

506E Headphone Amplifier



U S E R G U I D E

506E Headphone Amplifier User's Guide

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What Ships in the Box

- ☑ The 506E unit
- ☑ IEC power cord
- ☑ Two 3.5 mm to 1/4" mini jack adapters
- ☑ 4 rubber feet for mounting to bottom of unit
- ☑ This user's guide
- ☑ A warranty card (if purchased in USA)

You can register online at www.symetrixaudio.com

When you register the 506E, you get 4 extra years of warranty coverage.

Getting Help

If you have technical questions beyond the scope of this guide, please contact our Technical Services Group in the following ways:

- T** US customers (425) 778-7728
 International customers (425) 778-7728
 from 8:00 am to 4:30 pm Pacific Time Monday through Friday
- F** (425) 778-7727
tech@symetrixaudio.com
www.symetrixaudio.com

Optional Accessories

MODEL	ITEM	DESCRIPTION
HR-1	Headphone Remote	Stereo headphone jack with individual volume control, input and output jacks, various mounting options
USC-1	Security Cover	Fits 1U (19 in. x 1.72 in.) products

Contact your dealer or Symetrix for purchasing information.

Notational Conventions in this User Guide

<i>Note</i>	Identifies information that needs extra emphasis. Generally supplies extra information to help you to better use the 506E.
CAUTION	Identifies information that, if unheeded, may cause damage to the 506E or other equipment in your system.
WARNING	Identifies information that, if ignored, may be hazardous to your health or that of others.
CAPS	Controls, switches or other markings on the chassis of the 506E.



Operator Safety Summary

Follow all warnings and instructions. Install in accordance with the manufacturer's instructions.

Power Source This product is intended to operate from a power source that does not apply more than 120V rms between the power supply conductors or between either power supply conductor or ground.

Grounding The chassis of this product is grounded through the grounding conductor of the power cord. To avoid electric shock, plug the power cord into a properly wired receptacle before making any connections to the product. A protective ground connection, by way of the grounding conductor in the power cord, is essential for safe operation. **Do not defeat the safety purpose of the grounding plug.** The grounding plug has two blades and a third grounding prong. The third prong is provided for your safety. When the provided plug does not fit your outlet, consult an electrician for replacement of the obsolete outlet.

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.

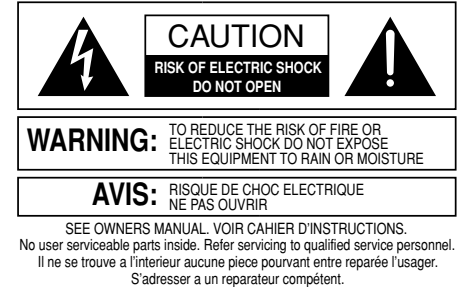
Proper Power Cord Use only the power cord and connector specified for the product and your operating locale. Use only a cord that is in good condition. Protect the power cord from being walked on or pinched, particularly at the plug, convenience receptacle, and the point where the cord exits from the apparatus.

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. Do not install near any heat source such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat. Unplug this apparatus during lightning storms or when unused for long periods of time.

Stay Out of the Box To avoid personal injury (or worse), do not remove the product covers or panels. Do not operate the product without the covers and panels properly installed. Only use accessories specified by the manufacturer. Clean only with a damp cloth.

User-serviceable parts There are no user serviceable parts inside the 506E. In case of failure, refer all servicing to the factory. Servicing is required when the 506E has been damaged in any way, such as when a power supply cord or plug 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.

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 product (i.e., this user 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 blades can be fully inserted.



Product Summary

The 506E Headphone Amplifier contains 6 discrete headphone amplifiers, which are normally driven by a stereo program input. Each amplifier has an independent level control. The PRO-GRAM INPUT section also has a level control and STEREO/MONO switch. The CUE INPUT section has a level control and Left/Center/Right ASSIGN switch.

