MODEL D-100 POWER AMPLIFIER
OWNER'S MANUAL

audio research
HIGH DEFINITION®
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INTRODUCTION

Congratulations on your purchase. The D-100 solid state dual channel power amplifier was conceived and designed for audio perfectionists. "Analog Module" front end circuitry coupled to a unique linear output stage provides stable "high definition" performance.

The D-100 output stage utilizes a total of 32 power devices coupled to a special heat sink design. It will drive capacitive or inductive loads and withstand accidental shorts without the aid of protective circuitry. It is also self-biasing - no internal biasing or balance adjustments are used or needed. Sonic performance will not change with time or temperature.

WARRANTY

A limited 90-Day Warranty (from the date of purchase by the original purchaser) is provided by Audio Research Corporation. This warranty is subject to the conditions and limitations stated within the documents attached to the outer shipping carton.

SERVICE CONTRACT

A 3-Year Service Contract Application is included with the documents attached to the outer shipping carton.

THIS SERVICE CONTRACT WILL NOT BE ISSUED OR EFFECTIVE UNLESS WITHIN THIRTY DAYS AFTER THE DATE OF SALE THE PURCHASER MAILS TO AUDIO RESEARCH A SERVICE CONTRACT APPLICATION FORM WHICH HAS BEEN COMPLETED, DATED AND SIGNED BY BOTH THE SELLING DEALER AND THE PURCHASER AND A COPY OF THE BILL OF SALE OR OTHER PROOF OF PURCHASE OF THE PRODUCT.

PACKAGING

Save All The Packaging - Your Audio Research component is a precision electronic instrument and should be properly cartoned any time shipment is made. You may never have occasion to return it to the factory for service, but if such should be necessary, or other occasion to ship it occurs, the original packaging may save your investment from unnecessary damage or delay.

ACCESSORIES

The following spare fuses are included with your D-100:

(1) AC line fuse (externally accessible)
(2) DC supply fuses (internally accessible)

WARNING

To prevent fire or shock hazard, do not expose this equipment to rain or moisture.

This unit contains voltages which may be lethal. Do not operate this unit with covers removed. Refer servicing to qualified personnel.

CAUTION

For continued protection against fire hazard, replace only with same type and rating fuse.

SPECIFICATIONS

Power Output:	100 WATTS PER CHANNEL MINIMUM RMS (both channels operating) AT 8 OHMS FROM 1 Hz TO 20 KHz WITH LESS THAN 0.2% TOTAL HARMONIC DISTORTION

Intermodulation Distortion:	Less than 0.05% at rated output (80Vp-p) and load, SMPTE method, 60 Hz and 7 KHz, 4:1	Hum & Noise:	Less than 15 microvolts equivalent input noise with shorted inputs (20 Hz to 20 KHz), Typically 106 dB below rated output
Frequency Response:	.05 Hz to 100 KHz (-3dB), 1 W, 8 ohms	Speaker Output:	Single ended, dual channel
Input Sensitivity:	1.5 Volts for rated output	Damping Factor:	More than 200 (1 Hz to 20 KHz)
Input Impedance:	30 K ohms	Output Offset:	Less than 10 mV
Protection Components:	Thermal AC switch, AC line fuse, DC supply fuses	Power Requirements:	120/240 VAC, 50/60 Hz, 500 watts maximum
Dimensions:	19 " (48 cm.) W, 10¼" (26 cm.) D, 5¼" (13 cm.) H, rack mount panel	Weight:	40 lbs. (18 kgm.) net, 46 lbs. (21 kgm.) shipping

INSTALLATION

Mechanical:

To insure normal component life, this equipment must be operated in a horizontal position to receive proper ventilation. Never confine this device such as to inhibit proper cooling by natural convection through the ventilated enclosure and finned heat sink. If this equipment is to be operated within a confined space or rack-type cabinet, forced air cooling must be provided. The "ambient" operating temperature should never exceed 120° F. or 50° C.

