TRANSISTOR RADIO

Even if you've never built a radio, you can make this simple receiver in an hour.

By Robert Hertzberg

START assembling the MI transistor radio at seven o'clock. At eight, plug in the earphone and listen to programs! It's as simple and reliable as that. Even if you've never attempted radio construction before, you'll find the job easy and enjoyable. The secret lies in a carefully planned and tested layout with open, one-plane wiring. Add to this the fact that we've presented a full-size photograph, over which you can assemble and wire the parts, and you can't go wrong.

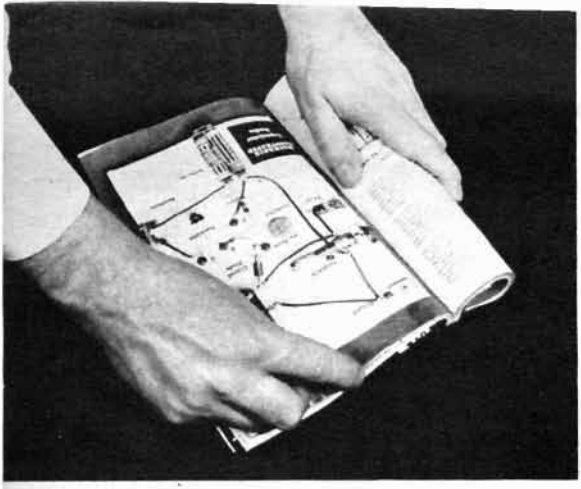
In the design of this set, special attention was paid to protection of the sensitive transistor against the heat of the soldering iron. The protective measure? No soldering of the transistor! You do all the assembling and soldering while the transistor is safely enclosed in its plastic container. Then, as the very last step, you merely wrap the three slender leads of the transistor under the heads of three small screws and tighten the latter.

The baseboard can be any smooth piece of wood equal in size to the full-size photograph. A scrap of shelving is fine; so is a piece of plywood ⅜ or ½ in. thick. Sand the edges lightly, then tear out the layout sheet and cement or tape it in place.

Begin by mounting the ground and aerial binding posts. In each case, pass a small wood screw through the hole in a soldering lug and through the hole in a post and tighten into the baseboard. Face the lugs to the right and pry them up a little so the wires will fit in their ends.

A flat piece of aluminum comes with the loopstick. Bend it carefully in the center to form an L bracket. Then face the leg with the large hole to the left and fasten the base leg with two wood screws. Mount the coil by putting the end with the threaded shaft through the large hole from the right, keeping the two soldering lugs on the coil form parallel to the baseboard. Press gently and the neck of the coil will lock in the hole. Next unravel and remove some loose, bare copper wire near the lugs and tighten a small black knob on the threaded shaft.

With its lugs facing the loopstick, mount the tuning capacitor with No. 4 wood screws, one in each corner. It is necessary to raise the capacitor about ¼ in. above the surface of the base to al-



The full-size photograph on the opposite page is your guide. Tear it out and glue it to a baseboard of the same dimensions.

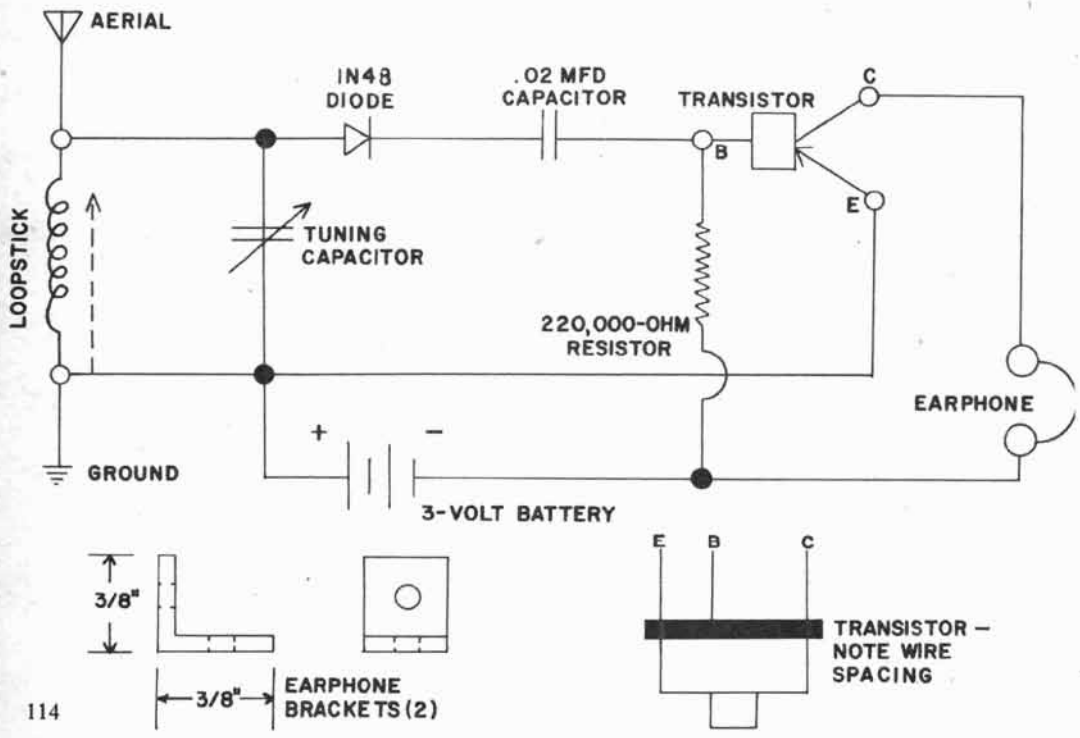
low the bottom of the shaft to turn freely. For spacers, use plywood, Masonite or a couple of hex nuts to each screw. Tighten a small black knob on the shaft.

