



Installation and Operation Manual

RM01-001 Remote Memory



SM77

ISSUE 1.01

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RM01-001 Remote Memory
SM77 Installation and Operation Manual

Table of Contents

Section	Title	Page
1.	Description	
1.1	Introduction	1-1
1.2	Product Description	1-1
1.3	Design Features	1-1
1.4	Specifications	1-2
1.4.1	Electrical Specifications	1-2
1.4.2	Physical Specifications	1-2
1.4.3	Environmental Specifications	1-2
1.4.4	Product Approval	1-3
2.	Installation	
2.1	Introduction	2-1
2.2	Unpacking and Inspection	2-1
2.2.1	Warranty	2-1
2.3	Continued Airworthiness	2-1
2.4	Installation Procedures	2-1
2.4.1	Warnings	2-1
2.4.2	Cautions	2-2
2.4.3	Cabling and Wiring	2-2
2.4.4	Mounting	2-2
2.4.5	Post-Installation Checks	2-3
2.5	Adjustments and Connections	2-3
2.6	Accessories Required But Not Supplied	2-3
2.7	Installation Drawings	2-4
3.	Operation	
3.1	Introduction	3-1
3.2	General Information	3-1



RM01-001 Remote Memory SM77 Installation and Operation Manual

Section 1 Description

1.1 Introduction

Information in this section consists of product description, design features and specifications for the RM01-001 Remote Memory (RM01). The RM01 has been developed for use in the Northern Airborne Technology Ltd (NAT) Digital Audio Communication System (DACS) but can be used in other applications as appropriate. All derivative product information shall be contained in the applicable manual supplement, which may be obtained from Northern Airborne Technology Ltd as required.

Review all notes, warnings and cautions.

Note: This manual contains information applicable to units s/n 3000 and above. For information applicable to units below s/n 3000 contact the product support department at Northern Airborne Technology Ltd.

1.2 Product Description

The RM01 is a Remote Memory unit for the Northern Airborne Technology Ltd. (NAT) Digital Audio Communication System (DACS).

The DACS is a communications management system that distributes and controls all of the audio in an aircraft. It manages the audio from all transceivers, receivers and audio warning sources. It enables the transmission of microphone audio to a selected transmitter and distributes all Inter-Communication System (ICS) audio.

The RM01 is a remote mounted device that connects to the DACS AMU50 Audio Management Unit. The RM01 stores the system's configuration and aural alert files. Storing the system configuration and alert files in this unit enables the replacement of the AMU50 without the need of downloading a new configuration file.

The RM01 communicates with the AMU50 over a Serial Peripheral Interface (SPI) port. The RM01 also receives regulated power from the AMU50.

1.3 Design Features

The RM01 provides digital memory accessible via a serial communications port to service an externally attached device such as an Audio Management Unit. A Typical application of the RM01 would be to store system configuration data or digital audio data.

The RM01 provides 64 Mbits of data storage capacity, which supports at least 120 seconds of 16 bit digital audio data (32 kHz sampled).



RM01-001 Remote Memory SM77 Installation and Operation Manual

1.4 Specifications

1.4.1 Electrical Specifications

Input Signals

Input Operating Voltage

The RM01 requires a conditioned +5 Vdc power supply such as that provided by an AMU50.

Nominal Operating Input Voltage 5.0 Vdc

Maximum Current: 0.1 A @ 5.0 Vdc

Communication

The RM01 communicates over a Serial Peripheral Interface (SPI) with an external device such as an AMU50.

1.4.2 Physical Specifications

Height	18.4 mm (0.73 in) maximum
Depth	51.4 mm (2.03 in) maximum
Width	57.2 mm (2.25 in) maximum
Weight	0.04 kg (0.09 lbs) maximum
Material and Finish	Brushed aluminium, conversion coated
Connectors	One 9 pin D-sub (male), Jackpost locking hardware
Installation	SPI Cable: 0.3 m (11.81 in) maximum Installation Kit: RM01-IKC
Mounting	Bulkhead Mount (four 6-32 screws)

1.4.3 Environmental Specifications

The RM01 has been tested to the environmental conditions listed below. Environmental categories for which TSO compliance has been demonstrated are listed on the Environmental Qualification Form in Section 2 of this manual.

