Installation and Operation Manual

Model 247
Audio Mixing Amplifier

SM247

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ISSUE 2.10

IMPORTANT NOTICE

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COBHAM
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The status of this installation and operation manual is controlled by issue shown on the title page. The status of each section is controlled by revision shown in the footer of each page. All revisions affecting sections of this manual have been incorporated into the latest issue.

ISSUE/REVISION RECORD

Manual Issue Number	Section Revision Number	Revision Description	Issue Date
2.10	See Manual Issue Number	DCA W12119: Combined all Sections into one manual as 247\804-0. Added Revs 1.60,1.70, 1.80 and 1.90 drawings for Outline drawing 247.	See Cover Page
2.00	Section 1 Rev: 1.00 Section 2 Rev: 1.00 Section 3 Rev: 1.00	Rewritten in full NAT format	July 31, 2009
A	N/A	NAT Front Cover on dB Manual	June 29, 2005

Table of Contents

Section 1 Description

1.1 Introduction

Information in this section consists of product description, design features and specifications for the Model 247 Audio Mixing Amplifier. The Model 247-001 is also included in this manual – any other derivative product information shall be contained in the applicable manual supplement, which may be obtained from COBHAM as required.

Review all notes, warnings and cautions.

1.2 Product Description

The Model 247 Audio Mixing Amplifier contains three electrically independent audio mixing circuits with four input channels and one output channel each.

The Model 247 is designed for use as a multipurpose mixing amplifier for mixing Aural Warning, Cockpit Voice Recorder or virtually any aircraft audio signals. Each input is adjustable to accept 0.25 Vrms microphone input signals, headphone audio signals from a standard aircraft audio system, or receiver input signals up to 50 mW. Mic bias for each input channel is user selectable. Access for gain adjustment and mic bias selection is made by cover removal.

Outputs from the Model 247 are designed to drive any impedance from 8 ohms up to 10K ohms. Output power is limited by 100 ohm resistors on each output. If additional inputs are needed beyond the four inputs provided for each mixing circuit, an output from one mixer circuit can be fed to the input of another mixer thereby increasing the size of the mixer. The Model 247 can also drive headsets for headset amplifier applications.

The Model 247 gain is established at a maximum of 12 dB with the bias/ground jumpers installed. However, for input signals which do not require DC BIAS or a 600 ohm input impedance, the bias/ ground jumper for a given input can be removed which will result in an additional 6 dB gain increase (doubling of the gain).

1.3 Design Features

The Model 247 standard configuration is designed for driving non-DC biased (ground referenced) loads.

The Model 247-001 includes bi-polar output capacitors for compatibility with DC biased loads such as DC biased microphone inputs to other equipment.

1.4 Specifications

1.4.1 Electrical Specifications

Power Supply:	28 VDC at 150 mA maximum (each circuit). Maximum current (3 mixer circuits combined) = 450 mA
Input impedance:	600 Ω (15KΩ with gnd/bias jumper removed)
Output impedance:	100 Ω

Frequency Response:	Flat within ±3dB from 300 to 6,000 Hz
Distortion:	<1% THD+N from 300 to 6,000 Hz
Gain Range:	>12 dB
Output:	4.5 Vrms (33mW) into 600 Ω, Outputs are current limited
	Note: Model 247-001 includes bi-polar output capacitors for compatibility with DC biased loads such as microphone inputs
Mic bias	18 Vdc at 30 mA (600 Ω source impedance) individually selectable

1.4.2 Physical Specifications

Height	41.40 mm (1.63 in) maximum
Depth	76.96 mm (3.03 in) maximum
Width	76.96 mm (3.03 in) maximum excluding flanges 102.36 mm (4.03 in) maximum including flanges
Weight	0.6 kg (0.42 lbs)
Enclosure	Conversion coated aluminum
Mounting	Bulkhead Mount: four # 8 screws

1.4.3 Environmental Specifications

Temperature	-55° to +70° C
Altitude	-15,000 to 70,000 feet

Qualification of the Model 247 Audio Mixing Amplifier was completed in accordance with RTCA/DO-160C Env. Cat. [A2F2]-BA(CL)XXXXXXZ(BZ)AAATZ(XXC2)XX

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

1.4.4 Product Approval

FAA: TSO-C50c (RTCA/DO-214 Class Ib, RTCA/DO-160C).

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 Model 247 Audio Mixing Amplifier.

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

This product is warranted for 2 years from date of sale, to be free of defects in workmanship or performance. This warranty covers all materials and labor, but is exclusive of any transport to deliver the defective unit to and from COBHAM or its designated warranty repair center, or any labor to remove or re-install the defective unit in the aircraft. Contact COBHAM for any questions regarding this warranty, its applicability to your units and/or for return authorization. COBHAM 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.

2.3 Airworthiness Limitations

The Airworthiness Limitations section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403, unless an alternative program has been FAA approved.

Maintenance of the Model 247 Audio Mixing Amplifier is ‘on condition’ only. Periodic maintenance of this product is not required. Assembly drawings, parts lists, and schematics are included in this manual for use during troubleshooting and repair.

2.4 Installation Procedures

Installation Notice

This product must be installed in accordance with the installation instructions provided in the latest issue of this Installation and Operation Manual. Check with COBHAM for the lastest issue status of the manual. All risk associated with installation of this product contrary to these instructions shall be the responsibility of the installing agency.

2.4.1 Warnings

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

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 Interconnect 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, except power and ground lines, which shall be a minimum of 20 AWG. Reference 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. Power to this unit must be supplied from a separate circuit breaker or fuse (fast blow), and not attached to any other circuit breaker without additional protection. Verify that the selected circuit breaker size and wire gauge are adequate for the installation using the techniques specified in AC43.13-1B Change 1, Paragraphs 11-47 through 11-51 and 11-66 through 11-69.

2.4.4 Mechanical Installation

The Model 247 is designed to be mounted in virtually any pressurized or unpressurized location within an aircraft fuselage. The unit can be mounted in any axis using four (4) #8 mounting screws. No shock or vibration isolators are required.

The Model 247 must be mounted to a clean metal surface which is electrically bonded to the aircraft ground plane. The unit is finished with a coating which prevents corrosion. This film is electrically conductive and should not be removed for electrical bonding.

2.4.5 Electrical Installation

The Model 247 has 3 separate power and ground inputs for each of its 3 internal mixer circuits. This is designed to allow maximum flexibility for the installer if separate power supplies are used. All three power and ground inputs can also be connected together and supplied from one source. Maximum current draw for each mixer circuit within the Model 247 is 0.5 Amps assuming maximum output voltage into a maximum load of 8 ohms.

2.4.6 Pin Assignment

Pin	Assignment	Pin	Assignment
P40-1	Mixer 1, Input 1 HI	P40-2	Mixer 1, Input 2 HI
P40-3	Mixer 1, Input 3 HI	P40-4	Mixer 1, Input 4 HI
P40-5	Mixer 1, 28 VDC	P40-6	Mixer 2, Input 1 HI
P40-7	Mixer 2, Input 2 HI	P40-8	Mixer 2, Input 3 HI
P40-9	Mixer 2, Input 4 HI	P40-10	Mixer 2, 28 VDC
P40-11	Mixer 3, Input 1 HI	P40-12	Mixer 3, Input 2 HI
P40-13	Mixer 3, Input 3 HI	P40-14	Mixer 3, Input 4 HI
P40-15	Mixer 3, 28 VDC	P40-16	Mixer 1, Input 1 LO
P40-17	Mixer 1, Input 2 LO	P40-18	Mixer 1, Input 3 LO
P40-19	Mixer 1, Input 4 LO	P40-20	Mixer 1, Power Return
P40-21	Mixer 2, Input 1 LO	P40-22	Mixer 2, Input 2 LO
P40-23	Mixer 2, Input 3 LO	P40-24	Mixer 2, Input 4 LO
P40-25	Mixer 2, Power Return	P40-26	Mixer 3, Input 1 LO
P40-27	Mixer 3, Input 2 LO	P40-28	Mixer 3, Input 3 LO
P40-29	Mixer 3, Input 4 LO	P40-30	Mixer 3, Power Return
P40-31	Chassis Ground(shield ground)	P40-32	Chassis Ground (shield ground)
P40-33	Chassis Ground(shield ground)	P40-34	Mixer 1, Output LO
P40-35	Mixer 1, Output HI	P40-36	Chassis Ground (shield ground)
P40-37	Chassis Ground(shield ground)	P40-38	Chassis Ground (shield ground)
P40-39	Mixer 2, Output LO	P40-40	Mixer 2, Output HI
P40-41	Chassis Ground(shield ground)	P40-42	Chassis Ground (shield ground)
P40-43	Mixer 3, Output LO	P40-44	Mixer 3, Output HI

2.4.7 Post Installation Checks

2.4.7.1 Voltage/Resistance Checks

Do not attach the Model 247 until the following conditions are met.

