



SM270

**270
Universal Interface Amplifier**



INSTALLATION AND OPERATION MANUAL

REV 4.10 Dec 12, 2006

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Northern Airborne Technology Ltd.
has acquired the assets of dB Systems Inc.,
and has revised and reissued this manual in
standard NAT format.

Northern Airborne Technology Ltd.
will be responsible for all future
amendments and revisions.

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

Insert any Amendment Instruction sheets after this page.

Consult NAT for any questions regarding product revisions prior to SM270 Revision 4.10.

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Section 1 Description

1.1 Introduction

This manual contains information on the Model 270 Universal Interface Amplifier. All derivative products 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 Model 270 Universal Interface Amplifier is designed to provide multipurpose amplification and switching functions for varying radio, microphone, and custom audio interface needs. The unit is designed to interface radios to operator headsets and microphones and provide specialized switching functions such as voice activated switching, radio PTT switching, or other interface functions. The Model 270 can be used as a primary amplifier for an aircraft or vehicle operator station or it can be used as an auxiliary amplifier for interface or other applications.

1.3 Features

The Model 270 has Audio, MIC, and Spare Input channels. The Audio Input (receiver) channel is a balanced (differential) type input; the MIC and Spare Input channels are single-ended (ground referenced) and designed for interface to commercial DC-biased microphones or similar low-level audio signals from virtually any source.

Signals applied to the Audio Input channel are reproduced at the Audio Output channel, the MIC Input channel is reproduced at the MIC Output channel, and the Spare Input is reproduced at the Spare Output channel. Signals applied to the MIC Input channel can also be routed to the Audio Output channel by adjusting the MIC SDTN level adjustment trimmer for the desired audio level.

The Model 270 also includes a multipurpose switching relay capable of performing different functions. Model 270 functions and specifications are outlined in Sections 1.4.1.1 through 1.4.1.4. A discrete input is provided for controlling the relay in a keyed mode (e.g. ground to activate or PTT), or alternate action (e.g. latched to another position with each ground applied). VOX controlled mode (e.g. by audio signals applied to the Spare Input) is also available. The switching relay can be used to control radio keying, audio switching, interphone mode switching, music muting, or other specialized functions as needed.

1.4 Specifications

1.4.1 Electrical Specifications

1.4.1.1 Functions

FUNCTION	DESCRIPTION
Audio Input Channel (receiver audio)	A 600 Ω balanced audio input that is routed to the Audio Output channel.
MIC Input Channel	<p>A single-ended input (ground referenced) that is routed to the MIC Output channel and to the Audio Output channel if desired for MIC Sidetone. A 22 mAdc microphone bias from a 9 Vdc @ 400 Ω source or a 600 Ω ground termination resistance are selectable by mini-switch MS3. MS3 can also be unplugged to raise the input impedance to >10 KΩ.</p> <p>This input is suitable for microphone input signals or any other low level audio signals in a range from 20 mVrms to 1.5 Vrms.</p>
Spare Input Channel	<p>A single-ended input (ground referenced) that is routed to the Spare Output channel. A 22 mAdc microphone bias from a 9 Vdc @ 400 Ω source or a 600 Ω ground termination resistance are selectable by mini-switch MS2. MS2 can also be unplugged to raise the input impedance to >10 KΩ.</p> <p>This input is suitable for microphone input signals or any other low level audio signals in a range from 20 mVrms to 1.5 Vrms.</p>
Audio Output Channel (receiver or headphone audio)	<p>The Audio Output channel is fed by the Audio Input channel. The amplifier gain for the Audio Output channel is adjustable by trim potentiometer VR2. MIC Sidetone audio from the MIC Input channel can also be routed to the Audio Output channel if VR2 is adjusted for the desired level. Set VR4 fully counter-clockwise if MIC Sidetone is not desired.</p> <p>The Audio Output channel can drive loads ranging from 8 Ω to greater than 600 Ω. Mini-switch MS5 is used to select 8 Ω or 600 Ω load compatibility. The Audio Output channel is transformer coupled.</p>
MIC Output Channel	<p>The MIC Output channel is fed by the MIC Input channel. The amplifier gain for the MIC Output channel is adjustable by trim potentiometer VR1. The MIC Output channel can drive loads ranging from 8 Ω to greater than 600 Ω. Mini-switch MS4 is used to select 8 Ω or 600 Ω load compatibility. The MIC Output channel is transformer coupled and also includes a 1μF AC coupling capacitor. Internal jumper J1 is installed if direct DC coupling from the transformer secondary is desired. Remove J1 if AC coupling is desired. The MIC Output can drive DC-biased or ground-referenced loads if AC coupled.</p>

Spare Output Channel	The Spare Output channel is fed by the Spare Input channel. A Voice Activated Switch circuit (VOX) is installed in the amplifier circuit between the Spare Input and Spare Output channels. The VOX circuit activation threshold is adjustable over a range of 20 mVrms to 250 mVrms by trim potentiometer VR3. Refer also to the External VOX threshold adjustment description. The Spare Output channel is suited to driving loads in the range from 150 Ω to greater than 600 Ω and the Spare Output channel can drive DC-biased or ground-referenced loads.
External VOX THLD	The Spare audio channel Voice Activated Switch can be controlled by an externally connected 10 K Ω linear potentiometer. To connect the potentiometer, remove internal jumper J2 and set trim potentiometer VR3 to full clockwise position (10 turns), then connect the external 10 K Ω potentiometer from the External VOX THLD input pin to ground. Maximum VOX threshold is achieved when the external VOX THLD pot is set for 0 Ω .
Switching Relay	The Switching Relay is for general-purpose audio or control switching functions. The relay contacts are rated for 28 Vdc @ 2 Amps, AC or DC non-inductive loads. If inductive loads are connected, a snubber diode should be installed across the load inductor coil to prevent high re-coil voltages (e.g. 'back-EMF') from entering the relay contacts. The switching relay has 3 modes of operation explained below.
KEYED Input (PTT relay control)	The Keyed Input is designed to control the internal switching relay. If mini-switch MS6 is set to the Keyed position, the Keyed Input will activate the relay when a ground signal is applied to the input. Ground current for the keyed input is < 100 mA.
KEYED Input (Alternate Action relay control)	The Keyed Input can also control an alternate action flip-flop circuit. If mini-switch MS6 is set to the VOX/LATCH position and MS1 is set to the LATCH position, alternate action relay function is selected. Each time a ground is applied to the Keyed Input, the relay will toggle to the next position.
VOX relay control	If mini-switch MS6 is set to the VOX/LATCH position and MS1 is set to the VOX position, control of the switching relay is connected to the Spare Audio input channel VOX circuit. With VOX control, each time an audio signal at the Spare Input crosses the VOX threshold, the relay is activated for the duration of time that the VOX threshold is exceeded. When the audio level to the Spare Input channel drops below the VOX threshold, the relay will disengage after an approximate 2-second delay.

