

Modulator Construction The modulator is constructed upon a steel chassis measuring 8" x 17" x 2". A 10½" aluminum panel is bolted to the chassis with two mounting brackets to form a rugged assembly. Placement of the major parts may be seen in figures 14 and 16. The modulation transformer T_2 and the 811-A tubes occupy the right end of the chassis, balanced in weight by the power transformer T_1 and modulator filament transformer T_3 at the opposite end of the chassis. The center space is taken by the plug-in speech amplifier, the high level splatter filter assembly and the 5881 driver stage.

The speech amplifier is constructed as a separate unit on a small aluminum utility box measuring 5" x 3" x 2". The bottom of the box holds two male plugs which match two receptacles mounted on the amplifier chassis. The speech amplifier, therefore, may be wired and tested as a separate unit. Clipping and audio level controls are mounted atop the amplifier box as long usage of clipper circuits has proven that these controls need not be re-adjusted once they are properly set.

The phone-c.w. switch, relay RY-1, and various small components are mounted beneath the chassis (figure 16). The input receptacle for the speech amplifier box is located adjacent to the microphone receptacle on the front panel of the modulator making the interconnecting lead less than two inches long. Also placed beneath the chassis are the filter choke for the low voltage supply and the various bypass and filter capacitors.

Wiring and Testing the Modulator The speech amplifier should be wired first.

The small resistors and capacitors are mounted either between the tube socket pins, or between terminals of small phenolic tie-point strips. Transformer T_1 is fastened within the amplifier box and is wired in the circuit after all other wiring is completed. Plugs PL₁ and PL₂ are mounted on the bottom portion of the box; the plug pins are wired to the proper points of the speech amplifier with short lengths of wire that allow the bottom plate to be removed for inspection and testing without the necessity of unsoldering any connections to the plugs.

The modulator chassis should be wired next. All leads to T_2 , RY-1, and the low pass filter should be carefully insulated from the chassis. High voltage "5000 volt test" cable should be employed for these connections. The capacitors that make up the high level audio filter are mounted directly to the terminals of the

filter choke which is mounted above the chassis on ½-inch ceramic insulators. High voltage connections to the modulator are made through Millen 37001 safety terminals.

When the wiring has been completed and checked, the 12AX7, 6AL5, 12AU7, 5881, and 5V4-GB tubes should be inserted in their sockets and the speech amplifier is plugged into the modulator receptacles. The vertical amplifier of an oscilloscope should be connected to one grid terminal of the 811-A stage. Plate voltage of the 5881 should be approximately 370 volts. A low level 1000 cycle tone (approximately 0.05 volts, r.m.s.) is applied to the amplifier input. The output level of the speech amplifier is controlled by the setting of the clipping control R_2 and the audio gain is controlled by potentiometer R_1 in the grid circuit of the 12AX7. The clipping control should be set so that not more than 60 volts r.m.s. is developed from one 811-A grid to ground. The modulator tubes may now be plugged in their sockets. A 7K, 200 watt resistor should be placed between the "H.V. Out" and "H.V. In" terminals, serving as a dummy load, and 1500 volts applied to the latter terminal. With no audio signal the resting plate current of the modulator stage should be approximately 15 milliamperes, kicking up to about 160 milliamperes under full output conditions. Final adjustment of the clipping control may be made when the modulator is placed in use with the r-f section of the transmitter. Potentiometer R_2 is then adjusted to limit the peak modulation level under sine wave modulation to approximately 90%.

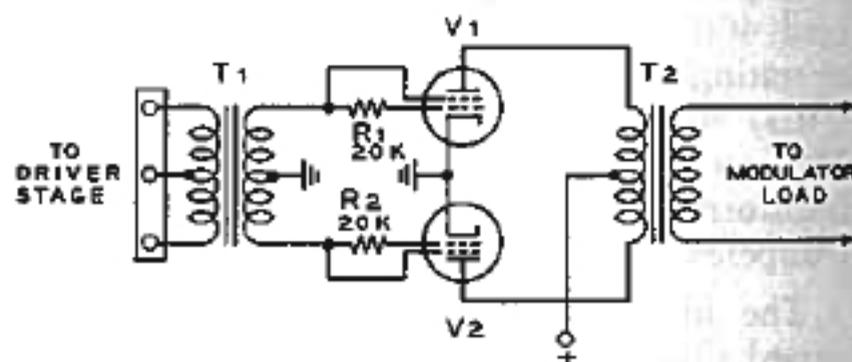


Figure 17

ZERO BIAS TETRODE MODULATOR ELIMINATES SCREEN AND BIAS SUPPLIES

Low driving power and simplicity are key features of this novel modulator. Tubes ranging in size from 6AQ5's to 813's may be employed in this circuit.

T_1 —Class B driver transformer
 T_2 —Modulation transformer
 V_1, V_2 —6AQ5, 6L6, 807, 803, 813, etc.
 R_1, R_2 —Not used with 803 and 813