Check the following:

a) Check pin **<5> <10> <15>** for +28 Vdc relative to ground.

b) Check pins **<20> <25>** and **<30>** for ground (less than 0.5Ω).

2.4.7.2 Power On Checks

Power up the aircraft's systems and verify normal operation of all functions of the Model 247.

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

The Model 247 cover must be removed to gain access to the internal adjustments shown in Figure 1 Internal Adjustments below. Refer to Assembly drawing 247-1 in the SM247 Maintenance manual.

To remove the Model 247 cover, remove the 2 screws in the top of the unit. Do not remove screws under the base of the unit. 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.

CAUTION
The Model 247 Series Audio Mixing Amplifier contains static sensitive devices. Proper ESD handling procedures must be followed to prevent damage to the unit.

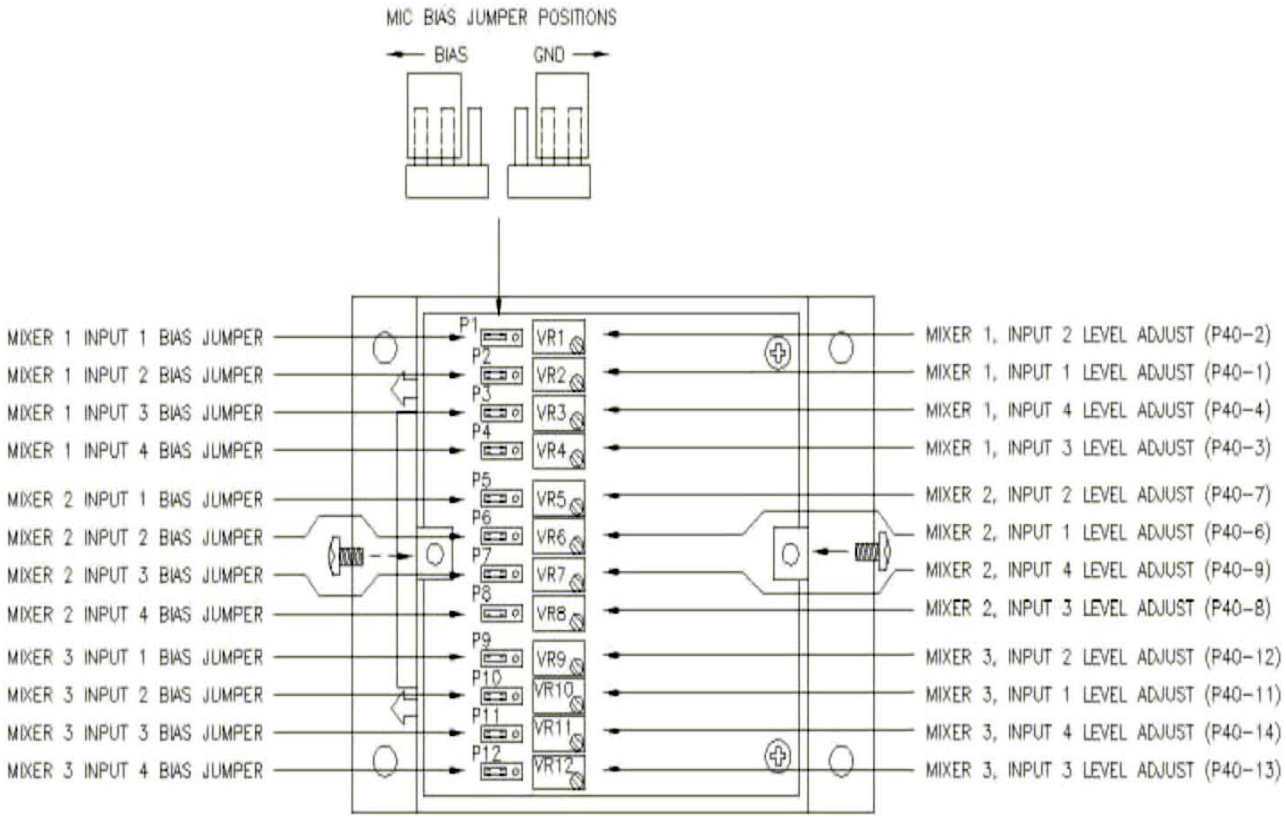


Figure 1 Internal Adjustments

2.6 Accessories Required But Not Supplied

Installation kit p/n D44SV-IKC (crimp) is required to complete the installation. The kit consists of the following:

Quantity	Description	NAT Part No.
1	D-sub Socket, Crimp, Locking	20-21-044
44	Contacts, Crimp, Female	20-26-014

