

Australian Monitor

PROFESSIONAL AUDIO POWER AMPLIFIER

AM1600 & AM1000

OWNERS MANUAL

Introduction

Congratulations on your choice of the Australian designed and manufactured, Australian Monitor range of Power Amplifiers. The AM1600 and AM1000 MOSFET Power Amplifiers have been designed for professional applications. They are therefore built to work within their designed specifications, over extended periods and with total reliability.

Features

- Robust over-engineered chassis
- Efficient front-to-back cooling
- Compact dimensions - only 3 rack units high!
- Front *and* rear mounting points
- Active balanced inputs
- Front and rear carry handles
- Fault Indication display
- Detented attenuation controls
- Continuous High Power capability
- Mains circuit breaker
- Fully protected - short circuit, input overvoltage, thermal, and individually fused DC rails for both channels
- Separate high voltage supply to MOSFET output stage driver circuit
- Mains In-rush Suppression at turn on.

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The Manual

Certain conventions are used in this Manual to ease understanding. A description of where to find a feature is sometimes written in *'italics'* and inside brackets '()' immediately after the feature is first mentioned. (See *'Switching On'* for an example).

When we refer to a particular control or function, as it is actually labelled on the amplifier, we have used all CAPITAL letters. So if when we explain how the input attenuators work, we will print Input ATTENUATORS. If a feature is not labelled on the amplifier then we will only print the first letters in capitals.

Installation

The Australian Monitor AM1600 and AM1000 may be mounted into a rack by using only the Front Rack Ears. It is recommended that both front and back panel mounts be used when using the amplifier in a touring environment. If having a case built to house the amplifier, the rack mounting points are situated 368 millimetres apart, (from behind front panel to back panel). The amplifiers should only be used in the horizontal position on a level and stable surface.

- ☞ The speaker cable runs should be as short as possible, of a high quality and with the maximum available cross section. (i.e the higher the current rating the better)
- ☞ Make sure the amplifier is ensured an uninterrupted air flow through its Front and Back Vents.
- ☞ Check that the local mains supply is the same Voltage labelled on the Back Panel of the amplifier.

Switching On

Before switching on, always turn both input 'ATTENUATORS' to the 'OFF' position (fully counter-clockwise). (*The attenuators are located on the front panel.*) To turn the amplifier on, you push down the large black switch labelled 'POWER' (*this switch is located centrally on the front panel*). The LED above the switch may momentarily flash red in colour (indicating the correct operation of the Mains Inrush Suppression circuitry).

- ☞ It is also recommended that your speakers should be connected before switching on unit. If something seems wrong you should then disconnect the speakers from the amplifier and try switching on again.

Connections

AC Mains

The AC mains lead colour code is

Brown	=	Active
Blue	=	Neutral
Green (or Green/Yellow stripe)	=	Earth

Audio Input

XLR-type connectors are used, and wired as follows

Pin 3	=	Active , Positive, or 'In Phase'
Pin 2	=	Return, Negative, or 'Out of Phase'
Pin 1	=	Ground, or Earth

Speaker Output

XLR-type, and binding posts wired

Pin 3	=	Active , or Positive
Pin 2	=	Not Connected
Pin 1	=	Ground, or Negative
RED	=	Positive, and 'In Phase'
BLACK	=	Negative, or Ground.

Attenuators

The 21 position detented ATTENUATORS can be used for level control, but the normal (and recommended) operating procedure is to run these at fully on (fully clockwise - 0dB Attenuation) and to use the other equipment in the signal chain to alter your gain structure.

- ☞ If full output level is required, then you should **NOT** have the ATTENUATORS set below the -10dB label, otherwise distortion in the amplifiers preamp circuitry could occur.