It is normal for the heat sink assembly to run very warm to the touch after "warm-up" or thermal equilibrium. All components within are operated at safe conservative levels and are part of a unique high performance design.

Electrical:

Proceed with system wiring as outlined below:

1. Connect the left and right channel loudspeakers to the amplifier "output" binding posts located on the rear panels to each side of the heat sink assembly. For convenience and/or reference, the left rear panel should be used for "left" channel wiring connections and the right rear panel for "right" channel connections. Use lamp cord or two conductor wiring according to the following table:

Wire Gauge (AWG)	Maximum Distance -vs- Impedance (16 ohm)	(8 ohm)	(4 ohm)
20	16 ft.	8 ft.	4 ft.
18	24 ft.	12 ft.	6 ft.
16	40 ft.	20 ft.	10 ft.
14	64 ft.	32 ft.	16 ft.

   Make sure that the speakers are "phased" properly, ie. identical wiring and connections for each channel between amplifier and speaker terminals. The black binding posts are ground and the red are "hot".

   Note: The D-100 is a NON-INVERTING amplifier, ie. the output signal at the hot or red terminal is in-phase with the input signal. This is of no consequence except in bi- and tri-amplified systems where the amplifiers and their respective speakers must be phased properly.

2. Connect the left and right channel audio inputs on the rear panels to the main left and right outputs respectively of the preamplifier or electronic crossover. Use only high quality shielded phono cables. Avoid inexpensive cables which use "weak" or soft metal grounding shells as they may introduce hum and/or noise into the system.

3. Finally, with the power switch on the preamplifier in the "off" position, connect the line cord plug into a switched outlet or Audio Research RPR-1 Remote Power Receptacle.

4. Monaural Connection:

The outputs of the D-100 can be bridged for monaural (balanced output) operation with increased power output capability. Proceed as follows:

a) Remove the bottom cover and mounting feet.

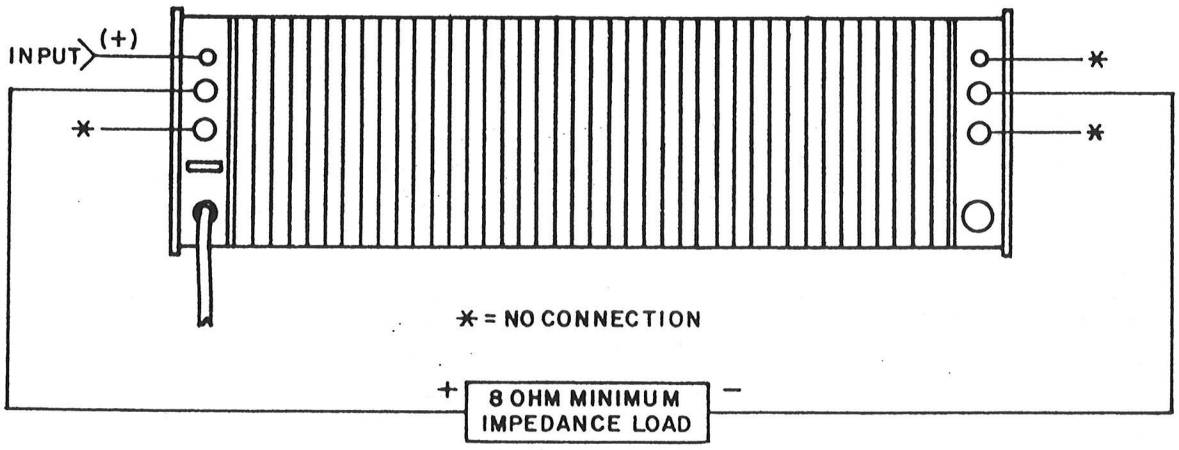
b) Move the printed circuit slide switch shown in the left hand figure on page 6 toward the center of the board until a white dot appears in the "switch window" and a detent stop is felt.

c) Replace the bottom cover and mounting feet.

d) Connect an 8 ohm (minimum impedance) load or greater between the "red" output terminals as shown in the figure below.