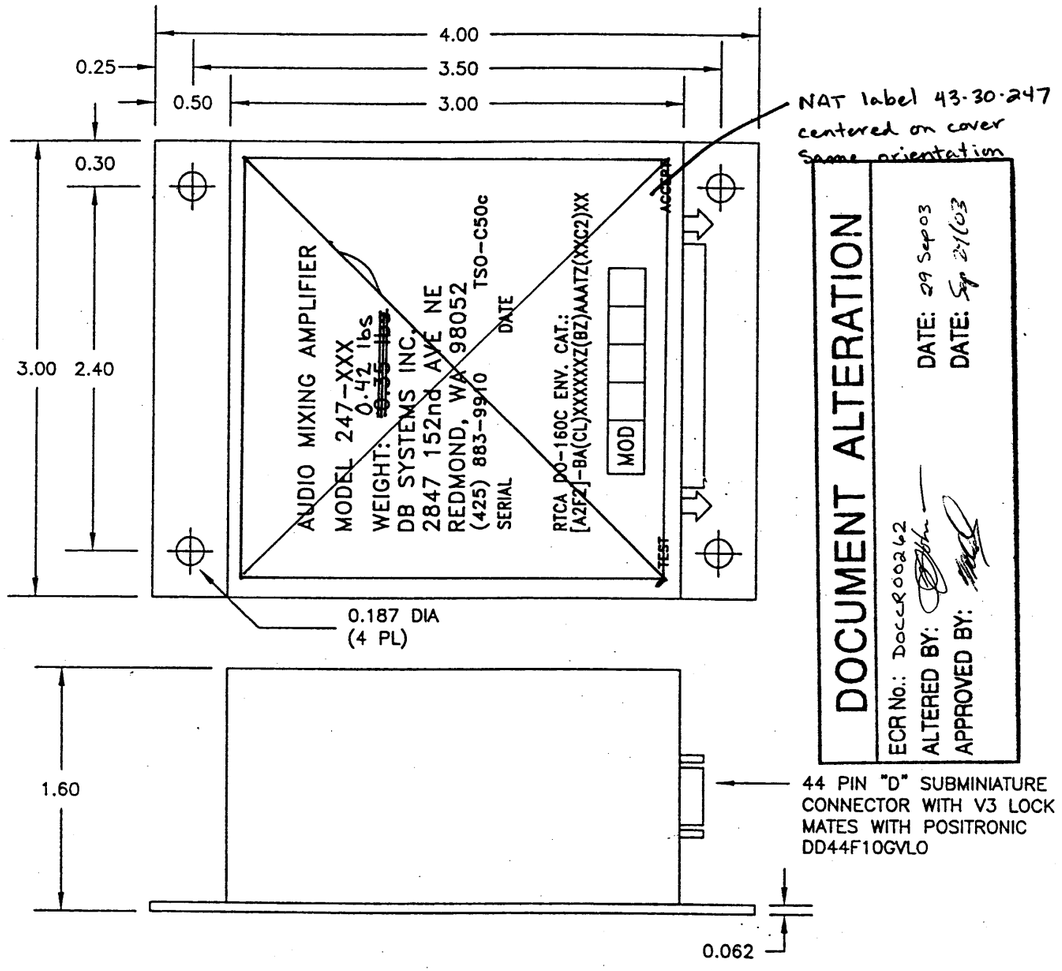
2.7 Installation Drawings

DRAWING	REV.	DESCRIPTION	TYPE	SERIAL No.
Model 247				
247	1.50	Audio Mixer Amplifier	Outline	062711-082411
247	1.60	Audio Mixer Amplifier	Outline	082511-102711
247	1.70	Audio Mixer Amplifier	Outline	102811-111311
247	1.80	Audio Mixer Amplifier	Outline	111411-021312
247	1.90	Audio Mixer Amplifier	Outline	021412+
247\403-0	1.00	Audio Mixer Amplifier	Interconnect	All
247\247\521-0	1.00	Audio Mixer Amplifier	Environmental Qual Form	All

Section 2 ends following the above documents

DOCUMENT ALTERATION

ECR No.: HWCR 00138
ALTERED BY: [signature] DATE: Dec 16/03
APPROVED BY: [signature] DATE: Dec 16/03



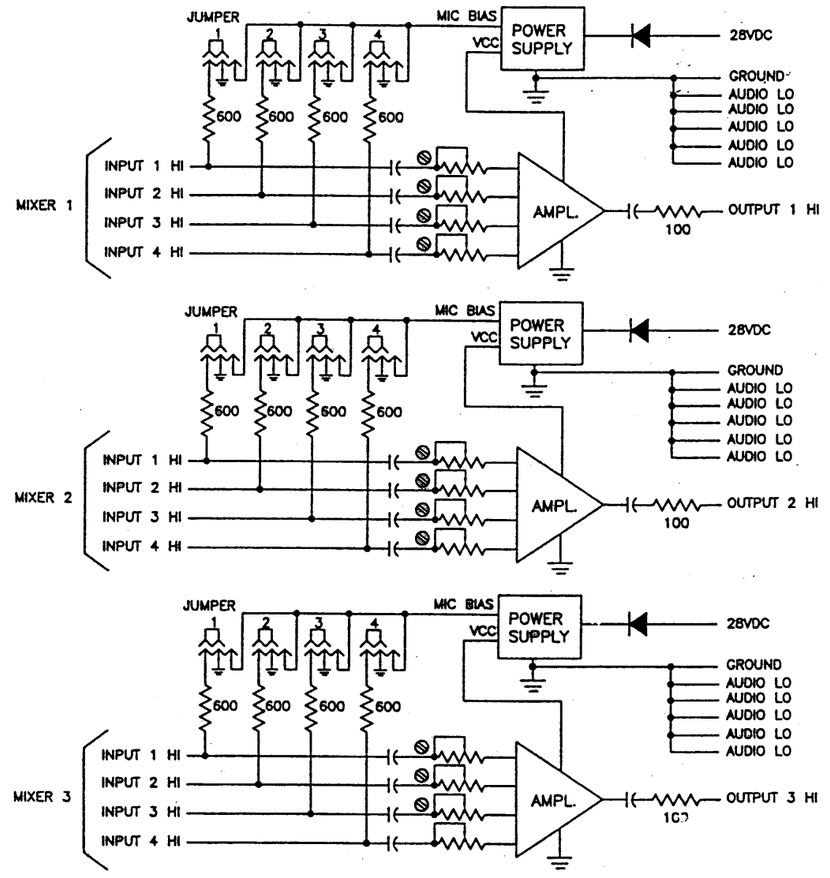
NAT label 43-30-247 centered on cover same orientation

DOCUMENT ALTERATION

ECR No.: Doc R00262 DATE: 29 Sep 03
ALTERED BY: [signature]
APPROVED BY: [signature] DATE: Sep 29/03

44 PIN "D" SUBMINIATURE CONNECTOR WITH V3 LOCK MATES WITH POSITRONIC DD44F10GVLO

MODEL 247 AUDIO MIXING AMPLIFIER BLOCK DIAGRAM



⊘ DENOTES INTERNAL SCREWDRIVER ADJUSTMENTS

NOTES:

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3. THE ENCLOSURE IS FABRICATED FROM 0.062 THICK ALUMINUM ALLOY, FINISHED USING CHROMATE CONVERSION COATING PER MIL-C-5541 TO PREVENT CORROSION AND PROVIDE ELECTRICAL BONDING. THE ENCLOSURE MUST BE BONDED OR GROUND STRAPPED TO THE AIRFRAME.
4. THE MODEL 247 MAY BE MOUNTED IN ANY POSITION, HEATSINKING OR SHOCK ISOLATORS ARE NOT REQUIRED. HOWEVER, TO MINIMIZE THE POSSIBILITY OF INDUCED ELECTRICAL INTERFERENCE, TWISTED, SHIELDED PAIR WIRING SHOULD BE USED FOR ALL AUDIO CONNECTIONS. GROUND THE SHIELDS AT ONE END ONLY IN ORDER TO AVOID INTRODUCING GROUND LOOPS.
5. NAMEPLATE INFORMATION ~~IS PERMANENTLY PRINTED ON THE ENCLOSURE USING BLACK EPOXY INK.~~ IS DISPLAYED ON THE NAT LABEL.
6. DIMENSIONAL TOLERANCES: XX.XX +/- 0.03
   HOLES +/- 0.005
7. 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.

DETAIL P/N	DESCRIPTION OF DETAIL (DIFFERENCES FROM BASE MODEL)
BASEMODEL	STANDARD PRODUCTION BASEMODEL NO MOD: USES PCB ASSY 247-41.
-001	INCLUDES BI-POLAR ELECTROLYTIC OUTPUT CAPACITORS FOR WITH DC BIASED LOADS. NO MOD. USES PCB ASSY. 247-51.

REV	DESCRIPTION	DATE	BY
C	INCORP. MODEL 247-001. ADDED NOTE 7. (TYPE M)	12-20-01	CK
B	CORRECT MINOR DRAWING ERROR. (TYPE M)	8-20-98	CK
A	MINOR TYPOGRAPHICAL ERROR CORR. (TYPE M)	8-29-96	DSP

dB Systems, Inc.