Bridging

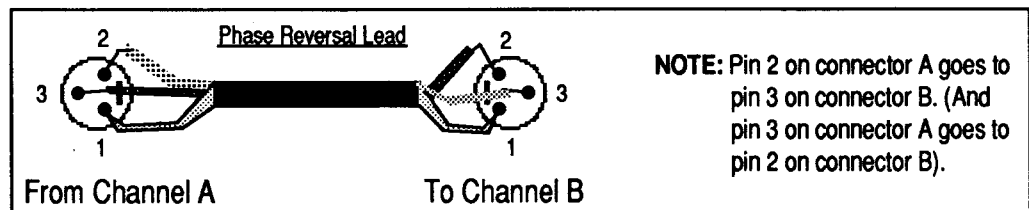
In the event that you need to drive 70 - 120 Volt lines, or require more power into high impedance loads, you may want to bridge your AM1600/1000 amplifier. To bridge the amplifier you will need to reverse the phase polarity of one of the amplifier's channels.

Apply your input to CHANNEL A, and channel A will then drive the positive side of the speaker load. (This channel is the "In Phase" input and output).

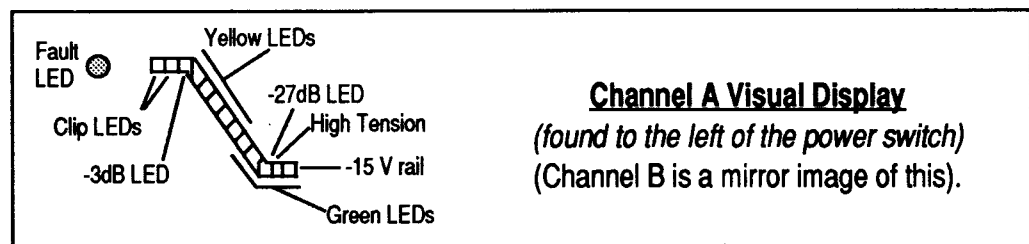
A Phase Change lead is then used to strap input signal from CHANNEL A input to CHANNEL B input. (See diagram below for details of a Phase Change lead).

Now Channel B is receiving the input signal which is out of phase with Channel A. The speaker load is then placed between the two Red Binding Post Output terminals. Channel A Output will be connected to the positive (+) side of the load, and Channel B Output to the negative (-) side of the load.

- ☞ The ATTENUATORS should be set to the same position on both channels (preferably the 0dB Attenuation - fully clockwise)
- ☞ When bridging a pair of channels, you must use the **RED** binding post **OUTPUTS** of those channels. These two red connectors are the only connections to be made to the speaker load. The same output can be found by using Pin 3 from both of the XLR **OUTPUTS**.
- ☞ Do **NOT** make any other connections at all to the speaker **OUTPUT** terminals or connectors.



Front Panel Display



A simple, yet thorough, Visual display section is found on the Front Panel of the amplifier. This section provides the user with the necessary day-to-day function of an Output Level LED Ramp, as well as including various circuitry status indicators.

To describe the indicators clearly, we will only discuss the Left hand side of the unit (also known as Channel A), since the Right hand side (Channel B) is a mirror image of the left.

Thermal Indication

The only indicator not duplicated is the THERMAL LED. This LED is found in the centre of the amplifier (*above the POWER switch*). When switching the amplifier on, the light will flash red indicating correct operation of the Mains In-Rush Suppression circuit. This light will not illuminate in normal use. This LED will glow Red when the amplifier has shutdown due to excessive heat build up - in this situation all indicators will extinguish and only the fans remain operational on the unit. The unit will then automatically restart when the internal temperatures return to a safe operating level.

Power On Indication

(Refer to Diagram above)

The LEDs closest to the mains switch glow Green when on. The first indicates the amplifier is ON. (It actually indicates the 15 Volt preamp supply is present - the left hand side display shows -15V, and the right hand side shows the +15V). The next LED outwards is also a supply indicator and also shows power on. (It indicates that the Positive High Tension Power Supply to the output stage is present - on the corresponding channel).

Level Indication

Each channel features a variable 10 segment display showing actual power level before clipping, (taking mains supply and load into account).

The display is colour coded, and calibrated in 3dB increments.

As seen in the diagram, the first of these is the -27dB LED, and this is the only one not labelled on the unit. The 10 LEDs are ; Green, -27dB to -21dB; Yellow, -18dB to -6dB; Red, -3dB, and two CLIP LEDs.

