303 Interface Amplifier
(Bi-directional)

Users Guide

303

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Mention of third-party products is for informational purposes only and constitutes neither an endorsement nor a recommendation. Symetrix assumes no responsibility with regard to the performance or use of these products.

Symetrix

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Computer audio recording systems and high-quality consumer audio equipment provide their users with efficient and affordable systems. Unfortunately, they also create a few audio challenges of their own. Joining consumer audio gear with professional audio gear in a signal path requires connecting equipment designed to operate at different signal levels. A direct wire connection between them should be avoided.

The Symetrix 303 Interface Amplifier creates a proper interface between consumer and professional audio gear. This tool provides bi-directional level-matching and balanced/unbalanced conversion between professional (+4 dBu nominal level, balanced) audio equipment and consumer (-10 dBV nominal level, unbalanced) audio components.

The 303 has two completely separate channels of conversion and level matching in each direction (from -10dBV to +4dBu, and from +4dBu to -10dBV). This means that, in each direction, the 303 may be used as a stereo interface amplifier, or as two mono interface amplifiers. All inputs and outputs may be used at the same time, allowing up to four channels of simultaneous level-matching and conversion.

Level-matching permits the connection of consumer and pro audio gear, while allowing both types of units to operate at optimal performance levels. A typical use of the 303 would be to connect a DAT, cassette deck or computer sound card (all of which generally run at -10dBV nominal level), to a professional audio mixer (+4dBu nominal level) or vice versa.

The Symetrix 303 also provides conversion from unbalanced, -10dBV outputs to balanced, +4dBu inputs and conversion from balanced, +4dBu outputs to unbalanced, -10dBV inputs. This conversion can also be used to minimize noise and hum.

A note about setup: Unbalanced cables are much more susceptible to induced noise and hum than balanced cables (when used with balanced inputs and outputs), and the longer an unbalanced cable is, the more noise and hum you are likely to pick up. If you keep the unbalanced cables between the consumer equipment and the 303 short (under 10 feet), and use the balanced lines between the professional gear and the 303 for any long cable runs, you are far less likely to pick up noise and hum, and you take advantage of the common-mode rejection of the balanced input.

Low noise operation is also ensured by the Symetrix 303 s external power supply, which eliminates the possibility of power supply noise developing in the 303's circuitry.

We recommend that you read this manual cover-to-cover. You will find the answers to most of your questions inside. However, if you are in a hurry, go directly to Chapter 3 (Fast Setup). It will get you started quickly. Please feel free to contact us if you have questions, comments or suggestions.

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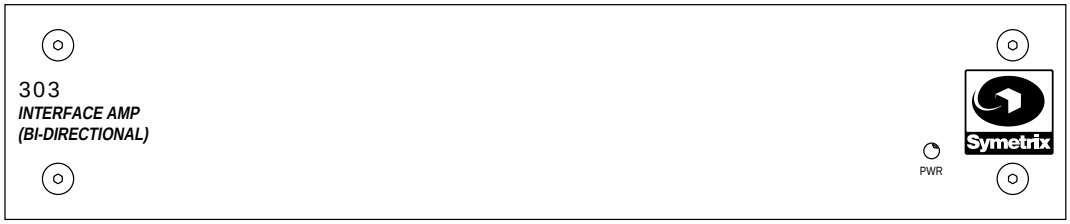
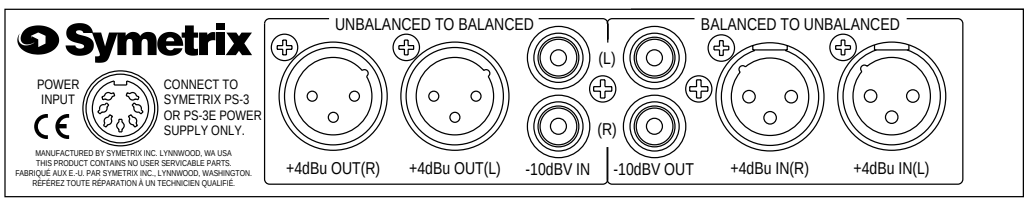


Front panel



Rear panel

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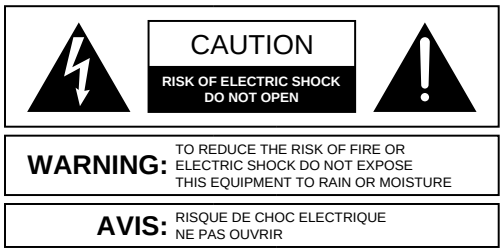
The information in this summary is intended for persons who operate the equipment as well as repair personnel. Specific warnings and cautions are found throughout this manual wherever they may apply.

