



Electro-Voice®

7200 STEREO POWER AMPLIFIER

OWNER'S OPERATION AND SERVICE INSTRUCTIONS

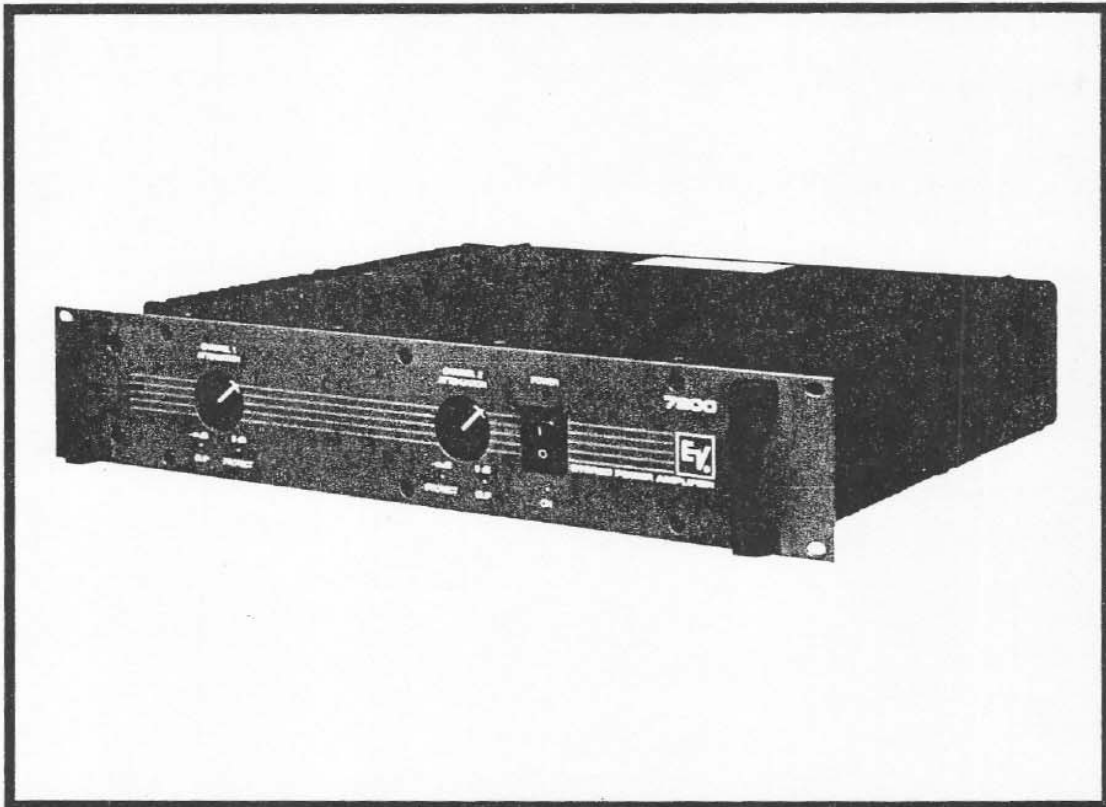


Table of Contents

1	ELECTRICAL	1
1.1	120 V ac, 50/60 Hz Power Connections	1
1.2	220/240 V ac, 50/60 Hz Power Connections	1
2	INSTALLATION	1
2.1	Rack Mounting	1
2.2	Ventilation	1
3	SIGNAL CONNECTIONS	2
3.1	Input Connections	2
3.2	Line Output Connections	2
3.3	Output Connections	2
3.4	Output Cable Selection	2
3.4.1	Calculating Power Losses with 8 ohm Loads	2
3.4.2	Calculating Power Losses with 4 ohm Loads	2
3.5	Damping Factor	3
3.5.1	Calculating the Maximum Length of Cable for a Specified Damping Factor	3
3.6	Speaker Protection Fuse Selection	5
3.7	Compression Driver Protection Capacitors	5
4	OCTAL ACCESSORY SOCKETS	5
5	PROTECTION SYSTEMS	6
5.1	Load Protection Circuitry	6
5.2	Amplifier Protection Circuitry	6
5.3	Protect Indicator	6
6	OPERATION	6
6.1	Dual Mode of Operation	6
6.2	Bridge Mode of Operation	6
7	IN CASE OF PROBLEMS	6
8	SPECIFICATIONS	8
9	SERVICE INFORMATION	12
9.1	Equipment Needed	13
9.2	Adjusting SVR1 and SVR2, the BIAS Trimpots	13
9.3	Ordering Replacement Parts	13
9.4	Factory Service	13
9.5	Technical Assistance	13

1 ELECTRICAL

Two amplifier models are available. One model has a 50/60 Hz power transformer with two 120 V ac primary windings. These windings may be wired in parallel or series for operation at either 120 V ac or 220/240 V ac. The other amplifier model is for export into countries where the ac line voltage is 100 volts, 50/60 Hz. The next two sections refer to the first model with the dual 120 V ac primary windings.

1.1 120 V ac, 50/60 Hz Power Connections

The amplifier is provided with the primary of the power transformer strapped for 120 V ac operation from the factory. Refer to Figure 2a for the wiring details.

WARNING: Verify that the power transformer's primary circuit configuration is correct for the intended ac line voltage **BEFORE** applying power to the amplifier.

1.2 220/240 V ac, 50/60 Hz Power Connections

The power transformer has two 120 volt primary windings which can be connected in parallel for 120 V ac line voltages, or in series to meet 220/240 V ac requirements. Use the following procedures to re-strap the primary of the power transformer for 220/240 V ac applications.

1. Make sure the amplifier is not connected to any power source.
2. Remove and save the seventeen screws securing the top cover. Refer to Figure 1 for the exact screw locations.
3. Locate terminal block TB1 located behind the AC main power switch. Reconnect the leads as shown in Figure 2.

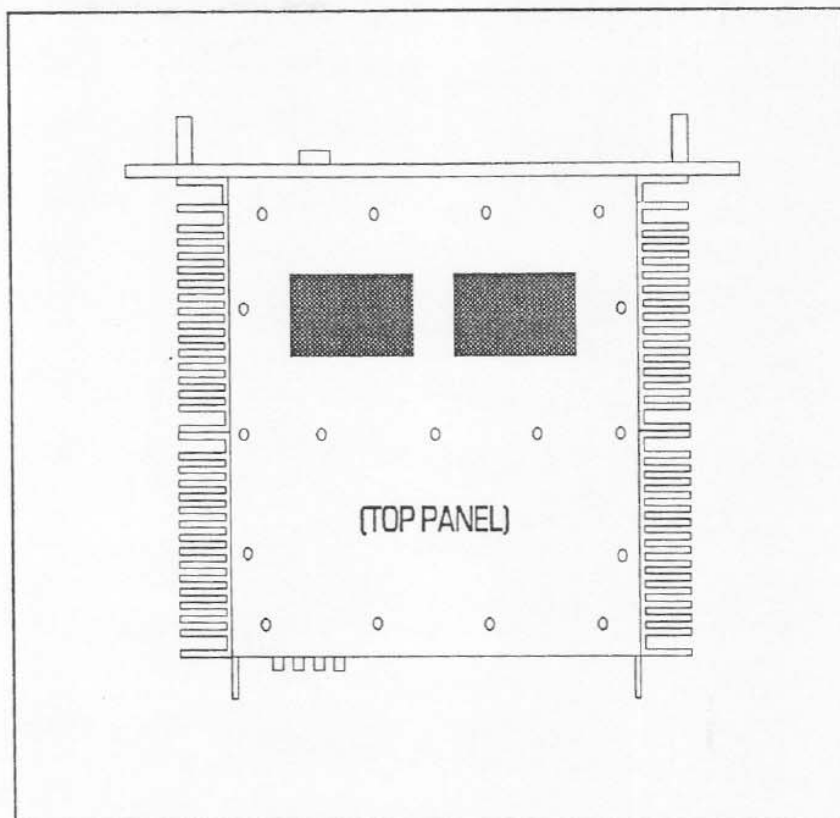


Figure 1 Top Cover Removal

4. Install the top cover with the seventeen screws previously removed.
5. Install the 2.5A fuse, T2.5A /250V slo-blo or equivalent.
6. Install the 230 Vac 50/60Hz and the T2.5A/250V decals in the the proper positions.