Temperature	-40 to +70° C (operating) -45 and +85° C (short-time operating) -55 to +85° C (ground survival)
Altitude	50,000 feet maximum
Humidity	95 % non-condensing
Shock	Operational shock; 6 g for 11 ms Crash safety (impulse); 20 g for 11 ms Crash safety (sustained); 20 g for 3 s
Vibration	RTCA/DO-160E Section 8 Categories (SBM) (U2FF1)



**RM01-001 Remote Memory
SM77 Installation and Operation Manual**

1.4.4 Product Approval

1.4.4.1 FAA: TSO-C139

When installed as part of the Northern Airborne Technology Ltd DACS:

FAA: TSO-C139 (RTCA/DO-214 Class Ib, RTCA/DO-160E, RTCA/DO-178B Level C)

Refer to SM76 AMU50-001 Audio Management Unit Installation and Operation manual for further installation compliance details.

1.4.4.2 EASA: ETSO-C50c

When installed as part of the Northern Airborne Technology Ltd DACS:

EASA: ETSO-C50c (RTCA/DO-214 Class Ib, RTCA/DO-160E, RTCA/DO-178B level C)

Refer to SM76 AMU50-001 Audio Management Unit Installation and Operation manual for further installation compliance details.

Section 1 ends



RM01-001 Remote Memory SM77 Installation and Operation Manual

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 RM01-001 Remote Memory (RM01).

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
- 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 RM01 Remote Memory is 'on condition' only. Periodic maintenance of this product is not required.

2.4 Installation Procedures

2.4.1 Warnings

Not Applicable.



RM01-001 Remote Memory SM77 Installation and Operation Manual

2.4.2 Cautions

CAUTION:

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

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

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. Refer to 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 Mounting

The RM01 can be bulkhead-mounted in any orientation, using four 6-32 screws. No shock or vibration isolators are required.

The RM01 must be mounted to a clean metal surface which is electrically bonded to the aircraft ground plane. The unit is finished with a coating that prevents corrosion. This coating is electrically conductive and should not be removed for electrical bonding.



RM01-001 Remote Memory SM77 Installation and Operation Manual

2.4.5 Post-Installation Checks

2.4.5.1 Voltage/Resistance Checks

Do not attach the RM01 until the following conditions are met.

Install the AMU50 or similar audio management unit and check the following:

- a) Check pin <6> for RM01 ground (ground return to AMU).
- b) Check pin <5> for chassis ground (less than 0.5 Ω).

2.4.5.2 Power On Checks

Power up the aircraft's systems.

- a) Check pin <1> for RM01 power (5 Vdc from AMU).

Verify normal operation of all functions of the RM01. Refer to the Installation and Operation manual for the device to which the RM01 is connected for verification of the RM01 operation.

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 RM01 stores system configuration data for an audio control system such as the DACS. When installed in the DACS, the configuration data can be modified using the Device Configuration Software (DevCs) application. Refer to the SM76 AMU50-001 Audio Management Unit Installation and Operation Manual and the DevCs Installation and Operation manual for information on connection and operation of the DevCs.

After an RM01 has been programmed using the DevCs, all settings that are essential to aircraft operation must be verified by a system test in both normal and emergency modes (e.g. direct audio audible to crew, transmit and receive functions on COM1 and COM2 operate correctly for crew, required intercom functions operate correctly, etc).

2.6 Accessories Required But Not Supplied

Installation kit p/n RM01-IKC is required to complete the installation. The kit consists of the following:

RM01-IKC consists of

Quantity	Description	NAT Part #
1	D-sub 9 Pin Socket Housing	20-21-009
9	Contact, Socket Crimp	20-26-901
1	Hood, D-sub, Metal	20-28-009
1	Cable Clamp, D-sub (SET)	20-27-189



