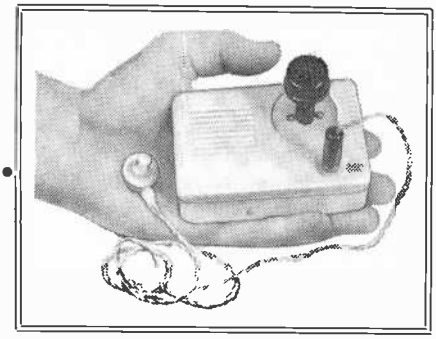
Pocket FM Receiver



By HERB COHEN*

HERE'S a miniature FM receiver that requires no external antenna, uses only one miniature tube and has good fidelity. The entire FM broadcast band is covered with enough selectivity to separate weak from strong signals even in metropolitan areas.

And it's possible to complete this "under $10.00" project in just one evening. Component placement is not critical even though the radio is constructed within a plastic case that is no larger than a cigarette pack.

Construction. The subminiature 1AG4 tube socket should be pre-wired before installation. Follow detail view, soldering plate and screen lugs together and then connecting 2½" lengths of hookup wire as shown. Connect *C2, C3* and *R1* directly to the grid lug. The tube socket can be glued directly to the case with a drop of Duco cement.

Antenna coil *L1* is made by winding four turns of #14 gauge solid wire around a form ⅜" in diameter. The turns should be spaced as close together as possible without actually touching each other. Remove *L1* from the form and solder its two ends directly across tuning capacitor *C1*. All leads should be as short as possible.

Quench coil *L2* is a four-section 2.5-mh. choke. Tap into *L2* between the first and second section as shown. Then carefully scrape the connecting wire clean and solder a thin flexible 3" lead to the tap.

All components can now be screwed or glued into place. In order to eliminate hand capacitance effect, an insulated shaft extension is used with *C1*. A dynamic earphone of 2000-3000 ohms impedance should be plugged into *J1*.

Trouble-Shooting. Before turning the unit on, check for shorts in the wiring. Turn *C1* to full mesh and *S1* to the "on" position. If the unit is functioning, a loud hiss will be heard. Tune *C1* across the band until the hiss subsides and a station appears. A large dead area may appear at the high end of the FM band. If this happens, shorten the leads in the tuning circuit.

If a hiss is not heard, touch *C1* with an insulated screwdriver. A click should be heard indicating that the ultra-audion section is oscillating but the quench circuitry is not functioning. Check all components, particularly the tap on *L2*, for a short, break or wiring error. Check battery voltage—if *B2* drops below 1.3 volts, oscillation will be difficult to obtain.

One method of calibrating your set to cover the entire FM band is to place the pocket receiver near a commercial FM set. Tune the commercial FM receiver to 88 mc. Then tune *C1* until a rushing noise is heard. Mark this spot on the pocket receiver's case. Repeat this procedure for the upper end of the FM band at 108 mc. If the high

(*Continued on page* 112)

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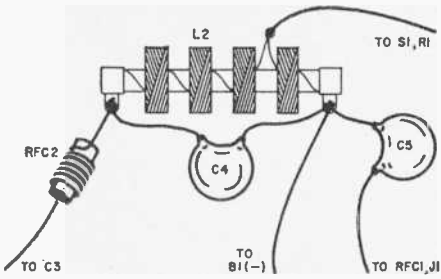
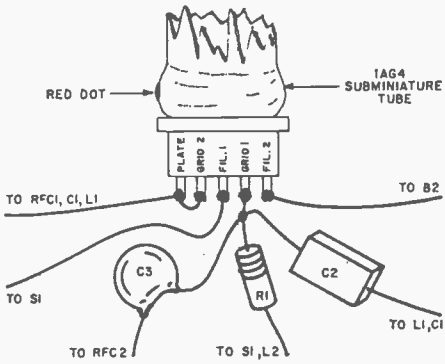
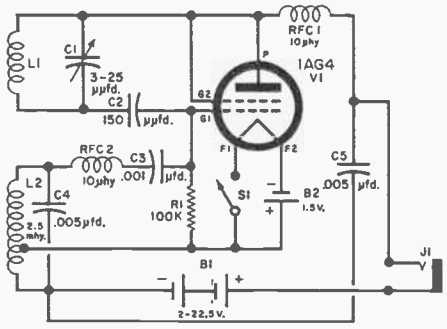


Wiring details of quench oscillator coil L2. Note added coil tap.

Detail view of wiring of sub-miniature tube socket. Red dot on tube is guide for proper installation.



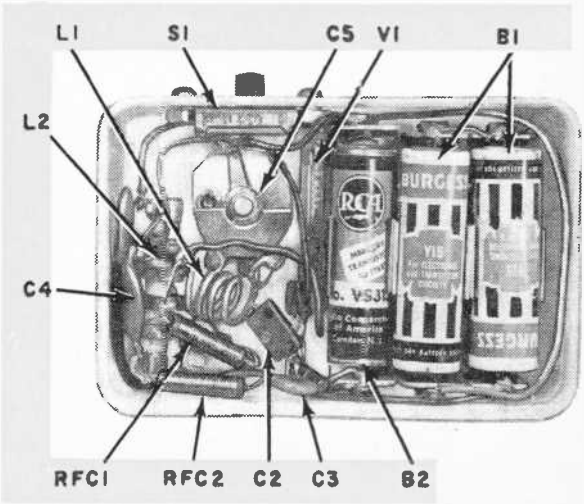
Sensitive superregen circuit pulls in FM band— without an antenna



Antenna coil L1 is the only one requiring special winding. All others are commercially available. For longer battery life, a mercury cell can be used as B2 instead of standard penlight cell.

PARTS LIST

B1—2-22.5 volt battery (Burgess Y15)
B2—1.5-volt penlight cell
C1—3-25-μμfd. variable capacitor (Hammarlund APC-25)
C2—150-μμfd. mica capacitor
C3—0.001-μfd. disc ceramic capacitor
C4, C5—0.005-μfd. disc ceramic capacitor
J1—Miniature open-circuit phone jack
L1—Four turns of #14 solid wire (see text)
L2—2.5-mh. choke (Miller 4537)
R1—100,000-ohm, ½-watt resistor
RFC1, RFC2—10-μh. choke (Miller 4612)
S1—S.p.s.t. slide switch
V1—1AG4 electron tube
1—Plastic shaft extension
1—Plastic cabinet (Lafayette MS-302)
2—Battery holders (Acme 5 and Acme 45)
1—Subminiature tube socket



Parts placement shown should be followed carefully for best results. Consult the two detail views above for exact positions. All leads should be as short as possible.