BIAMP®

CAUTION: These installation instructions are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

IWA 250
In-Wall Powered Mixer

Installation Instructions

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INTRODUCTION

The **IWA 250** In-Wall Powered Mixer provides an 8 input/2 output mixer plus emergency page interrupt, a 9-band graphic equalizer, and a 250 Watt power amplifier with outputs for standard and distributed speaker systems. Optional VCA remote control cards may be added for controlling mixer input/output levels. Designed for in-wall or surface mounting, with integral security cover, the IWA250 is UL/C-UL listed and is covered by a five-year warranty.

- six balanced microphone/line level mixer input channels
- two balanced/summing line level mixer input channels
- high & low tone controls on each mixer input channel
- independent main & aux level controls on each channel
- trim control & peak indicator on each mic/line input channel
- additional balanced line input for emergency page interrupt
- main & aux mixer outputs with master level controls
- mixer functions provided on screw-driver adjustable controls
- optional VCA cards for remote control of input/output levels
- 9-band graphic equalization integrated at amplifier input
- patch points provided for mixer outputs & equalizer input
- mixer inputs & outputs on front panel plug-in barrier strips
- output taps for standard and distributed speaker systems
- +48 Volt phantom power selectable for microphone inputs
- "in-wall" or "surface-mount" chassis with security cover
- **UL** and **C-UL** listed
- covered by Biamp Systems' five-year warranty

IMPORTANT SAFETY INFORMATION

Read these instructions.

Keep these instructions.

Heed all warnings.

Follow all instructions.

Do not use this apparatus near water.

Clean only with a dry cloth.

Do not block any of the ventilation openings.

Install in accordance with the manufacturers instructions.

WARNING - To reduce the risk of electric shock, do not expose this apparatus to rain or moisture.

Unplug this apparatus during lightning storms or when unused for long periods of time.

Apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.

Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

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. When the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

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 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.

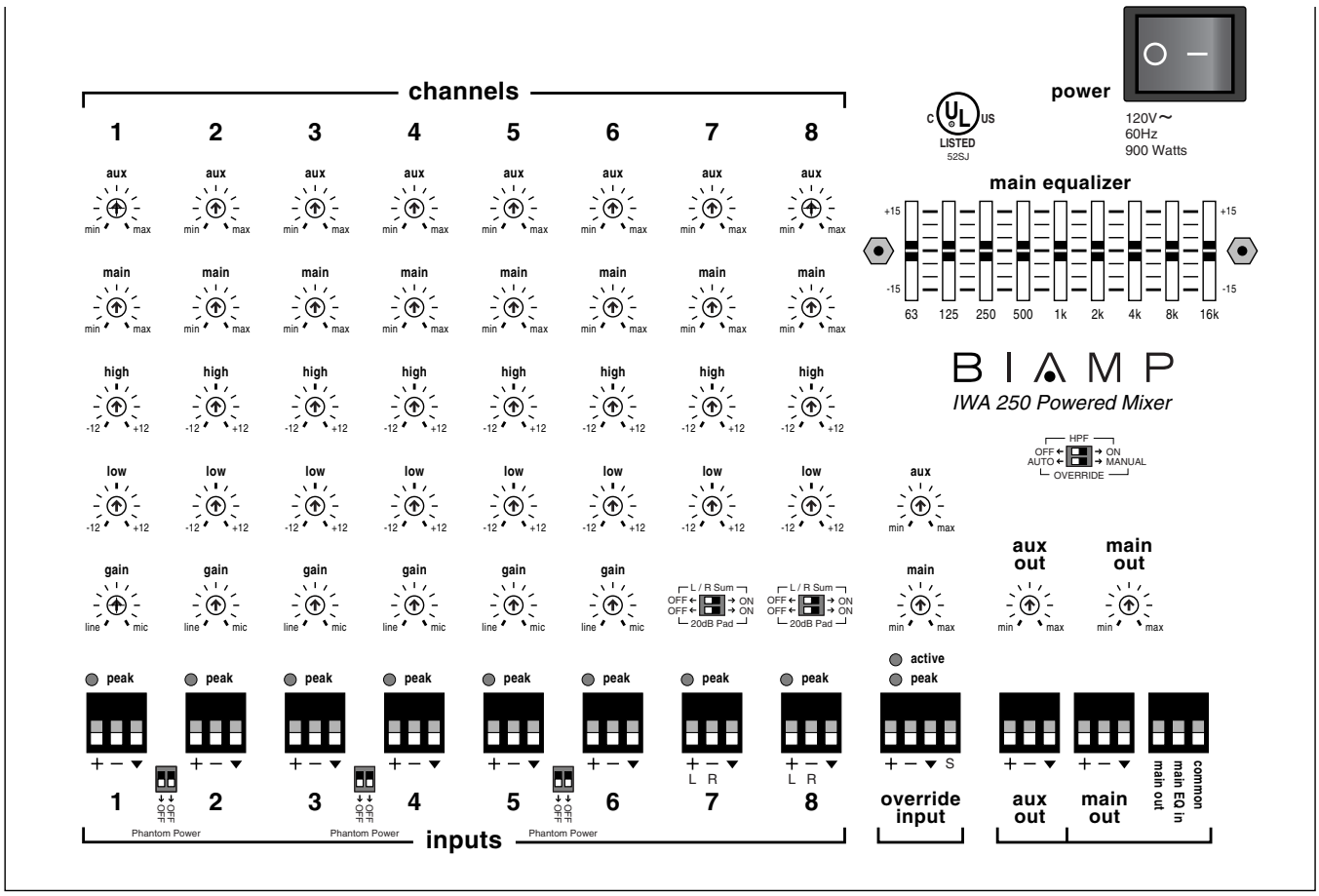
Explanation of safety related markings and symbols which appear on the outside of the apparatus.

Lightning Bolt: Hazardous Live voltages present when this unit is in operation. Do not touch terminals marked with this symbol while the unit is connected to live power.

Exclamation Point: Replace components (i.e. fuses) only with the values specified by the manufacturer. Failure to do so will compromise safe operation of this unit.

CAUTION: Opening the unit enclosure will place operator at risk of injury due to electric shock.

FRONT PANEL FEATURES



Aux: These screw-driver controls set the level of channel signals sent to the Aux Out master control. Aux controls are used to create an independent mix of channel signals for a secondary sound system. This mix is sent (via the Aux Out master control) to the Aux Out connector (see below).