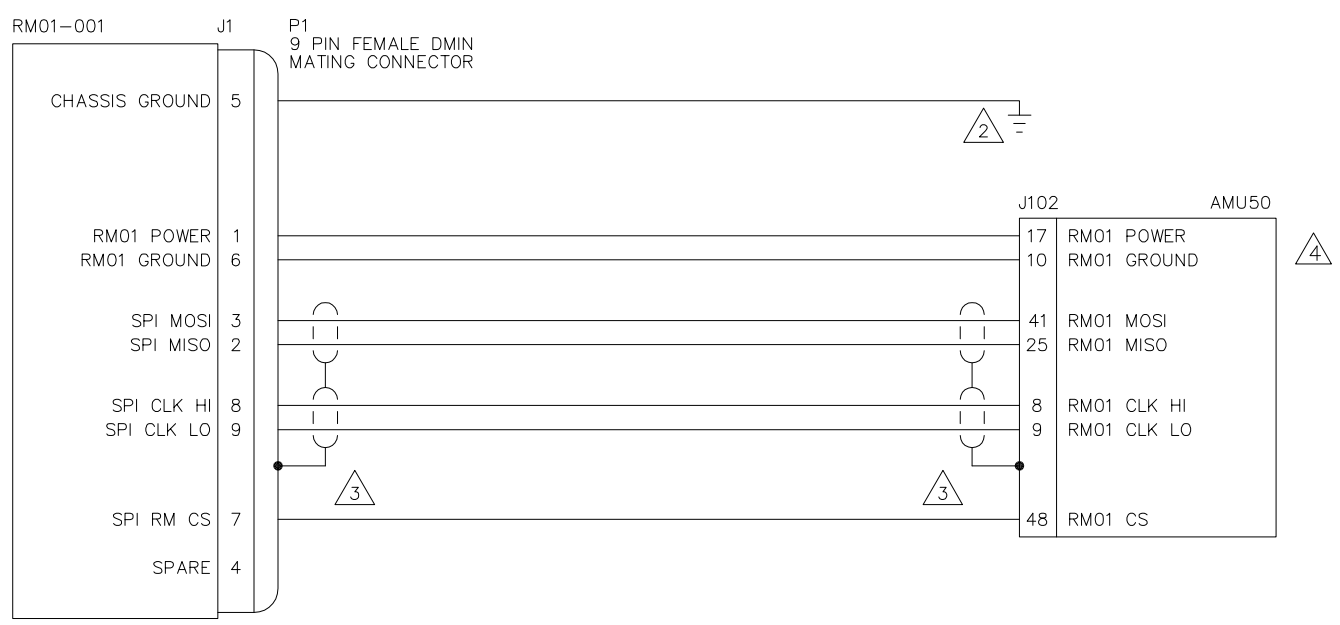
**RM01-001 Remote Memory
SM77 Installation and Operation Manual**

2.7 Installation Drawings

DRAWING	REV.	DESCRIPTION	TYPE	SERIAL No.
RM01\001\403-0	1.21	Remote Memory	Interconnect	3000 and up
RM01\001\405-0	1.00	Remote Memory	Connector Map	3000 and up
RM01\001\521-0	1.01	Remote Memory	Environmental Qual. Form	3000 and up
RM01\001\922-0	1.10	Remote Memory	Mechanical Installation	3000 and up




Section 2 ends following the above documents

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.10	REFER TO DOCCR02229 FOR DETAILS.	AUG 29/07	MWS
1.20	REFER TO DOCCR02602 FOR DETAILS.	JUL 31/08	TAT
1.21	DOCCR02662 – CORRECTED J102 PIN 14 TO 41.	OCT 24/08	TAT



NOTES:

- ALL WIRES SHOULD BE 22 AWG UNLESS OTHERWISE SPECIFIED. 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. ALL SHIELDED WIRE/CABLE SHOULD BE IN ACCORDANCE WITH MIL-C-27500.

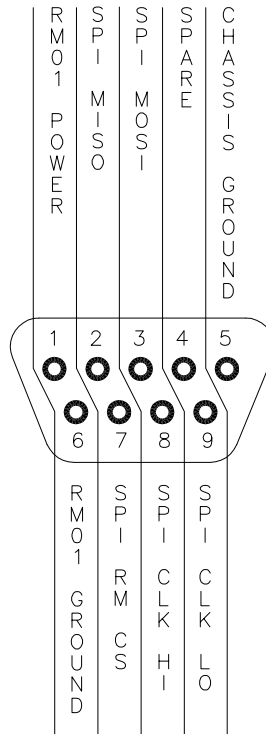
 -  GROUNDED NOT MORE THAN 0.7 FT [0.2 M] FROM UNIT.
 -  SHIELDS SHOULD BE GROUNDED TO CONNECTOR BACK SHELL (METAL TYPE).
 -  CABLING NOT MORE THAN 1 FT [0.3 M] FROM UNIT.

