

SERVICE INFORMATION

AMC+120P POWER AMPLIFIER

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COMPONENT OVERLAY

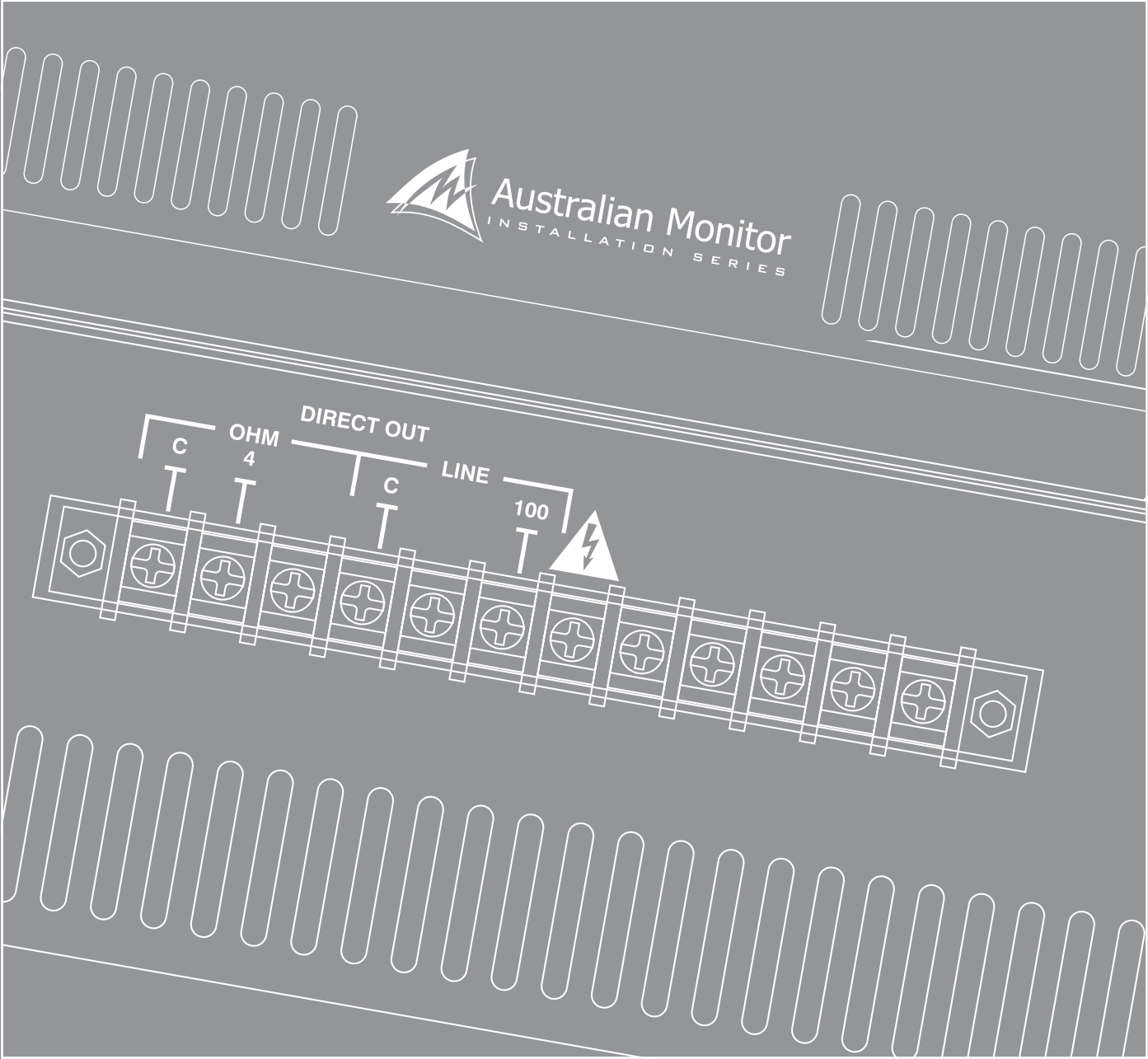
TEST PROCEDURE

REPLACEMENT PARTS LIST

SERVICE BULLETIN

AMC+ SERIES

120W / 250W POWER AMPLIFIERS
INSTALLATION AND OPERATION MANUAL





IMPORTANT SAFETY INFORMATION





1. Save the carton and packing material even if the equipment has arrived in good condition. Should you ever need to ship the unit, use only the original factory packing.
2. Read all documentation before operating your equipment. Retain all documentation for future reference.
3. Follow all instructions printed on unit chassis for proper operation.
4. Do not spill water or other liquids into or on the unit, or operate the unit while standing in liquid.
5. Make sure power outlets conform to the power requirements listed on the back of the unit.
6. Do not use the unit if the electrical power cord is frayed or broken. The power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords and plugs, convenience receptacles, and the point where they exit from the appliance.
7. Always operate the unit with the AC ground wire connected to the electrical system ground. Precautions should be taken so that the means of grounding of a piece of equipment is not defeated.
8. Mains voltage must be correct and the same as that printed on the rear of the unit. Damage caused by connection to improper AC voltage is not covered by any warranty.
9. Have gain controls on amplifiers turned down during power-up to prevent speaker damage if there are high signal levels at the inputs.
10. Power down and disconnect units from mains voltage before making connections.
11. Never hold a power switch in the "ON" position if it won't stay there itself!
12. Do not use the unit near stoves, heat registers, radiators, or other heat producing devices.
13. Do not block fan intake or exhaust ports. Do not operate equipment on a surface or in an environment which may impede the normal flow of air around the unit, such as a bed, rug, weathersheet, carpet, or completely enclosed rack. If the unit is used in an extremely dusty or smoky environment, the unit should be periodically "blown free" of foreign matter.
14. Do not remove the cover. Removing the cover will expose you to potentially dangerous voltages. There are no user serviceable parts inside.
15. Do not drive the inputs with a signal level greater than that required to drive equipment to full output.
16. Do not connect the inputs / outputs of amplifiers or consoles to any other voltage source, such as a battery, mains source, or power supply, regardless of whether the amplifier or console is turned on or off.
17. Do not run the output of any amplifier channel back into another channel's input. Do not parallel- or series-connect an amplifier output with any other amplifier output. Australian Monitor is not responsible for damage to loudspeakers for any reason.
18. Do not ground any red ("hot") terminal. Never connect a "hot" (red) output to ground or to another "hot" (red) output!
19. Non-use periods. The power cord of equipment should be unplugged from the outlet when left unused for a long period of time.
20. Service Information Equipment should be serviced by qualified service personnel when:
 - A. The power supply cord or the plug has been damaged.
 - B. Objects have fallen, or liquid has been spilled into the equipment
 - C. The equipment has been exposed to rain
 - D. The equipment does not appear to operate normally, or exhibits a marked change in performance
 - E. The equipment has been dropped, or the enclosure damaged.