Features

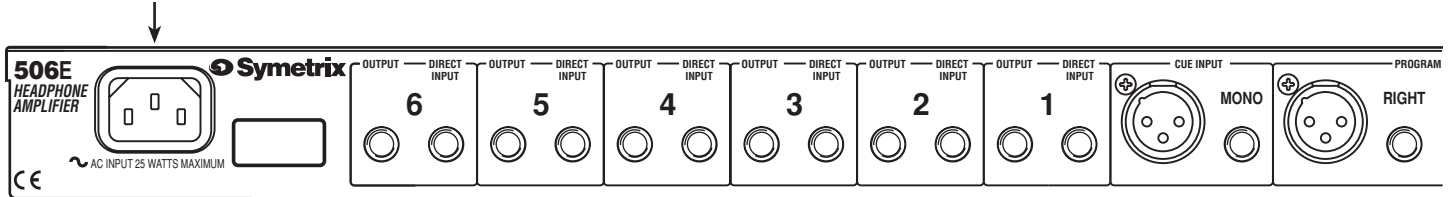
Proprietary High Voltage Drive Technology	Drives multiple headphones of any impedance greater than or equal to 8 ohms with the equivalent output voltage of a much larger power amplifier.
6 Stereo Outputs	Automatically adjusts output power to match the load impedance. Can be used as a one-input, 6-output headphone amplifier or as 6 headphone amplifiers.
Unique Mono Cue Input	For feeding a mix minus or IFB from a producer or remote talent into the main monitor mix during a live broadcast, or for feeding a click track during a recording session. Assignable to left, center (left and right), or right.
Mono/Stereo Switch	Maintains stereo signal integrity from input to output or, in mono position, either or both program inputs may be used to provide mono program signal.
Direct Input/Output and Level Control	Allows you to interrupt the program/cue input on each amplifier channel and to insert a separate signal to drive that amplifier channel independently from the other channels. Gain controls are provided for program and cue inputs and for the 6 output amplifier channels.
Internal Power Supply	No "wallwart" or "lump-in-the-line."
Optional Headphone Remote Box	Same 6 headphone outputs are also provided at the rear panel to provide output to the Symetrix HR-1 Headphone Remote.



Making Hardware Connections and Selections

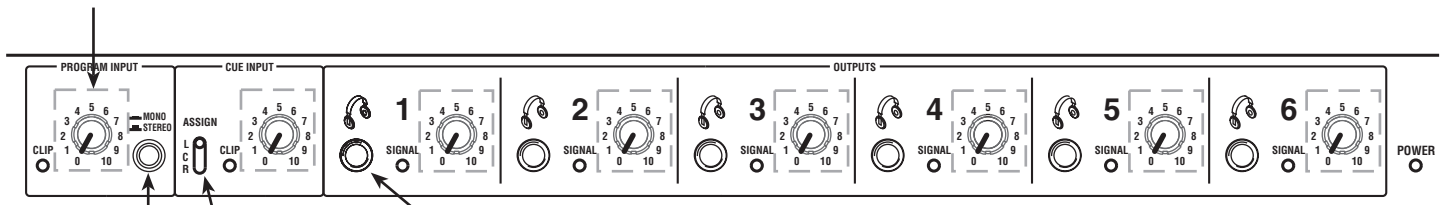
506E Rear Panel

- 1 Plug the IEC power cord into the 506E and into the appropriate source of AC power as indicated on the rear panel.



506E Front Panel

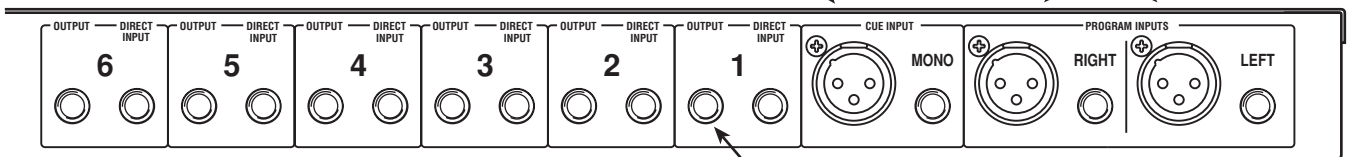
- 2 Set all levels—PROGRAM INPUT, CUE INPUT, and all 6 headphones—to zero.



- 3 If your program source is mono, press switch to lower position.
If stereo, leave in forward position.
- 4 Set CUE INPUT ASSIGN switch to **C** (center).
- 7 Connect the first set of headphones either here or to the rear panel OUTPUT 1 jack.

506E Rear Panel

- 5 (Optional) Connect your cue source.
- 6 Connect your program source. If your source is mono, connect either to the left or right jack.

