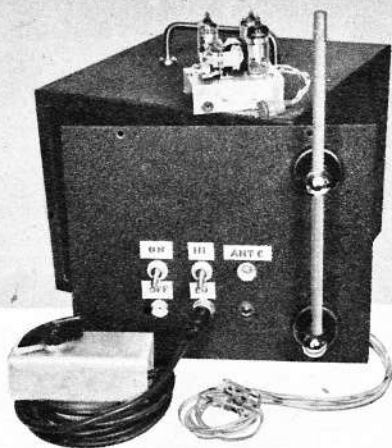


GOOD'S X TAL MTR

Here's Dr. Walter A. Good's remarkable audio-tone transmitter for 27.255 mc



■ This transmitter is designed to send out a steady carrier on 27¼ mc. and also a 400 cycles tone for heavy modulation. That means the RF output is practically turned on and off at a 400 cycle rate.

Unit consists of three sections, crystal oscillator on 27¼ mc. (3V4), RF amplifier (3V4), and audio oscillator (3A5) which is a multivibrator running at 400 cycles.

When sending a steady carrier both 3V4's are working—the 3A5 is off. During modulation the 3A5 is oscillating at 400 cycles and its output modulates the grid of the 3V4 amplifier. This has the effect of turning the amplifier off at a 400 cycle rate; thus the average power output is less during modulation. This may not appear ideal to some, but seems to work quite well in the field. Power input to the amplifier plate is about 1.5 watts and power output measures about ½ watt. Output power is efficiently radiated by using McEntee's Mac II antenna coupling circuit plus a small series lamp to indicate current going into the antenna. This was on brother Bill Good's transmitter and works very well. Just tune for maximum brightness.

One of the transmitter problems is to prevent the crystal oscillator output from "leaking" to the antenna during "modulation." When this happens, the percentage of modulation is lessened and the receiver relay current doesn't drop as far. Actually, this is only a close-range problem and can be cured by building the transmitter in a tight metal box and keeping the crystal oscillator separated from the antenna coil, as shown.

The transmitter is fastened into a metal box, 10" x 10" x 8", which houses the dry batteries, serves as a sturdy base for the whip antenna, and forms a good "ground" for best radiation.

Build the transmitter according to the diagrams and sketches and use the following adjustment procedure:

1. **Voltages.** Use 135 volts on the crystal oscillator, multi-vibrator and power amplifier. This is HI-LO-power switch in the HI position.

2. **Crystal oscillator.** Place milliammeter (10 ma. or larger) at E-F, observing proper polarities, and tune coil L₁. The current should change as shown in Fig. 2. Set on the stable part of the curve as indicated, at about 6 ma. Touching coil with your finger should stop oscillation, but it should return to 6 ma. when finger is removed.

3. **Power amplifier.** Place meter at G-H and tune L₂ for a dip in current. This dip is not deep, only a mil or so. A brown bead (150 ma.) lamp from antenna post to ground in place of the an-

tenna will help determine when the amplifier is delivering power, as will the pink bead antenna current lamp.

4. **Antenna coil.** On the bench use brown bead lamp connected between antenna and ground instead of the antenna. Vary coupling between L₂ and L₃ and also tune C₃ for maximum brightness. Keep the L₂ coupling on the light side as indicated by the plate current of the power amplifier. The plate current should not exceed 12 ma. If L₂ is far out of tune or the crystal tube stops oscillating, the amplifier plate current can jump up to 25 ma. which is damaging to the tube; go back to LO power and "rough in" settings. Pressing the modulation switch causes the lamp to dim. This is normal. Note that the "antenna current lamp" (pink bead) glows brightest when L₂ and C₃ are tuned best.

5. **Field check.** Connect antenna. Use field strength meter at a suitable distance. Repeat tests 3 and 4 and see that the amplifier plate current does not exceed 12 ma. Use settings which give maximum brightness of antenna current lamp. On different types of earth, the antenna condenser may need slight retuning for best lamp output.

The transmitter batteries are: 1.5 V.—one Burgess size 4F. 135 V.—three Burgess M30 (45V.). 12 V.—two Burgess F4P1 (6V.), used here with a 12V. Beep Box.

The writer happily acknowledges the assistance of many of the DC/RC Club members for serving as "guinea pigs" during the testing stages of this radio gear. In particular, thanks to Murray Colliere who helped "debug" the receiver, and to Bill Saks whose efforts converted a "workbench" transmitter into a practical field design.

Note. 52 mc. operation of receiver: coil—17T #26 enamel close wound; RFC—higher frequency type; tube—the 1U5 may have to be selected to find a "hot" one for this higher frequency. Also a plate voltage up to 67V is helpful.

Wag Transmitter Parts List

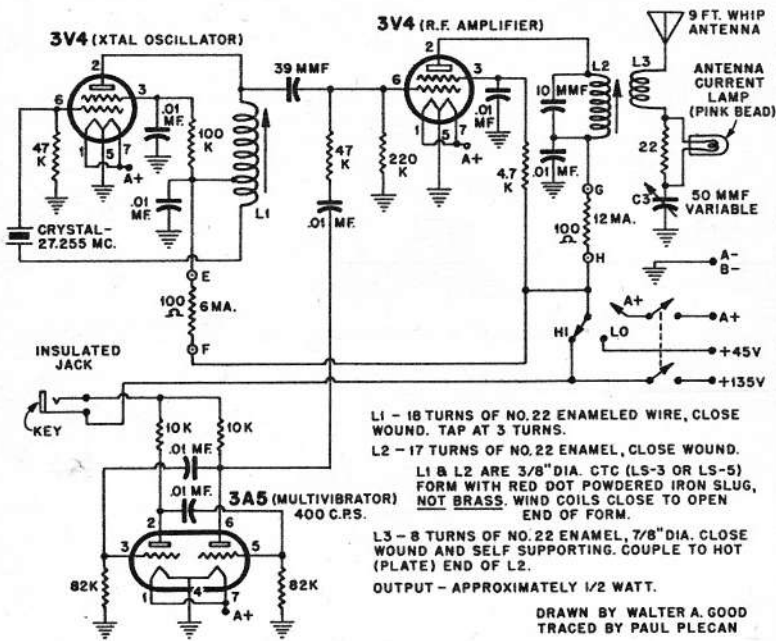
Capacitors: 1 4 to 50 mmf variable—Hammarlund APC-50 (or equivalent). 7 .01 mf disc ceramic. 1 10 mmf mica. 1 39 mmf ceramic.

