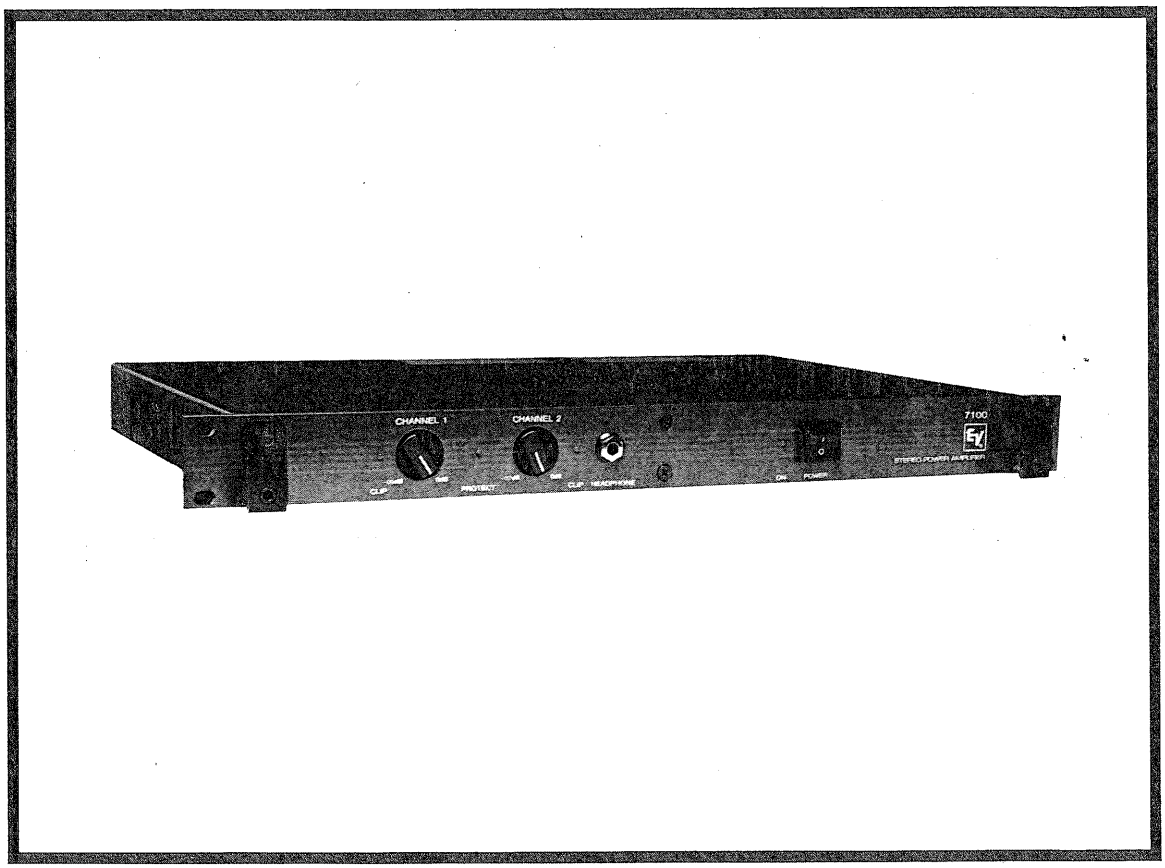
Electro-Voice®

7100 STEREO POWER AMPLIFIER

OWNER'S OPERATION AND SERVICE INSTRUCTIONS



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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 2 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 ten 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.