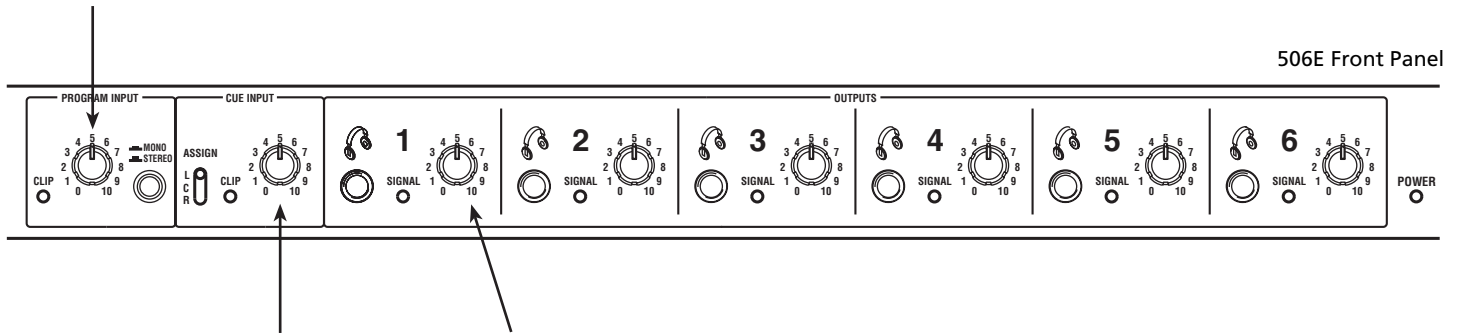


- 7 Connect the first set of headphones either here or to the front panel OUTPUT 1 jack.



Setting Gain Controls

- 1 While sending signal from your program source, slowly turn the PROGRAM INPUT level control clockwise until the CLIP LED flashes. Then back it off until the CLIP LED does not flash, or only flashes occasionally on peaks in the program source.



- 2 While sending signal from your cue source, slowly turn the CUE INPUT level control clockwise until the CLIP LED flashes. Then back it off until the CLIP LED does not flash, or only flashes occasionally on peaks in the cue source.
- 3 While sending signal from your program and/or cue source, slowly turn the Channel 1 level control clockwise until the green SIGNAL LED lights. You should be able to hear program and/or cue signal in your first set of headphones now.
- 4 Adjust the Channel 1 level control for the desired listening level.
- 5 If you are using program and cue signals, adjust the PROGRAM INPUT and CUE INPUT level controls to achieve the desired balance of program to cue signal.
- 6 Repeat steps for any additional headphone sets, using channels 2–6 of the 506E. See in this section, Calculating the Maximum Amplifier Load, to find out how many headphones of various impedances may be used with each output of the 506E.



Calculating the Maximum Amplifier Load

The minimum operating impedance, or maximum load, for each output of the 506E 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.

How Many Headphones of Various Impedances May Be Used With Each Output of the 506E

IMPEDANCE OF HEADPHONES	MAXIMUM NUMBER/CHANNEL
8	1
16	2
32	4
100	10
200	20
400	40
600	60

If You Are Driving Low Impedance Headphones

The quantities noted above reflect usage with typical wide-range musical signals. If you are driving low-impedance headphones (16 ohms or lower *actual* impedance), and you intend to drive them to the brink of amplifier clipping, then you should revise the number of headphones possible to 2 headphones at 8 ohms or 4 headphones at 16 ohms. In the example of 8 ohms, you'll have 2 amplifier channels that aren't doing anything. It is OK to use any remaining amplifier channels with higher impedance phones (50 ohms or higher).

For maximum output with all channels driven, try to restrict the lowest combined load impedance to 50 ohms per channel. Lower impedance loads simply reduce the maximum output possible.

If You Are Using Headphones Spec'd for 8 Ohms Output

Many headphones are spec'd as being suitable for 8 ohm outputs. They are, but this does not mean that their actual impedance is 8 ohms. In most cases, the actual impedance is substantially higher. This is good (rather than bad). For whatever it's worth, most decent headphones have actual impedances ranging from 50 ohms and up.

If You Are Using Multiple Headphones

When multiple headphones are required with each output, use headphone type "Y" cords, or a "breakout box," such as the Symetrix HR-1 Headphone Remote. A breakout box may have as many paralleled 1/4" stereo jacks as necessary, as long as the total combined impedance (per output) does not fall below 8 ohms.

CAUTION

The 506E is capable of driving many headphones past the threshold of pain. At this volume level, hearing damage can occur. For your own hearing health, monitor at a low sound pressure level.

Symetrix 506E Headphone Amplifier User's Guide
**Controlling the Volume Level from
 a Remote Control**



Using the Symetrix HR-1 Headphone Remote

The HR-1 Headphone Remote is designed for use with the 506E unit and is available for separate purchase. The HR-1 allows you to make headphone amp outputs available at a remote location. It also provides level control for an individual output as well as a Loop Through Output. This output provides line level audio that is not affected by the HR-1's gain control.

