Electro-Voice®

ELECTRO-VOICE, INC.
BUCHANAN, MICHIGAN

Specifications and Instructions
Model A50 Amplifier
50-watt Circlotron High-Fidelity Power Amplifier

GENERAL DESCRIPTION—The Electro-Voice Model A50 amplifier is a high quality 50-watt power amplifier. The brushed-brass and rich brown baked enamel finish presents an attractive appearance which will blend with contemporary room decors.

FEATURES—The Model A50 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.

A damping factor control permits perfect coupling between the amplifier and loudspeaker system eliminating the usual loss of bass from overdamping or hangover due to underdamping. For the first time, through the use of this control, optimum operation of any speaker system is assured.

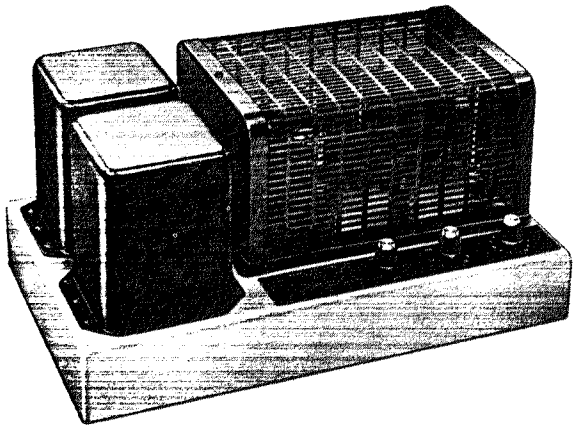

Fig. 1—Model A50 Amplifier

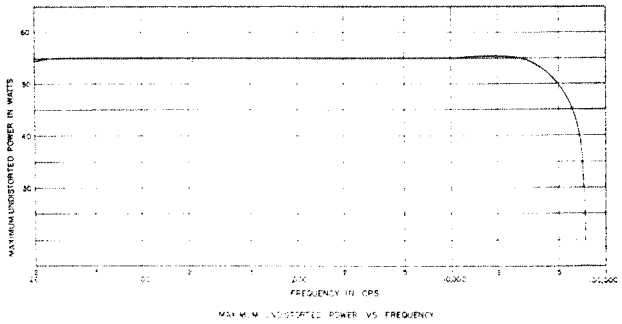

Fig. 2—Maximum Undistorted Power vs. Frequency

SPECIFICATIONS

Power Output:	50 watts rated, 100 watts on peaks See Fig. 2 "Maximum Undistorted Power vs. Frequency"
Frequency Response:	±0.5 db 20 to 75,000 cps See Fig. 3 "Frequency Response"
Harmonic Distortion:	Less than 0.5% at rated output
Intermodulation Distortion:	Less than 1% 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; 70 volts balanced
Feedback:	Loop feedback: 15 db negative Drive plate: 2 db positive Output circuit: 17 db negative Total: 30 db negative
Damping factor:	Adjustable between 0.1 and 10. See table for critical damping factors of all E-V speakers.
Input Impedance:	250,000 ohms
Sensitivity:	1.25V RMS for rated output
Controls:	a. Gain b. Damping Factor c. Power On-Off
Tubes:	Total of 6 as follows: 1 12AX7 1 12BH7A 2 6550 2 5U4GB
Power Consumption:	117V 60 cycle AC at 2.2 amps max.
Size:	16½ in. wide x 10½ in. deep x 8½ in. high
Weight:	41 lb net, 45 lb shipping

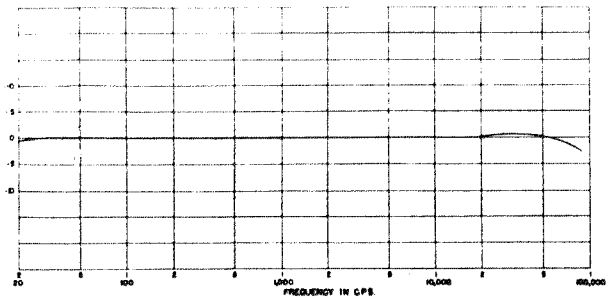

Fig. 3 — Frequency Response at 16-watt Level

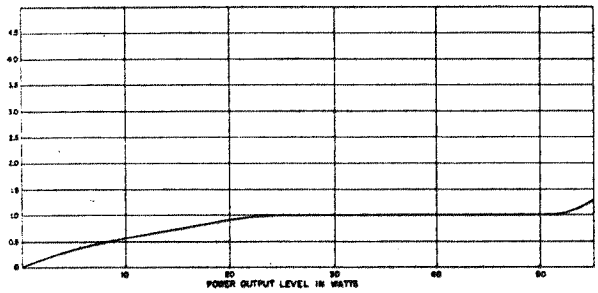

Fig. 4 — Power vs. Intermodulation Distortion

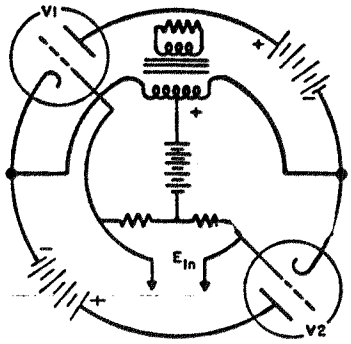

Fig. 5 — Simplified Diagram Circlotron Circuit

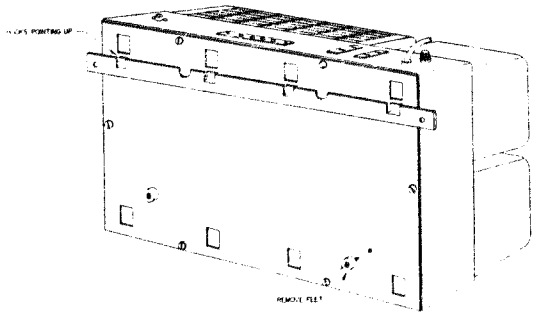

Fig. 6 — Affixing Mounting Brackets

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 produces 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.

VARIABLE DAMPING FACTOR — It is necessary for the amplifier to present the correct effective impedance to the speaker for optimum acoustic performance at low frequencies. This value of critical damping resistance varies widely with different speakers, and is dependent upon flux density, type of enclosure, length of conductor in the air gap, and to some extent, the position of the enclosure in the room. The Electro-Voice damping factor control is variable over a wide range so that an optimum match can be made between the amplifier and any speaker or system. Varying amounts of voltage and current feedback are combined to match the effective impedance while maintaining the *total* feedback at a constant value. The maximum power available from the amplifier is independent of the damping factor, remaining constant at all settings of the control.

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 A50 may be mounted in any position. The amplifier is supplied with rubber feet to prevent marring of the surface on which it is placed. For mounting in a vertical position or for fixed upright mounting (See Fig. 6 "Affixing Mounting Brackets") remove these feet by extracting the screws located in the center of each rubber foot. Install one mounting bracket in the desired location on supporting wall or surface with the hooks pointing up. Install the second mounting bracket on the lower end of the bottom plate with the hooks facing down. Place the amplifier so that the hooks on mounted bracket engage the four cutouts on the bottom plate nearest the top and fasten the second mounting bracket to the supporting wall or surface. Reasonable ventilation is required, and the unit should not be operated in small, completely enclosed spaces. Brackets may also be used for permanent horizontal mounting and are designed to permit mounting in a standard rack. Under unusual conditions of very restricted ventilation, the tube and component cover may be removed to assist cooling.