1.4.1.2 Input Specifications

INPUT	DESCRIPTION
Audio Input Channel (receiver audio)	One differential receiver/transceiver audio input. Input range is 0.5 Vrms to 7.75 Vrms. A 10 K Ω termination resistor to ground is provided on the HI and LO side of the receiver input pins and a 1 K Ω resistance is connected between the HI and LO inputs. Equivalent input impedance is approximately 600 Ω .
MIC Input Channel	0.25 Vrms into 200 Ω nominal. Dynamic range from 20 mVrms to 1.5 Vrms. DC Bias is 9 Vdc @ 20-25 mA.
SPARE Input Channel	0.25 Vrms into 200 Ω nominal. Dynamic range from 20 mVrms to 1.5 Vrms. DC Bias is 9 Vdc @ 20-25mA. VOX switch activation is within 5 mS of speech detection and deactivation 2 seconds after speech. VOX range is 20 mVrms to 250 mVrms.
28V Circuit Power Supply	28 Vdc power to operate the internal circuitry is connected to this pin. Power Supply range is 18 Vdc to 32 Vdc, 0.05A nominal, 0.25A Max. (use 0.5A circuit breaker). Use 22 AWG wire min.
14V Circuit Power Supply	14 Vdc power to operate the internal circuitry is connected to this pin. Power Supply range is 9 Vdc to 15 Vdc, 0.05A nominal, 0.25 A Max. (use 0.5A circuit breaker). Use 22 AWG wire min.
Power Return (Gnd)	Use 22 AWG wire min.
Chassis Ground	Ground chassis directly to airframe or with a suitable ground strap.

1.4.1.3 Output Specifications

OUTPUT	DESCRIPTION
Audio Output Channel	A transformer coupled output capable of driving loads ranging from 8 Ω to greater than 600 Ω . Maximum rated output level is 8 Vrms (106 mW) into 600 Ω or 0.70 Vrms (60 mW) into 8 Ω . Output is adjustable.
MIC Output Channel	A transformer coupled output capable of driving loads ranging from 8 Ω to greater than 600 Ω . Maximum rated output level is 8 Vrms (106 mW) into 600 Ω or 0.70 Vrms (60 mW) into 8 Ω . Output is adjustable. An internal installer selectable jumper can be removed to connect a 1 μ F series capacitor to provide AC coupling of the output transformer secondary. Maximum load when the jumper is removed should not be less than 600 Ω .
Spare Output Channel	A single ended (ground referenced) microphone level audio output capable of driving loads ranging from 150 Ω to greater than 600 Ω . The Spare Output is fed by the Spare Input channel and is switched by the Voice Activated Switch circuit. Output level is 0.25 Vrms into 150 Ω .

1.4.1.4 Overall Specifications

SPECIFICATION	Description
Isolation & Crosstalk	≤-70 dB (-80 dB typical)
Noise	<-80 dB (-80 dB typical)
Total Harmonic Distortion (THD+N)	<1% (typical)
Frequency Response	Flat to within 3 dB from 300 Hz to 6000 Hz

TSO Compliance: TSO-C50c, RTCA/DO-214

1.4.2 Physical Specifications

Height	1.37" (34.91 mm)
Depth	2.50" (63.50 mm)
Width	4.50" (114.30 mm)
Weight	0.40 lbs (0.18 kg)
Mounting	Four #10 mounting screws into 0.203" diameter holes spaced 4.00" (W) by 1.80" (D) on centre
Enclosure Finish	Chromate Film in accordance with MIL-C-5541
Connector (P1)	One 25-pin 'D' submin connector with locking posts

1.4.3 Environmental Specifications

Operating Temperature	-55° to +70°C
Altitude	up to 70,000 feet

Qualification:

DO-160D Environmental Categories: [(A2)(F2)]BBB[(TRY)(UG)]XXXXXXZ[BZ]AZAUM[XXC2]XXA

Note: Refer to Environmental Qualification Form in Section 2 of this Manual for complete details of the environmental categories.

1.5 Unit Nomenclature

Derivative information can be found in the applicable manual supplement, or by contacting 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:

- Model 270 Universal Interface Amplifier
- 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 Cautions

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

2.3.2 Cabling and Wiring

In all installations, use shielded cable exactly as shown and ground as indicated. Significant problems (particularly with ground loop noise) may result from not following these guidelines.

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 block diagram 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. The chassis must be grounded to the airframe.

Audio cable shields must be grounded at one end only. If audio cable shields are grounded at both ends, AC noise currents can flow through the shield and inductively couple noise into the audio wires. If additional RF shielding is required, use double-shielded wire with the inner shield grounded at one end and the outer shield grounded at both ends.

Do not connect the 14 Vdc power and 28 Vdc power inputs at the same time without external diode isolation to prevent a short circuit between the +28 Vdc and +14 Vdc power supplies.

2.3.2.1 Pin Identification

The following table specifies the functions of the connector pins.

