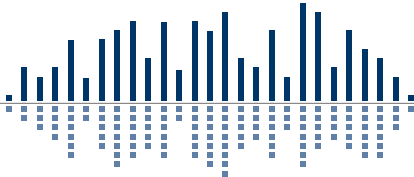


304 Headphone Amplifier

User's Guide



The Vision Behind the Sound



Engineered by Symetrix

What Ships in the Box

- A 304 hardware unit.
- One PS-3 (115 VAC), PS-3E (230 VAC) power supply.
- This User's Guide.

If you have questions beyond the scope of this Quick Start Guide or the help module, contact our Customer Support Group in the following ways:

Tel: +1 (425) 778-7728

8:00 am to 4:30 pm

Monday through Friday,
Pacific Time


Web: <http://www.SymetrixAudio.com>

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This Class B Digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations

Cet appareil numérique de la classe B respecte toutes les Exigences du Règlement sur le matériel brouilleur du Canada.

Important Safety Instructions

- 1 Read these instructions.
- 2 Keep these instructions.
- 3 Heed all warnings.
- 4 Follow all instructions.
- 5 Do not use this apparatus near water. This apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.
- 6 Clean only with dry cloth.
- 7 Do not block any ventilation openings. Install only in accordance with the manufacturer's instructions.
- 8 Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- 9 This apparatus shall be connected to a mains socket outlet with a protective earthing connection. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- 10 Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- 11 Only use attachments/accessories specified by the manufacturer.
- 12 Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over. 
- 13 Unplug this apparatus during lightning storms or when unused for long periods of time.
- 14 Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug cord is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

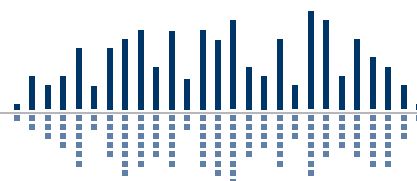


WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE

AVIS: RISQUE DE CHOC ELECTRIQUE NE PAS OUVRIR

SEE OWNERS MANUAL. VOIR CAHIER D'INSTRUCTIONS.
No user serviceable parts inside. Refer servicing to qualified service personnel.
Il ne se trouve à l'intérieur aucune pièce pouvant être réparée l'utilisateur.
S'adresser à un réparateur compétent.

- ◆ **The lightning flash** with arrowhead symbol within an equilateral triangle is intended to alert the user of 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. The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product (i.e. this Quick Start Guide).
- ◆ **CAUTION:** To prevent electric shock, do not use the polarized plug supplied with the unit with any extension cord, receptacle, or other outlet unless the prongs can be fully inserted.
- ◆ **Power Source:** This Symetrix hardware uses a switching power supply that automatically adjusts to the applied voltage. Ensure that your AC mains voltage is somewhere between 100-240 VAC, 50-60 Hz. Use only the power cord and connector specified for the product and your operating locale. A protective ground connection, by way of the grounding conductor in the power cord, is essential for safe operation. The appliance inlet and coupler shall remain readily operable once the apparatus has been installed.
- ◆ **User Serviceable Parts:** There are no user serviceable parts inside this Symetrix product. In case of failure, customers inside the U.S. should refer all servicing to the Symetrix factory. Customers outside the U.S. should refer all servicing to an authorized Symetrix distributor. Distributor contact information is available online at: <http://www.SymetrixAudio.com>.



Introduction

The Symetrix 304 Headphone Amplifier is a 1-in / 4-out amplifier designed to drive multiple headphones of any impedance. Symetrix proprietary high voltage drive technology gives the 304 the ability to drive high impedance headphones with the equivalent output voltage of a much larger power amplifier, yet provides more than ample current for low impedance phones. The four stereo outputs automatically adjust output power to match the load impedance.

Controls provided are input level, output level for each individual amplifier, and a stereo/mono switch.

