

ANTHEM AMP 1 OPERATING MANUAL



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We at Sonic Frontiers hope you will derive many years of listening pleasure with your new Anthem Amp 1. This Operating Manual contains important information regarding the operation and care of the Amp 1. Be sure to read this manual carefully and follow these instructions in order to keep your unit performing and sounding its best. Please contact Sonic Frontiers if you have any questions, a Customer Service Representative will be pleased to assist you.

#### WHAT'S IN THE BOX?

In addition to the Amp 1, its cover, and the operating manual you are presently reading (with associated inserts and warranty card), there are a few more items to take inventory of before steps are taken to make the Anthem Amp 1 operational.

These items are:

- 2 12AU7 tubes
- 1 12AX7 tube
- 4 EL34 tubes\*
- a glove for handling the tubes
- a detachable AC power cord
- a handful of Phillips screws
- a Phillips screwdriver

After completing an inventory of these items, proceed to the next steps.

\*These tubes are carefully measured and matched in pairs. Take extra care to keep them from being mixed and mismatched which would degrade performance.



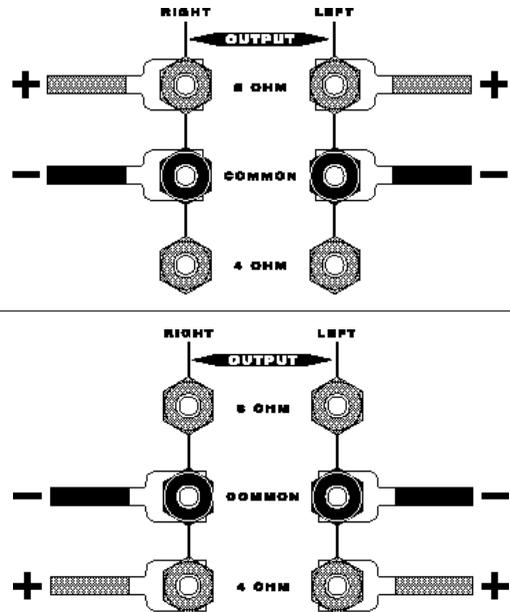
## CONTROL FUNCTIONS

- A LED**  
When the LED is lighted the Amp 1 is "ON", receiving power from the power supply.
- B ON-OFF BUTTON**  
When in the ON position (button depressed), high voltage power is received by the Amp 1 circuitry from the power source. Due to the warm up characteristics of tubes, it will take 30 seconds for the tubes to pass full signal. It is suggested that the Amp 1 remain muted or the Volume turned down for this first minute. When in the OFF position (not depressed), the Amp 1 is not receiving power and is not operational.

## CONNECTION FUNCTIONS

- C DETACHABLE AC POWER CORD SOCKET**  
Plug the Detachable Power Cord into this socket (see Figure 2). The Amp 1 is factory set for the correct operating voltage for the area in which it is sold (see shipping box for voltage setting). If a different operating voltage is required, please contact an authorized Sonic Frontiers or Anthem dealer, distributor or the factory directly.
- D SPEAKER CONNECTION POSTS**  
These 5 way binding posts accept a connection from one pair of speakers. The negative connections are to be made to the black connectors; left speaker to the terminals marked left and right to the terminal marked right. The positive connections are determined by the speakers. If the speakers impedance tends towards an 8 ohm load, use the left and right positive (red) posts labeled as 8 ohm. If the speakers are better represented by a 4 ohm load impedance, use the positive connectors labeled 4 ohm. Consult your speaker specification sheet, manual or manufacturer directly if there is any clarification needed regarding the impedance of your speakers. **NOTE: ONLY ONE PAIR OF POSITIVE CONNECTORS MAY BE USED AT A TIME. UNDER NO CIRCUMSTANCES ARE TWO PAIR OF SPEAKERSTO BE CONNECTED TO BOTH 4 OHM AND 8 OHM POSTS.**  
Refer to Figure 2 for further instruction.

- E PREAMPLIFIER INPUT**  
This input accepts RCA input connections from an external preamp or crossover; connect left channel to left channel and right channel to right channel.



**FIGURE 2**  
Top figure shows a connection to a loudspeaker with an 8 ohm impedance, lower figure shows a connection to a speaker with 4 ohm impedance.