Pin#	Function	Pin#	Function
P1-1	28 VDC POWER ***	P1-12	WIPER #2 (relay contact)
P1-2	14 VDC POWER ***	P1-13	SPARE OUT (spare audio)
P1-3	MIC IN HI	P1-14, 15, 20, 21, 23	GROUND RETURN
P1-4	AUDIO OUT HI		
P1-5	MIC OUT HI		
P1-6	AUDIO IN HI	P1-16	MIC IN LO
P1-7	KEYED INPUT (relay control)	P1-17	AUDIO OUT LO
P1-8	GND/EXT. VOX THLD	P1-18	MIC OUT LO
P1-9	N.O.#1 (relay contact)	P1-19	AUDIO IN LO
P1-10	WIPER #1 (relay contact)	P1-22	N.C.#1 (relay contact)
P1-11	N.O.#2 (relay contact)	P1-24	N.C.#2 (relay contact)
		P1-25	SPARE IN (spare audio)

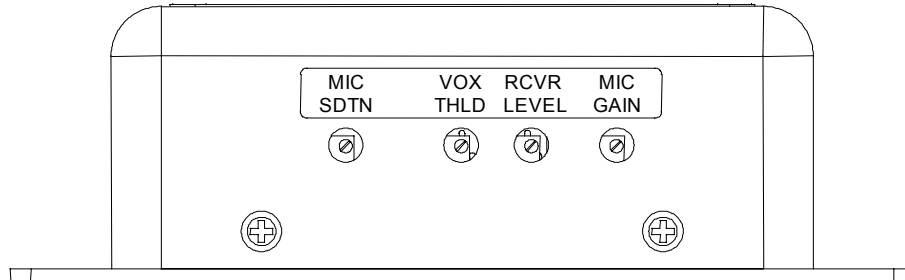
*** **Note:** The 14 Vdc and 28 Vdc power inputs are designed for mutually exclusive use.

2.3.3 Adjustments and Selections

Refer to drawing 270 Switches-Pots at the end of this section for all adjustment locations.

2.3.3.1 Trim Adjustments

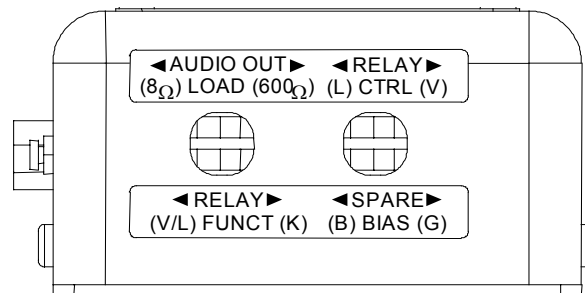
Access to trim pots is through holes in the sides of the cover (see below).



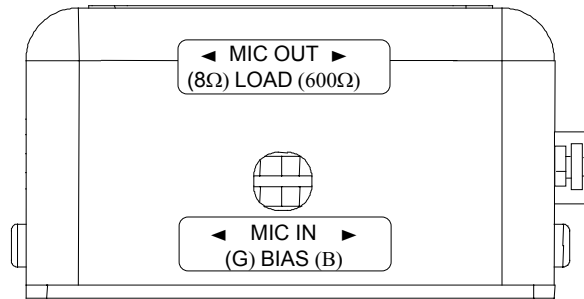
MIC SDTN (VR4)	Adjusts the level of MIC sidetone audio mixed from the MIC Audio input channel to the Audio Output channel. Adjust VR4 fully CCW (10 turns) if no MIC sidetone is desired.
VOX THLD (VR3)	Adjusts the activation VOX threshold for the Voice Activated Switch between the Spare Audio input channel and the Spare Audio output channel. Set this adjustment to full CW position (10 turns) if the External VOX threshold option is to be connected and jumper J2 is removed.
RCVR LEVEL (VR2)	Adjusts the audio level between the Audio input channel and the Audio Output channel.
MIC GAIN (VR1)	Adjusts the audio level (gain) between the Mic Audio input channel to the Mic Audio output channel. Adjusting the MIC gain will also affect the MIC SDTN level.

2.3.3.2 Mini-Switch Adjustments

Access to mini-switches is through holes in the sides of the cover (see below).



AUDIO OUT LOAD - 8Ω / 600Ω (MS5)	Allows selection of 8 Ω or 600 Ω load compatibility for the Audio Output channel.
RELAY CTRL - L/V (MS1)	Allows selection of the switching relay control source between L atch (alternate action) control and V OX (voice activated) control.
RELAY FUNCTION - V/L / K (MS6)	Allows selection of the switching relay control source between V OX/ L ATCH control (VOX or alternate action) and K eyed (PTT switch).
SPARE BIAS - B/G (MS2)	Allows selection of DC MIC bias (B) or 600 Ω ground termination resistance (G) to the Spare Input channel. Removing MS2 raises the Spare Input channel input impedance to >10KΩ. (see cautions in section 2.3.3.3.)



MIC OUT LOAD - 8Ω / 600Ω (MS4)	Allows selection of 8 Ω or 600 Ω load compatibility for the MIC Output channel.
MIC IN BIAS - G/B (MS3)	Allows selection of 600 Ω ground termination resistance (G) or DC MIC bias (B) to the MIC Input channel. Removing MS3 raises the MIC Input channel input impedance to >10 KΩ.

2.3.3.3 Jumper Adjustments

Refer to Assembly dwg 270-4100\270-4100 in the SM270 Maintenance manual.

CAUTION
 The Model 270 Series Universal Interface Amplifier contains static sensitive devices. Proper ESD handling procedures must be followed to prevent damage to the unit.

Access to Jumpers J1 and J2 is by cover removal. To remove the Model 270 cover, remove the 4 screws in the sides of the unit (do not remove screws under the base of the unit), and then remove two connector locking-posts that attach the connector to the cover. Lift the cover to remove. Reinstall the cover by following the same steps in reverse order. Tighten all screws securely but do not over-tighten.