The Stereo/Mono switch allows the amplifier to be used several ways. As a "normal" stereo amplifier (with four outputs), the left and right inputs are used for stereo signals, which feed the left and right outputs. Switching to mono

with a stereo input provides a quick check of the mono compatibility of a stereo mix. For that matter, you may want to monitor in mono.

As a mono amplifier, one signal fed to either input will feed both outputs. Also in mono mode, when two different mono signals are fed to the left and right inputs, they will be mixed to feed both the left and right outputs.

The inputs are electronically balanced, but will operate normally in an unbalanced configuration when 2-conductor 1/4 inch plugs are inserted. The outputs are 1/4 inch stereo connectors.

Fast First Time Setup

Wiring

To install the 304:

Plug the PS-3 power supply's DIN connector into the 304. Plug the PS-3 into a suitable source of AC power. Refer to the labelling on the PS-3 to determine what is suitable.

Connect your source to the 304's tip-ring-sleeve input jacks. The inputs are balanced. They will work with either balanced or unbalanced sources.

Connect your headphones to the four output jacks. The 304 can handle headphone impedances ranging from 8 Ohms to over 2000 Ohms. 60 Ohm headphones are optimal (they get the loudest). It is not necessary for each set of headphones to be the same (although it might help if they were).

Go!

Set the individual level controls to minimum (max ccw rotation). Set the master level control to the halfway position (12 noon). Set the stereo/mono switch as appropriate.

With the source signal active, adjust the individual level controls for comfortable listening levels.



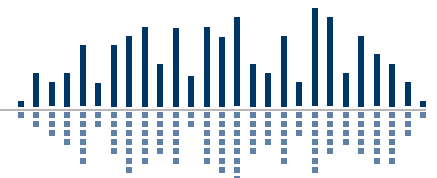
Warning: The 304 is capable of driving many headphones past the threshold of pain. This can also result in hearing damage. For your own hearing health, monitor at the lowest SPL that you can use and still get the job done.



Front Panel	
Item	Description
Input Level	Sets the input signal strength. Fully counterclockwise, no signal. Fully clockwise, input signals are boosted by 20 dB.
Mono/Stereo	Combines stereo, or two mono, input signals into one mono output signal (fed equally to both left and right headphone outputs).
Headphone Outputs	1/4" stereo jacks for headphones. The minimum impedance is 8 Ohms (see Table 1 for combined headphone impedances).
Headphone Levels	Volume controls set the signal strength at the corresponding output jack (1-4).
Power	Red LED indicates power "on".



Rear Panel	
Item	Description
7-pin DIN Connector	Connect the 7-pin DIN plug end of a Symetrix PS-3 (115 VAC) or PS-3E (230 VAC) here. Connect the AC power connector end of the PS-3 or PS-3E to an AC power source that is of the correct voltage and frequency as marked on the PS-3 or PS-3E.
Thru A	TRS jack connected in parallel with Input A jack. Use this jack to connect to other 304's or other audio equipment.
Thru B	TRS jack connected in parallel with Input B jack. Use this jack to connect to other 304's or other audio equipment.
Input A (Left channel)	3 conductor 1/4" jack for line level balanced or unbalanced input signals. Tip = high (+), Ring = low (-), Sleeve = ground.
Input B (Right channel)	3 conductor 1/4" jack for line level balanced or unbalanced input signals. Tip = high (+), Ring = low (-), Sleeve = ground.



Impedance, Sensitivity, Loudness

Loudness is directly related to the impedance and sensitivity of the headphones. Impedance determines how much power the headphones will draw, while sensitivity indicates how much of the electrical signal delivered to the headphones is converted into sound.

Because low impedance headphones draw more power from the amplifier they will sound louder, at the same control settings, than high impedance headphones. Also, headphones of higher sensitivity will sound louder than those of lower sensitivity. Check the manufacturer's spec sheet for impedance and sensitivity information.

