

The art of being frugal comes naturally to most amateurs. We tend to save things for "future use," which in the long run frees up landfills for more important stuff. VE3ERP has come up with another use for those little plastic film containers we've been saving for just such a project.

QRP Antenna Cheapware

BY GEORGE MURPHY*, VE3ERP

My original title for this article was "Free Hardware for QRP Antennas." However, in these days of computerspeak, I had no desire to be inundated with requests for free computers, towers, 5-element beams, etc. Therefore, I coined the term "Cheapware."

The "Cheapware" described herein consists of the plastic containers in which 35mm camera film is packaged. Your local film processor will be glad to give you as many as you want for free, which is about as cheap as you can get. The ones I like to use are Kodak™ containers. They are the ones with black bodies and gray lids. A little rummaging around in your junk box and the family button box will provide just about everything else you need for a QRP antenna.

The plastic film canisters can be cut and then trimmed very easily with an X-ACTO™ hobby knife equipped with a #11 (the long, tapered, skinny one) blade. Don't drill holes with an electric drill; the plastic is so soft the drill will go right through the plastic and probably anything else within range before you can stop the drill. One method of drilling holes is to simply roll a sharp drill bit slowly between your fingers and let it cut its way through the soft plastic. I'm not certain, but from the feel of it I suspect this is the method used to make the holes in Swiss cheese. Larger holes are best cut with a #11 blade in a hobby knife. Don't be too aggressive. This operation is about as energy demanding as carving snow with a blow torch.

QRP Antennas

Antennas for low power can be made with very fine monofilament steel fishing line, with insulators made from almost any non-conducting material. Traps do not need large air-core coils or transmitter-type capacitors. Toroid inductors and standard silver-mica capacitors work just fine. Bal-

Fig. 1—Diagram of a simple QRP antenna trap made from all those things you're glad you saved. →

uns can be simple toroid devices. The "Cheapware" described in this article is primarily intended for QRP antennas and will handle up to about 50–100 watts.

Nothing I can find in the Amateur Code of Ethics says you should not connect your 300 milliwatt QRP transmitter to the bottom of 120 feet of hardline up to the 7-element full-size beam on top of your tower. However, this definitely would be a classic case of the tail wagging the dog. On the other hand, I would not suggest letting the dog wag the tail by firing up your QRP antenna with your 2 KW linear in its "numb-the-neighbors" mode. You have to draw the line somewhere.

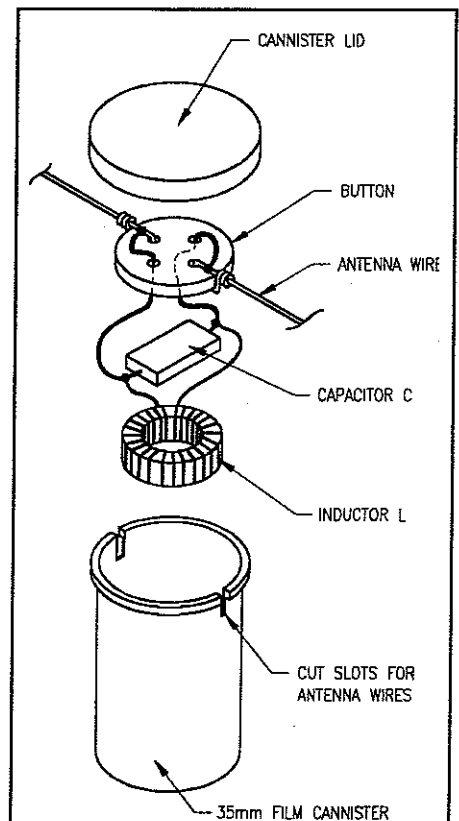
Antenna Trap (fig. 1)

With the help of a large, plastic coat button, a silver-mica capacitor, and a toroid coil, you can make a very neat and weather-proof trap by enclosing the components in a plastic film canister. All you have to do to the canister is cut a couple of slots for the antenna wires.

Balun (fig. 2)

For this one you need to prepare the canister lid to accept a coaxial-cable chassis-mount connector. First, cut a mounting hole to suit the connector barrel. If you use an SO-239 connector, you will have to cut away the inner sealing ridge of the lid in four places and also cut four shallow slots in the top rim of the canister to clear the corners of the connector flange.