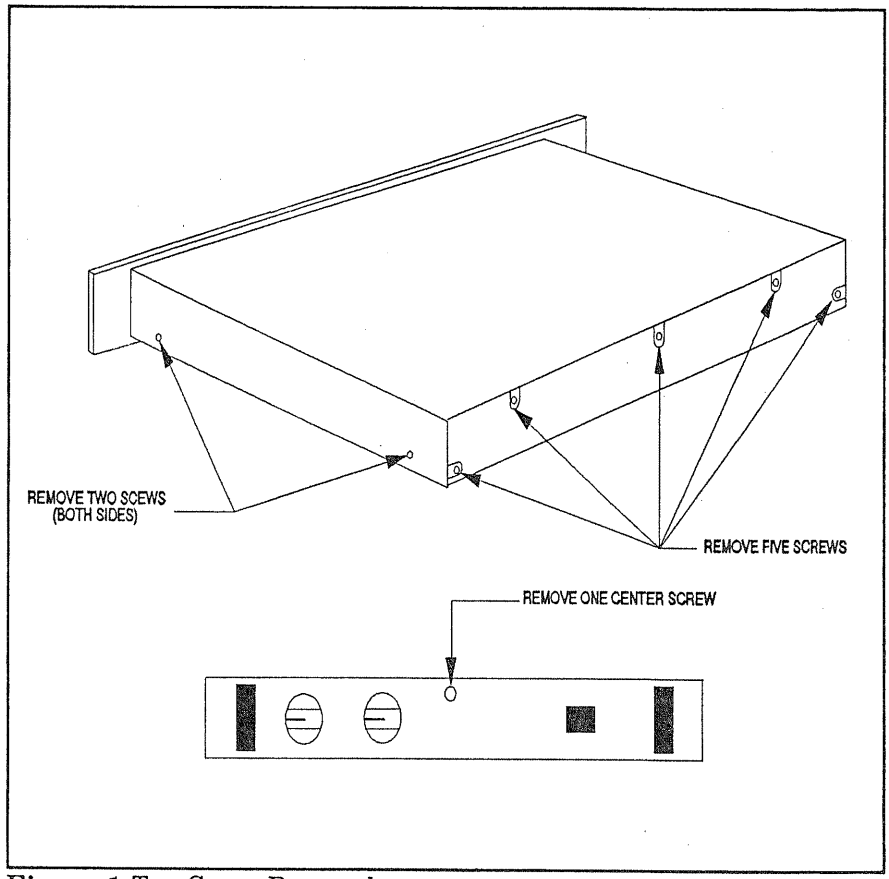

Figure 1 Top Cover Removal

4. Install the top cover with the ten screws previously removed.
5. Install the 2.0A fuse, T2.0A /250V slo-blo or equivalent.
6. Install the 230 Vac 50/-60Hz and the T2.0A/250V decals in the proper positions.

2 INSTALLATION

2.1 Rack Mounting

The amplifier may be installed in a standard 19 inch equipment rack. It requires 1.75 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.*

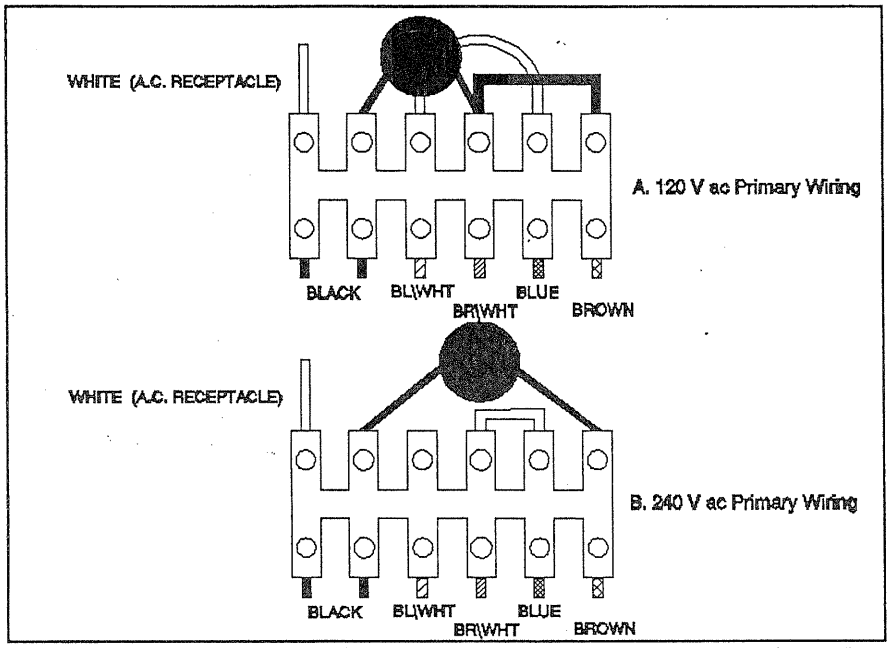

Figure 2 Primary Wiring Configuration for 120 V ac and 220/240 V ac

3 SIGNAL CONNECTIONS

3.1 Input Connections

Balanced input connections may be made to either the ¼" phone (TRS) or the female XLR connectors. For single-ended inputs, strap the low (—) input to ground (pin 3 on XLR or *Ring* on ¼" 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 ¼" phone connectors are wired in parallel. Pin 2 of the XLR is the *Tip* of the ¼" 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 equipment. 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 connectors. 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 Loss 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 selected 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

= 0.0191 watts/foot × 160 feet
= *3.0 watts*

Does this mean that whenever the amplifier produces 75 watts of output power, 72.0 watts (75 watts minus 3.0 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 24.4 V rms. Therefore, the amplifier produces *71.5* watts with this load instead of 75 watts. This was calculated by squaring the voltage and dividing by the load impedance (24.4^2 divided by 8.3264 ohms). As a result, the actual power delivered to the load is *68.5* watts (71.5 watts minus 3.0 watts).

Had 18 GA wire been used in the above example, the loss in the cable would have been 19.5 watts. This example illustrates the importance of using the proper wire size.

3.4.2 Calculating Power Loss 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 9.0 watts of power while the 18 GA wire would waste 58.5 watts - *more than half of the amplifier's 4 ohm power rating.*