Proprietary high voltage driver technology allows the 304 to drive even high impedance headphones to maximum levels, because the amplifiers are capable of very high output voltage swing. However, to get a loudness equivalent to that of low impedance headphones, the controls will have to be set to higher settings when using high impedance headphones. This is normal.

If low and high impedance headphones are combined on the same channel, the low impedance headphones will be much louder. As a result, when a combination of high impedance and low impedance headphones is used, only those of like impedance should be used on the same channel. This allows each listener to properly adjust loudness, without regard to the impedance and sensitivity of the other headphones. (It's ok to mix impedances on the same amplifier, it's just not optimum. You won't hurt anything.)

Maximum Amplifier Load

The minimum operating impedance, or maximum load, for each output of the 304 is 8 Ohms. Use as many pairs of headphones as desired, as long as the total combined impedance (per output) does not fall below 8 Ohms. Table 1 shows how many headphones of various impedances may be used with each output of the 304.

Impedance of Headphones	Maximum Number/Channel
8 (see note 1)	1
16	2
32	4
100	10
200	20
400	40
600	60

The 304 can be used in the following applications. Please note that this list is far from comprehensive and your imagination may create new uses that we haven't listed here.

Project Studio: Let the 304 expand your mixer's headphone capacity. You can drive it via a tip-ring-sleeve to dual tip-sleeve cable from your mixer's headphone jack, or from one or two of your mixer's aux sends. If you only use one aux send, then press the stereo/mono switch to route the signal to both channels.

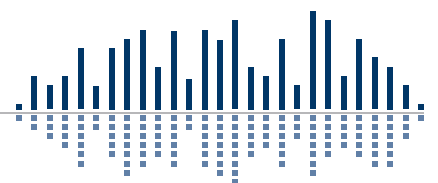
Broadcast: Use the 304 to drive the guest headphones in your studio. Does your console have an anemic headphone amplifier?

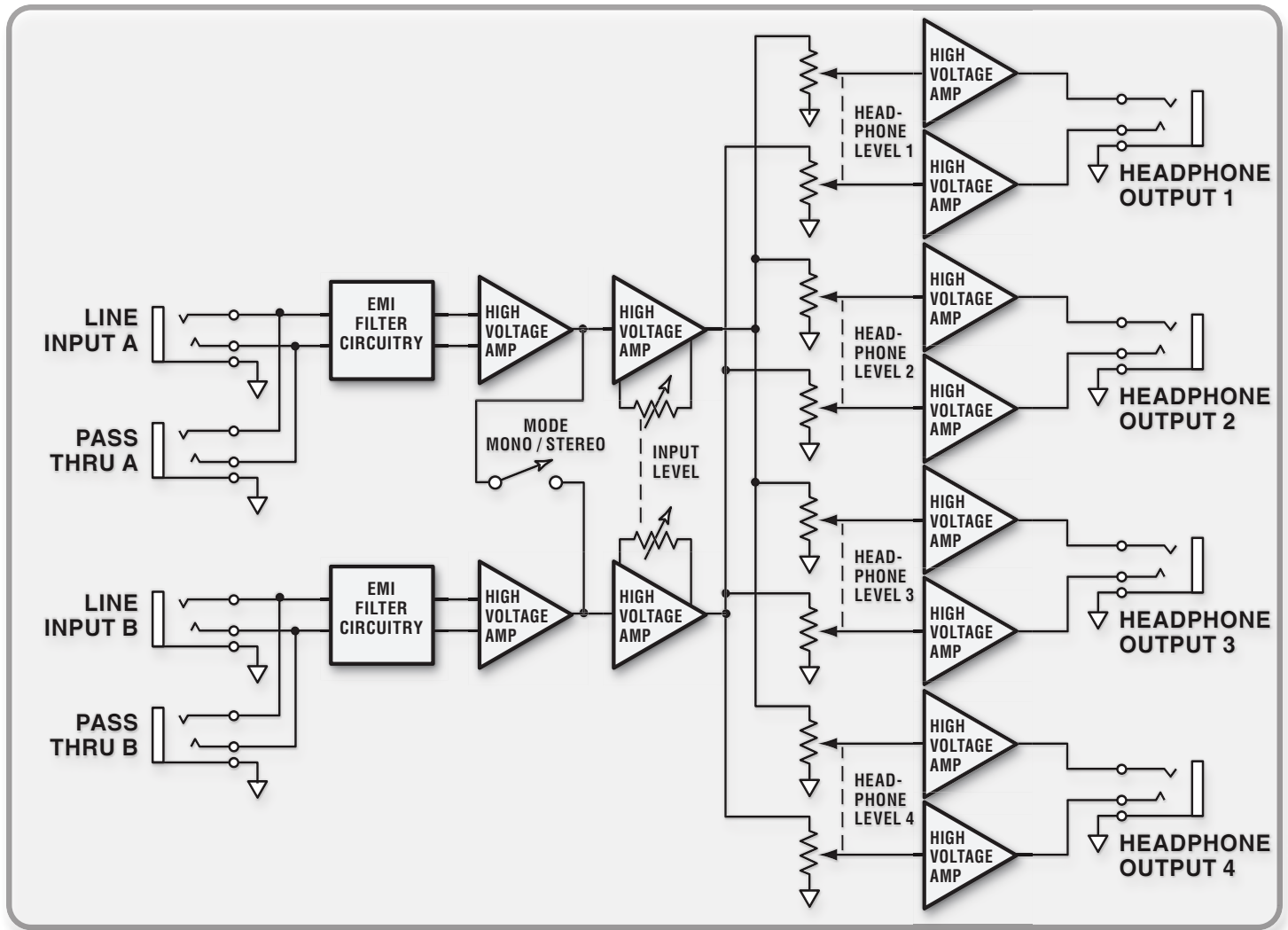
Live Sound: Does your console have an anemic headphone amplifier?