**WARNING-DISCONNECT THE AC DETACHABLE POWERCORD FROM THE AMP 1 AND WAIT 5 MINUTES BEFORE REMOVING COVER, TUBES OR FUSE.**

## SETTING UP

The Amp 1 comes with seven (7) tubes, as follows:

### 12AX7 (V2) FIRST STAGE AMPLIFICATION TUBE

The first stage of amplification in the amplifier section of the Amp 1 is achieved through the use of this dual triode, amplifying both channels, one per triode section. The 12AX7 may be replaced with the ECC83 or 7025A tube.

### 12AU7 (V1 & V3) DRIVER TUBES

These tubes split the phase of the signal and drive the push/pull pairs of power tubes. The 12AU7 tubes may be replaced with ECC82, E82CC, ECC802S, 5814A, 6189, CV4003 or M8136. 12BH7A tubes may also be used with a slight increase in performance.

### EL34 (V4,V5,V6,V7) POWER TUBES

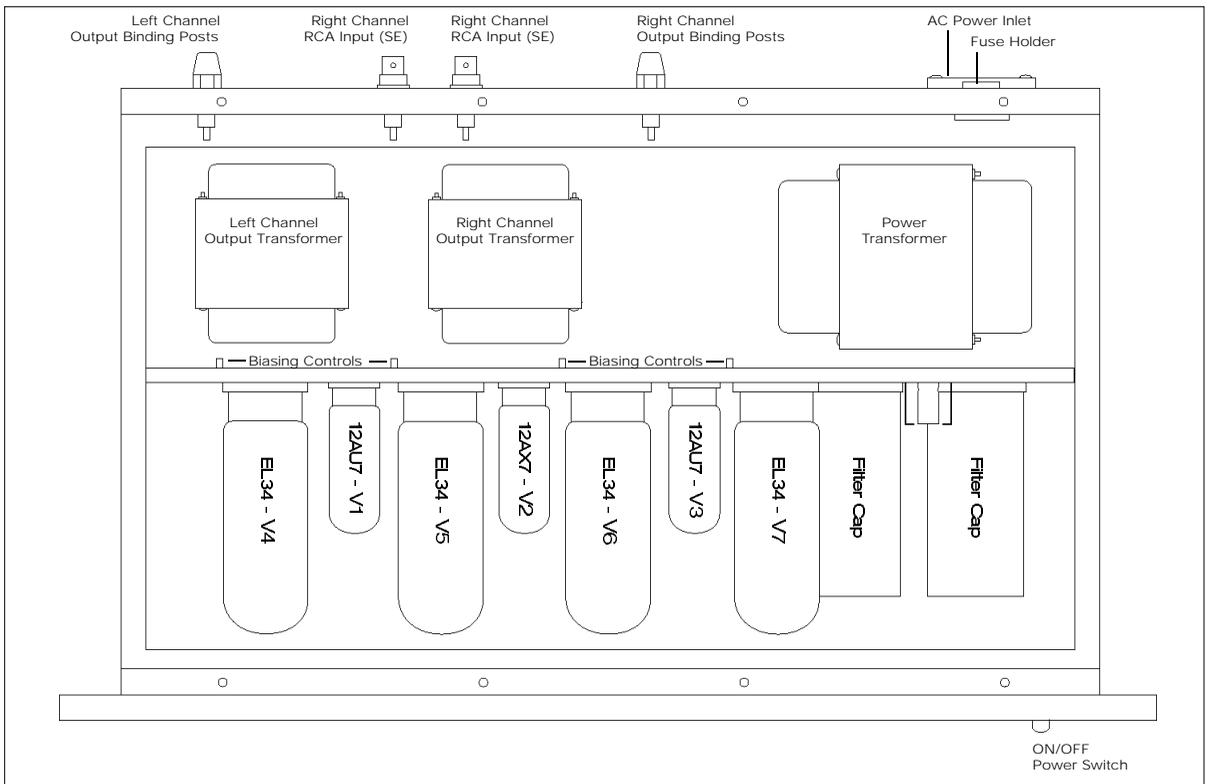
These tubes provide the last stage of amplification, set up in push/pull pairs (2 tubes per channel). The output stage uses an adjustable fixed biasing scheme which has been carefully adjusted at the factory to match the characteris-

tics of the output tubes shipped with this unit. The Bias adjustments should remain reasonably stable over the life of the output tubes and should not require periodic adjustment until the EL34 tubes are replaced.

