In VFO mode of operation the fundamental frequency of the VFO is doubled. In crystal mode, the fundamental frequency of the crystal is tripled. The output is then fed into the input of the second frequency doubler stage, pentode section of V8.

The second frequency doubler stage doubles the frequency again. The frequency produced at the output of the second frequency doubler stage V8 is four times the VFO oscillator frequency and six times that of the crystal frequency. The output of the second frequency doubler is fed to the grid of the RF power output stage V9.

The RF power output stage V9 amplifies the signal further and supplies RF power to the antenna through a pi matching network and a harmonic filter.

To modulate the transmitter, an audio signal must be introduced into the microphone. When an audio signal is introduced into the microphone, it is amplified by the triode section of the microphone preamplifier V4. The output of the microphone preamplifier is fed to the triode section of the second preamplifier V6 where it is further amplified. The output of the second preamplifier is fed to the triode section of the phase inverter V7 where two 180° out-of-phase signals are produced to feed the push-pull power output tubes (V6 and V7). The output of the phase inverter is fed to the grids of the pentode sections of the power amplifiers (V6 and V7) which provides the power necessary for high level plate modulation.

The output of the push-pull power amplifiers is used to modulate the RF power output stage V9.

POWER SUPPLY

The power supply of the HA-460 is a universal type capable of operating from 117 volts AC or 12 volts DC power sources.

When operating from 117 volts AC power source, the power supply functions in the usual manner with the AC being applied to the power transformer and rectified by a full wave rectifier and its associated filter network (see schematic diagram).

When operating from a 12 volt DC source, four 2SB425 transistors are used to convert the DC to AC. The AC is then stepped up by the power transformer and rectified to produce the B+ voltage. A polarity reversing switch S1 (see schematic diagram) is furnished so that the power supply may be used on vehicles having either a positive or negative ground.

S-METER/RELATIVE POWER INDICATOR

A unique meter circuit is used to provide indication of operation in both the receive and transmit modes. In the receive mode, the screen current of the AVC controlled IF amplifier (V5) is measured by the meter. The indication is proportional to the AVC voltage (or incoming signal strength). The meter is calibrated in "S" units to 9 and in decibels above S-9.

In transmit, a small portion of the RF output signal is rectified and filtered. This rectified voltage is measured by the meter and gives an indication of the relative output of the transmitter.