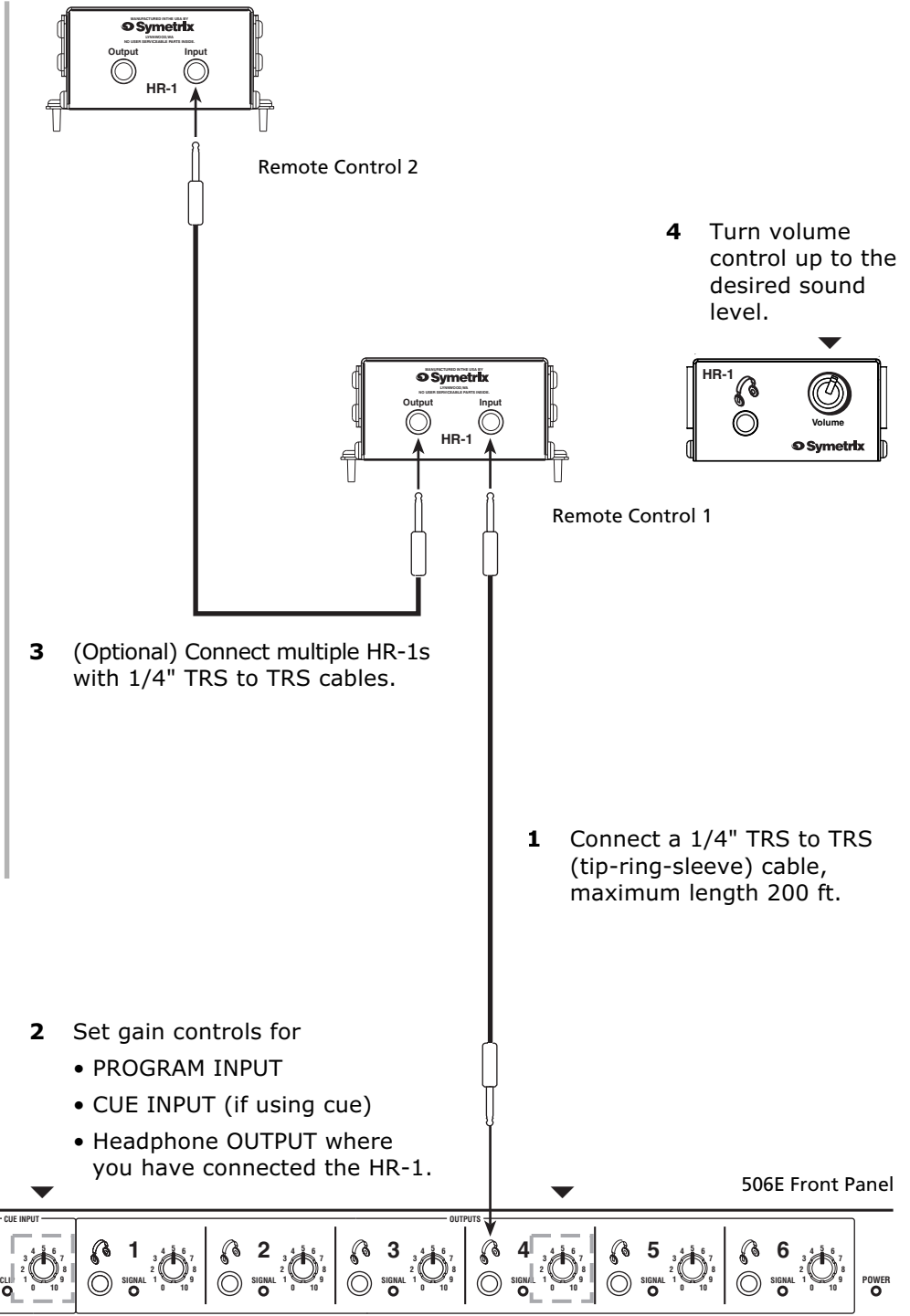
For figuring headphone impedances, see in this section Calculating the Maximum Amplifier Load. Include in your calculations both headphones connected to the 506E's front panel jacks and headphones connected to the corresponding HR-1 jacks. Minimum impedance is 8 ohms for 506E's headphone outputs.