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DESIGNED	MO	 NAT NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	MWS					
DATE	JUL 13/07	TITLE				REMOTE MEMORY
CHECKED						
APPROVED		SIZE	CAGE CODE	PART NO.	REV.	SHEET
FILE	403-0.DWG	A	3AB01	RM01-001	1.21	1/1
DWG. TYPE		INTERCONNECT		DWG. NO. RM01\001\403-0		


P101

9 PIN FEMALE DMIN
MATING CONNECTOR



VIEW IS FROM REAR OF AIRFRAME CONNECTOR

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DESIGNED	MDO	 NAT NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	MWS					
DATE	JUL 12/07	TITLE				REMOTE MEMORY
CHECKED	NAT 249					
APPROVED	NAT 129	SIZE A	CAGE CODE 3AB01	PART NO. RM01-001	REV. 1.00	SHEET 1/1
FILE	405-0.DWG	DWG. TYPE CONNECTOR MAP		DWG. NO.	RM01\001\405-0	



ENVIRONMENTAL QUALIFICATION FORM

Description: Remote Memory Document #: RM01\001\521-0




NAT Part #: RM01-001 TSO #: TSO-C139

Manufacturer's Specification and/or Other Applicable Specification: _____

RTCA/DO-160E, RTCA/DO-214

Manufacturer: Northern Airborne Technology Ltd.

Address: 1925 Kirschner Rd., Kelowna, BC, Canada. V1Y 4N7

Prepared By: 	Checked By: 	Approved By: 
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Conditions	Section	Description of Conducted Tests
Temperature and Altitude	4.0	Category [(A4)(D1)-]
Ground Survival Low Temperature	4.5.1	-55° C
Short-Time Operating Low Temp.	4.5.1	-45° C
Operating Low Temperature	4.5.2	-40° C
Ground Survival High Temperature	4.5.3	+85° C
Short-Time Operating High Temp.	4.5.3	+70° C
Operating High Temperature	4.5.4	+70° C
In-flight Loss of Cooling	4.5.5	N/A. No forced air cooling.
Altitude	4.6.1	+50,000 ft (+15,240 m)
Decompression	4.6.2	+8,000 ft to +50,000 ft (+2,438 m to + 15,240 m)
Overpressure	4.6.3	-15,000 ft (-4,752 m)
Temperature Variation	5.0	Category B.
Humidity	6.0	Category B.
Operational Shocks and Crash Safety	7.0	Category B.
Operational Shocks	7.2.2	Alternate Test Procedure.
Crash Safety	7.3.2	Alternate Test Procedure (Impulse).
	7.3.3	Test Procedure 2 (Sustained), Unknown or Random orientation in aircraft.
Vibration	8.0	Category [(SBM)(U2FF1)] (without shock mounts).

Conditions	Section	Description of Conducted Tests
Explosive Atmosphere	9.0	Category X, no test performed.
Waterproofness	10.0	Category X, no test performed.
Fluids Susceptibility	11.0	Category X, no test performed.
Sand and Dust	12.0	Category X, no test performed.
Fungus	13.0	Category X, no test performed.
Salt Fog	14.0	Category X, no test performed.
Magnetic Effect	15.0	Category Z.
Power input	16.0	Category Z. <ul style="list-style-type: none"> • Equipment receives conditioned input power from AMU50-xxx. The equipment was tested configured as part of the DACS. • The system was tested to DO-160E subparagraph 16.6.1.3 b, requirement for equipment with digital circuits. • The system was tested to DO-160E subparagraph 16.6.1.1 b (3) Emergency Operating Voltage conditions. • The system was tested to DO-160E subparagraph 16.6.2.2 Low Voltage Conditions
Voltage Spike	17.0	Category A. <ul style="list-style-type: none"> • Equipment receives conditioned input power from AMU50-xxx. The equipment was tested configured as part of the DACS.
Audio Frequency Susceptibility	18.0	Category Z. <ul style="list-style-type: none"> • Equipment receives conditioned input power from AMU50-xxx. The equipment was tested configured as part of the DACS.
Induced Signal Susceptibility	19.0	Category [ZC].