The notational conventions used in this manual and on the equipment itself are described in the following paragraphs.

Equipment Markings



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 303 (i.e. this manual).

Caution *To prevent electric shock, do not use the polarized plug supplied with the 303 with any extension cord, receptacle, or other outlet unless the blades can be fully inserted.*

Terms

Several notational conventions are used in this manual. Some paragraphs may use Note, ***Caution***, or **Warning** as a heading. Certain typefaces and capitalization are used to identify certain words. These are:

Note — Identifies information that needs extra emphasis. A Note generally supplies extra information to help you to better use the 303.

Caution — *Identifies information that, if not heeded, may cause damage to the 303 or other equipment in your system.*

Warning — **Identifies information that, if ignored, may be hazardous to your health or that of others.**

CAPITALS — Controls, switches or other markings on the 303's chassis.

Boldface — Strong emphasis.

Power source - This product is intended to operate from a power source that does not apply more than 255Vrms between the power supply conductors or between either power supply conductor and ground. A protective ground connection, by way of the grounding conductor in the power cord, is essential for safe operation.

Danger from loss of ground - If the protective ground connection is lost, all accessible conductive parts, including knobs and controls that may appear to be insulated, can render an electric shock.

In-line power supply - This product receives its operating power from the Symetrix PS-3 or PS-3E power supply. This is the only power supply approved for use with the product. Do not connect the product to any other in-line, or plug-in, transformer. The use of other power sources may cause damage to the equipment or present a shock hazard to the operator.

Operating location - Do not operate this equipment under any of the following conditions: explosive atmospheres, in wet locations, in inclement weather, improper or unknown AC mains voltage, or if improperly fused.

Stay out of the box - To avoid personal injury or injury to others, do not remove the product covers or panels. Do not operate the product without the covers and panels properly installed.

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Fast First-Time Setup

Follow these instructions to get your 303 up-and-running as quickly as possible. The intent of this section is fast setup. Refer to later chapters for explanation of the 303's connections and applications.

1. Connect the 7-pin connector end of the 303's external power supply cable to the 7-pin power receptacle on the rear of the Symetrix 303.

2. Connect the three-pronged AC plug end of the 303's external power supply cable to an AC power source of the proper voltage and frequency, as marked on the rear of the unit.

Caution *Failure to connect the 303 to the proper mains voltage may cause fire and/ or internal damage.*

Warning **Lethal voltages are present inside the chassis. There are no user serviceable parts inside the chassis. Refer all service to qualified service personnel or to the factory.**

3. To connect the analog output(s) of a consumer (-10dBV) audio device to the analog input(s) of a professional (+4dBu) audio device:

A. Connect the output(s) of the -10dBV device to the Symetrix 303's RCA input jack(s).

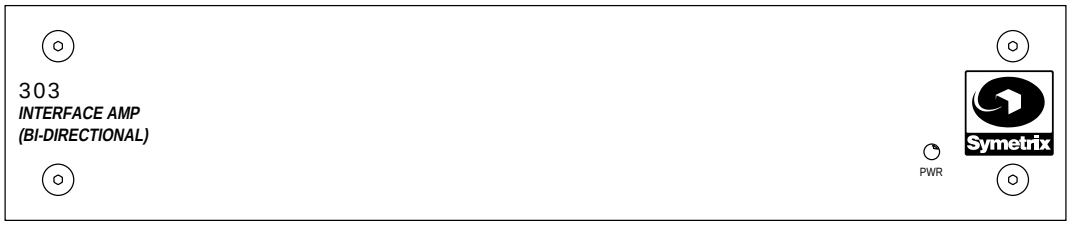
B. Connect the Symetrix 303's XLR output jack(s) to the input(s) of the +4dBu device.

