



SM245

245 Speaker Amplifier



INSTALLATION AND OPERATION MANUAL

REV 4.10 June 23, 2005

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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
1	Jul 19/06	2		Performed at factory

Insert any Amendment Instruction sheets after this page.



INSTALL_OPS MANUAL AMENDMENT

Manual: SM245

Amendment #: 1

Document # SM245\Install_Ops\809-0001

Amendment Date: Jul 19, 2006

The purpose of this amendment is to add the latest drawing revisions to the manual.

Amendment Instructions:

1	Remove Pages	Replace With Pages
	2-3 to 2-4 Rev 4.10	2-3 to 2-4 Rev 4.10 Amendment #1
2	Remove Drawings (Section 2)	Replace or add Drawings (Section 2)
	245\245\922-0 Rev 1.00	245\245\922-0 Rev 1.01

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

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

Manual Amendment ends after the following amended pages

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Section 1 Description

1.1 Introduction

This manual contains information on the Model 245 Speaker Amplifier. Information on the 245-001 and 245-002 is included; all other derivative products (245-xxx) 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 245 is a Speaker Amplifier that is capable of driving a 4-ohm cockpit speaker. It is intended to be a direct replacement for the Collins model 356F-3.

1.3 Features

The Model 245 is rated at 18 watts into a 4 ohm load. This is a peak rating intended for speech and music. The continuous rating of the amplifier is 10 watts into 4 ohms, sine wave.

For proper heat dissipation, the unit should be mounted to a metal surface of at least 100 square inches.

1.4 Specifications

1.4.1 Electrical Specifications

Power Supply	2.5 amps max @ 27.5 Vdc. A 5 A circuit breaker is recommended
Input:	7.75 Vrms into 600 ohms (245 base unit only)
Speaker Output	18 Watts into 4 ohms @ <1 % distortion (rated power) 25 Watts into 8 ohms @ <1 % distortion (rated power)
Output Noise	-70 dB below 10 watts

1.4.2 Physical Specifications

Height	2.12" (53.9 mm) max
Depth (excl. connectors)	3.00" (76.2 mm) max, excluding flanges 3.85" (97.8 mm) max, including flanges
Width	3.60" (91.4 mm) max
Weight	0.60 lbs (0.3 Kg) max

1.4.3 Environmental Specifications

Operating Temperature	-55° to +70° C
Operating Altitude	70,000 feet
Qualification	ENV. CAT. [A2F2]-BA(CL)XXXXXXZ(BZ)AAATZ(XXC2)XX

Tested under environmental conditions and test procedures in accordance with RTCA DO-160C and qualified to the categories listed in the Environmental Qualification Form in Section 2 of this manual.

TSO Compliance: TSO-C50c, RTCA DO-214

1.5 Unit Nomenclature

Any derivatives of the Model 245 base unit are represented as Model 245-xxx, where xxx represents the specific derivative. All differences between the base unit and the -001 and -002 derivatives are shown below.

Model	Specification Differences
245 Base Model	Standard Input (7.75 Vrms into 600 ohms).
245-001	Input is 1.0 Vrms into 1800 ohms.
245-002	Input is 0.25 Vrms into 1600 ohms.

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 245 Speaker Amplifier
- 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

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 Cautions

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

2.3.3 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 backshell to be easily installed.

2.3.3.2 Pin Identification

The following table specifies the functions of the connector pins.

PIN #	FUNCTION
A	+ SIGNAL INPUT
B	SIGNAL GROUND
C	- SIGNAL INPUT
D	- OUTPUT
E	+ OUTPUT
F	POWER GROUND
G	+ 28 VDC IN

Connection to the unit should be made with twisted pair, shielded cable. The shield should be attached to the airframe at one end only. Pins A, B, and C (the input pins) should be wired using 22 - 24 AWG wire. The output (pins D and E) and power (pins F and G) should be wired using wire no smaller than 20 AWG.

The finish on the case is electrically conductive, and it is not necessary to remove the finish for electrical bonding.

Caution: do not connect the audio outputs to power return or chassis ground.

2.3.4 Mechanical Installation

The Model 245 may be mounted in any position. No shock or vibration isolators are required.

For proper heat dissipation, the Model 245 should be mounted on a metal surface of at least 100 square inches. The amplifier case should also be grounded to the airframe.

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.