Main: These screw-driver controls set the level of channel signals sent to the Main Out master control. Main controls are used to create an independent mix of channel signals for the primary sound system. This mix is sent (via the Main Out master control) to the Main Equalizer and Main Amplifier, as well as to the Main Out connector (see below).

High: These screw-driver controls set the high-frequency equalization (Treble) for the channels. High equalization is a shelving type filter, which provides ±12dB of gain adjustment for frequencies above 10kHz. Equalization is used to compensate for tonal differences which may exist between various input signals.

Low: These screw-driver controls set the low-frequency equalization (Bass) for the channels. Low equalization is a shelving type filter, which provides ±12dB of gain adjustment for frequencies below 50Hz. Equalization is used to compensate for tonal differences which may exist between various input signals.

Gain (Channels 1~6)**:** These screw-driver controls set the channel gain (0~60dB) to compensate for different input signal levels. Adjust these controls so the channel Peak indictors flash only on occasional peaks (see below).

L / R Sum (Channels 7 & 8)**:** These DIP switches convert the the balanced mono inputs to unbalanced stereo (L/R) summing inputs. Use L / R Sum whenever input is from an unbalanced stereo program source (i.e. CD player, tape deck, etc.).

20dB Pad (Channels 7 & 8)**:** These DIP switches reduce input gain by 20dB to compensate for higher level input signals. Use 20dB Pad whenever input signal levels cause the channel Peak indicator to light more often than just on occasional peaks.

Peak: These red LEDs will light whenever channel signal levels reach +10dB (8dB below clipping). Use this feature to aid in proper adjustment of Gain and 20dB Pad (see above).

Phantom Power: These DIP switches assign +48 Volt DC to the respective inputs for powering condenser microphones. Phantom Power should remain off when input is from line-level sources or dynamic microphones. Always turn AC power off, or turn all level controls down, before switching Phantom Power.

FRONT PANEL FEATURES

Inputs (Channels 1~6): These plug-in barrier strips provide mic/line input to Channels 1~6. These inputs accept signals from balanced low-impedance microphones or from balanced (or unbalanced) line-level sources. Balanced input (Mic or Line) is wired high to (+), low to (-), and ground to (▼). Unbalanced Line input is wired high to (+), and ground to both (-) and (▼). Phantom Power (+48V) is selectable per input (see above) and remote level control is optional (see pg. 8).

Inputs (Channels 7 & 8): These plug-in barrier strips provide line level input to Channels 7 & 8. These inputs accept mono (balanced or unbalanced) or stereo (unbalanced) signals from line-level sources (see L/R Sum above). Balanced mono input is wired high to (+), low to (-), and ground to (▼). Unbalanced mono input is wired high to (+), and ground to both (-) and (▼). Unbalanced stereo input is wired left high to (L), right high to (R), and both grounds to (▼). Stereo signals are summed together into a mono signal at this input. Two independent mono signals may be connected here (wired to left & right respectively), which will be summed together providing common channel equalization and level controls. Remote level control is optional (see pg. 8).

Override Input: This plug-in barrier strip provides the line level override input. This inputs accepts mono (balanced or unbalanced) signals from line-level sources. Balanced input is wired high to (+), low to (-), and ground to (▼). Unbalanced input is wired high to (+), and ground to both (-) and (▼). The Override Input channel includes the same Main & Aux level controls as all other inputs. However, there is no input Gain control. Therefore, input level must be adjusted at the override source. For best performance, adjust the override source level so the channel Peak indictor flashes only on occasional peaks (see Peak above). The Override Input can trigger muting of all other input signals either manually (via external switch) or automatically (via signal presence), regardless of Main or Aux level settings (see Override below). For manual muting (as from a push-to-talk paging microphone) the switch is wired across the Override Input (S) and (▼) terminals. For automatic muting (as from telephone paging), an Override Sensitivity adjustment must be made (see pg. 8). The green Active LED indicator will remain lit during either form of Override muting.

Main Out: The Main Out screw-driver control sets the overall level of signals sent (from channel Main controls) to the Main Out connector. The Main Out connector is a plug-in barrier strip, which provides a balanced line-level output for feeding external equipment (recorders, auxiliary amplifiers, etc.). For unbalanced output, wire high to (+) and ground to (▼), leaving (-) un-connected. An additional plug-in barrier strip connector (to the right of Main Out) provides unbalanced access to the mixer Main Out, and to the Main Equalizer input. From the factory, a jumper wire between "Main Out" and "Main EQ In" routes signal from the Main Out control to the Main Equalizer and the Main Amplifier. Signal processing may be inserted between the mixer and the equalizer by first removing the jumper wire, then wiring "Main Out" to processor input and "main EQ In" to processor output, using a common ground (▼). To access unbalanced Main Out from the mixer (to feed recorders, auxiliary amps, etc.) wire high to "Main Out" and ground to (▼), *<u>without</u> removing the jumper wire.* ***NOTE:*** *If the jumper is removed, the main output and equalizer input are separated (no signal passes between them).* Remote level control is optional (see pg. 8).

Aux Out: The Aux Out screw-driver control sets the overall level of signals sent (from channel Aux controls) to the Aux Out connector. The Aux Out connector is a plug-in barrier strip, which provides a balanced line-level output for feeding external equipment (recorders, auxiliary amplifiers, etc.). For unbalanced output, wire high to (+) and ground to (▼), leaving (-) un-connected. Remote level control is optional (see pg. 8).

HPF: This DIP switch enables a high-pass filter (12dB/octave @ 125Hz) which reduces unnecessary low-frequency signals. Enable HPF whenever the 70V or 25V outputs are being used, or in any 'speech only' applications.

Override: This DIP switch determines whether the Override Input will trigger muting of all other input signals automatically (via signal presence) or manually (via external switch).

Main Equalizer: This 9-band graphic equalizer adjusts the frequency response (tonal balance) of signals sent to the Main Amplifier. Each control provides ±15dB boost/cut at the designated center frequency. From the factory, the Main Equalizer receives signal from the mixer Main Out. However, the Main Equalizer may instead be wired to receive signal from another source (see Main Out above). Do not boost frequencies below 250Hz whenever the 70V or 25V outputs are being used.

Power Switch: This switch applies power to the unit. *<u>Caution</u>: complete all connections & installation before turning power on.*

Power Indicator (not shown)**:** This green LED lights when power is applied to the IWA 250.