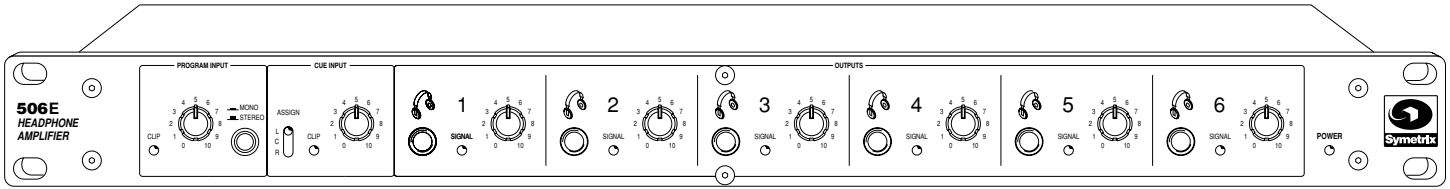
The HR-1 Has A Variety of Mounting Options

Either recessed, extruded or flush mounted into studio console furniture.

Attached to the top or underside of a desk or cabinet.

Mounted on a microphone stand.

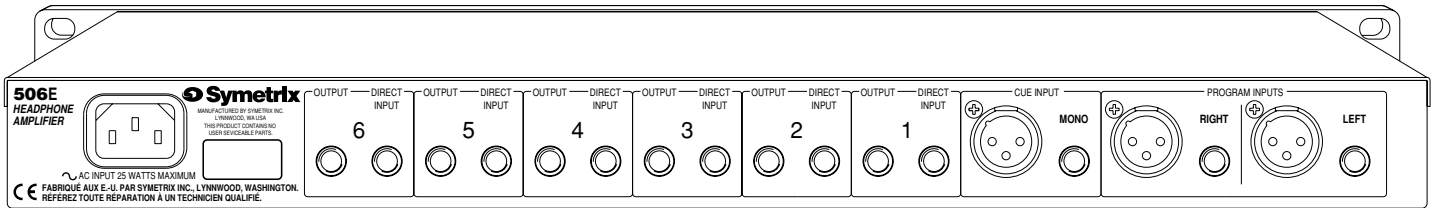




CONTROL	CONTROL TYPE	WHAT IT DOES
PROGRAM INPUT	CLIP LED	Illuminates when the program signal reaches 2 dB below clipping.
	Gain Control	Adjusts the level of the program signal. When you turn control fully counterclockwise, no program signal passes. When you turn this control clockwise, the level of the program signal increases.
	MONO/STEREO Switch	Selects whether the PROGRAM INPUT signal(s) will be kept separate (stereo left and right), or summed to mono. If you are using stereo left and right inputs, set this switch to STEREO. If you are using a mono program input, or if you wish to sum both PROGRAM INPUTs to mono, set this switch to MONO. Using MONO, you can also check the mono compatibility of your stereo program.
CUE INPUT	ASSIGN LCR Switch	Assigns the cue signal to the left channel, center channel (both channels simultaneously), or the right channel of the headphone outputs.
	CLIP LED	Illuminates when the cue signal reaches 2 dB below clipping.
	Gain Control	Adjusts the level of the cue signal. When you turn control fully counterclockwise, no cue signal passes. When you turn this control clockwise, the level of the cue signal increases.



CONTROL/CONNECTION	CONTROL/CONNECTOR TYPE	WHAT IT DOES
Headphone 1–6 OUTPUTS	Headphone Jack	3-conductor TRS (tip-ring-sleeve) 1/4" jack for connecting stereo headphones. The minimum impedance is 8 ohms (see Calculating Maximum Amplifier Load for calculating combined headphone impedances). Be sure to include in your impedance calculations the headphones connected to the corresponding rear-panel output jack. The tip contact is the left channel.
	SIGNAL LED	Lights to indicate the presence of signal.
	Gain Control	Adjusts the level of signal present at the headphone output. When you turn control fully counterclockwise, no signal will be present. When you turn this control clockwise, the signal at the headphone output increases.
		CAUTION <i>The 506E is capable of driving many headphones past the threshold of pain. At this volume level, hearing damage can occur. For your own hearing health, monitor at a low sound pressure level.</i>
Power	POWER LED	Lights to indicate the presence of AC power.