3.5 Damping Factor

The higher the damping factor rating of an amplifier, the

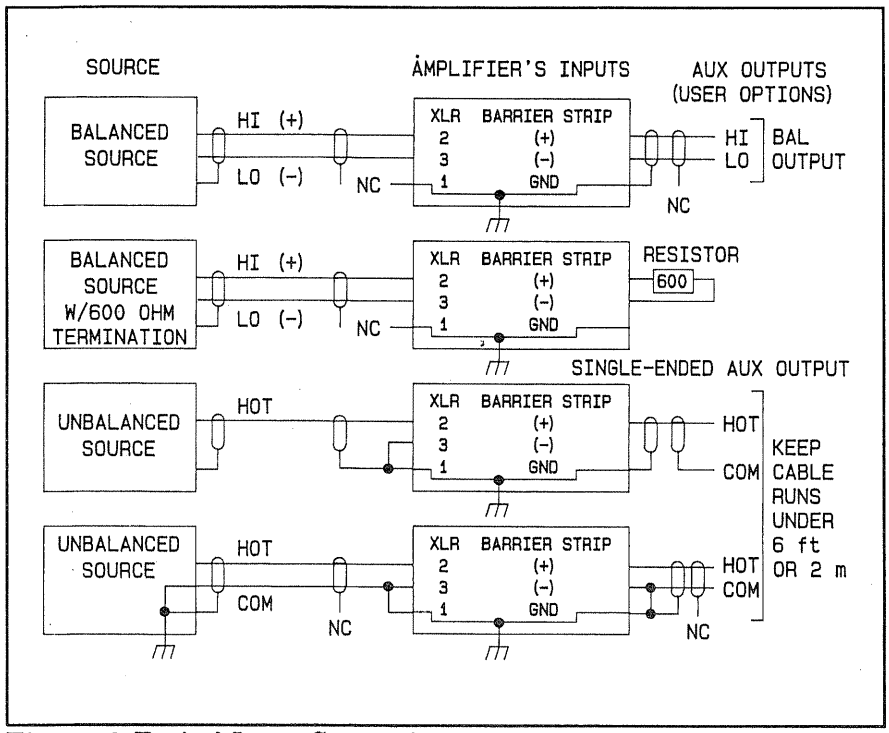

Figure 3 Typical Input Connections

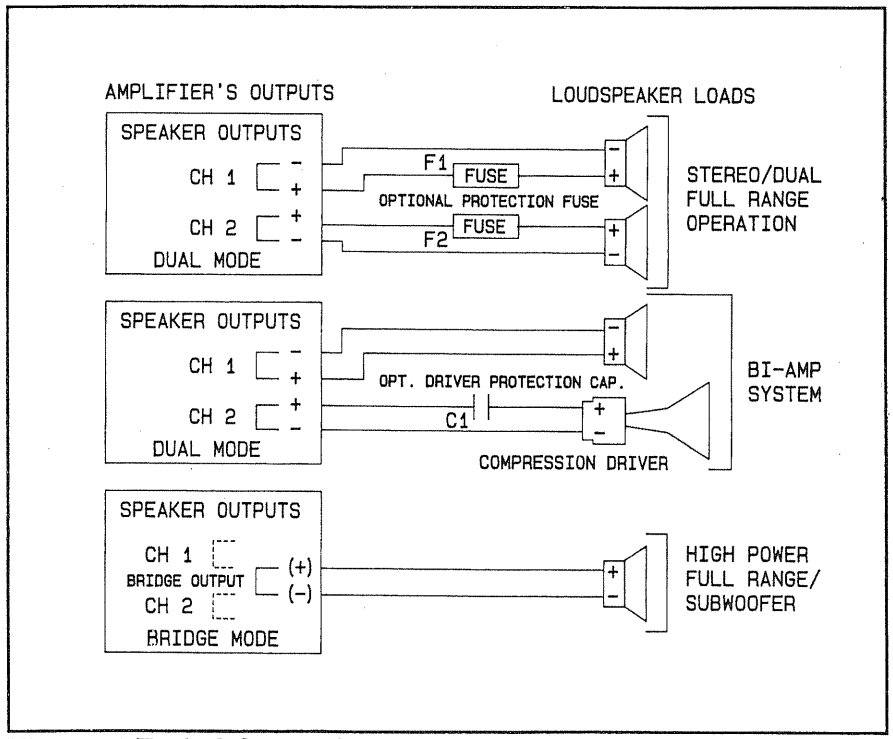

Figure 4 Typical Output Connections

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 **7100** 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 which can be used to achieve the minimum damping factor specified at the load:

Max. Length of 2-wire cable in feet

$$= \frac{\frac{ZL}{DF} - Zo}{DCR/ft}$$

where

ZL is the load impedance to connect to the amplifier;
Zo is the amplifier's output impedance (0.08 ohms for the **7100**);
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.

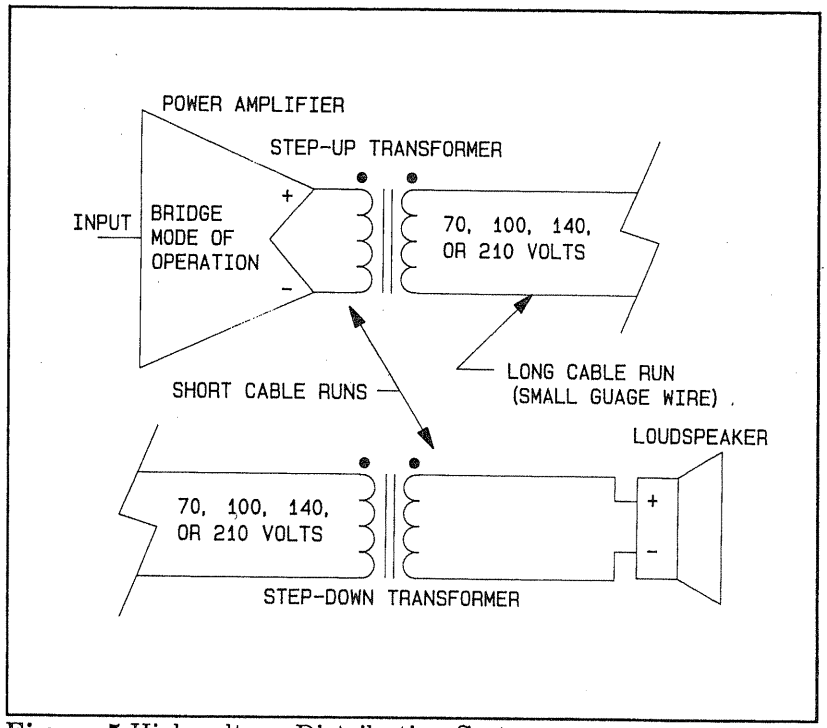

Figure 5 High-voltage Distribution System

Let's use the equation. Suppose ZL equals 8 ohms, Zo = 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:

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

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

$$\frac{V^2}{(Pout)(DCR/ft)}\left(\frac{1}{DF} - \frac{Zo}{ZL}\right)$$

where

V is the stepped-up voltage of the system;
Pout is the rated output power of the amplifier;
Zo is the output impedance of the amplifier (0.08 ohms for the **7100**);
ZL is the load impedance;
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.