Temp/Fault Indicator (not shown)**:** This red LED indicates over-temperature and output fault conditions for the amplifier. When the LED remains lit, the amplifier has an over-temperature condition. When the LED is flashing, the amplifier has an output fault condition. Either condition will temporarily de-activate the amplifier, causing the Signal/Peak LED to turn off as well. The amplifier will attempt to self-reset once the over-temperature or output fault condition is resolved.

Signal/Clip Indicator (not shown)**:** This 2-color LED indicates the signal level for the amplifier. When the LED is green, the amplifier has signal (above -30dB). When the LED is red, the amplifier signal is clipping (max. power). ***CAUTION:*** *Signal levels should be adjusted to avoid clipping. Clipping can cause distortion, over-temperature conditions, and even loudspeaker damage.* ***NOTE:*** *Signal/Peak indicators will turn off during Temp/Fault conditions (see Temp/Fault Indicator above).*

INSTALLATION

Backbox Installation: Backboxes are available for mounting the IWA 250 chassis in the wall, flush with the finished wall surface ("IWB" - In Wall Box), or for mounting on the surface of the wall, with a 4" projection ("SMB" - Surface Mount Box). The mounting location should be capable of supporting a weight of at least 75 pounds. Surface mounted units ("SMB") should be located near a dedicated AC power source, capable of providing the required power for the unit being installed. When flush mounted ("IWB"), the front surface of the backbox must be flush with the finished surface. Failure to do so may cause improper fit of the chassis (or security cover).

Either IWA250 backbox ("IWB" or "SMB") should be connected to electrical service (15 Amp max.) by a licensed electrician, to ensure compliance with local electrical code. Cables should route through appropriate conduit, raceway, or service entrance cable fitting.

Mount the backbox with the internal cable tray assembly located on the right side. The "IWB" can be mounted between standard 16" center studs, using the six mounting holes on each side of the box. The "SMB" can be mounted onto standard 16" center studs, using the four outer-most "keyhole" slots, or onto other suitable surfaces, using the six inner-most "keyhole" slots.

Wire Routing: Wiring that carries signals of dramatically different voltages must be separated by as much distance as possible. *Microphone and line level wiring should never be run with loudspeaker or power wiring. To reduce the potential of crosstalk or oscillations that could damage the amplifier, never bundle the microphone and line level cables with loudspeaker or power cables*.

It is recommended that all loudspeaker wiring enter the backbox at the upper right "knock-out", and route through the cable tray. It is recommended that wiring for the microphone and line inputs should enter the backbox at the lower right "knock-out", and route under the bottom edge of the chassis.

The microphone and line level inputs require shielded wire for proper operation. Loudspeaker wiring may be unshielded. Loudspeaker wire should be of a heavy gauge, to prevent cable losses from degrading the system capabilities. Cable runs using 14 gauge wire should not exceed 90 feet (for 8 ohm operation) or 45 feet (for 4 ohm operation). Longer cable lengths require heavier gauge cable (smaller wire number). Constant voltage outputs (70V and 25V) can tolerate lighter gauge cables or longer cable runs (check an appropriate line loss chart for specific application requirements).

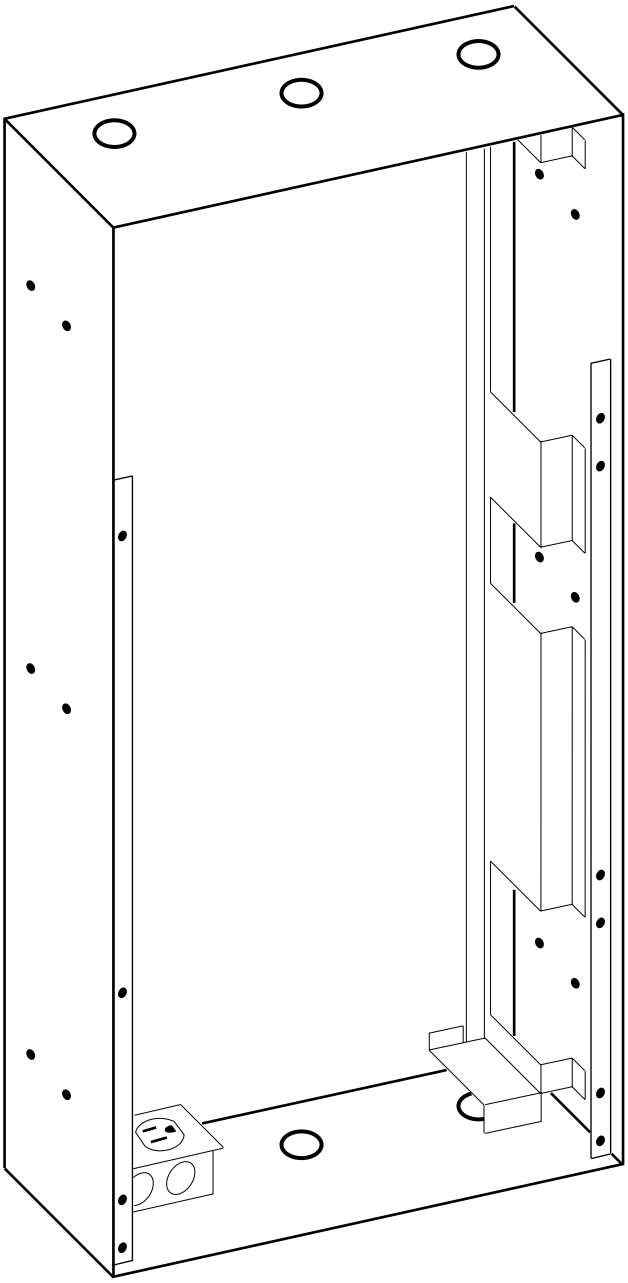
NOTE: AC power should enter the backbox at the bottom left "knock-out" (a standard AC duplex outlet, with enclosure and cover, is provided). ***For proper system grounding, the duplex outlet ground, enclosure, backbox, and conduit or raceway must be bonded together and connected to earth ground. For safety and conformance to codes, this bonding of all metal surfaces should be performed by a qualified electrician during installation of the backbox*****.**

Back-Box Grounding:

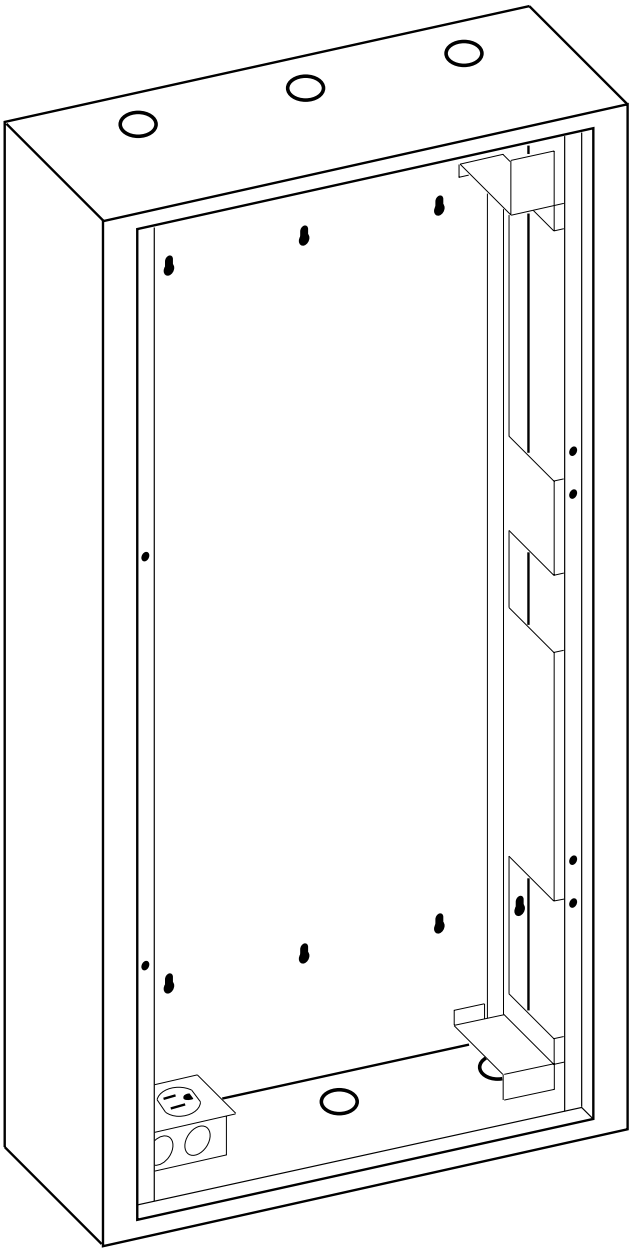
1) The back-box must be electrically bonded to the ground conductor of the incoming power cable.
2) Ground to the box should be bonded to the stud provided in the cable tray inside the back-box.
3) Grounding shall be made with minimum #18 AWG wire, preferably green in color.
4) Grounding shall be in accordance with NEC and all applicable wiring codes.

Safety Ground: This symbol identifies the appropriate back-box grounding stud, located on the lower portion of the cable tray at the bottom right of the back-box.

IWB
(In Wall Box)



SMB
(Surface Mount Box)