4. To connect the analog output(s) of a professional (+4dBu) audio device to the analog input(s) of a consumer (-10dBV) audio device:

A. Connect the output(s) of the +4dBu device to the Symetrix 303's XLR input jack(s).

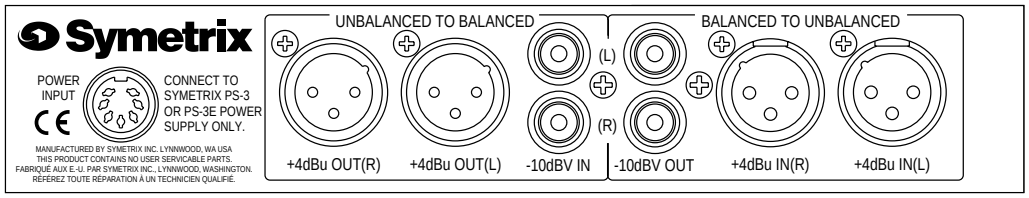
B. Connect the Symetrix 303's RCA output jack(s) to the input(s) of the -10dBV device.

Once you have completed the previous steps, the 303 should pass signal. Fast setup is complete.



Front Panel

PWR LED: This is the power LED, which lights to indicate the presence of power at the 303's power input jack.



Rear Panel

POWER INPUT: 7-pin DIN receptacle. Connect this to the 7-pin DIN plug of a Symetrix PS-3 or PS-3E **only**. Connect the AC power connector 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.

Note: The PS-3 and PS-3E are Symetrix accessories, available from your Symetrix dealer.

UNBALANCED TO BALANCED: This is the input and output section of the 303's unbalanced -10dBV to +4dBu conversion/level-matching circuitry.

+4dBu OUT (L) and +4dBu OUT (R): These balanced XLR outputs will contain the signal applied to the -10dBV inputs, after that signal has been balanced and raised to +4dBu nominal level.

-10dBV IN (L) and (R): These unbalanced RCA inputs accept -10dBV nominal unbalanced signals, which are converted to +4dBu balanced signals at the +4dBu outputs.

Note: The (L) and (R) inputs and outputs listed above may be used for stereo left and right signals, or they may be used as two mono inputs and outputs, because the circuitry for the left and right channels is completely separate.

BALANCED TO UNBALANCED: These are the input and output jacks for the 303's balanced +4dBu to -10dBV conversion/level-matching circuitry.

-10dBV OUT (L) and (R): These unbalanced RCA outputs will contain the signal applied to the +4dBu inputs, after that signal has been unbalanced and lowered to -10dBV nominal level.

+4dBu IN (R) and (L): These balanced XLR inputs accept +4dBu nominal balanced signals, which are converted to -10dBV unbalanced signals at the -10dBV outputs.

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Consumer Audio Equipment

For the purposes of this discussion, consumer audio equipment is defined as equipment that is designed to operate at -10dBV nominal signal levels. The inputs and outputs of this type of gear are unbalanced. Typically, the input and output connectors are of the RCA-type.

To operate properly and with the lowest noise performance, the signal level applied to the line input of a consumer audio device must be -10dBV nominal. If the input signal is too low, the apparent noise floor will increase as the overall gain is increased downstream , to compensate for the weak input signal. If the input signal is too weak it may never reach the threshold at which the consumer device begins to act. If the input signal is too high (i.e. +4dBu), headroom will be greatly reduced, and the input stage of the audio device may overload and distort.

Consumer audio equipment is unbalanced, and unbalanced wiring is susceptible to RF (radio frequency) interference, as well as other types of induced noise and hum. The length of interconnecting cables for unbalanced equipment must be kept to a minimum (under 10 feet), to minimize the noise and hum that may be induced in the cables.

Semi-pro audio equipment also falls into this category.

Professional Audio Equipment

For the purposes of this discussion, professional audio equipment is defined as equipment that is designed to operate at +4dBu nominal signal levels. The inputs and outputs of this type of gear are balanced. Typically, the input and output connectors are of the XLR-type.

