

OSCILLATORS, MULTIPLIERS, AMPLIFIERS

AN INEXPENSIVE 75-WATT TRANSMITTER

The transmitter shown in Figs. 6-40 and 6-42 combines the efficiency and flexibility of plug-in coils with good shielding for TVI prevention. It is a two-stage transmitter using a 12BY7 crystal oscillator and an inexpensive 1625 triode amplifier. The latter tube is quite inexpensive in surplus and probably represents the least "dollars per watt" of any available tube. Provision is included for crystal-controlled operation, and terminals are provided for connecting a v.f.o. Construction has been simplified by holding the metal work to a minimum.

Referring to the circuit diagram of the transmitter, Fig. 6-41, a 12BY7 grid-plate type crystal-controlled oscillator is used. The output can be tuned to the crystal frequency or to multiples of it, depending upon the coil plugged in at L_1 .

the inductance of a small coil, since any coil of sufficient turns (without the ferrite) would of necessity be wound of wire too small to handle the r.f. current adequately.

Two methods of keying are provided. The oscillator and amplifier can be keyed simultaneously with switch S_2 in the "break-in" position, or the amplifier only can be keyed, with the oscillator running all the time, turned on by a switch connected at J_4 . The latter keying system should be used if reports of a chirpy signal are received (a possibility on 10 and 15 meters with some crystals). However, good keying is provided for in the break-in condition through the inclusion of a 4- μ f. "shaping" capacitor across the keyed circuit.

The switch S_1 provides "CAL" ("calibrate")

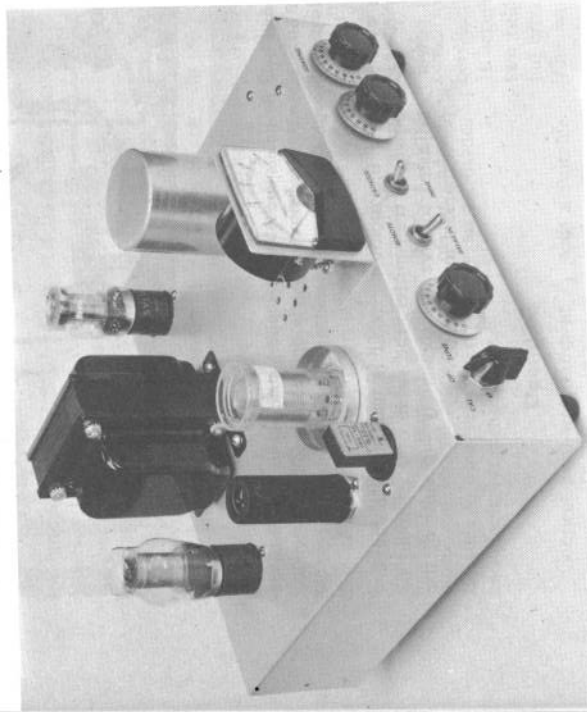


Fig. 6-40—The inexpensive 75-watt transmitter is a two-tube five-band crystal-controlled transmitter; v.f.o. control can be added at any time. To simplify construction and testing, plug-in coils are used, housed in the two shield cans (Millen 80011 or Miller S-42 with S-42C base). The crystal oscillator tube, a 12BY7, is housed in the black tube shield at the left; the 1625 amplifier tube is mounted under the chassis.

Two toggle switches under the meter select (left) remote oscillator control or break-in keying and (right) grid or cathode current of the 1625. Two voltage regulator tubes can be seen at the rear of the chassis; the key jack, antenna jack, remote oscillator control jack and line-cord outlet are at the rear of the chassis (not visible).

Both 80- and 40-meter crystals are used; 80-meter crystals for 80- or 40-meter operation, and 40-meter crystals for 40-, 20-, 15- and 10-meter work. Output on 10 meters is obtained by quadrupling to 10 meters in the oscillator and running the amplifier at reduced input because the excitation is marginal.

The amplifier tank circuit is a pi network designed primarily for working into a low impedance (50 to 75 ohms). A 140-pf. capacitor, C_2 is used for plate tuning on all bands; on 80 meters it is shunted by an additional 100 pf. This is done automatically by a jumper connection in the coil. The loading capacitor is a 3-section broadcast-tuning type capacitor (365 pf. per section) with all stators connected in parallel. On 80 meters it