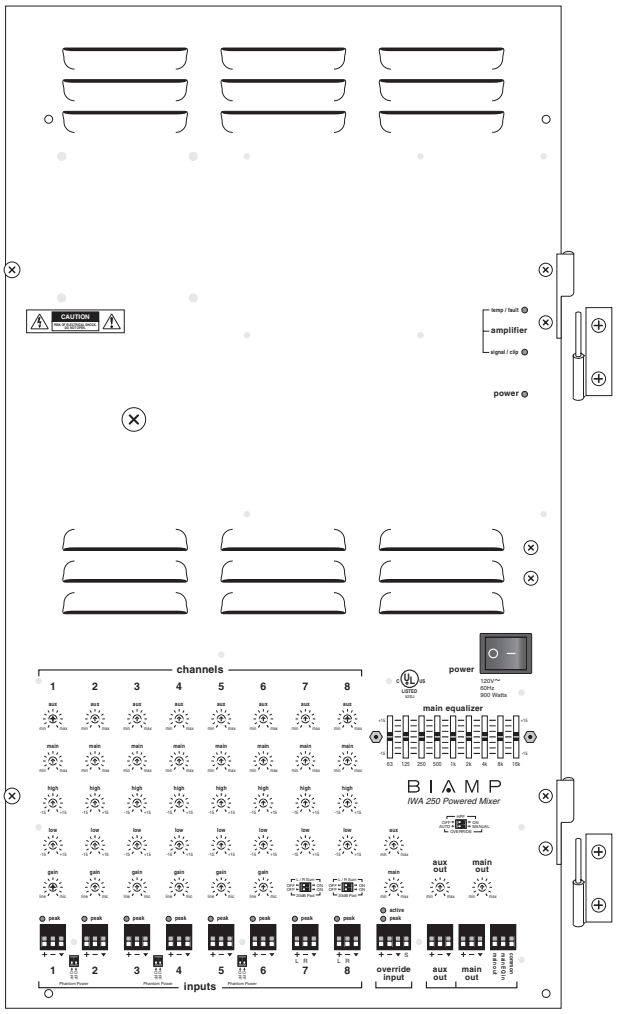


INSTALLATION

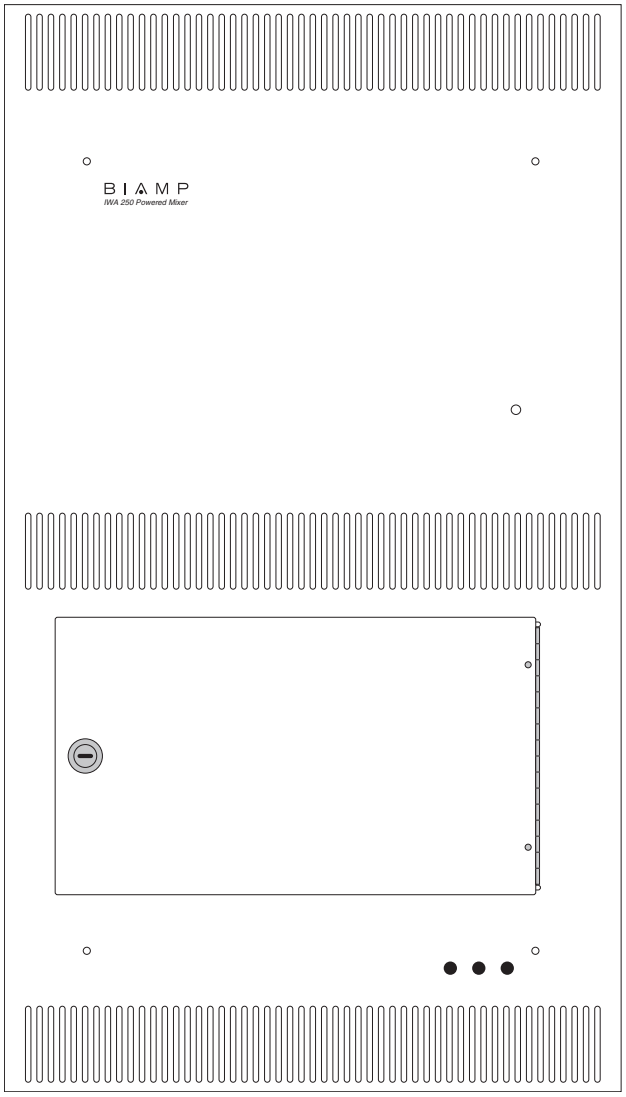
Chassis Installation: The chassis front panel includes two male hinges, which must be secured to the right side-rail of the backbox (use the screws, lock-washers, and nuts provided). Be sure to install the male hinges with the pin pointing up and towards the inside of the backbox. The chassis front panel (with two female hinges on its right side) is then lowered onto the male hinges. This allows the chassis to swing open for access to internal connections, modifications, and for servicing. It is recommended that all loudspeaker wiring enter the backbox at the upper right "knock-out", and route through the cable tray. It is recommended that wiring for the microphone and line inputs should enter the backbox at the lower right "knock-out", and route under the bottom edge of the chassis. Mounting hardware for the security cover must be installed before proceeding (see below). Install the two speed nuts (provided with chassis) in the holes on the left side-rail of the backbox, directly across from the hinges. Two tapping screws with washers (provided with chassis) install through the holes in the left side of the chassis front panel (into the speed nuts) to secure the chassis to the backbox.

Security Cover Installation: Before the chassis front panel is secured to the backbox, mounting hardware for the security cover must be installed. The security cover is attached to the chassis front panel using four stand-offs (provided with chassis). First, the stand-offs must be secured to the chassis front panel, using four screws with lock-washers. Be sure to use the chassis front panel holes which align with the holes in the security cover. Once the chassis is secured to the backbox, the security cover is then secured to the four stand-offs, using the remaining four screws with lock-washers. The security cover also includes keys for the locking/hinged control access panel.

CHASSIS FRONT

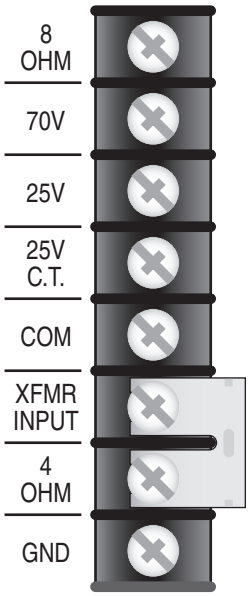


SECURITY COVER



Loudspeaker Wiring: Model IWA 250 provides a single 250 Watt amplifier (Main). To help offset the inductance of certain speaker matching transformers, the IWA 250 includes a high-pass filter (see pg. 3), which must be enabled whenever the 70V or 25V outputs are being used. Loudspeaker wiring is connected to the screw-terminal block on the amplifier/power supply circuit board, located inside the chassis front panel, at the upper left-hand corner. This screw-terminal block accept wires of #12 AWG (or smaller) gauge, or 1/4" spade-lug wire connectors.

These screw terminals provide the speaker outputs from the amplifier. From the factory, a jumper strap is installed betweem the 4 OHM terminal (amplifier direct output) and the XFMR INPUT (transformer input) terminal. For transformer (xfmr) output, connect speaker negative to the COM terminal, and connect speaker positive to the appropriate transformer output terminal (8 OHM for an 8 ohm speaker load; 70V for a 70 Volt distributed speaker system; 25V for a 25 Volt distributed speaker system). For 'balanced' 25V speaker systems, connections are the same as above, plus a ground connection (center-tap) made to the 25V C.T. terminal. For direct output from the amplifier, first remove the factory installed jumper strap, then connect speaker negative to the GND terminal, and connect speaker positive to the 4 OHM terminal.



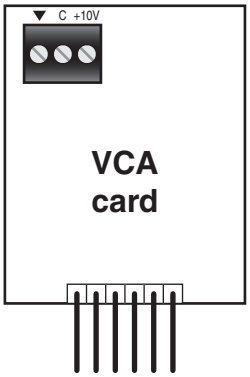
Wire Routing: Wiring that carries signals of dramatically different voltages must be separated by as much distance as possible. *Microphone and line level wiring should never be run with loudspeaker or power wiring. To reduce the potential of crosstalk or oscillations that could damage the amplifier, never bundle the microphone and line level cables with loudspeaker or power cables.* It is recommended that all loudspeaker wiring enter the backbox at the upper right "knock-out", and route through the cable tray. Loudspeaker wire should be of a heavy gauge, to prevent cable losses from degrading the system capabilities. Cable runs using 14 gauge wire should not exceed 90 feet (for 8 ohm operation) or 45 feet (for 4 ohm operation). Longer cable lengths require heavier gauge cable (smaller wire number). Constant voltage outputs (25, 70.7, or 100 volts) can tolerate lighter gauge cables or longer cable runs (check an appropriate line loss chart for specific application requirements).