Fault Indication

A FAULT LED is located above each ATTENUATOR. This LED will light Orange in the event of a short circuit on the amplifier's Output or speaker lines. The same LED will light Orange when the Rear Panel Negative RAIL FUSE of the corresponding channel has failed. (Both these conditions require signal).

Other Fault Indications

- ☞ When a Rear Panel Positive RAIL FUSE has failed, the entire level meter for that particular channel will light up, and the High Tension Green LED will extinguish (*this is the second Green LED in from the POWER switch*).
- ☞ If the Output load is too low in impedance, or the output is driven into heavy clipping, then the FAULT LED will glow dimly with the signal.
- ☞ If the THERMAL LED remains on after turn on, and/or pulsates brightly with applied signal, you must switch the amplifier OFF immediately! The amplifier Slow Start Circuitry needs servicing.

Make sure...

- ☞ AC Mains Supply
 - 1/ is the same Voltage as written on the amplifier back panel.
 - 2/ is adequate for the amplifier (recommended at 15 amp 220/240 volt, 25 amp 110/120 volts).
 - 3/ Earth is always connected.
- ☞ Amplifier is kept away from water or moisture.
- ☞ The amplifier Outputs are not plugged back into its Inputs.
- ☞ The signal source of the amplifier Inputs should come from the same Earth point as the amplifier.
- ☞ The amplifier should be the LAST item in a system to be turned ON, and the FIRST to be turned OFF.
- ☞ When replacing the Supply RAIL FUSES, use correctly rated fuses.
- ☞ ATTENUATORS are set at -10dB or above, for full amplifier Output.
- ☞ The Red CLIP LEDs are not on continuously, as this will greatly reduce speaker life.

Specifications

Power output

with 1kHz sine wave, at THD ≤ 0.05%, (watts RMS continuous)

	Output Load	Single Channel	Both Channels
AM1600	8 ohm	520 W	470 W
	4 ohm	900 W	810 W
	2 ohm	1200 W	1050W
AM1000	8 ohm	350 W	300 W
	4 ohm	595W	520 W
	2 ohm	750W	700 W

with 1kHz sine wave, at THD ≤ 0.05%, from a bridged output,(watts RMS)

	Output Load	Power Output
AM1600	8 ohm	1620 W
	4 ohm	2100 W
AM1000	8 ohm	1040 W
	4 ohm	1400 W

Dynamic Power

Power output (watts RMS)

with a 1kHz sine wave at 0dB for 20 cycles, and then -20dB for 480 cycles, repeated

	Output Load	Power Output
AM1600	4 ohm	950 W
AM1000	4 ohm	625 W

Total Harmonic Distortion (THD) (and noise)

	100Hz	1kHz	20kHz
<i>Single channel at rated power output</i>			
8 ohms	<0.004%	<0.004%	0.025%
4 ohms	<0.005%	<0.004%	0.05%

Both channels with 0.5dB attenuation

4 ohms	<0.005%	<0.004%	0.055%
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Single channel with -3dB to -10dB attenuation

4 ohms	0.004%	0.004%	0.027%
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Single channel with -20dB attenuation

4 ohms	0.012%	0.009%	0.0275%
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Single channel at 1 watt output level

4 ohms	0.025%	0.016%	0.045%
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Intermodulation Distortion (IMD)

SMPTE and CCIF methods

at rated output and into a 4 ohm load

(SMPTE method utilises 60Hz and 7kHz sine waves in a 4:1 ratio)

(CCIF method utilises 14kHz and 15kHz sine waves in a 1:1 ratio)

IMD < 0.015% (SMPTE)

IMD < 0.007% (CCIF)

Input Sensitivity

both channels driven at rated power into a 4 ohm load

+1.5dBm (0.92 volts RMS)

Input CMRR

(Common Mode Rejection Ratio)

100Hz	1kHz	10kHz	20kHz
97dB	91dB	72dB	67dB

Input Impedance

balanced input, with 1kHz sine wave

AM1600 8.5kΩ

AM1000 10kΩ

Voltage Gain

at rated power with 1kHz sine wave

AM1600 62x (35.8dB)

AM1000 50x (34.0dB)