Note: Do not use a 4 ohm load or less in the bridged output configuration.

e) Connect the "signal" shielded audio cable to the left input as shown. Input and output signal polarities are also shown in the figure below.



MONAURAL (BRIDGED) OPERATION CONNECTIONS

OPERATION

Once the D-100 has been properly connected into the system as instructed in the previous section, proceed to operate as follows:

1. Turn "system" power switch "On" - the green LED indicator on the D-100 front panel should illuminate.

2. Adjust the preamplifier for desired source and volume level.

   Note that it is perfectly normal for the heat sink assembly to run very warm to the touch after thermal equilibrium is reached. The quiescent power dissipation of the output stage is distributed between 32 high power devices - each operating at a safe,conservative level.

3. Speaker Line Fuse

   Internal DC supply fuses (5 Amp) provide "output" protection against any catastrophic failure. However, for maximum speaker protection an "in-line" speaker fuse is strongly recommended to protect against high power levels or any possible catastrophic failure. A suitable fuse value can be calculated using the following equation:

$$I = \sqrt{\frac{P}{Z}}$$

where:
- I = fuse value in amperes
- P = RMS power rating of speaker (CAUTION - only use RMS power rating as supplied by the speaker manufacturer.)
- Z = nominal speaker impedance

example: What value fuse is required to protect an 8 ohm speaker rated at 35 Watts, RMS?

$$I = \sqrt{\frac{35}{8}} = \sqrt{4.375} = 2.09 \text{ Amps}$$

Use a 2 Amp instrument type fuse ("Littelfuse" 361000 series) or equivalent.

4. AC Line Fuse Replacement

   In the event of an output overload, catastrophic failure or power line transient, the AC line fuse may blow. This fuse is accessible at the rear panel and should be replaced with the spare fuse included in the original packaging or a Bussmann type MDX-4 amp for 120 VAC models or type MDX-2 amp for 240 VAC models.

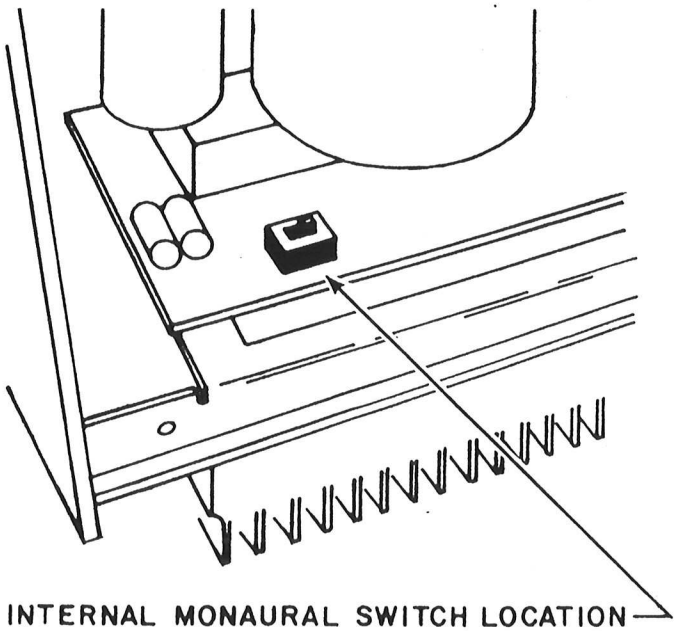
   Note: The D-100 AC line fuse will sustain full power operation into 8 ohm loads only. While 4 ohm loads are satisfactory, sustained full power operation into a 4 ohm load will result in a blown AC line fuse while "normal" operation into a 4 ohm load will not result in fuse failure.