REMOTE CONTROL

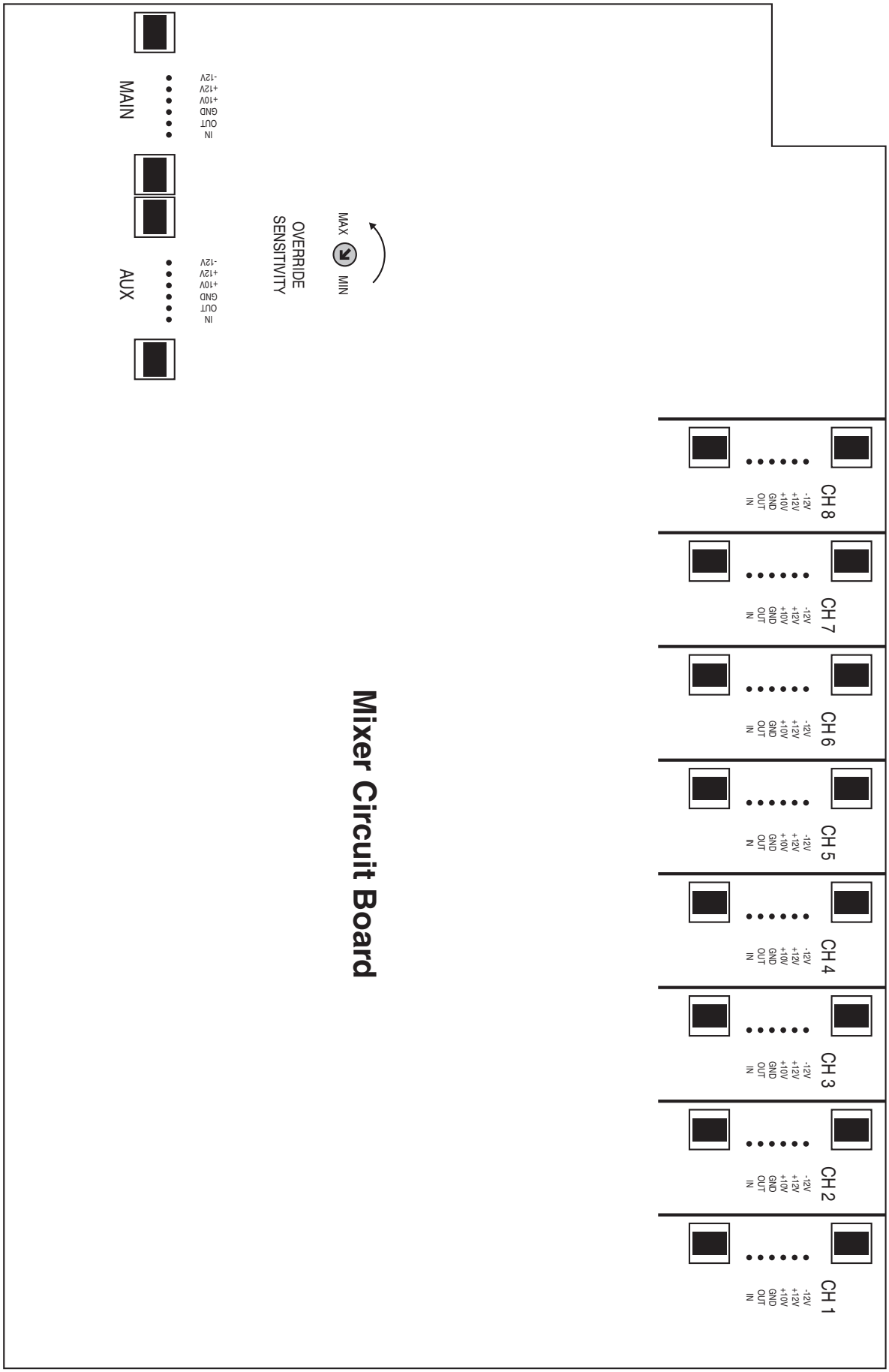
Remote Control: Remote level control is available as a user installed option. It can be added selectively to any of the Input Channels 1~8, as well as to the Main Out and the Aux Out. Remote control capability is added by installing VCA Cards onto the mixer circuit board (see diagram on next page). ***CAUTION****: Turn off and/or dis-connect AC power before performing any modifications.*

To install VCA Cards, first remove the jumper wires (between OUT and IN) on the respective channels/outputs of the mixer circuit board. Then install the two plastic support/guides (provided with each VCA Card) into the holes provided on the respective channels/outputs of the mixer circuit board (support/guides must be properly oriented to accept VCA Card). Once the support/guides are in place, slide the VCA Cards into the support/guides, making sure all pins on the VCA card slide fully into the corresponding holes in the mixer circuit board.