OUTLINE, MODEL 247 AUDIO MIXING AMPLIFIER

SCALE	DRAWN	CHECK	APPROVED
FULL	AP 8-28-96	GB 8-28-96	AP 8-28-96

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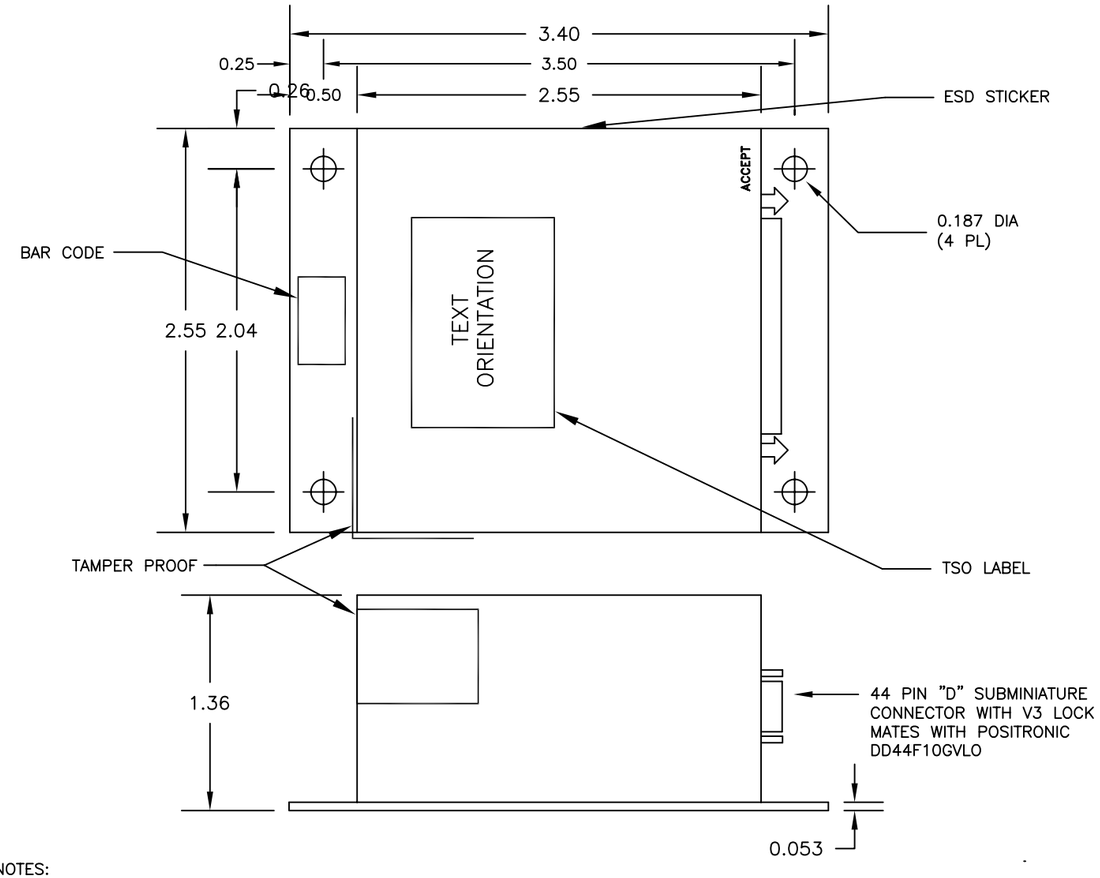
1.50



NOTES:

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   247-1 ASSEMBLY, AUDIO MIXING AMPLIFIER
   247-4 ACCEPTANCE TEST PROCEDURE
   247-16 EQUIPMENT MANUAL
   247-8 QUALIFICATION TEST REPORT

2. THE MODEL 247 IS A GENERAL PURPOSE AUDIO MIXING AMPLIFIER DESIGNED FOR MULTIPLE USES SUCH AS MIXING COCKPIT VOICE RECORDER SIGNALS. THE 247 INCORPORATES 3, ELECTRICALLY ISOLATED, 4 CHANNEL AUDIO MIXING CIRCUITS. EACH OF THE 12 ADJUSTABLE INPUTS WILL ACCEPT AUDIO SIGNALS FROM 0.25Vrms TO 7Vrms. 18 Vdc @ 30mA MIC BIAS IS INTERNALLY SELECTABLE AFTER COVER REMOVAL. FREQUENCY RESPONSE IS FLAT FROM 300 TO 6000 Hz. OUTPUT LEVEL IS 0 TO 4 Vrms WITH AN OUTPUT IMPEDANCE OF 100 Ohms. INPUT IMPEDANCES ARE EACH 600 OHMS. EACH ELECTRICALLY ISOLATED AND SEPARATELY POWERED MIXING CIRCUIT REQUIRES 28 Vdc @ 300mA (MAX) POWER SUPPLY.

3. THE ENCLOSURE IS FABRICATED FROM 0.062 THICK ALUMINUM ALLOY, FINISHED USING CHROMATE CONVERSION COATING PER MIL-C-5541 TO PREVENT CORROSION AND PROVIDE ELECTRICAL BONDING. THE ENCLOSURE MUST BE BONDED OR GROUND STRAPPED TO THE AIRFRAME.

4. THE MODEL 247 MAY BE MOUNTED IN ANY POSITION, HEATSINKING OR SHOCK ISOLATORS ARE NOT REQUIRED. HOWEVER, TO MINIMIZE THE POSSIBILITY OF INDUCED ELECTRICAL INTERFERENCE, TWISTED, SHIELDED PAIR WIRING SHOULD BE USED FOR ALL AUDIO CONNECTIONS. GROUND THE SHIELDS AT ONE END ONLY IN ORDER TO AVOID INTRODUCING GROUND LOOPS.

5. NAMEPLATE INFORMATION IS DISPLAYED ON THE NAT LABEL.

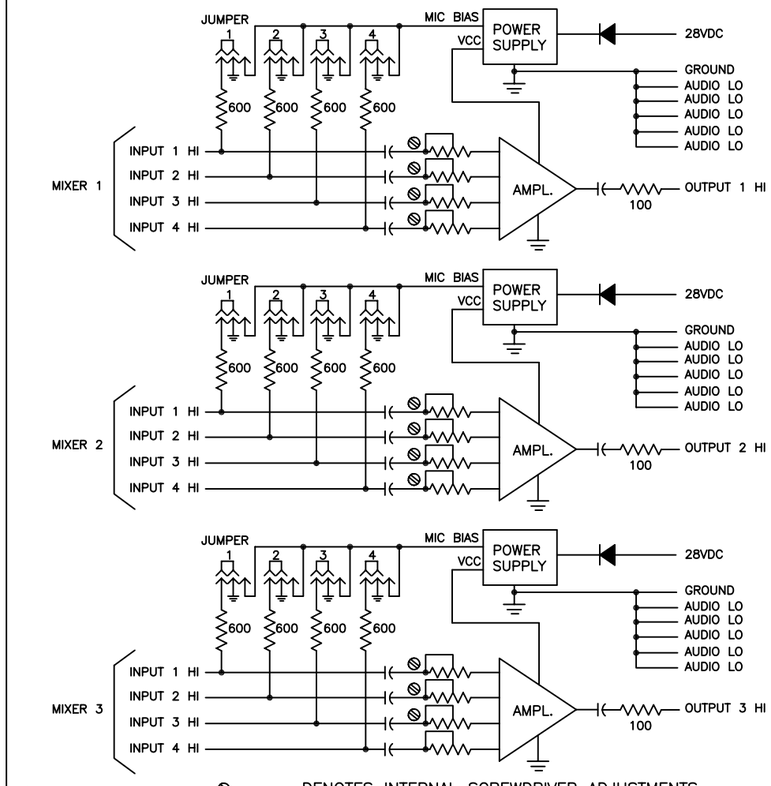
6. DIMENSIONAL TOLERANCES: XX.XX +/- 0.03
   HOLES +/- 0.005

7. 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.

