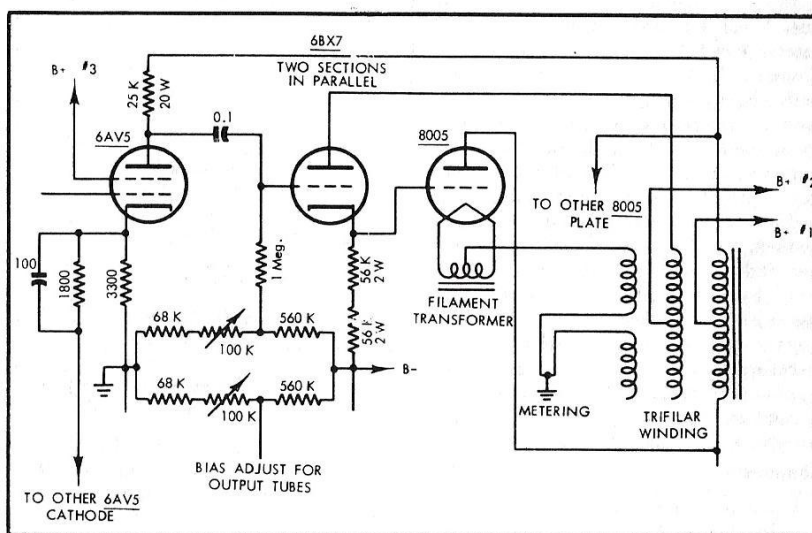


Fig. 11. The modified "long-tailed pair" phase-split inverter, designed to compensate for B+ line fluctuations (due to transient changes in signal level) that otherwise can cause erratic amplifier behavior.

Fig. 12. An "inversion" of the unity-coupled circuit uses a transmitting triode in the output, with a pentode boot-strap drive. With power drive of the 8005's, this circuit delivers 200 watts.



identical effect with that present in the first half. (Fig. 11). In this way the asymmetrical effect of the long-term time-constant changes in the supply circuit are neutralized out so that no component of this appears beyond the phase inverter. This results in an amplifier that does not get shock excited into bounce effect when sudden transients hit it.

There is one more variation of the unity-coupled circuit that this company has produced, using triodes in class-B instead of pentodes. In this case two transmitting type triodes, 8005's, are utilized for the output. The boot-strap method is used for the drive stage in just the same way as for the pentode circuit. But in this case tetrodes are used for the drive function. (Fig. 12). This is because the whole proportions of the output circuit are changed.

With pentode operation the cathode degeneration is responsible for reducing the effective plate-circuit resistance or

source resistance for the output stage from its original very high value to a fraction of the load resistance. Hence a relatively low-resistance triode is necessary for the drive stage, in conjunction with the regeneration of the boot-strap circuit, to prevent complete loss of this improved output impedance and linearization. Using triode output tubes, the picture is practically reversed.

The plate resistance of the tubes is not larger than the load resistance to begin with. In a class-B circuit it is approximately of the same order. The cathode degeneration due to unity coupling reduces this to a lower figure and the regeneration of the boot-strap circuit can be permitted to bring it back approximately to its original region. What is more necessary with a triode output circuit is a bigger swing for the output-tube grids, because of the longer grid base of these tubes as compared with corresponding pentodes. For this reason a pentode, operated with a low-value

plate resistor and using regeneration to multiply the effective value of the resistor, enables the much bigger needed swing to be obtained.

Again, cathode followers are used to drive the triode grid directly and avoid the effects previously mentioned and also to enable the tubes to be driven into the positive grid region to get power drive.

Apart from these slight differences, the circuitry of the 200-watt unity coupled amplifier, using two 8005 triodes for the output, is very similar to the other circuits we have already discussed.

It will be noticed that the circuitry we have discussed in this article is different from that employed by many amplifiers in that it has been engineered to serve the purpose intended, not just taken from current practice and reduced to a minimum for economic purposes. Having engineered a working circuit the McIntosh people have then worked on their production technique to obtain a satisfactory price.