

# ALTEC

## 9440A POWER AMPLIFIER

### OPERATING INSTRUCTIONS



#### NOTICE

Read this manual before operating  
the 9440A Power Amplifier.

#### FEATURES

- 800 Watts in Monaural Mode
- Exclusive "Active Dissipation Sensing Circuit" Protects Transistors
- Temperature Activated High and Low Power Modes
- Ultra-Low Distortion
- Direct-Coupled Transformerless Output
- Illuminated VU Meters
- High Input Sensitivity
- Balanced and Direct Inputs

*Specifications and components subject to change without  
notice. Overall performance will be maintained or improved.*

# ALTEC

SOUND PRODUCTS DIVISION

1515 S. Manchester Ave., Anaheim, Calif. 92803

1975 ALTEC CORPORATION

## SPECIFICATIONS

Type:	Two-channel basic power amplifier with provision for two optional 15335A plug-in line transformers for balanced input
Power Output — Single Channel Driven with Unbalanced Input:	200W into 8 ohms from 20 Hz to 20 kHz at less than 0.1% THD 400W into 4 ohms from 20 Hz to 15 kHz at less than 0.25% THD Greater than 250W into 8 ohms at 1 kHz with 0.01% THD Greater than 450W into 4 ohms at 1 kHz with 0.05% THD
Both Channels Driven:	200W per channel into 8 ohms from 20 Hz to 20 kHz at less than 0.25% THD Greater than 400W per channel into 4 ohms at 1 kHz with 0.25% THD
Mono Unbalanced Input with Dual Output (CH 1 and CH 2):	Greater than 800W into 8 ohms at 1 kHz with 0.25% THD
IM Distortion (Single Channel Driven):	Less than 0.1% from 0.01W to 250W into 8 ohms (60 Hz, 7 kHz, 4:1) Less than 0.1% from 0.01W to 450W into 4 ohms (60 Hz, 7 kHz, 4:1)
Input Sensitivity (Nominal) — Direct Input:	0.6V rms for 200W output (8 ohms) 0.6V rms for 400W output (4 ohms)
Balanced Input:	0.6V rms for 200W output (8 ohms) with 15335A Line Transformer 0.6V rms for 400W output (4 ohms) with 15335A Line Transformer 0.6V rms for 800W output (8 ohms) with 15335A Line Transformer (bridge operation)
Direct Input/Bridge (mono) Mode:	0.6V rms for 800W output (8 ohms)
Input Impedance:	15,000 nominal ohms for all inputs
Load Impedance:	4 ohms or greater per channel 8 ohms or greater in bridge (mono) mode
Output Impedance:	Less than 0.1 ohm in dual mode at 1 kHz Less than 0.2 ohm in bridge (mono) mode at 1 kHz
Signal-to-Noise Ratio:	Greater than 100 dB and 20 kHz noise bandwidth; equivalent to 5.5 $\mu$ V maximum input noise or -103 dBm (600 ohms)
Channel Separation:	Greater than 80 dB at 1 kHz and 8-ohm loads
Frequency Response (direct input):	$\pm 0.25$ dB at 1W (8 ohms) from 20 Hz to 20 kHz +0 -3 dB at 1W (8 ohms) from 5 Hz to 100 kHz
Gain:	55 dB minimum with 15335A bridging 600-ohm line with 8-ohm load 58 dB minimum with 15335A bridging 600-ohm line with 4-ohm load 61 dB minimum with 15335A bridging 600-ohm line in bridge (mono) mode with 8-ohm load
Voltage Gain — Direct Input: Balanced Input:	77:1 or 37.7 dB typical 70:1 or 36.9 dB typical with 15335A

## SPECIFICATIONS (continued)

Controls:	<p>2 VOLUME controls, continuously variable</p> <p>2 METER RANGE switches having 0 dB, -10 dB and -20 dB ranges (Ref: 0 dB = 40V output)</p> <p>1 POWER OUTPUT switch to select mode (MONO or DUAL) and clipping power percentage (40% or 100%) in either MONO or DUAL mode</p> <p>1 POWER ON-OFF switch (primary power)</p>
Indicators:	<p>2 illuminated meters indicating full-wave average output level with ranges of 0 dB, -10 dB and -20 dB. Not true VU meter ballistics.</p>
Connectors:	<p>2 Cannon XLR3-31 input receptacles</p> <p>2 Phone jack input receptacles</p> <p>4 Five-way binding-post output jacks on 3/4" centers</p> <p>2 Phone jack multiple receptacles (to connect additional amplifiers)</p> <p>1 each 8-1/2 foot, 3-wire, 16GA power cord with NEMA 5-15P plug</p> <p>2 AC power receptacles, switched. Total maximum power-handling capacity of 150 watts.</p>
Power Requirements:	<p>120/240V ac, 50/60 Hz</p> <p>100W at zero signal</p> <p>850W at 1/3 rated output (4 ohms) with both channels driven at 1 kHz</p> <p>1500W at rated output (4 ohms) with both channels driven at 1 kHz</p> <p>Power output ratings are at 120V ac (339V peak-to-peak)</p>
Safety — Amplifier Protection:	<p>Voltage/current limiting acting upon output stage and dual voltage-level power supply to reduce power output and heat generation to 40% of rated output. Control circuitry parameters provide for excessive heat sink temperature, mismatch of load impedance and setting of POWER OUTPUT switch. Output relay removes load if thermal runaway occurs.</p>
Load Protection:	<p>Output relay delays turn-on of output power for 5 seconds; provides instant turn-off of output power and removal of load in case of amplifier failure or presence of dc voltage in the output.</p>
Operating Temperature Range:	<p>Up to +55°C (131°F) ambient</p>
Dimensions:	<p>7" H x 19" W x 11" D (without fans)</p>
Weight:	<p>56.5 pounds</p>
Color:	<p>Gun-metal gray front panel with clear-irridited steel chassis</p>
Enclosure:	<p>Rack mount chassis with provision for mounting two accessory fans on heat sink shroud</p>
Accessories:	<p>ALTEC 15335A Line Transformer. Do not use 15335 transformer.</p> <p>Axial fan, 4-11/16", 120V ac</p>

## DESCRIPTION

The ALTEC Model 9440A Power Amplifier is a direct-coupled amplifier that typically delivers over 250 watts per channel into 8-ohm loads and over 450 watts per channel into 4-ohm loads at less than 0.25% total harmonic distortion (THD). An optional plug-in line bridging transformer may be used in each channel for balanced inputs.

The 9440A is capable of operation from a 120V or 240V ac source.

Circuit design provides fail-safe protection for the output transistors and the load.

Provisions are made for mounting two accessory fans on the heat sink shroud for greater cooling of the output circuitry.

Illuminated VU meters indicate full-wave average output level of each channel at selectable ranges of 0 dB, -10 dB and -20 dB.

