

1-6. THEORY OF OPERATION.

1-7. A 6V6 tube is employed in a regenerative crystal oscillator circuit. The oscillator has a substantial harmonic output and works very well as a doubler or tripler with a minimum of crystal current; this allows the use of 160, 80 and 40 Meter crystals for complete Amateur band coverage. A VFO with 3 or 4 watts RF output will drive the oscillator stage easily and may be used in place of a crystal. A keying jack in the oscillator cathode circuit allows the operator to work CW. Bandchanging in the plate circuit of the oscillator is accomplished by shorting-out unused portions of the oscillator plate coil (L-1).

1-8. A type ⁶¹⁴⁶~~6X6~~ tube functions as a buffer or doubler stage. This stage is capacity coupled to the oscillator. A combination of fixed and excitation bias are applied to the buffer stage; this allows class "C" operation and also insures complete cut-off of buffer plate current when the oscillator is keyed, or in the event of excitation failure. R.F. output to the Power Amplifier is controlled by a potentiometer in the buffer tube screen grid circuit. Bandswitching of the entire Exciter section is simplified by the use of a ganged switch. D.C. voltages are kept off the coil (L-3) and the bandswitch by shunt feeding the plate of the buffer tube. A SSB R.F. signal may be inserted by means of a link in the buffer plate coil (L-3). This same link may be used for VFO control and drive of the Power Amplifier stage. 10 to 15 watts are required for this method of operation. SSB operation requires the removal of low B + voltage from the exciter section. A switch in the Exciter B + line is provided for this purpose.

1-9. The Power Amplifier employs one type 4-250A tube which operates as a straight-through class "C" AM, or class "B" SSB amplifier. Fixed and excitation bias are employed in the Power Amplifier, as well as in the Buffer stage. Class of operation is determined by a switch which selects the proper fixed bias voltage. The plate circuit is tuned by a Pi network and an additional L matching section may be switched in if necessary. The Pi and L network will match impedances of from 52 to 600 ohms. When properly tuned harmonic output of the Power Amplifier is reduced considerably. The plate of the final is modulated directly while the screen grid is self-modulated by means of a high inductance choke. The Power Amplifier is unique in that the screen grid voltage is self-regulated. A rise in screen grid current automatically reduces voltage and vice versa. By this method the screen grid dissipation rating is not exceeded, giving excellent tube protection, and tube life is extended. A 5Y3GT tube is employed as the low voltage rectifier for the Power Amplifier screen grid supply. A 6X5GT tube operating as a half-wave rectifier supplies all bias voltages to the Power Amplifier and Buffer stages.