DC COUPLE (J1)	Allows connection of a series 1 μF AC coupling capacitor on the MIC Output channel. If jumper J1 is installed, the capacitor is shorted providing DC coupling from the secondary of the transformer on the MIC Output channel
EXT. THLD (J2)	Allows connection of an external VOX control potentiometer for the Spare Input channel. If J2 is installed, the internal VOX threshold potentiometer (VR3) is enabled. If J2 is removed and VR3 is set to full clockwise position, an external 10 KΩ VOX threshold control potentiometer can be connected.

2.3.4 Mechanical Mounting

The Model 270 can be mounted in any orientation. No shock or vibration isolators are required.

The case must be grounded to the aircraft structure, either directly or through a grounding strap of appropriate width according to its length. The case is finished with electrically insulating and conductive films in accordance with MIL-C-5541.

Note: The finish should not be removed because it prevents corrosion.

2.3.5 Post-Installation Checks

If any preset requires adjustment, be sure this is performed before flight, 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.

2.3.6 Voltage/Resistance Checks

Do not attach the model 270 until the following conditions are met.

Check the following:

- a) P1 pin <1> for +28 Vdc or P1 pin <2> for +14 Vdc relative to ground.
- b) P1 pins <14> <15> <20> <21> and <23> for continuity to ground (below 0.5 Ω).

2.3.7 Power On Checks

- a) Install the model 270 and power up the ship's systems. Verify normal operation of all radio functions. Refer to the manual supplied with the mobile radio for specific operation details.

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 Model 270 is 'on condition' only. Periodic maintenance of this product is not required.

2.5 Accessories Required But Not Supplied

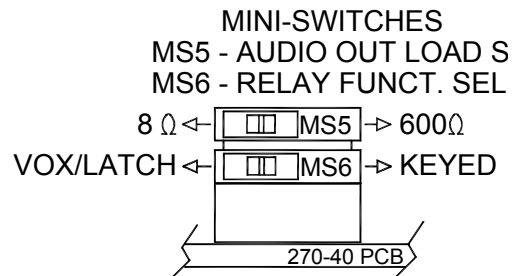
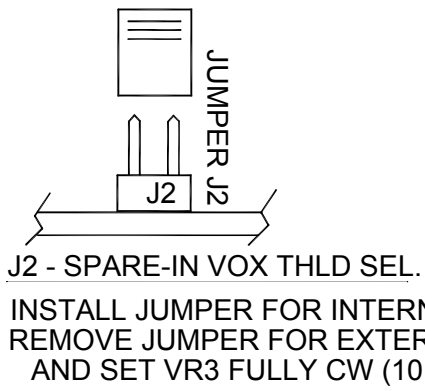
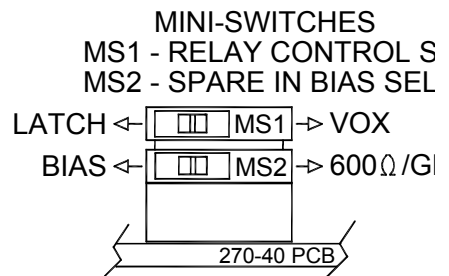
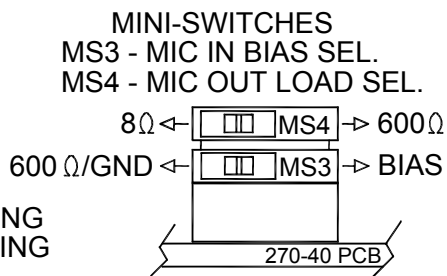
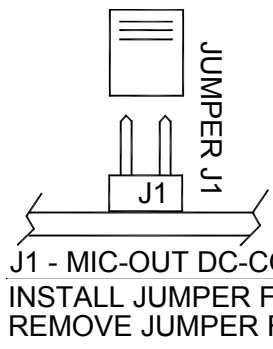
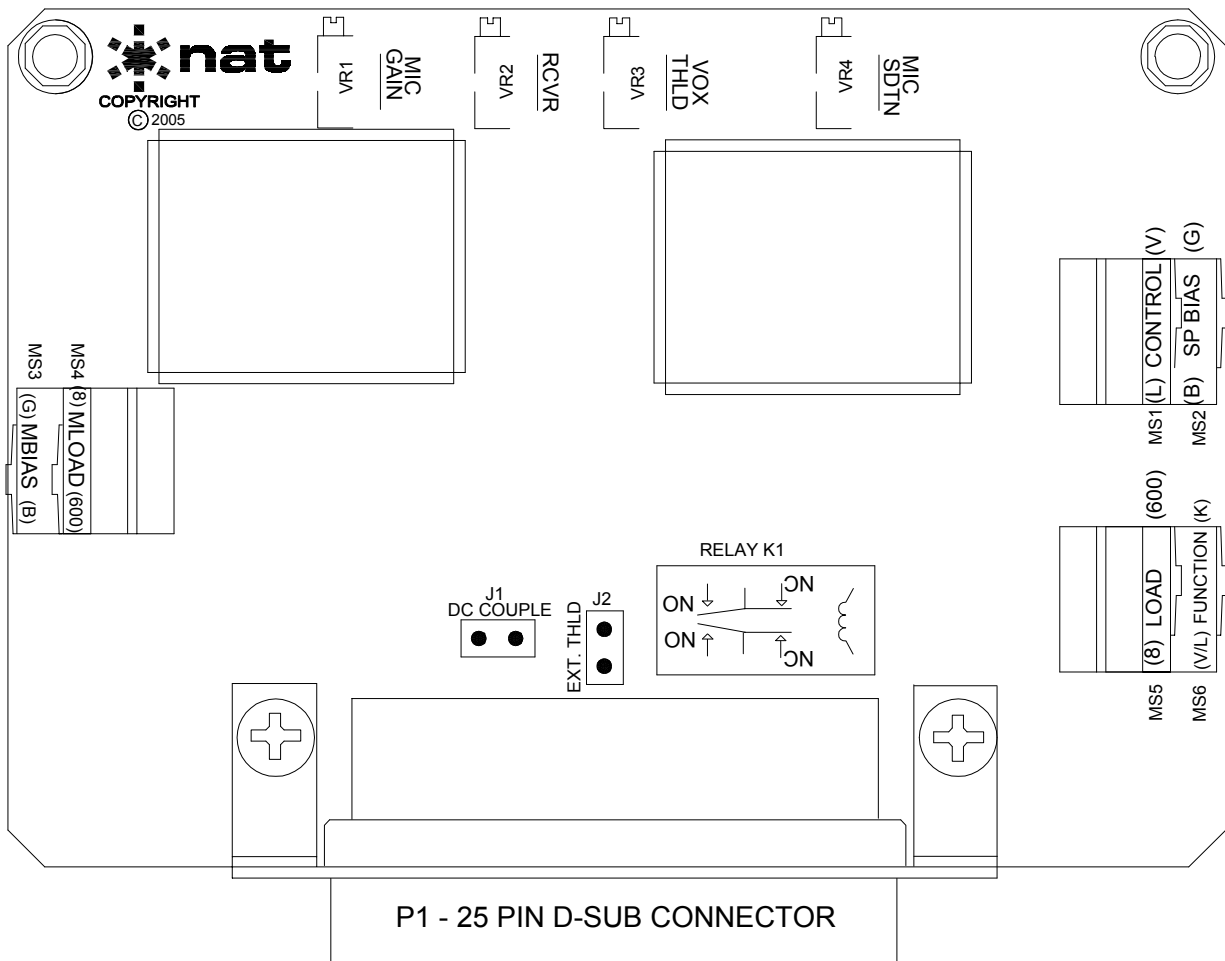
Installation kit p/n D25SM-IKC (crimp) is required to complete the installation. The kit consists of the following:

Quantity	Description	NAT Part #
1	D-min 25 Socket Housing	20-21-025
25	MS Crimp Socket	20-26-901
1	Lock Clip Set	20-27-004
1	25 Pin Metal Hood	20-28-225

2.6 Installation Drawings

DRAWING	REV.	DESCRIPTION	TYPE
270 Switches-Pots	-		Mini-Switch Reference
270\270	1.31	Universal Interface Amplifier	Outline
270\270-13	-		Block Diagram
270\521-0	1.00	Universal Interface Amplifier	Environmental Qualification Form

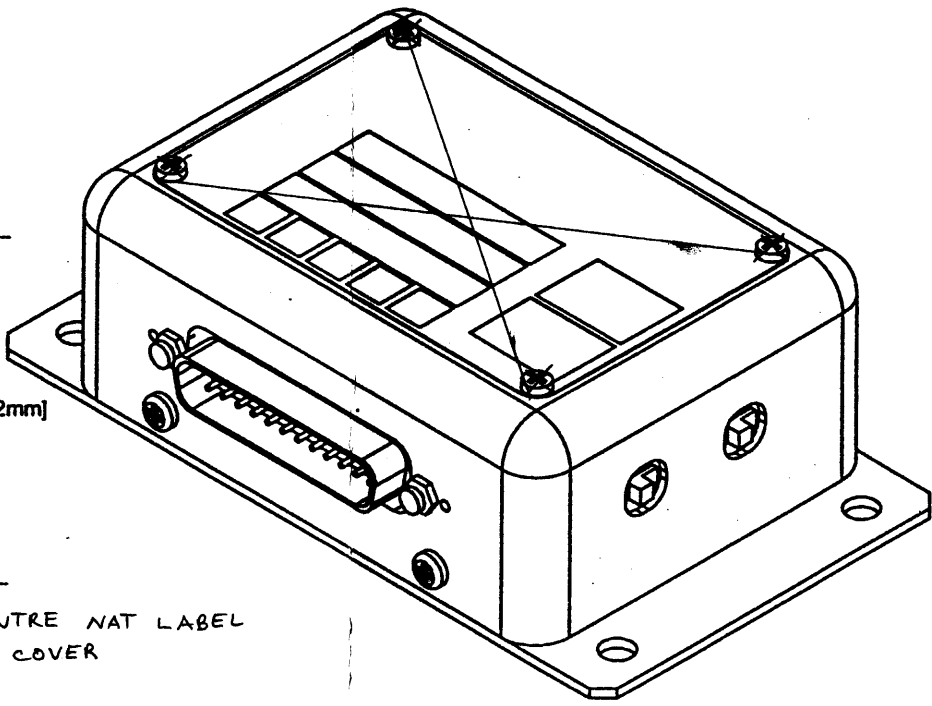