5. DC Supply Fuse Replacement

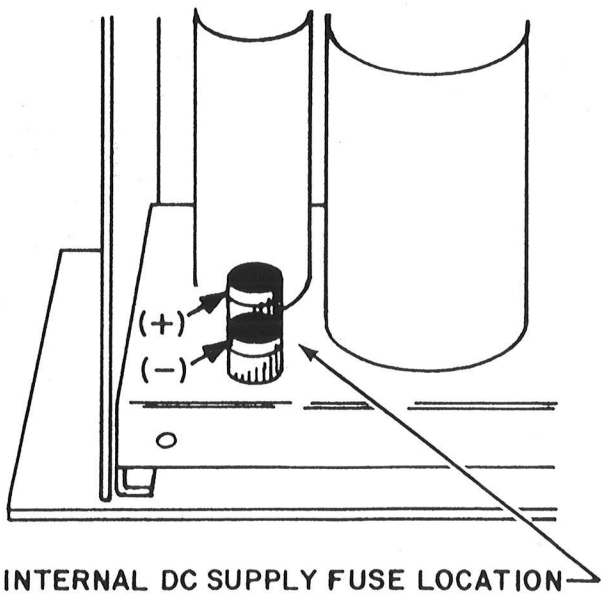
In the event of abusive output overload or catastrophic failure, one or both of the internal DC supply fuses for each channel may blow. This is normal in event of such an overload and will simply necessitate removal of the bottom cover and replacement of the fuse(s) located on the power supply chassis (use only Bussmann MTH - 5 amp normal-blo). There are (2) fuses for each channel ($\pm$ 50 VDC supplies) - located on each end of the power supply chassis toward the bottom edge. The left hand pair of fuses is for the left channel, etc., when viewed from the rear. Fuse post location for the left channel is shown in the right hand figure below.

DISCONNECT THE AC POWER PLUG BEFORE REMOVING THE BOTTOM COVER AND REPLACING ANY OF THE INTERNAL FUSES.

Note: The D-100 has been designed to deliver maximum output current under any output voltage conditions. This feature is essential for proper performance with complex or reactive speaker loads. Sound-degrading load-line or VI limiting circuitry has not been employed within the D-100. Instead, multiple high power devices safely handle any output condition or load that may exist under normal output conditions without the need for protective "circuitry". Only simple DC supply fusing against sustained abusive output loads has been employed.



INTERNAL MONAURAL SWITCH LOCATION



INTERNAL DC SUPPLY FUSE LOCATION
(ONE CHANNEL SHOWN)

GENERAL RECOMMENDATIONS

1. The D-100A is designed to operate on line voltages from 105 VAC to 125 VAC, 50-60 Hz. For optimum performance and rated power output, however, a line voltage of 115 to 120 VAC should be maintained at the power cord plug. The above voltages are doubled for 240 VAC wiring.

2. Provide adequate ventilation for the rear mounted heat sink assembly to insure maximum component life. Refer to the INSTALLATION section for proper cooling requirements.

3. To minimize system ground loops and noise pick-up, tie or twist the left and right shielded audio input cables together and "position" for minimum interference. In some rack mounted systems, it may be necessary to electrically isolate the front panel and/or line cord ground.

GENERAL PRECAUTIONS

1. For "optimum" performance, do not overload the speaker outputs. The minimum impedance load should be 4 ohms in the stereo mode or 8 ohms in the bridging (monaural) mode. Use a series-parallel combination for multiple speaker loads so that 4 ohms minimum is presented to the amplifier in the stereo mode and 8 ohms in the monaural mode.