2 INSTALLATION

2.1 Rack Mounting

The amplifier may be installed in a standard 19 inch equipment rack. It requires 3.5 inches of vertical rack space and secures to the rack cabinet with the four rack mount screws and cup washers provided in the hardware kit.

2.2 Ventilation

The amplifier must be adequately ventilated to avoid excessive temperature rise. It should not be used in areas where the ambient temperature exceeds 50°C (122°F). To determine the ambient air temperature, operate the system in the rack until the temperature stabilizes. Measure the ambient air with a bulb-type thermometer held at the bottom of the uppermost amplifier. Do not let the thermometer touch the metal chassis because the chassis will be hotter than the ambient air. If the air temperature exceeds 50°C (122°F), the equipment should be spaced at least 1.75 inches apart or a blower installed to provide sufficient air movement within the cabinet.

WARNING: Do not operate the amplifier within a completely closed unventilated housing.

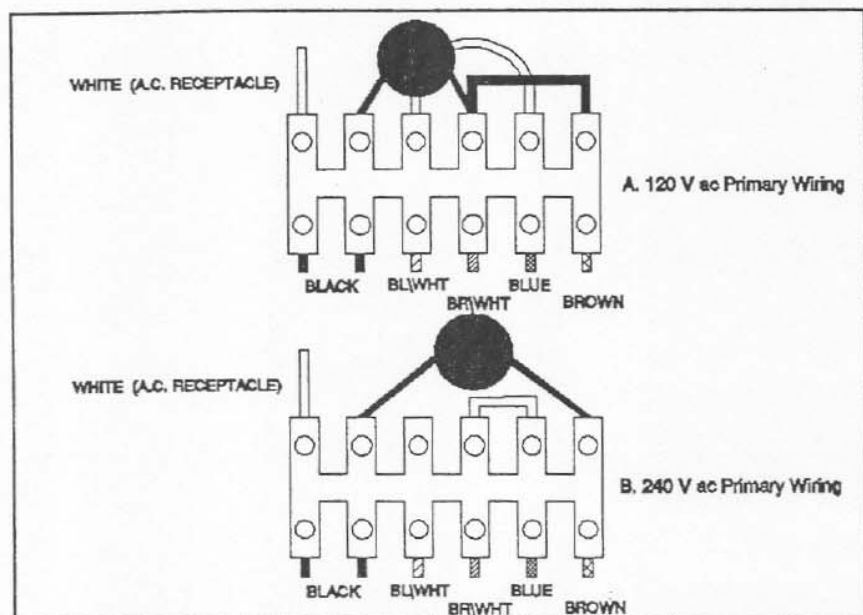


Figure 2 Primary Wiring Configuration for 120 V ac and 220/240 V ac

3 SIGNAL CONNECTIONS

3.1 Input Connections

Balanced input connections may be made to either the 1/4" phone (TRS) or the female XLR connectors. For single-ended inputs, strap the low (—) input to ground (pin 3 on XLR or Ring on 1/4" phone). Otherwise, the electronically-balanced input stage will see 6 dB less input signal level than with a balanced input. Refer to Figure 3 for typical input connections.

3.2 Line Output Connections

The XLR and 1/4" phone connectors are wired in parallel. Pin 2 of the XLR is the Tip of the 1/4" phone connector, and pin 3 is the Ring. Since the input impedance of the electronically-balanced input stage is high (15 kohms), there is minimal loading on the signal source. When the input connections are made to one connector, the other may be used as an auxiliary line output to feed other high input impedance equip-

ment. Refer to Figure 3 for possible applications.

3.3 Output Connections

Output connections are made to the binding post connectors located on the rear. The Red post is the high (+) output and the Black post is the low (—) output. Refer to Figure 4 for typical output connections.

3.4 Output Cable Selection

Speaker wire size plays an important part in quality sound systems. Small wire gauges can waste power and reduce the damping factor at the speaker terminals. This can add coloration and muddiness to the sound. To help offset this problem, Table I has been assembled to enable you to calculate the power losses in the speaker cable.

3.4.1 Calculating Power Losses with 8 ohm Loads

To calculate the total power loss in the speaker cable, multiply the power loss per foot (or meter) of the 2-wire cable sel-

ected from Table I by the length of the cable in feet (or meters). For example, suppose an installer uses 160 feet of 10 GA 2-wire cable with an 8 Ω speaker system. The total power loss in the cable is:

Total Power Loss in cable

$$= 0.0318 \text{ watts/foot} \times 160 \text{ feet} \\ = 5.0 \text{ watts}$$

Does this mean that whenever the amplifier produces 125 watts of output power, 120 watts (125 watts minus 5.0 watts) will be delivered to the 8 ohm load? NO! The actual load impedance is 8 ohms plus the resistance of the cable (0.00204 ohms/foot times 160 feet) for a total load impedance of 8.3264 ohms. At the 8 Ω rated output power, the output voltage is 31.6 V rms. Therefore, the amplifier produces 119.9 watts with this load instead of 125 watts. This was calculated by squaring the voltage and dividing by the load impedance (31.6² divided by 8.3264 ohms). As a result, the actual power delivered to the load is 114.9 watts (119.9 watts minus 5.0 watts).

Had 18 GA wire been used in the above example, the loss in the cable would have been 32.5 watts. This example illustrates the importance of using the proper wire size.

3.4.2 Calculating Power Losses with 4 ohm Loads

To calculate the losses when using a 4 ohm speaker system, multiply the loss at 8 ohms by 3. In the above example, the 10 GA wire would consume 15.0 watts of power while the 18 GA wire would waste 97.5 watts - close to half of the amplifier's 4 ohm power rating.