8. WEIGHT: 0.36 (0.16kg) +0.10 (0.045kg) MAX
   -0.25 (0.113kg) MIN

REVISIONS						
REV	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED	PUBLISHED
	FOR PREVIOUS REVISIONS SEE REV 1.50					
1.60	LABEL CHANGES PER DCA W11139	06/27/11	P. HAGEN	A. RODGERS	J. BUEHRING	L. ANDUJO

MODEL 247 AUDIO MIXING AMPLIFIER BLOCK DIAGRAM



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TEMPLATE 150-744514-01 REV A

SOURCE: DWG

TOLERANCES:
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DECIMALS	ANGLES
.XX±.01	±.5°
.XXX±.005	

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THIRD ANGLE PROJECTION

Chelton Avionics, Inc
dba Wulfsberg Electronics Division
Prescott,AZ

TITLE OUTLINE, MODEL 247 AUDIO MIXING AMPLIFIER

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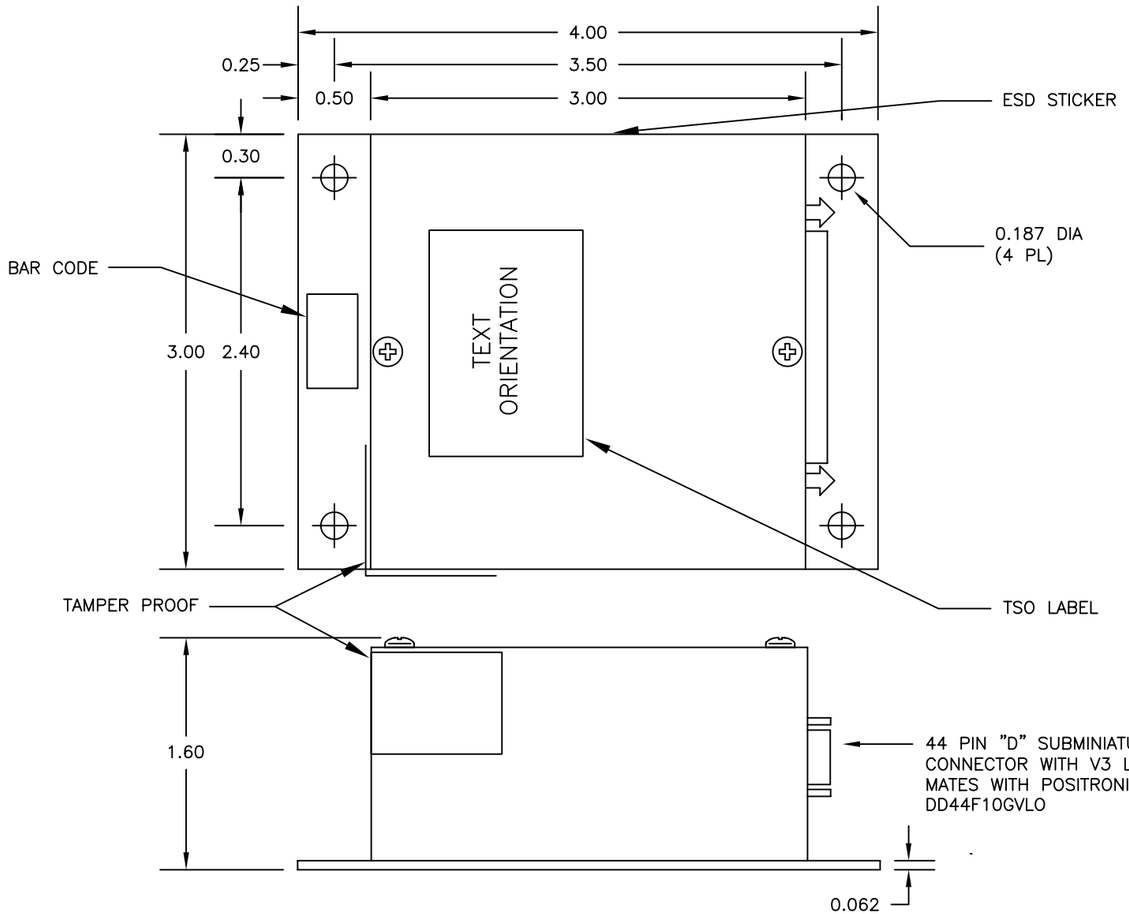

REVISIONS						
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	FOR PREVIOUS REVISIONS SEE REV 1.50					
1.60	LABEL CHANGES PER DCA W11139	06/27/11	P. HAGEN	A. RODGERS	J. BUEHRING	L. ANDUJO
1.70	CORRECT INADVERTENT DIMENSION CHANGES PER W11831.	10/28/11	P. HAGEN	S. ELLIOTT	J. BUEHRING	L. ANDUJO

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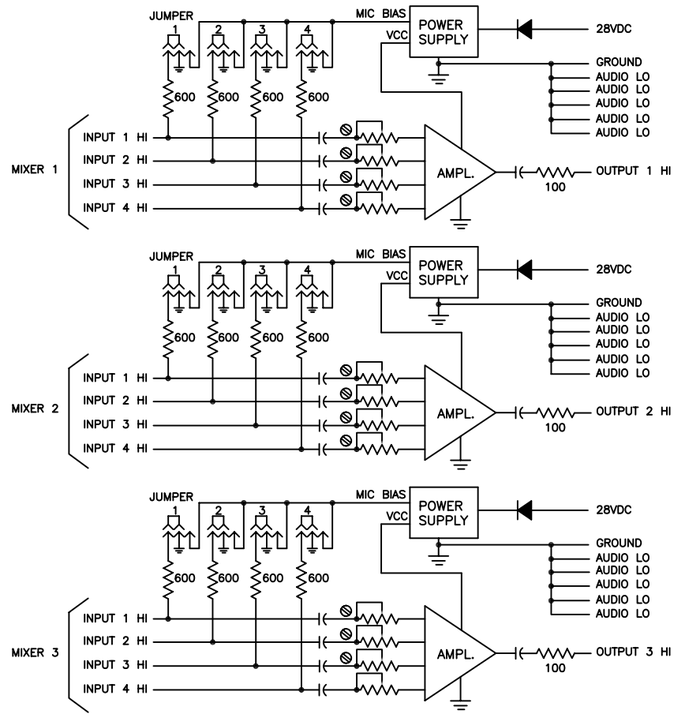

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SIZE	CAGE CODE	DWG NO.	REV
B	1B7G3	247	1.70

SCALE = NONE | OUTLINE | SHEET = 1 OF 1

NOTES:

