile Interface



INSTALLATION AND OPERATION MANUAL

REV 4.00 November 20, 2003

Northern Airborne Technology Ltd.
1925 Kirschner Road
Kelowna BC, Canada
V1Y 4N7

Telephone (250) 763-2232
Facsimile (250) 762-3374

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	Jan 10/07	iii, 2		**Performed at factory**

Insert any Amendment Instruction sheets after this page.

INSTALL_OPS
MANUAL AMENDMENT

Manual: SM29 (MI34)	**Amendment #: 1**
Document # SM29\Install_Ops\809-0001	**Amendment Date:** Jan 10, 2007

The purpose of this amendment is to correct the installation section of the manual.

Amendment Instructions:

1

Remove Pages	Replace With Pages
iii Rev 4.00	iii Rev 4.00 Amendment 1
2-1 to 2-3 Rev 4.00	2-1 to 2-4 Rev 4.00 Amendment 1

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

Table of Contents

Section 1.0 Description

1.1 Introduction

This manual contains information on the MI34 Mobile Interface.

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

1.2 Purpose of Equipment

The MI34 is a bulkhead mounted interface unit specifically designed to allow NAT MT series, Midland Syn-Tech I, or Midland Syn-Tech XTR mobile radios to be used in aircraft audio systems.

1.3 Design Features

The MI34 provides internal microphone excitation, adjustable sidetone generation and a floating output for the radio. It also provides a simple interconnect interface between the radio and a Tac/Com control head

A fully floating, adjustable Receive Audio amplifier is included.

The MI34 is operational from either 14 or 28 VDC aircraft supply.

All interconnect and relay contacts are gold plated. The relay is sealed, high vibration rated (50g shock) and dry nitrogen filled.

The circuit boards are constructed of G10-FR (flame retardant) material, with solder masks, reflowed tin plating, and environmental post-coat.

1.4 Specifications

1.4.1 Electrical Specifications

Power	+12 to 18 VDC at 160 mA max. +20 to 33 VDC at 160 mA. (Selected by appropriate pin) Case is internally grounded.
Logic	Ground seeking input for keyline (TX) Outputs a DPDT set of uncommitted contacts
Audio	Receive (RX) input 2V typ. at 8 -100Ω adjustable. Outputs on 600Ω line (floating) with 200mW minimum at 150/600Ω Microphone interface accepts all types, and outputs either high or low level signals, with or without excitation.

1.4.2 Physical Specifications

Height	1.725"
Length	4.50"
Width	2.40"
Weight	8 ounces (230 grams)
Mounting	Bulkhead attachment

1.4.3 Environmental Specifications

Temperature	-40 to +70°C
Altitude	15,000' max.
Humidity	95% Noncondensing
Shock	12g (any axis)

End of Section 1.0

Section 2.0 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:

- MI34 Mobile Interface
- Warranty Card
- Release certification

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

2.2.1 Warranty

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

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

2.3 Installation Procedures

2.3.1 Warnings

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

All audio installations can be degraded by incorrect wiring and shielding, and may result in abnormal cross-talk, hum, and ground-loop noise.

2.3.3 Notes

For Midland SynTech XTR radios, the 34-pin ribbon cable assembly may need to be re-terminated to match the pin allocations shown on drawing MI34\403-2 and drawing MI34\403-3.

2.3.4 Cabling and Wiring

All unshielded wire shall be selected in accordance with AC43.13-1B Change 1, Paragraphs 11-76 through 11-78. Wire types should be to MIL-W-22759 as specified in AC43.13-1B Change 1, Paragraphs 11-85, 11-86, and listed in Table 11-11. For shielded wire applications, use Tefzel MIL-C-27500 shielded wire with solder sleeves (for shield terminations) to make the most compact and easily terminated interconnect. Follow the wiring diagrams in Section 2.6 as required.

Allow 3 inches from the end of the wire to the shield termination to allow the hood to be easily installed. Note that the hood is a 'clamshell' hood, and is installed after the wiring is complete.

All wiring should be at least 24 AWG, except power and ground lines, which should be at least 22 AWG. Ensure that all ground connections are clean and well secured.

2.3.5 Post-Installation Checks

If any preset requires adjustment, be sure this is carried out before the aircraft leaves, and that the unit and its mating connector are secured before departure. Make all required log book entries, electrical load, weight and balance amendments and other paperwork as required by your local regulatory agency.