The Australian Monitor Installation Series AMC+ range of booster amplifiers take the rugged reliability of the famous AMIS range and deliver the same high quality audio reinforcement, in a low cost, 2 rack unit package. The AMC+ booster amplifiers are available in 120 & 250 watts & offer 100 volt or 4 ohm outputs.

The AMC+ series booster amplifiers give the audio contractor a reliable, low cost booster amplifier for applications that are price sensitive but still require high quality commercial sound reinforcement.

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AUS, EUR, USA
Rev A: 10th Nov 2008

	CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN	
<p>CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK), NO USER SERVICEABLE PARTS INSIDE, REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.</p>		



This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the products enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



This symbol is intended to alert the user to the presence of important operational and maintenance (servicing) instructions in the literature accompanying the appliance.

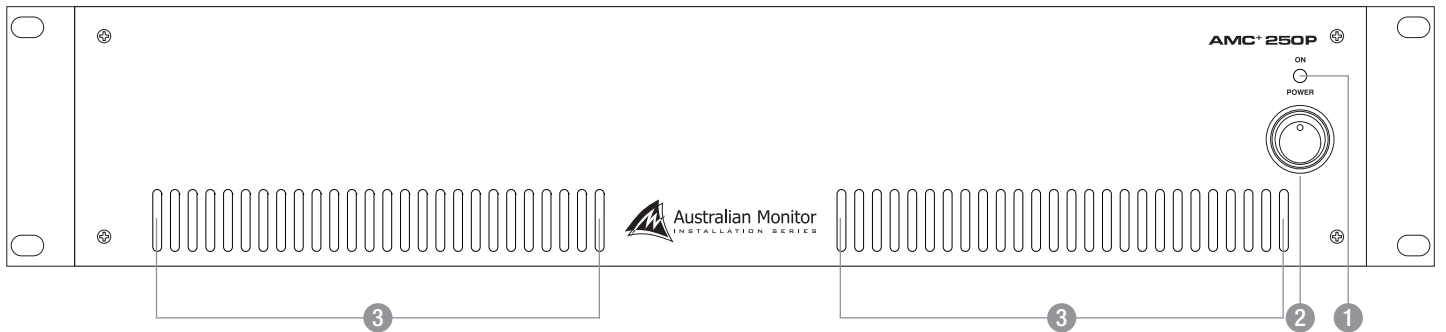
Caution:

To prevent electric shock do not use this (polarised) plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure. To prevent electric shock, match wide blade of plug to wide slot, fully insert.

WARNING!

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

FRONT PANEL



1 On

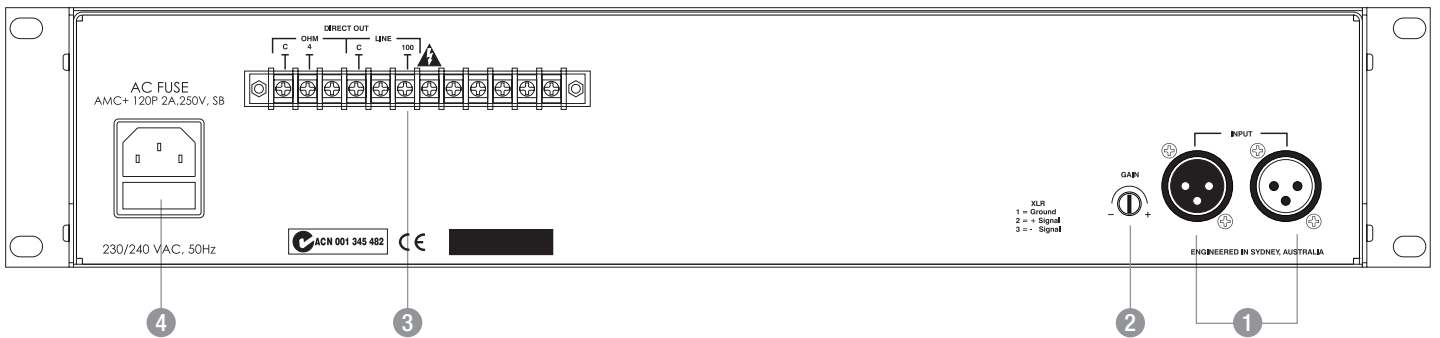
This LED indicates the unit is powered “on”.

2 Power

This switch switches power on or off the mains. The up position is on.

3 Vents

Air intake for fan cooling on AMC+250P only.



1 Input

These 3 pin XLR sockets accept the source input for each channel. One input is a male XLR, the other is a female XLR. The male XLR is normally used as a thru output. When wiring from unbalanced sources, pins 1 and 3 should be shorted together (see Installation section). The input sensitivity (voltage required to drive amplifier to maximum power) of the amplifier is 150mV (-14dBu) with the Input Level Control set at maximum.

2 Level

This pot controls the level of the signal through the amplifier channel. Minimum position is Off and maximum gives a sensitivity of 150mV (-14dBu). The maximum input voltage before the input stage clips is 2.45V (+10.0dBu). Depending on the input source, the input level control should be run above the 12 o'clock position (half way) to avoid clipping the input stage.

3 Direct Out

The speaker connections are on the 12 pole terminal strip. There is a low impedance output (OHM) and a distributed line voltage output (LINE). 70V out is available on 115V models. 100V out is available on 230V models.

There are 6 unused terminals. These do not connect to anything.