Designed for rack mounting, the 9440A occupies only four vertical units of rack space (7"). Typical performance characteristics of the 9440A are shown in Figures 1 through 6.

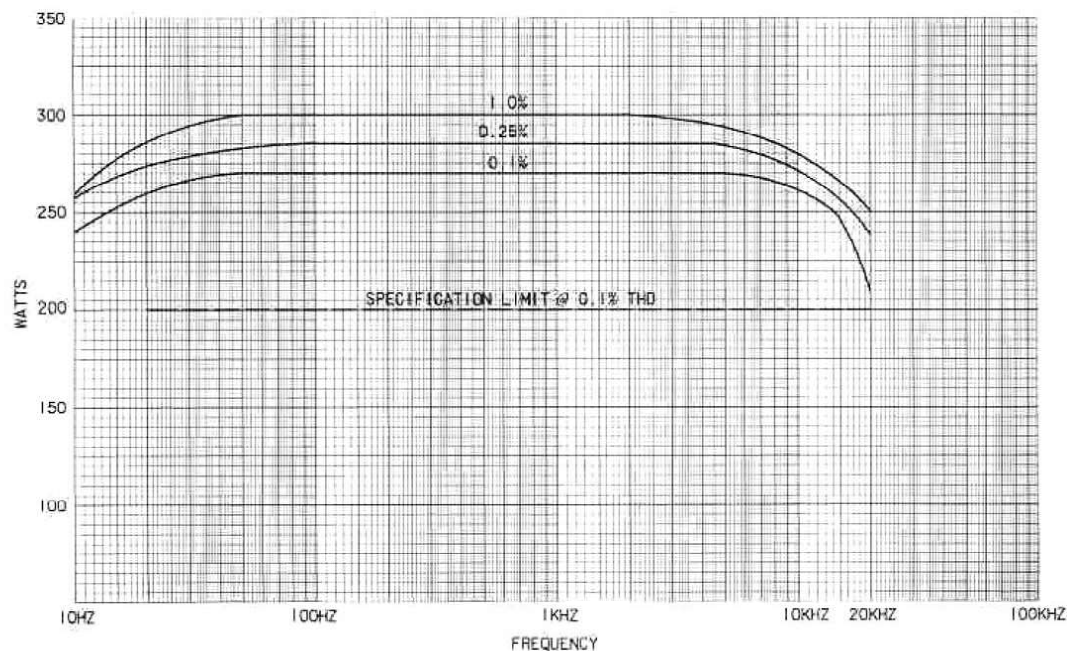


FIGURE 1  
9440A  
SINGLE CHANNEL DRIVEN  
TYPICAL POWER INTO 8 $\Omega$  FOR CONSTANT  
TOTAL HARMONIC DISTORTION

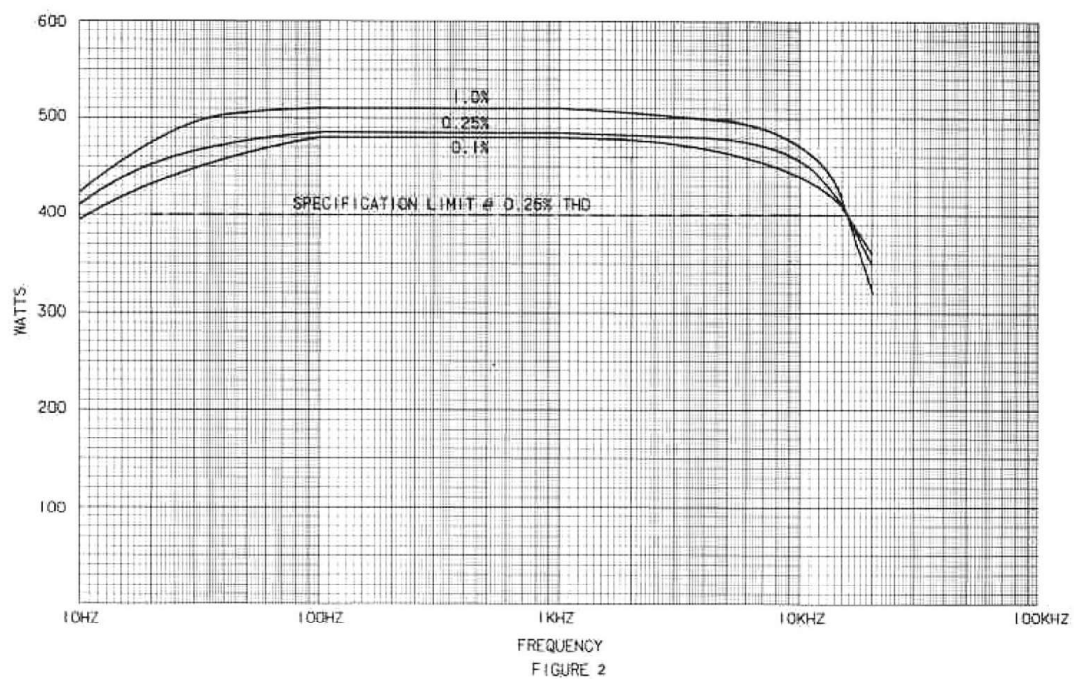


FIGURE 2  
9440A  
SINGLE CHANNEL DRIVEN  
