

**CASCADE Series
Portable Mixing Console**

Operation Manual



CASCADE SERIES

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INTRODUCTION

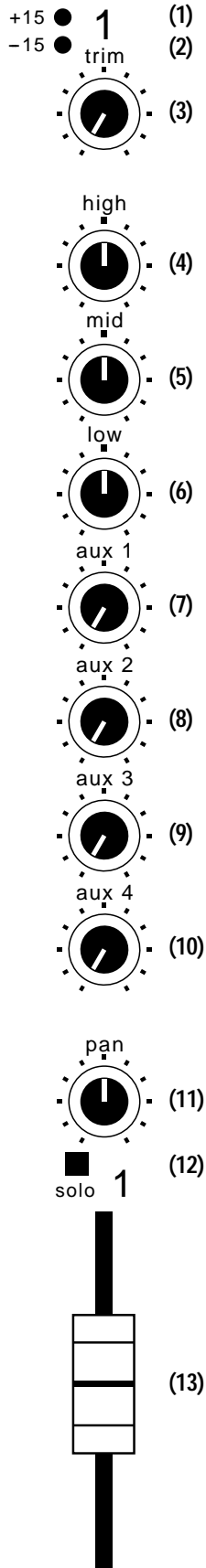
The **BIAMP CASCADE Series** 12/342c and 16/342c mixers are compact 12 and 16 input channel, stereo consoles designed for a variety of sound reinforcement applications. Easily portable, the mixers require only a small amount of table space, and the top mounted jacks allow the units to be pushed flush against the wall. The CASCADE Series mixers provide features normally found only on more expensive mixers, such as a complete solo system, switchable +48 volt phantom power, 2 stereo returns for stereo effects devices, patch insert jacks on all input channels, and a switchable headphone output. Discrete transistor pre-amps and the use of low-noise, high-slew rate 5532 & TL072 op-amps throughout the signal chain guarantee sonic excellence. An 8 channel rack-mount CASCADE Series mixer is also available.

CASCADE Series features include:

- ♦ signal present & peak indicators on each input channel
- ♦ 40dB trim control on each input channel
- ♦ 3-band equalization on each input channel
- ♦ four auxiliary sends on each input channel
- ♦ patch insert jack on each input channel
- ♦ solo system previews individual channels and monitor mix
- ♦ 2 stereo returns & 1 mono return with pan control
- ♦ balanced output from stereo mains, mono main, & monitor
- ♦ 600 ohm headphone output monitors stereo mains & solo
- ♦ stereo tape output on RCA jacks
- ♦ dual ten-segment meters display stereo mains & solo
- ♦ switchable +48 volt phantom power for condenser microphones
- ♦ DC-Out jack provides power for optional external modules

After reading this manual, if you have any questions or need technical assistance, please call BIAMP SYSTEMS toll-free at 1-800-826-1457 (U.S. & Canada).

INPUT CHANNEL CONTROLS



(1) +15 (Peak Indicator): This red LED indicates signal level in the channel has reached +15dB (6dB below clipping). For best performance, adjust the Trim control (3) so the Peak Indicator flashes only on occasional peaks.

(2) -15 (Signal Present Indicator): This green LED indicates when signal level within the channel is above -15dB (normal levels). Once the Trim control (3) is adjusted, this indicator remains lit when signal is present in the channel.

(3) Trim: This control provides 40dB of gain adjustment to compensate for different input signal levels. For best performance, adjust this control so the Peak Indicator (1) flashes only on occasional peaks in signal level.

(4) High: This control provides $\pm 15\text{dB}$ @ 10kHz shelving type equalization.

(5) Mid: This control provides $\pm 12\text{dB}$ @ 2kHz peaking type equalization.

(6) Low: This control provides $\pm 15\text{dB}$ @ 80Hz shelving type equalization.

(7)(8) Aux 1 & Aux 2 (Sends): These controls adjust the level of channel signal sent to the respective auxiliary Send 1 & 2 output sections. The Aux 1 & 2 signals are post-fader and are affected by both channel EQ and Fader settings (see pg. 7 for modification to pre-fader). Post-fader sends are typically used for creating separate mixes to feed effects units.

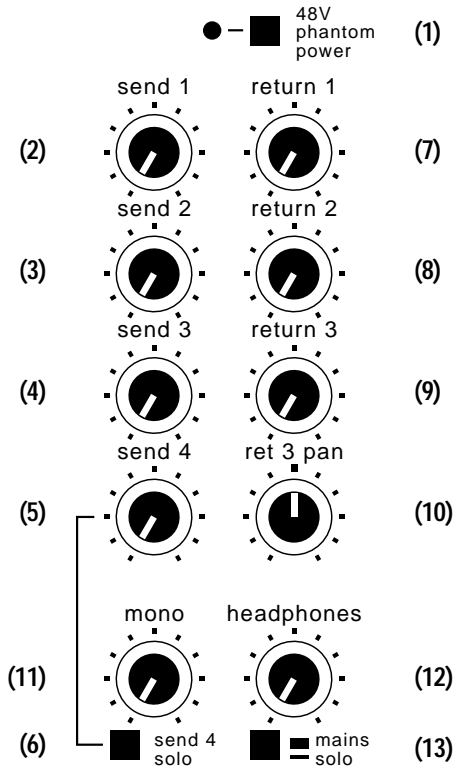
(9)(10) Aux 3 & Aux 4 (Sends): These controls adjust the level of channel signal sent to the respective auxiliary Send 3 & 4 output sections. The Aux 3 & 4 signals are pre-fader and are affected by channel EQ settings, but not by channel Fader settings (see pg. 7 for modification to post-fader). Pre-fader sends are typically used for creating separate mixes to feed stage monitors.

