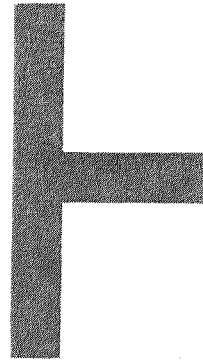


Electro-Voice®

ELECTRO-VOICE, INC.
BUCHANAN, MICHIGAN



Specifications and Instructions Model A100 Amplifier and Power Supply 100-watt Circlotron High-Fidelity Power Amplifier



Fig. 1 — Model A100 Amplifier

GENERAL DESCRIPTION — The Electro-Voice Model A100 amplifier is a high quality, rack mounting 100-watt power amplifier. The TV gray panels present an attractive appearance. Model A100 consists of two units; one chassis contains the amplifier section, the other is the power supply.

FEATURES — The Model A100 employs the new Wiggins Circlotron circuit. DC output current is removed from the output transformer through the use of a bridge circuit. All switching transients are eliminated through unity coupling between output tubes. The primary impedance of the output transformer is one quarter of that found in conventional amplifier output circuits, allowing an increase in power output at extremes of the frequency spectrum.

SPECIFICATIONS

Power Output:	100 watts rated, 200 watts on peaks See Fig. 2. "Maximum Undistorted Power vs. Frequency"
Frequency Response:	± 0.5 db 20 to 50,000 cps See Fig. 3 "Frequency Response"
Harmonic Distortion:	Less than 0.3% at rated output
Intermodulation Distortion:	Less than 0.5% at rated output See Fig. 4 "Power vs. Intermodulation Distortion"
Hum and Noise:	85 db below rated output
Speaker Output:	4 ohms, 8 ohms, 16 ohms unbalanced, 70 volts unbalanced; 600 ohms balanced
Feedback:	Loop feedback: 14 db negative Drive plate: 2 db positive Output circuit: 17 db negative Total: 29 db negative
Damping factor:	10
Input Impedance:	250,000 ohms
Sensitivity:	1.25V RMS for rated output
Controls:	
Amplifier Unit:	a. Gain b. Balance (on rear of chassis)
Power Unit:	c. Power On-Off
Tubes:	Total of 8 as follows: 1 12AX7 1 12BH7A 4 6550 2 5U4GB
Power Consumption:	117V 60 cycle AC at 3.25 amps max.
Size:	19 in. wide x 8 in. deep x 7 in. high, each unit
Weight:	64 lb net, 85 lb shipping

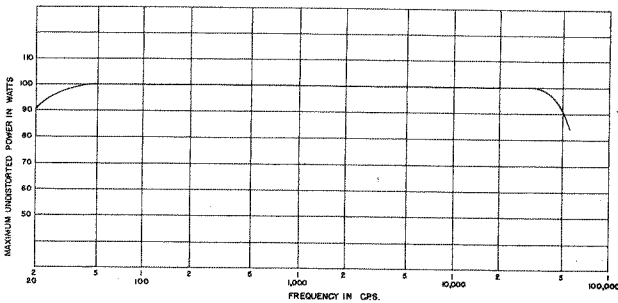


Fig. 2 — Maximum Undistorted Power vs. Frequency

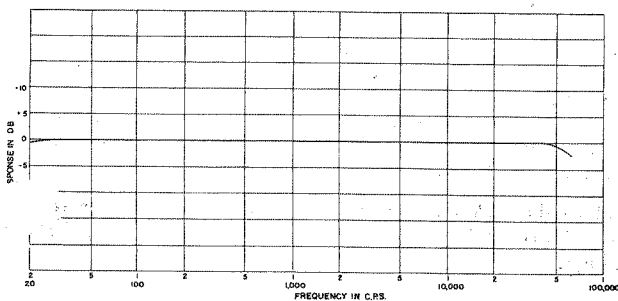


Fig. 3 — Frequency Response at 35-watt Level



THEORY OF OPERATION

THE OUTPUT TRANSFORMER AND CIRCUIT — One requirement of a quality high-fidelity amplifier is that it has an output transformer with negligible leakage reactance. This leakage reactance must be low to avoid the transient distortion ordinarily resulting from collapsing currents, in class AB or B operation, when either output tube is driven past cut-off. The transient distortion will appear as a parasitic oscillation in the wave form at the instant of cut-off. A high value of leakage reactance also will cause the output transformer of a conventional amplifier to lose efficiency at high frequencies. The distributed capacity of the output transformer should be very low in order to minimize high-frequency attenuation and phase shift. The Circlotron circuit configuration avoids many of the limitations imposed by the output transformer and overcomes the inherent disadvantages of conventional push-pull output circuits.

