

If the metering plug is inserted all the way into the jack, the meter will read final amplifier cathode current, typically in the order of 20-25 ma. The meter plug must be withdrawn from this position for normal operation once proper tuneup has been accomplished. The meter plug in this fully inserted position overrides the normal functioning of the transmit-receive switch and allows final amplifier plate current to flow regardless of switch position.

With a key plug inserted all the way in the meter jack, the transmitter may be used on CW if desired, although considerable "back wave" may result due to the fact that previous transmitter stages are running constantly.

For phone operation, modulation is accomplished by causing the plate and screen voltage source for V4B to vary at the audio frequency rate determined by the signal being passed through the combination modulation-output transformer (see AUDIO SECTION description).

RECEIVER SECTION

The incoming signal received by the antenna and arriving at the antenna connector via the transmission line is supplied to an impedance matching tap on coil L5, through capacitor C20. The resultant signal appearing across the broadly tuned circuit consisting of L5 and C21 is fed to the input of the RF amplifier stage V3A. The output circuit of the RF amplifier is "impedance coupled" to the cathode circuit of the superregenerative detector V3B through capacitor C24. This arrangement provides considerable gain in the RF stage, which does not require neutralization as the feed point in the detector circuit is relatively low impedance.

This means of coupling these two stages eliminates the most trying problem in most superregenerative detectors in that a condition referred to as "suck-out" can occur where a tuned circuit is not properly isolated from the detector. In other instances where a tuned circuit (it may be a coil and capacitor combination or reflected antenna tuning) is closely coupled, the detector will drop out of oscillation as detector tuning passes the resonant frequency of the interfering tuned circuit. In addition to solving the above problem and providing gain, the RF amplifier also isolates the antenna from the oscillating detector, minimizing re-radiation from the detector into the antenna.

The type of detector used is one which provides the most sensitivity for the number of components required and is superregenerative. In a straight regenerative detector, considerable sensitivity is achieved by adjusting the signal feedback of the detector for a near oscillating condition. In the regenerative circuit, the more feedback that can be employed with stable operation short of the detector actually going into oscillation, the greater will be the gain.

The superregenerative detector employed here carries the regenerative principle one step further in that the detector actually goes in and out of oscillation at a controlled rate. In doing such, the detector periodically passes through the point of maximum gain (just prior to oscillation) and therefore provides optimum gain from its circuit. This periodic rate, referred to as the "quench" frequency, is controlled by the value of RFC5, and associated components, and is in the vicinity of 20,000 cycles per second; therefore, the quench frequency is inaudible. The detector circuit is essentially a Colpitts type of oscillator circuit in which interelectrode tube and stray capacities form the normal feedback path. The detector cathode and heater are placed above RF ground by RF chokes RFC3 and RFC4. The plate circuit is bypassed for RF by C29.

The rear apron mounted 250 K Ω linear potentiometer R11 is adjusted for maximum sensitivity by setting the value of B+ voltage at the detector plate. The receiver configuration is one of very good sensitivity. Three microvolts input will produce near complete quieting with usable signals extending down to 1/2 microvolt.

AUDIO SECTION

The detected audio signal passes through C30 to the 1 megohm volume control R13. Signal flow proceeds through the audio mixing resistor R22 to the grid of the audio driver V1A which is coupled to the power output stage V2 by capacitor C35. The combination modulation-output transformer T2 provides proper impedance matching to the speaker with the unit operating as a receiver. With the transmit-receive switch in the receive position, no loading of the audio output occurs at the primary modulation tap because the cathode circuit of the transmitter final amplifier is open. During receive, tubes V5, V4 and section V1B are inoperative.