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

With the MI34 disconnected from its mating connector, check pin 1 of J101 for +28 VDC (or +14 VDC on pin 2) relative to ground and check pin 14 for continuity to ground (below 0.5 Ω). Do not attach the MI34 until these conditions are met.

Power up the aircraft's system with the MI34 installed, and confirm that the radio is operating properly. Adjust the receive (RX), sidetone (S/T) and microphone (MIC) levels as required. Be sure the internal jumpers and switches are correctly set. Refer to Section 3.2 for switch and jumper default positions.

If difficulty is encountered, check interconnect or Mic level adjustments and switches. Use of a service monitor (IFR 1200S or similar) is very beneficial in setting up the radio to ensure correct modulation and low distortion.

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 MI34 is 'on condition' only. Periodic maintenance of this product is not required.

2.5 Accessories Required But Not Supplied

Installation kit p/n MI34-IKC (crimp) is required to complete the installation. The kit consists of the following:

Quantity	Description	NAT Part #
1	D-min 25-Pin Female Crimp Installation Kit	D25SL-IKC
1	D-min 37-Pin Female Crimp Installation Kit	D37SL-IKC
1	34-Pin IDC Connector	20-05-034

NAT Part #: **D25SL-IKC** consists of:

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

NAT Part #: **D37SL-IKC** consists of:

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

* Use as required.

Note: Ensure proper orientation of the 34-Pin IDC connector before crimping. Refer to the appropriate installation diagram for Midland Radio installation.

2.6 Installation Drawings

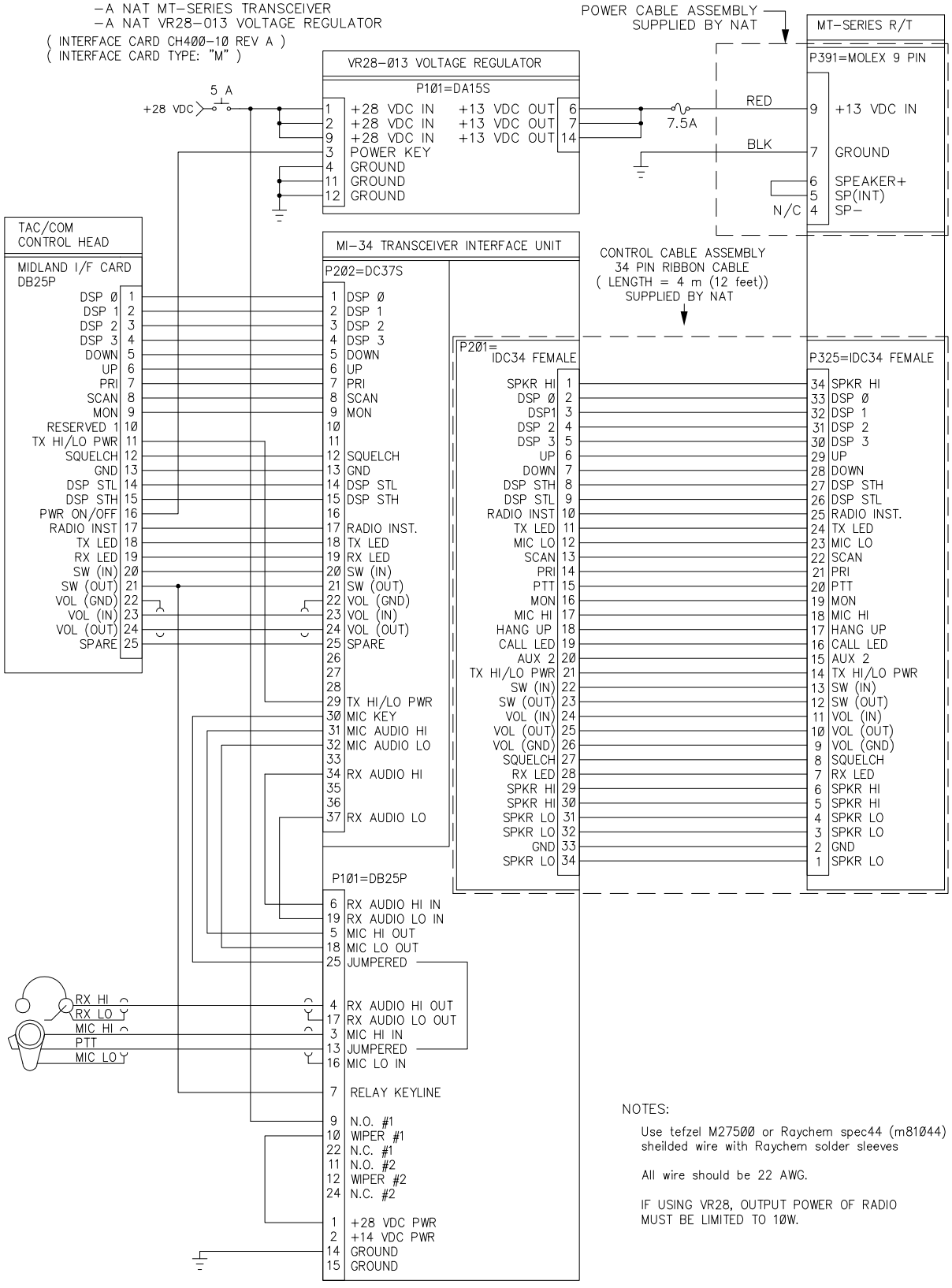
DRAWING	REV.	DESCRIPTION	TYPE
MI34\403-1	1.10	Tac/Com C/H, MT Radio, MI34, VR28 (MT Series)	Interconnect
MI34\403-2	1.20	Tac/Com C/H, MT Radio, MI34, VR28	Connector Map
MI34\403-3	1.10	Tac/Com C/H, MT Radio, MI34, VR28, DF	Connector Map
MI34\405-1	-	Midland Syn-Tech XTR or NAT MT/XTR Series	Connector Map
MI34\000\922-0	1.00	Mobile Interface	Mechanical Installation