3 Direct Out continued

Minimum Impedance	AMC+120P	AMC+250P
Distributed Line Output		
70V (115V version)	41ohm	20ohm
100V (230V version)	83ohm	40ohm
Low Impedance Output		
(both versions)	4ohm	4ohm

Note: Only connect one output – either Distributed Line or Low Impedance per channel. Do not connect LowZ and 70/100V at the same time.

The output strip comes fitted with a touch-proof cover held in place by two M3 machine screws with flat and spring washers.

4 IEC Mains Input Socket

This is a standard IEC 3 pin socket. It accepts a standard IEC mains cable, provided. The fuse draw at 5 contains the mains fuse and a spare. The mains fuse is a time lag (slow blow) HRC 20mm x 5mm ceramic type fuse.

The ratings are:	AMC+120P	AMC+250P
230V model	2A	2.15A
115V model	4A	6.3A

! Always replace the fuse with one of the same value and type.

⚡ Note: Always disconnect power to the amplifier before replacing fuses.

INSTALLATION

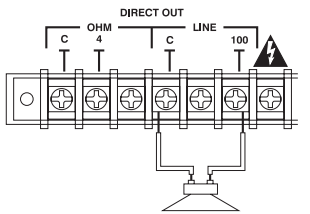
Mounting

When rack mounting, it is advisable to allow 1 rack space above and below the amplifier. When multiple amplifiers are mounted in a rack, exhaust fans should be used on the rack. Airflow for cooling the AMC+120P is by convection from bottom to top. Airflow for cooling the AMC+250P is by fan from front to side.

Direct Output

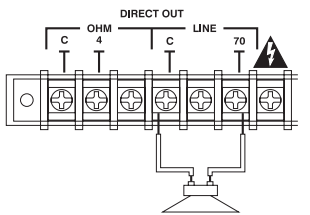
The output terminal strip accepts wire sizes from 16-22AWG (1.5mm² – 0.35mm²) or spade lugs. The following table should be used as a guideline for cable sizes. Regulations in your area may require different gauged wire and should be checked before using.

Output	Distance	Wire Size	
		AMC+120P	AMC+250P
100V	Up to 50m	AWG24(0.2mm ²)	AWG22(0.35mm ²)
	50m–200m	AWG18(0.75mm ²)	AWG16(1.5mm ²)
	Over 200m	AWG16(1.5mm ²)	AWG13(2.5mm ²)
70V	Up to 50m	AWG22(0.35mm ²)	AWG18(0.75mm ²)
	50m–200m	AWG16(1.5mm ²)	AWG13(2.5mm ²)
	Over 200m	AWG13(2.5mm ²)	AWG10(6.0mm ²)
4 ohm	Up to 10m	AWG18(0.75mm ²)	AWG18(0.75mm ²)
	10m–30m	AWG13(2.5mm ²)	AWG13(2.5mm ²)
	Over 30m	Not Recommended	Not Recommended



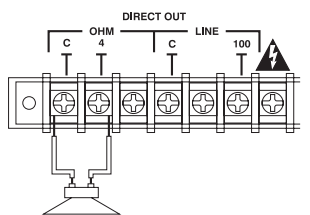
230/240V version

minimum total speaker impedance
 AMC+120P 83ohm AMC+250P 40ohm



115V version

minimum total speaker impedance
 AMC+120P 41ohm AMC+250P 20ohm



Both versions

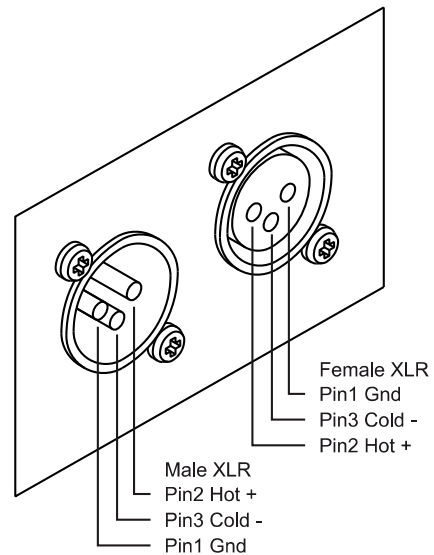
minimum total speaker impedance
 All models 4 ohm

Note: Only connect one output – either Distributed Line or Low Impedance.

Input Connections

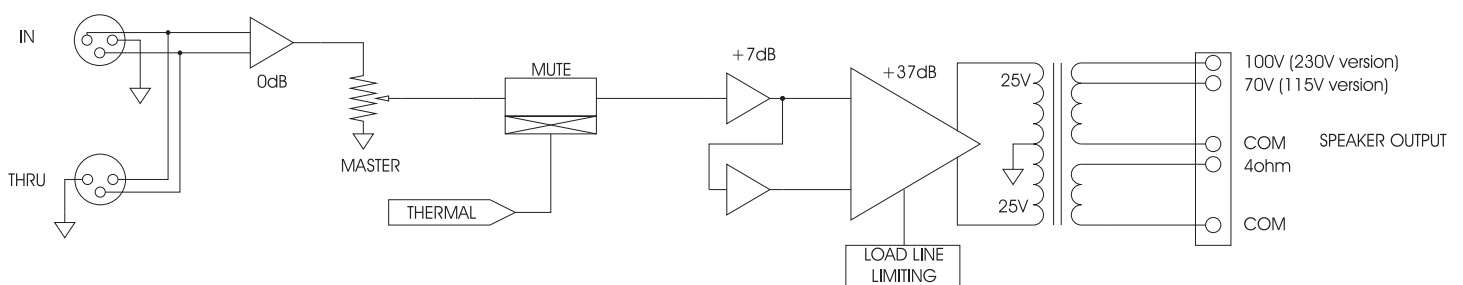
For wiring balanced in, pin 2 is hot. Balanced input wiring (shielded pair cable) is recommended.

When wiring unbalanced in, pin2 is hot and pin 1 and pin 3 should be shorted together to the shield.