TYPICAL POWER INTO 4Ω FOR CONSTANT  
TOTAL HARMONIC DISTORTION

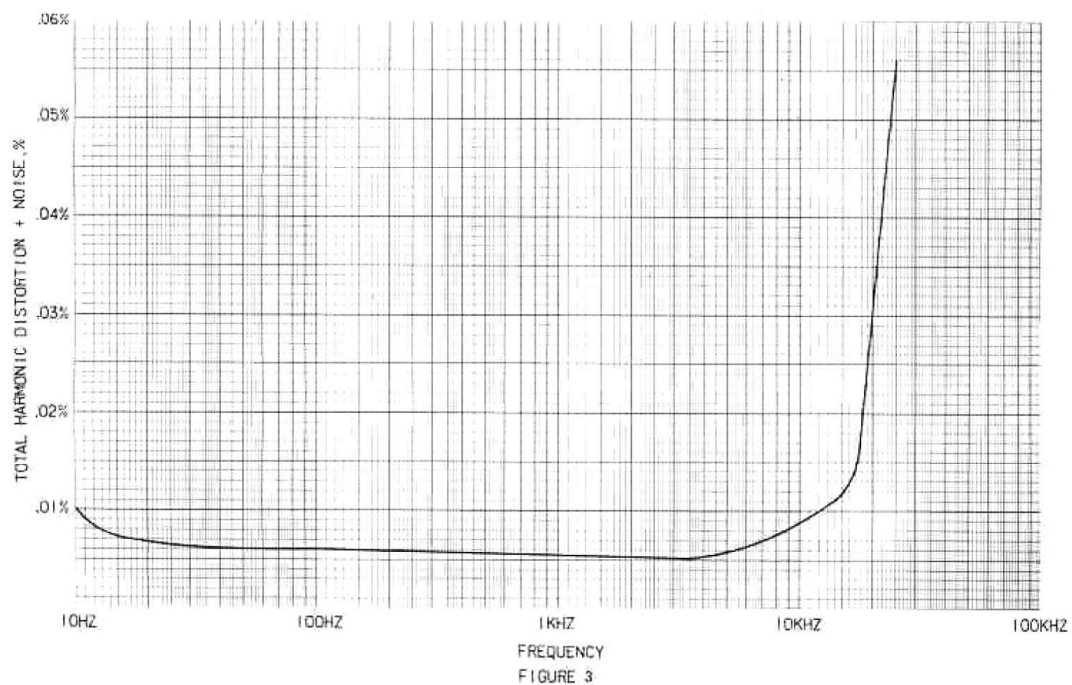


FIGURE 3  
9440A  
SINGLE CHANNEL DRIVEN  
TYPICAL TOTAL HARMONIC DISTORTION  
200W INTO 8Ω



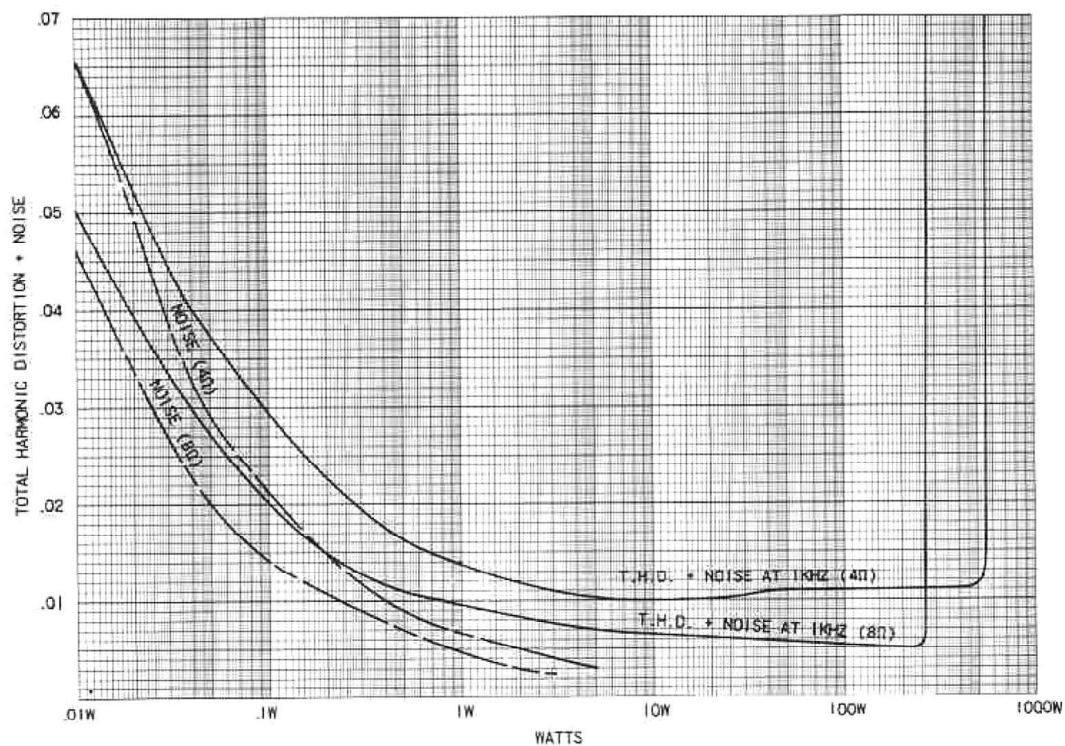


FIGURE 4  
9440A  
SINGLE CHANNEL DRIVEN  
TYPICAL TOTAL HARMONIC DISTORTION + NOISE VS  
40 POWER AT 1KHZ &  
80 POWER AT 1KHZ

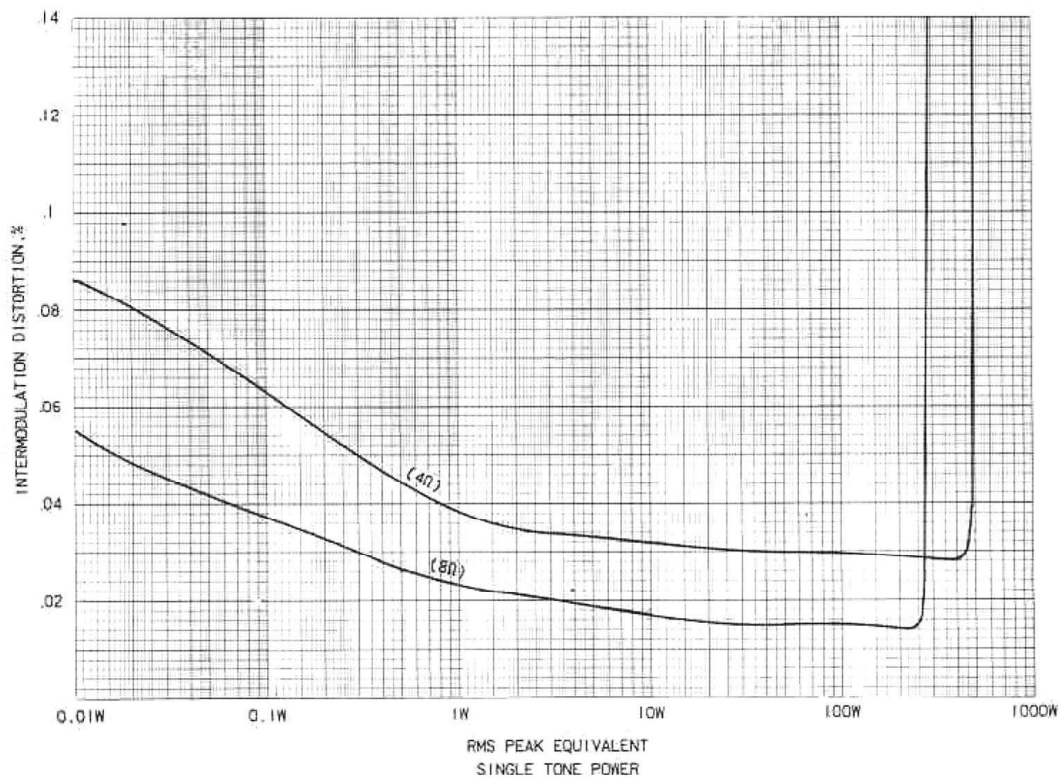
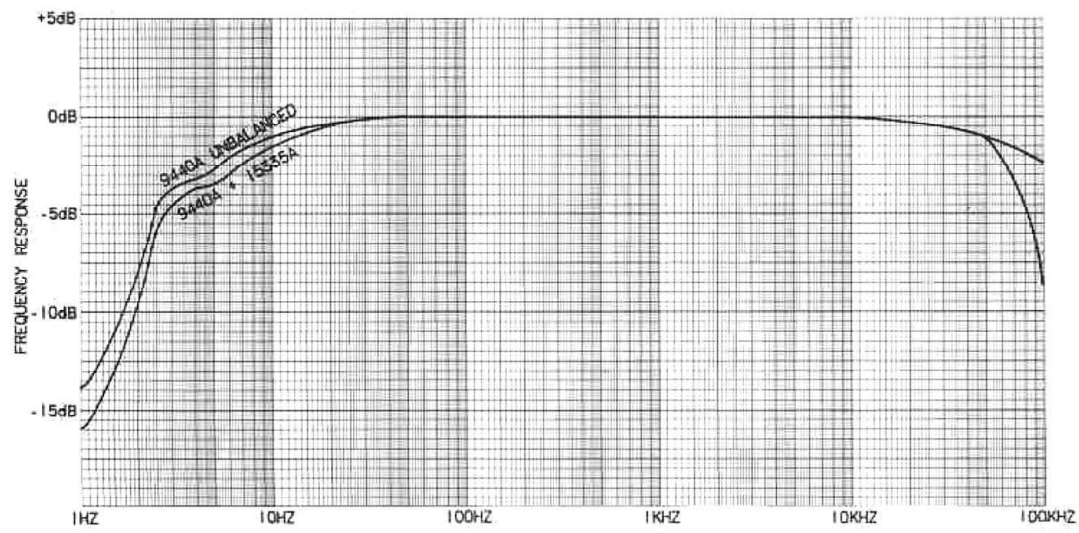