To operate properly and with the lowest noise performance, the signal level applied to the line input of a professional audio device must be +4dBu nominal. If the input signal is too low (i.e. -10dBV), the apparent noise floor will increase as the gain is increased downstream , to compensate for the weak input signal. If the input signal is too weak it may never reach the threshold at which the professional device begins to act. If the input signal is too high, the input stage of the audio device may overload and distort.

Professional audio equipment is balanced, and balanced wiring is designed to reject RF (radio frequency) interference, as well as other types of induced noise and hum. Balanced inputs utilize Common-Mode Rejection to get rid of any noise or hum that may have been picked up by the interconnecting cables. The relative immunity of balanced wiring to induced noise and hum permits the interconnecting balanced cables to be very long, sometimes hundreds of feet, without picking up appreciable noise or hum.

Beware of using unbalanced cables to interconnect balanced equipment. Doing this immediately changes the operation of your balanced equipment to unbalanced, and destroys the noise immunity advantage of your balanced gear.

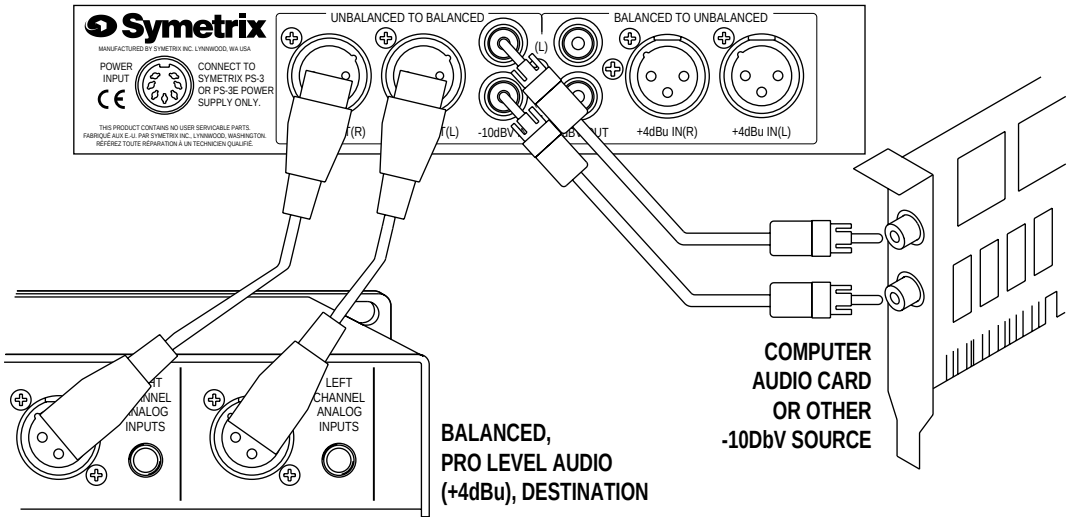
Also avoid making a direct-wire connection between unbalanced and balanced gear. This connection changes the operation of your balanced equipment to unbalanced, and destroys the noise immunity advantage of your balanced gear. Use your Symetrix 303 instead.

Interconnecting Consumer and Professional Audio Equipment

To properly connect a piece of consumer audio equipment to a piece of professional audio gear, you must ensure that each type of gear receives the appropriate nominal signal levels. You must also make sure that the inputs and outputs of your balanced equipment are connected to balanced cables, which are in turn connected to other balanced equipment. The Symetrix 303, inserted in the signal path between consumer and professional audio devices, accomplishes both of these functions, maintaining the integrity of the signal as it passes between the two types of audio equipment.