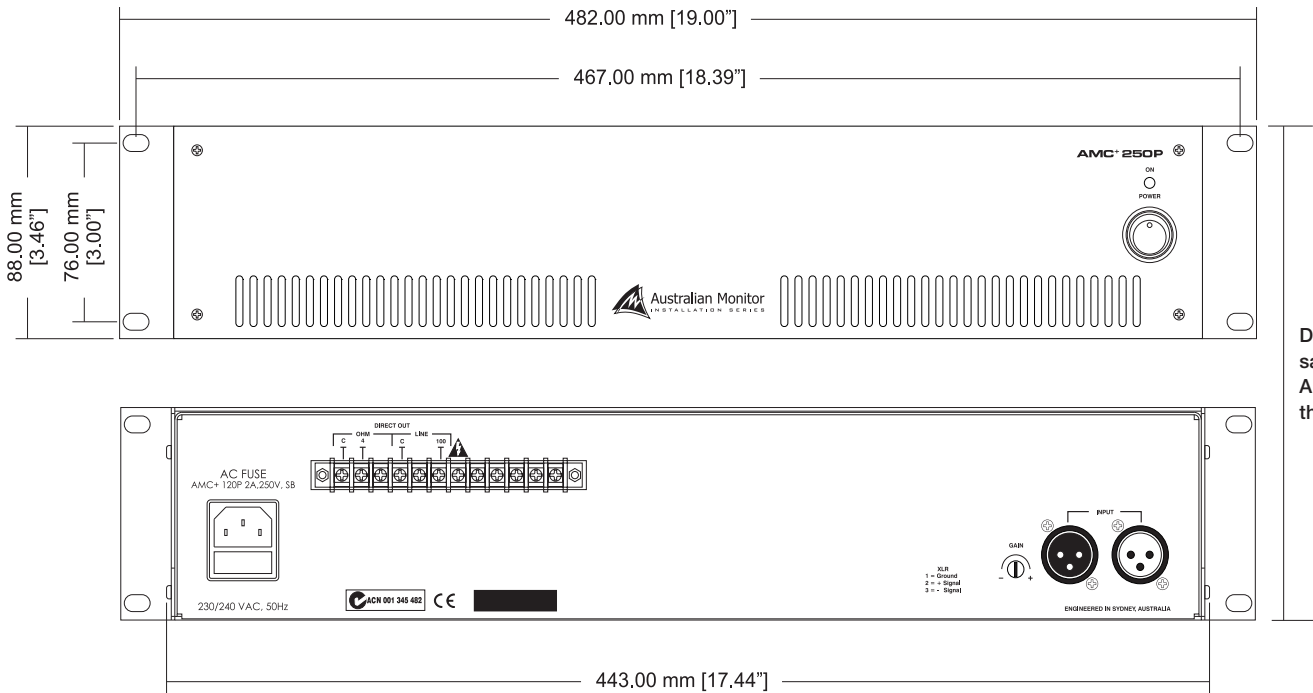


TROUBLESHOOTING AND BLOCK DIAGRAM

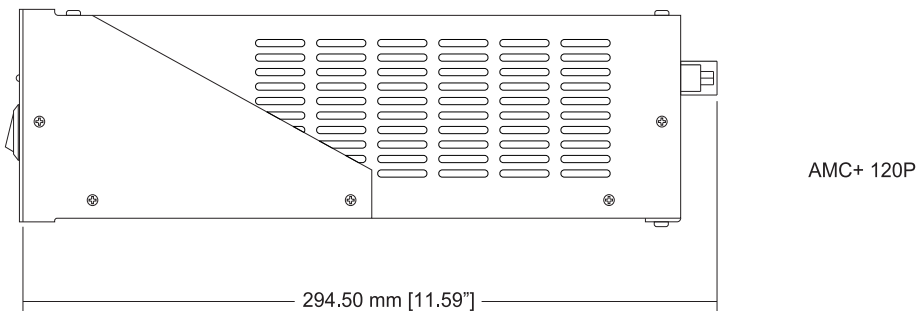
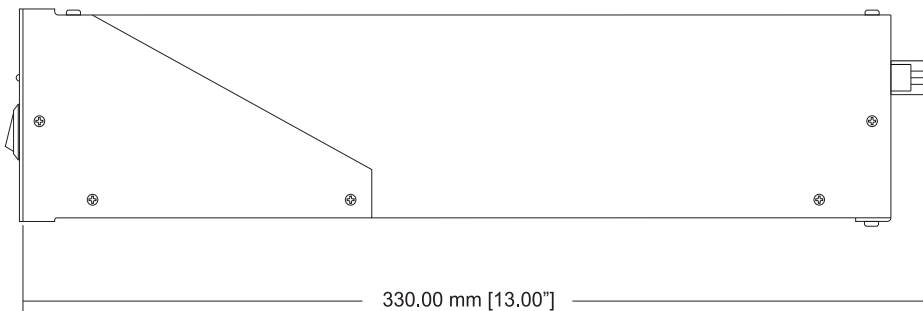
Troubleshooting Guide		
Trouble	Likely Cause	Remedy
Power LED not on	Power not reaching amplifier	Check power switch is on Check mains connection Check mains fuse
Distorted sound	Output is short circuited Input is overloaded Output is being over driven	Check speaker loads for shorts Reduce input level at source Reduce volume levels
No sound but amp is on	Volume controls down Amplifier has overheated DC fuse(s) blown	Check volume controls Check for obstructions above and below Make sure the amplifier is well ventilated Refer product to local Australian Monitor dealer



