

SEMICONDUCTORS

THEORY OF OPERATION

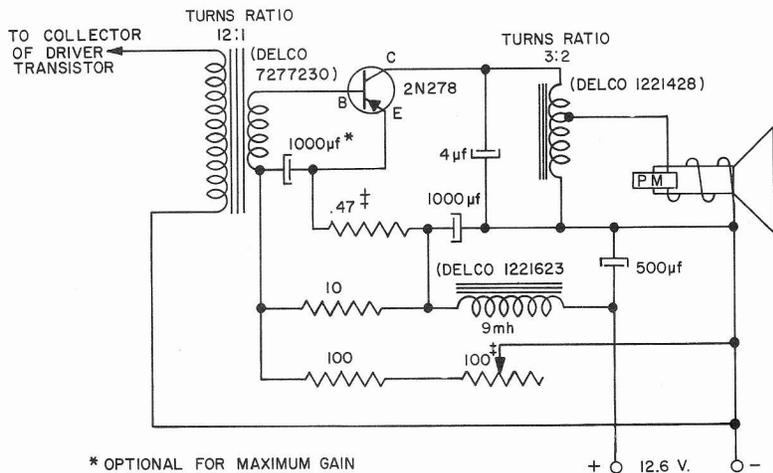
The circuit below is representative of the single-ended class A transistor output stages which are commonly used in modern automobile radios. Operation of this circuit may be explained as follows.

The audio signal from the collector circuit of the driver transistor is coupled through the driver transformer to the base of the output transistor. The d. c. bias which is applied to the base of the output transistor is controlled by the voltage divider composed of the 10 ohm and 100 ohm fixed resistors in conjunction with the 100 ohm rheostat. Thermal stability of the amplifier is promoted by the positive temperature coefficients of the 10 ohm resistor and the 100 ohm rheostat. The rheostat is set at the position which establishes a collector current of 1.05 amperes. Elimination of interference originating in the vehicular electrical system is accomplished by the 9 millihenry choke and the two electrolytic capacitors which are connected to it.

A gain increase of at least 5 db is realized through use of the optional emitter bypass capacitor which is identified by the asterisk. This capacitor provides a low impedance path for the signal, thus avoiding signal losses which would otherwise occur in the 10 ohm and .47 ohm resistors. High frequency response is attenuated by the 4 mfd. capacitor across the primary of the output transformer. In addition to providing the desired response roll-off, this capacitor gives excellent protection from transients. The output transformer effectively matches the 4 ohm speaker to the 11 ohm collector impedance of the transistor. Distortion remains below 10% at four watts output.

The output transistor should be thermally protected by mounting it on a heat sink which will maintain its junction temperature at a safe value while radiating the heat which is generated by the dissipation of the class A collector current. Delco Radio 7270725 or 7281366 heat sinks are suitable for use with this circuit.

**TYPICAL TRANSISTOR
OUTPUT STAGE FOR
AUTOMOBILE RADIO**



* OPTIONAL FOR MAXIMUM GAIN
‡ PLUS TEMPERATURE COEFFICIENT

AUTOMOBILE RADIO OUTPUT STAGE

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