House of Worship: Create assistive listening stations at several pews. Drive the 304 with a mixture of the sound reinforcement signal and a room microphone. No, this isn't as sophisticated as one of the RF or infrared systems, but it doesn't cost like they do either!

Balanced Here's how to use the 304 as a one-in, four out balanced line amplifier.

Line Driver: Make a "Y" cable so that you can drive both inputs in parallel. Wire the plug for the right-channel input so that it is reverse polarity from the left-channel input. Connect your source to the "Y" cable's input. Connect each of your balanced loads to the tip-ring-sleeve output connectors. The tip connection is hot.

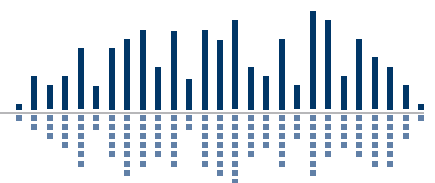




Troubleshooting Chart

Symptom	Probable Cause
No output:	Check cables and connections. Are inputs driven by outputs, and outputs driving inputs? Verify cables, source and load. Check for AC power presence.
Hum or buzz in output:	Check input and output connector wiring. Ground loop: check related system equipment grounding. Are all system components on the same AC ground?
Distortion:	Check input signal. Is it too hot, or is it already distorted? Check the output loading. Is something else clipping?
Noise (hiss):	Check input signal levels. The 304 is intended to operate at or near “line” level (+4dBu is nominal) Make sure that the signal you are feeding to the 304 is a line level signal, not mic level. Make sure that all systems components are on the same AC ground. Check gain settings on upstream equipment. The system gain structure should be such that the 304 receives +4dBu nominal signal. Is the input signal already noisy?
No LED display:	Is the unit plugged in? Is the AC outlet OK?

NOTES:



Architects and Engineers Specifications

The headphone amplifier shall have a single stereo input and four stereo outputs. Each output shall have its own amplifier and volume control. An overall volume control (master) shall also be provided. There shall be an overall stereo/mono switch.