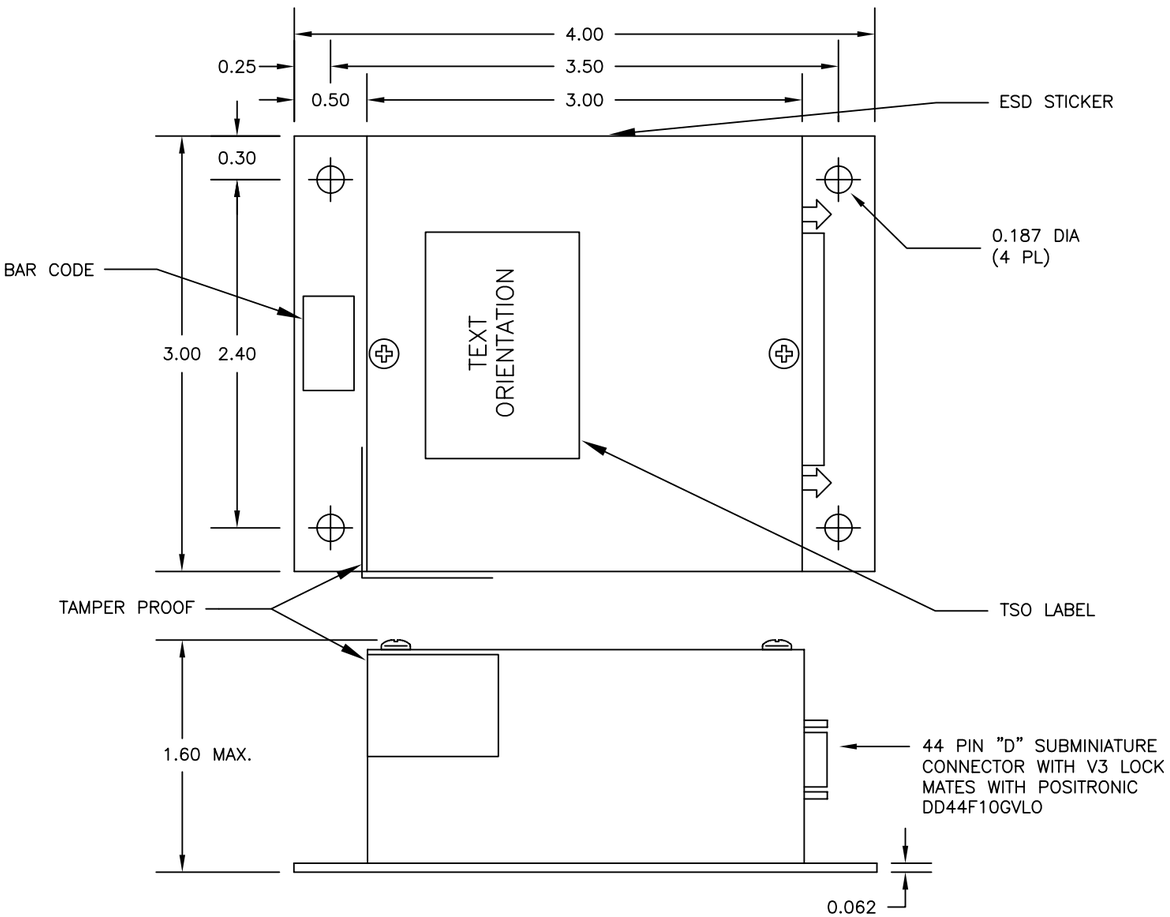
1. REFERENCE DRAWINGS AND DOCUMENTS:
   247-1 ASSEMBLY, AUDIO MIXING AMPLIFIER
   247-4 ACCEPTANCE TEST PROCEDURE
   247-16 EQUIPMENT MANUAL
   247-8 QUALIFICATION TEST REPORT
2. THE MODEL 247 IS A GENERAL PURPOSE AUDIO MIXING AMPLIFIER DESIGNED FOR MULTIPLE USES SUCH AS MIXING COCKPIT VOICE RECORDER SIGNALS. THE 247 INCORPORATES 3, ELECTRICALLY ISOLATED, 4 CHANNEL AUDIO MIXING CIRCUITS. EACH OF THE 12 ADJUSTABLE INPUTS WILL ACCEPT AUDIO SIGNALS FROM 0.25Vrms TO 7Vrms. 18 Vdc @ 30mA MIC BIAS IS INTERNALLY SELECTABLE AFTER COVER REMOVAL. FREQUENCY RESPONSE IS FLAT FROM 300 TO 6000 Hz. OUTPUT LEVEL IS 0 TO 4 Vrms WITH AN OUTPUT IMPEDANCE OF 100 Ohms. INPUT IMPEDANCES ARE EACH 600 OHMS. EACH ELECTRICALLY ISOLATED AND SEPARATELY POWERED MIXING CIRCUIT REQUIRES 28 Vdc @ 300mA (MAX) POWER SUPPLY.
3. THE ENCLOSURE IS FABRICATED FROM 0.062 THICK ALUMINUM ALLOY, FINISHED USING CHROMATE CONVERSION COATING PER MIL-C-5541 TO PREVENT CORROSION AND PROVIDE ELECTRICAL BONDING. THE ENCLOSURE MUST BE BONDED OR GROUND STRAPPED TO THE AIRFRAME.
4. THE MODEL 247 MAY BE MOUNTED IN ANY POSITION, HEATSINKING OR SHOCK ISOLATORS ARE NOT REQUIRED. HOWEVER, TO MINIMIZE THE POSSIBILITY OF INDUCED ELECTRICAL INTERFERENCE, TWISTED, SHIELDED PAIR WIRING SHOULD BE USED FOR ALL AUDIO CONNECTIONS. GROUND THE SHIELDS AT ONE END ONLY IN ORDER TO AVOID INTRODUCING GROUND LOOPS.
5. NAMEPLATE INFORMATION IS DISPLAYED ON THE COBHAM LABEL.
6. 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.

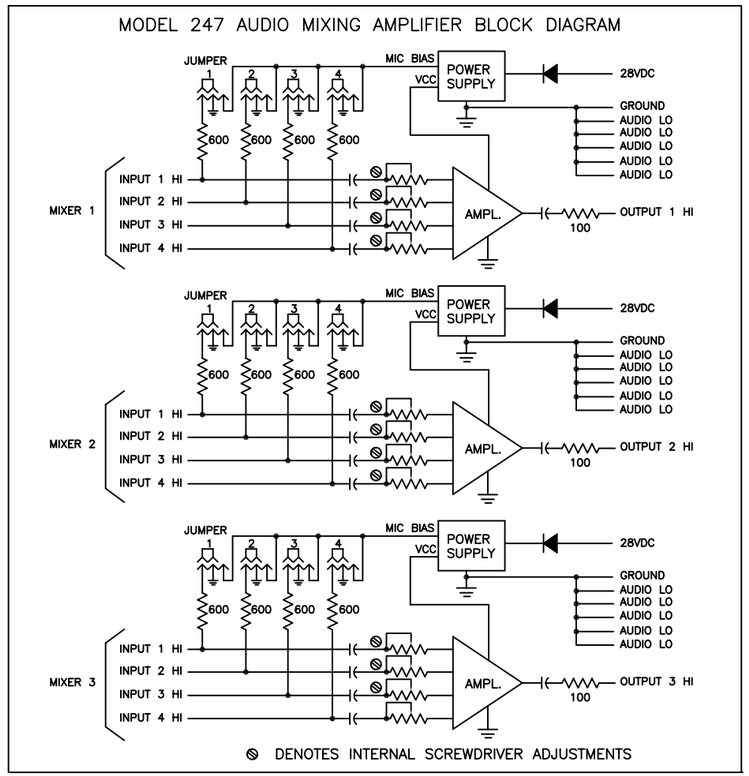
DETAIL P/N	DESCRIPTION OF DETAIL (DIFFERENCES FROM BASE MODEL)
BASEMODEL	STANDARD PRODUCTION BASEMODEL NO MOD: USES PCB ASSY 247-41.
-001	INCLUDES BI-POLAR ELECTROLYTIC OUTPUT CAPACITORS FOR DC BIASED LOADS. NO MOD. USES PCB ASSY. 247-51.

7. WEIGHT: 0.36 (0.16kg) +0.10 (0.045kg) MAX -0.25 (0.113kg) MIN

REVISIONS

REV	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED	PUBLISHED
	FOR PREVIOUS REVISIONS SEE REV 1.50					
1.60	LABEL CHANGES PER DCA W11139	06/27/11	P. HAGEN	A. RODGERS	J. BUEHRING	L. ANDUJO
1.70	CORRECT INADVERTENT DIMENSION CHANGES PER W11831.	10/28/11	P. HAGEN	S. ELLIOTT	J. BUEHRING	L. ANDUJO
1.80	HEIGHT CHANGE, ADJUSTED TOLERANCE TO XX.*.03, DELETED NOTE 6 PER W11881	11/14/11	P. HAGEN	S. ELLIOTT	B. PAGE	L. ANDUJO





TEMPLATE 150-744514-01 REV A | SOURCE: DWG

TOLERANCES:
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DECIMALS	ANGLES
.XX±.03	±.5°
.XXX±.005	

COBHAM

TYPED SIGNATURES INDICATE APPROVAL. HANDWRITTEN SIGNATURE APPROVAL OF THIS DOCUMENT IS ON FILE AT WULFSBERG ELECTRONICS, PRESCOTT, ARIZONA.