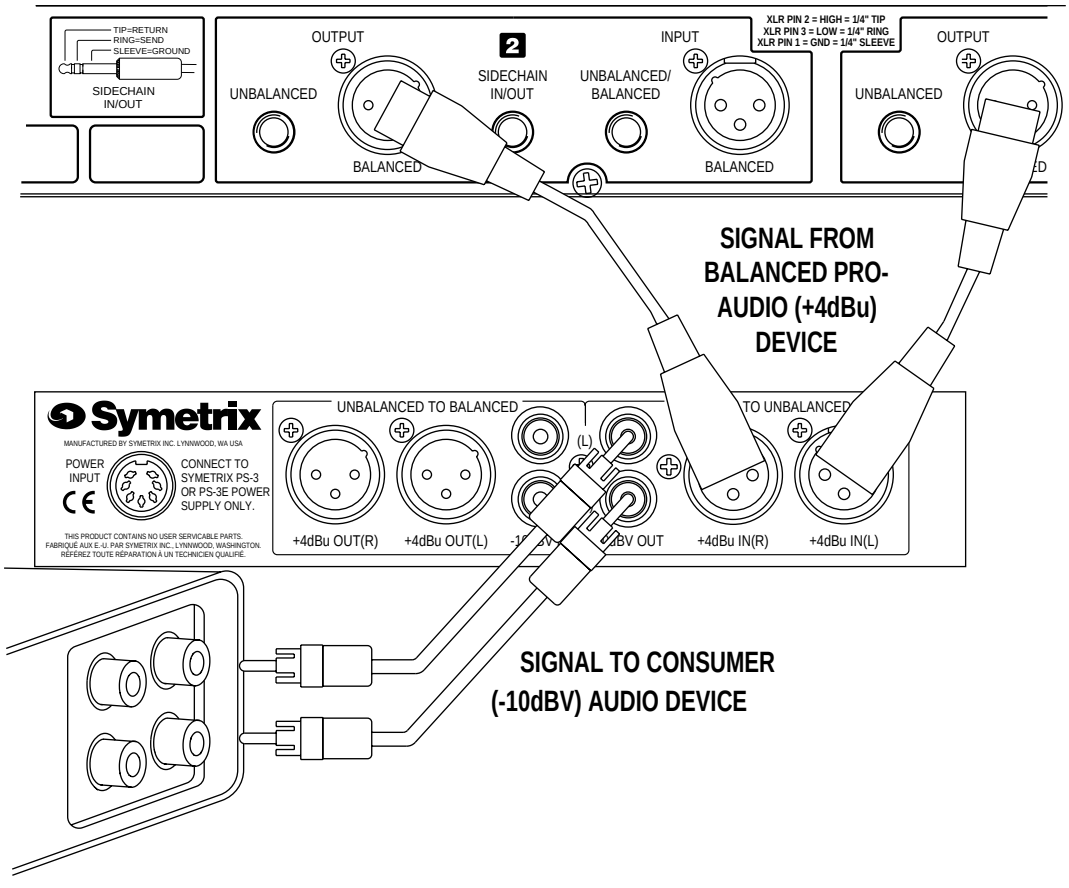
Connecting the Output of a Computer Audio Card to +4dBu Gear

The diagram below shows how the 303 should be connected in-line between the audio card's -10dBV, unbalanced output and the input of a +4dBu, balanced device.



Connecting the Output of a +4dBu Device to -10dBV Gear

The diagram below shows how the 303 should be connected in-line between the balanced outputs of a +4dBu device, and the unbalanced inputs of a -10dBV unit, such as a DAT machine or cassette recorder.



Troubleshooting Chart

SYMPTOM	PROBABLE CAUSE
No output signal	Check cables and connections. Are inputs driven by outputs, and outputs driving inputs? Check for AC power presence. Is the 303's power light on?
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. It should be above or equal to 600 ohms. Is the input of the device following the 303 clipping? Is something else clipping?
Noise (hiss)	Check input signal. The 303's unbalanced inputs are designed to run at -10dBV nominal, and the 303's balanced inputs are designed to run at +4dBu nominal. Make sure that you are feeding a line level (not mic level) signal to the 303 at the appropriate nominal level. Check gain settings on downstream equipment. The system gain structure should be such that the 303 operates at or near unity gain. Is the input signal already noisy?
No Power LED	Is the 303 plugged in? Is the AC outlet OK?

Architects and Engineers Specifications

The Symetrix 303 Interface Amplifier (Bi-directional) shall simultaneously provide the following: two channels of -10dBV to +4dBu (nominal) signal level matching, and two channels of +4dBu to -10dBV (nominal) signal level matching.