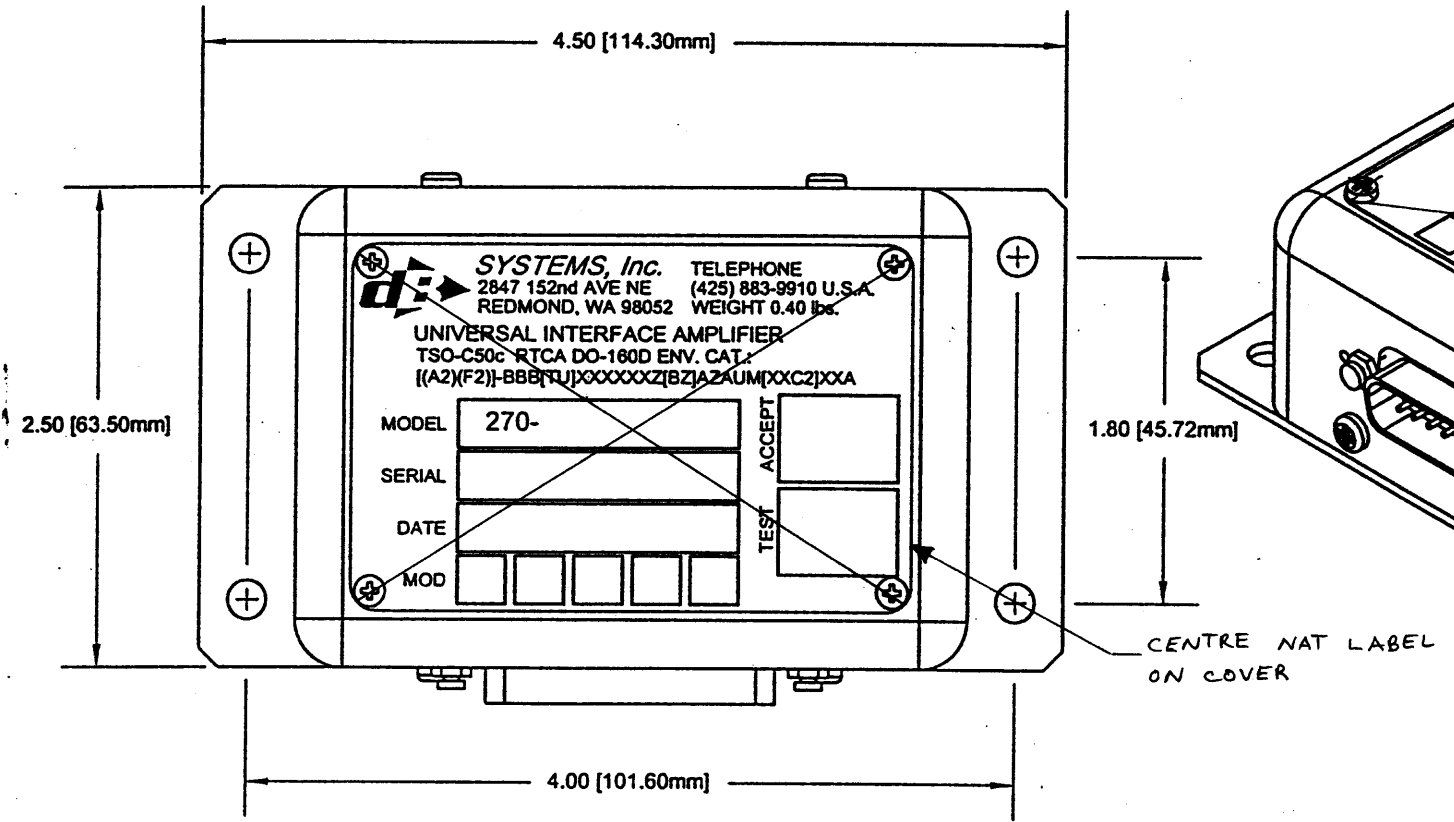
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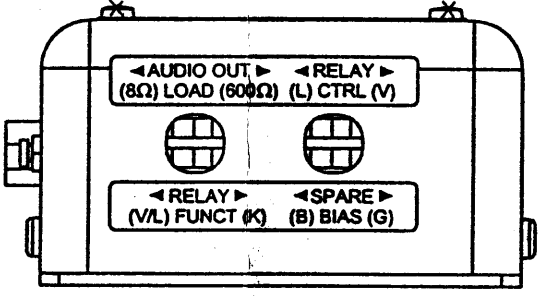
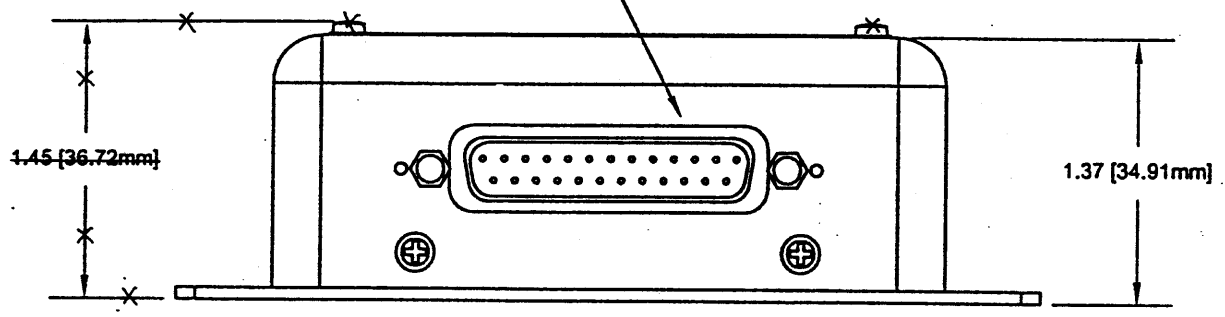
DOCUMENT ALTERATION
 CR No.: DOCC R01347
 Altered By: GLEN DUVAL Date:
 Approved By: *[Signature]* Date: Dec. 7/05

DOCUMENT ALTERATION
 ECR No.: DOCC R00464
 ALTERED BY: ADRIEL JENSEN DATE: 20 NOV 2003
 APPROVED BY: *[Signature]* DATE: Nov. 20/03