Should one of the EL34 tubes fail, it may be replaced individually, as separate bias adjustments allow optimizing the operating conditions for each tube. For best performance, tubes in the pair V4 and V5 or V6 and V7, should be replaced with a matched pair. EL34 output tubes are interchangeable with and may be replaced by 6CA7, E34L, and KT77. Other tube substitutions are not recommended.



**WARNING:** Tube replacement and bias adjustment involves working with the covers off and power applied, around hazardous and potentially lethal voltages, and should be performed only by qualified personnel with the proper equipment and training.

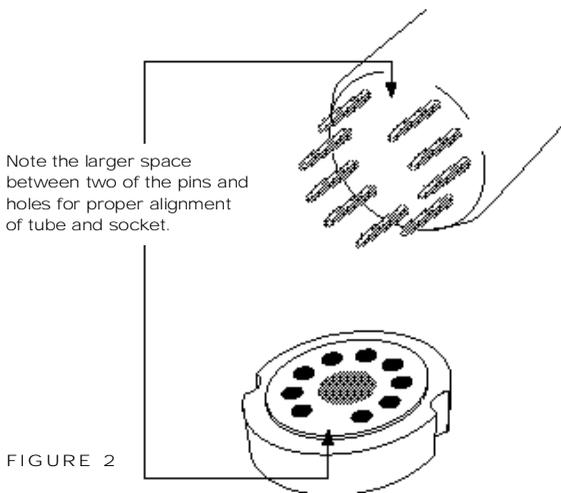


## INSERTION OF THE TUBES

1. Using the screwdriver supplied, remove the cover of the Amp 1. For your convenience, only two of the screws are installed at the factory.

2. When handling the tubes, it is recommended that the cotton gloves provided be worn to prevent skin oils from depositing on the glass surface and possibly causing the tube to become prematurely "gassy", thereby shortening the tube's useful operating life.

3. Noting the location of the tube sockets in the top view photo, inspect the tubes for corresponding labels and markings. Once locations are mapped, take a tube and inspect the pins, noting the larger space between two of the pins (see Figure 2). This space will match with the socket. Insert each tube into the appropriate tube socket, making sure all pins and pin holes are aligned. Do not force the tubes into the sockets. "Rock" the tubes gently while pushing slowly until each tube is firmly seated.



## OPERATION

Before plugging in the Amp 1, check to see that the unit is configured for the correct AC line voltage for country of use. The operating AC line voltage is indicated on the side of the shipping box. If the Amp 1 is set incorrectly for the country in which it is to be operated, contact the dealer or distributor in your area. If the unit is configured properly, continue with operation.

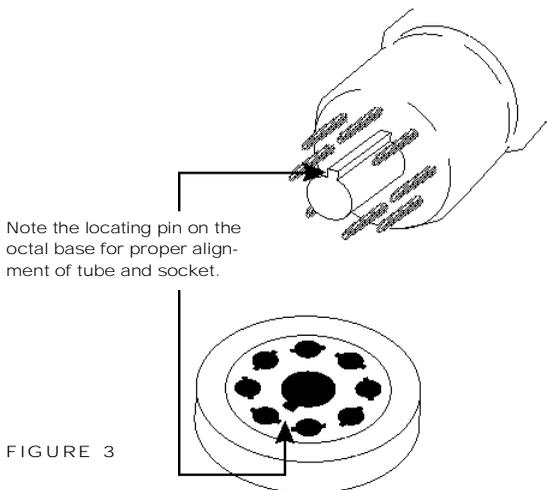
Connect the Detachable Power Cord to the Amp 1 AC Power Cord Socket (H) (see Figure 4). Plug your Amp 1 into the AC power source.

Connect loudspeakers to the appropriate post as described in the connection section of this manual.

The two remaining connections are made with co-axial cable and RCA connectors to a suitable Preamplifier such as the Anthem Pre 1.

Connect the pre amp to the Amp 1 Inputs (E); left channel to left channel and right channel to right channel.

The Amp 1 is now ready for operation. Power the Amp 1 by placing the On-Off button (G) in the ON position. The tubes will take approximately 30 seconds to warm up and then the Amp 1 is functional.