CONNECTION	CONNECTOR TYPE	WHAT IT DOES
AC Power Input	IEC Power Connector	Powers the 506E. Connect only to the AC power source marked on the rear panel.
Headphones 1–6		
OUTPUT	3-conductor TRS (tip-ring-sleeve) 1/4" jack	For connecting to the optional Symetrix HR-1 Headphone Remote. The minimum impedance of this output is 8 ohms (see Calculating the Maximum Amplifier Load for combining headphone impedances). Be sure to include headphones connected to the corresponding front-panel output jack in your impedance calculations. The tip contact is the left channel.
DIRECT INPUT	3-conductor TRS (tip-ring-sleeve) 1/4" jack	Allows separate access to the inputs of each of the 6 headphone amplifiers. When an input is not used, it is normalled to allow signal from the 506E's program inputs and cue input to be fed to this headphone amplifier section. When a TRS 1/4" connector is plugged into this jack, it breaks the signal path, allowing the user to insert a different line-level signal into this amplifier section only. For example, vocalists could use the first 5 headphone outputs to monitor the full program, and, by patching a click track into DIRECT INPUT 6, the drummer could use headphone output 6 to listen to just the click track.

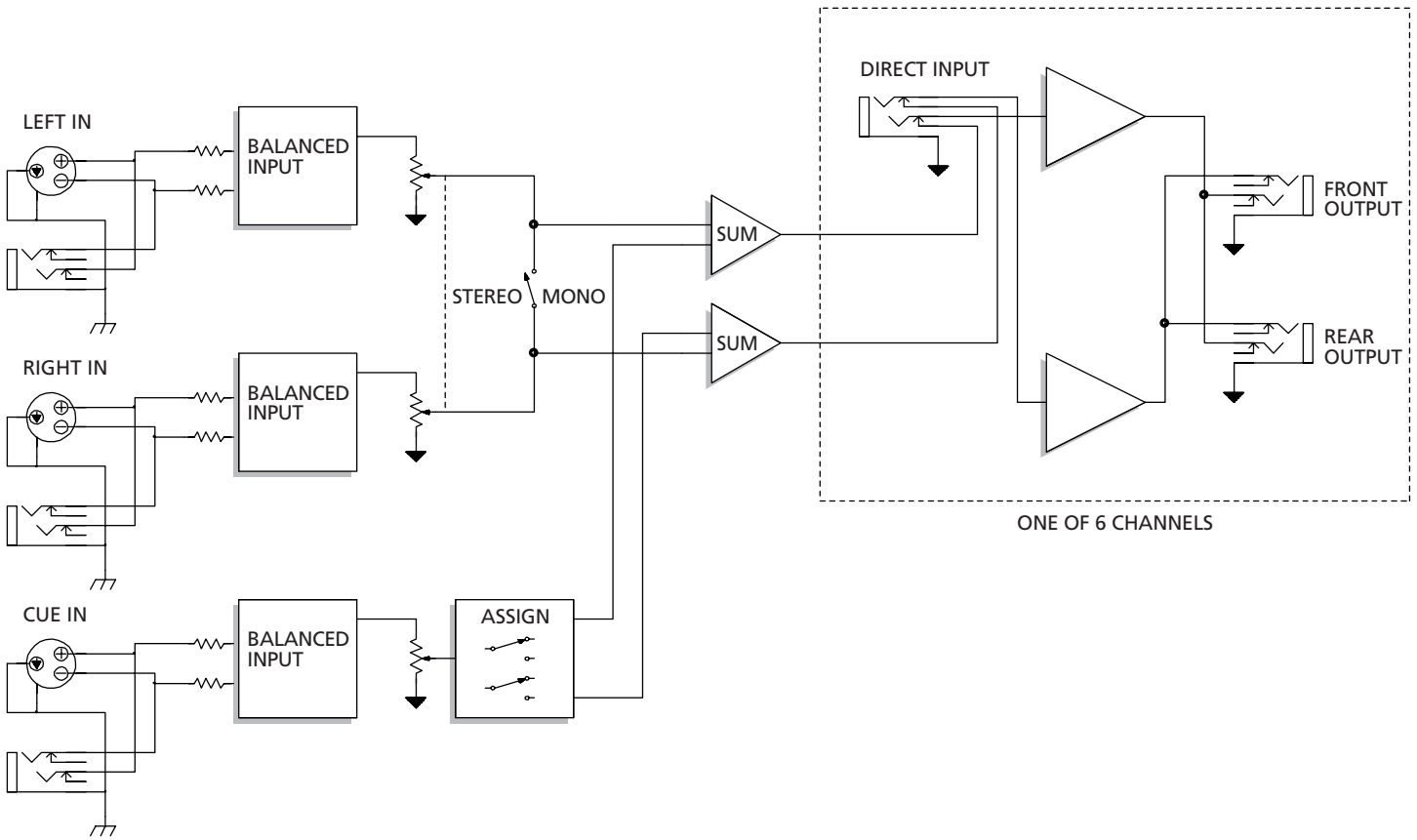


CONNECTION	CONNECTOR TYPE	WHAT IT DOES
CUE INPUT (MONO)		
XLR	3-conductor balanced input jack	10 kilohm balanced bridging line input intended for signals ranging from -10 dBu to +4 dBu. This jack parallels the 1/4" TRS CUE INPUT jack.
1/4" TRS	3-conductor balanced input jack	10 kilohm balanced bridging line input intended for signals ranging from -10 dBu to +4 dBu. This jack parallels the XLR CUE INPUT jack.
PROGRAM INPUTS		
Right XLR	3-conductor balanced input jack	10 kilohm balanced bridging line input intended for signals ranging from -10 dBu to +4 dBu. This jack parallels the 1/4" TRS Right PROGRAM INPUT jack.
Right 1/4" TRS	3-conductor balanced input jack	10 kilohm balanced bridging line input intended for signals ranging from -10 dBu to +4 dBu. This jack parallels the XLR Right PROGRAM INPUT jack.
Left XLR	3-conductor balanced input jack	10 kilohm balanced bridging line input intended for signals ranging from -10 dBu to +4 dBu. This jack parallels the 1/4" TRS Left PROGRAM INPUT jack.
Left 1/4" TRS	3-conductor balanced input jack	10 kilohm balanced bridging line input intended for signals ranging from -10 dBu to +4 dBu. This jack parallels the XLR Left PROGRAM INPUT jack.

Note

For the left, right, and cue inputs, XLR pin 2 corresponds to the tip contact of the TRS jack and is in phase with the output signals.

Signal Flow Diagram





SYMPTOM	PROBABLE CAUSE/WHAT TO DO