Figure 5 is a simplified version of the Wiggins Circlotron circuit. Two power supplies are used and are indicated as batteries. Each power supply is connected from the plate of one tube to the cathode of the other. The plate current of each tube circulates through both power supplies *without traversing the windings of the output transformer*. Because any pair of opposite points in this configuration is equipotential, the circuit is a balanced bridge under "no-signal" conditions.

The total primary winding of the output transformer presents a load to each of the two output tubes. One half of this load is in the cathode circuit, the other half in the plate circuit; the plate load of one tube is the cathode load of the other. Because each tube looks into the same load as the other, the result is unity coupling between the tubes. Despite the residual leakage reactance in the transformer, no switching transients can occur during the operation of the amplifier, for both halves of the transformer primary have the same signal current flowing through them. Thus, through the use of this circuit, troublesome switching transients, normally found in even high-quality amplifiers, are completely eliminated.

The impedance of the primary winding of the output transformer is one fourth that of the transformers in usual amplifiers. Therefore, the Circlotron transformer has much less distributed capacity and leakage reactance, so that a wide frequency response range is much more easily attained.

Low quiescent current in the Circlotron circuit results in higher efficiency and produce more power without exceeding the dissipation ratings of the tubes.

THE DRIVER CIRCUIT — The gain of the Circlotron output stage is almost unity, thus requiring a high drive voltage. This higher voltage is obtained by means of technique called "boot strapping." By this method the B+ supply to the driver stage is dynamically changed as signal voltage changes allowing linear operation over a much wider range.

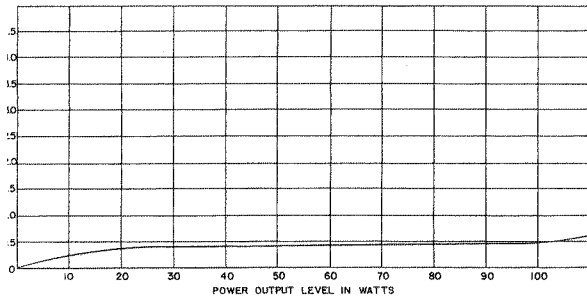


Fig. 4 — Power vs. Intermodulation Distortion

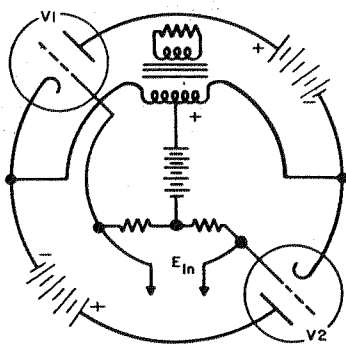


Fig. 5 — Simplified Diagram Circlotron Circuit

INSTRUCTIONS FOR SET-UP AND OPERATION

Immediately upon unpacking the amplifier carefully inspect it for physical damage. If damage is evidenced, notify the dealer from whom the unit was purchased, or the transportation company if the unit was shipped to you. Responsibility for shipping damage lies with the carrier and claim should be made for recovery.

MOUNTING — The A100 is designed for standard rack mounting; four pan-head screws for each chassis are supplied for this purpose. Use the elongated slots located on the chassis flanges to secure the chassis to the rack. The round holes in the flanges are clearance holes for the front panel mounting screws. Secure the front panels to the rack with the cup washers and oval head screws provided. The knob is then placed on the amplifier unit control shaft. Interconnect both units with the cable provided.

PREPARATION FOR USE — Make certain that all tubes are firmly seated in the proper sockets as marked. Connect the loudspeaker or other load to the amplifier. Matching to any load between approximately 3 and 20 ohms may be obtained from the screw terminals on the amplifier unit. Use the terminal marked "C" and either 4, 8, or 16, whichever is nearest the load impedance. The 70-volt terminals are "C" and "70V". The 600-ohm terminals are balanced to chassis. Therefore, the "C" terminal should not be used when operating into a 600-ohm load. *Do not ground either side of the 600-ohm line.*

Connect the input signal to the jack marked "SIGNAL" on the rear apron of the amplifier. The Electro-Voice PC1 or PC2 preamplifier is recommended for use with the A100 amplifier.

PARTS LIST

POWER SUPPLY UNIT

The A100 is provided with an SJ type line cord. In the event that the unit is to be permanently installed using BX type cable, the SJ line cord lugs can be disconnected from the terminal block and removed from the power supply chassis. An electrical knockout is provided near the line terminal block.