Section 2.0 ends after these Drawings

INTERCONNECT DRAWING FOR CONNECTING THE FOLLOWING UNITS
- A NAT TAC/COM CONTROL HEAD MT-SERIES OR MIDLAND INTERFACE CARD
- A NAT MI34 TRANSCEIVER INTERFACE UNIT
- A NAT MT-SERIES TRANSCEIVER
- A NAT VR28-013 VOLTAGE REGULATOR

(INTERFACE CARD CH400-10 REV A)
(INTERFACE CARD TYPE: "M")

MT-SERIES



NOTES:

Use tefzel M27500 or Raychem spec44 (m81044) sheilded wire with Raychem solder sleeves

All wire should be 22 AWG.

IF USING VR28, OUTPUT POWER OF RADIO MUST BE LIMITED TO 10W.

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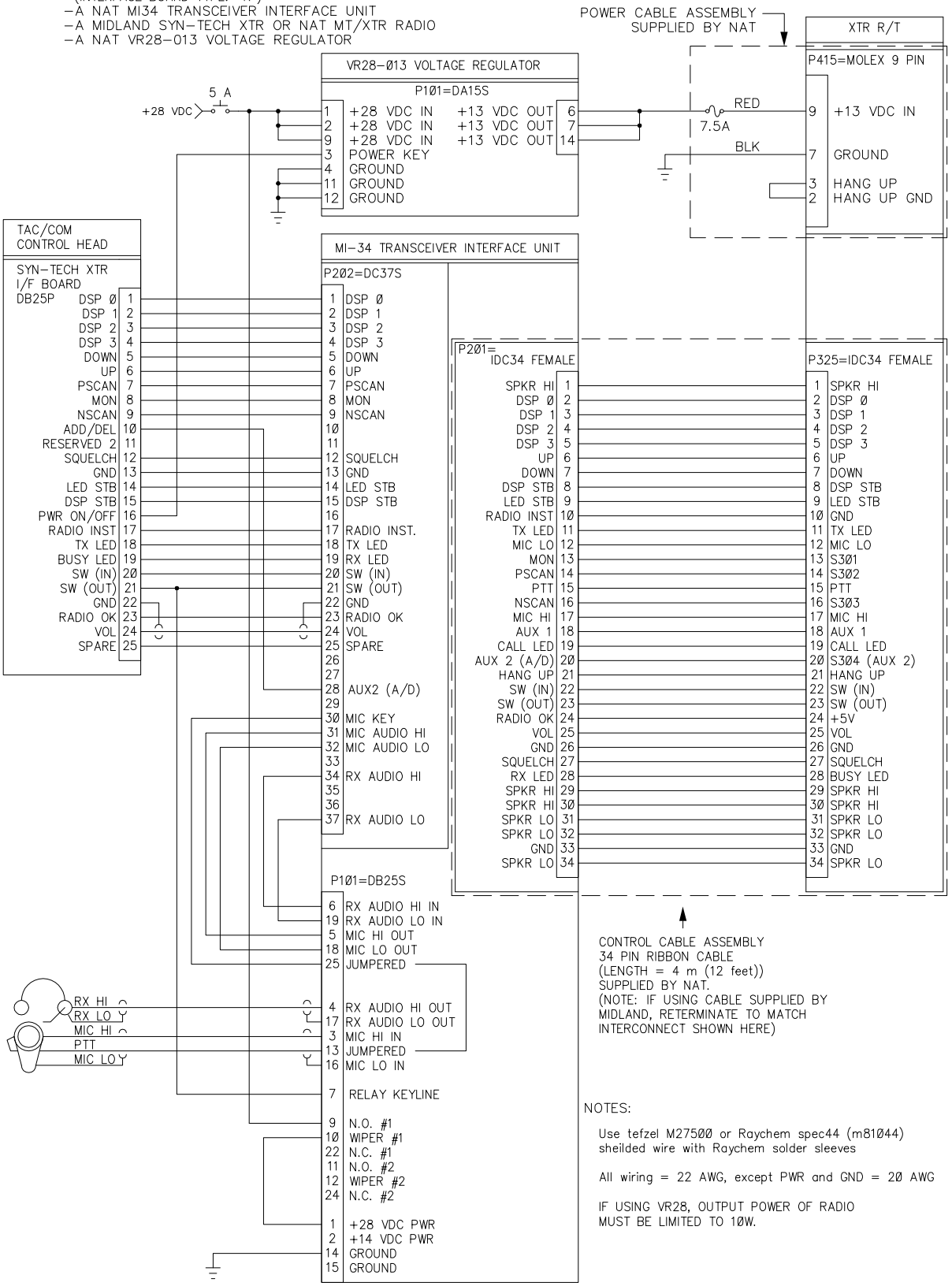
REVISION	DATE	*nat NORTHERN AIRBORNE TECHNOLOGY LTD.			
–	DEC 12/91	DESIGNED BY	DESCRIPTION		
1.10	JUNE 13/94	MQS	TAC/COM C/H, MT RADIO, MI34, VR28		
		DRAWN BY	PART NUMBER	DRAWING TYPE	SHEET
		S. MOORE	MI34	INTERCONNECT	1/1
		APPROVED BY	DRAWING NUMBER		FILE NUMBER
		NAT R&D 101	MI34\403-1		MI34\403-1110

INTERCONNECT DRAWING FOR CONNECTING THE FOLLOWING UNITS
- A NAT TAC/COM CONTROL HEAD XTR INTERFACE BOARD (INTERFACE BOARD TYPE: "K")
- A NAT MI34 TRANSCEIVER INTERFACE UNIT
- A MIDLAND SYN-TECH XTR OR NAT MT/XTR RADIO
- A NAT VR28-013 VOLTAGE REGULATOR

MIDLAND SYNTECH XTR OR NAT MT/XTR



NOTES:

Use tefzel M27500 or Raychem spec44 (m81044) sheilded wire with Raychem solder sleeves

All wiring = 22 AWG, except PWR and GND = 20 AWG

IF USING VR28, OUTPUT POWER OF RADIO MUST BE LIMITED TO 10W.