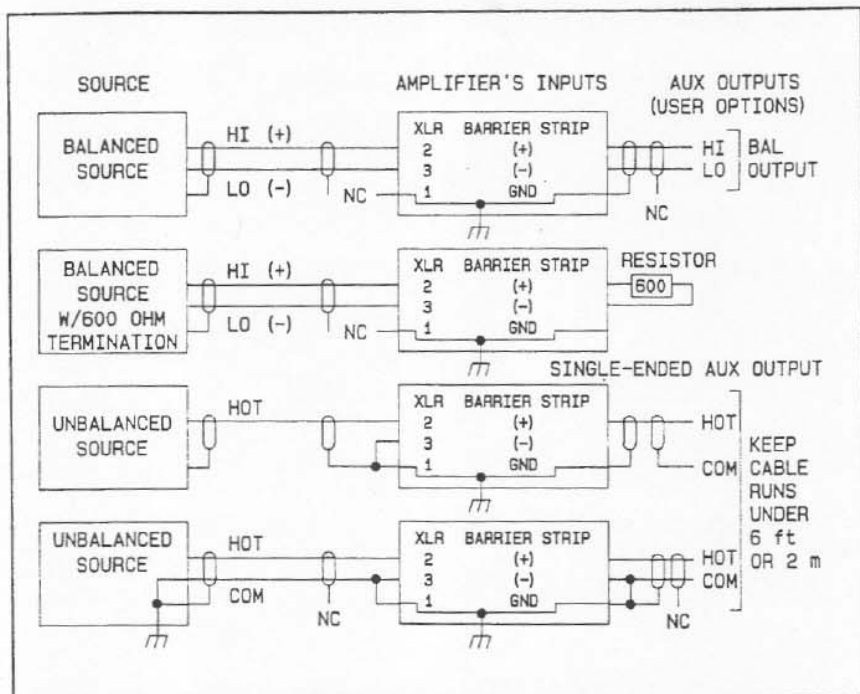


Figure 3 Typical Input Connections

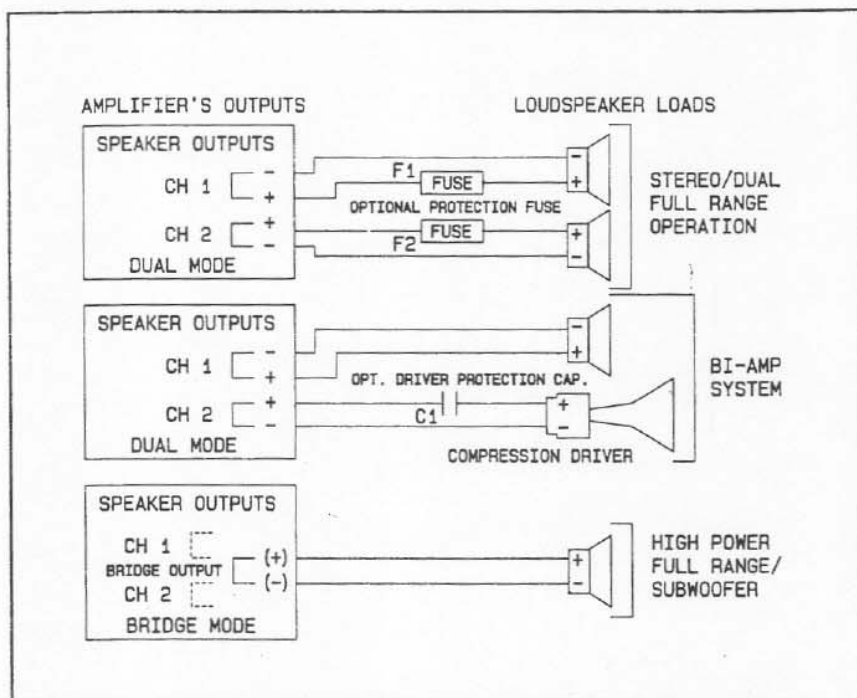


Figure 4 Typical Output Connections

3.5 Damping Factor

The higher the damping factor rating of an amplifier, the greater the ability of the amplifier to control unwanted speaker cone

movements. When a signal drives a woofer, current flowing through the voice coil creates a magnetic field. This field interacts with the permanent magnetic field in the

gap and forces the combination cone and voice coil assembly to move outward. When the signal is removed, the assembly moves inward but its momentum causes it to overshoot its resting point. This overshoot will dampen itself out eventually but the unwanted movements can add considerable distortion products to the sound.

In the process of moving inward through the magnetic field, the voice coil assembly generates a current of opposite polarity to the original signal. This current induces a voltage or "back EMF" which travels through the speaker wire to the amplifier's output. The lower the amplifier's output impedance, the faster the overshoot of the voice coil will dampen out. The output impedance of an amplifier can be calculated by dividing the rated output impedance, typically 8 ohms, by the damping factor. The 7200 has a damping factor rating of 100 which corresponds to an output impedance of 0.08 ohms.

3.5.1 Calculating the Maximum Length of Cable for a Specified Damping Factor Specification at the Load

The damping factor rating is typically never realized at the load because of the resistance of the cable (and other factors such as the contact resistance of an output relay or the resistance of an output fuse). The damping factor at the load should be 30 for general paging systems and 50 for high fidelity music systems. Economics usually dictate, however, that these numbers are cut-in-half. The resulting damping factor at the load should be based on experience and customer satisfaction. Once a minimum damping factor is determined for a particular type of installation, the following equation can calculate the maximum length of 2-wire cable

Operating and Service Instructions for the Electro-Voice 7200 Power Amplifier

which can be used to achieve the minimum damping factor specified at the load:

Max. Length of 2-wire cable in feet

$$= \frac{Z_L - Z_o}{DF \cdot DCR/ft}$$

where

Z_L is the load impedance to connect to the amplifier;
 Z_o is the amplifier's output impedance (0.08 ohms for the 7200);
 DF is the minimum permissible damping factor at the load; and
 DCR/ft is the DC resistance of the 2-wire cable per foot from Table I.

The same equation can be used to calculate the maximum cable length in meters by substituting the DCR per meter value from Table I.

Let's use the equation. Suppose Z_L equals 8 ohms, $Z_o = 0.08$ ohms, and the minimum damping factor at the load is 25. In addition, 18 GA cable is preferred. Then, the maximum length of 18 GA cable which can be used to achieve a damping factor of 25 at the load is:

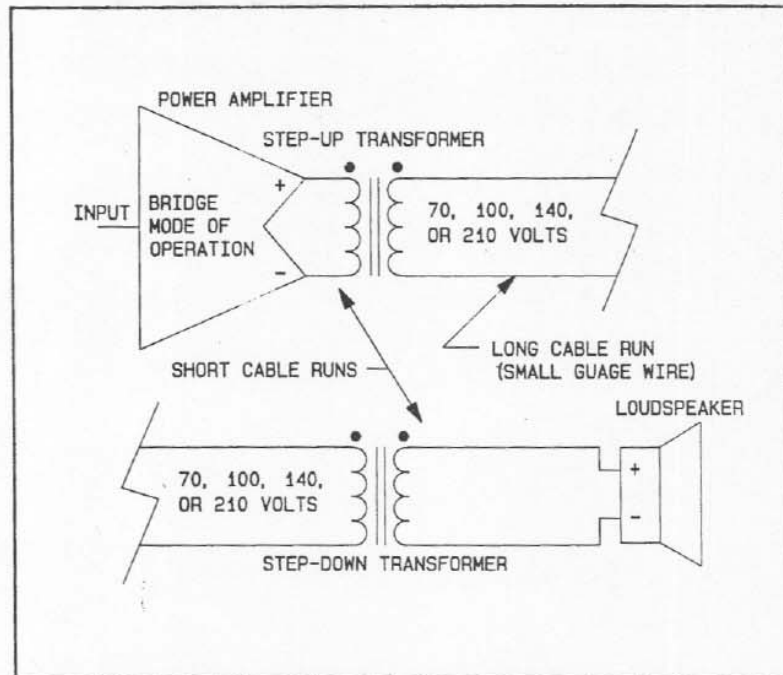


Figure 5 High-voltage Distribution System

$$\frac{8 - (0.08)}{25 \cdot 0.01302 \Omega/ft} = 18.4 \text{ feet}$$

Sometimes it may be necessary to locate the speaker 100 feet or more away from the amplifier. In this situation, a much larger gauge cable is required. However, this may not be practical or economical. The size of the 2-wire cable can be greatly reduced by

stepping up the output voltage of the amplifier to 70, 100, 140, or 210 volt, using an output transformer, then stepping down the voltage at the load. Such a system is shown in Figure 5.