Should high line voltage be encountered, the primary tap on the power transformer should be moved from 115V terminal to the 130V terminal on the centrally located terminal strip on the chassis. This will protect the amplifier components from excessive voltages and possible failure.

CONTROLS — The gain control, located to the left on the front panel of the amplifier unit, adjusts the sensitivity of the amplifier to match the associated equipment. A tube balancing control is provided for use when output tubes are replaced. To balance the output stage, place a 2000-ohm-per-volt voltmeter or VTVM across the 600-ohm output terminals and adjust for 0 volts potential difference. If a voltmeter is not available, connect a loudspeaker to the 16-ohm tap and vary the balance adjustment. Note that the loudspeaker will "breathe" at a rather high amplitude at the ends of the potentiometer adjustment. There will be an arc of travel of the control where the speaker does not "breathe." The adjustment should be made midway between the extremes of this arc.

The power switch is located on the power supply unit.

SERVICE — The 4-ampere fuse located on the amplifier is of the "slo-blo" 3AG type and in the event of a component failure, should be replaced with an identical 4-ampere type. Two 3/4-amp 3AG plate fuses are located in the power supply unit for output tube protection. The fuses will not blow in normal operation. In the event of repeated failure: (a) make certain amplifier is mounted and connected in accordance with these instructions, (b) check tubes for possible shorts and replace if necessary, or (c) refer to the dealer from whom purchased for instructions. Do not attempt to operate amplifier without all tubes in place.

CAUTION NOTES

1. Do not operate amplifier in an overloaded condition for a period of time, since this will substantially shorten the life of the output tubes.
2. Do not attempt to operate the amplifier from a power source other than 105-130 V, 60 cycle AC.
3. Do not apply power to amplifier unless *all* tubes are in sockets.
4. Do not attempt to check fuses with power on.

OPTIONAL ACCESSORIES — Model PC1 or PC2 Preamplifiers.