(11) Pan: This control adjusts the relative position of the channel signal between the Left & Right Mains during stereo operation. For mono operation using the Mono output: center this control to provide mono signal to the Mains, or set it full Left or full Right to provide a subgrouping of signals (i.e...instruments on Left Main Fader and Vocals on Right Main Fader), or set it to create a stereo mix at the Left/Right Main and Tape outputs (for recording) while the Mono output is used to feed the sound system (live mix).

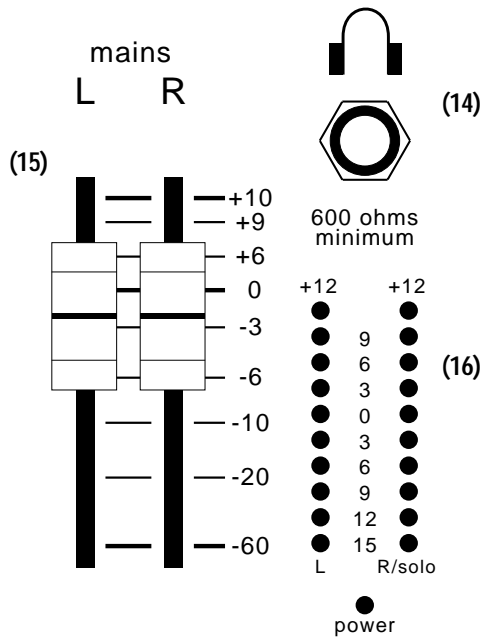
(12) Solo: This switch sends channel signal to the Solo section for headphone monitoring. Solo is useful for listening to individual channel signals, without interrupting any output mixes. Solo is pre-fader, which permits listening to a channel even when the channel Fader is turned down.

(13) Fader: This 100mm slide control adjusts the level of channel signal sent to the Left & Right Main output sections. Channel Fader settings will vary from channel to channel. For best performance, Fader settings in general should center around the "0" mark (unity gain).

MASTER CONTROLS



CASCADE Series
model 16/342c
biamp



(1) 48 Volt Phantom Power Switch & Indicator: This switch applies +48 Volts DC to all channel Mic inputs for phantom powering of condenser microphones and direct boxes. Normal low-impedance dynamic microphones are not affected by this voltage. The red LED remains lit while phantom power is on. **CAUTION:** Always turn levels down before switching phantom power. Always turn phantom power off before making input connections.

(2)(3)(4)(5) Sends 1~4: These controls adjust the overall level of signal sent from their respective Aux 1~4 channel controls to the Send 1~4 output jacks.

(6) Send 4 Solo: This switch routes Send 4 signal to the Solo section for headphone monitoring. This signal is a sum of all channel Aux 4 signals, and is the same signal that appears at the Send 4 output jack on the rear panel. Send 4 Solo signal is post-Send 4 output level control (5).

(7)(8) Returns 1 & 2 (stereo): These controls adjust the level of signal sent from their respective stereo Return 1 & 2 jacks to the Left & Right Mains.

(9) Return 3 (mono): This control adjusts the level of signal sent from the Return 3 jack to the Left & Right Mains.

(10) Return 3 Pan: This control adjusts the relative position of the Return 3 signal between the Left & Right Mains during stereo operation. When operating in mono and using the Left & Right Mains as submasters, this control can assign an effect to its respective submaster (i.e...vocal delay sent to vocal submaster on Right Main Fader).

(11) Mono: This control adjusts the level of signal sent to the Mono jack. This signal is the sum of the Left & Right Main signals (post-Left & Right Main Faders). This becomes the main output level control for the sound system during mono operation. Depending upon channel Pan control settings, the Left & Right Mains may function as submasters for grouping inputs, as additional mono outputs, or as a stereo output for recording.

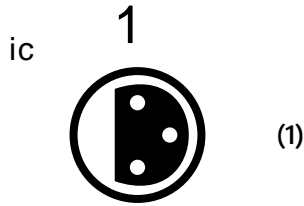
(12)(14) Headphones Section: The Headphones Level control adjusts the level of signal sent to the Headphones jack. The Headphones output is designed to drive 600 ohm headphones, or to feed a stereo sound system, such as a control room monitor system (see Patch Cable on pg. 4).

(13) Mains/Solo: In the OUT position, this switch selects the stereo signal from the Left & Right Mains to appear at the respective Left & Right Level Meters, and at the Headphones jack. In the IN position, this switch selects mono Solo signals from the channels and Send 4 to appear at the Right Level Meter (for metering individual signals) and at the Headphones jack.