The maximum length of 2-wire cable in this situation can be approximated from the following equation:

Max. Length of 2-wire cable in feet

$$\frac{V^2}{(P_{out})(DCR/ft)} \left(\frac{1}{DF} - \frac{Z_o}{Z_L} \right)$$

where

V is the stepped-up voltage of the system;
 P_{out} is the rated output power of the amplifier;
 Z_o is the output impedance of the amplifier (0.08 ohms for the 7200);
 Z_L is the load impedance;

Table I 7200 Power Losses in 2-wire Speaker Cable

AWG (GA)	DCR/ft (Ω/ft)	Power Loss/ft (watts/ft)	Cable Cross-Sectional area (mm ²)	DCR/meter (Ω/m)	Power Loss/meter (watts/m)
6	0.00081	0.0126	13.30	0.00264	0.0412
8	0.00121	0.0189	8.36	0.00421	0.0657
10	0.00204	0.0318	5.26	0.00669	0.1044
12	0.00324	0.0506	3.31	0.01063	0.1658
14	0.00515	0.0804	2.08	0.01691	0.2636
16	0.00819	0.1278	1.31	0.02685	0.4181
18	0.01302	0.2031	0.82	0.04289	0.6665
20	0.02070	0.3226	0.52	0.06764	1.0480
22	0.03292	0.5122	0.33	0.10658	1.6434

DCR/ft is the DC resistance of the 2-wire cable per foot from Table I; and

DF is the minimum permissible damping factor at the load.

Suppose a 210 volt system were used at a 400 watt power level to drive an 8 ohm load with a minimum damping factor of 25. Using the same 18 GA cable as before, the maximum length can now be 254 feet. Power companies use this technique to transfer large amounts of power over great distances.

3.6 Speaker Protection Fuse Selection

Sometimes it may be desirable to use in-line fuses (fuses in series with the output) to protect loudspeaker systems (or the amplifier). It is difficult, however, to determine the proper fuse value with the correct time lag and overload characteristics to match the limitations of a speaker system. The values shown in Table II should serve only as a guide. To use, determine the power rating and load value. Then, select a standard value fuse of the next smaller value to the one listed in the table.

The values are calculated for fast-blow fuses which carry 135% of their current rating for an hour but will blow within 1 second at 200%. Other fuse values may be calculated for different power levels from the following equation:

$$\text{Fuse value} = \frac{(P_{out} \times ZL)^{1/2}}{ZL \times 1.35} \text{ amps}$$

where

P_{out} is the output power rating of the amplifier; and
 ZL is the load impedance.

Use 32 volt fuses if possible; they typically have the lowest internal resistance which will help minimize deterioration of the damping factor at the load. Refer to the example in Figure 4.

Table II Calculated Output Fuse Values

Power (watts)	4 Ω Load	8 Ω Load	16 Ω Load
100	3.70	2.62	1.85
150	4.54	3.21	2.27
200	5.24	3.70	2.62
300	6.42	4.54	3.21
400	7.41	5.24	3.70
600	9.07	6.42	4.54

3.7 Compression Driver Protection Capacitors

Compression drivers, used for mid to high frequency sound reproduction, are much more susceptible to damage from low frequencies than large cone loudspeakers. Even though an electronic crossover may be employed, problems may arise in the cables between the crossover and the power amplifier, or from misadjustment of the crossover. Either of these situations could apply low frequency signals or hum to the driver and cause damage. To prevent a potential mishap, Electro-Voice recommends using a capacitor between the amplifier and the compression driver to suppress low frequencies and possible DC. Refer to the example in Figure 4.

In choosing a value, one must be careful not to interfere with the crossover frequency. *As a general rule, select a capacitor whose break frequency, with respect to the load, is 3 dB down at approximately 1/2 of the high pass corner frequency.*

Mylar capacitors with at least a 100 volt ac rating are

recommended. Table III shows the recommended capacitor values for use with 8 and 16 ohm drivers at popular crossover frequencies.

Table III Compression Driver Protection Capacitors

Crossover Frequency	8 Ω Driver	16 Ω Driver
500 Hz	80 μF	40 μF
800 Hz	50 μF	25 μF
1000 Hz	40 μF	20 μF
1250 Hz	33 μF	16 μF
2000 Hz	20 μF	10 μF
3150 Hz	12 μF	6 μF

4 OCTAL ACCESSORY SOCKETS

Two octal sockets permit a variety of plug-in accessories to be used with the amplifier. Normally, one "U" jumper is inserted between octal socket pins 8 and 1, and another between pins 7 and 6. *These jumpers must remain in place for the amplifier to operate when not using any accessory modules.* To use with an accessory module, remove (and save) the jumpers and install the module making sure the key on its center post aligns with the groove in the female socket. For operation, refer to the instructions provided with the module. Schematically, the module will be inserted between the input connector and the balanced input stage.

Electronic modules are powered from a bipolar 15 volt supply in the amplifier. The supply is capable of supplying up to 25 ma DC of current. Currents in excess of 25 ma DC may prevent the amplifier from disengaging from its built-in protection mechanisms.

5 PROTECTION SYSTEMS

5.1 Load Protection Circuitry

Each channel independently protects its load from startup/shutdown transients, DC, and large subsonic signals.

5.2 Amplifier Protection Circuitry

A unique current-limiting circuit was designed specifically for the amplifier. It features a variable current limit which is a function of the output signal voltage. As a result, the amplifier can deliver the rated currents into rated loads but substantially limits the current into low impedance or shorted loads (shorted output terminals). Once the short is removed, however, the amplifier will resume normal operation.

The heatsink is conventionally cooled. Should the heatsink temperature of a channel remain excessively high, the affected channel will shut down automatically. When the output devices cool to a safe operating temperature, the channel will automatically resume normal operation.

5.3 Protect Indicator

The "PROTECT" LED illuminates when the corresponding channel enters thermal protection. If a shutdown does occur, the channel will resume normal operation as soon as its devices have cooled to an acceptable temperature.

If the protection LED illuminates and there is no indication of excessive temperature, the corresponding channel is in an internal fault mode. If this occurs refer to the service instructions on page 12.

6 OPERATION

6.1 Dual Mode of Operation

In the dual mode of operation, the channels may be operated independently. After installation and hookup, verify that the mode switch, located on the rear panel, is in the "DUAL" position and rotate the level controls fully counterclockwise (full attenuation). Input a 0 dBu (0.775 V rms) nominal signal level and apply power. Slowly increase the level controls until the desired output power is obtained. If either "CLIP" LED illuminates, reduce the output with the channel level control or reduce the input signal level at its source.

