

Pinchpenny Project

\$3.13 Wavemeter for Hams and CBers

By CLARE GREEN, W6FFS ARE YOU sure that your ham or CB transmitter isn't putting out spurious out-of-the-band signals? The quickest and cheapest way to find out is with a wavemeter. When held near your transmitter's final, this accessory will let you know via a VOM or an earphone whether you're radiating harmonics and how clean your modulation is. SWLs can use the wavemeter to troubleshoot the front-end oscillator of their receiver.

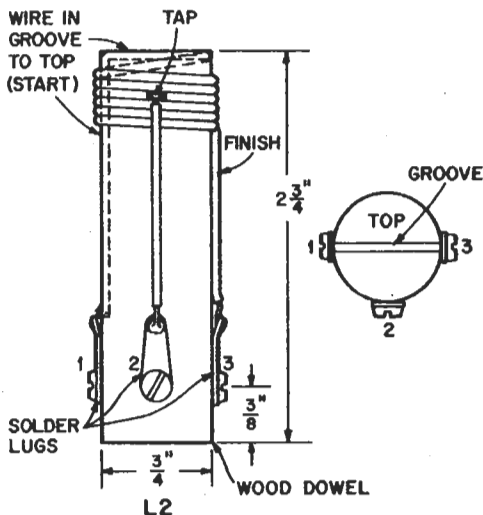
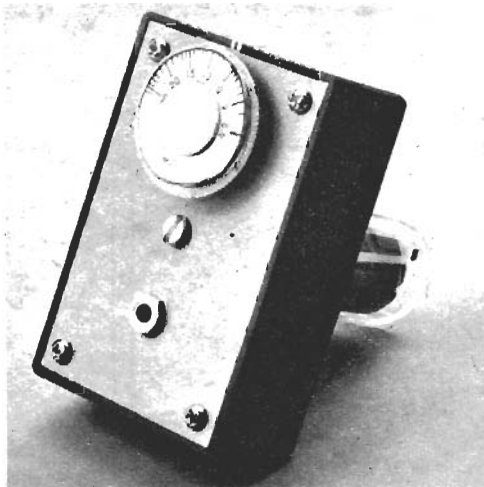
Our wavemeters, which consist of a tunable resonant circuit and detector, cover 3.2 to 10 mc and 8.6 to 35 mc. The units are built in $3\frac{1}{4}$ x $2\frac{1}{8}$ x $1\frac{1}{8}$ -in. Bakelite utility cases and do not require a source of operating power.

Construction. Except for the coils, which cover different ranges, the wavemeters are alike. Most of the components are mounted on the $3\frac{1}{8}$ x 2-in. metal panel. A 7-dram plastic pill bottle is mounted on the bottom of the case to cover the coils.

First, cut two $2\frac{3}{4}$ -in. lengths of $\frac{3}{4}$ -in. wood dowel and cut grooves in the tops of them as shown. Then mount three solder lugs and wind the coils with No. 22 plastic-covered solid hookup wire. Use tape to hold the last turns of the coils in place. Lay out and mount the components on each panel as shown. Because of the high-frequency at which the circuits operate, parts placement is critical. Mount C1 so that the dial edge is close to the top edge of the metal panel. Mount the coils on each panel with a sheet-metal or wood screw in the center of the dowel. Mount phone jack J1 so its connecting lugs do not short to the coil lugs. Cut off the unused lug on J1.

Cut a hole in the bottom at each box and cement the pill bottle in place. Make sure that the bottle is large enough to fit over the coil. (There may be a variation in the size of pill bottles.)

Calibration. The wavemeters can be cali-



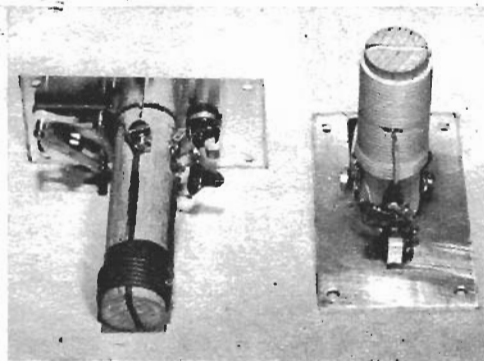
NOTES:

L1-(3.2-10MC) 28 TURNS, CENTER TAPPED
NO.22 PLASTIC-INSULATED SOLID HOOK-
UP WIRE.