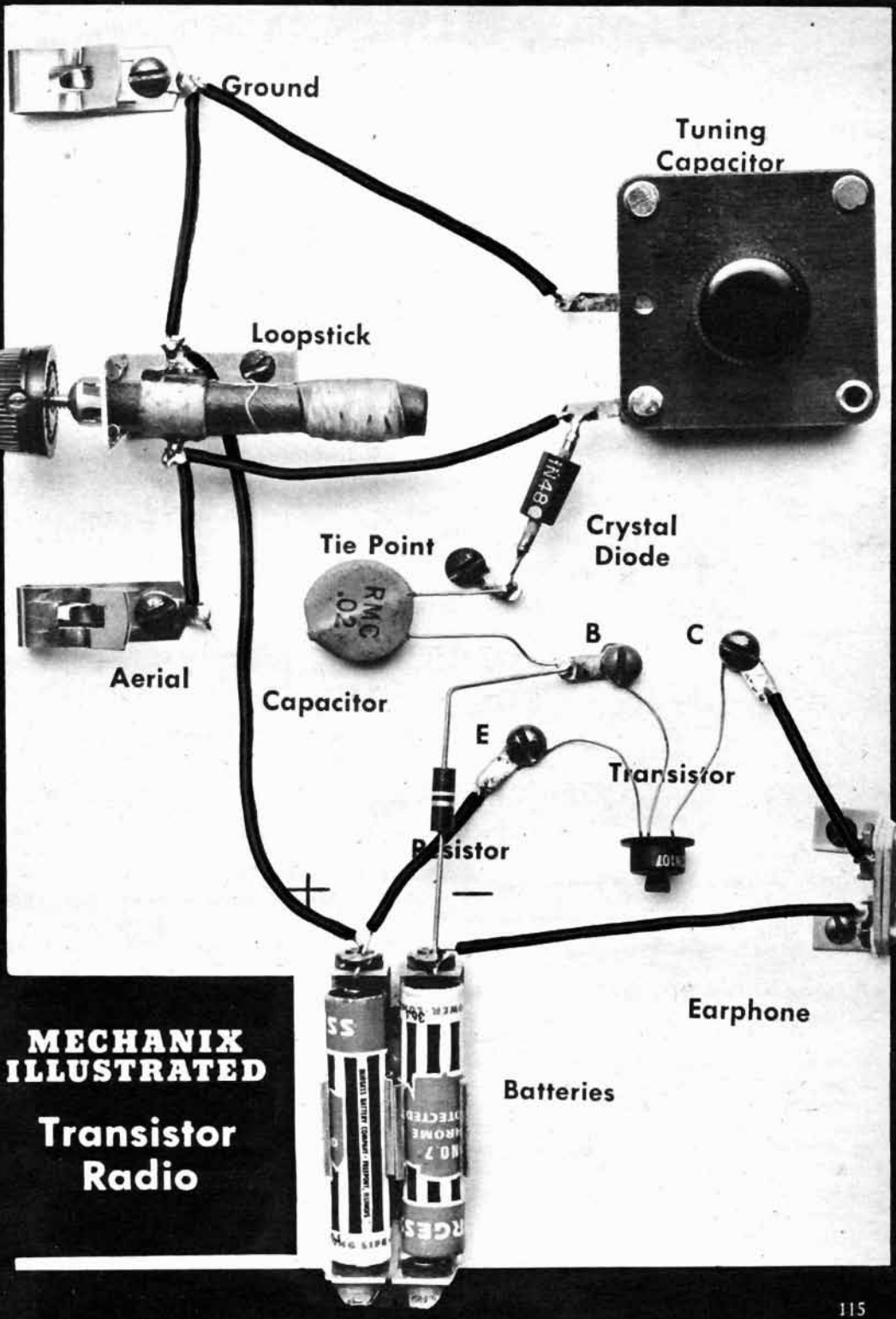
Next four soldering lugs are installed. Tighten one, facing right, under a screw in the position marked "Tie Point." The other three are fastened loosely at the points marked "E," "B" and "C." These identify the connections of the transistor: E for emitter, B for base and C for collector.