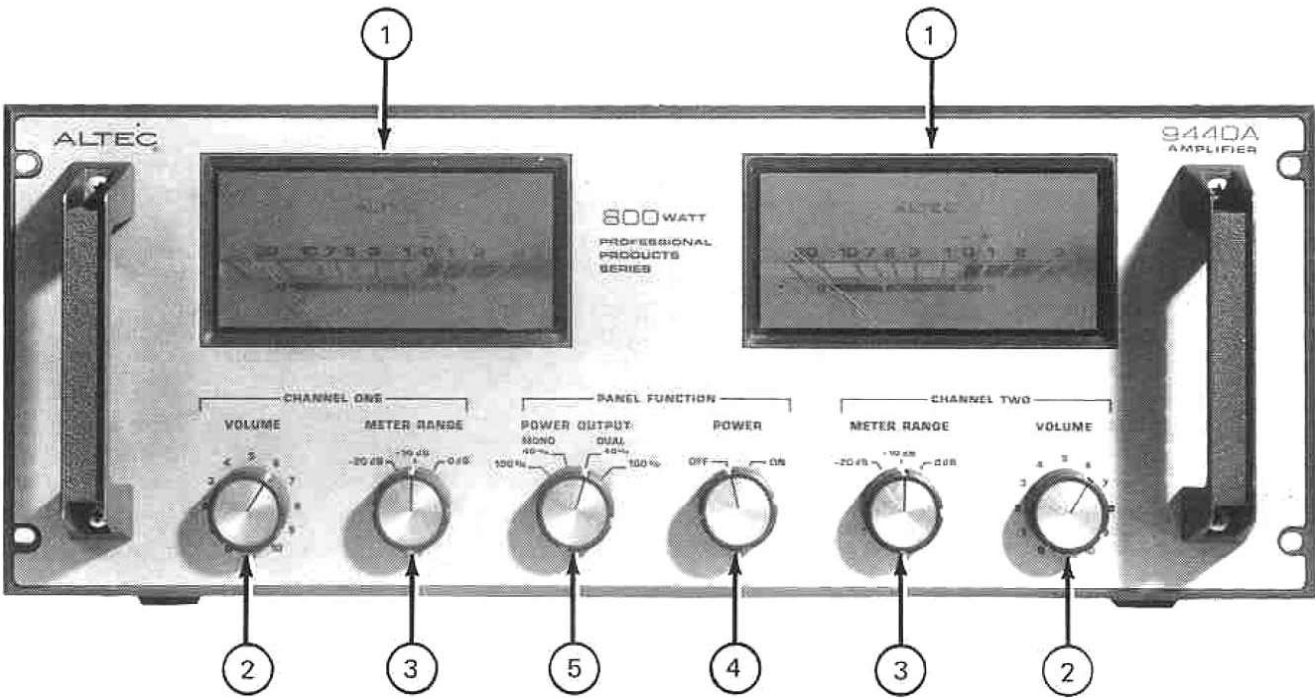
FIGURE 5  
9440A  
SINGLE CHANNEL DRIVEN  
TYPICAL INTERMODULATION DISTORTION VS  
40 POWER LEVEL &  
80 POWER LEVEL