DIMENSIONS



Dimensions the same for both the AMC+120P and the AMC+250P



		AMC+ 120P	AMC+ 250P
POWER OUTPUT (0.5%THD, 1KHZ)		120W	250W
S/N RATIO		>88dB	>88dB
FREQ RESPONSE (-3dB +1dB)		50Hz-20kHz	40Hz-20kHz
THD (1KHz, -1dB)		Better than 0.5%	Better than 0.5%
INPUT (pot @ full)	SENSITIVITY	150mV	150mV
	IMPEDANCE	20k	20k
	HEADROOM	10dB	10dB
FUSES	MAINS (115V)	4A	6.3A
	MAINS (230V)	2A	3.15A
	DC	8A	10A (x2)
SIZE (WXHxD)		482 x 88 x 281mm 19" x 3.5" x 11.1"	482 x 88 x 384mm 19" x 3.5" x 15.1"
NET WEIGHT		10.5kg 23.1lb	11.5kg 25.3lb
SHIPPING WEIGHT		12.5kg 27.6lb	14kg 30.8lb
SHIPPING DIMENSIONS (WXHxD)		525 x 175 x 385mm 20.7" x 6.9" x 15.2"	525 x 185 x 470mm 20.7" x 7.3" x 18.5"
MAINS CURRENT DRAW (230V)			
	FULL POWER	1.20A	2.53A
	1/3 POWER	0.80A	1.61A
	1/8 POWER	0.55A	1.10
	IDLE	0.15A	0.15A
MAINS CURRENT DRAW (115V)			
	FULL POWER	2.50A	5.28A
	1/3 POWER	1.67A	3.36A
	1/8 POWER	1.15A	2.30A
	IDLE	0.31A	0.31A
THERMAL OUTPUT (W)			
	FULL POWER	128W	259W
	1/3 POWER	118W	231W
	1/8 POWER	91W	168W
	IDLE	26W	26W
THERMAL OUTPUT (BTU/HR)			
	FULL POWER	437	884
	1/3 POWER	403	788
	1/8 POWER	311	573
	IDLE	89	8