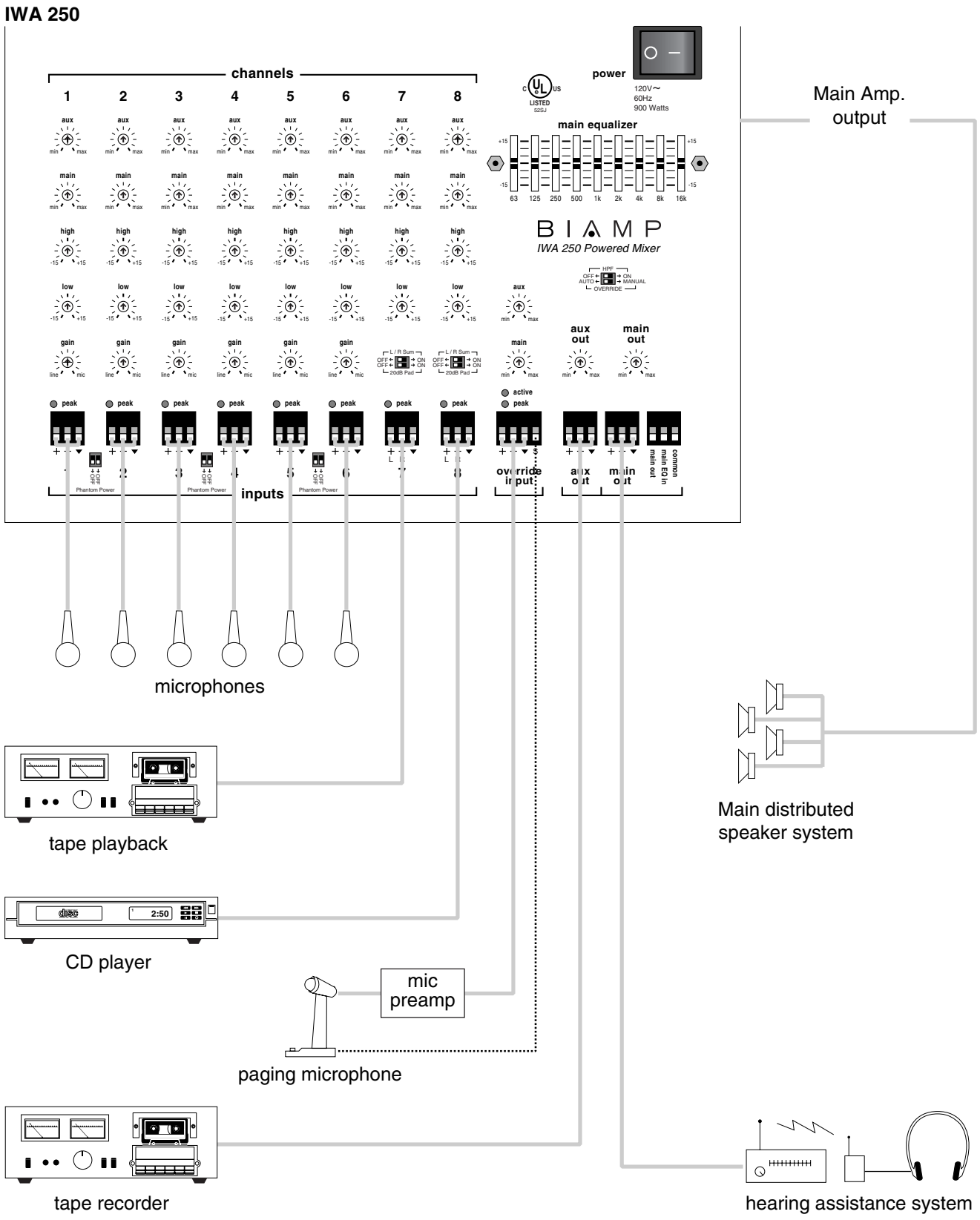
Once the VCA Cards have been installed, remote controls may be wired up to 2000 feet away, using 2-conductor shielded cable. Controls may be any 5k~50kΩ linear taper potentiometer and/or switch to provide adjustment and/or muting of the level. Potentiometers are wired with high-side to "+10V", low-side to "▼", and wiper to "C". The wiper of one potentiometer may be wired to the "C" terminal on multiple VCA Cards, allowing control of a group of signals from a single potentiometer. Switches simply connect (or disconnect) "+10V" to "C", and do not require a ground ('▼') connection. A combination of potentiometer and switch may be used, with the switch in line with either the "C" or "+10V" connection. ***NOTE:*** *When a VCA Card is installed, but no control is connected, signal will not pass. To avoid this circumstance, a jumper wire may be temporarily connected between "+10V" and "C". Additionally, if VCA Cards are removed, jumper wires must be re-installed between OUT and IN on the respective channels/outputs of the mixer circuit board, before signal can pass.*



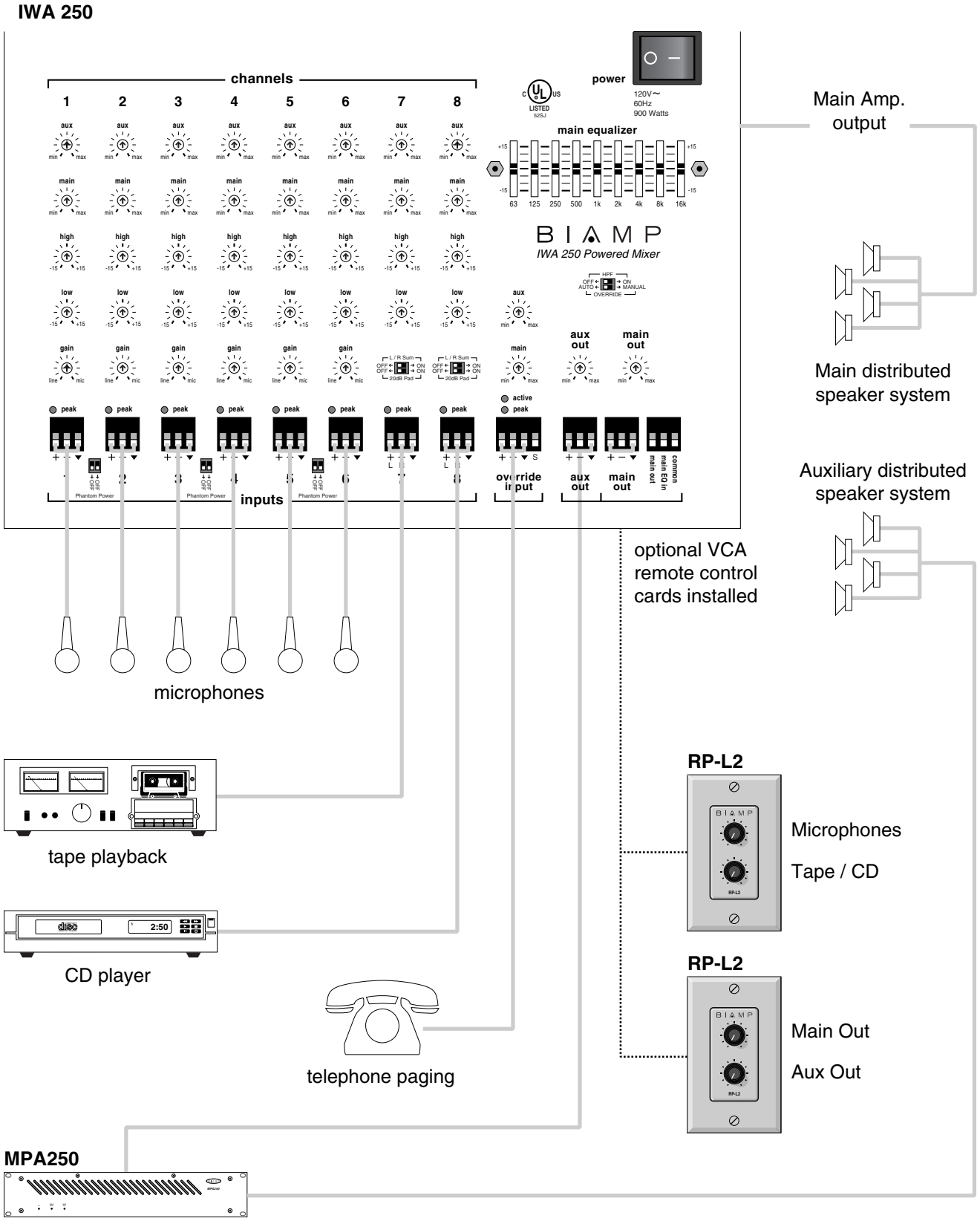
Override Sensitivity: The IWA 250 Override Input can trigger muting of all other input signals automatically (see Override Input on pg. 3). For automatic muting (as from telephone paging), an Override Sensitivity adjustment should be made (see diagram on next page). Once Override Input settings are made, Override Sensitivity may be adjusted for proper muting sensitivity. Override Sensitivity should be adjusted so that muting is easily triggered by Override Input (paging) signals, but not by ambient or background noises on the paging line. The Override Input Active indicator will remain lit during muting.