No output	<p>Check cables and connections to see if:</p> <ul style="list-style-type: none"> • Inputs are driving outputs, and outputs are driving inputs. • Unit is plugged in. • The DIRECT INPUT jack of the headphone channel you are monitoring has a cable plugged in. If so, unplug this source. <p>Check controls to see if:</p> <ul style="list-style-type: none"> • PROGRAM INPUT and CUE INPUT gain controls are turned up. • The gain control of the headphone channel that you are monitoring is turned up. • If the PROGRAM INPUT's Mono/Stereo switch is set to MONO, try setting the switch to STEREO (you may have a phase cancellation problem with the signal that you are sending to the PROGRAM INPUT). <p>Verify cables, source, and load.</p> <p>Replace or verify that headphones are in working order.</p>
Hum or buzz in output	<p>Check input and output connector wiring.</p> <p>Check for a ground loop problem. Inspect related system equipment grounding to verify that all system components are on the same AC ground.</p>
Distortion	<p>Check if line input signal is too hot or already distorted. If so, turn down the PROGRAM INPUT and/or CUE INPUT gain controls.</p> <p>Check the output loading.</p> <p>Check if something else is clipping.</p> <p>Check if you are overdriving your headphones. If so, turn down the output gain control for the channel that you are using.</p>
Noise (hiss)	<p>Check input signal levels. The 506E is intended to operate at or near "line" level (+4 dBu is nominal). Make sure that the signal you are feeding to the 506E is a line level signal, not mic level.</p> <p>Check that all systems components are on the same AC ground.</p> <p>Check gain settings on upstream equipment. The system gain structure should be such that the 506E receives +4 dBu nominal signal. Check if the input signal is already noisy.</p>
No LED display	<p>Check if unit is plugged in.</p> <p>Verify that AC outlet works.</p>

**Input/Output**

Maximum Input Level	+21 dBu
Maximum Output Level	2000 ohm load: 12V RMS 600 ohm load: +21 dBm 60 ohm load: 3.3V RMS
Input Impedance	Program and Cue Inputs: 20K ohms balanced Direct Channel Inputs: 20K ohms unbalanced
Output Impedance	100 ohms

Indicators

Clip LED	Lights at 2 dB below onset of clipping
Signal LED	Lights at -30 dBu output level

Performance Data

Frequency Response	20 Hz to 20 kHz, +0, -0.5 dB
THD+Noise	<0.05%
Residual Output Noise	<-90 dBu
Maximum Gain	Program and Cue Inputs: 20 dB Direct Channel Inputs: 10 dB
Separation	70 dB @ 1000 Hz typical

Connections

Input	Program Inputs and Cue Input: balanced XLR and balanced TRS Direct Channel Inputs: unbalanced TRS
Output	Unbalanced TRS
Power In	Standard IEC Power Inlet