**1/3 and 1/8 power levels relate to voltage changes, not load changes.*

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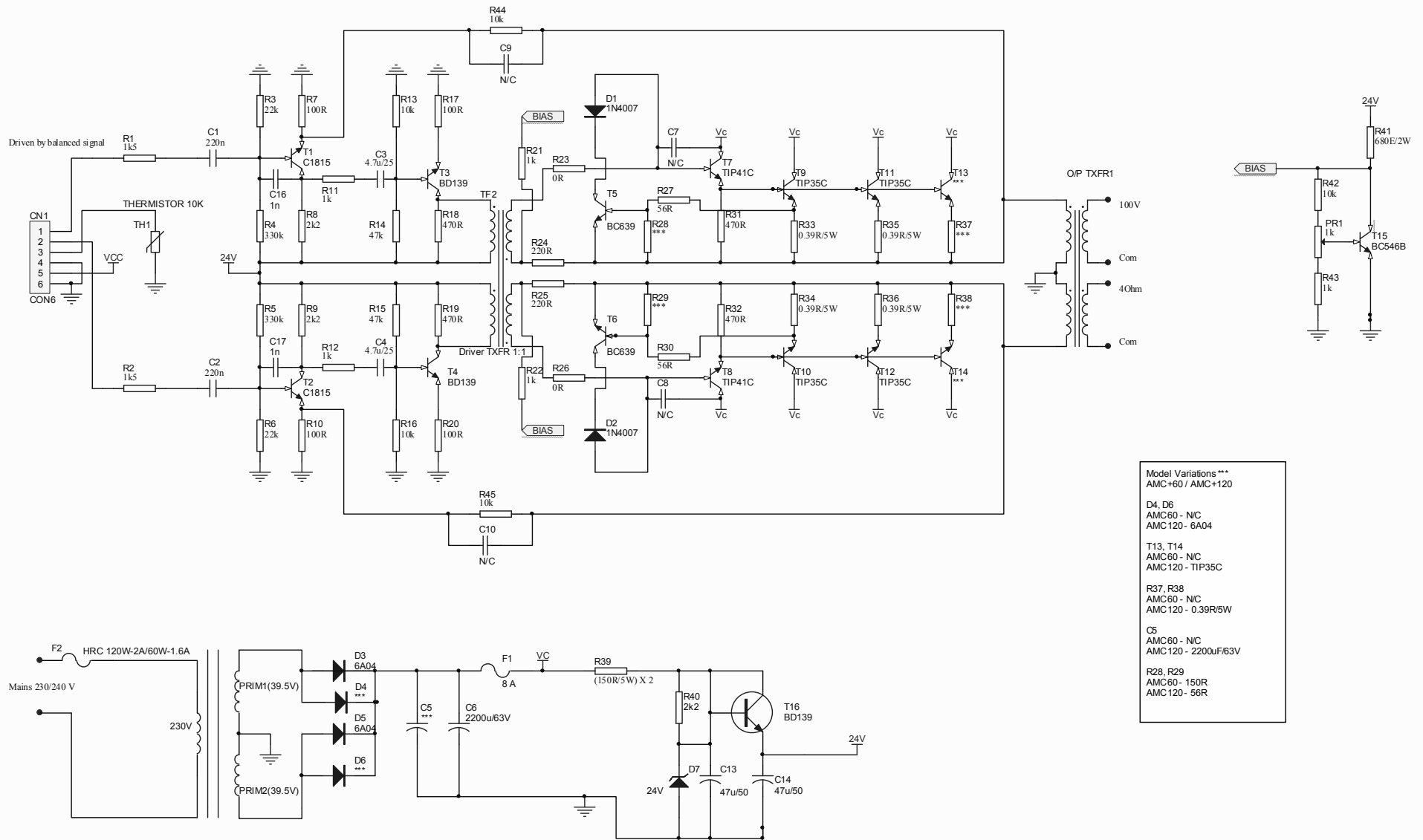
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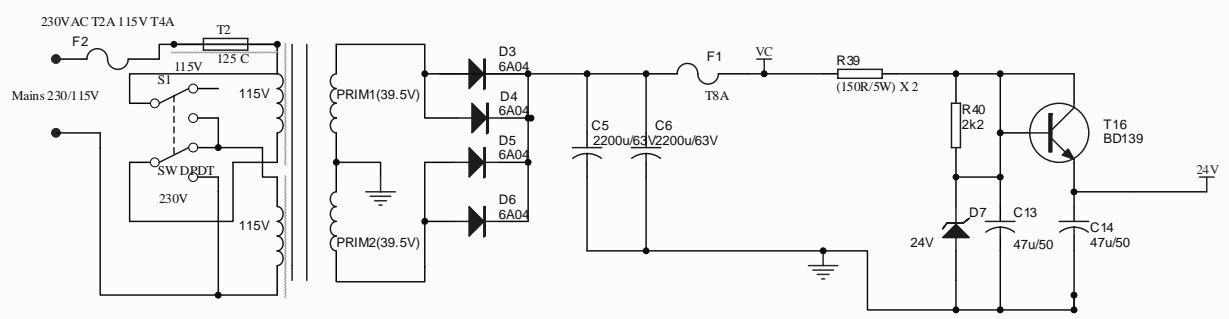
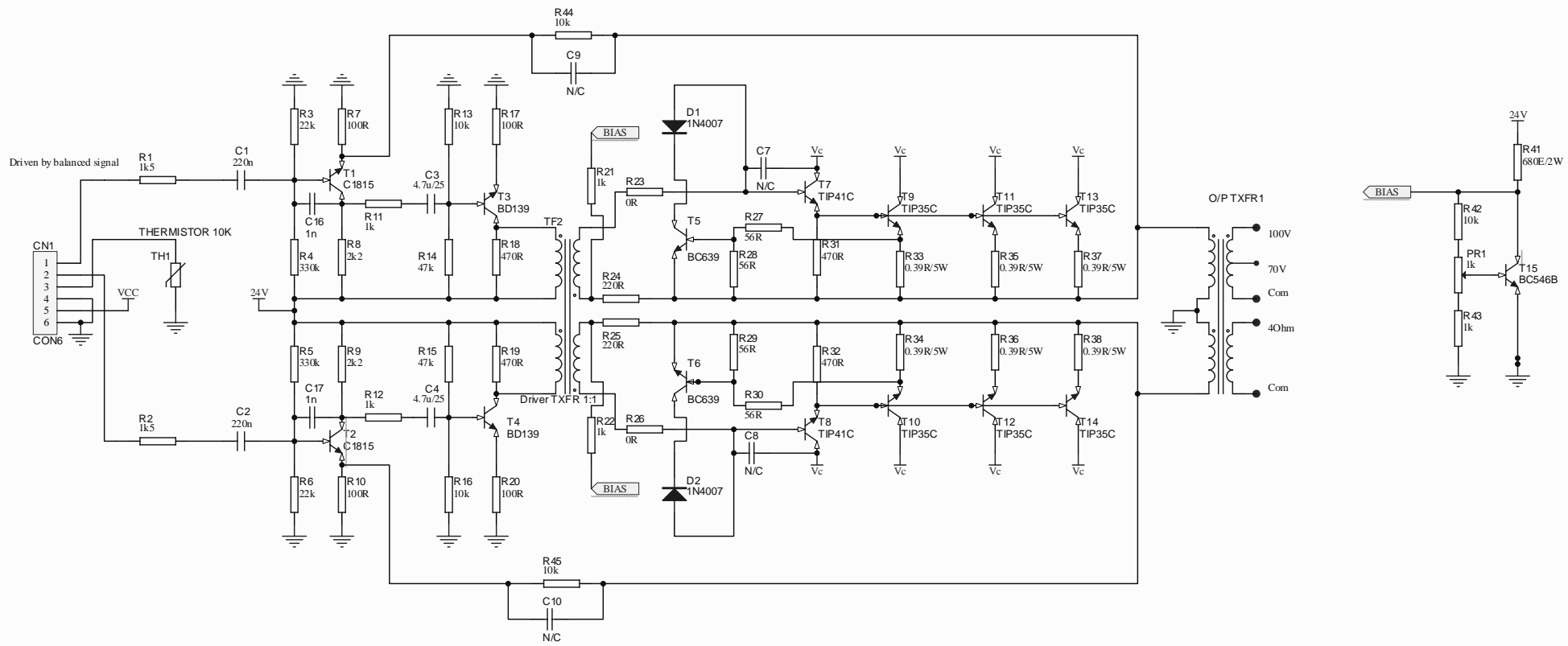
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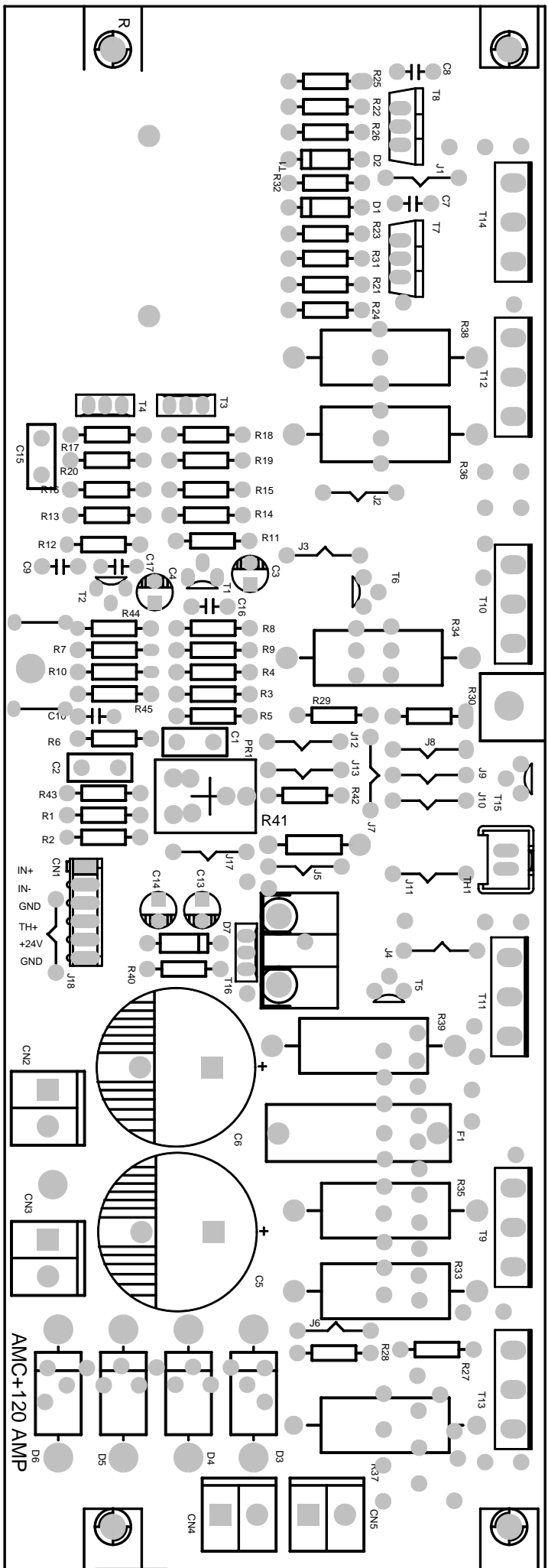


