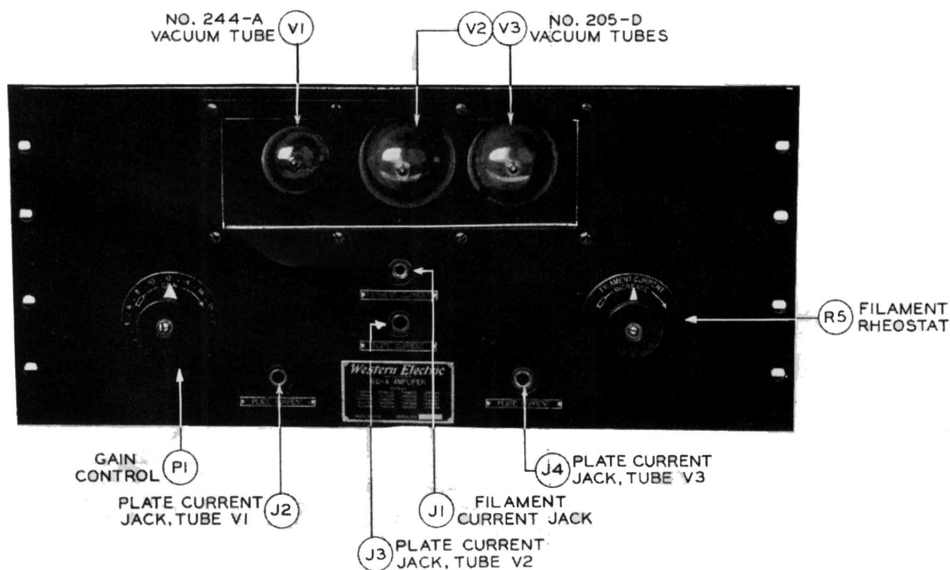


No. 60-A AMPLIFIER



AMPLIFIER

No. 60-A

Instructions for Use

The No. 60-A Amplifier is primarily designed for use in Western Electric Speech Input Equipments for radio telephone broadcasting or similar service. It is capable of amplifying low-level audio frequency signals to such a level that they may be fed into a radio transmitter or telephone line. It can also be used for operating loud speakers.

The No. 60-A Amplifier shown above and in Figure 1 is a two-stage transformer coupled vacuum tube amplifier with the second stage connected in push-pull. It has a maximum gain of approximately 48 db and will deliver without distortion a signal level of approximately +16 db. A No. 244-A Vacuum Tube is used in the first stage and two No. 205-D Vacuum Tubes are used in the second stage. The No. 60-A Amplifier is designed to work from an impedance of 200 ohms and into an impedance of 500 ohms.

The No. 60-A Amplifier requires a filament supply of 3.2 amperes at 7 volts and a plate supply of approximately 55 milliamperes at 350 volts. The grid bias for the first stage vacuum tube is obtained from the potential drop across a resistance located in the cathode circuit. The second stage requires a grid bias of 22.5 volts which is supplied by a battery mounted in the amplifier.

No.60-A AMPLIFIER

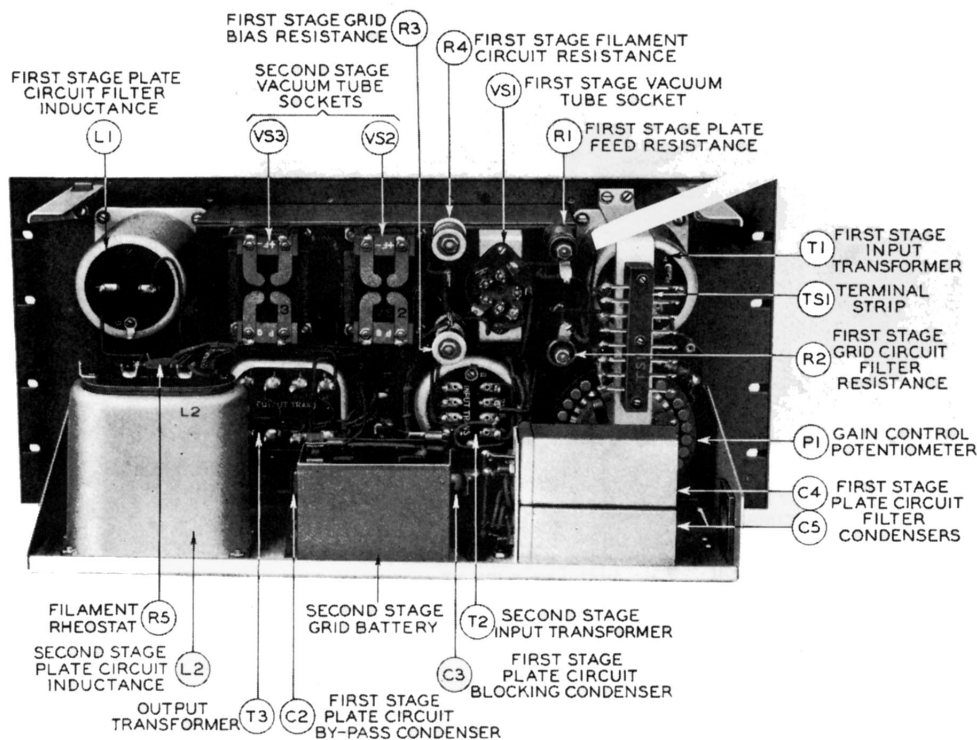


Fig. 1—No. 60-A Amplifier—Rear View

The component parts of the No. 60-A Amplifier are mounted on a panel 19 inches wide and $8\frac{3}{4}$ inches high designed for relay rack mounting. The vacuum tubes are mounted in a recess in the panel and, together with the jacks, gain control and filament rheostat are accessible from the front. The other apparatus is mounted on the rear of the panel and is protected by a removable dust cover.