## TROUBLESHOOTING

If at any time the Amp 1 fails to work properly, consult this checklist:

1. Check that the AC Detachable Power Cord is plugged into the Amp 1 Detachable Power Cord Socket (C) and is connected to a live source of AC power. For instance, if using a power bar, check that the bar is turned on.
2. Ensure that all Input and Output connections are secure for a proper electrical contact.

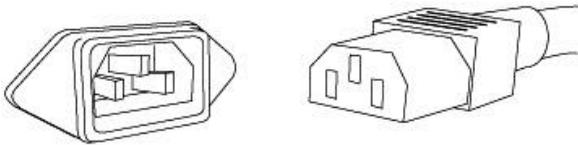


FIGURE 4  
Alignment of the AC power connector and detachable cord.

3. **DISCONNECT THE AC POWER CORD**, wait 5 minutes and check that:
  - A slo-blo fuse, with a rating of 3.5 Amp/250 V (1.6 Amp/250 V for European and Asian versions), is installed in the fuse holder.
  - The AC power fuse is intact and has not blown. If the fuse has blown, the thin metal conductor will have melted and the glass may appear “smoked”. If the fuse has blown, replace with a fuse of the same rating (3.5 Amp/250V slo-blo for 100 to 120 volt countries and 1.6 Amp/250V slo-blo for 220 to 240 volt countries). (See Figure 5)

NOTE: Under no circumstances should you replace the AC power fuse with one of a higher current rating! Doing so may cause further damage to the Amp 1 and will also void the warranty. In addition, your continued protection from risk of fire or shock would be seriously compromised.

  - Ensure the tubes are plugged firmly into their sockets as described in “INSERTION OF THE TUBES”.

4. Be sure the rest of the system is functioning properly (i.e. source unit, power amplifiers, cables and connections, etc.).
5. With tubes, fuses, covers and power cords in place, check that the LED (A) is lighted (glowing light green). If all of the above troubleshooting steps have been followed and the LED is not lighted (remains dark green), contact your dealer or distributor for assistance.

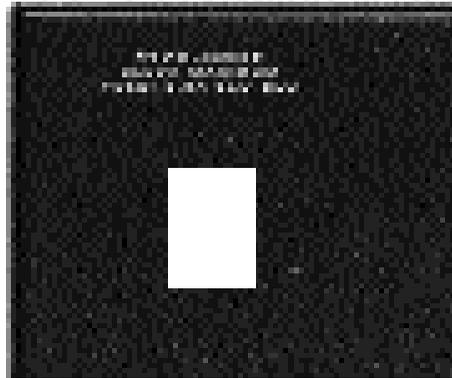


FIGURE 5  
Removal of the fuse holder.



**WARNING-DISCONNECT THE AC DETACHABLE POWERCORD FROM THE AMP 1 AND WAIT 5 MINUTES BEFORE REMOVING COVER, TUBES OR FUSE.**

#### BREAK-IN TIME

As with all audio electronic products, the ultimate sonic character of the Amp 1 will not be realized until and unless the unit receives a minimum of approximately 70 hours of signal break-in time (i.e. the Amp 1 is on and outputting a signal).

#### PLACEMENT FOR PROPER VENTILATION

The Amp 1 requires a minimum of 12" (30cm) above and 6" (15cm) at each side, of unobstructed air space. Make sure that the ventilation slots on the top, sides and bottom remain unobstructed by any object. Do not stack any other component on top of the AMP 1 or block the ventilation slots in any way. Also, be sure that the AMP 1 is placed on a secure, hard and level surface, not on carpet.

#### SAFETY INSTRUCTIONS

1. Ventilation - Your Amp 1 generates considerable heat in use, be sure that the ventilation slots in the top cover have at least 12" of unobstructed air space above them.
2. Water and Moisture - This product should not be used near water. To prevent fire or shock hazard, do not expose this product to rain or moisture.
3. Heat - This product should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances which produce heat.
4. Power Sources - This product should be connected to an AC power source of the proper rated voltage. The original shipping container will stipulate the AC voltage this unit can operate with correctly.
5. Cleaning - A regular dusting with a soft, non-abrasive cloth will generally keep the finish of the faceplate and chassis looking like new. At no time should you allow any liquid to come in contact with the Amp 1; it may run into the electronic circuitry and cause damage which will not be covered under your warranty.
6. Servicing - Do not open this product. No user serviceable parts inside. Refer servicing to an authorized service technician.
7. Non-Use Periods - The power cord of this product should be unplugged from the outlet when left unused for an extended period of time.
8. Do not remove the Amp 1 covers while the unit is "on", or connected to an AC power source. Cover screws could fall through the ventilation slots and cause electrical damage to the Amp 1.