Table I 7100 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	0.0075	13.30	0.00264	0.0247
8	0.00121	0.0134	8.36	0.00421	0.0394
10	0.00204	0.0191	5.26	0.00669	0.0626
12	0.00324	0.0303	3.31	0.01063	0.0952
14	0.00515	0.0482	2.08	0.01691	0.1581
16	0.00819	0.0767	1.31	0.02685	0.2508
18	0.01302	0.1218	0.82	0.04289	0.3996
20	0.02070	0.1935	0.52	0.06764	0.6288
22	0.03292	0.3073	0.33	0.10658	0.9860

Suppose a 210 volt system were used at a 200 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 508 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:

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

where

Pout 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 mis-adjustment 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 ½ of the high pass corner frequency.*

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

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.

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 start-up/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 func-

tion 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, both channels will shut down automatically. When the output devices cool to a safe operating temperature, the channels will automatically resume normal operation.

5.3 Protect Indicator

The "PROTECT" LED illuminates when either channel enters thermal protection. If a shutdown does occur, the channels 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, one, or both, of the channels 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 levels 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. Insure that the two jumpers for each octal socket are properly installed (if not using optional plug-in modules).
7. Insure 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

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

Electro-Voice Customer Service/Repair
10500 West Reno
Oklahoma City, OK 73128 U.S.A.
Tel: (405) 324-5311
Fax: (405) 324-8981

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:	>100 watts/ch
Bridge mode, 8 Ω:	>200 watts
Dual mode, 8 Ω:	> 75 watts/ch
Bridge mode, 16 Ω:	>150 watts

Continuous Rated Output Power to Subwoofer:
(20 Hz - 1 kHz at less than 0.1% THD)

Dual mode, 4 Ω:	>130 watts/ch
Bridge mode, 8 Ω:	>260 watts
Dual mode, 8 Ω:	> 95 watts/ch
Bridge mode, 16 Ω:	>180 watts

Maximum Midband Output Power:
(Ref. 1 kHz, 1% THD, @120 volts ac line voltage)

Dual mode, 4 Ω:	>145 watts/ch
Bridge mode, 8 Ω:	>270 watts
Dual mode, 8 Ω:	>100 watts/ch
Bridge mode, 16 Ω:	>200 watts

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

Dual mode, 4 Ω:	>115 watts/ch
Bridge mode, 8 Ω:	>220 watts
Dual mode, 8 Ω:	> 80 watts/ch
Bridge mode, 16 Ω:	>155 watts

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

Dual mode, 4 Ω:	> 95 watts/ch
Bridge mode, 8 Ω:	>185 watts
Dual mode, 8 Ω:	> 70 watts/ch
Bridge mode, 16 Ω:	>135 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 dBr where 0 dBr = rated output power in any mode)

Voltage Gain:
(Ref. 1 kHz)

Dual mode, 4 Ω and 8 Ω:	28 dB
Bridge mode, 8 Ω and 16 Ω:	34 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:	+1.0 dBu (0.869 V rms)
Bridge mode, 16 Ω:	+1.0 dBu (0.869 V rms)

Maximum Input Level: (Ref. 1 kHz)
+20 dBu (7.75 V rms)

Input Impedance: (Ref. 1 kHz)

Balanced:	30 kΩ
Unbalanced:	15 kΩ

Polarity: Positive-going signal applied to pin 2 of XLR or *Tip* of ¼" TRS jack produces positive-going signal at (+) output terminal.

Phase Response: (Any mode)

20 Hz:	<+25°
20 kHz:	>—25°

THD: <0.1% (Typ. <0.05%)
(Any mode, 30 kHz measurement bandwidth)

IMD (SMPTE 4:1): <0.1%
(Any mode)

Slew Rate:

Dual mode, 4 or 8 Ω:	>19 V/µsec
Bridge mode, 8 or 16 Ω:	>37 V/µsec

Damping Factor:
(Dual mode, 8 Ω)
1 kHz: >100

Crosstalk: <55 dBr
(Ref. 1 kHz, 0 dBr = 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

Load Protection: Startup/shutdown transients, DC faults, Subsonic signals

Cooling: Convention heatsinks

Output Topology: True complementary symmetry

Output Type:
Dual mode: Unbalanced, each channel
Bridge mode: Balanced

Output Devices:
Total number: 4 devices
Pdmax rating: 130 watts
Vceo: 180 volts DC
Ic: 15 amps DC
Tjmax: 150°C

Controls and Switches:
Rear: Mode switch
Front: Two input level controls, Power switch

Front Panel Indicators: Power LED, Clip LED (x 2), Protect LED

Connections:
Input: ¼" phone (× 2), Female XLR (x 2), Octal accessory socket (x 2), powered with ±15 volts DC at 25 ma.