FREQUENCY  
FIGURE 6

9440A  
TYPICAL FREQUENCY  
RESPONSE WITH 8Ω LOAD

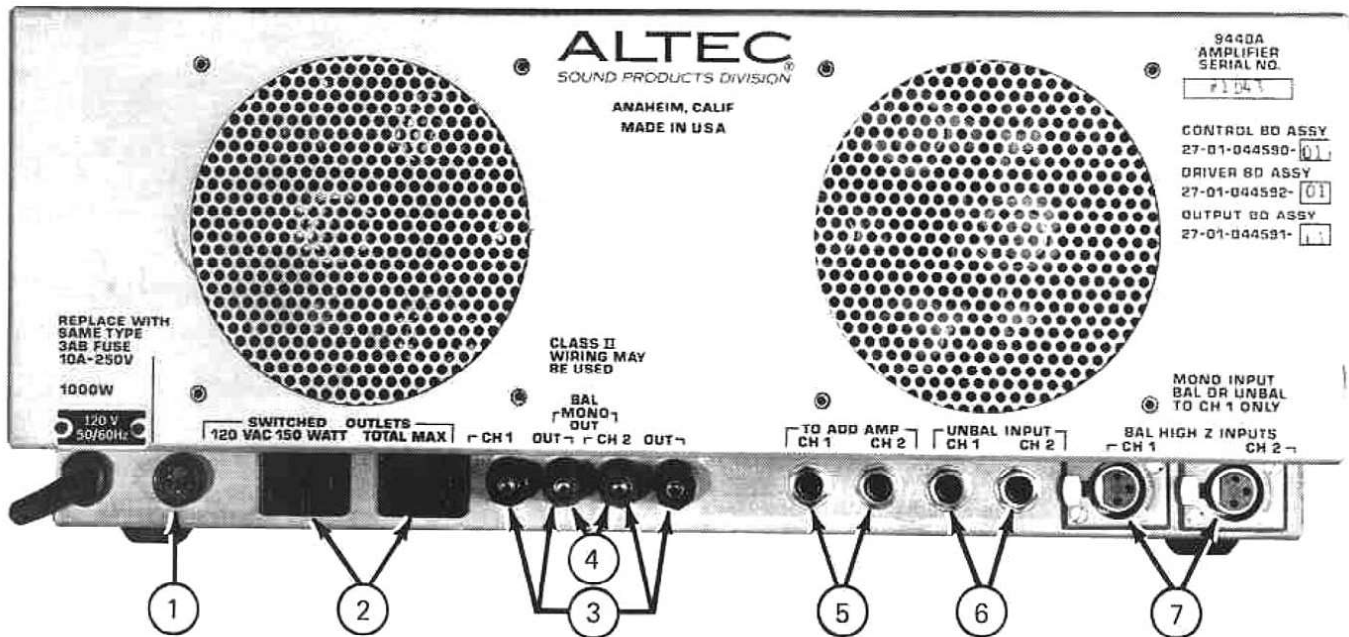
FRONT PANEL CONTROLS AND FEATURES



1	VU meters	Display output for channels 1 and 2. Meters illuminate when power is on.
2	VOLUME controls	Adjust gain of channels 1 and 2. Rotate clockwise to increase gain.
3	METER RANGE switches	Select full scale range of VU meter. Selectable ranges are 0 dB, -10 dB and -20 dB. Maximum output of each range (0 dB, -10 dB and -20 dB) coincides with zero dB on meter scale.
4	POWER switch	Applies primary power to amplifier. VU meters illuminate when switch is turned to ON.
5	POWER OUTPUT switch	<p>In DUAL position, channel 1 and channel 2 inputs are amplified and applied to CH 1 and CH 2 OUT jacks, for separate sound reproduction of each channel. In MONO position, channels are combined at BAL MONO OUT jacks for combined sound reproduction at all speakers. Channel 2 input is removed during mono operation.</p> <p>When fan accessories are not used, and amplifier is used for continuous service under heavy load, turn switch to 40% position to prevent amplifier from cycling due to excessive heat. In all other applications, use 100% position for full power output.</p>



## REAR PANEL CONNECTIONS AND FEATURES



1 Fuse	Protects amplifier from excessive current drain. Replace only with same type 10-ampere fuse. Refer to qualified service personnel if fuse blows repeatedly. A 15-ampere fuse may be used for test purposes only.
2 SWITCHED AC OUTLETS	Provide additional source of line power when amplifier is turned on with POWER switch on front panel. Maximum acceptable power drain is 150 watts for both outlets combined.
3 CH 1 OUT CH 2 OUT speaker terminals	Connect channel 1 and channel 2 speakers for corresponding channels. Two pair of standard GR jacks; have red (+) and black (-) polarity designations. When two or more speakers are connected in parallel, combined impedance should be not less than 4 ohms.
4 BAL MONO OUT speaker terminals	Connect balanced output to speaker system. NEVER CONNECT EITHER TERMINAL TO GROUND. When two or more speakers are connected in parallel, combined impedance should be not less than 8 ohms. Operate POWER OUTPUT switch in MONO mode.
5 TO ADD AMP jacks	Accept cables to connect another 9440A amplifier in parallel.
6 UNBAL INPUT jacks	Accept cables from high-impedance (nominal 20K $\Omega$ ) microphones, AM/FM tuners, tape recorders, etc.
7 BAL HIGH Z INPUTS receptacles	Accept cables from high-impedance (nominal 20K $\Omega$ ) microphones, AM/FM tuners, tape recorders, etc. Two transformer-isolated, balanced input channels; have XLR3-31 type connectors.

## INSTALLATION

### RACK MOUNTING

The 9440A amplifier is designed for mounting in a standard 19-inch equipment rack, requiring a vertical rack space of 7 inches. Use four 10–32 x 1/2" screws to secure the front panel against the rack.

### VENTILATION

The 9440A must be adequately ventilated to prevent excessive temperature rise of output transistors. An inch or two of space should be left *behind, above and below* the 9440A to ensure adequate cooling. Four feet raise the amplifier from a flat surface to allow free passage of air beneath the chassis.

#### CAUTION

*Do not* block ventilation slots in the top of the chassis, the bottom of the chassis, or the heat sink shroud at the back of the amplifier. Be sure free circulation of air is not restricted by other equipment, walls, curtains or furniture.

The 9440A should not be placed too close to other heat-generating equipment or in areas where ambient temperature exceeds 55°C (131°F).

If the 9440A is mounted in an equipment rack or cabinet with other heat-producing equipment

mounted above and/or below, space must be provided between the units to prevent excessive temperature rise. The ALTEC 10399 1-3/4" Perforated Panel is recommended for this purpose.

When several amplifiers or other heat-producing units are installed in a single rack or cabinet, acceptable air temperature may be in doubt. To determine temperature conditions, operate the system until temperature stabilizes, then measure air temperature with a bulb-type thermometer held at the bottom of the uppermost amplifier. Do not let the thermometer bulb touch metal because the metal may be hotter than the ambient air. If air temperature exceeds 55°C (131°F), the equipment should be spaced farther apart or a blower should be installed to ventilate the cabinet.

If the 9440A amplifier becomes too warm, due to continuous use at high output, two accessory fans should be installed on the rear of the heat sink shroud. Each fan should produce at least 30 cubic feet per minute at a static pressure of 0.04 inch of water. A typical fan that meets this requirement is the Rotron Whisper® fan.

### ELECTRICAL

#### 120-Volt, 50/60 Hz Power Connections

Equipment supplied for domestic use is provided with the power transformer primary strapped for 120 volts, as shown in Figure 7. The power input nameplate, adjacent to the power cord on the chassis, is mounted to show the appropriate side specifying connections. Verify that line voltage is in accordance with the voltage rating *before* connecting primary power.