#### PACKING MATERIALS

Please retain all of the packing material and shipping boxes for your Amp 1. They are custom designed to prevent shipping damage from occurring. Sonic Frontiers, Inc. will accept no responsibility for any damage occurring to an Amp 1 that is shipped in packing material other than the original Sonic Frontiers packing material.

#### DISCLAIMER OF LIABILITY

Under no circumstances does Sonic Frontiers, Inc. assume liability or responsibility for injury or damages sustained in the use or operation of this equipment or for damages to any other equipment connected to it. Sonic Frontiers, Inc. reserves the right to make design changes or improvements without the obligation to revise prior versions. All specifications are subject to change without notice.

#### LIMITED FIVE YEAR WARRANTY

Sonic Frontiers, Inc. warrants to the purchaser that each Amp 1 is free of manufacturing defects for a period of five (5) years from the date of purchase. This five (5) year limited non-transferable warranty excludes all vacuum tubes, which we warrant for a period of twelve (12) months. To receive this warranty, the original purchaser must complete and mail to Sonic Frontiers, within thirty (30) days from the date of purchase, the enclosed Warranty Registration Card. Sonic Frontiers, Inc. will then validate the warranty to the original purchaser. This warranty is subject to the following conditions and limitations:

1. Warranty applies only to the original purchaser.
2. This warranty is void and inapplicable if the product has been handled other than in accordance with the instructions in this Operating Manual, abused or misused, damaged by accident, neglect or in being transported, or the defect is due to the product being tampered with, modified or repaired by anyone other than Sonic Frontiers, Inc. or an authorized Sonic Frontiers repair depot.
3. Warranty does not cover normal maintenance.

4. Sonic Frontiers, Inc. shall not be responsible in any way for consequential or indirect damages or liabilities resulting from the use and operation of the product covered herein or resulting from any breach of this warranty or any implied warranty relating to said product.

During this period, Sonic Frontiers, Inc. will repair or replace any defective components free of charge. A Return Authorization Number (RA Number) is required before any product is returned to our factory for any reason. This number must be visible on the exterior of the shipping container(s) for Sonic Frontiers to accept the return.

Units shipped to us without a Return Authorization Number or without a visible RA Number on the exterior of the shipping container(s) will be returned to the sender, freight collect.

Units to be repaired by Sonic Frontiers, Inc. must be sent shipping and insurance prepaid by the original purchaser in the original packing material. A returned product should be accompanied by a written description of the defect. Repaired units will be returned by Sonic Frontiers, Inc. shipping and insurance prepaid.

All other warranties or conditions either written or implied are void.

Note: In foreign markets (anywhere outside of Canada and the USA), the warranty is supplied by the authorized International Distributor. Exact terms and conditions may vary.



This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's 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 operating and maintenance (servicing) instructions in the literature accompanying the appliance.

## BIAS ADJUSTMENT



**WARNING:** Hazardous and potentially lethal voltages! The Bias adjustment procedure described below involves working with equipment covers off and power applied, exposing the operator to potentially hazardous or lethal voltages. These tests and adjustments should be performed only by qualified personnel with the proper testing equipment and training.

The Anthem AMP 1 has been designed to give many hours of listening pleasure and should only require biasing at tube replacement time.\*

Should one of the EL34 output tubes fail or otherwise require replacement, it will be necessary to adjust the output stage bias current.

The factory set bias current of 40 ma per tube is a good compromise between long tube life and low distortion. For the highest performance the current may be increased to 50 ma per tube, of course at the expense of output tube longevity.

Bias current is measured by sampling the voltage drop across a 10 ohm resistor connected in the cathode circuit of each output tube. Using Ohms law  $E=IxR$  we can see that 40 ma current results in a 0.4 volt drop across the 10 ohm cathode resistor and 50 ma is 0.5 volts. For setup below, 40 ma or a measurement of 0.4 volts is assumed. A suitable analog or digital multimeter (20,000 Ohms/Volt) capable of accurately measuring 0-2 Volts DC. eg. Fluke 77 DMM or a Simpson 260, is required.