L2-(8.6-35MC) 6 TURNS, CENTER TAPPED
(SAME WIRE)

BOTH COILS START APPROX. 1/8 IN. FROM
TOP OF DOWEL

Coil-winding details. Diagram is of high-frequency coil L2. Except for the number of turns, coil L1 is the same. Both coils are tapped at center.



Wavemeter for 8.6-35 mc is at left. At right is low-frequency (3.2-10 mc) wavemeter. Dowel is held to plate with wood or sheet-metal screw.

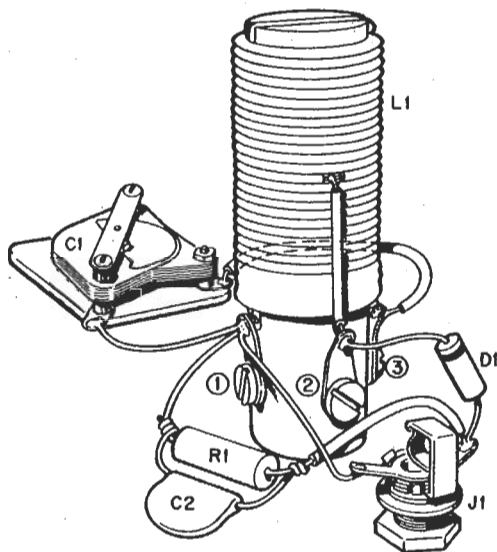
brated with either a modulated signal generator or a grid-dip meter, and a crystal or high-impedance magnetic earphone plugged in J1. They can also be calibrated with an unmodulated signal generator or grid-dip meter, and a VOM (set it to lowest DC-current range) plugged in J1. (Diode D1 is connected to give a negative DC output.)

If a signal generator is used, connect a loop of wire to its output terminals or output cable and position the wavemeter coil close to the generator's coil to obtain a VOM (or earphone) output indication. When using a grid-dip meter, either phones, VOM, or the grid-dip meter can be used for the indication.

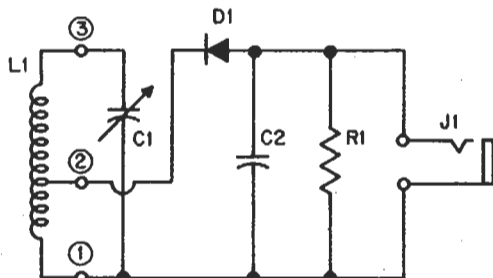
Calibrate the dials starting at the lowest frequency (C1 fully closed). We calibrated our units as follows: low-frequency unit—3.2 to 4 mc in 100-kc points, 4 to 6 mc in 200-kc points and 6 to 10 mc in 500-kc points. High-frequency unit—8.6 to 10 mc in 200-kc points and 20 to 30 mc in 2-mc points and a 35 mc point.

Operation. To check the front-end oscillator circuit of a tube or transistor short-wave receiver use the wavemeter to test for RF output of the oscillator as well as the approximate operating frequency; just hold the wavemeter near the oscillator coil to detect RF.

To check for spurious RF output of a transmitter, hold the wavemeter near the RF circuits (with a VOM set to a low-current range and plugged in J1) and tune C1 for an indication. Then note any out-of-band indications. To test modulation quality, have someone speak into the mike while you listen with an earphone. Do not hold the wavemeter too close to high-power RF circuits. —



Low-frequency wavemeter. Except for L1 (which has fewer turns) high-frequency wavemeter is same. Parts are shown spread apart for clarity.



Pick-up coil L1 is tuned by C1. Signal is detected by D1, and C2 filters RF. Negative DC output at J1 feeds VOM or a crystal earphone.

PARTS LIST

C1—10-365 μ f miniature variable capacitor with dial (Lafayette 99 T 6217)	\$.59
C2—.001 μ f ceramic disc capacitor	.15
D1—Germanium diode (1N34, 1N34A, 1N60 or equiv. Radio Shack 276-821)	.10
J1—Subminiature phone jack (Lafayette 99 T 6211)	.18
L1, L2—Coils wound of No. 22 plastic-covered solid hookup wire on $\frac{3}{4}$ -in. dia. wood dowel (see text)	.11
R1—180,000 ohm, $\frac{1}{2}$ watt, 10% resistor	.12
Misc.— $3\frac{1}{4} \times 2\frac{1}{8} \times 1\frac{1}{8}$ -in. Bakelite utility case with aluminum panel (Radio Shack 270-230)	.79
Crystal earphone (Lafayette 99 T 2515)	1.09
Plastic pill bottle, screws, solder lugs	.00
	\$3.13