2. Always position the amplifier for optimum convection cooling.

3. Avoid abusive loads or testing - a blown fuse will only result and necessitate replacement.

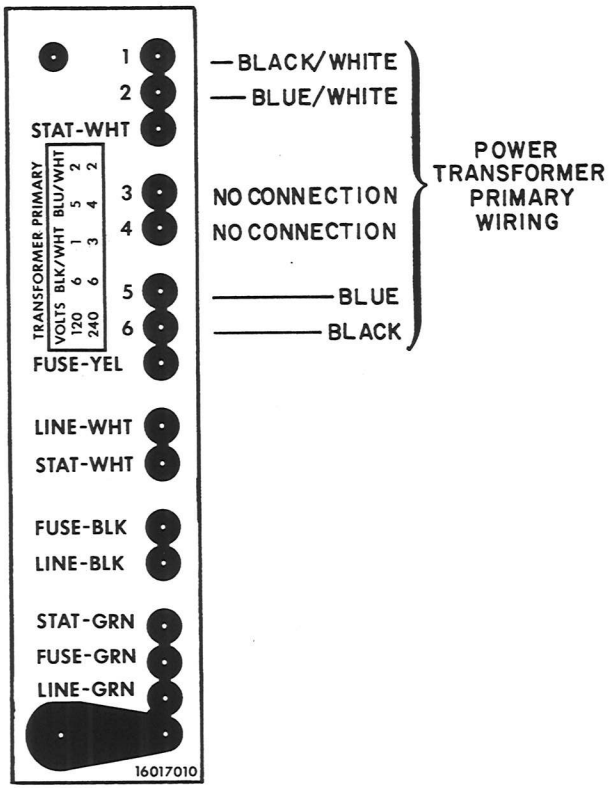
4. Always disconnect the AC power cord before replacing a blown fuse.

5. Never parallel or "strap" the output terminals of each channel together - refer to page 4 for monaural connection.

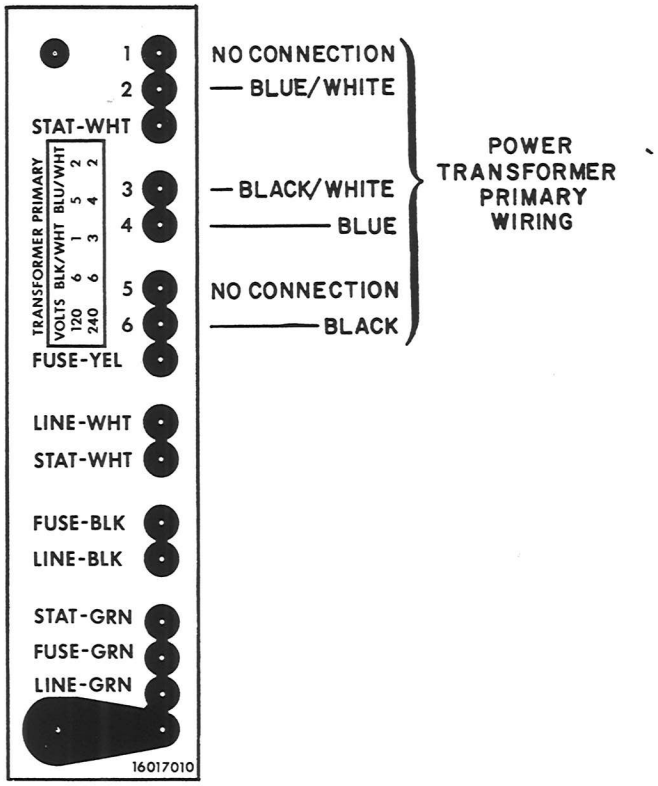
LINE VOLTAGE CONVERSION

Your D-100A Power Amplifier is shipped wired for the power line voltage indicated on the rear panel. If a line voltage conversion is ever required and re-wiring of the amplifier becomes necessary, observe the following procedure:

1. Unplug the D-100 from AC power source.
2. Remove the top and bottom covers.
3. Remove the front panel - secured to the power supply chassis by the handles and (4) mounting screws. Use caution when removing the front panel so as not to damage the LED power indicator and associated wiring.
4. Re-solder the (4) power transformer primary leads according to the wiring diagram on page 8.
5. Replace the front panel - make sure that no wiring is "pinched" between the chassis flange and panel.
6. Replace the top and bottom covers.