All inputs are balanced bridging inputs. Outputs shall be suitable for driving headphones in the range of 8 Ohms to 2000 Ohms. The output source impedance shall be 100 Ohms.

The headphone amplifier shall be capable of delivering 35 volts peak-to-peak into a 2000 Ohm load (or greater).

The unit shall be capable of operating by means of a Symetrix PS-3 or PS-3E external power supply connected to 115 VAC nominal (95 to 130 VAC), 50/60 Hz or 230 VAC nominal, 207 to 253 VAC, 50 Hz where applicable.

The unit shall be a Symetrix, Inc. model 304 Headphone Amplifier.

Specifications

INPUT/OUTPUT

Input Type.....Bridging, Balanced or Unbalanced

Maximum Input Level.....+18 dBu Balanced

Maximum Output Level.....21 dBm, 600 Ohm load,
>6 VRMS, 200 Ohm load

Input Impedance 20k Ohms Balanced, 10k Ohms Unbalanced

Output Impedance 100 Ohms

Performance Data

Frequency Response..... 20 Hz to 20 kHz, +0, -1 dB

THD+Noise......01% (1kHz, 0 dBm, 600 Ohms)
.02% (1kHz, +20 dBm, 600 Ohms)

Signal-to-Noise Ratio..... 95 dB

Maximum Gain 25 dB

CONNECTIONS

Input..... 1/4" TRS

Output..... 1/4" TRS

Power In.....7-pin DIN

PHYSICAL

Size (hwd)..... 1/2 rack unit
1.75 x 8.5 x 6.5 in., 4.445 x 21.59 x 15.875 cm.

Shipping Weight 4.5 lbs

ELECTRICAL

Power Requirements 115 VAC nominal, 95 to 130 VAC, 50 to 60 Hz
230 VAC nominal, 207 to 253 VAC, 50 Hz

Declaration of Conformity

We, Symetrix Incorporated, 6408 216th St. SW, Mountlake Terrace, Washington, USA, declare under our sole responsibility that the product:

304 Headphone Amplifier

to which this declaration relates, is in conformity with the following standards:

EN 60065

Safety requirements for mains operated electronic and related apparatus for household and similar general use.

EN 50081-1

Electromagnetic compatibility - Generic emission standard
Part 1: Residential, commercial, and light industry.

EN 50082-1

Electromagnetic compatibility - Generic immunity standard
Part 1: Residential, commercial, and light industry.

The technical construction file is maintained at:

Symetrix, Inc.

6408 216th St. SW

Mountlake Terrace, WA, 98043 USA

The authorized representative located within the European Community is:

World Marketing Associates

P.O. Box 100

St. Austell, Cornwall, PL26 6YU, U.K.

Date of issue: October 31, 1998

Place of issue: Lynnwood, Washington, USA

Authorized signature:

Dane Butcher, President, Symetrix Incorporated.



The Symetrix Limited Warranty

Symetrix, Inc. expressly warrants that the product will be free from defects in material and workmanship for eighteen (18) months from the date the product is shipped from the factory. Symetrix's obligations under this warranty will be limited to repairing or replacing, at Symetrix's option, the part or parts of the product which prove defective in material or workmanship within eighteen (18) months from the date the product is shipped from the factory, provided that the Buyer gives Symetrix prompt notice of any defect or failure and satisfactory proof thereof. Products may be returned by Buyer only after a Return Authorization number (RA) has been obtained from Symetrix. Buyer will prepay all freight charges to return the product to the Symetrix factory. Symetrix reserves the right to inspect any products which may be the subject of any warranty claim before repair or replacement is carried out. Symetrix may, at its option, require proof of the original date of purchase (dated copy of original retail dealer's invoice). Final determination of warranty coverage lies solely with Symetrix. Products repaired under warranty will be returned freight prepaid via United Parcel Service by Symetrix, to any location within the Continental United States. Outside the Continental United States, products will be returned freight collect.