2.3.5.1 Voltage/resistance checks

Do not attach the Model 245 until the following conditions are met.

Check the following:

- a) Check pin <G> for +28 Vdc relative to ground.
- b) Check pin <F> for continuity to ground - less than 0.5 Ω (power ground).
- c) Check inputs and outputs for correct orientation.

2.3.5.2 Power On checks

Install the Model 245 and power up the aircraft's systems. Verify normal operation of all functions.

2.3.6 Log Entries

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

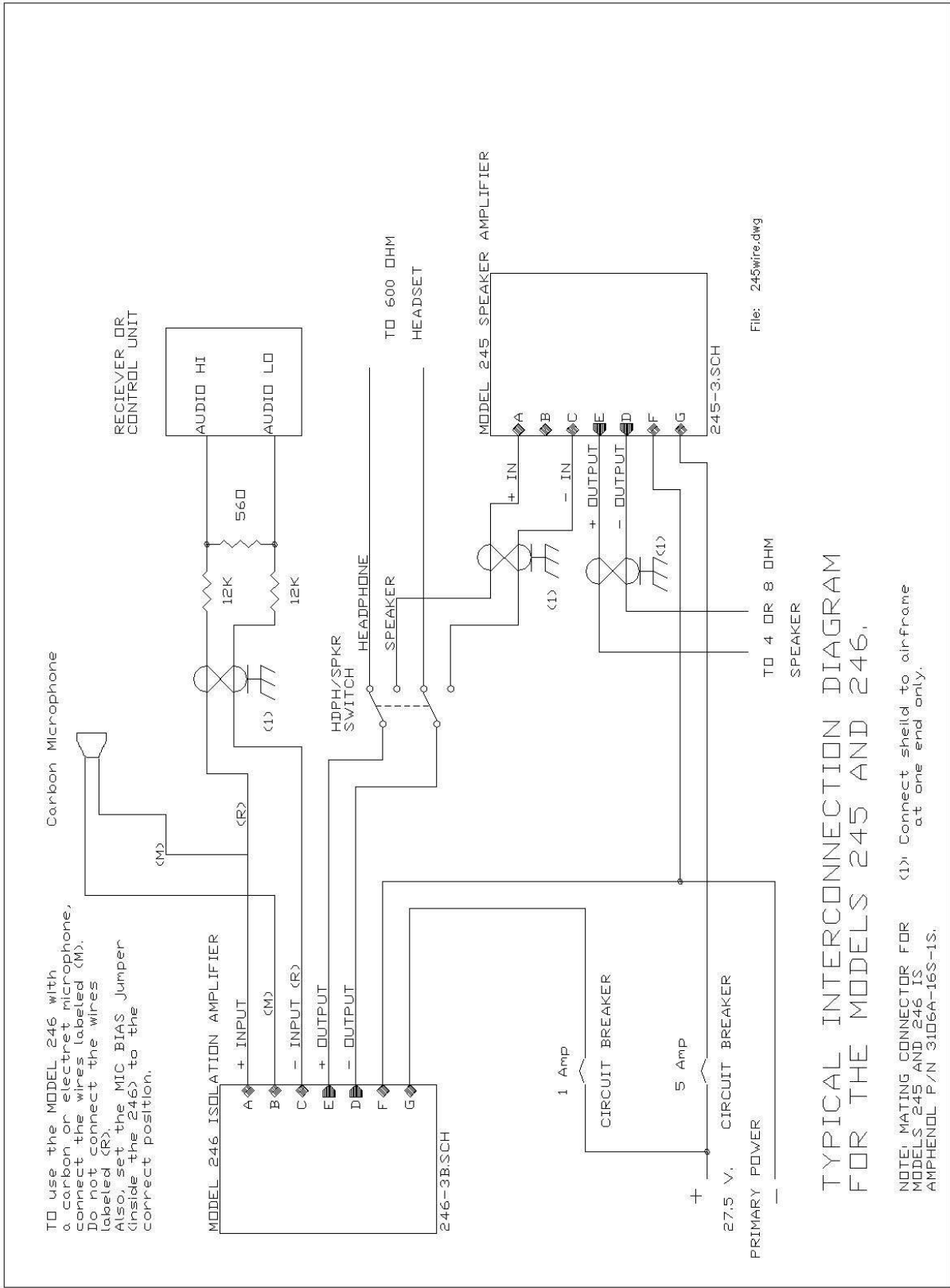
2.5 Accessories Required But Not Supplied

Electrical connections to the amplifier are made via a 7-pin circular connector. The mating connector is Amphenol part number MS3106F-16S-1S or equivalent.