THIRD ANGLE PROJECTION

Chelton Avionics, Inc
dba Wulfsberg Electronics Division
Prescott,AZ

TITLE OUTLINE, MODEL 247 AUDIO MIXING AMPLIFIER

SIZE	CAGE CODE	DWG NO.	REV
B	1B7G3	247	1.80

SCALE = NONE | OUTLINE | SHEET = 1 OF 1

NOTES:

1. REFERENCE DRAWINGS AND DOCUMENTS:

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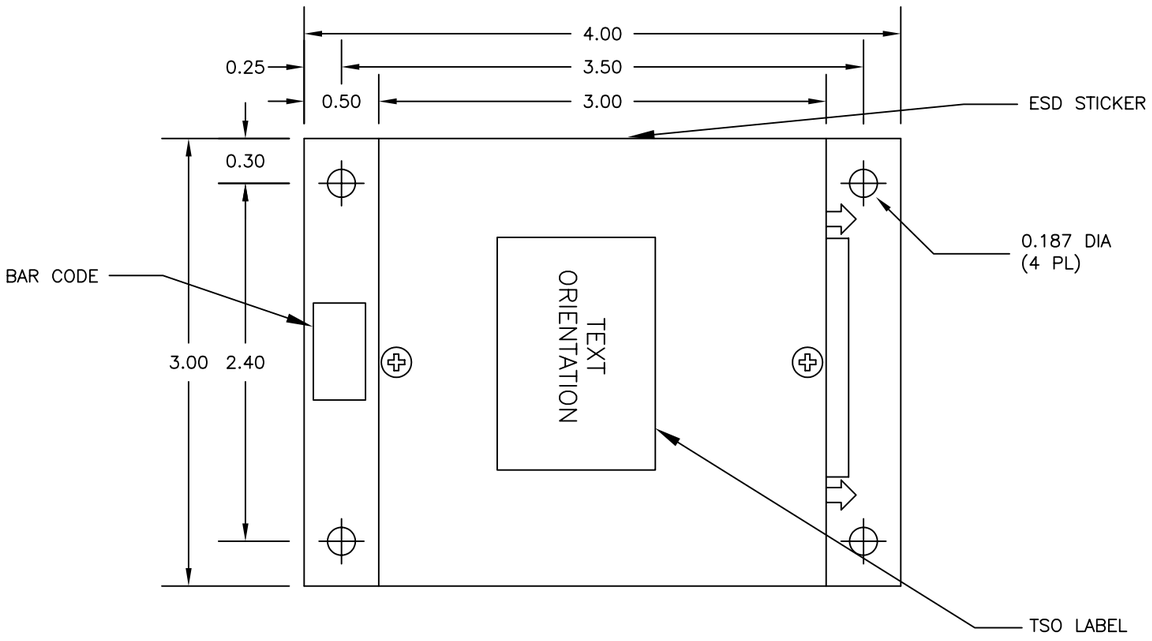
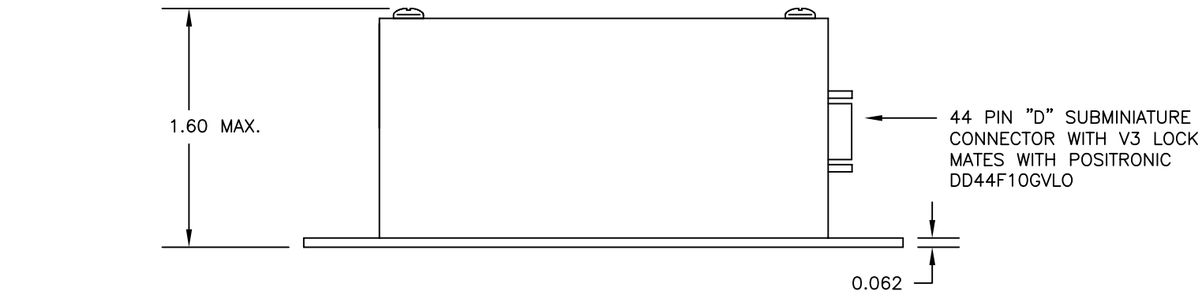
-001	INCLUDES BI-POLAR ELECTROLYTIC OUTPUT CAPACITORS FOR DC BIASED LOADS. NO MOD. USES PCB ASSY. 247-51.

7. WEIGHT: 0.36 (0.16kg) +0.10 (0.045kg) MAX -0.25 (0.113kg) MIN

NOTE: TAMPER PROOF LABEL NOT REQUIRED.





REVISIONS

REV	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED	PUBLISHED
	FOR PREVIOUS REVISIONS SEE REV 1.50					
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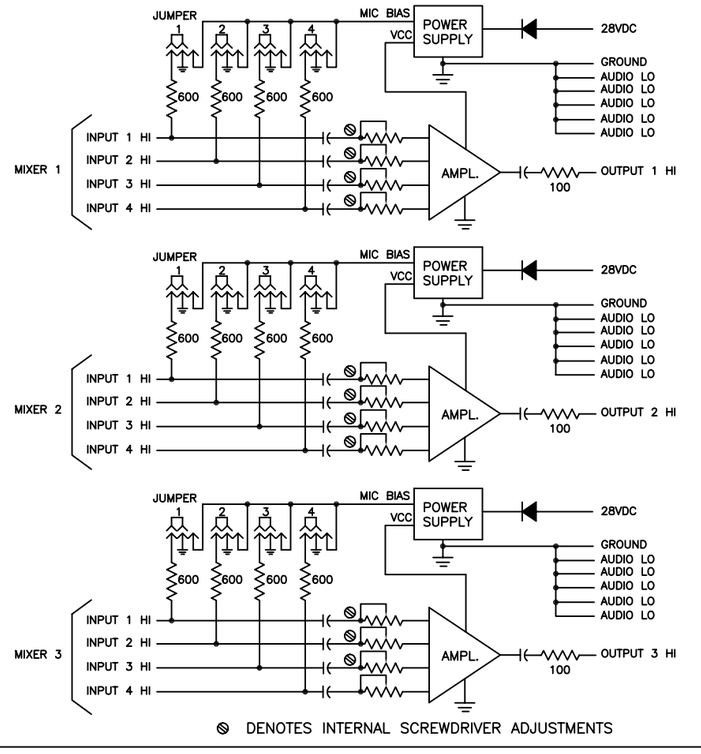
1.80	HEIGHT CHANGE, ADJUSTED TOLERANCE TO XX.±.03, DELETED NOTE 6 PER W11881	11/14/11	P. HAGEN	S. ELLIOTT	B. PAGE	L. ANDUJO
1.90	W12119: REMOVED TAMPER PROOF LABEL AND ADDED NOTE REGARDING TAMPER PROOF LABEL. ROTATED TEXT ORIENTATION 180 DEGREES.					

MODEL 247 AUDIO MIXING AMPLIFIER BLOCK DIAGRAM



TEMPLATE 150-744514-01 REV A

SOURCE: DWG

TOLERANCES:
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DECIMALS	ANGLES
.XX±.03	±.5°
.XXX±.005	

COBHAM

TYPED SIGNATURES INDICATE APPROVAL. HANDWRITTEN SIGNATURE APPROVAL OF THIS DOCUMENT IS ON FILE AT WULFSBERG ELECTRONICS, PRESCOTT, ARIZONA.