(15) Left & Right Main Faders: These slide controls adjust the level of the Left & Right Main signals sent to the Left & Right Main output jacks. The sum of these Left & Right Main signals is also sent to the Mono output section.

(16) Level Meter & Power Indicator: These 10-segment LED displays normally indicate levels at the Left & Right Main outputs. If the Mains/Solo switch is IN, the Right Level Meter displays signal levels at the Solo system (the Left Level Meter continues to display the Left Main signal level). When the red +12 indicators flash, 5dB of headroom remains before clipping. These meters are peak reading with "0" referenced to +4dBu.

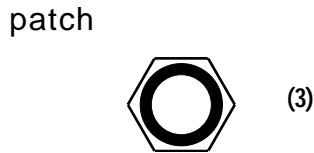
INPUT CHANNEL CONNECTIONS



(1) Mic: This 3-pin XLR jack provides a balanced transformerless input for connecting low-impedance microphones and direct boxes. It is wired to the DIN standard, with Pin 2 High (+), Pin 3 Low (-), and Pin 1 Ground. When Phantom Power is turned on, +48 Volts is applied to both Pins 2 & 3 of the Mic input jack.



(2) Line: This 3-conductor 1/4" phone jack provides for proper connection of either balanced or unbalanced signals from line-level devices such as electronic keyboards, drum machines, effects units, tape decks, wireless microphones, and other mixers. It is wired with Tip High (+), Ring Low (-), and Sleeve Ground. For unbalanced input simply use a standard 2-conductor (TS) 1/4" phone plug wired with Tip High (+) and Sleeve Ground.

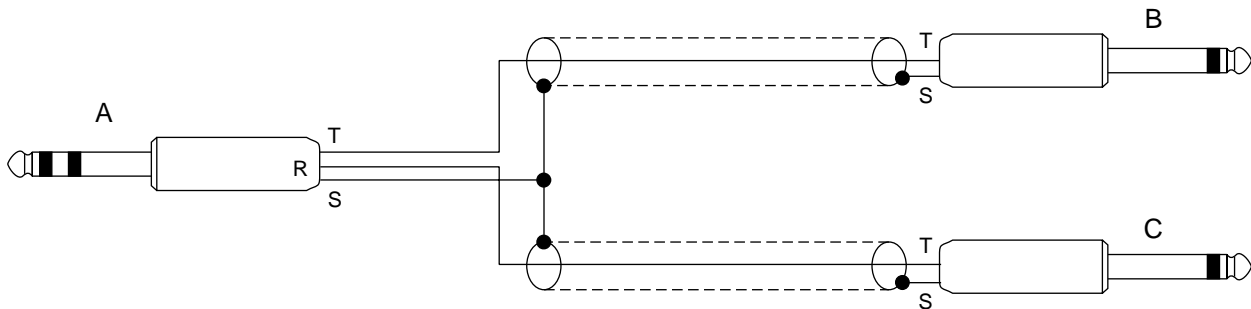


CAUTION: The Mic and Line inputs share the same channel circuitry, and connecting to both inputs simultaneously can cause signal interaction.

(3) Patch: This 3-conductor 1/4" phone jack provides a post-EQ/pre-fader insert point for connecting outboard signal processing units to the individual channels. A 3-conductor (TRS) 1/4" phone cable inserted into the Patch jack intercepts the channel signal, sends the signal to a processing unit, and returns the processed signal to the channel. The Tip is the send, the Ring is the return, and the Sleeve is ground. Use a standard 3-conductor 1/4" phone cable if the processing unit has a single In/Out jack. Use a special patch cable if the processing unit has separate input and output jacks (see Patch Cable below). Patch jacks may also be used as pre-fader direct outputs to feed other devices, such as multi-track tape recorders, by connecting a 3-conductor cable to the Patch jack with Tip & Ring (wired together) being the send (+) and Sleeve being ground. **NOTE:** Using a standard unbalanced 2-conductor 1/4" phone cable to extract signal from the Patch jack will interrupt the channel signal before it reaches the channel fader.