- NOTES:
1. THE MODEL 270-XXX UNIVERSAL INTERFACE AMPLIFIER PROVIDES INTERFACE AND SWITCHING FUNCTIONS FOR MOBILE OR AIRCRAFT RADIO AND INTERCOM SYSTEMS. THE UNIT PROVIDES BALANCED AUDIO INPUT AND OUTPUT LINES AS WELL AS FLOATING KEY LINES. THE MODEL 270-XXX HAS INTERNAL RECEIVER, SIDETONE, MICROPHONE AND VOICE ACTIVATED AMPLIFIERS AND INTERNALLY SELECTABLE FEATURES, ADJUSTABLE LEVELS AND SELECTABLE MIC BIAS.
 2. THE ENCLOSURE IS FABRICATED FROM 0.062 THK ALUMINUM ALLOY CHROMATE CONVERSION TREATED IN ACCORDANCE WITH MIL-C-5541 TO PREVENT CORROSION AND PROVIDE ELECTRICAL BONDING TO THE AIRFRAME.
 3. NAMEPLATE INFORMATION AND OTHER MARKINGS ARE PERMANENTLY PRINTED ON THE ENCLOSURE USING BLACK EPOXY INK IS DISPLAYED ON THE NAT LABEL.
 4. TOLERANCE: DIMENSIONS WITHIN 0.030 INCH AND HOLES WITHIN 0.015 INCH.
 5. WEIGHT: 0.40 POUND (0.18 kg).
 6. OPERATING TEMPERATURE: -55° TO +70° C.
 7. POWER: SELECTABLE 14 VDC OR 28 VDC, 250mA (MAX). (SELECTED BY USING APPROPRIATE INPUT PIN)
 8. PERFORMANCE SPECIFICATIONS ARE AS FOLLOWS:
 1. VOX RANGE: 20mVRMS TO 245mVRMS INTERNALLY OR EXTERNALLY ADJUSTABLE.
 2. MIC BIAS: 22mA @ 18VDC.
 3. FREQUENCY RESPONSE: 300 TO 6000 Hz.
 4. DISTORTION: <1% TYPICALLY.
 5. NOISE: <-80dB
 6. AUDIO OUTPUT: 106mW @ 600 OHMS OR 60mW @ 8 OHMS.
 9. QUALIFIED TO: FAR PART 21, TSO-C50c, DO-160D ENV. CAT.: [(A2)(F2)]-BBB[FU]XXXXXXZ[BZ]AZAUM[XXC2]XXA [(TRY)(UG)]
 10. THE APPLICABLE DETAIL PART NUMBER (e.g. "001" FOR DETAIL P/N -001) IS STAMPED NEXT TO THE MODEL NUMBER IF IT IS A DETAIL PART. MOD STATUS IS AS IDENTIFIED BELOW.



25 PIN D-SUB CONNECTOR POSITRONIC P/N MD25M5R40V50, MATES WITH SD25F0000 WITH FC7520D CONTACTS, AMP 206942-1 SLIDE LATCH CLIPS AND ITT CANNON DB19678-2 BACKSHELL.



DETAIL P/N	DESCRIPTION OF DETAIL (DIFFERENCES FROM BASE MODEL)
BASEMODEL	STANDARD PRODUCTION BASEMODEL NO MOD: USES PCB ASSY 270-4100.
/001	NO OTHER DETAIL PART NUMBERS AT THIS TIME CUSTOM ADJUSTED UNIT

REV	DESCRIPTION	DATE	BY
1.31	ADD DETAIL P/N INFORMATION	12-09-05	G.D.
1.30	ALTER NAT LABEL DRAWING AND NOTE 9 CORRECTED ENV STAINING	11-20-03	A.S.
B	206942-1 WAS 206514-1 (TYPE IV).	7-15-02	At
A	AMP SLIDE LATCH CLIPS WERE 206941-1 (TYPO) (TYPE IV).	5-10-02	AP

dB SYSTEMS, INC.

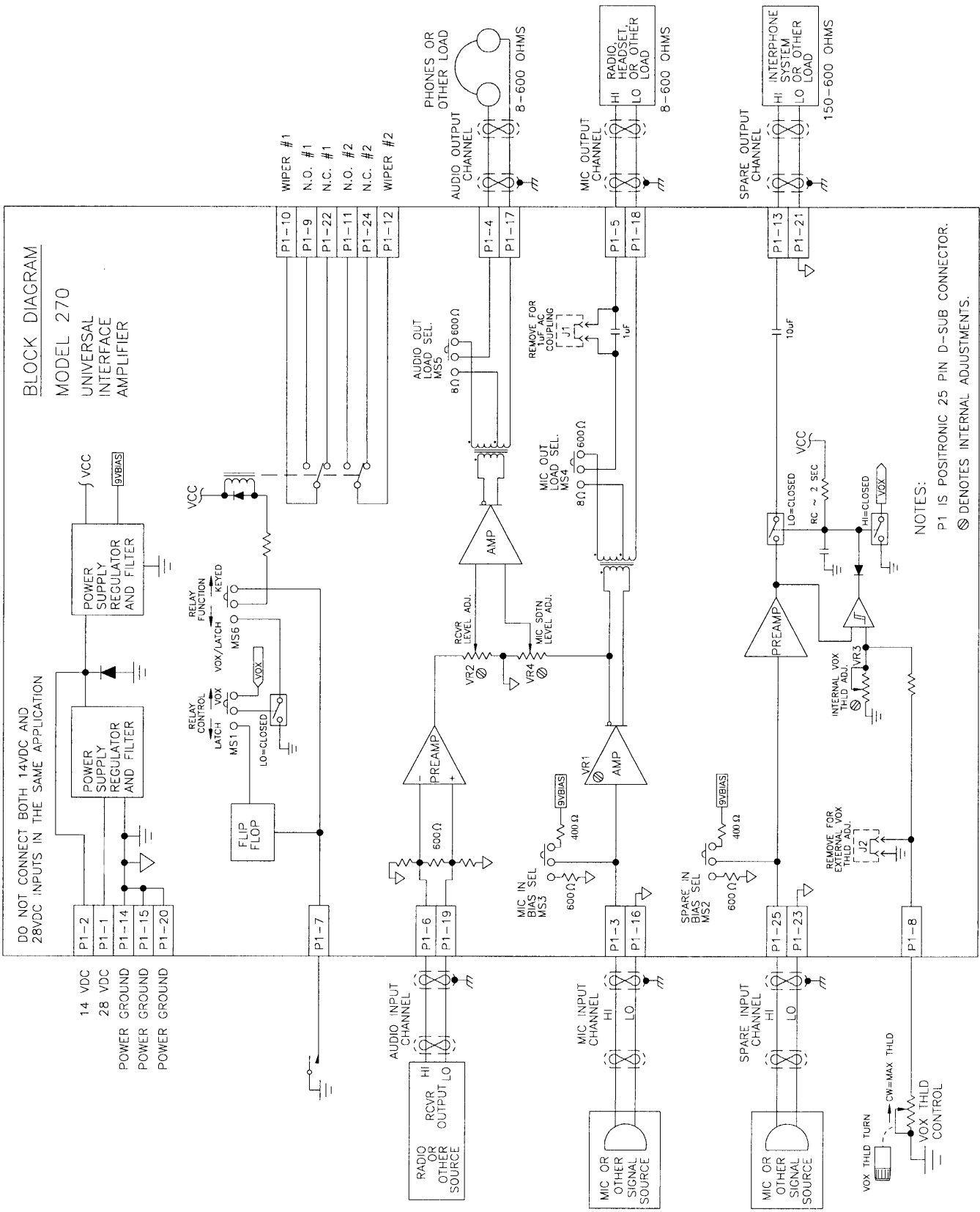
OUTLINE, MODEL 270-XXX
 UNIVERSAL INTERFACE AMPLIFIER