The two small L brackets for the earphone jack are fastened to the baseboard with small wood screws and the earphone jack itself is secured to the brackets with 2x56 screws and nuts. Last to be installed is the battery holder, which is fastened in place with two small wood screws.

You're now ready for the wiring. For this you'll need a small soldering iron of the pencil type, a roll of rosin core solder, a pair of side cutting pliers, a pair of long-nose pliers and a small spool of No. 20 solid hook-up wire with plastic or push-back insulation. This wire is indicated in blue on the full-size photograph. In all cases, after cutting a wire to length, push back or trim off about ¼ in. of the insulation from each end and bend the ends to form small hooks to fit the holes in the soldering lugs.

Begin by soldering the points where there is only wire leading into a connection; that is, solder at the upper lug of the tuning [*Continued on page* 182]




Ground
Tuning Capacitor
Loopstick
Crystal Diode
Tie Point
Aerial
Capacitor
B
C
E
Transistor
Earphone
Batteries
MECHANIX ILLUSTRATED
Transistor Radio

[*Continued from page* 114]

capacitor, at the aerial lug, at the upper and lower lugs of the earphone jack and at the lugs at points E and C. Remember that the leads from the transistor are not soldered at points E, C or B and that the transistor is not introduced until all soldering is completed.

Next solder at the points where two insulated wires meet: the ground lug, the upper and lower lugs of the loopstick and the plus terminal of the battery holder.

You are now ready to tie in the 1N48 diode, the .02 mfd capacitor and the 220,000-ohm resistor. Cut the leads of the 1N48 diode to a length of ½ in. and bend down each lead carefully at right angles. This diode has a tapered body and one end marked with a dot. Take the lead from the unmarked, larger end and, with the lead from the lower lug of the loopstick, solder it to the lower lug of the tuning capacitor. Leave the other lead from the diode free for the moment. Then cut one lead of the .02 mfd capacitor to a ⅝-in. length and cut the other to a length of 1¼ in. Solder the short lead from the capacitor and the free lead from the diode to the lug at the Tie Point. Next cut one wire of the 220,000-ohm resistor to 1¼ in. and bend it, at a right angle, ½ in. from the body. Solder this lead and the free lead from the .02 capacitor to the lug at point B. You can then bend up the resistor so that it is about ⅝ in. above the baseboard and solder the straight, uncut lead, with the lead from the lower lug of the earphone jack, to the minus terminal of the battery holder.

The transistor comes next. Examine it closely and note that two of its leads are quite close together while the third is spaced away from the center wire. Form a loop at the end of each lead and catch them under the screws at points E, B and C in accordance with the identification drawing.

Finally, unscrew the cap of the earphone plug, pass the phone cord through it and solder the ends of the cord to the pins of the plug. The wire is thin, so do this carefully. Then replace the cap.

This radio receiver gets all its power from two small No. 7 penlight batteries connected in series to give three volts. Hold one battery up straight, its brass center cap up, and press it into the left hand holder. Turn the other around, with its center cap down, and put it into the right-hand holder. By actual measurement, the set requires only 180 millionths of an ampere, an extremely small current. In service, the batteries will last almost as long as they would if not used at all.

A small set of this kind requires an aerial. Just how long it must be depends on the location. Excellent results are obtained with 25 to 50 ft. of ordinary No. 18 wire hanging out the window, strung from a window to a fence or tree or even spread around the edges of a room. A ground connection sometimes helps, sometimes doesn't. Clip to any handy water pipe or radiator. Tuning is usually sharper without a ground connection, volume better with it.

To tune the set, merely turn the knobs of the tuning capacitor and the loopstick until the combination produces the best signals. The capacitor turns through 180 degrees; the loopstick in and out about a dozen turns. You'll find after a little experimenting that you can leave the loopstick set in one position and do all the tuning with the capacitor. •

PARTS LIST

1—Midget 365 mfd variable tuning capacitor, flat type, 1½ in. square
1—Loopstick
2—Small knobs to fit shaft of tuning capacitor and loopstick screw
1—Type 1N48 diode
1—Type 2N107 General Electric transistor
1—Disc type fixed capacitor, .02 mfd
1—220,000-ohm, ½-watt resistor
1—Double holder for No. 7 batteries
2—No. 7 batteries
2—Single Fahnstock spring binding posts
1—Miniature earphone jack, flat type
1—Miniature earphone plug, to fit above
1—Dynamic earphone, hearing aid type
6—Soldering lugs, No. 6 hole
12—Roundhead wood screws for mounting parts, No. 4, about ⅜ in. long
4—Roundhead wood screws for mounting tuning capacitor, No. 4, ¾ or 1 in. long
1—Spool of No. 20 solid insulated hook-up wire (only about 15 in. needed)
1—Wooden baseboard
Aerial wire—Use balance of No. 20 wire or 25 to 50 ft. of bell wire or regular bare, stranded copper aerial wire with small insulators at ends.

Note: Basic parts for this radio are available from Lafayette Radio, 100 Sixth Ave., New York 13, New York.