Output: 5-way binding posts

Power: 6 ft (1.83 m), 3-wire, 18 GA power cord with NEMA 5-15 plug/IEC

Fuse Type: T 4 A/250 V Slo-Blo or equivalent (for 120 V ac use)

Power Requirements: 120 V ac, 50/60Hz, 300 watts (configurable to 220/240 V ac). 100 Vac, 50/60 Hz model available.

Operating ac Voltage Range: Operates from line voltages as low as 90 volts (at reduced output power) assuming a 120 V ac nominal line.

Power Consumption/ Heat Produced:
(Both channels operating in dual mode with 1 kHz sinewave input signal at stated output power into 4 Ω loads)

idle:	30 watts/0.102 kBTU/h
1/8th max midband power:	270 watts/0.833 kBTU/h
1/3rd max midband power:	390 watts/1.099 kBTU/h
Rated output power:	600 watts/1.360 kBTU/h
Max midband power:	730 watts/1.496 kBTU/h

Operating Temperature Range:
Up to 50°C (122°F) ambient

Dimensions (Rear of rack ears to max depth):
1.75 in H x 19 in W x 12.8 in D (4.44 cm H x 48.26 cm W x 32.51 cm D)

Shipping Weight: 22 lbs (9.97 kg)

Net Weight: 18 lbs (8.16 kg)

Color: Grey and Black

Enclosure: Rack mount chassis, 16 GA steel, 3/16 in 5052 aluminum alloy front panel

Standard Accessories:
4 - "U" jumper plugs for octal sockets (2 per socket, installed)
1 - Operating Instructions and Service Manual
1 - T 2.0A/250 V fuse (for 220/240 V ac use)

Optional Accessories:
APX 24 dB/oct Linkwitz-Riley Crossover
APX-2 24 dB/oct Linkwitz-Riley Crossover with External High Frequency Output
APX-200 Equalizer module for S200 and FR200 speakers

Electro-Voice continually strives to improve products and performance. Therefore, the specifications are subject to change without notice.

ELECTRO-VOICE UNIFORM LIMITED WARRANTY STATEMENT

Electro-Voice products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual, beginning with the date of original purchase. If such malfunction occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain specific items described in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual; (c) malfunction resulting from use or operation of the product other than as specified in the product data sheet or owner's manual; (d) malfunction resulting from misuse or abuse of the product; or (e) malfunction occurring at any time after repairs have been made to the product by anyone other than Electro-Voice or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice or any of its authorized service representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list of authorized service representatives is available from Electro-Voice at 600 Cecil Street, Buchanan, MI 49107 (616/695-6831) and/or Electro-Voice West at 8234 Doe Avenue, Visalia, CA 93291 (209/651-7777). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are only remedies provided to the customer. Electro-Voice shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Electro-Voice Electronics are guaranteed against malfunction due to defects in materials or workmanship for a period of three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

7100 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 a constant ac line voltage.*

9.2 Adjusting VR02 and VR102, the BIAS Trimpot

To adjust VR02 and VR102 for the proper bias, follow the procedures:

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 ten screws securing the top cover. Refer to Figure 1 for the screw locations.
3. Channel 1: Locate the junction of Q12's emitter and R37. Connect the positive side of the digital DC volt meter to the junction of Q12's emitter and R37. Then locate the junction of Q14's emitter and R38. Connect the negative side of the digital DC volt meter to the junction of Q14's emitter and R38. Connect the unit to its power source and turn the power on. Adjust VR02 so that the digital DC volt meter reads 7 milli volts DC (± .2 mVdc). Turn power off and disconnect the unit from its power source.
   Note: Adjust Bias immediately after turning power on.
4. Channel 2: Locate the junction of Q112's emitter and R137. Connect the positive side of the digital DC volt meter to the junction of Q112's emitter and R137. Then locate the junction of Q114's emitter and R138. Connect the negative side of the digital DC volt meter to the junction of Q114's emitter and R138. Connect the unit to its power source and turn the power on. Adjust VR102 so that the digital DC volt meter reads 7 milli volts DC (± .2 mVdc). Turn power off and disconnect the unit from its power source.
   Note: Adjust Bias immediately after turning power on.
5. Re-install the top cover with the ten 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.