Damping Factor

at rated power with 1kHz sine wave

AM1600 into	8 ohm	> 650:1
	4 ohm	> 400:1
	2 ohm	> 200:1

AM1000 into	8 ohm	> 650:1
	4 ohm	> 350:1

at rated power with 20kHz sine wave

AM1600 into	8 ohm	> 130:1
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Rise Time (-10% to +90%)
measuring the leading edge of a 20kHz square wave, just before clipping, into 8 ohm load

AM1600	2.2 μ s	170 volts pk-pk
AM1000	2.0 μ s	138 volts pk-pk

Slew Rate
(includes all filters) into 8 ohm load

AM1600	65 volts / μ second
AM1000	60 volts / μ second

Frequency Response
at rated power into a 4 ohm load

20Hz - 20kHz	(-0.5dB, -0.15dB)
5Hz - 90kHz	(-3dB points)

Dimensions

Height	133mm (3U)
Width	482mm (across front panel)
Depth	460mm including handles (375mm excluding handles)
Weight	AM1600 is 30 kg (approx.) AM1000 is 25 kg (approx.)

Crosstalk

at rated power into a 4 ohm load.

200Hz	500Hz	1kHz	10kHz	20kHz
94dB	94dB	93dB	75dB	67dB

(averaged out between channels)

Signal to Noise

*at rated power into a 4 ohm load
(attenuators fully clockwise)*

better than 105dB (A - weighted)

NOTE:

The dBm figures are measured with a source impedance of 600 ohm. (Therefore they also read the same for dBu.)

These are factory specifications and a variety of independent tests have shown them to be conservative.

Specifications are subject to change without notice.

Test Conditions

*AC Mains voltage held at 240 volts.

*All measurements are with a 600 ohm source impedance.

*Crosstalk is measured with one channel at rated power, while the other has its attenuator fully counter-clockwise, and input lead connected.

*All distortion measurements were bandwidth limited to 30kHz, except the 20kHz measurements which were 200kHz band limited.

*The 2 ohm (and bridged 4 ohm) power output measurements, are the outputs achieved at 0.05% THD. SUSTAINING OF THIS POWER IS LIMITED BY THE BACK PANEL AC MAINS CIRCUIT BREAKER, AND SUPPLY RAIL FUSES.

*All test equipment grounds were floating, using the speaker output's ground binding post as ground reference. The amplifier was grounded to AC mains along with the variac.

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

WARNING:

Australian Monitor wishes to inform you that there are no user-serviceable parts inside the AM1600 and AM1000. Only qualified service personnel should attempt the removal of any covers off the unit, for any purposes. Lethal voltages are present inside the amplifier, and the AC line cord must be disconnected from the AC mains outlet prior to opening the unit.



WARRANTY

Australian Monitor warrant the AM1600 and AM1000 amplifiers for a period of 24 months from the date of purchase.

Australian Warranty terms are:

- 1/ Warranty covers parts and labour for a period of 24 months from first customers purchase from an authorised Australian Monitor dealer.
- 2/ Warranty covers defects in material and workmanship, but does not cover damage due to misuse, abuse, accident, or neglect.
- 3/ Proof of original purchase is all you need, retain your sales docket, which must be dated and show the serial number of the unit. A copy of the sales docket should accompany the amplifier if claiming Warranty.
- 4/ Ship the unit in its original packaging. Prepay the freight, and we will pay for the return freight.

International Warranty Terms:

- 1/ Electronic, electrical and performance Warranty covers parts & labour for a period of 24 months from original customer purchase from an authorised Australian Monitor dealer.
- 2/ Limited Chassis Warranty: The chassis is warranted for a period of five (5) years from initial purchase, against defects in materials and workmanship.
Such warranty does not apply where, in the opinion of your Australian Monitor Service centre, the amplifier has been suspended in an equipment rack without rear support.
- 3/ Electronic, electrical and performance Warranty covers defects in materials and workmanship, but does not cover damage due to misuse, abuse, accident, or neglect.
- 4/ In the event of a situation occurring that would give rise to a Warranty claim, please contact the point of purchase to seek advice on the best procedure.
- 5/ Failing contact with point of purchase, please contact your national distributor, or in the event this proves difficult, telephone Australian Monitor here in Australia.

Manufacturer



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