All -10dBV input and output connectors shall be unbalanced RCA-type phono connectors. All +4dBu input and output connectors shall be balanced 3-pin XLR (AES/IEC standard wiring - pin 2 +).

The unit shall occupy half of the width of one rack space. The physical dimensions shall be 1.75"H x 8.5"W x 6.5"D; 4.445cm H x 21.59cm W x 15.875cm D.

The interface amplifier shall operate by means of a Symetrix PS-3 or PS-3E power supply connected to 117V AC nominal, (95-130V AC), 50-60 Hz or 230V AC nominal, (165-255V AC), 50 Hz.

The interface amplifier shall be a Symetrix, Inc. model 303 Interface Amplifier (Bi-directional).

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Specifications

Input/Output: +4dBu to -10dBV Circuit

Maximum Input Level	+28 dBu Balanced, +22dBu Unbalanced
Maximum Output Level	+18 dBV Unbalanced
Input Impedance	40k Ohms Balanced, 20k Ohms Unbalanced
Output Impedance	100 Ohms Unbalanced
Input Common Mode Rejection	>40dB

Performance Data: +4dBu to -10dBV Circuit

Frequency Response	10 Hz to 30 kHz, +0, -1dB
THD+Noise	<.005% at +28dBu
Gain	-12dB

Input/Output: -10dBV to +4dBu Circuit

Maximum Input Level	+8dBV Unbalanced
Maximum Output Level	+22 dBm Balanced, 600 Ohm load +18dBm Unbalanced, 600 Ohm load
Input Impedance	100k Ohms Unbalanced
Output Impedance	200 Ohms Balanced, 100 Ohms Unbalanced

Performance Data: +4dBu to -10dBV Circuit

Frequency Response	10 Hz to 30 kHz, +0, -1dB
THD+Noise	<.005% at +8dBV
Gain	+12dB

Connections

Input	XLR, RCA jacks
Output	XLR, RCA jacks
Power In	7 pin DIN

Physical

Size (hwd)	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	117V AC nominal, 95-130V AC, 50 to 60 Hz 230V AC nominal, 165-255V AC, 50Hz

In the interest of continuous product improvement, Symetrix, Inc. reserves the right to alter, change, or modify these specifications without prior notice.

303 Limited Warranty

Symetrix, Inc. expressly warrants that the product will be free from defects in material and workmanship for (18) months. 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 (18) months from date of shipment, 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 by Symetrix via United Parcel Service (surface), to any location within the Continental United States. At Buyer's request the shipment may be returned via airfreight at Buyer's expense. 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.

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 allocable 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 or substitute facilities or supply houses.

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Servicing the 303

If you have determined that your 303 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:

Before sending anything to Symetrix, contact our Customer Service Department for a return authorization (RA) number. The telephone number is (425) 778-7728 or email: tech@symetrixaudio.com

In-warranty Repairs

To get your 303 repaired under the terms of the warranty:

1. Call us for an RA number.
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.

Repairs made in-warranty will cost you only one-way freight charges. We'll prepay the return (surface) freight.

If you send us your product in substandard packaging, we will charge you for factory shipping materials. If you don t have the factory packaging materials, please use an oversized carton, wrap the unit in a plastic bag, and surround it with bubble-wrap. Pack the box full of Styrofoam peanuts. Be sure there is enough clearance in the carton to protect the rack ears (you wouldn't believe how many units are returned with bent ears). We will return the unit in Symetrix packaging. Of course, if the repair is due to operator error, parts and labor will be charged. In any event, if there are charges for the repair costs, 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.

Declaration of Conformity

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

303 Interface Amplifier (Bi-directional)

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:
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Mountlake Terrace, WA, 98043
USA

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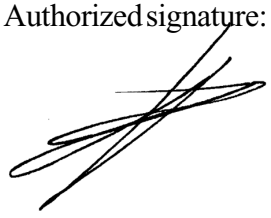
Date of issue: June 15, 1998
Place of issue: Mountlake Terrace, Washington, USA
Authorized signature:



Dane Butcher, President, **Symetrix Incorporated**.

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