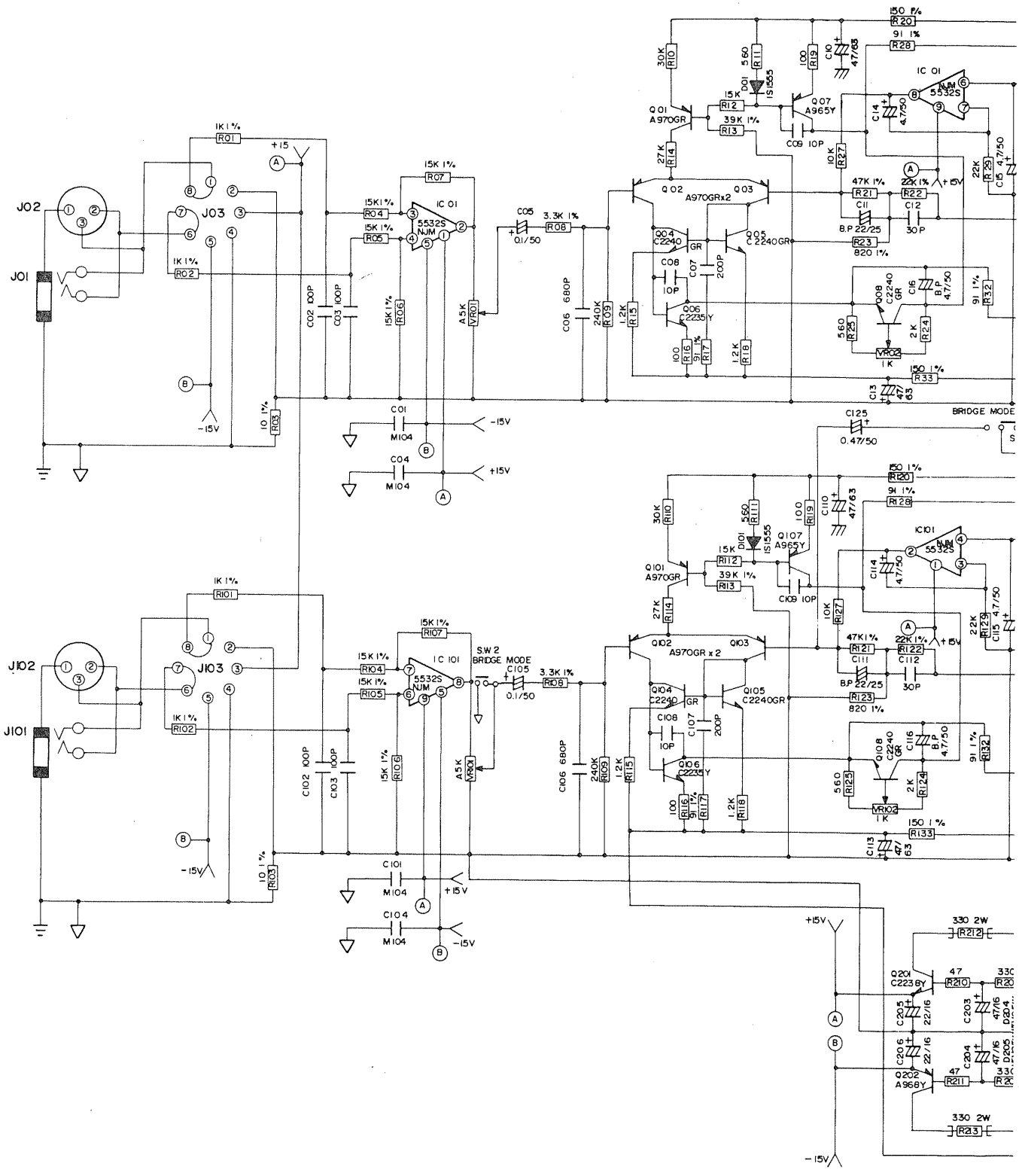

Figure 6 Schematic of 7100, Sheet 1 of 2

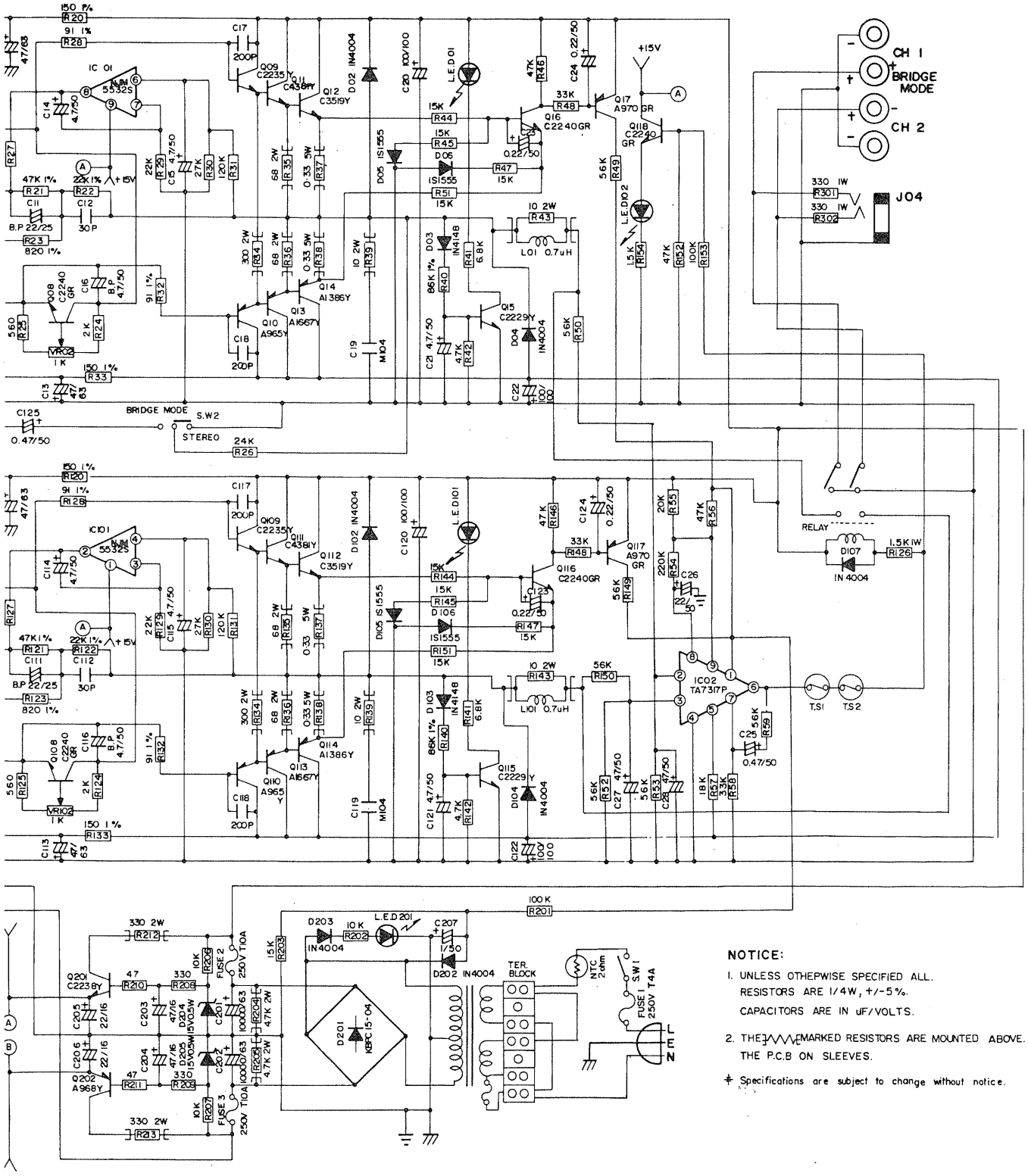

Figure 7 Schematic of 7100, Sheet 2 of 2

Component Parts Listing for the 7100

Reference Designator	Ordering Number	Name and Description
R01, R02, R101, R102	47-03-121532	Resistor, 1.0 KΩ, 0.25 watt, 1%, metal film
R03, R103	47-03-122803	Resistor, 10 Ω, 0.25 watt, 1%, metal film
R04-07, R104-107	47-03-028238	Resistor, 15.0 KΩ, 0.25 watt, 1%, metal film
R08, R108	47-03-037660	Resistor, 3.32 kΩ, 0.25 watt, 1%, metal film
R09, R109	47-01-028011	Resistor, 240 kΩ, 0.25 watt, 5%, metal film
R10, R110,	47-01-028530	Resistor, 30 kΩ, 0.25 watt, 5%, metal film
R11, R25, R11, R125	47-01-102072	Resistor, 560 Ω, 0.25 watt, 5%, metal film
R14, R44, R45, R47, R51, R112, R144, R145, R147, R151, R203	47-01-102106	Resistor, 15 KΩ, 0.25 watt, 5%, metal film
R13, R113	47-03-028274	Resistor, 39.2 KΩ, 0.25 watt, 1%, metal film
R14, R30, R114, R130	47-01-102112	Resistor, 27 KΩ, 0.25 watt, 5%, metal film
R15, R18, R115, R118	47-01-102080	Resistor, 1.2 KΩ, 0.25 watt, 5%, metal film
R16, R19, R116, R119	47-01-102054	Resistor, 100 Ω 0.25 watt, 5%, metal film
R17, R28, R32, R117, R128, R132	47-03-038030	Resistor, 91 Ω, 0.25 watt, 1%, metal film
R20, R33, R120, R133	47-03-028694	Resistor, 150 Ω, 0.25 watt, 1%, metal film
R21, R121,	47-03-038031	Resistor, 47 KΩ, 0.25 watt, 1%, metal film
R22, R122,	47-03-122953	Resistor, 22.1 KΩ, 0.25 watt, 1%, metal film
R23, R123,	47-03-038032	Resistor, 820 Ω, 0.25 watt, 1%, metal film
R24, R124	47-01-102085	Resistor, 2 KΩ, 0.25 watt, 5%, metal film
R26	47-01-102111	Resistor, 24 kΩ, 0.25 watt, 5%, metal film
R27, R127, R202, R206, R207	47-01-102102	Resistor, 10 KΩ, 0.25 watt, 5%, metal film