Mixer Circuit Board
CH 1
CH 2
CH 3
CH 4
CH 5
CH 6
CH 7
CH 8
IN
OUT
GND
+10V
+12V
-12V
MAIN
AUX
OVERRIDE SENSITIVITY
MAX
MIN

250 Watt Distributed System plus Hearing Assistance & Recording Outputs



250 Watt Distributed System plus Remote Control & Auxiliary Speaker System

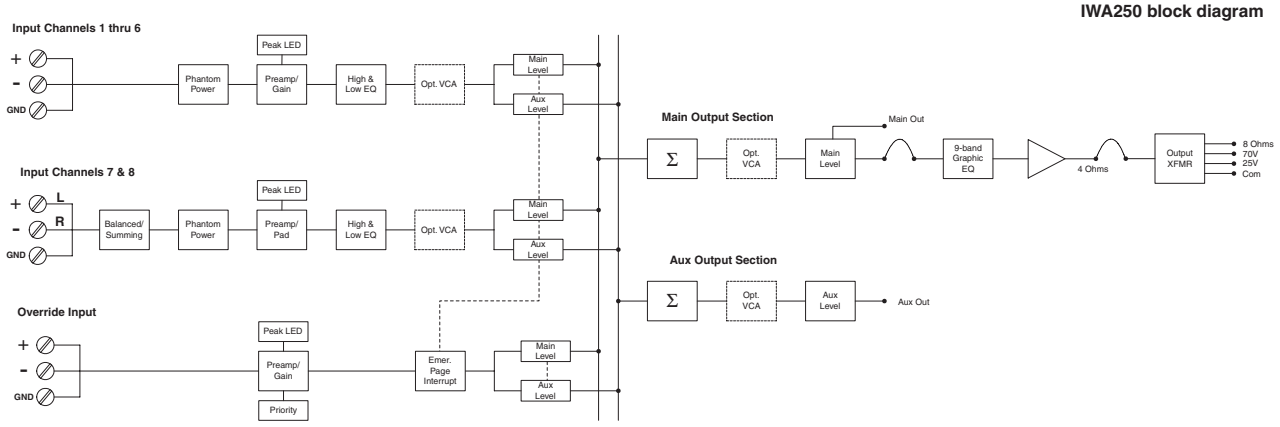


SPECIFICATIONS & BLOCK DIAGRAM

Continuous Power (4 ohm direct & transformer outputs)**:**	250 watts
Signal-to-Noise Ratio (20Hz~20kHz)**:**	
referenced to 250 watts into 4 ohm direct output	> 90dB
Total Harmonic Distortion:	
20Hz~20kHz @ 250 watts into 4 ohm direct output	< 0.2%
100Hz~15kHz @ 250 watts at transformer outputs	< 1.0%
Intermodulation Distortion (SMPTE)**:**	< 0.35%
Frequency Response (20Hz~20kHz)**:**	+0/-1dB
Input / Output Impedance:	
balanced mic/line inputs	600 ohms
balanced line-level inputs	20k ohms
unbalanced main & aux outputs	200 ohms
unbalanced equalizer input	10k ohms

Equalization:	
low-frequency input channel EQ	±12dB @ 50Hz
high-frequency input channel EQ	±12dB @ 10kHz
9-band graphic output EQ	±15dB @ 64Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz, 8kHz, 16kHz
Dimensions (H x W x D)**:**	
security cover	28.6" x 16.25" x 0.9" (726x413x23mm)
in-wall back-box	26.6" x 14.25" x 4" (676x362x102mm)
surface-mount back-box	28.6" x 16.25" x 4" (726x413x102mm)
Weight:	
chassis + security cover	< 34 lbs. (15.42kg)
in-wall back-box	< 14 lbs. (6.35kg)
surface-mount back-box	< 17 lbs. (7.71kg)

IWA250 block diagram



WARRANTY

BIAMP SYSTEMS IS PLEASED TO EXTEND THE FOLLOWING 5-YEAR LIMITED WARRANTY TO THE ORIGINAL PURCHASER OF THE PROFESSIONAL SOUND EQUIPMENT DESCRIBED IN THIS MANUAL

1. BIAMP Systems warrants to the original purchaser of new products that the product will be free from defects in material and workmanship for a period of 5 YEARS from the date of purchase from an authorized BIAMP Systems dealer, subject to the terms and conditions set forth below.

2. If you notify BIAMP during the warranty period that a BIAMP Systems product fails to comply with the warranty, BIAMP Systems will repair or replace, at BIAMP Systems' option, the nonconforming product. As a condition to receiving the benefits of this warranty, you must provide BIAMP Systems with documentation that establishes that you were the original purchaser of the products. Such evidence may consist of your sales receipt from an authorized BIAMP Systems dealer. Transportation and insurance charges to and from the BIAMP Systems factory for warranty service shall be your responsibility.

3. This warranty will be VOID if the serial number has been removed or defaced; or if the product has been altered, subjected to damage, abuse or rental usage, repaired by any person not authorized by BIAMP Systems to make repairs; or installed in any manner that does not comply with BIAMP Systems' recommendations.

4. Electro-mechanical fans, electrolytic capacitors, and normal wear and tear of items such as paint, knobs, handles, and covers are not covered under this warranty.

5. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. BIAMP SYSTEMS DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

6. The remedies set forth herein shall be the purchaser's sole and exclusive remedies with respect to any defective product.

7. No agent, employee, distributor or dealer of Biamp Systems is authorized to modify this warranty or to make additional warranties on behalf of Biamp Systems. statements, representations or warranties made by any dealer do not constitute warranties by Biamp Systems. Biamp Systems shall not be responsible or liable for any statement, representation or warranty made by any dealer or other person.

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

9. BIAMP SYSTEMS SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING LOST PROFITS OR LOSS OF USE ARISING OUT OF THE PURCHASE, SALE, OR USE OF THE PRODUCTS, EVEN IF BIAMP SYSTEMS WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

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