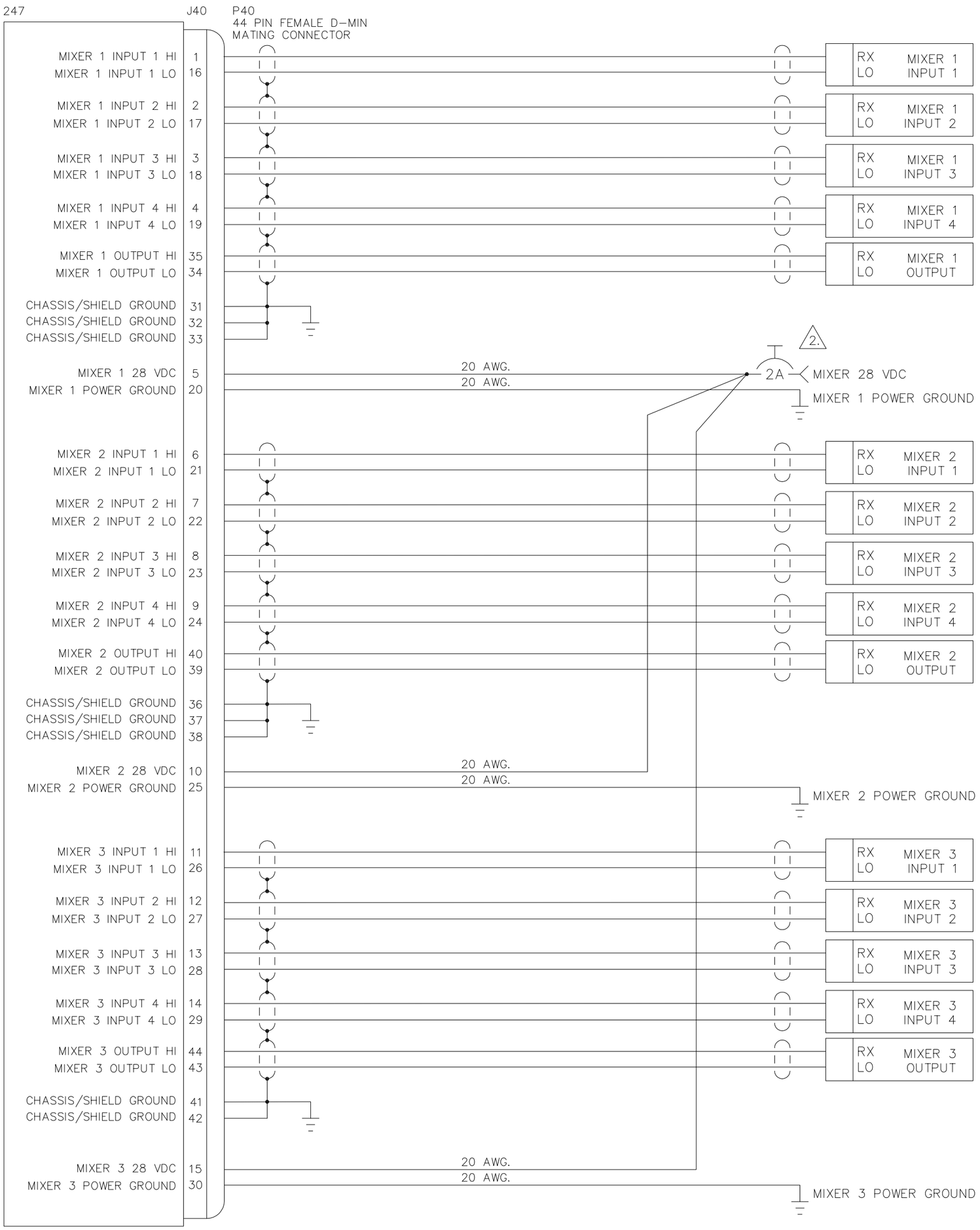
THIRD ANGLE PROJECTION

Chelton Avionics, Inc
dba Wulfsberg Electronics Division
Prescott,AZ

TITLE OUTLINE, MODEL 247 AUDIO MIXING AMPLIFIER

SIZE	CAGE CODE	DWG NO.	REV
B	1B7G3	247	1.90

SCALE = NONE	OUTLINE	SHEET = 1 OF 1



NOTES:

1. 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.

2. ALL 3 MIXER POWER INPUTS CAN BE PARALLELED OFF THE SAME CIRCUIT BREAKER. FOR SEPARATE OPERATION OR CONFIGURATION EACH POWER INPUT CAN BE CONNECTED TO A SEPARATE 1A CIRCUIT BREAKER.

DESIGNED	SI	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	MWS						
DATE	APR 23/09	TITLE	MIXING AMPLIFIER				
CHECKED	NAT 255						
APPROVED	NAT 114	SIZE B	CAGE CODE 3AB01	PART NO. 247		REV. 1.00	SHEET 1/1
FILE	403-0.DWG	DWG. TYPE	INTERCONNECT	DWG. NO.	247\403-0		

ENVIRONMENTAL QUALIFICATION FORM

Description: **Audio Mixing Amplifier** Document #: **247\247\521-0**

NAT Part #: **247-xxx** TSO#: **TSO-C50c**

Manufacturer's Specification and/or Other Applicable Specification: **RTCA DO-160C**

Manufacturer: **Wulfsberg Electronics Division**

Address: **6400 Wilkinson Drive, Prescott, AZ 86301, USA**

Prepared By:	Checked By:	Approved By:
NAT 226	NAT 231 DE 05	NAT 149

Conditions	Section	Description of Conducted Tests
Temperature and Altitude	4.0	Categories A2 and F2
Low temperature	4.5.1	-55°C Operating Low Temperature
High temperature	4.5.2, 4.5.3	+70°C Operating High Temperature
In-flight loss of cooling	4.5.4	No cooling required
Altitude	4.6.1	+70,000 feet
Decompression	4.6.2	+8,000 feet to +55,000 feet
Overpressure	4.6.3	-15,000 feet
Temperature Variation	5.0	Category B
Humidity	6.0	Category A
Operational shocks and crash safety Operational shocks Crash safety	7.0 7.2 7.3	Operational and Crash shocks per DO-160C, paragraphs. 7.2.1, 7.3.1, 7.3.2 and 7.3.2.2 (without shock mounts) Equipment meets Operational Shocks requirement during application of 15g crash shock
Vibration	8.0	Categories C and L (without shock mounts) Curve L upper test frequency was extended from 150 Hz to 2000 Hz at 3g PK
Explosion Proofness	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

Conditions	Section	Description of Conducted Tests
Fungus resistance	13.0	Category X, no test performed
Salt spray	14.0	Category X, no test performed
Magnetic effect	15.0	Class Z
Power input	16.0	Categories B and Z Equipment met requirements for Emergency Electrical System Operation per DO-160C subparagraph 16.5.2.1 b (3)
Voltage spike	17.0	Category A
Audio frequency conducted susceptibility	18.0	Category A
Induced signal susceptibility	19.0	Category A
Radio frequency susceptibility	20.0 Change No. 3	Category T
Emission of radio frequency energy	21.0	Category Z
Lightning induced transient susceptibility	22.0 Change No. 2	Category XXC2
Lightning direct effect	23.0	Category X, no test performed
Icing	24.0	Category X, no test performed

REMARKS:

Model 247-xxx was qualified to the environmental test requirements of RTCA DO-160C by similarity to Model 250-xxx

- Tests of DO-160C, Sections 4.0 (paragraphs 4.5.1, 4.5.2, and.4.5.3), 5.0, 16.0 and 18.0 were conducted on the Model 250 at dB Systems, Inc. in Redmond, Washington.
- Tests of DO-160C, Sections 4.0 (paragraph 4.6.1), 6.0, 7.0, 8.0, 15.0, 17.0, 19.0, 20.4 (cond. susc.), 21.0, and 22.0 were conducted on the Model 250 at the Eldec Corporation in Lynnwood, Washington.
- Tests of DO-160C, Sections 4.0 (paragraphs 4.6.2, and 4.6.3) and 20.5 (radiated susc.) were conducted on the Model 250 at Allied Signal 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 247 Audio Mixing Amplifier.

3.2 General Information

The Model 247 Audio Mixing Amplifier has no operator accessible controls. During installation, it may be determined that internal level adjustments are required. Only qualified personnel shall complete internal level adjustments.