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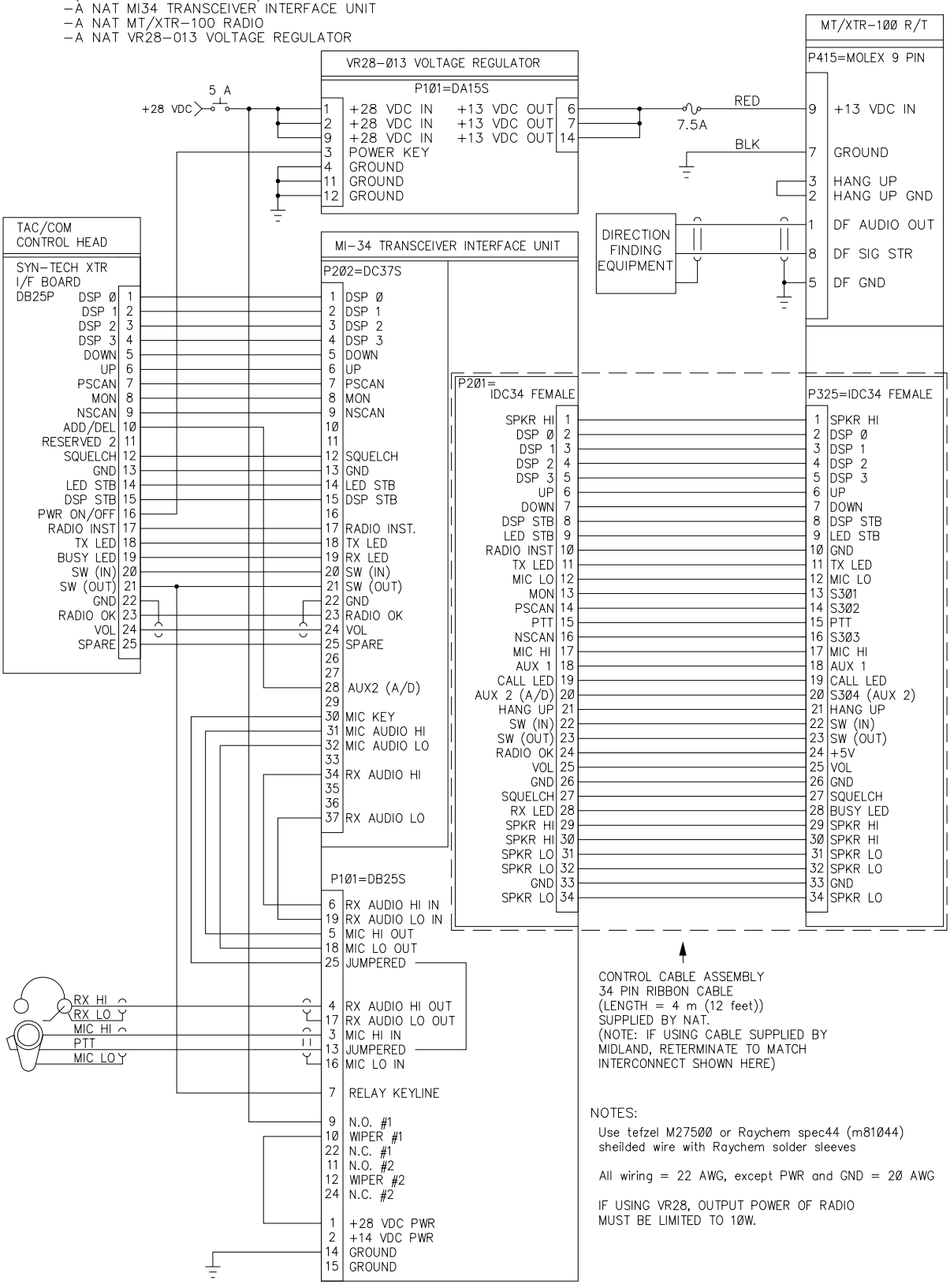
REVISION	DATE
–	NOV 30/92
A	APR 29/93
1.20	JUNE 13/94

*nat NORTHERN AIRBORNE TECHNOLOGY LTD.

DESIGNED BY	DESCRIPTION		
MQS	TAC/COM C/H, XTR RADIO, MI34, VR28		
DRAWN BY	PART NUMBER	DRAWING TYPE	SHEET
MQS	MI34	INTERCONNECT	1/1
APPROVED BY	DRAWING NUMBER		FILE NUMBER
NAT R&D 101	MI34\403-2		MI34\403-2120

INTERCONNECT DRAWING FOR CONNECTING THE FOLLOWING UNITS
- A NAT TAC/COM CONTROL HEAD XTR INTERFACE BOARD (INTERFACE BOARD TYPE: "K")
- A NAT MI34 TRANSCEIVER INTERFACE UNIT
- A NAT MT/XTR-100 RADIO
- A NAT VR28-013 VOLTAGE REGULATOR

NAT MT/XTR-100



NOTES:

Use tefzel M27500 or Raychem spec44 (m81044) sheilded wire with Raychem solder sleeves

All wiring = 22 AWG, except PWR and GND = 20 AWG

IF USING VR28, OUTPUT POWER OF RADIO MUST BE LIMITED TO 10W.