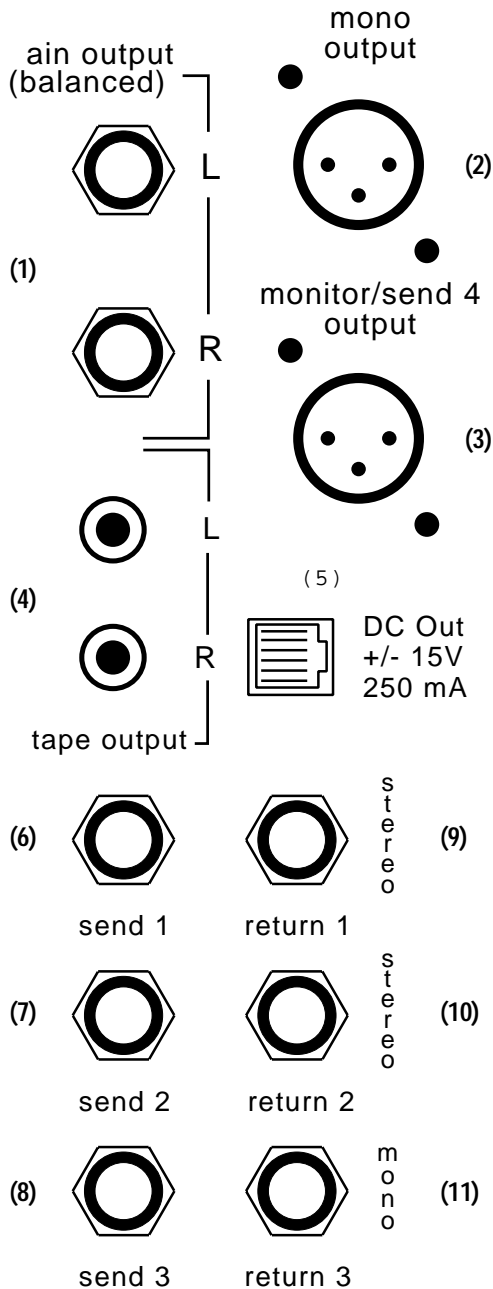
PATCH CABLE

This type of cable uses a Tip/Ring/Sleeve (TRS) 1/4" phone connector on one end, and Tip/Sleeve (TS) 1/4" phone (or RCA) connectors on the other two ends. It is wired with Tip A to Tip B, Ring A to Tip C, and Sleeve A to Sleeve B & Sleeve C (ground). This cable is typically used for inserting processed signal into the channel via the Patch jack. Tip B is the send (output) from the channel and Tip C is the return (input) to the channel.



Two other uses for this Patch cable are: 1) To provide a stereo line input to the Return 1 & 2 jacks from stereo effects devices with separate left & right outputs (Tip B connects to the left output of the effects device and Tip C connects to the right output of the effects device). 2) To provide a stereo line output from the Headphones jack for connecting to a stereo sound system (Tip B is the left output and Tip C is the right output).

MASTER CONNECTIONS



(1) Left & Right Main Outputs: These 3-conductor 1/4" phone jacks provide proper connection to either balanced or unbalanced line-level inputs on equipment such as sound system amplifiers and tape decks. The Left & Right Main Outputs provide either one stereo output or two mono outputs depending on the settings of the channel Pan controls. The Left & Right Main Output jacks are wired with Tip High (+), Ring Low (-), and Sleeve Ground. *NOTE: An internal modification is provided to route the Left & Right Main Output signals to the Mono & Monitor XLR jacks, and the Mono & Monitor Output signals to the Left & Right Main 1/4" phone jacks (see Modifications on pg. 7).*

(2) Mono Output: This 3-pin XLR jack provides a balanced output for connection to line-level inputs on equipment such as sound system amplifiers and tape decks. The Mono Output signal is a sum of all signals present at the Left & Right Main Outputs. This becomes the main output for mono operation, and the Left & Right Mains may function either as submasters, as additional mono outputs, or as a stereo output. The Mono Output jack is wire to the DIN standard, with Pin 2 High (+), Pin 3 Low (-), and Pin 1 Ground. For unbalanced use, connect to the Mono Output jack with Pin 2 High (+) and both Pins 3 & 1 Ground.

(3) Monitor/Send 4 Output: This 3-pin XLR jack provides a balanced output for connection to the input of stage monitor amplifiers or other line-level devices. The Monitor/Send 4 Output signal is a sum of all channel Aux 4 signals. The Monitor/Send 4 Output jack is wire to the DIN standard, with Pin 2 High (+), Pin 3 Low (-), and Pin 1 Ground. For unbalanced use, connect to Monitor/Send 4 Output with Pin 2 High (+) and both Pins 3 & 1 Ground.

(4) Left & Right Tape Outputs: These 2-conductor RCA jacks provide unbalanced post-fader signals from the Left & Right Mains, and are wired with Tip High (+) and Sleeve Ground. The Left & Right Tape Output signals have a nominal level of -10dBu, which is suitable for cassette tape decks and other consumer equipment.

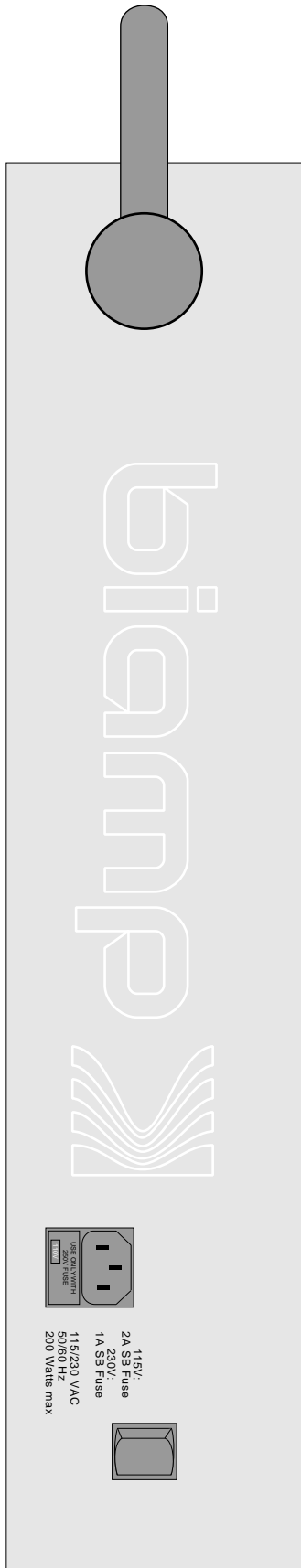
(5) DC Out: This modular connector provides ± 15 Volts DC (150mA max.) for powering other products (contact Biamp Systems for product information).