WARNING: *Never attempt to connect the outputs of the two channels in parallel.*

6.2 Bridge Mode of Operation

After installation and hookup, verify that the mode switch, located on the rear panel, is in the "BRIDGE" position. Rotate both level controls fully counterclockwise (full attenuation). Input a 0 dBu (0.775 V rms) nominal signal level into channel 1 only and apply power. Slowly increase the level control of channel 1 until the desired output power is obtained. If either "CLIP" LED illuminates, reduce the output level with the level control or reduce the input signal level at its source.

CAUTION: *Be sure that no input connections are made to channel 2 and that its level control is fully counterclockwise (OFF).*

WARNING: *The bridged output mode provides a true balanced-to-ground output. Do not use any test equipment to test or evaluate this amplifier which does not have floating grounds.*

7 In Case of Problems
Please check the following items:

1. Verify that the amplifier is properly connected to an ac power source and that the source is active.
2. Verify that the input connections are properly made. Refer to Figure 3.
3. Verify that the output connections are properly made. Refer to Figure 4.
4. Check the input and output cables for proper wiring and continuity.
5. Check the signal source and the load.
6. Ensure that the two jumpers for each octal socket are properly installed (if not using optional plug-in modules).
7. Ensure that any accessory modules installed do not draw more than 25 ma DC of current.
8. Check that the mode switch is in the desired position.

NOTICE: *Repairs performed by other than authorized warranty stations (Dealers) or qualified personnel shall void the warranty period of this unit. To avoid loss of warranty, see your nearest Electro-Voice authorized dealer, or call Electro-Voice Customer Service directly at (616) 695-6831, FAX (616) 695-1304, or write:*

Electro-Voice Customer Service/Repair
600 Cecil Street
Buchanan, MI 49107 U.S.A.
Tel: (616) 695-6831
FAX: (616) 695-1304

Operating and Service Instructions for the Electro-Voice 7200 Power Amplifier

8 SPECIFICATIONS

Conditions:

1. 0 dBu = 0.775 volts rms.
2. Dual mode ratings are for each channel.
3. Both channels operating at rated output power unless noted.
4. 120 volt ac line input voltage maintained for all tests unless noted.

Continuous Rated Output Power:

(20 Hz - 20 kHz at less than 0.1% THD)

Dual mode, 4 Ω :	>200 watts/ch
Bridge mode, 8 Ω :	>400 watts
Dual mode, 8 Ω :	>125 watts/ch
Bridge mode, 16 Ω :	>250 watts

Continuous Rated Output Power to Subwoofer:

(20 Hz - 1 kHz at less than 0.1% THD)

Dual mode, 4 Ω :	>210 watts/ch
Bridge mode, 8 Ω :	>420 watts
Dual mode, 8 Ω :	>130 watts/ch
Bridge mode, 16 Ω :	>260 watts

Maximum Midband Output Power:

(Ref. 1 kHz, 1% THD, @120 volts ac line voltage)

Dual mode, 4 Ω :	>220 watts/ch
Bridge mode, 8 Ω :	>450 watts
Dual mode, 8 Ω :	>140 watts/ch
Bridge mode, 16 Ω :	>280 watts

(Ref. 1 kHz, 1% THD, @108 volts ac (10% sag))

Dual mode, 4 Ω :	>175 watts/ch
Bridge mode, 8 Ω :	>350 watts
Dual mode, 8 Ω :	>110 watts/ch
Bridge mode, 16 Ω :	>220 watts

(Ref. 1 kHz, 1% THD, @100 volts ac (17% sag))

Dual mode, 4 Ω :	>150 watts/ch
Bridge mode, 8 Ω :	>300 watts
Dual mode, 8 Ω :	>95 watts/ch
Bridge mode, 16 Ω :	>190 watts

Headroom (Before clip): ≥ 1 dB

(Ref. 1 kHz, 1% THD, single channel mode)

Frequency Response: 10 Hz - 50 kHz

(Ref. 1 kHz, 1 watt output, +0/-3 dB)

Power Bandwidth: 20 Hz - 20 kHz

(Ref. 1 kHz, +0/-1 dB where 0 dB = rated output power in any mode)

Voltage Gain:

(Ref. 1 kHz)

Dual mode, 4 Ω and 8 Ω : 31 dB

Bridge mode,
8 Ω and 16 Ω :

37 dB

Input Sensitivity for Rated Output Power:

(Ref. 1 kHz, ± 0.5 dB)

Dual mode, 4 Ω :	0 dBu (0.774 V rms)
Bridge mode, 8 Ω :	-0.25 dBu (0.752 V rms)
Dual mode, 8 Ω :	+0.5 dBu (0.820 V rms)
Bridge mode, 16 Ω :	+0.5 dBu (0.820 V rms)

Maximum Input Level: +20 dBu (7.75 V rms)

(Ref. 1 kHz)

Input Impedance:

(Ref. 1 kHz)

Balanced:	30 k Ω
Unbalanced:	15 k Ω

Polarity:

Positive-going signal applied to pin 2 of XLR or *Tip* of 1/4" TRS jack produces positive-going signal at (+) output terminal.

Phase Response:

(Any mode)

20 Hz:	<+30°
20 kHz:	>-30°

THD:

<0.1% (Typ. <0.01%)

(Any mode, 30 kHz measurement bandwidth)

IMD (SMPTE 4:1):

<0.1% (Typ. <0.01%)

(Any mode)

Slew Rate:

Dual mode, 4 or 8 Ω :	>20 V/ μ sec
Bridge mode, 8 or 16 Ω :	>25 V/ μ sec

Damping Factor:

(Dual mode, 8 Ω)

1 kHz: >100

Crosstalk:

<70 dB

(Ref. 1 kHz, 0 dB = rated output power into 8 ohms, single channel operating)

Noise:

>100 dB

(Below rated output power, A-weighting filter, any mode, 50/60 Hz ac line frequency)

Amplifier Protection:

Shorted output terminals, Over-temperature, RF interference

Operating and Service Instructions for the Electro-Voice 7200 Power Amplifier

	interference	Operating ac Voltage Range:	Operates from line voltages as low as 90 volts (at reduced output power) assuming a 120 V ac nominal line.
Load Protection:	Startup/shutdown transients, DC faults, Subsonic signals		
Cooling: Heatsink:	Convention black heatsink	Power Consumption/Heat Produced:	
		(Both channels operating in dual mode with 1 kHz sinewave input signal at stated output power into 4 Ω loads)	
Output Topology:	True complementary symmetry	idle:	70 watts/0.238 kBTU/h
Output Type: Dual mode:	Unbalanced, each channel	1/8th max midband power:	400 watts/1.190 kBTU/h
Bridge mode:	Balanced	1/3rd max midband power:	600 watts/1.586 kBTU/h
Output Devices: Total number:	8 devices	Rated output power:	900 watts/1.700 kBTU/h
Pdmax rating:	150 watts	Max midband power:	970 watts/1.717 kBTU/h
Vceo:	200 volts DC		
Ic:	15 amps DC		
Tjmax:	150°C		
Controls and Switches: Rear:	Mode switch	Operating Temperature Range:	Up to 50°C (122°F) ambient
Front:	Two input level controls, Power switch		
Front Panel Indicators:	Power LED, Clip LED (x 2), Protect LED	Dimensions (Rear of rack ears to max depth):	3.5 in H x 19 in W x 16 in D (8.89 cm H x 48.26 cm W x 40.64 cm D)
Connections: Input:	1/4" phone (x 2), Female XLR (x 2), Octal accessory socket (x 2), powered with ± 15 volts DC at 25 ma.	Shipping Weight:	43 lbs (19.5 kg)
		Net Weight:	37 lbs (16.8 kg)
Output:	5-way binding posts	Color:	Grey and Black
Power:	6 ft (1.83 m), 3-wire, 18 AWG (16/3SJT) power cord with NEMA 5-15 plug/IEC	Enclosure:	Rack mount chassis, 16 GA steel, 3/16 in 5052 aluminum alloy front panel
Fuse Type:	T 5 A/250 V Slo-Blo or equivalent (for 120 V ac use)	Standard Accessories:	4 - "U" jumper plugs for octal sockets (2 per socket, installed) 1 - Operating Instructions and Service Manual 1 - T 2.5A/250 V fuse (for 220/240 V ac use)
Power Requirements:	120 V ac, 50/60Hz, 400 watts (configurable to 220/240 V ac). 100 V ac, 50/60 Hz model available.	Optional Accessories:	APX 24 dB/oct Linkwitz-Riley Crossover