Resistors, all ½ watt: 2 100 ohms. 1 22 ohms. 1 4700 ohms. 2 10K. 2 47K. 1 100K. 1 220K. 2 82K.

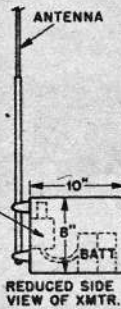
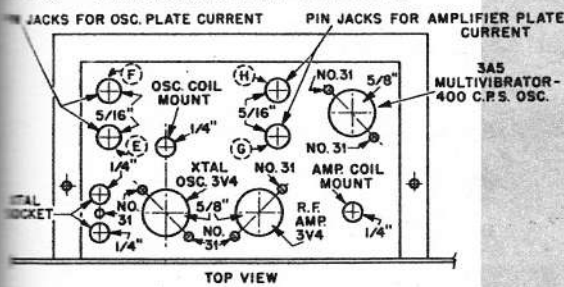
Misc. 3 sockets—7 pin min with shield base—Cinch 7XB. 3 tube shields for 7 pin min 1¼" high—Cinch 7S3. 1 crystal—Peterson -9, 27,255+.04% mc. 1 crystal socket, .050" pins, .485" spacing. 4 insulated phone tip jacks (E, F, G, H). 2 CTC type LS-5 or LS-3 ¾" dia. coil forms, red slug. 1 phone jack, open circuit, insulated type. 1 DPST toggle switch. 1 SPDT toggle switch. 1 phono plug (RCA type) for beep box motor, if used 2 rubber grommets for ½" hole—¾" ID. 1 chassis. 3"x4"x5" etched aluminum ICA #29340 or Bud CU-3005. 2 3V4 tubes. 1 3A5 tube. 1 pilot bulb 2V-60 ma pink bead #48 or #49. 2 sets insulating washers for ¾" dia. jack. 1 utility case 8"x10"x10", Premier C-8101. 1 antenna, 4 section, 100" Ward type SC-8. 4 standoff tie points, insulated terminal, CTC—X1980C. Misc. wire and hardware.

—Walter A. Good

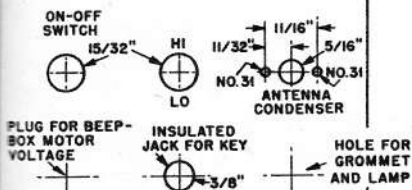
"WAG" MODULATED TONE XMTR - 27.255 MC.



"WAG" TRANSMITTER CHASSIS



FRONT VIEW OF CHASSIS



ADJUSTMENT OF CRYSTAL OSCILLATOR (OSCILLATOR CURRENT VERSUS COIL TUNING)

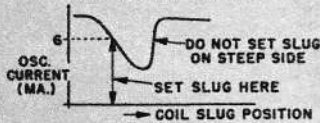


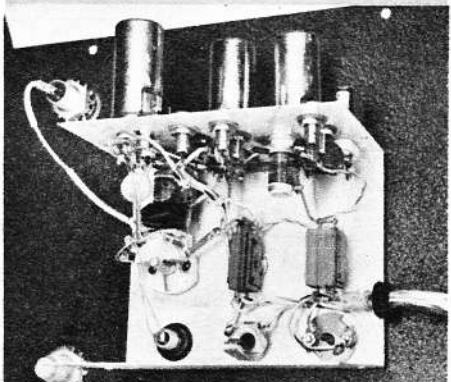
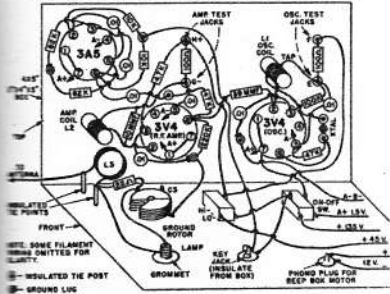
FIG. 2

SUMMARY OF TRANSMITTER OPERATION

TRANSMITTER OPERATION	MOD. KEY ON	MOD. KEY OFF
3V4 CRYSTAL OSC. PLATE CURRENT	6 MA.	6 MA.
3V4 R.F. AMPLIFIER PLATE CURRENT	7 MA.	12 MA.
3A5 AUDIO OSC. PLATE CURRENT	6 MA.	ZERO
TOTAL PLATE CURRENT	19 MA.	18 MA.
POWER INPUT TO AMPLIFIER	0.9 WATTS	1.6 WA.
"B" BATTERY VOLTAGE	135 VOLTS	135 V.

WITH "B" VOLTAGE AT 45 VOLTS (LO-POWER) THE POWER INPUT IS ABOUT 0.1 WATT.

BOTTOM VIEW OF "WAG" TRANSMITTER SHOWING WIRING AND PARTS LAYOUT



Full-size "Wag" chassis drawings are on Group Plan #654A (50¢), Hobby Helpers, 770 Hunts Pt. Ave., NYC 59.