The foregoing warranties are in lieu of all other warranties, whether oral, written, express, implied or statutory. Symetrix, Inc. expressly disclaims any IMPLIED warranties, including fitness for a particular purpose or merchantability. Symetrix's warranty obligation and buyer's remedies hereunder are SOLELY and exclusively as stated herein.

This Symetrix product is designed and manufactured for use in professional and studio audio systems and is not intended for other usage. With respect to products purchased by consumers for personal, family, or household use, **Symetrix expressly disclaims all implied warranties, including but not limited to warranties of merchantability and fitness for a particular purpose.**

This limited warranty, with all terms, conditions and disclaimers set forth herein, shall extend to the original purchaser and anyone who purchases the product within the specified warranty period.

Symetrix does not authorize any third party, including any dealer or sales representative, to assume any liability or make any additional warranties or representation regarding this product information on behalf of Symetrix.

This limited warranty gives the buyer certain rights. You may have additional rights provided by applicable law.

Note: Some Symetrix products contain embedded software and may also be accompanied by control software intended to be run on a personal computer. Said software is specifically excluded from this warranty.

Limitation of Liability

The total liability of Symetrix on any claim, whether in contract, tort (including negligence) or otherwise arising out of, connected with, or resulting from the manufacture, sale, delivery, resale, repair, replacement or use of any product will not exceed the price allocatable to the product or any part thereof which gives rise to the claim. In no event will Symetrix be liable for any incidental or consequential damages including but not limited to damage for loss of revenue, cost of capital, claims of customers for service interruptions or failure to supply, and costs and expenses incurred in connection with labor, overhead, transportation, installation or removal of products, substitute facilities or supply houses.

Servicing Your Symetrix Product

If you have determined that your Symetrix product requires repair services and you live outside of the United States please contact your local Symetrix dealer or distributor for instructions on how to obtain service. If you reside in the U.S. then proceed as follows:

Return Authorization

At the Symetrix factory, Symetrix will perform in-warranty or out-of-warranty service on any product it has manufactured for a period of three (3) years from date of discontinued manufacture.

Before sending anything to Symetrix, please contact our Customer Service Department for a Return Authorization (RA) number. The telephone number is +1 (425) 778-7728. Additionally, support is available via the web site: <http://support.SymetrixAudio.com>.

In-warranty Repairs

To get your Symetrix product repaired under the terms of the warranty:

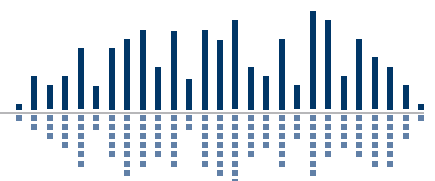
1. Call us for an RA number (have the serial number, shipping and contact information and description of the problem ready).
2. Pack the unit in its original packaging materials.
3. Include your name, address, daytime telephone number, and a brief statement of the problem.
4. Write the RA number on the **outside** of the box.
5. Ship the unit to Symetrix, freight prepaid. We do not accept freight collect shipments.

Just do these five things, and repairs made in-warranty will cost you only one way freight charges. We'll pay the return freight.

If you don't have the factory packaging materials, we recommend using an oversize box. Wrap the unit in a plastic bag, surround it with bubble-wrap, and place it in the box surrounded by Styrofoam peanuts. Be sure there is enough clearance in the box to protect the rack ears. We won't return the unit in anything but Symetrix packaging for which we will have to charge you. If the problem is due to operator misuse or error, you will have to pay for both parts and labor. In any event, if there are charges for the repair, you will pay for the return freight. All charges will be COD unless you have made other arrangements (prepaid, Visa or Mastercard).

Out-of-warranty Repairs

If the warranty period has passed, you'll be billed for all necessary parts, labor, packaging materials, and freight charges. Please remember, you must call for an RA number before sending the unit to Symetrix.





The Vision Behind the Sound

Engineered by **Symetrix**

Item No. 53-0001

304 Headphone Amplifier User's Guide

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