7200 Power Amplifier

SERVICE INSTRUCTIONS

*** * * CAUTION * * ***

NO USER SERVICEABLE PARTS INSIDE. EXTREMELY HAZARDOUS VOLTAGES AND CURRENTS MAY BE ENCOUNTERED WITHIN THE CHASSIS. THE SERVICING INFORMATION CONTAINED WITHIN THIS DOCUMENT IS ONLY FOR USE BY ELECTRO-VOICE AUTHORIZED WARRANTY REPAIR STATIONS AND QUALIFIED SERVICE PERSONNEL. TO AVOID ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO. OTHERWISE, REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL.

9 SERVICE INFORMATION

WARNING: No user serviceable parts inside. Extremely hazardous voltages and currents may be encountered within the chassis. The servicing information contained within this document is only for use by Electro-Voice authorized warranty repair stations and qualified service personnel. To avoid electric shock DO NOT perform any servicing other than that contained in the Operating Instructions unless you are qualified to do so. Otherwise, refer all servicing to qualified service personnel.

NOTICE: Modifications to Electro-Voice products are not recommended. Such modifications shall be at the sole expense of the person(s) or company responsible, and any damage resulting therefrom shall not be covered under warranty or otherwise.

9.1 Equipment Needed

To precisely adjust the trimpots, you must have the following equipment:

- 1 — Digital DC volt meter
- 2 — 4 Ω load rated at 200 watts
- 1 — Small non-conducting flat-blade screwdriver or set of plastic TV alignment tools
- Miscellaneous handtools (to remove the top cover)

NOTE: If you need to verify the amplifier's performance against the rated specifications, you must be able to maintain the ac line voltage constant at 120 V ac (or 240 V ac if wired according to Figure 2b). Therefore, we recommend a suitably rated variac (50 ampere rating at 120 V ac).

9.2 Adjusting SVR1 and SVR2, the BIAS Trimpot

To adjust SVR1 and SVR2 for the proper bias, follow the procedures below:

1. Turn power off and disconnect the unit from its power source. Make sure the unit is in the Dual mode with 4 Ω loads connected to each channel.
2. Remove the seventeen screws securing the top cover. Refer to Figure 1 for the screw locations.
3. Channel 1: Locate D04 and D06. Connect the positive side of the digital DC volt meter to the anode of D04. Then connect the negative side of the digital DC volt meter to the cathode of D06. Connect the unit to its power source and turn the power on. Adjust SVR1 so that the digital DC volt meter reads 2 volts DC ($\pm .1$ Vdc). Turn power off and disconnect the unit from its power source.
4. Channel 2: Locate D104 and D106. Connect the positive side of the digital DC volt meter to the anode of D104. Then connect the negative side of the digital DC volt meter to the cathode of D106. Connect the unit to its power source and turn the power on. Adjust SVR2 so that the digital DC volt meter reads 2 volts DC ($\pm .1$ Vdc). Turn power off and disconnect the unit from its power source.
5. Re-install the top cover with the seventeen screws previously removed.

9.7 Ordering Replacement Parts

To order replacement parts, look up the ordering number from the component parts listing and call (616) 695-6831, FAX (616) 695-1304, or write:

Electro-Voice
Replacement Parts Sales
600 Cecil Street
Buchanan, MI 49107
U.S.A.

9.8 Factory Service

If factory service is required, ship the unit in its original packing prepaid to:

Electro-Voice Customer
Service/Repair
600 Cecil Street
Buchanan, MI 49107 U.S.A.
Tel: (616) 695-6831
FAX: (616) 695-1304

Electro-Voice Customer
Service/Repair
8324 Doe Avenue
Visalia, CA 93219 U.S.A.
Tel: (209) 651-7777
FAX: (209) 651-0164

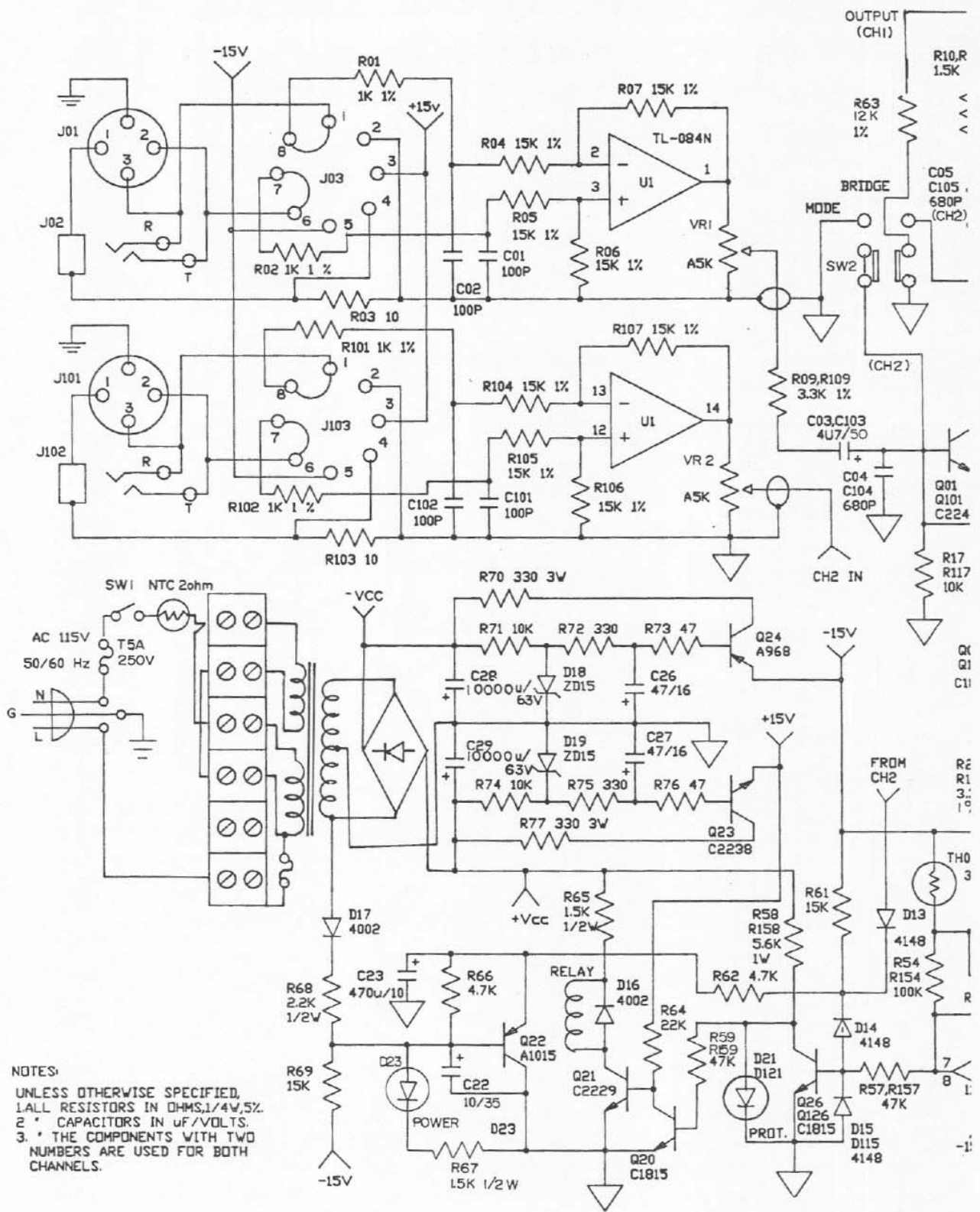
Enclose a note describing the problem in as much detail as possible. Include any additional helpful information such as test conditions, where used, how used, etc.