DESCRIPTION

The schematic circuit diagram of the No. 60-A Amplifier is shown in Figure 2 and the wiring diagram in Figure 3. The signal is applied to the grid of vacuum tube V1 through the input transformer T1 which is designed to work from a 200-ohm circuit into the grid of a vacuum tube. The secondary of the input transformer is shunted by a potentiometer P1, the variable arm of which is connected directly to the grid of the tube. This potentiometer is divided into 23 steps of 3 db each. As it is advanced from step zero the gain of the amplifier is increased in 3 db steps from a loss of 18 db on step No. 1 to a gain of 48 db on step No. 23.

The first stage is coupled to the second stage by means of the interstage transformer T2. The plate current for the first stage vacuum tube is supplied through the resistance R1. A condenser C3 connected between the primary of the transformer and the cathode circuit prevents direct current from flowing

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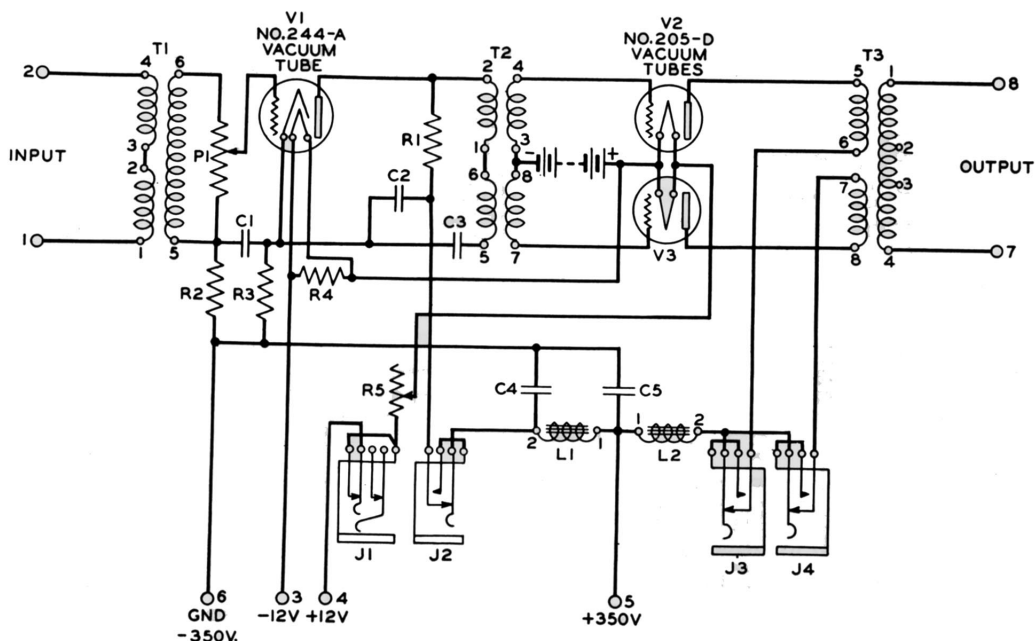
through the coil. The resistance R1 serves the double purpose of offering a high impedance to the passage of voice currents from the plate circuit and reducing the plate voltage from 350 volts to 130 volts for the No. 244-A Vacuum Tube. The secondary of the interstage transformer is connected for push-pull operation.

Two No. 205-D Vacuum Tubes connected for push-pull operation are used in the final stage of the No. 60-A Amplifier. These are designated V2 and V3 on the schematic diagram. The output circuit of the amplifier consists of the output transformer T3 which is designed to work between two No. 205-D Vacuum Tubes in push-pull and a 500-ohm circuit.

The filaments of the vacuum tubes are supplied with current in a series-parallel circuit. The positive side of the filament circuit goes through the jack J1, to the rheostat R5 and then to the filaments of the No. 205-D Vacuum Tubes connected in parallel. The circuit then goes to the heater of the No. 244-A Vacuum Tube and then to the negative terminal. Since the two No. 205-D Tubes in parallel require more filament current than the No. 244-A Tube a resistance R4 is shunted across the filament of the No. 244-A Tube to by-pass the excess current. The jack J1 included in the circuit allows the total filament current of the amplifier to be measured by means of an external ammeter.

The filament current of the No. 60-A Amplifier can be adjusted by means of the rheostat R5. The resistance of the filament rheostat is such that a terminal voltage as high as 16 volts may be applied to the amplifier.

The plate supply circuit is divided into two branches in the amplifier, one branch supplies the first stage and goes through the retardation coil L1, the jack J2 and the plate feed resistance R1. The retardation coil L1 in combination with the condensers C4 and C5 filters the plate current for the first stage to



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SCHEMATIC CIRCUIT DIAGRAM OF 60-A AMPLIFIER

910-1806

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