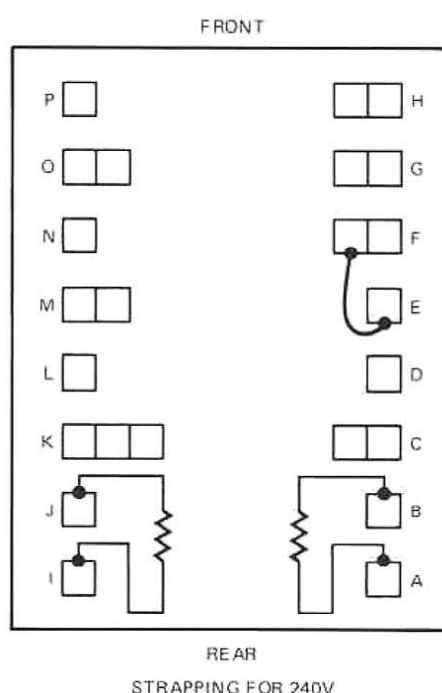
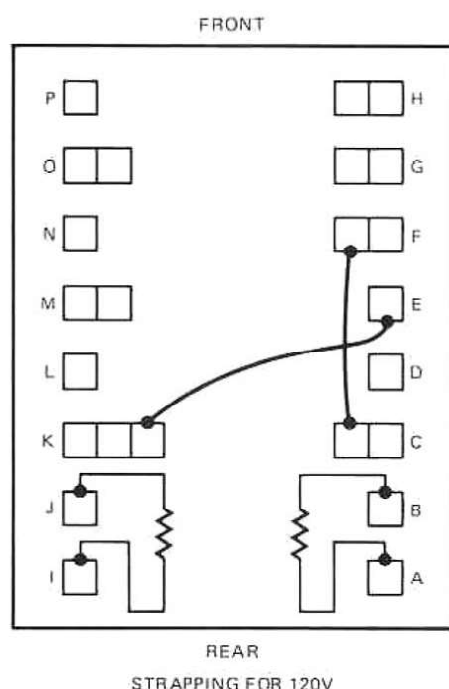


Figure 7. Strapping of Power Transformer for 120V and 240V Power

## 240-Volt, 50/60 Hz Power Connections

Export equipment is provided with the power transformer primary strapped for 240 volts, as shown in Figure 7. The power input nameplate, adjacent to the power cord on the chassis, is mounted to show the appropriate side specifying connections.

For a 9440A previously wired for 120 volts ac primary power, use the following procedure to change wiring for 240 volts ac operation. Refer line voltage change to qualified service personnel only.

- Step 1. Turn POWER switch to OFF.
- Step 2. Remove power cord from primary power outlet.
- Step 3. Remove seven screws securing top cover. Lift off top cover to expose transformer terminal board.
- Step 4. Locate strap connecting terminals C and F (see Figure 7). Remove strap and store for possible later use.
- Step 5. Locate strap connecting terminals E and K. Remove spade connector from terminal K and connect it to terminal F. This strap now connects terminals E and F as shown in Figure 7.
- Step 6. Install top cover on amplifier and secure with seven screws removed in Step 3.

- Step 7. Remove voltage rating plate from chassis; reverse and reinstall to show 240-volt rating.

### NOTE

Switched ac outlets provide 120V ac when amplifier is strapped for 240V ac operation. Maximum acceptable power drain remains at 150 watts for combined outlets.

## Input Connections — Unbalanced

Connections to UNBAL INPUT for channels 1 and 2 are made with two-wire cables terminated with standard 1/4" diameter phone plugs.

The UNBAL INPUT connects preamplifiers, mixers, etc., to channels 1 and 2 (see Figure 8). Nominal input level should be approximately 0.5 volt rms. If the 9440A is used in a mono mode with only one input connected, use the channel 1 (CH 1) jack; connection of an input to channel 2 (CH 2), with no connection to channel 1, will result in no output.

### NOTE

The UNBAL INPUT overrides the BAL HIGH Z INPUTS when cable connections are made.

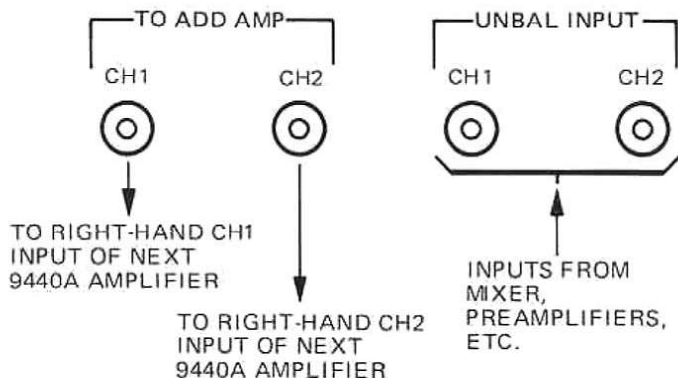


Figure 8. Unbalanced High-Impedance Input Connections

The TO ADD AMP jacks are in parallel with the respective CH 1 and CH 2 input jacks. These jacks are used to connect 9440A amplifiers in multiple configurations. Multiple amplifiers can be connected when the first amplifier receives input to either the UNBAL INPUT or the BAL HIGH Z

INPUTS. Figure 9 shows a typical multiple configuration of 9440A amplifiers.

Unbalanced output at the TO ADD AMP jacks may be employed from a balanced input at the XLR3-31 jacks, as shown in Figure 10.