R29, R129	47-01-102110	Resistor, 22 kΩ, 0.25 watt, 5%, metal film
R31, R131	47-01-102129	Resistor, 120 KΩ, 0.25 watt, 5%, metal film
R34, R134	47-01-038033	Resistor, 300 Ω, 2 watt, 5%, metal oxide
R35, R36, R135, R136	47-01-038034	Resistor, 68 Ω, 2 watt, 5%, metal oxide
R37, R38, R137, R138	47-01-037992	Resistor, 0.330 Ω, 5 watt, 5%, cement
R39, R43, R139, R143,	47-01-038035	Resistor, 10 Ω, 2 watt, 5%, metal oxide
R40, R140	47-01-038036	Resistor, 80 KΩ, 0.25 watt, 5%, metal film
R41, R141	47-01-102098	Resistor, 6.8 KΩ, 0.25 watt, 5%, metal film
R42, R142	47-01-102094	Resistor, 4.7 KΩ, 0.25 watt, 5%, metal film
R46, R56, R146, R152	47-01-102119	Resistor, 47 KΩ, 0.25 watt, 5%, metal film
R48, R58, R148	47-01-102114	Resistor, 33 KΩ, 0.25 watt, 5%, metal film
R49, R50-53, R59, R149, R150	47-01-102121	Resistor, 56 KΩ, 0.25 watt, 5%, metal film
R54	47-01-107043	Resistor, 220 KΩ, 0.25 watt, 5%, metal film
R55	47-01-102109	Resistor, 20 KΩ, 0.25 watt, 5%, metal film
R57	47-01-102108	Resistor, 18 KΩ, 0.25 watt, 5%, metal film
R63	47-01-038038	Resistor, 1.5 KΩ, 0.25 watt, 5%, metal oxide
R126, R154	47-01-102082	Resistor, 1.5 KΩ, 0.25 watt, 5%, metal film
R153, R201	47-01-102127	Resistor, 100 KΩ, 0.25 watt, 5%, metal film
R204, R205	47-03-124444	Resistor, 4.7 KΩ, 2 watt, 5%, metal oxide
R208, R208	47-01-102066	Resistor, 330 Ω, 0.25 watt, 5%, metal film
R210, R211	47-01-102046	Resistor, 47 Ω, 0.25 watt, 5%, metal film
R212, R213	47-01-113781	Resistor, 330 Ω, 2 watt, 5%, metal oxide
C01, C04, C19, C101, C104, C119	15-06-037215	Capacitor, 0.1 µF, 100 volt, 5%, mylar
C02, C03, C102, C103	15-02-038039	Capacitor, 100 pF, 100 volt, 5% ceramic
C05, C105	15-01-038040	Capacitor, 0.1 µF, 50 VDC, electrolytic

