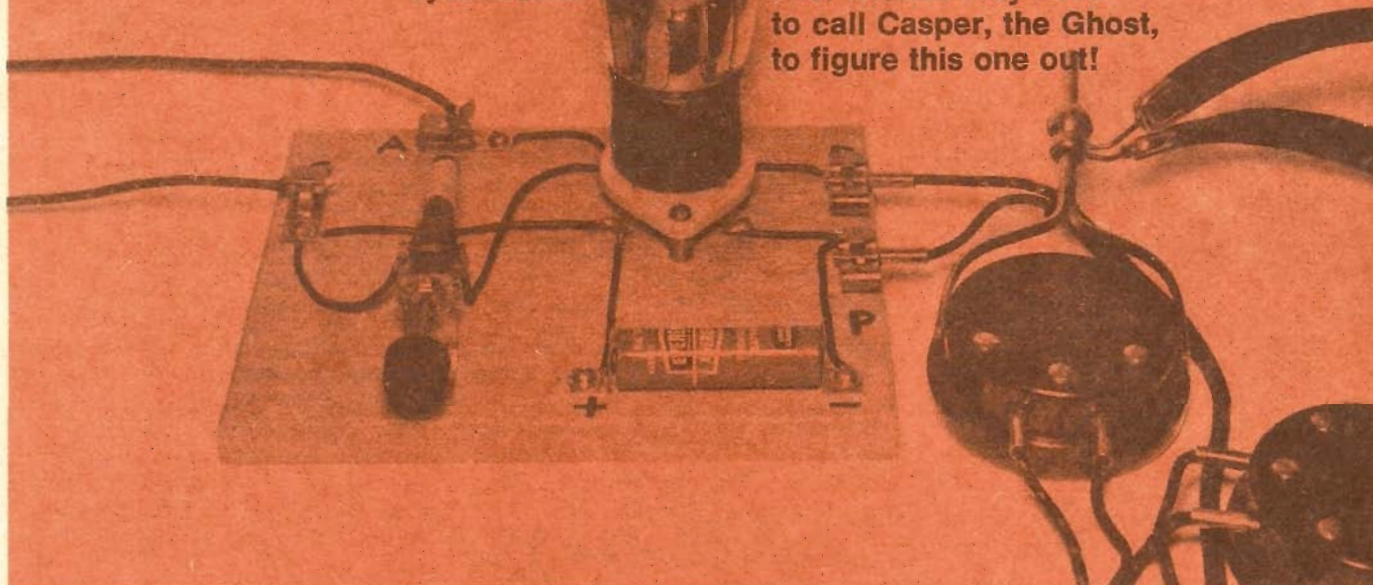


Mystery Radio

by Art Trauffer

Your friends may have to call Casper, the Ghost, to figure this one out!



BUILD THIS MYSTERY RADIO. It uses a radio vacuum tube that doesn't glow in the dark. See if your friends can figure out how it works before you reveal the trick. It's a fun project, educational as well as entertaining—a good choice as first receiver for the beginning constructor.

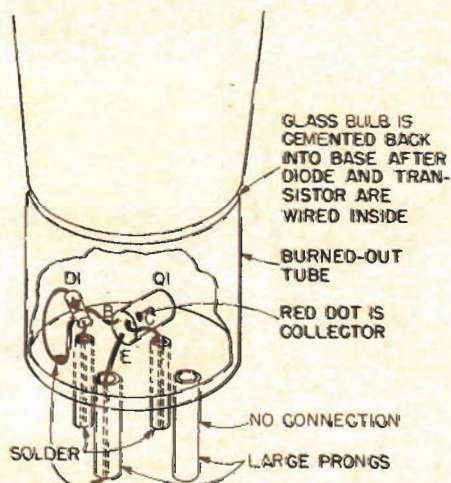
Take a quick look at the photo and you see a one-tube radio tuned by a common ferrite loopstick antenna coil. Nothing too unusual about that. But wait a minute—all there is to power the tube is a small penlight battery of 1½ volts. There is no B battery for the plate of the tube, and there is no grid leak and capacitor going to the grid of the

tube—yet you get a good signal in the phones from local broadcast stations! How can this be?

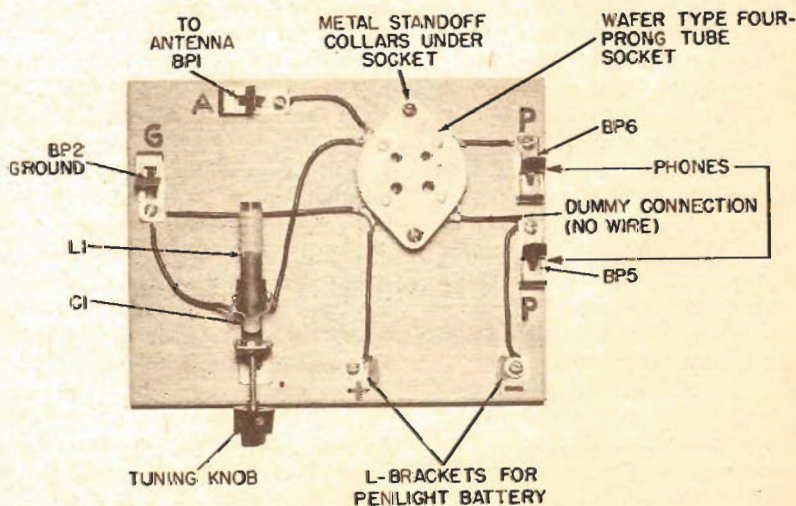
The secret is revealed when we examine the pictorial drawing. We see a germanium crystal diode detector, with a transistor serving as an audio amplifier. These two units are hidden inside the base of the tube. Looking at the schematic diagram you will see that we have a perfectly conventional crystal detector radio driving a one-transistor amplifier. The tube is a dummy, and can even be one which is burned out. It isn't in the circuit at all. If your friends can't guess the answer, there's the mystery in this "one tube" radio receiver.