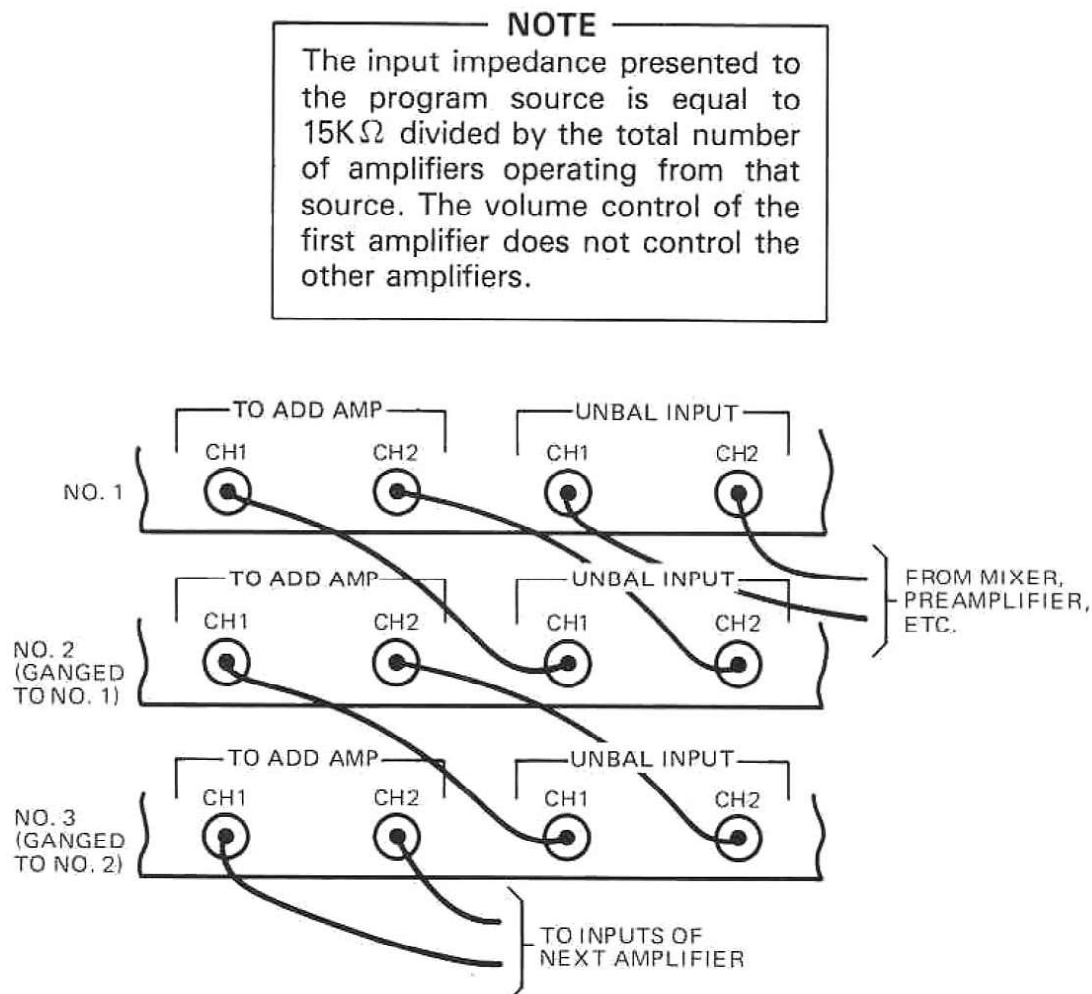


Figure 9. 9440A Amplifiers Connected in Multiple

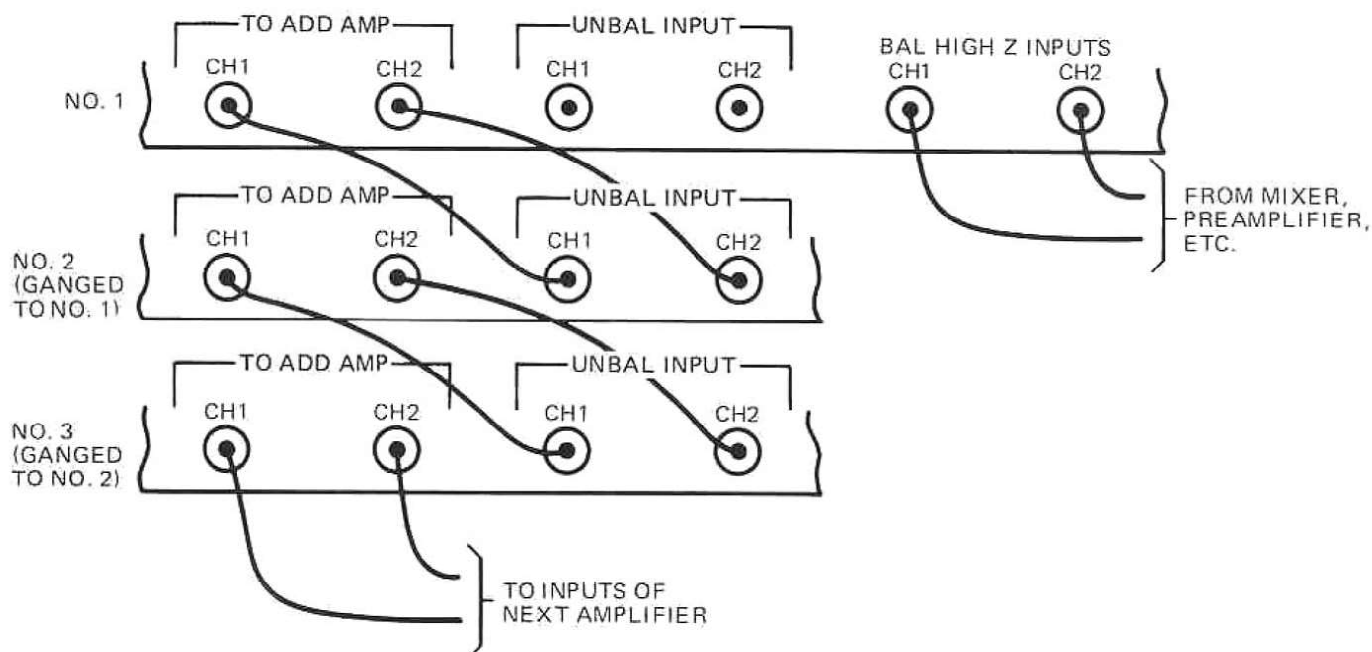


Figure 10. Application of Unbalanced Output from Balanced Input

## Input Connections — Balanced

Connections to BAL HIGH Z INPUTS for channels 1 and 2 are made with shielded two-wire cables terminated with XLR3-type plugs. Wiring of these plugs is shown in Figure 11.

Inputs may be from mixers, preamplifiers, tuners, phono or other high-level line sources. Nominal input level should be approximately 0.5 volt rms. If the 9440A is used in a mono mode with only one output connected, use channel 1 (CH 1) jack; connection of an input to channel 2 (CH 2), with no connection to channel 1, will result in no output.

### NOTE

Inputs connected to the UNBAL INPUT override inputs to BAL HIGH Z INPUTS.

One plug-in ALTEC 15335A Line Transformer accessory is required for each of the two channels for BAL HIGH Z INPUTS. The transformer accessories are plugged into the corresponding receptacles within the chassis (see Figure 11). Refer transformer installation to qualified service personnel only.