SCALE FULL	DRAWN SF 2-5-01	CHECK AP 1-4-02	APPROVED AP 1-4-02
FILE NO.: 270.DWG	DRAWING NO. 270	SHEET 1 OF 1	REV B

BLOCK DIAGRAM

MODEL 270

**UNIVERSAL
INTERFACE
AMPLIFIER**



NOTES:
P1 IS POSITRONIC 25 PIN D-SUB CONNECTOR.
⊗ DENOTES INTERNAL ADJUSTMENTS.



ENVIRONMENTAL QUALIFICATION FORM

Description: Universal Interface Amplifier Document #: 270\521-0
 NAT Part #: Model 270-xxx TSO #: TSO-C50c
 Manufacturer's Specification and/or Other Applicable Specification: RTCA DO-160D
 Manufacturer: Northern Airborne Technology Ltd.
 Address: 1925 Kirschner Rd., Kelowna, BC, Canada. V1Y 4N7

Prepared By: NAT
226 Checked By: NAT
234 DE
05 Approved By: NAT
125

Conditions	Section	Description of Conducted Tests
Temperature and Altitude	4.0 Rev. 1	Equipment tested to Category [(A2)(F2)-]
Low Temperature	4.5.1	-55C Operating Low Temperature
High Temperature	4.5.2 & 4.5.3	+70C Operating High Temperature & Short-time Operating High Temperature
in-flight Loss of Cooling	4.5.4	N/A. No cooling required
Altitude	4.6.1	+70,000 ft.
Decompression	4.6.2	8,000 ft to +55,000 ft.
Overpressure	4.6.3	-15,000 ft.
Temperature Variation	5.0	Equipment tested to Category B
Humidity	6.0	Equipment tested to Category B
Shock	7.0	Equipment tested to Category B
Operational Shocks	7.2	
Crash Safety	7.3	
Vibration	8.0 Change No.1	Equipment tested without shockmounts to Category [(TRY)(UG)]. Curve R extended to 2,000 Hz.
Explosion	9.0	Equipment identified as Category X, no test required
Waterproofness	10.0	Equipment identified as Category X, no test required
Fluids Susceptibility	11.0	Equipment identified as Category X, no test required
Sand and Dust	12.0	Equipment identified as Category X, no test required
Fungus	13.0	Equipment identified as Category X, no test required



Conditions	Section	Description of Conducted Tests
Salt Spray	14.0	Equipment identified as Category X, no test required
Magnetic Effect	15.0	Equipment is Class Z.
Power input	16.0 Change No.2	Equipment tested to Categories B and Z • Emergency Operating Voltage was tested
Voltage Spike	17.0	Equipment tested to Category A
Audio Frequency Susceptibility	18.0 Change No.2	Equipment tested to Category Z
Induced Signal Susceptibility	19.0	Equipment tested to Category A
Radio Frequency Susceptibility	20.0	Equipment identified as Category [UU]. • Subparagraph 20.4 Conducted Susceptibility was tested to Category U • Subparagraph 20.5 Radiated Susceptibility was tested to Category Y, which exceeds Category U
Radio Frequency Emission	21.0	Equipment tested to Category M.
Lightning Induced Transient Susceptibility	22.0	Equipment tested to requirements of Category [XXC2]
Lightning Direct Effects test	23.0	Equipment identified as Category X, no test required
Icing	24.0	Equipment identified as Category X, no test required
Electrostatic discharge	25.0	Equipment tested to Category A.
Other Tests		

REMARKS

The following tests were conducted on dB Systems Model 270-xxx Universal Interface Amplifier

- Tests of DO-160D, Sections 4.0, 5.0, 15.0, 16.0, and 18.0 were conducted at dB Systems, Inc, Redmond, Washington.
- Tests of DO-160D, Section 6.0 were conducted at West Coast Specialties, Preston, Washington.
- Tests of DO-160D, Sections 7.0 and 8.0 were conducted at Primex Aerospace in Redmond, Washington and Dynamark Engineering in Bothell, Washington.
- Tests of DO-160D, Sections 17.0, 19.0, 20.0, 21.0, 22.0, and 25.0 were conducted at CKC Laboratories in Redmond, Washington.

End of Environmental Qualification Form

Section 3 Operation

3.1 Introduction

Information in this section consists of the functional and operational procedures for the Model 270 Universal Interface Amplifier.

3.2 General

The Model 270 Universal Interface Amplifier is designed to provide multipurpose amplification and switching functions for varying radio, microphone, and custom audio interface needs. The unit is designed to interface radios to operator headsets and microphones and provide specialized switching functions such as voice activated switching, radio PTT switching, or other interface functions. The Model 270 can be used as a primary amplifier for an aircraft or vehicle operator station or it can be used as an auxiliary amplifier for interface or other applications.

3.3 Operation Specifics

The Model 270 has no operator accessible controls. During installation, or if the unit has been exchanged, it may be a requirement to change internal adjustments. This should be done **ONLY BY FULLY QUALIFIED PERSONNEL.**

End of section 3