9.9 Technical Assistance

For applications assistance or other technical information, contact the Technical Services Manager. You can call (616) 695-6831, TWX 810-270-31353, FAX (616) 695-1304, or write:

Electro-Voice
Technical Services Manager
600 Cecil Street
Buchanan, MI 49107
U.S.A.

Operating and Service Instructions for the Electro-Voice 7200 Power Amplifier



NOTES:
 1. ALL RESISTORS IN OHMS, 1/4W, 5%
 2. * CAPACITORS IN uF/VOLTS.
 3. * THE COMPONENTS WITH TWO NUMBERS ARE USED FOR BOTH CHANNELS.

Figure 6 Schematic of 7200, Sheet 1 of 2

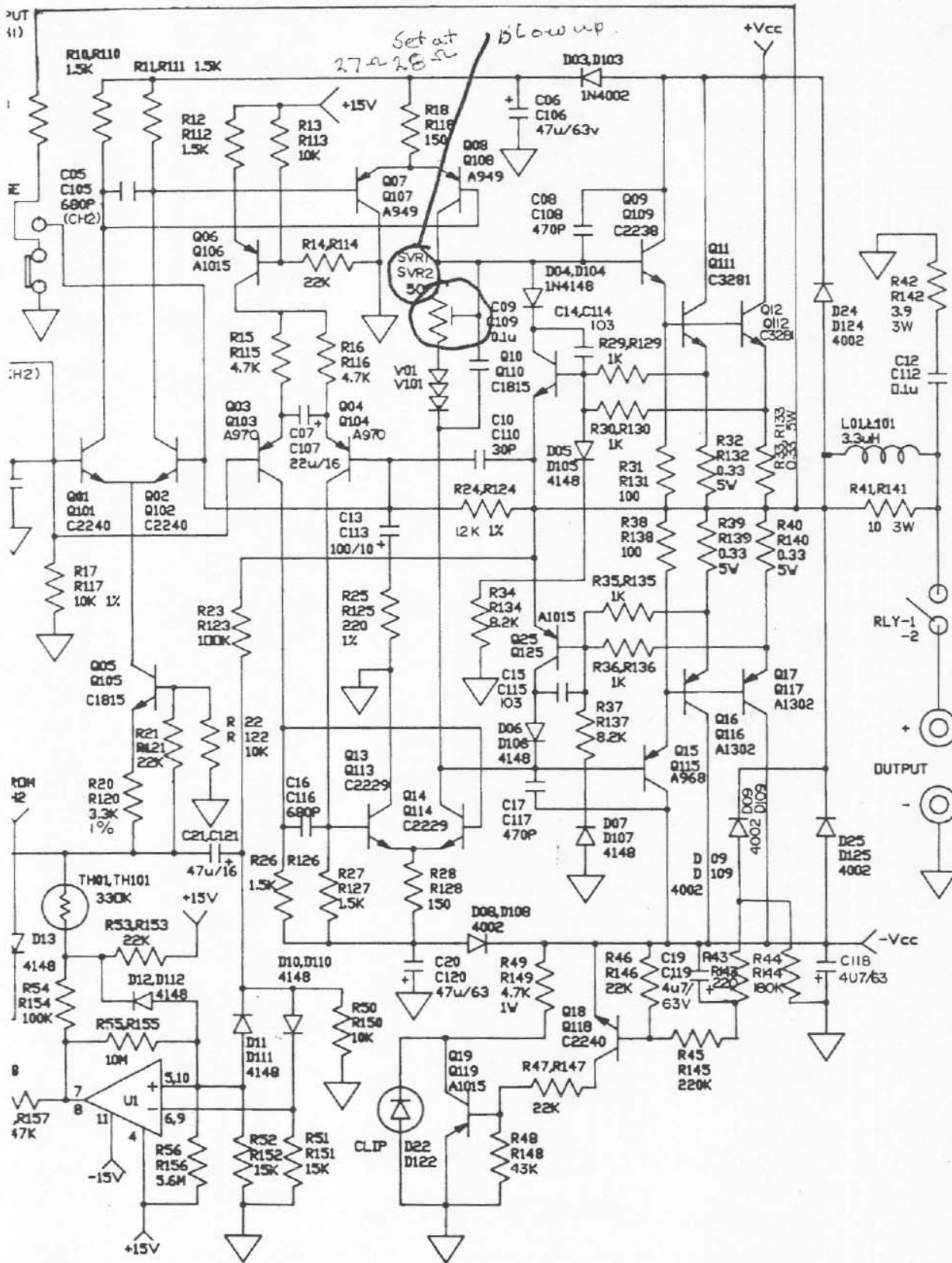


Figure 7 Schematic of 7200, Sheet 2 of 2

Component Parts Listing for the 7200

Reference Designator	Ordering Number	Name and Description
R01, R02, R101, R102	47-03-121532	Resistor, 1.0 K Ω , 0.25 watt, 1%, metal film
R03, R103	47-01-102030	Resistor, 10 Ω , 0.25 watt, 5%, metal film
R04-07, R104-107	47-03-028238	Resistor, 15.0 K Ω , 0.25 watt, 1%, metal film
R09, R20, R109, R120	47-03-037660	Resistor, 3.32 k Ω , 0.25 watt, 1%, metal film
R10-12, R26, R27, R110-112, R126, R127	47-01-102082	Resistor, 1.5 k Ω , 0.25 watt, 5%, metal film
R13, R22, R50, R71, R74, R113, R122, R150	47-01-102102	Resistor, 10 k Ω , 0.25 watt, 5%, metal film
R14, R21, R46, R47, R53, R64, R114, R121, R146, R147, R153	47-01-102110	Resistor, 22 k Ω , 0.25 watt, 5%, metal film
R15, R16, R62, R66, R115, R116	47-01-102094	Resistor, 4.7 K Ω , 0.25 watt, 5%, metal film
R17, R117	47-03-109437	Resistor, 10.0 K Ω , 0.25 watt, 1%, metal film
R18, R28, R118, R128	47-01-102058	Resistor, 150 Ω , 0.25 watt, 5%, metal film
R23, R54, R123, R154	47-01-102127	Resistor, 100 K Ω , 0.25 watt, 5%, metal film
R24, R63, R124	47-03-124685	Resistor, 12.1 K Ω 0.25 watt, 1%, metal film
R25, R125	47-03-123030	Resistor, 221.0 Ω , 0.25 watt, 1%, metal film
R29, R30, R35, R36, R129, R130, R135, R136	47-01-102078	Resistor, 1 K Ω , 0.25 watt, 5%, metal film
R31, R38, R131, R138	47-01-102054	Resistor, 100 Ω , 0.25 watt, 5%, metal film
R32, R33, R39, R40, R132, R133, R139, R140	47-01-037992	Resistor, 0.330 Ω , 5 watt, 5%, cement
R34, R37, R134, R137	47-01-102100	Resistor, 8.2 K Ω , 0.25 watt, 5%, metal film
R41, R141	47-01-037994	Resistor, 10 Ω , 3 watt, 5%, metal oxide
R42, R142	47-01-037993	Resistor, 3.9 Ω , 3 watt, 5%, metal oxide
R43, R143	47-01-102062	Resistor, 220 Ω , 0.25 watt, 5%, metal film
R44, R144	47-01-109298	Resistor, 180 K Ω , 0.25 watt, 5%, metal film
R45, R145	47-01-107043	Resistor, 220 K Ω , 0.25 watt, 5%, metal film
R48, R148	47-01-102118	Resistor, 43 K Ω , 0.25 watt, 5%, metal film
R49, R149	47-01-037996	Resistor, 4.7 K Ω , 1 watt, 5%, metal oxide
R51, R52, R61, R151, R152	47-01-102106	Resistor, 15 K Ω , 0.25 watt, 5%, metal film
R55, R155	47-01-107373	Resistor, 10 M Ω , 0.25 watt, 5%, metal film
R56, R156	47-01-113206	Resistor, 5.6 M Ω , 0.25 watt, 5%, metal film
R57, R59, R157, R159	47-01-102119	Resistor, 47 K Ω , 0.25 watt, 5%, metal film
R58, R158	47-01-122971	Resistor, 5.6 K Ω , 1 watt, 5%, metal oxide
R65, R67	47-01-102268	Resistor, 1.5 K Ω , 0.50 watt, 5%, metal film