(6)(7)(8) Send 1~3 Outputs: These 2-conductor 1/4" phone jacks provide unbalanced outputs for connection to effects units or other line-level devices. The Send 1~3 Output signals are from the respective channel Aux Sends. The Send 1~3 Output jacks are wired with Tip High (+) and Sleeve Ground.

(9)(10) Returns 1 & 2 (stereo): These 3-conductor 1/4" phone jacks each provide an unbalanced stereo input for connection of signals from line-level equipment such as effects units, tape decks, and other mixers. Return 1 & 2 jacks are wired with Tip as the left input, Ring as the right input, and Sleeve as a common Ground. Use a special Patch cable for returning stereo signals (see Patch Cable diagram on pg. 4). When returning mono signals, use a 3-conductor (TRS) plug with Tip & Ring (wired together) as High (+) and Sleeve as Ground. The left and right return signals from each Return jack are sent to the respective Left & Right Mains, via the Return 1 & 2 level controls.

(11) Return 3 (mono): This 2-conductor 1/4" phone jack provides an unbalanced mono input for connection of signals from effects units or other line-level devices. Return 3 signal is sent to the Left & Right Mains via the Return 3 level and Pan controls. Return 3 is wired with Tip High (+) and Sleeve Ground.

SIDE PANEL FEATURES



(1)

(1) Handle: This carrying handle is designed to provide portability. However, while the mixing console is in use, the handle may be positioned underneath as a prop or it may be positioned above the connector panel to help manage cables. To adjust the handle, first loosen the knobs on each side, re-position the handle, and tighten the knobs.

(2) AC Power Entrance: This receptacle accepts the detachable AC Power Cord. The AC Power Cord is for connection to three-prong grounded AC outlets. *CAUTION: Do not remove or defeat the ground prong on the AC Power Cord, as this constitutes a shock hazard.* The Fuse Clip may be removed by first detaching the AC Power Cord, then prying the Fuse Clip out from above, using a flat-blade screwdriver in the notch provided. The Fuse Clip contains both the standard fuse and an alternate fuse. The standard fuse is held in the clip, and becomes the actual AC fuse when the Fuse Clip is installed. Replace the standard fuse only with the same value and type (2A SB for 110 VAC operation or 1A SB for 240 VAC operation). The alternate fuse, held in a drawer inside the Fuse Clip, is provided only for use at the alternate operational voltage setting. If it is necessary to change the operational voltage, first slide the voltage selector out of the left side of the Fuse Clip. Turn the voltage selector over, and slide it back into the Fuse Clip, making sure the desired voltage selection is visible through the voltage window. Then change the standard fuse value (2A SB for "110V" or 1A SB for "240V"), before re-installing the Fuse Clip.

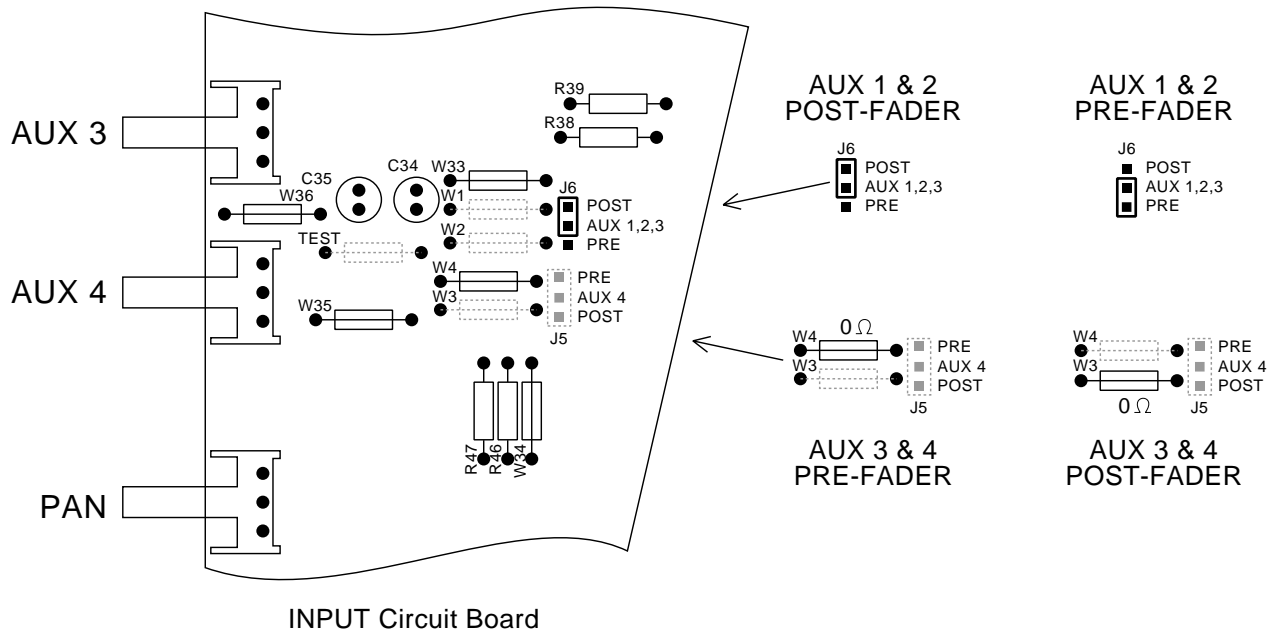
(2)

