

struments a lot better than it actually sounds.

Circuit Used

The circuit of Fig. 2 is a very stable 40-watt amplifier (or a 60-watt amplifier with the higher voltage power supply in Fig. 4), using a new transformer made by *Chicago Standard Transformer Corp.*—the BO-15. This transformer was designed for 6550's, EL34's, or KT88's using screen-taps plus 11 db of tertiary feedback in the output stage. There is also 12 db of feedback taken around the whole amplifier. Many configurations were tried and discarded for one reason or another before the present design was arrived at.

The first problem which arose was the high signal needed to drive the 6550's when using tertiary feedback. The required signal is 135 volts r.m.s. grid-to-grid. The need for this high signal arises because the voltage must be increased by the feedback factor in the output stage. This ruled out the use of a 6SN7 as a driver. The tube found best suited for this purpose was the 5687, a dual-triode used extensively in electronic computers. It is capable of exceptional output into the low impedance necessary when using fixed bias. When used in the *Mullard* circuit as a phase-splitter/driver, as it is here, it will deliver 180 volts r.m.s. grid-to-grid into a 50,000-ohm load. The outputs

from the plates are almost perfectly balanced and the impedance looking back into the tube is the same. This stage is quite degenerative and very little distortion is introduced by it.

The EF86 is a low-noise pentode used as a voltage amplifier. This is direct-coupled to the phase-splitter/driver, thus eliminating some phase shift that would be introduced by a coupling capacitor.

Stability of the amplifier is very good under practically any type of load, as can be seen by the oscillograms of Fig. 1. Over 20 db more of over-all feedback could be added before instability in the form of ringing or motorboating sets in. If the amplifier is to be used

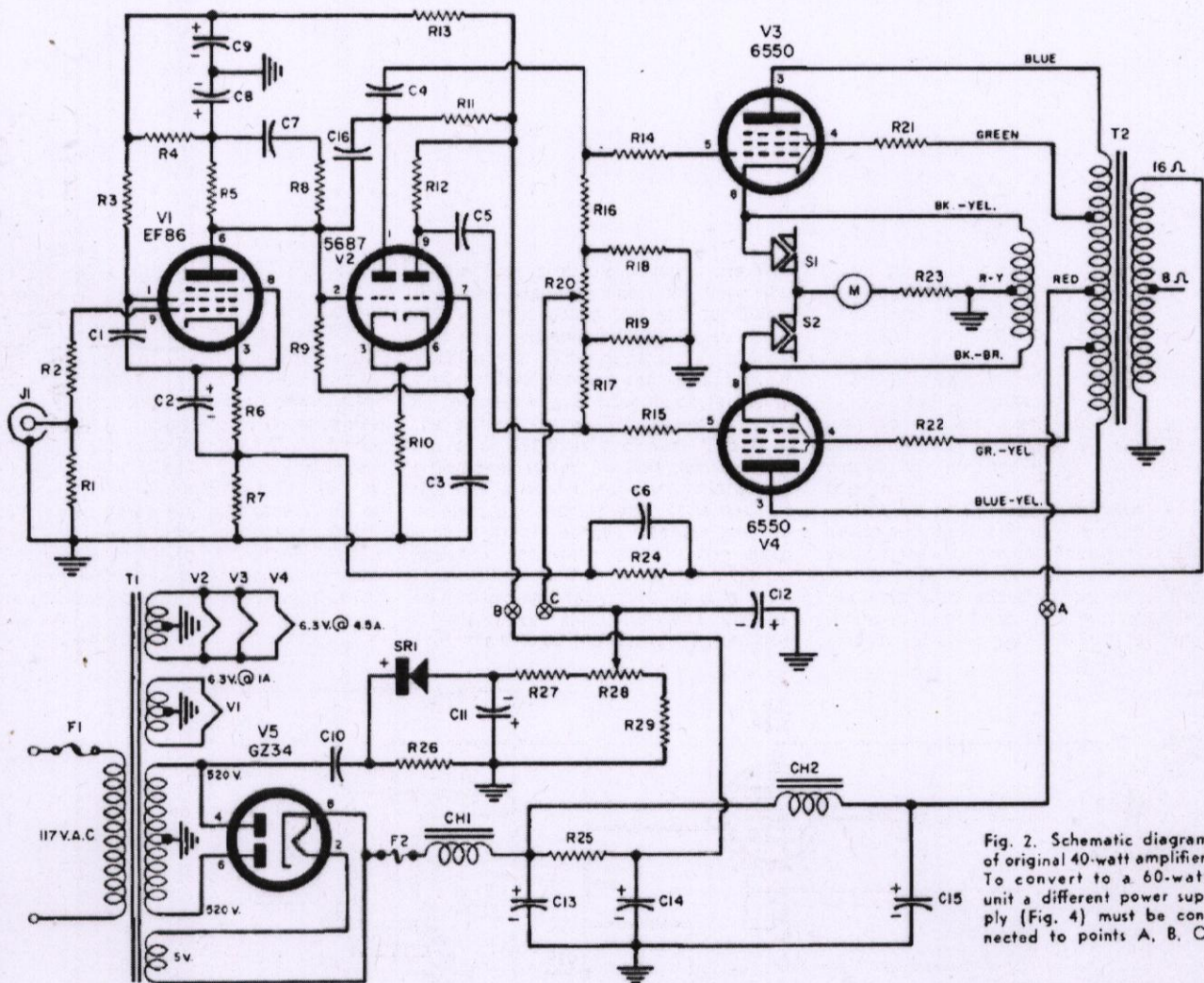


Fig. 2. Schematic diagram of original 40-watt amplifier. To convert to a 60-watt unit a different power supply (Fig. 4) must be connected to points A, B, C.

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