Solder the coil winding leads to the connector, and then attach the connector to the lid with epoxy adhesive. The cold end of the winding can be soldered into one of the connector's mounting holes, but if the plating on the connector makes solder adhesion difficult, simply install a screw, solder lug, and nut through a hole in the



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12	24.9	18		20
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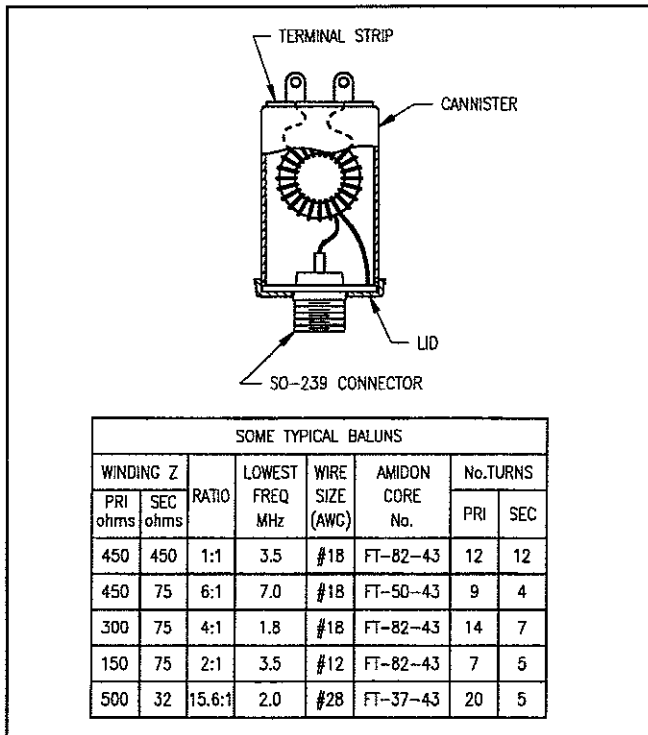


Fig. 2— The film container can also serve as a housing for a low-power balun.

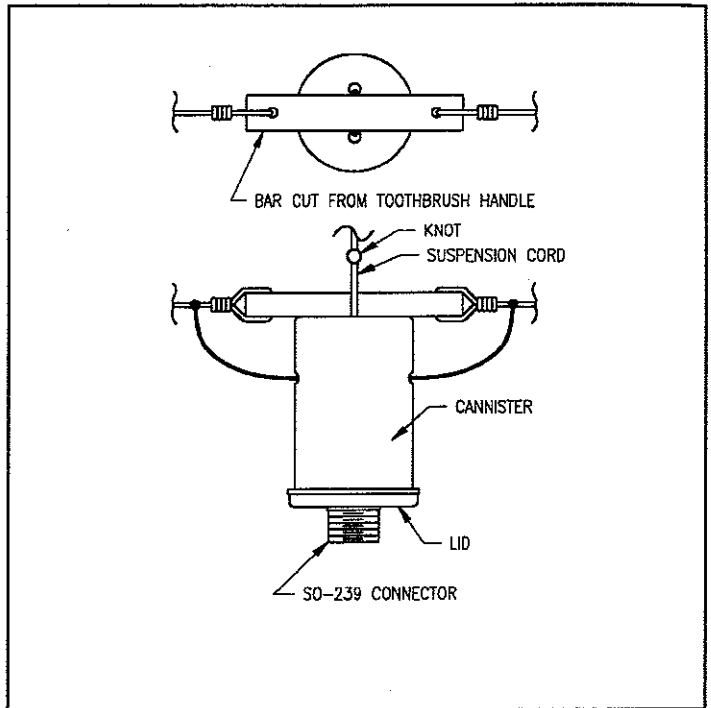


Fig. 3— If we add the remnants of an old toothbrush to a film container, we have the makings of a center support system for a dipole antenna.

lid and one of the connector mounting holes for the coil connection.

Make appropriate holes in the bottom of the canister and attach a suitable terminal strip for the balanced line with epoxy adhesive. If you do not trust epoxy as much as I do, you can use screws. To me, unless you intend to use this joint to raise the *Titanic*, it is a waste of good screws.

Solder the transformer leads to the terminal strip lugs, and you are done.

Dipole Feed Point (fig. 3)

This one is real simple. Drill a couple of holes in a piece of toothbrush handle and fasten it to the bottom of a canister with epoxy adhesive. Drill a hole in the bottom

of the canister on each side of the toothbrush handle, and install a suspension cord or wire through one hole, passing under the toothbrush handle inside the canister and out the other hole. Fit a connector into the canister lid as described for the balun, with leads long enough to reach through holes in the canister body to the ends of the dipole elements.

If you need a balun at the antenna feed-point, just combine the details in figs. 2 and 3, connecting the leads of one transformer winding to the connector, and the other winding leads out through holes in the canister body to the antenna wires.

