

Power Amplifiers

The main power amplifiers are shown from the back of the relay rack in *Fig. 10*. The power supplies are at the bottom and the amplifiers on the chassis directly above them. The rack is cooled by forced air to insure reasonably cool operation of the power amplifier array. The front of the rack is constructed to give access to the undersides of all of the power amplifier chassis for purposes of setting the balance pots and checking out the performance of the amplifiers from time to time. The access panels are shown removed in *Fig. 11*. A schematic of the amplifier is shown in *Fig. 12*. The amplifier is rather standard in design except for the internal feedback loop. It is quite undesirable and unnecessary to include the entire amplifier under a single feedback loop since the stability of this arrangement is so poor. Two loops do not give quite the same distortion reduction as will one loop but the stability is very much improved and the overload characteristics are far superior. The d.c. coupling from the driver to the output

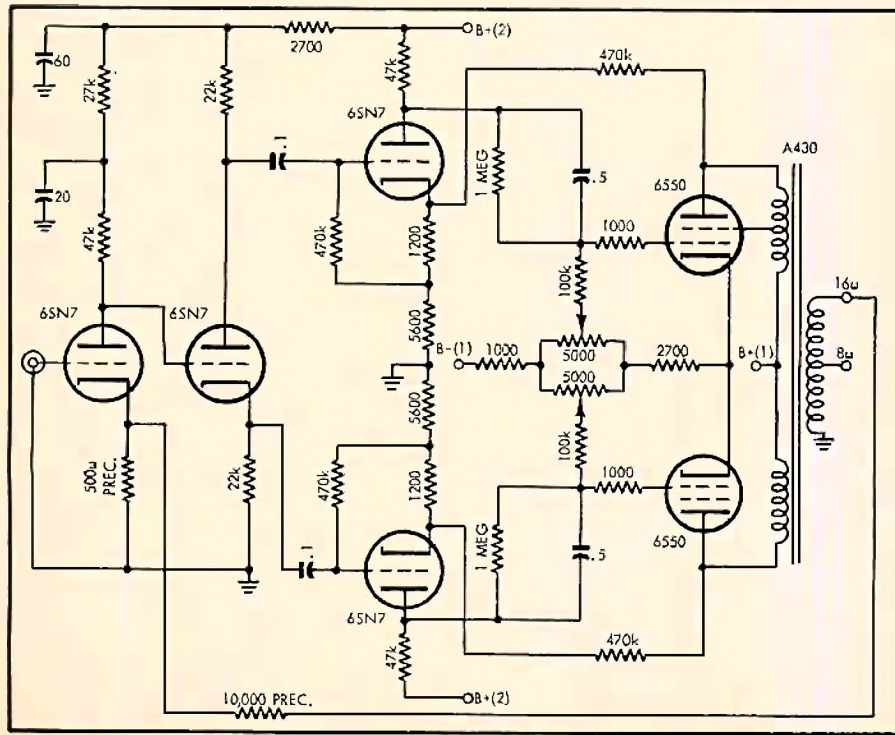


Fig.12. Schematic diagram of one of the power amplifiers.

amplifier tubes also increases the low-frequency stability of the amplifier. Individual bias adjustments are provided so that the output tubes may be balanced. The fact that almost all of the nonlinear distortion in a power amplifier comes from the driver tubes and the output tubes combined makes the inner feedback loop very effective in providing distortion reduction. The over-all loop corrects for the residual distortion which is not very high. These four amplifiers will provide 50 watts each at less than 0.5 percent total harmonic distortion. The hum level is less than the tube noise and essentially not measurable. *Figure 13* shows the power supply for the amplifier. Each amplifier has its own power supply and may be operated independently. The power supply is simple and very conservatively designed. Plate power is not turned on until the tubes have warmed up and the bias supply has come up to full voltage. This is accom-

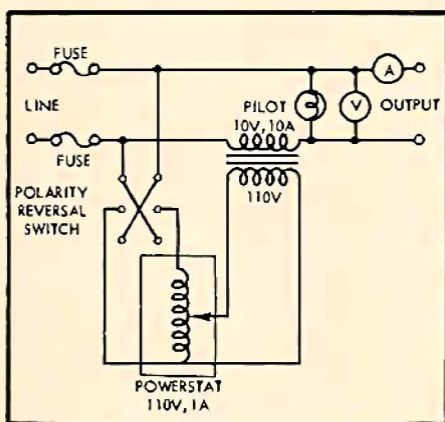


Fig. 14. Schematic diagram of control for regulating line voltage.

plished by means of the relays shown. The 6X4 is operated with 5 volts on the heater so that sufficient time delay is provided. This low heater voltage is not detrimental to the tube because the current drawn from the bias supply is not very large. The bias supply is regulated.

Line Control

A line control is provided for the entire electronic part of the system. The voltage can be adjusted over a small range around the nominal line voltage. The main purpose of the control is to insure proper operation of the tape recorders since they are not electronically regulated. The line control schematic is shown in *Fig. 14*. This schematic is self explanatory.