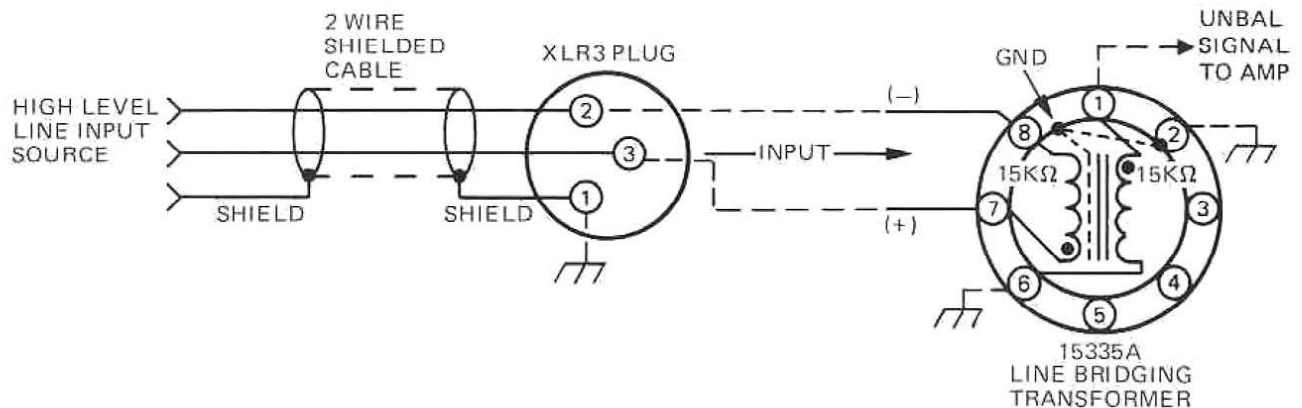


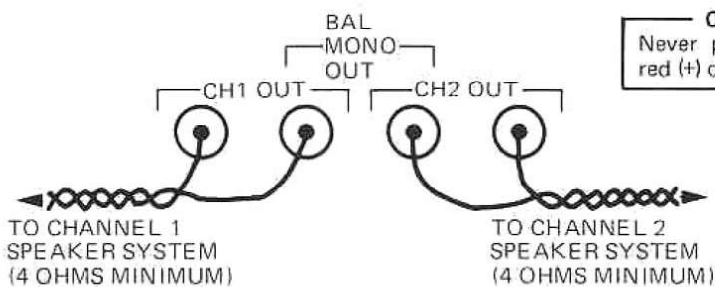
Figure 11. Balanced Input Connections to 9440A

## Speaker Connections

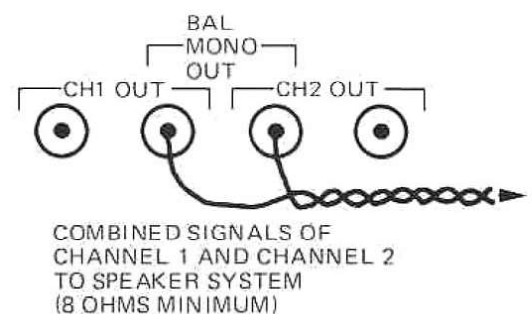
Connections to channel 1 (CH 1 OUT) and channel 2 (CH 2 OUT) speaker outputs are made with two-wire cables. Both red (+) speaker output jacks are isolated from chassis ground. *Do not* place either of these jacks in a circuit to chassis ground. Combined impedance of the speaker system should be not less than 4 ohms

for each of the two speaker outputs (see Figure 12).

Connections to BAL MONO OUT combine the two channels into one output. NEVER CONNECT EITHER RED OUTPUT TERMINAL TO CHASSIS GROUND. Combined impedance of the speaker system should be not less than 8 ohms (see Figure 12).



A. DUAL (STEREO) SPEAKER CONNECTIONS



B. MONO-SPEAKER CONNECTIONS

Figure 12. Mono and Dual Speaker Connections



## **BLOCK DIAGRAM**

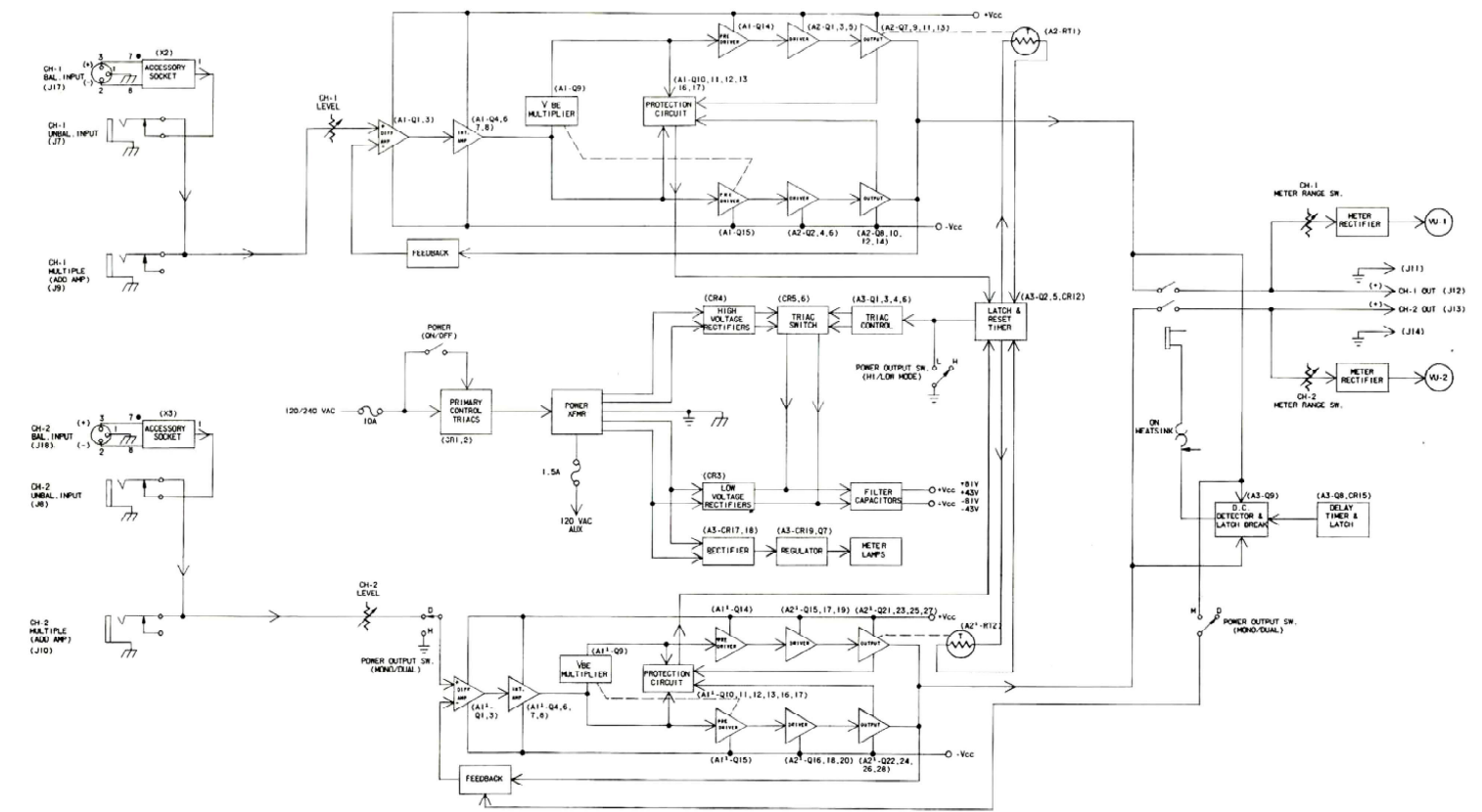
A system block diagram of the 9440A is shown in Figure 13.

## **SERVICE**

If a malfunction occurs, service should be performed by an ALTEC Qualified Service Representative. For factory service, ship the 9440A prepaid to:

ALTEC Customer Service  
131 West Katella  
Anaheim, California 92803

For additional information or service, call:  
(714) 774-2900 or Telex 65-5415.



NOTES: UNLESS OTHERWISE SPECIFIED

Figure 13. 9440A Power Amplifier Block Diagram (6D714)