Model Variations**
 AMC+60 / AMC+120
 D4, D6
 AMC60 - NC
 AMC120 - 6A04
 T13, T14
 AMC60 - NC
 AMC120 - TIP35C
 R37, R38
 AMC60 - NC
 AMC120 - 0.39R/5W
 C5
 AMC60 - NC
 AMC120 - 2200uF/63V
 R28, R29
 AMC60 - 150R
 AMC120 - 56R

REV	REVISION NOTE:	DRN	DATE	AUSTRALIAN MONITOR	
A				DRAWING No: AMC60_120amp	
B				DESCRIPTION: AMC 60/120 Amp	
C				DATE: 2009-5-5	DRAWN BY:
D					SHEET 1 of 1
E					
F	Increased gain, removed 230/240V switch, removed zobel	CKW	22/05/08		



Title		
Size B	Number	Revision
Date: 4/29/2012	Sheet of	
File: \\...AMC-120.SCH	Drawn By:	



TEST PROCEDURE XXXX-1

MODEL: AMC+120P

Rev A 22/09/08 Original

Outline

1. Physical checks
2. Set up amplifier for test
 - 2.1. Fuse check
 - 2.2. Connections
 - 2.3. Reset controls
3. Power up
 - 3.1. Voltages
 - 3.2. Bias setup
4. Initial AC Checks
 - 4.1. Signal check and gain of amp
 - 4.2. Emitter current check
 - 4.4. Outputs
 - 4.5. Phantom power
5. THD
6. Sensitivity
 - 6.1. Input
7. Bandwidth
8. Phase
9. Current Limit
10. Noise floor / SNR
11. Fan/Thermal check
12. Final check for damage
13. Factory setting
14. Listening Test
 - 14.1. Switch on thump
 - 14.2. Audio quality
 - 14.3. Current Limit

VISUAL INSPECTION STAGE

1. Physical checks

- All screws for tightness (esp. bridge rectifier and transistor bolts), referring to the torque setting of the manufacturing tools
- Capacitors for polarity
- Earth connection for good contact, using multimeter (XLR GND to AC earth)
- Power transistors for shorts to heat sink using a multimeter
- All wiring points for good contacts (soldering and crimping)

PRETESTING

PRE TESTING SETUP REQUIREMENT

- a) Oscilloscope
- b) Variac
- c) Multimeter
- d) Load [4ohm]
- e) Signal generator
- f) Phantom power jig

2. Set up amplifier for test :

2.1. Fuse check

- 2 x AC fuses (2A), 20x5mm
- 1 x DC fuses (8A), 20x5mm

2.2. Connections

Connect amplifier to:

Variac (0Vac)

Signal generator (mic1, no signal)

Resistive load (4ohm on 4ohm terminal) with meters/oscilloscope

2.3. Reset controls:

Volume control to minimum

PR1 (preset) on the amplifier PCB CCW

3. Power up :

Turn on power switch and adjust voltage to 230VAC. Watch current meter for excess current draw.

(P/F) Current shall not exceed 0.5Aac.

3.1. Voltages

Measure the following DC voltages with a multimeter referenced to mains safety earth or the chassis.

(P/F)

	Pass Range
DC power supply	47.5VDC – 55.0VDC
Input PCB rail (ICp8)	11.0.0VDC – 13.0VDC
Input PCB ½rail (ICp1)	5.0VDC – 6.0VDC
Input PCB gnd (ICp4)	-0.1VDC – +0.1VDC

3.2. Bias setup

Put a multimeter across an emitter resistor.

(P/F) Slowly adjust the preset PR1 so that you get 4.5mVDC (+/-0.5mVDC) reading.

Check Quiescent Voltage across all Emitter resistors.

(P/F) The emitter resistor voltages shall be 4.5mVDC (+/-2.0mVDC).

[Setup for next test]

4. Initial AC Checks :

4.1. Signal check and gain of amp

Setup

Signal generator = 260mVAC, 1kHz

Signal in = XLR

Master pot = max (CW)

Output metering = 4ohm out

Load = 4ohm

Procedure

Turn up volume control to full. Watch for irregularities with output.

(P/F) Output voltage shall be 21.9VAC +/-2VAC.

4.2. Emitter current check

Setup

Signal generator = 260mVAC, 1kHz

Signal in = XLR

Master pot = max (CCW)

Output metering = 4ohm out

Load = 4ohm

Procedure

Set output to 15VAC using master volume control. Check voltage across emitter resistors of power devices.

(P/F) Voltage shall be between 150mVDC – 250mVDC.

4.3. Outputs

Setup

Signal generator = ~260mVAC adjusted for 21.9V out with pots max, 1kHz

Signal in = XLR

Master pot = max (CW)

Output metering = 4ohm out

Load = 4ohm

Procedure

Using a multimeter check the following:

(P/F)

	Pass Range
100V line	90VAC – 110VAC

Measure on the terminal block.

Remove all inputs and connections. Attach tested tag. Turn all volume pots to min.

FINAL TESTING

REQUIREMENTS FOR FINAL TESTING:

- a) THD meter
- b) Load 80Ω
- c) Multimeter
- d) Oscilloscope
- e) Microphone
- f) Variac

5. THD

Setup

Signal generator = 260mVAC, 1kHz
Signal in = XLR
Master pot = min (CW)
Output metering = 100Vout
Load = 80ohm

Procedure

Turn up master pot to 70VAC (+/-1.0VAC) on output. Measure THD.

(P/F) Reading shall be < 0.5%.

Values to be recorded:

		Value	Pass Range
5.	THD		0% – 0.5%

6. Sensitivity

6.1. Inputs

Setup

Signal generator = 260mVAC, 1kHz
Signal in = XLR
Master pot = max (CW)
Output metering = 100Vout
Load = 80ohm

Procedure

Set channel pot to max.