Reference Designator	Ordering Number	Name and Description
C06, C106	15-06-038041	Capacitor, 680 pF, 100 volt, 5%, polypropylene
C07, C17, C18, C107, C117, C118	15-06-038042	Capacitor, 200 pF, 100 volt, 5%, polypropylene
C08, C09, C108, C109	15-02-038043	Capacitor, 10 pF, 200 volt, 5%, ceramic
C10, C13, C110, C113	15-01-038002	Capacitor, 47 µF, 63 VDC, electrolytic
C11, C111	15-01-038044	Capacitor, 22 µF, 25 VDC, electrolytic (B.P.)
C12, C112	15-02-038006	Capacitor, 30 pF, 200 volt, 5%, ceramic
C14, C15, C21, C114, C115, C121	15-01-037997	Capacitor, 4.7 µF, 50 VDC, electrolytic
C16, C116	15-01-038045	Capacitor, 4.7 µF, 50 VDC, electrolytic (B.P.)
C20 C22, C120, C122	15-01-038046	Capacitor, 100 µF, 100 VDC, electrolytic
C23, C24, C123, C124	15-01-038047	Capacitor, 0.22 µF, 100 VDC, electrolytic
C25, C125	15-01-038048	Capacitor, .47 µF, 50 VDC, electrolytic
C26	15-01-038049	Capacitor, 22 µF, 50 VDC, electrolytic
C27, C28	15-01-038050	Capacitor, 47 µF, 50 VDC, electrolytic
C201, C202	15-01-038005	Capacitor, 1000 µF, 63 VDC, electrolytic
C203, C204	15-01-038001	Capacitor, 47 µF, 16 VDC, electrolytic
C205, C206	15-01-038000	Capacitor, 22 µF, 16 VDC, electrolytic
C207	15-01-038051	Capacitor, 1 µF, 50 VDC, electrolytic
L01, L101	56-01-038052	Inductor, 0.7 µF, coil
D01, D05, D06, D101, D105, D106	48-01-038053	Diode, 1S155, switching
D02, D04, D102, D104, D107, D202, D203	48-02-042787	Diode, 1N4004, rectifier
D03, D103	48-01-122601	Diode, 1N4148, switching
D201	48-02-037985	Diode, KBPC15-04, bridge
D204, D205	48-01-037984	Zener Diode, 15 volt, 0.5 watt
IC01, IC101	17-01-122832	IC, NJM 5532S
IC02	17-01-124804	IC, TA 7317P
Q01-03, Q17, Q101-103, Q117	48-03-026634	Transistor, 2SA 970 GR, PNP
Q04, Q05, Q08, Q16, Q104, Q105, Q108, Q116, Q118	48-03-124824	Transistor, 2SC 2240 GR, NPN
Q06, Q09, Q106, Q109	48-03-038054	Transistor, 2SC 2235 Y, NPN
Q07, Q10, Q107, Q110	48-03-037237	Transistor, 2SA 965 Y, PNP
Q11, Q111	48-03-038055	Transistor, 2SC 4381 Y, NPN
Q12, Q112	48-03-038056	Transistor, 2SC 3519 Y, NPN
Q03, Q04, Q103, Q104	48-03-026634	Transistor, 2SA 970 GR, PNP
Q13, Q113	48-03-038057	Transistor, 2SA 1667 Y, PNP
Q14, Q114	48-03-038058	Transistor, 2SA 1386 Y, PNP
Q15, Q115	48-03-037983	Transistor, 2SC 2229 Y, NPN
Q201	48-03-124822	Transistor, KTC 2238A Y, NPN
Q202	48-03-037236	Transistor, KTA 968 Y, PNP
	53-02-038017	Thermister, NTC B57364-S209-M
TS1, TS2	53-01-038061	Thermal switch, 115N
	56-08-038059	Transformer, EV 7100 (UB)
F1	51-04-038060	Fuse, T4 amp, 250 volt, SB-UL-GLS
SW1	51-02-038066	Switch, power, H 8650 VB (250V 10A)
SW2	53-01-038061	Switch, bridge, SS22F22-G9
VR01, VR101	47-01-038063	Potentiometer, volume, 18PN01 C41 15SK A5K

Reference Designator	Ordering Number	Name and Description
VR02, VR102	47-06-038064	Potentiometer, bias, 422Z B1K
	45-01-038065	Relay, AW 8812
LED 01, 101, 102, 201	48-04-038018	L.E.D., KLR-124 3 mm
	21-03-038019	Dual Binding Post, TB-301D RED/Black
	28-13-026422	Hardware, rack mount