(3) Power Switch: This switch turns the mixing console on. If the Power indicator on the front panel does not light and the mixing console does not pass signal properly, turn the mixing console off, disconnect AC power, and check/replace the AC fuse. If the AC fuse is intact, then check the power connections (and possibly another AC outlet). If the problem still exists, the mixing console may need service.

(3)

MODIFICATIONS

CAUTION: Modifications should be performed by qualified service technicians only. Care must be taken not to damage any internal parts or circuitry, since this type of damage will not be covered under the product warranty.



Aux 1 & 2: These sends are factory set for post-fader operation. To change Aux 1 & 2 to pre-fader (on a given channel), move jumper strap J6 to the 'PRE' position (see diagram). Aux 1 & 2 are changed as a pair (not individually). Channels must be modified individually.

Aux 3 & 4: These sends are factory set for pre-fader operation. To change Aux 3 & 4 to post-fader (on a given channel), move jumper W4 (0 ohm resistor) to the W3 ('POST') position (see diagram). Aux 3 & 4 are changed as a pair (not individually). Channels must be modified individually.

XLR and 1/4" Phone Balanced Outputs: From the factory, the Left & Right Main Outputs are provided on balanced 3-conductor (TRS) 1/4" phone jacks, and the Mono & Monitor/Send 4 Outputs are provided on balanced 3-pin XLR jacks. To interchange the type of jacks used for these outputs: 1) Remove the 1/4" phone wire harness 6-pin female connector from J5, located on the circuit board labeled "380.0348.00 CASCADE RETURNS PCB". 2) Remove the XLR wire harness 6-pin female connector from J50, located on the circuit board labeled "380.0344.00 CASCADE SENDS PCB". 3) Connect the 1/4" phone wire harness connector to J50. 4) Connect the XLR wire harness connector to J5. **CAUTION:** Pin 1 on the male 6-pin connectors J5 & J50 is the pin located next to the actual label ("J5" or "J50") on their respective circuit boards. Proper orientation when connecting the wire harness female connectors to these pins is extremely important. Connect the 1/4" phone wire harness to J50 with the wire from hole #4 on the jack board connecting to Pin 1 of J50. Connect the XLR wire harness to J5 with the wire from Pin 1 of the Monitor/Send 4 XLR connecting to Pin 1 of J5.

SPECIFICATIONS

MICROPHONE PREAMPLIFIERS:

Frequency Response (20Hz-20kHz @ +4dBu)	+0/-1dB
Total Harmonic Distortion (20Hz-20kHz @ +4dBu, 40dB gain)	< 0.02%
Intermodulation Distortion (SMPTE)	< 0.05%
Equivalent Input Noise (20Hz-20kHz, 150Ω termination)	-127dBu
Maximum Gain (Mic input)	48dB
Maximum Gain (Line input)	31dB
Trim Control Range	40dB
Input Impedance (Mic/balanced)	2kΩ
Input Impedance (Line/balanced)	10kΩ
Maximum Input (Mic)	+11dBu
Maximum Input (Line)	+26dBu
Phantom Power	+48 Volts DC

INPUT CHANNEL EQUALIZATION:

High EQ	±15dB @ 10kHz
Mid EQ	±12dB @ 2kHz
Low EQ	±15dB @ 80Hz

MIXER SECTION:

Frequency Response (20Hz-20kHz @ +4dBu)	+0/-1dB
Total Harmonic Distortion (20Hz-20kHz @ +4dBu, unity gain)	< 0.02%
Intermodulation Distortion (SMPTE)	< 0.05%

INPUT IMPEDANCE:

Returns (unbalanced)	10kΩ
Channel Patch (unbalanced)	3kΩ

OUTPUT IMPEDANCE:

L/R Mains, Mono, & Monitor/Send 4 (balanced)	200Ω
Sends 1-3 & Channel Patch (unbalanced)	50Ω

MAXIMUM OUTPUT

L/R Mains, Mono, & Monitor/Send 4 (balanced)	+21dBu
Sends 1-3 & Channel Patch (unbalanced)	+21dBu

MINIMUM LOAD IMPEDANCE:

L/R Mains, Mono, & Monitor/Send 4 (balanced)	600Ω
Sends 1-3 & Channel Patch (unbalanced)	2kΩ

HEADPHONES:

Minimum Impedance	600Ω
Maximum Output (each side)	+18dBm (70mW)