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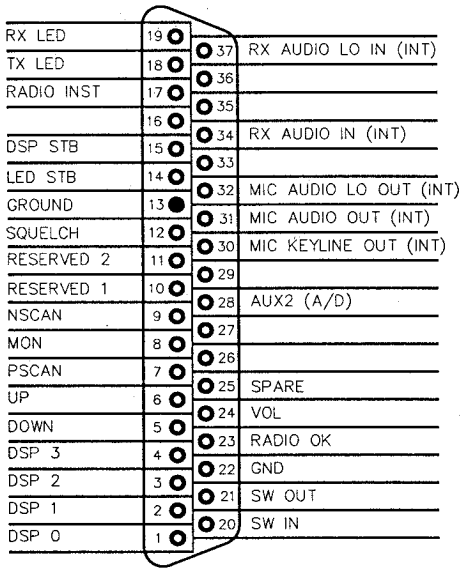
REVISION	DATE	NORTHERN AIRBORNE TECHNOLOGY LTD.			
–	APR 29/93	DESIGNED BY	DESCRIPTION		
1.10	JUNE 13/94	MQS	TAC/COM C/H, XTR RADIO, MI34, VR28, DF.		
		DRAWN BY	PART NUMBER	DRAWING TYPE	SHEET
		MQS	MI34	INTERCONNECT	1/1
		APPROVED BY	DRAWING NUMBER	FILE NUMBER	
		NAT R&D 101	MI34\403-3	MI34\403-3110	

MIDLAND SYN-TECH XTR OR NAT MT/XTR SERIES

CONNECTOR MAP FOR THE MI34-000 TRANSCEIVER INTERFACE UNIT
WHEN CONNECTED TO A MIDLAND SYNTECH XTR OR NAT MT/XTR SERIES RADIO.
(MI34-000 UNIT USING AA34-200 REV A PCB AND MI34 REV A PCB)
(This drawing is for all MI34-000 units with serial numbers starting at 1001)