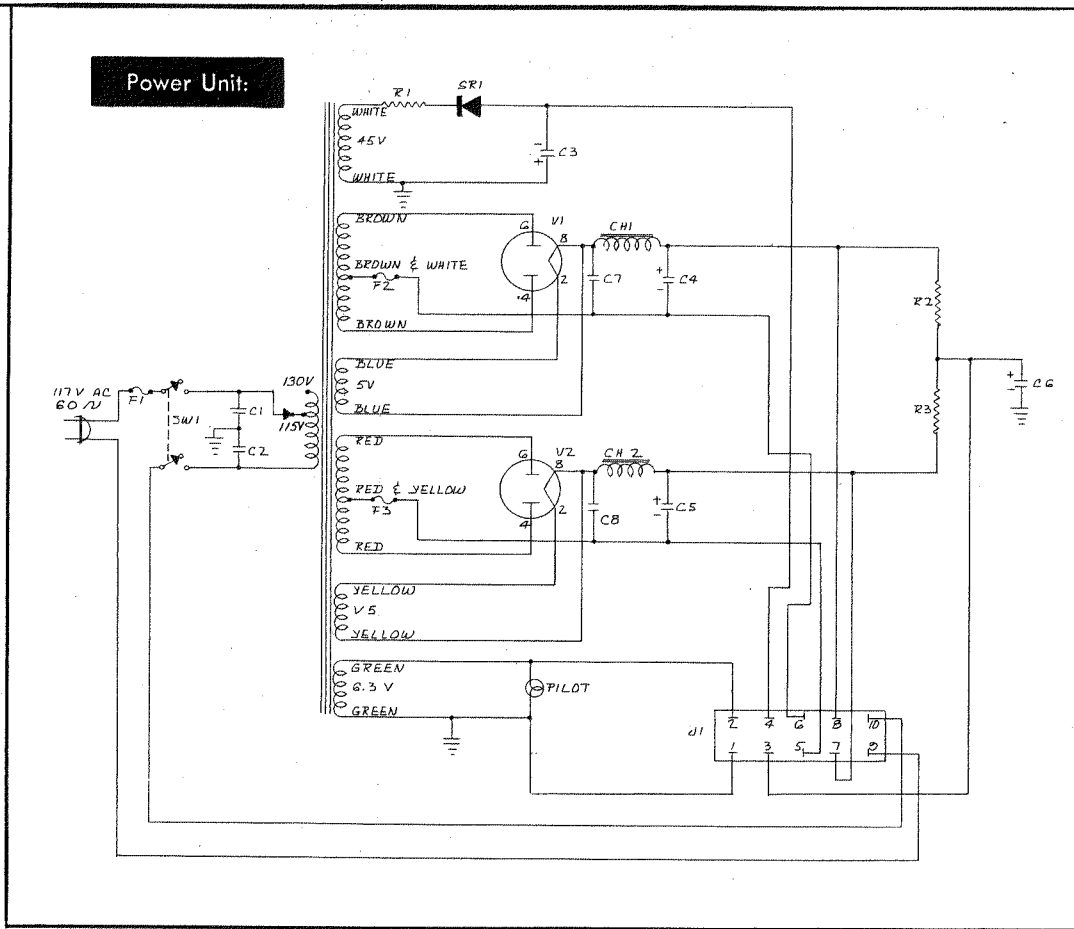
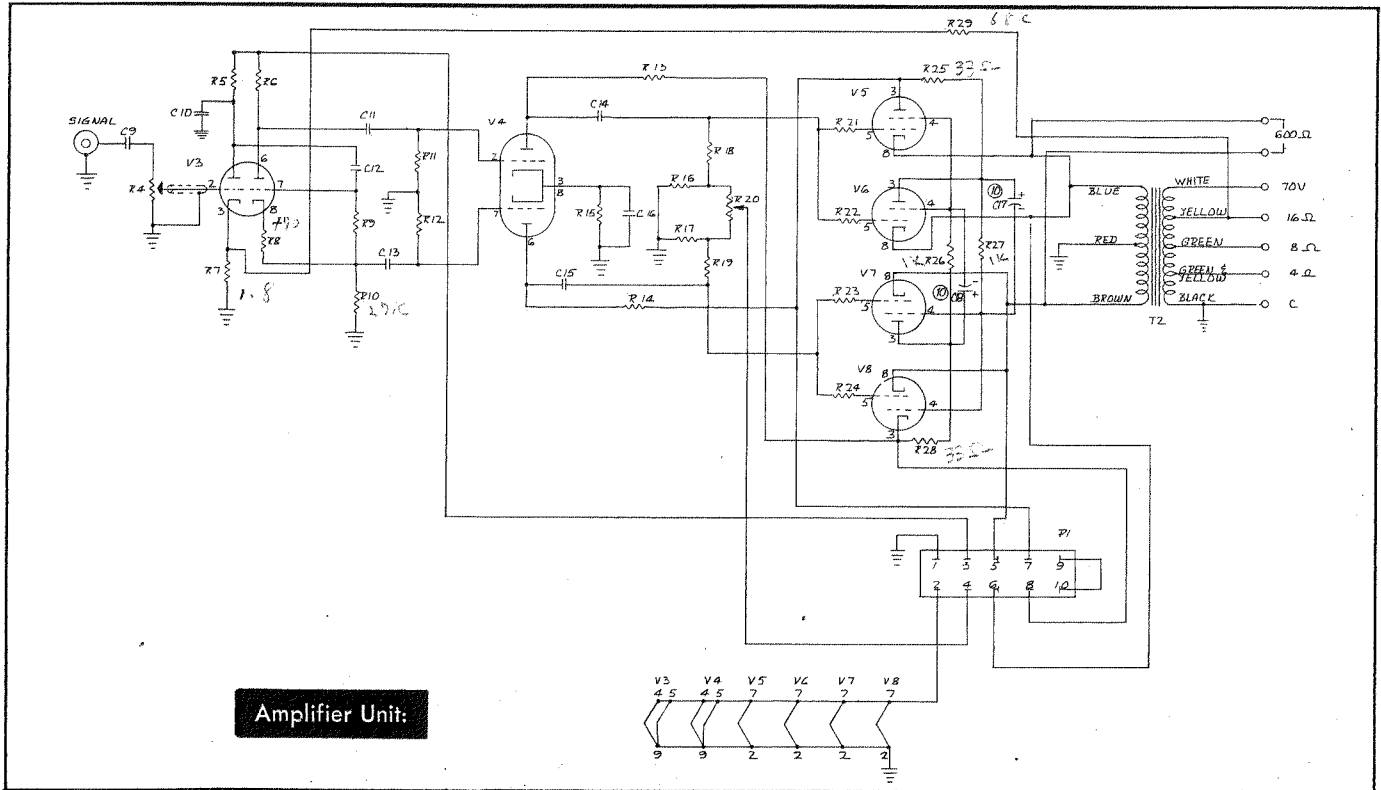
Key	Description	Part No.
C1	Capacitor, 0.047 MFD, 400 V, Plastic Tubular	4243
C2	Capacitor, 0.047 MFD, 400 V, Plastic Tubular	4243
C3	Capacitor, 50 MFD, 100 V, Electrolytic	4242
C4	Capacitor, 40 MFD, 600 V, Electrolytic	42104
C5	Capacitor, 40 MFD, 600 V, Electrolytic	42104
C6	Capacitor, 20 MFD, 450 V, Electrolytic	4246
C7	Capacitor, 0.25 MFD, 600 V, Plastic Tubular	42073
C8	Capacitor, 0.25 MFD, 600 V, Plastic Tubular	42073
R1	Resistor, 220 OHM, Carbon	4664
R2	Resistor, 56K, Carbon	4652
R3	Resistor, 56K, Carbon	4652
V1	Tube, 5U4GB	4338
V2	Tube, 5U4GB	4338
*T1	Transformer, Power	1585
*CH1	Choke, Filter	1586
*CH2	Choke, Filter	1586
SR1	Rectifier, Selenium, 10MA	5914
F1	Fuse, 3AG, 4A Slo-Blo	20218
F2	Fuse, 3AG, 3/4A	20221
F3	Fuse, 3AG, 3/4A	20221
AMPLIFIER UNIT		
C9	Capacitor, 0.1 MFD, 200 V, Plastic Tubular	4265
C10	Capacitor, 100 MMFD, 500 V, Ceramic	4281
C11	Capacitor, 0.022 MFD, 400 V, Plastic Tubular	4260
C12	Capacitor, 0.022 MFD, 400 V, Plastic Tubular	4260
C13	Capacitor, 0.022 MFD, 400 V, Plastic Tubular	4260
C14	Capacitor, 0.47 MFD, 600 V, Oil Impregnated, Wax.	42062
C15	Capacitor, 0.47 MFD, 600 V, Oil Impregnated, Wax.	42062
C16	Capacitor, 0.01 MFD, 500 V, Ceramic	4257
C17	Capacitor, 50 MFD, 100 V, Electrolytic	4242
C18	Capacitor, 50 MFD, 100 V, Electrolytic	4242
R4	Potentiometer, 250K, Audio Taper, Carbon	14686
R5	Resistor, 270K, Carbon	4669
R6	Resistor, 27K, Carbon	4651