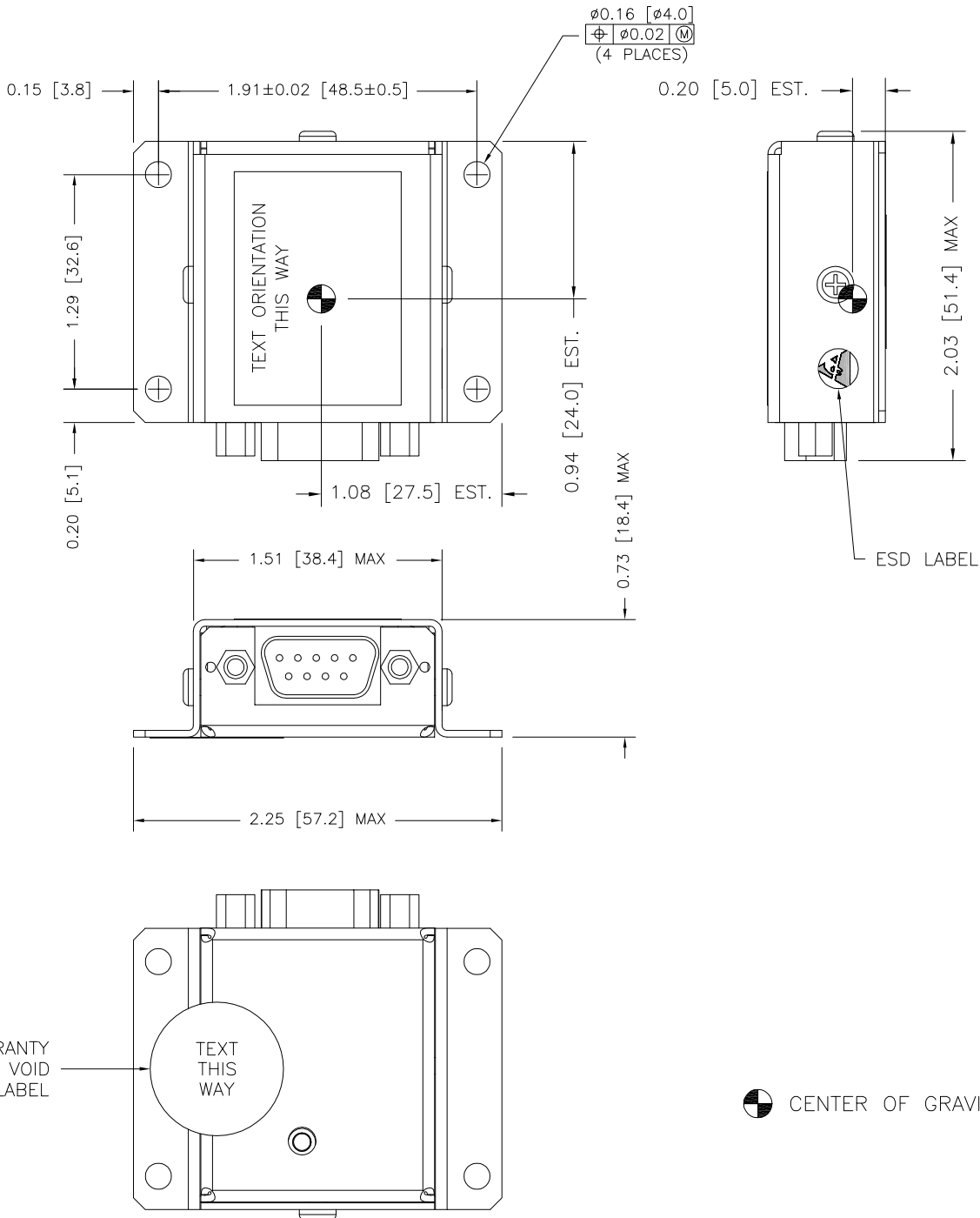
Conditions	Section	Description of Conducted Tests
Radio Frequency Susceptibility	20.0	Category [RR]. <ul style="list-style-type: none"> DO-160E subparagraph 20.5 Radiated Susceptibility was tested per DO-214 section 2.5.11 and DO-160E.
Radio Frequency Emission	21.0	Category H.
Lightning Induced Transient Susceptibility	22.0	Category [A3Z33]. <ul style="list-style-type: none"> The RM01-001 was tested to DO-160E subparagraph 22.5.2 Cable Bundle Tests using waveform set J, Single/Multiple Stroke Level 3, Multiple Burst Level 3. All pulse waveforms were applied using the ground injection test method in section 22.5.2.2 because the cable bundle was too short to pass through the injection transformer.
Lightning Direct Effects test	23.0	Category X, no test performed.
Icing	24.0	Category X, no test performed.
Electrostatic Discharge	25.0	Category X, no test performed.
Fire, Flammability	26.0	Category X, no test performed.
Other Tests		