R68	47-01-102272	Resistor, 2.2 K Ω , 0.50 watt, 5%, metal film
R70, R77	47-01-037995	Resistor, 330 Ω , 3 watt, 5%, metal oxide
R72, R75	47-01-102066	Resistor, 330 Ω , 0.25 watt, 5%, metal film
R73, R76	47-01-102046	Resistor, 47 Ω , 0.25 watt, 5%, metal film
C01, C02, C101, C102	15-02-038007	Capacitor, 100 pF, 200 volt, 5%, ceramic
C03, C103	15-01-037997	Capacitor, 4.7 μ F, 50 VDC, electrolytic
C04, C05, C16, C104, C105, C116	15-06-038010	Capacitor, 680 pF, 50 volt, 5%, polypropylene
C06, C20, C106, C120	15-01-038002	Capacitor, 47 μ F, 63 VDC, electrolytic
C07, C107	15-01-038000	Capacitor, 22 μ F, 16 VDC, electrolytic
C08, C17, C108, C117	15-06-038009	Capacitor, 470 pF, 50 volt, 5%, polypropylene
C09, C12, C109, C112	15-06-026822	Capacitor, 0.1 μ F, 50 volt, mylar
C10, C110	15-02-038006	Capacitor, 30 pF, 200 volt, 5%, ceramic
C13, C113	15-01-038003	Capacitor, 100 μ F, 10 VDC, electrolytic

Operating and Service Instructions for the Electro-Voice 7200 Power Amplifier

Reference Designator	Ordering Number	Name and Description
C14, C15, C114, C115	15-02-038008	Capacitor, 0.01 μ F, 200 volt, 5%, ceramic
C19, C118, C119	15-01-037998	Capacitor, 4.7 μ F, 63 VDC, electrolytic
C21, C26, C27, C121	15-01-038001	Capacitor, 47 μ F, 16 VDC, electrolytic
C22	15-01-037999	Capacitor, 10 μ F, 35 VDC, electrolytic
C23	15-01-038004	Capacitor, 470 μ F, 10 VDC, electrolytic
C28, C29	15-01-038005	Capacitor, 1000 μ F, 63 VDC, electrolytic
L01, L101	56-01-038011	Inductor, 3.3 μ F, coil
D03, D08, D09, D16, D17, D24, D25, D103, D108, D109, D124, D125	48-01-037276	Diode, 1N4002 (K.E.C.), rectifier
D04-07, D10-15, D104-107, D18, D19	48-01-122601	Diode, 1N4148, switching
D20	48-01-037984	Zener Diode, 15 volt, 0.5 watt (K.E.C.)
U1	48-02-037985	Diode, KBPC15-04, bridge
Q01, Q02, Q18, Q101, Q102, Q118, Q03, Q04, Q103, Q104	17-01-122131	IC, TL084CN
Q05, Q10, Q20, Q26, Q105, Q110, Q126	48-03-124824	Transistor, 2SC 2240 GR, NPN
Q06, Q19, Q22, Q25, Q106, Q119, Q125	48-03-026634	Transistor, 2SA 970 GR, PNP
Q07, Q08, Q107, Q108	48-03-026624	Transistor, 2SC 1815 Y, NPN
Q09, Q23, Q109	48-03-037275	Transistor, 2SA 1015 Y, PNP
Q11, Q12, Q111, Q112	48-03-037982	Transistor, 2SA 949 Y, PNP
Q13, Q14, Q21, Q113, Q114	48-03-124822	Transistor, KTC2238A Y, NPN
Q15, Q24, Q115	48-03-124821	Transistor, 2SC 3281 O, NPN
Q16, Q17, Q116, Q117	48-03-037983	Transistor, 2SC 2229 Y, NPN
TH01, 101	48-03-037236	Transistor, KTA968 Y, PNP
V01, 101	48-03-124820	Transistor, 2SA 1302 O, PNP
VR1, 2	53-02-038012	Thermistor, HTD 5-433 330 K Ω
SVR1, 2	48-01-038027	Varistor, HSV 312 Y
	47-07-037989	Potentiometer, volume, 15SK A5K
	47-06-037991	Trimpot, bias, B 50 Ω
	56-08-038013	Transformer, EV 7200 (MT)
	51-04-038014	Fuse, T5 amp, 250 volt, SB-UL-GLS
SW1	51-02-038016	Switch, power, DPST 1832-1107
SW2	51-02-037989	Switch, bridge, KSA-2226
	53-02-038017	Thermistor NTC S209
LED21, 22, 23, 121, 122	48-04-038018	L.E.D., KLR-124, 3mm, Red
	21-03-038019	Dual Binding Post, TB-301D RED/Black
	28-13-026422	Hardware, rack mount
	21-01-013567	Jumper, Octal Socket, gold flash
	45-01-037986	Relay, HL2-HP-DC24V

Fuse Holder 51-04-124831