120 VAC POWER SUPPLY WIRING



240 VAC POWER SUPPLY WIRING

LINE VOLTAGE CONVERSION

SYSTEM DIAGNOSTICS

In case of difficulty after connecting the D-100A into your system, a list of common system problems and possible causes is provided below to aid in troubleshooting:

Symptom	Possible Cause
Both channels dead	- Power not applied to amplifier - Blown line fuse - Improper or defective interconnect wiring - Defective signal source
One channel dead	- Blown supply fuse(s) - Defective or improper interconnect wiring - Balance control or mode switch on preamplifier not set properly - Defective signal source
Hum or noise	- System ground loop - Poor interconnect wiring - Defective audio cable - Excessive lead length - Defective signal source
Distortion	- Low AC line voltage - Incorrect speaker wiring - Defective signal source - Blown supply fuse(s)

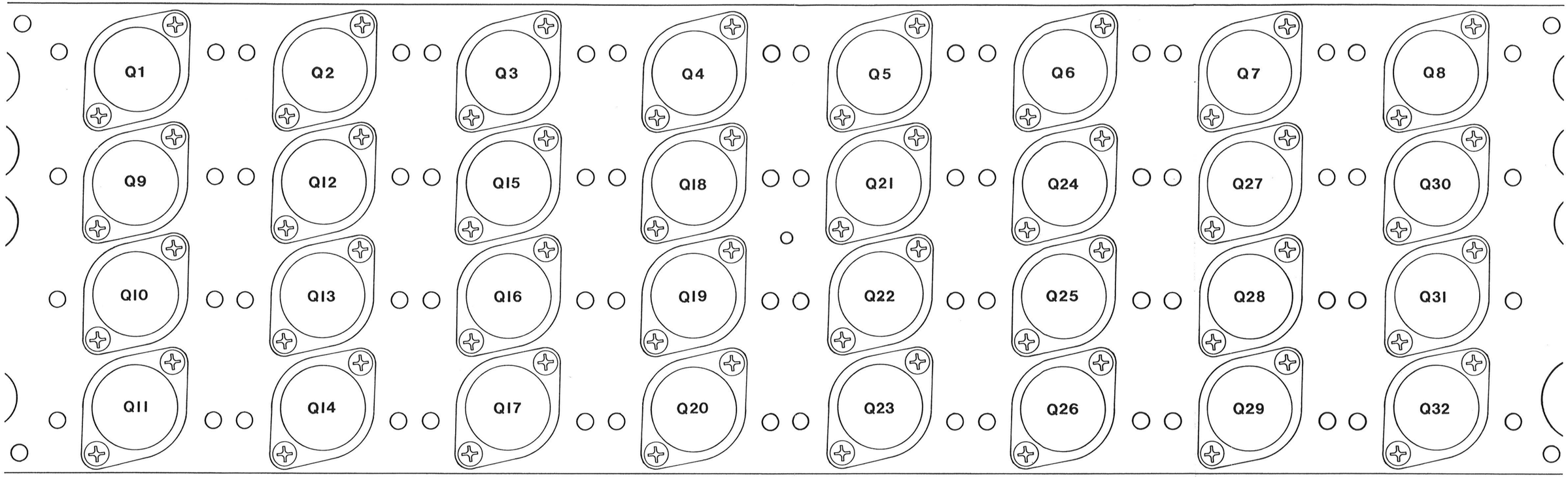
FACTORY SERVICE

In the event that service becomes necessary, the D-100A must be returned to the factory with return authorization. Please write or call Customer Service at Audio Research for return authorization. The original equipment packaging should be used any time shipment is made.

All shipments to the factory must be prepaid and insured for full value. All factory serviced equipment will be returned freight collect. In the event that chargeable repairs are required, you will be contacted prior to the return of your equipment.

NOTES

HEAT SINK ASSEMBLY (TRANSISTOR MOUNTING SIDE)



NOTES:

1. All devices mounted on Chomerics 60-11-4511-1666.
2. All 6-32 mounting screws tightened to 6 in.-lbs. torque.
3. Q1,2,7,8 are Audio Research P/N 30002400. } Matched Set
4. Q3,4,5,6 are Audio Research P/N 30002500. }
5. Q9-14,27-32 are Audio Research P/N 30002700. } Matched Set
6. Q15-20,21-26 are Audio Research P/N 30002600. }