Physical

Size (H x W x D)	1.72 in. x 19 in. x 7.25 in. / 4.4 cm x 48.3 cm x 18.4 cm
Weight	7.6 lbs. / 3.5 kg net

Electrical

Power Requirements	115 VAC nominal, 105 to 125 VAC, 60 Hz, 25W max 230 VAC nominal, 220 to 240 VAC, 50 to 60 Hz, 25W max
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The headphone amplifier shall have stereo left and right program inputs with a mono/stereo switch and a mono cue input that is assignable to left, right, and center. The headphone amplifier shall have six stereo outputs. Each output shall have its own volume control, amplifier, and signal LED. Each output channel shall also have a direct input, which interrupts the signal from the program and cue inputs to that output channel.

The headphone amplifier shall have a program input gain control with a mono/stereo switch. A cue input gain control with LCR toggle switch shall also be provided. All inputs shall be 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 equipped with a program input clip LED, a cue input clip LED and a power LED.

The headphone amplifier shall be capable of delivering 35 volts peak-to-peak into a 2000 ohm load.

The headphone amplifier shall be capable of operating by means of its own built-in power supply connected to 115 VAC nominal (105 to 125V), 60 Hz or 230 VAC nominal (220 to 240V), 50 to 60 Hz.

The headphone amplifier shall be a Symetrix Inc. model 506E Headphone Amplifier.



Warranty

Symetrix, Inc. expressly warrants to the original purchaser (Buyer), subject to the terms and conditions set forth below, that the Product will be free from defects in material and workmanship as a result of normal commercial use for one (1) year from the date of purchase.

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.

Symetrix's warranty obligation is limited to the repair, replacement, or refund at Symetrix's sole discretion, of the part or parts of the Product which may thus prove defective in materials or workmanship within one year from date of purchase under normal use and which our examination discloses to our satisfaction to be thus defective, provided that Buyer gives Symetrix prompt notice of its warranty claim and satisfactory proof thereof.

Symetrix will make every reasonable effort to ensure that parts are available to support the repair of our products under warranty. In the event that a product or component part thereof becomes obsolete, unavailable or irreparable, Symetrix reserves the right to refund a prorated portion of the purchase price in full satisfaction of all warranty claims.

In order to serve you better we request that the Buyer shall, prior to shipping Product to Symetrix for warranty service, contact Symetrix and secure a Return Authorization Number that shall be included with the returned Product. This will facilitate our efforts to keep track of your Product and process your warranty repair as quickly as possible. Buyer will prepay all freight charges to ship the Product to Symetrix for warranty inspection and service. This warranty is subject to Symetrix's inspection of the Product at its facilities and, upon Symetrix's request, satisfactory proof of purchase (dated copy of original retail dealer's invoice.)

Symetrix reserves the right to effect repairs to the product with reconditioned components/parts. Products once repaired under warranty will be shipped to Buyer freight prepaid by Symetrix via United Parcel Service (surface) or any similar shipper, to any location designated by buyer within the Continental United States. At Buyer's request and expense Product will be returned via airfreight. Outside the continental United States,

repaired or replaced products will be returned freight collect.

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This Symetrix product has been designed and manufactured for use in professional/industrial systems and is not intended for other usage. This warranty only applies to Buyers using the Product in professional/industrial systems. With respect to others, including but not limited to consumers for personal, family, or household use, **Symetrix expressly disclaims all warranties, including but not limited to warranties of merchantability and fitness for a particular purpose and the express warranties as otherwise provided herein.**

Symetrix reserves the right to modify the design or make additions to, or improvements to, its product lines without making similar upgrades to Product purchased by Buyer. Symetrix does not authorize any third party, including any dealer or sales representative, to assume any liability, effect any repairs or modifications to the Product, or make any additional warranties or representation regarding the Product or Product information on behalf of Symetrix.

Symetrix's total liability 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 Product will not exceed the purchase price of 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 lost 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 as a result of Product failure.

This limited warranty gives Buyer certain rights. Buyer may have additional rights under applicable law. Service



Servicing the 506

If you have determined that your unit 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 Symetrix product 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.



We, Symetrix, Inc.

6408 216th St. SW, Mountlake Terrace, Washington USA

declare under our sole responsibility that the product:

506E 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 55103-2

Electromagnetic Compatibility—Product Family Standard for Audio, Video, and Entertainment Lighting Control Apparatus for Professional Use
Part 2: Immunity

The technical construction file is maintained at:

Symetrix, Inc.

6408 216th St. SW

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USA

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