R7	Resistor, 1.8K, Carbon, ±20%	4612
R8	Resistor, 470 OHM, Carbon	4654
R9	Resistor, 1.2 MEG, Carbon	4656
R10	Resistor, 27K, Carbon	4651
R11	Resistor, 470K, Carbon	4650
R12	Resistor, 470K, Carbon	4650
R13	Resistor, 12K, 2W, Carbon	4679
R14	Resistor, 12K, 2W, Carbon	4679
R15	Resistor, 820 OHM, Carbon	4694
R16	Resistor, 82K, Carbon	4696
R17	Resistor, 82K, Carbon	4696
R18	Resistor, 82K, Carbon	4696
R19	Resistor, 82K, Carbon	4696
R20	Potentiometer, 10K, Linear Taper, Carbon	54686
R21	Resistor, 120 OHM, Carbon	4607
R22	Resistor, 120 OHM, Carbon	4607
R23	Resistor, 120 OHM, Carbon	4607
R24	Resistor, 120 OHM, Carbon	4607
R25	Resistor, 33 OHM, 2W, Carbon	4663
R26	Resistor, 1000 OHM, 2W, Carbon	46018
R27	Resistor, 1000 OHM, 2W, Carbon	46018
R28	Resistor, 33 OHM, 2W, Carbon	4663
R29	Resistor, 68K, Carbon	46019
V3	Tube, 12AX7	4311
V4	Tube, 12BH7A	4312
V5	Tube, 6550	4337
V6	Tube, 6550	4337
V7	Tube, 6550	4337
V8	Tube, 6550	4337
*T2	Transformer, Output	1584

Tolerances: Capacitors ±20%, Resistors ±10%, unless otherwise indicated. Resistors are 1/2 watt unless indicated.

Note: 1K=1,000 OHMS 1 MEG=1,000,000 OHMS

These parts are available from Electronic parts dealers, except those marked with an asterisk (*) which may be ordered from Electro-Voice.

Schematic Diagram Model A100 Power Amplifier



WARRANTY

The Electro-Voice Model A100 amplifier is guaranteed against defects in workmanship and material.



ELECTRO-VOICE, INC. / BUCHANAN, MICHIGAN