Construction. You can use most any 4-prong (or 4-pin) tube you can find which has a loose bulb. The larger the base the better as it gives you more room inside to wire in the diode and transistor. The writer used a dead 201-A having a loose bulb which was easy to remove from the base.

To remove the glass bulb from the base heat the ends of the pins with a soldering iron and shake out the solder, then carefully twist and pull the bulb out of the base. Caution: For safety wear a pair of gloves when removing the glass bulb from the base of the tube. Use a tube that has a loose bulb to start with. Clip off the leads going up into



The trick is in the base of the radio vacuum tube. Diode and transistor in its base replace the tube in receiving circuit.



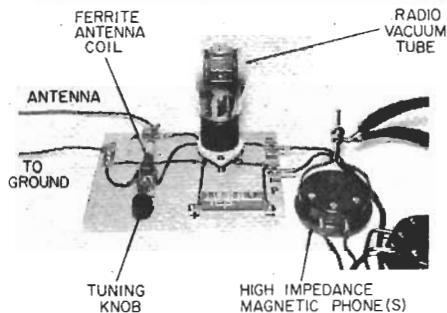
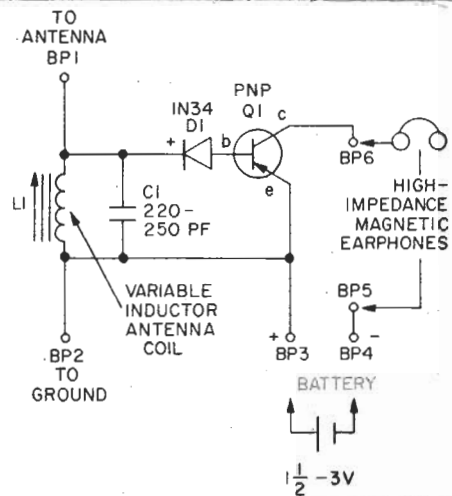
Beginner's one-transistor project uses easy-to-assemble breadboard construction just like the one- and two-tube sets Dad built in the Twenties and early Thirties.

e/e MYSTERY RADIO

PARTS LIST FOR MYSTERY RADIO

- C1**—250 pF. disc capacitor, see text (Radio Shack 270-1430 or equiv.)
D1—1N34A germanium diode (Radio Shack 276-821 or equiv.)
Q1—CK-722 or similar general purpose PNP transistor (Radio Shack 276-2004 or equiv.)
L1—Ferrite rod antenna coil for broadcast band, preferably with mounting bracket (Radio Shack 270-1430 or equiv.)
Phones—Any high impedance magnetic single or pair of phones, 1K to 2K or so. Cannon model CF (Lafayette Radio 40R81048-AN-151 or equiv.)

- Misc.**—four-prong vacuum tube (see text), four-prong wafer type tube socket (Burstein-Applebee 12A93, Lafayette Radio 32 E 20415 or equiv.), several feet of insulated hookup wire, 3-in. length of strap brass $\frac{3}{8}$ -in. or $\frac{1}{2}$ -in. wide for making battery holder (see text), nine $\frac{3}{8}$ -in. round-head wood screws, two metal collars for mounting tube socket (see text), $6\frac{1}{4}$ -in. x 5-in. x $\frac{1}{2}$ -in. hardwood breadboard, knob to fit L1 adjustment screw. Binding posts (Fahnestock clips). Medium or large size (Radio Shack 270-393 or equiv.)



“One tube” receiver uses any old radio vacuum tube (even a burned-out one). Circuit is up-to-date, using hidden diode and transistor.

the glass bulb. Now solder the diode (D1) and the transistor (Q1) into the pins as shown in the pictorial drawing. To do this put a drop of solder on the end of each pin, as shown. Note that the right-hand filament pin is not used at all.

Check to see that there are no shorts

in the wiring, and then cement the glass bulb back on the base using Duco Cement.

Follow the photograph which shows how the parts are mounted and wired onto the wooden baseboard. The diagram shows two Fahnestock clips (BP3 & BP4) to connect your 1½ volt battery to, but if you prefer you can screw a factory-made battery holder onto the base instead. I made two L-brackets from strap brass and screwed them to the base to hold a size AA penlight cell, as shown.

Use any 4-pin socket you can get. If the socket is a wafer type, as shown, use metal collars as stand-offs, and mount the socket with round-head wood screws. If the ferrite loopstick antenna coil (L1) that you buy doesn't have a mounting bracket, simply bend an L from strap brass, drill the necessary mounting holes, and screw the L-bracket to the base.

To Listen. Use a pair of *magnetic* high

impedance (1000 to 2000) headphones. A single headphone is fine, too, only these aren't as easy to find as they were when crystal detector radios were all the rage. For your ground connection run a wire to the nearest cold water pipe. A length of wire 25 feet long (or more) will serve as the antenna for local stations.

This radio will pick up some local stations if you're near any strong ones without the long outdoor antenna which you'll need for weaker stations. Just hook any piece of wire to the antenna terminal. In some situations you can even get reception by connecting the antenna terminal to a water pipe and forget about the ground connection. For best results of course use the longest antenna you can, as high as possible, and use a good water pipe for ground.

To turn the set on and off just remove one headphone plug from its terminal. This saves the cost of a switch to turn the penlight battery on and off. ■