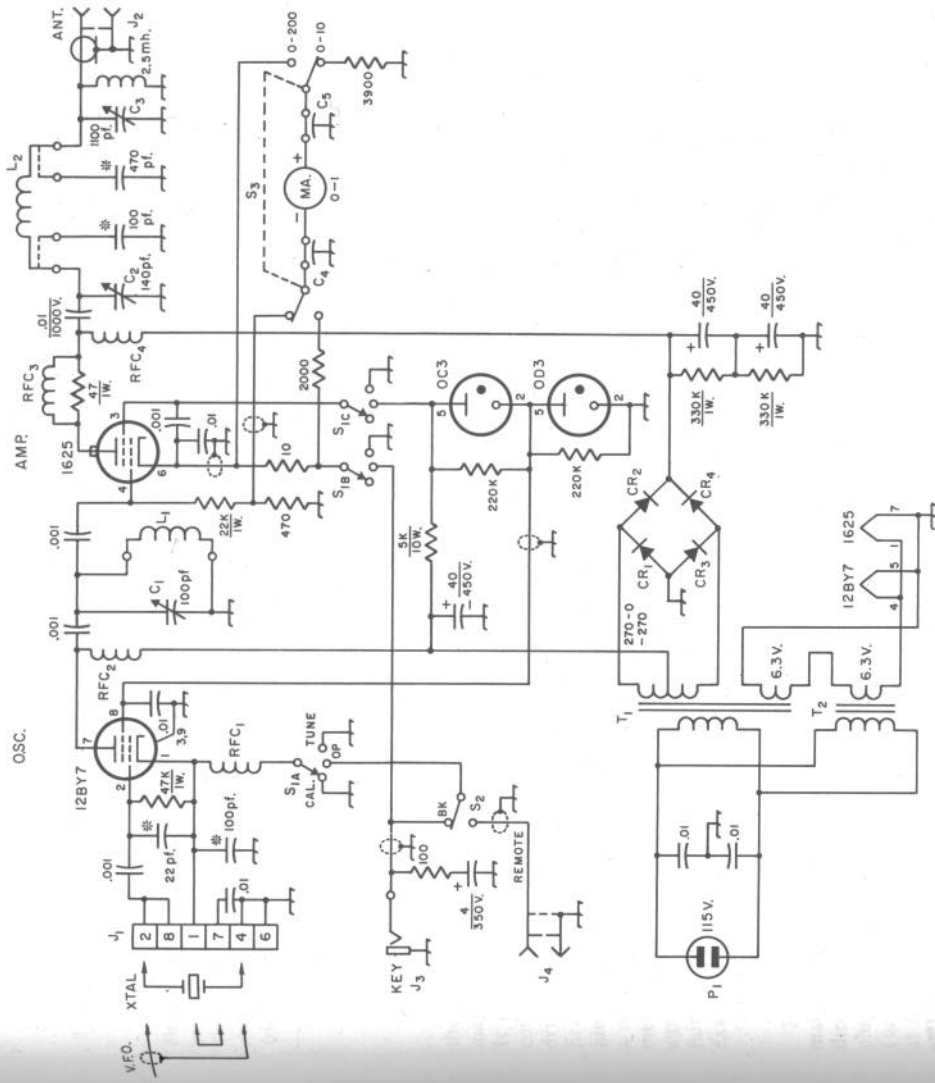


Fig. 6-41—Circuit diagram of the inexpensive 75-watt transmitter. Unless indicated otherwise, all resistors are $\frac{1}{2}$ -watt, all resistances are in ohms, all capacitances are in μ f. Electrolytic capacitors are marked with polarity, mica capacitors are marked with *, other fixed capacitors under 0.1 μ f. are ceramic.

- C_1 —100-pf. variable (Hammarlund HF-100).
- C_2 —140-pf. variable (Hammarlund HFA-140-A).
- C_3 —1100-pf. variable—triple b.c. capacitor (J. W. Miller 2113).
- C_4 , C_5 —500-pf. feedthrough (Centralab FT-500).
- CR_1 —CR₄—1000 p.i.v. 300-ma. silicon (1N3563).
- J_1 —Octal socket (Amphenol 77MIP8).
- J_2 —Coaxial chassis receptacle, SO-239.
- J_3 —Standard phone jack.
- J_4 —Phono jack.
- L_1 —See coil table.
- L_2 —Fused line plug, 5-ampere fuses.
- RFC_1 , RFC_2 —1-mh. 135-ma. r.f. choke (National R-50).
- RFC_3 —7 turns No. 20 space-wound on 47-ohm 1-watt resistor.
- RFC_4 —2.5-mh. 115-ma. r.f. choke (National R-1000).
- S_1 —3-pole 3-position rotary switch (Centralab PA-1007).
- S_2 —D.p.d.t. toggle (one pole used, see text).
- S_3 —D.p.d.t. toggle.
- T_1 —540 v.c.t. at 120 ma., 5 v. at 3 amp. (not used), 6.3 v. at 3.5 amp. (Knight 54A1466 or equiv.).
- T_2 —6.3 v. at 1 amp.

CONSTRUCTION DETAILS

Before drilling any holes for the components, it would be wise to study the arrangement of parts on the 10 X 12 X 3-inch aluminum chassis.

Two brackets of sheet aluminum are required, one for the 1625 socket and one for the meter. The bracket for the tube socket is held to the chassis by the 4-pin socket for L_1 , and the tube socket is centered $1\frac{1}{2}$ inches from the chassis.