2.6 Installation Drawings

DRAWING	REV.	DESCRIPTION	TYPE
Interconnect	-	Speaker Amplifier	Generic Interconnect
245\521-0	1.00	Speaker Amplifier	Environmental Qual Form
245\245\922-0	1.01	Speaker Amplifier	Mech. Installation

Section 2 ends after these Drawings





ENVIRONMENTAL QUALIFICATION FORM

Description: **SPEAKER AMPLIFIER** Document #: **245\521-0**
NAT Part #: **MODEL 245-xxx** TSO #: **: C50c**
Manufacturer's Specification and/or Other Applicable Specification: **RTCA DO-160C**
Manufacturer: **Northern Airborne Technology Ltd.**
Address: **1925 Kirschner Rd., Kelowna, BC, Canada. V1Y 4N7**

Prepared By:	NAT 226	Checked By:	NAT 278	DE 01	Approved By:	NAT 125
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CONDITIONS	DO-160C SECTION/ PARAGRAPH	DESCRIPTION OF CONDUCTED TESTS
Temperature and altitude	4.0	Equipment was tested to and meets requirements of Category A2, F2
Low temperature	4.5.1	-55C Operating Low Temperature
High temperature	4.5.2, 4.5.3	+70C Operating High Temperature
Altitude	4.6.1	Maximum Operating Altitude +70,000 ft
Decompression	4.6.2	8,000 ft to 70,000 ft
Overpressure	4.6.3	-15,000 ft
Temperature variation	5.0	Equipment was tested to and meets requirements of Category B
Humidity	6.0	Equipment was tested to and meets requirements of Category A
Operational shocks and crash safety	7.0	Equipment was tested to and meets requirements of DO-160C, paragraphs. 7.2.1, 7.3.1, 7.3.2, and 7.3.2.2
Operational shocks	7.2	For shock, equipment meets 15g requirement while operating.
Crash safety	7.3	
Vibration	8.0	Equipment tested to and meets requirements (without shock mounts) of Categories C and L (DO-160C, Table 8-1)
Explosion proofness	9.0	Equipment identified as Category X, no test required.
Waterproofness	10.0	Equipment identified as Category X, no test required.

CONDITIONS	DO-160C SECTION/ PARAGRAPH	DESCRIPTION OF CONDUCTED TESTS
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 resistance	13.0	Equipment identified as Category X, no test required.
Salt spray	14.0	Equipment identified as Category X, no test required.
Magnetic effect	15.0	Equipment is Class Z.
Power input	16.0	Equipment was tested to and meets requirements of Categories B and Z.
Voltage spike	17.0	Equipment was tested to and meets requirements of Category A.
Audio frequency conducted susceptibility	18.0	Equipment was tested to and meets requirements of Category A.
Induced signal susceptibility	19.0	Equipment was tested to and meets requirements of Category A.
Radio frequency susceptibility	20.0 Change No. 3	Equipment was tested to and meets requirements of Category T.
Emission of radio frequency energy	21.0	Equipment was tested to and meets requirements of Category Z.
Lightning induced transient susceptibility	22.0 Change No. 2	Equipment meets requirements of Category XXC2.
Lightning direct affects	23.0	Equipment identified as Category X, no test required.
Icing	24.0	Equipment identified as Category X, no test required.

REMARKS:

- Tests of DO-160C, Sections 4.0 (paragraphs 4.5.1, 4.5.2, & 4.5.3), 5.0, 16.0, and 18.0 were conducted at dB Systems, Inc. in Redmond, WA.
- Tests of DO-160C, Sections 4.0 (paragraphs 4.6.1, 4.6.2, 4.6.3), 6.0, 7.0, 8.0, 17.0, 19.0, 20.0, 21.0, and 22.0 were conducted at Allied Signal Aerospace in Redmond, WA.

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 245 Speaker Amplifier

3.2 General

The Model 245 Speaker Amplifier is an electronic device that is capable of driving a 4-ohm cockpit speaker. It is intended to be a direct replacement for the Collins model 356F-3.

3.3 Operation Specifics

The Model 245 Speaker Amplifier 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