Open-Wire Line (fig. 4)

Plastic film containers make ideal spacers for four-wire and two-wire open-wire transmission lines. Four-wire lines offer the advantage of having lower impedances than two-wire lines, but have not been popular because they require complicated spacers. However, in the La-La Land of QRP, where life is good, the living is easy, wire is cheap, and complex spacers are free, you might want to try a four-wire line.

Make either two or four holes in the lid and canister bottom for the wires. A blob of gloop on each wire at the top and bottom of each container will hold it in place. Unless otherwise noted, gloop can be anything weatherproof that sticks to the surfaces being glooped, such as epoxy adhesive, silicone bathtub sealer, regular caulking compound, or a lump of solder.

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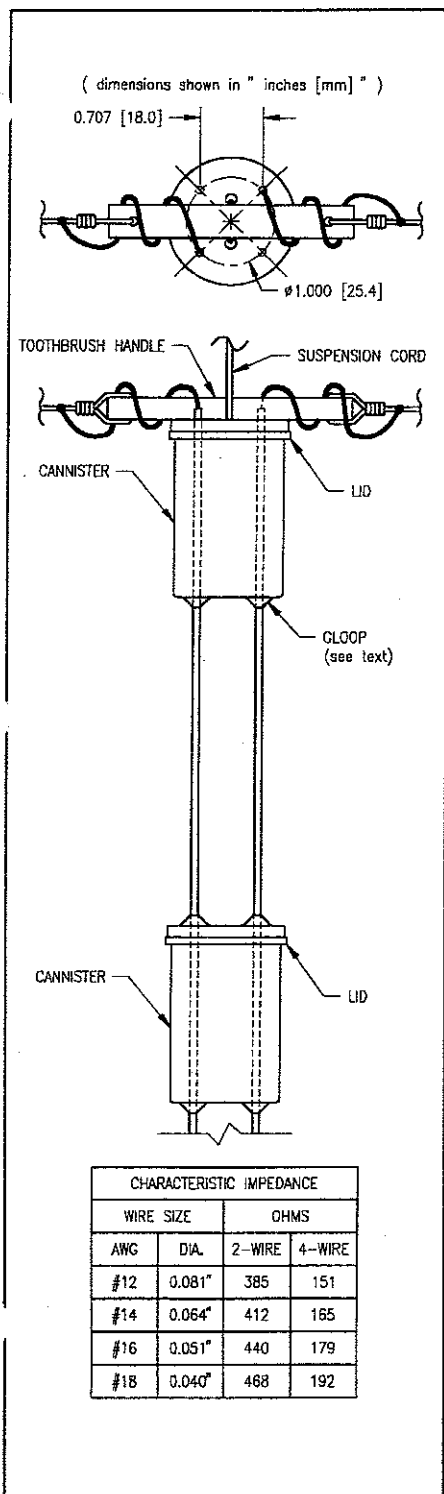


Fig. 4— If you've been compulsive and saved a number of the containers, you can easily make open-wire spreaders.

Depending on the wire used, a distance between spacers of about 10–15 cm (4–6 inches) should be about right.

To connect the open-wire line to the antenna, use the old toothbrush handle shown in fig. 3 and install it as shown in fig. 4. If you need a balun at the feed point, you can include one in the top canister.

Component Values

The component values in the tables of figs. 1, 2, and 4 are arbitrary values I chose using *HAMCALC* software.¹ If you have a computer and *HAMCALC*, you can change these values to whatever turns your crank.

Finally . . .

When all else is done, run a bead of epoxy adhesive all around the joint between the lid and body of all canisters to discourage separation. Seal all openings in lids and bodies with gloop. Relax. Read a good

book. Enjoy QRP. Let the Big Guns dominate the airwaves. On contest weekends go fishing (with monofilament steel line, a good casting weight, a QRP Cheapware antenna, and your QRP transceiver) . . .

Footnote

1. *HAMCALC* is free software you can get from me by sending me US\$5 to defray materials and airmail postage costs to anywhere in the world (ask for version 32 or later). *HAMCALC* comes as an MS-DOS/Windows 1.44 Mb 3 1/2 inch diskette with over 200 programs of interest to amateur and professional RF enthusiasts. ■

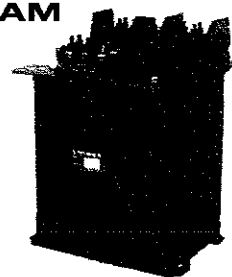
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