

LOOP EXPERIMENTS: The Super Booster Bar

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This is the first in a series of articles describing some of the loop experiments I've conducted over the past several years. Most of these articles deal with questions of loop theory for which I could not find answers. A few of the articles deal with more mundane questions such as loop construction techniques; this is one of those articles.

Passive booster loops have been around for years and are still commercially available (e.g., the Select-A-Tenna). I've even written a couple of earlier articles on booster loops (the "Tilting T-Bar Antenna" and the "Hot Rod") but none has been as effective or as easy to construct as the "Super Simple Booster Bar" (see Figure 1). The key to its simplicity is its use of readily available construction components; the variable capacitor and ferrite rods remain as difficult to come by as ever, though.

A booster loop is nothing more than a parallel-tuned circuit which, when placed near the antenna of a portable radio, significantly boosts the signal to the radio. This parallel-tuned (or "primary" winding) circuit becomes a transformer when inductively coupled to the "secondary" winding that is on the portable radio's built-in ferrite rod antenna. This transformation results in a "peak" in tuning (instead of the "null" that normally results from a parallel-tuned circuit).

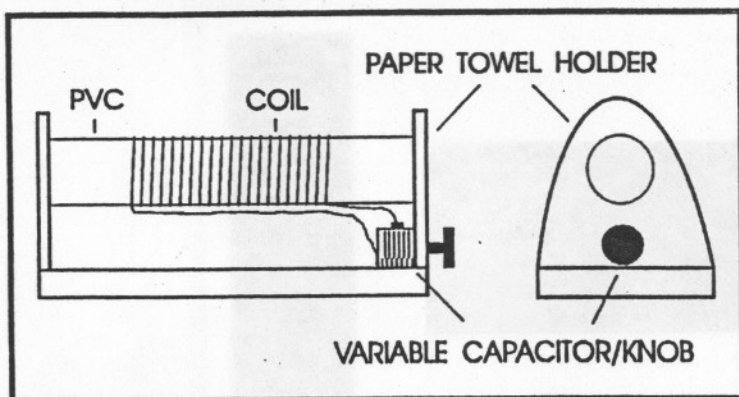


Figure 1. Super Booster Bar.

Materials Needed...

1. **Paper towel holder** -- This is the key to the simplicity of this booster. ScotTowels now makes a short (8-inch wide) paper towel holder that is perfect for mounting the ferrite rod assembly and variable capacitor. These are called "ScotTowel Juniors" and the holder costs under \$1.00.
2. **PVC tubing** -- The 1-1/4" diameter PVC tubing fits nicely on the nubs of the paper towel holder and is capable of housing a large number of ferrite rods. You'll need an 8-3/8" length of tubing (most smaller hardware stores will cut this to length; mine was \$.50).
3. **Variable capacitor** -- Ideally, you would use a small (1" x 1") 365 pF variable capacitor. Years ago they were available at any Radio Shack for \$.69; now they are next to impossible to find. Mouser Electronics (1-800-34-MOUSER) carries a dual gang variable capacitor (266 pF each gang; under \$3.00) that is useable but requires a shaft extension to accommodate a standard knob. (To extend the shaft of this variable capacitor, use a 1" x 1/4" round nylon "stand off" (for PC boards), a 1-1/4" x 2.5 mm screw to thread into the stubby knob of the variable capacitor and hold the "stand off" in place, and a tiny drop of super glue to further secure the "stand off" to the stubby knob.)
4. **Ferrite rods** -- The PVC tubing can hold a fair amount of ferrite -- I was able to

cram 10 rods (each 8" x 3/8") into mine and the boost it gives is incredible. Amidon Associates (12033 Otsego St., North Hollywood, CA 91607) carries rods (with a permeability of 125 mu) that are 7-1/2" x 1/2". I'm not sure of the current price but buy as many as you can afford and center them in the PVC tubing supporting them with cork or foam as needed. Alternatively, scavenge some ferrite from some old radios or attend the next hamfest nearest you and try to get your hands on some ferrite rods.

5. **Wire** -- Just about any kind of insulated wire will do. You'll need between 12' and 15' (depending on the variable capacitor you use). I used stranded 18 gauge for mine.
6. **Rubbermaid turntable** (optional) -- Available at most supermarkets; use the small size (about \$3.50).

Construction...

1. **Wind wire on PVC tube** -- If you are using a 365 pF variable capacitor, closely (i.e., no space between turns) wind 34 turns (12') of wire on the center of the tube. If you are using the Mouser variable capacitor (and are using only a single gang), closely wind 43 turns (15') of wire on the center of the PVC tube. With ferrite mounted in the tubes, either of the preceding windings with their respective variable capacitors will tune from at least .530 - 2.000 MHz. After you've wound the coil on the tube, ensure that there is sufficient wire overage to reach the variable capacitor to be mounted below the tubing (see illustration). Tape the ends of the coil in place and, if you have it, coat the windings with Q-dope to hold them in place.
2. **Drill hole in holder** -- A small variable capacitor can be mounted as illustrated after drilling a suitable hole in one arm of the paper towel holder.
3. **Mount variable capacitor** -- Fasten variable capacitor with glue or screws to holder.
4. **Insert ferrite rod bundle into tubing** -- Insert ferrite into PVC tube making sure fit is snug and rods won't slide when tube is tilted.
5. **Hook up coil** -- Solder (or use alligator clips) one end of the coil to the rotor of the variable capacitor and the other end of the coil to the stator.
6. **Attach a knob** -- Put a knob on the variable capacitor shaft and you're ready to go.
7. **Test** -- Place a portable radio close to the booster bar and slowly tune the variable capacitor until you hear a rise in background noise or signal level or see a peak on the S-meter (if the radio has one) when the radio is tuned to about mid-scale. If nothing is noticed, move the booster closer to the radio and try again. If that doesn't produce a peak, re-check wiring and solder connections. Quite frankly, there just isn't a whole lot that can go wrong with a booster circuit.

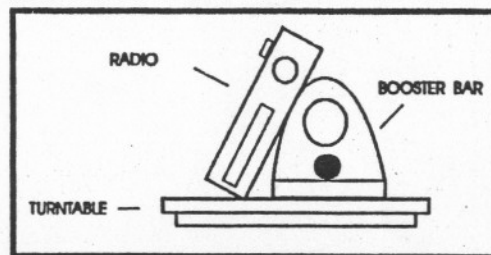


Figure 2. Booster Bar/Turntable/Radio Arrangement.

The booster bar becomes more useful if it is mounted on one of Rubbermaid's plastic turntables (see Figure 2). The portable radio (if it isn't too large) can be placed on the turntable and leaned against the booster bar. The two can then be rotated together to null and directionally peak stations. A longwire antenna can be tuned by hooking it to one side of the variable capacitor if you really need more signal.

Best of luck with this project. If you have any problems or suggestions for improvements, drop me a line. Also, if you discover sources for variable capacitors and ferrite rods, let me know. 73's...GT (3635 Chastain Way, Pensacola, FL 32504)