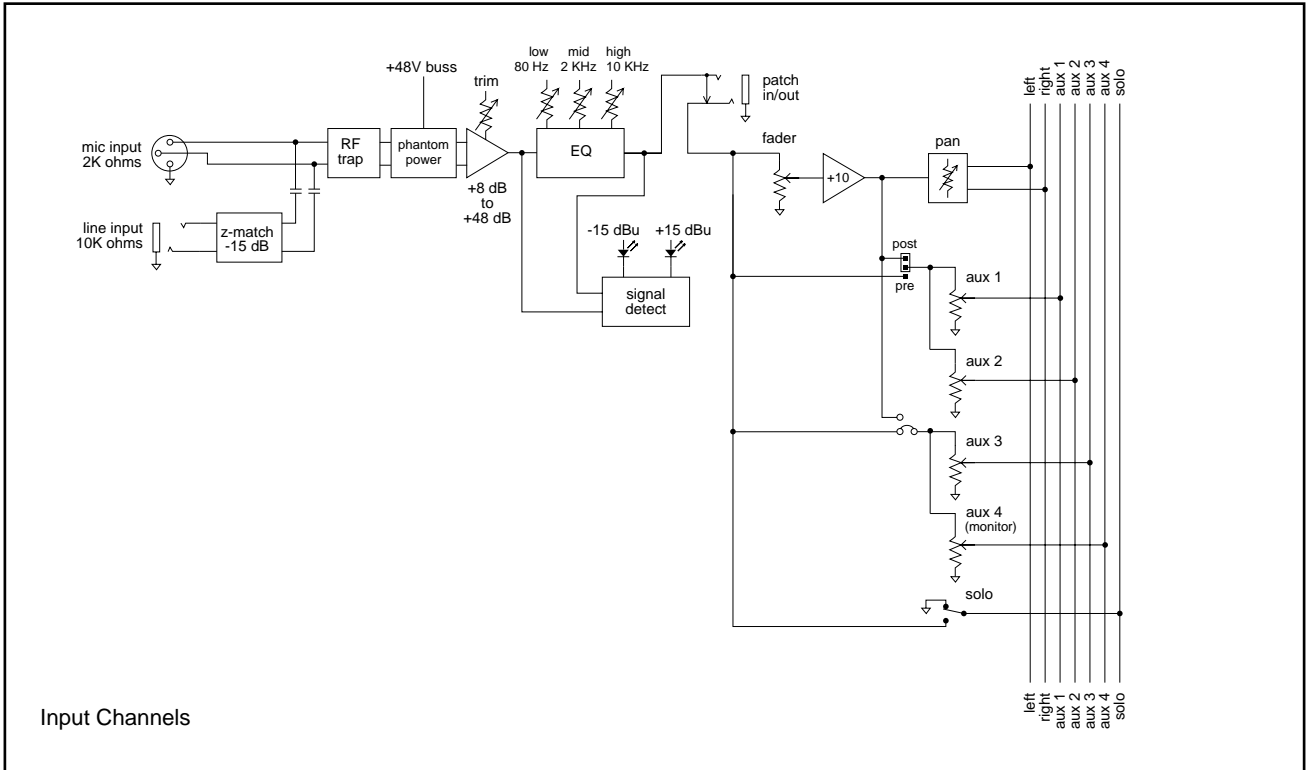
AC POWER REQUIREMENTS (115/230VAC @ 50/60Hz): 45 Watts max.

DIMENSIONS:

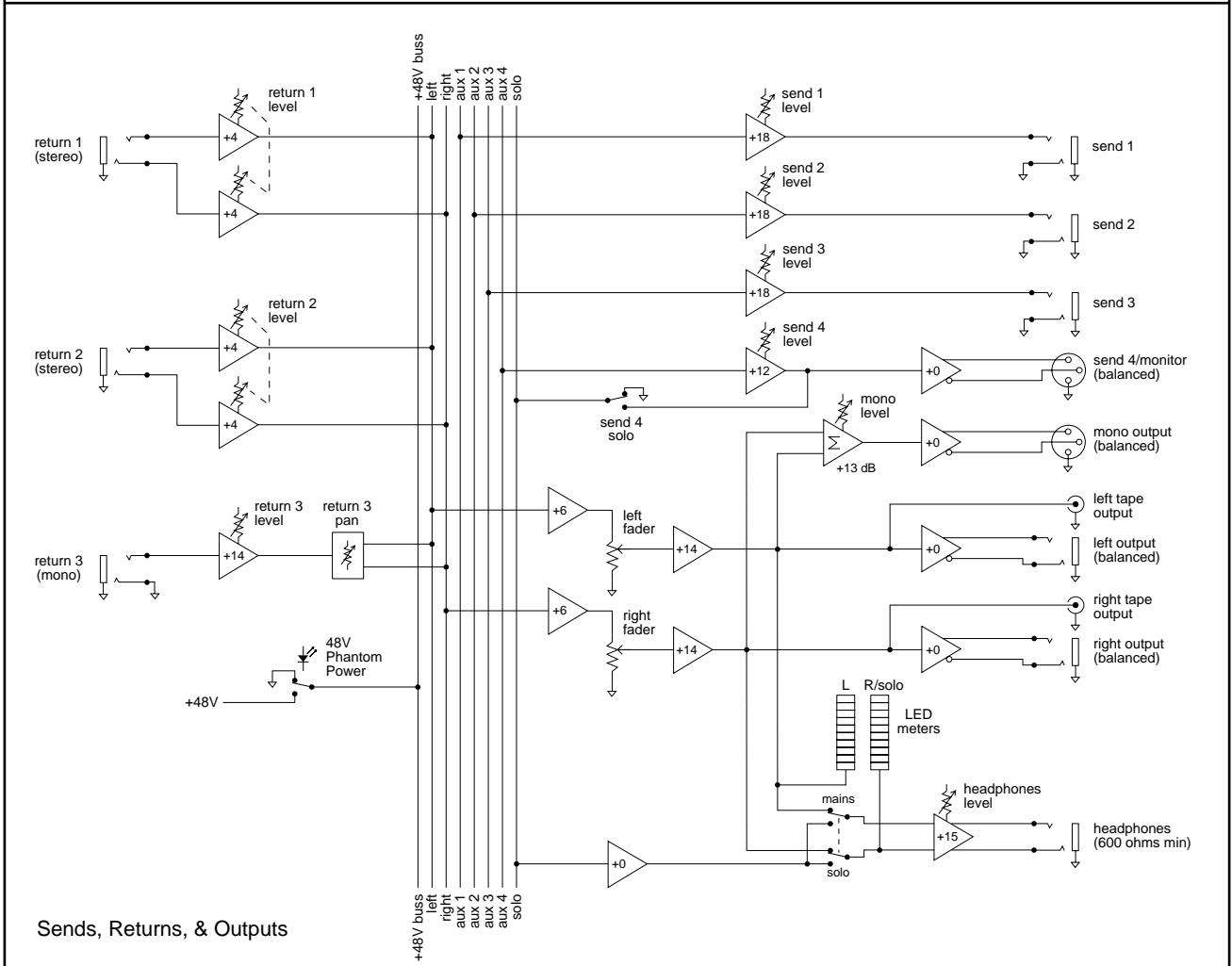
Height	4.5" (114mm)
Width	22" (559mm)
Depth	20.5" (521mm)

WEIGHT: 35 lbs. (15.88kg)

BLOCK DIAGRAM



Input Channels



Sends, Returns, & Outputs

WARRANTY

BIAMP IS PLEASED TO EXTEND THE FOLLOWING 1-YEAR LIMITED WARRANTY TO THE ORIGINAL PURCHASER OF THE PROFESSIONAL SOUND EQUIPMENT DESCRIBED IN THIS OWNER'S MANUAL.

BIAMP Systems expressly warrants this product to be free from defects in material and workmanship for a period of 1 YEAR from the date of purchase as a new product from an authorized BIAMP dealer under the following conditions.

1. The Purchaser is responsible for completing and mailing to BIAMP, within 10 days of purchase, the attached warranty application.
2. In the event the warranted BIAMP product requires service during the warranty period, BIAMP will repair or replace, at its option, defective materials, provided you have identified yourself as the original purchaser of the product to any authorized BIAMP Service Center. Transportation and insurance charges to and from an authorized Service Center or the BIAMP factory for warranted products or components thereof to obtain repairs shall be the responsibility of the Purchaser.
3. This warranty will be VOIDED if the serial number has been removed or defaced; or if the product has been subjected to accidental damage, abuse, rental usage, alterations, or attempted repair by any person not authorized by BIAMP to make repairs; or if the product has been installed contrary to BIAMP's instructions.
4. The normal wear and tear of appearance items such as paint, knobs, handles, and covers is not covered under this warranty.

5. BIAMP SHALL NOT IN ANY EVENT BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING LOST PROFITS, LOSS OF USE, PROPERTY DAMAGE, INJURY TO GOODWILL, OR OTHER ECONOMIC LOSS OF ANY SORT. EXCEPT AS EXPRESSLY PROVIDED HEREIN, BIAMP DISCLAIMS ALL OTHER LIABILITY TO PURCHASER OR ANY OTHER PERSONS ARISING OUT OF USE OR PERFORMANCE OF THE PRODUCT, INCLUDING LIABILITY FOR NEGLIGENCE OR STRICT LIABILITY IN TORT.

6. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED. BIAMP EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE REMEDIES SET FORTH HEREIN SHALL BE THE PURCHASER'S SOLE AND EXCLUSIVE REMEDIES WITH RESPECT TO ANY DEFECTIVE PRODUCT. THE AGENTS, EMPLOYEES, DISTRIBUTORS, AND DEALERS OF BIAMP ARE NOT AUTHORIZED TO MODIFY THIS WARRANTY OR TO MAKE ADDITIONAL WARRANTIES BINDING ON BIAMP. ACCORDINGLY, ADDITIONAL STATEMENTS SUCH AS DEALER ADVERTISEMENTS OR REPRESENTATIONS DO NOT CONSTITUTE WARRANTIES BY BIAMP.

7. No action for breach of this warranty may be commenced more than one year after the expiration of this warranty.

Thank you for purchasing BIAMP...
AMERICAN SOUND CRAFTSMANSHIP

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