1. Disconnect the power cord and allow the amplifier to cool 15 minutes before removing the top cover.
2. After removing the top cover, with the front end of the chassis facing you and referring to Fig. 6, observe the location of four test points TP-1, TP-2, TP-3 and TP-4. These are located left to right along the top edge of the main printed circuit board assembly. Also note the position of the four potentiometer adjustment shafts protruding from the rear of the PCB mounting bracket. The potentiometers from left to right are VR1, VR2, VR3 and VR4.

3. Connect the multimeter's negative test lead to the AMP 1's left channel output COM or black binding post on the rear panel.

4. Carefully apply line voltage to the amplifier and observe that all the tube filaments light. As the amplifier is warming up touch each test point, TP-1, through TP-4 in succession with the positive meter test probe, noting the voltage at each point is less than or equal to 0.4 volts. Adjust the corresponding potentiometers VR1 through VR4 to maintain voltage at 0.4 volts at each test point over a twenty minute period.

5. After 20 minutes if no further movement in the test point voltage is observed, then disconnect the amplifier from the power source and replace the top cover.

\*Optional periodic checks of the bias may be made every 500 hours or so. Dramatic changes in bias over a 500 hour period generally indicates that the output tubes are becoming weak and should be replaced.

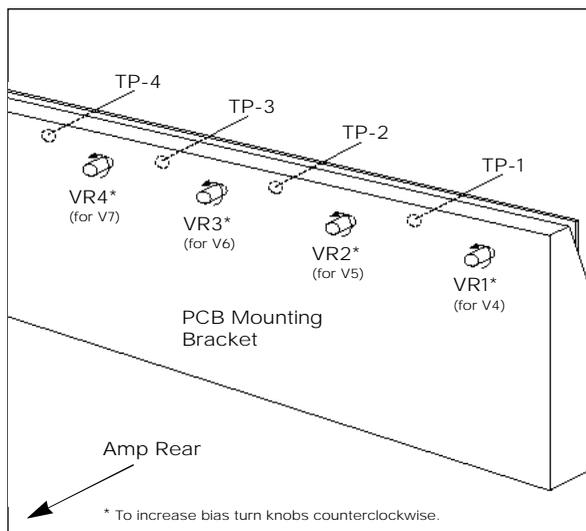


FIGURE 6  
Adjustment of the output tube bias.

## TECHNICAL SPECIFICATIONS

NOTE:  
Specification ratings based on the nominal power line input  
for the country in which it is used

POWER OUTPUT:  
40 watts per channel continuous both channels  
driven, into 4 or 8 Ohms (user selectable),  
20Hz to 20kHz with 1% THD  
Typical power at clipping (1% THD @ 1kHz) 55 watts

IMD: 1% at rated power, SMPTE 4:1 method

POWER BANDWIDTH (40 WATT):  
10Hz to 65kHz (-3 dB points)  
15Hz to 33kHz (-0.5 dB points)

FREQUENCY RESPONSE (1 WATT):  
10Hz to 75kHz (-0.5 dB points)  
2Hz to 105kHz (-3 dB points)

THD+N: 1% at rated power, 20Hz to 20kHz both  
channels driven. Typically .05% 1 kHz at 1 watt level

INPUT SENSITIVITY: 1.3V for Rated Power

INPUT IMPEDANCE: 100 Kohm

DAMPING FACTOR: 14 on 8 Ohm tap

HUM AND NOISE: -92 dB below rated power unweighted;  
-100 dB below rated power IHF-A weighted

VOLTAGE GAIN: 22.8 dB

RISE TIME: 2.8 uSec

POWER SUPPLY ENERGY STORAGE: 57 Joules

POWER REQUIREMENTS: 100-120VAC 50/60Hz  
(Export 220-240VAC 50/60Hz) 355 VA maximum

TUBE COMPLEMENT: 2-12AU7A/ECC82, 1-12AX7A/ECC83,  
4-EL34/6CA7 (2 matched pairs)

DIMENSIONS: 19" (48 cm) W x 5.25"  
(13.4 cm) H x 12" (30 cm) D

WEIGHT: 40 lbs. (18 kg) Net (unpacked)

All tests were performed with the Audio Precision System Two.

# A N T H E M

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