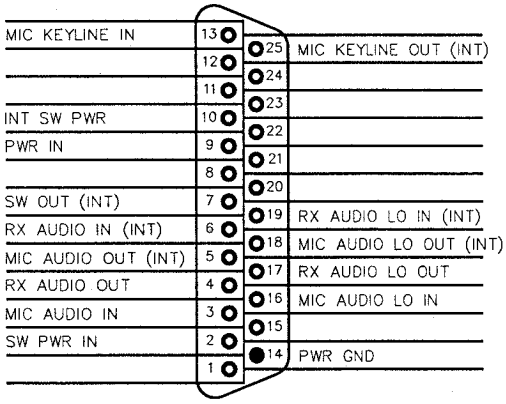


J202

37-PIN DMIN

J201

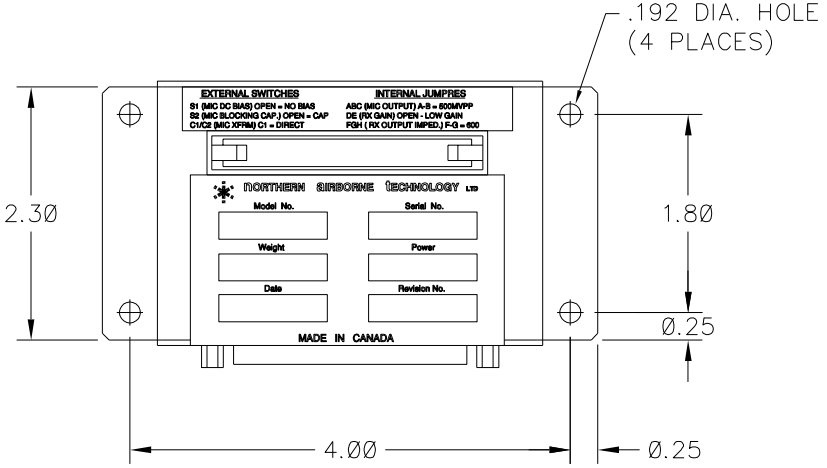
34-PIN IDC

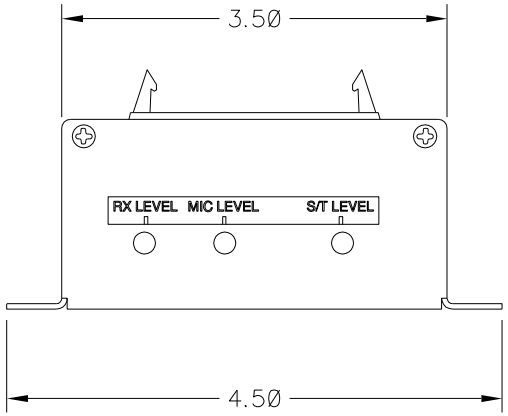


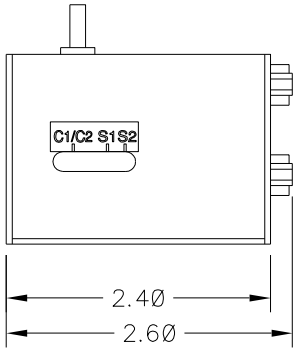
J101

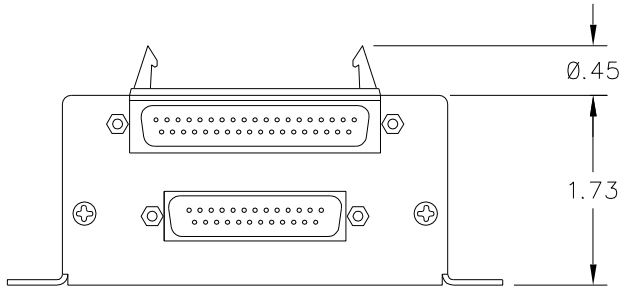
25-PIN DMIN

REVISION	DATE	NORTHERN AIRBORNE TECHNOLOGY LTD. 1925 KIRSCHNER RD. KELOWNA, B.C.		
		PART NUMBER	DRAWING NUMBER	FILE NUMBER
		MI34	MI34\405-1	MI34\405-1
		DESCRIPTION	SHEET	DATE
		CONNECTOR MAP		NOV 30/92
		DESIGNED BY	DRAWN BY	APPROVED BY
		MQS	M SAWCHUK	









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REVISION	DATE	TOLERANCES UNLESS STATED OTHERWISE
1.00	JAN 25/95	0.X=+/−0.030 DIM. IN INCHES 0.XX=+/−0.010 0.XXX=+/−0.005 0.XXXX=+/−0.002 ANGLE=+/− 0.5 DEG.

THIRD ANGLE PROJECTION

MATERIAL/FINISH

*nat NORTHERN AIRBORNE TECHNOLOGY LTD.

DESIGNED BY	DESCRIPTION		
MQS	MOBILE INTERFACE		
DRAWN BY	PART NUMBER	DRAWING TYPE	SHEET
T. MASTERS	MI34−000	MECH. INSTALLATION	1/1
APPROVED BY	DRAWING NUMBER	FILE NUMBER	
NAT R&D 101	MI34\000\922−0	MI34\000\922−0100	

Section 3.0 Operation

3.1 General

The operation of the MI34 is generally as part of a NAT system including a Tac/Com control head and NAT MT series (Midland Syn-Tech I) or NAT MT/XTR series (Midland Syn-Tech XTR) radio.

The MI34 provides a method of coupling the radios into the aircraft audio system. It can provide the excitation needed for standard aircraft microphones and can output the mic signal through a floating transformer winding to eliminate any ground loop or polarity problems. The microphone signal is also used to generate adjustable artificial sidetone which is echoed back to the audio system on the receive line. Receive Audio interface is provided with level adjustments and floating connections.

In normal use the operation is completely transparent to the user.

3.2 Configuration

The units are normally shipped from NAT with the C1/C2 switch in the C1 position. This bypasses the mic coupling transformer output and the mic is wired direct through the MI34. The S1 switch is set in the 'ON' position providing internal mic bias, and the S2 switch is set to 'OFF' allowing C114 (DC blocking capacitor) to be in series in the MIC HI audio line. With the C1/C2 switch in the C1 position, the Microphone (mic) adjustment (R109) is taken out of the circuit and has no effect.

The Receive Audio (RX) level (R112) is set to 200 mW into 600Ω with a standard RX signal of 2.5 Vrms.

The Sidetone (S/T) level (R104) is set to 25 mW into 600Ω with a standard mic signal of 250 mVrms.

End of section 3.0