REMARKS

- DO-160E, Sections 4 to 8, and 15 to 17 tests were conducted at Northern Airborne Technology Ltd. (NAT) in Kelowna, BC on RM01-001.
- DO-160E, Sections 18 to 22 tests were conducted at CKC Laboratories in Bothell, WA on RM01-001.
- Testing was conducted with the RM01-001 configured as part of the Digital Audio Communication System (DACS). Where compliance with Minimum Performance Standards is required by DO-160E it was assessed on the system against DO-214 Section 2.5.
- Testing was performed between June 2008 and March 2009.

End of Environmental Qualification Form

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	DOCCR02157 - MASS WAS 0.083 lbs.	JUL 23/07	MWS
1.02	DOCCR02205 - ADDED TOL TO DIM 1.91[48.51]	AUG 14/07	MWS
1.10	DOCCR02623 - ADDED WARRANTY VOID & ESD LABEL.	SEP 05/08	MWS



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

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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	DESIGNED	MO	NAT NORTHERN AIRBORNE TECHNOLOGY LTD.				
	THIRD ANGLE PROJECTION	DRAWN	MWS					
		DATE	JUN 11/07	TITLE				
		CHECKED	NAT 205 NAT 255	REMOTE MEMORY				
MASS: 0.09 lbs. (40.8 g) MAX		APPROVED	NAT 104	SIZE	CAGE CODE	PART NO.	REV.	SHEET
MATERIAL: -				A	3AB01	RM01-001	1.10	1/1
FINISH: -		FILE	922-0.DWG	DWG. TYPE	MECH. INSTALLATION	DWG. NO.	RM01\001\922-0	



RM01-001 Remote Memory SM77 Installation and Operation Manual

Section 3 Operation

3.1 Introduction

Information in this section consists of the functional and operational procedures for the RM01-001 Remote Memory (RM01).

3.2 General Information

The RM01 is a Remote memory unit for the Northern Airborne Technology Ltd. (NAT) Digital Audio Communication System (DACS).

The DACS is a communications management system that distributes and controls all of the audio in an aircraft. It manages the audio from all transceivers, receivers and audio warning sources. It enables the transmission of microphone audio to a selected transmitter and distributes all Inter-Communication System (ICS) audio.

The RM01 is a remote mounted device that connects to the DACS AMU50 Audio Management Unit. The RM01 stores the system's configuration and aural alert files. Storing the system configuration and alert files in this unit enables the replacement of the AMU50 without the need of downloading a new configuration file.

The RM01 communicates with the AMU50 over a Serial Peripheral Interface (SPI) port. The RM01 also receives regulated power from the AMU50.

Optionally, more than one RM01 may be used in an aircraft to provide rapid re-configuration of an aircraft audio when an aircraft is assigned to a different role. The connector on the harness from the AMU50 can be moved to the RM01 which contains the configuration appropriate to the required role.

The RM01 Remote Memory has no operator accessible controls.

Section 3 ends