(P/F) The output reading shall be 100VAC (+/- 10VAC).

7. Bandwidth

Setup

Signal generator = 260mVAC, 1kHz
Signal in = XLR
Master pot = max (CW)
Output metering = 100Vout
Load = 80ohm

Procedure

Set the volume pot so the output is 70VAC. Adjust the frequency on the signal generator down till the output is 50VAC.

(P/F) The frequency shall be < 75Hz.

Adjust the frequency on the signal generator up till the output is 50VAC.

(P/F) The frequency shall be > 20kHz.

Values to be recorded

		Value	Pass Range
7a.	Bandwidth - low		<75Hz
7b.	Bandwidth - high		>20kHz

8. Phase

Setup

Signal generator = 260mVAC, 1kHz

Signal in = XLR

Master pot = max (CW)

Output metering = 100Vout

Load = 80ohm

Procedure

Attach channel 2 of the CRO to the input. Make sure the CRO is being triggered by the input. Look at each output on channel 1 of the CRO. The CRO ground should be connected to the common both for the low impedance outputs and the line outputs.

(P/F) The signals on the CRO shall be in phase for all outputs (100V, 4Ω).

9. Current Limit

Setup

Signal generator = 260mVAC, 1kHz

Signal in = XLR

Master pot = min (CCW)

Output metering = 100Vout

Load = 80ohm

Procedure

Change the load to 40ohms. Increase the signal such that at ~65VAC you can see the overload protection coming on with a rounding of the sine wave. If it is there then reduce the voltage to 30VAC out. Short the unit for ~10sec. Release the shorting link and check for the output.

(P/F) The output shall be reading 30VAC +/-1V.

10. Noise floor / SNR

Setup

Signal in = none

Master pot = max

Output metering = 100Vout

Load = 80ohm

Procedure

Put dummy lid on. Check for Hum & Noise.

(P/F) The output shall be reading < 3.2mVAC (-90dBr ref 100V).

Values to be recorded

		Value	Pass Range
10.	Noise floor		0mV – 3.2mV

11. Fan/Thermal check

Setup

Signal generator = 260mVAC, 1kHz

Signal in = XLR

Master pot = max (CW)

Output metering = 100Vout

Load = 80ohm

Procedure

Adjust volume pot to an output reading of 70VAC. Connect a thermometer to the temperature sensor. Wait the unit to heat up. A heat gun may be used to speed up the heating of the heatsink.

(P/F) The output shall mute to < 10V at a temp between 90–115degC

Values to be recorded

		Value	Pass Range
11b.	Thermal cutout		90degC – 115degC

12. Final check for damage

Disconnect from test bench and inspect for scratches on external paint.

13. Factory setting

Set up the unit for default factory setting as below:

Pot positions:

- a) Master volume : min

Attach tested sticker.

LISTENING TEST

REQUIREMENTS FOR LISTENING TEST SETUP:

- a) CD Player
- b) mixer
- c) Speaker

14. Listening Test

Connect amplifier to the setup

Keep all pots full, tone at center.

14.1. Switch on thump

Switch on the set and check for any ON Thump. Ensure unit does not thump. Check that no low frequencies are audible. Make all pots minimum.

14.2. Audio quality

Check CD Player output.

14.3. Current Limit

Short the output with signal ON. Signal should mute and return.

	<u>AMC+ Parts</u>	
<u>Circuit boards</u>	<u>Part Number</u>	<u>Factory code</u>
Input board	AMC+IB	
Mixer board	AMC+120MB	B06044
AMC+30 output board	AMC+30OPB	B03048
AMC+60 output board	AMC+60OPB	B06047
AMC120+ mixer board	AMC+120MB	B06044
AMC+120 output board	AMC+120OPB	B012046
AMC+250 output board	AMC+250OPB	BR025001
<u>Transformers</u>		
AMC+30 mains transformer	AMC+30TX	BR030123
AMC+30 output transformer	AMC+30OT	BR030124
AMC+60 mains transformer	AMC+60TX	BD6041
AMC+60 output transformer	AMC+60OT	BD060127
AMC+120 mains transformer	AMC+120PTX	BD0642
AMC+120 drive transformer	BR0120036	BR0120036
AMC+120 output transformer	AMC+120OT	BR0120125
AMC+250 mains transformer	AMC+250TX	BR0250140
AMC+250 output transformer	AMC+250OT	BR0250141
AMC+250 drive transformer	BR0120036	BR0120036

Australian Monitor Service Bulletin

AMC+ Mixer and Booster Amplifiers

Mains Fuses



20 February 2012

Applicable Models

This bulletin applies to AMC+30, AMC+60, AMC+120 and AMC+250 Mixer Amplifiers and the AMC+120P, AMC+1202P and AMC+250P Booster Amplifiers manufactured prior to 2012.

Known Issue

The AMC+ range of mixer amplifiers and AMC+ booster amplifier have experienced a higher than acceptable incidences of mains fuse failures at turn on.

Details

AMC+ products manufactured prior to 2012 are fitted with inferior Chinese fuses.

Solution

The problem can easily be rectified by placing the existing mains fuse with name brand quality fuses available from Element14 as follows:

Model	115V Operation (North America)		230V Operation (Australia/Europe)	
	Fuse Rating	Element14	Fuse Rating	Element 14
AMC+30	T1A	1123115	T500mA	1123121
AMC+60	T3.15A	1123119	T1.6A	1123113
AMC+120	T4A	1123120	T2A	1123118
AMC+120P				
AMC+250	T8A	1123125	T4A	1123120
AMC+250P				
AMC+1202P				

All fuses are Cooper Bussman 250VAC rated, slow-blow ceramic HRC type M205 cartridge.

All future production models will be fitted with these fuses.

Procedure

1. Remove the mains lead from the amplifier.
2. Remove the fuse holder drawer that is part of the IEC mains input socket.
3. Remove the two existing fuses (one of these is a spare fuse).
4. Install two M205 size fuses as per the operating voltage above.
5. Reinstall the drawer.