

by David Fischer

Herein is described a very simple type of loop antenna which, although not state-of-the-art, performs respectably well and is constructed on a mast-frame structure that is chosen for the DXer to meet his needs or space limitations. This loop is less bulky than conventional box loops and hence can serve as a loop to use for portable use away from the main BCB den, as a standby loop, or it can serve well for the main DXing antenna in your BCB den. This loop, because of its ease of construction, is excellent as a "first" built loop antenna for the beginning DXer.

The purpose of this writing is not to describe state-of-the-art loop antennas but rather to give a design/construction technique for inductively coupled loops of a shape and size to be chosen by the BCB DXer. Thus, it is important to state that, although only one mast-frame structure is defined here, it need not be used and any mast-frame structure conceived by a DXer will likely serve as well and after this structure has been selected and constructed, the winding and pruning-tuning procedures described here are applicable.

Supplies and components needed:

- a .365 picofarad (micro-microfarad), 2-section variable capacitor (popularly known as a "standard broadcast" or easily obtained from any radio supply store at the cost of, at most, \$2).
- about 150 feet of insulated wire of the stranded type in size #12, #14, #16, or #18
- a two-terminal terminal strip
- a 1" diameter oak dowel
- 5" x 5" (or so) piece of masonite
- 5 to 10 feet of 300 ohm TV twinlead
- 1" x 3/4" lumber
- quarter-inch drill
- hammer
- nails
- saw
- soldering iron and solder
- two pieces of 1/4" to 3/4" thick lumber cut about 7" square

The mast-frame structure is built first. The appearance is sketched on the last page of this article. Note that one crossarm has been cut into two sections, the double line figure represents the oak dowel mast on which the antenna rotates. At the point I of intersection of the crossarms and mast, use nails and the two squares of wood to "sandwich" the crossarms and mast rigidly together. The squares dashed in the figure denote this "sandwich".

The 90° and 45° angles can be aligned "by eye" since they are not exceptionally critical. The crossarms can be made from 1" x 3/4" lumber easily obtained from a lumberyard and the 1" side should be used to keep the sandwich 1" thick on the inside--note that the oak dowel is also 1" in diameter. The length of the crossarms is up to the builder! Suggested total length per arm is in the range of 24" to 72". The dowel-mast should be long enough to allow the antenna to rotate when set in a stand or supporting base (to be designed by the builder). Next, stretch a piece of wire or string between points A and B as shown in the sketch. Mark where this line crosses the mast and drill a 3/4" hole (H) through the mast (the line of the hole is at right angles to the plane of the crossarm structure). Next drill a small diameter hole just below one end of hole H and mount the 2-terminal terminal strip on this small hole. Strip one end of the 300 ohm TV twinlead and attach the wires to the terminal strip--one wire to each lug. Now cut off enough stranded wire to make a one-turn loop around the frame with about 6 or 7 inches to spare. Strip one end of this wire and attach it to one lug of the terminal strip and solder the two wires now attached to that lug. For reference henceforth, the end of hole H next to the terminal strip will be called X and the other end of hole H will be called Y.

Run the stranded wire attached to the lug from X to Y and then once around the frame of crossarms back to Y passing through to X; pull the loop taught, strip the free end of this wire and attach it to the unsoldered lug. Now solder the two wires attached to this lug. The other end of the TV twinlead runs to the receiver and the length of this run can be cut to suit the physical location of the receiver and antenna. This completes the winding of the pickup loop--that winding which inductively couples the main winding to the receiver. If you wish, cut V-grooves in the ends of the crossarms (as shown in the sketch) to hold the wires in place as they are wound over the ends of the crossarms and

around the frame. Next, mount the variable capacitor on the masonite board and attach the board to the mast just below hole H at end Y. The top of the masonite can be flush with hole H. There are three points or terminals of interest on the variable capacitor. The frame of the variable capacitor will be called terminal F, the other terminals are lugs on the fixed-plate sections of the variable with the lug on that section with the smaller number of fixed plates called terminal P and the other lug called terminal Q. Now strip one end of the roll of stranded wire, pass it from Y to X and connect (solder) to terminal F. Now wind all the wire around the frame in the grooves cut in the crossarms making as many turns as the length of wire allows. The last complete turn ends at point Y, passes through to point X, and attaches (solders) to terminal P. You now have a loop antenna!

Tune-up procedure: Connect the TV twinlead to your receiver and tune to 1580-1600 kHz. Rotate the variable capacitor (better put a good knob on the tuning-rotating shaft) for a sharp peak in signal. If no sharp peak is obtained, unsolder at P, remove (cut off) one turn of the main winding and connect the new end as before to point P. Try again for a sharp peak very near 1600. Continue this process until you get a peak of signal at 1600 kHz with the plates of the capacitor almost completely unmeshed! When you have reached this point, tighten the main loop windings and solder end at terminal P, taking up any slack. The loop is now wound to the high end of the band. If your variable capacitor has a trimmer capacitor mounted on the section with terminal P, you can adjust it (a small screw mounted on the side of the section of fixed plates) so that with the plates fully unmeshed the signal peaks right on 1600 kHz. Now start tuning down the BCB peaking the signal with the variable capacitor as you go from frequency to frequency. You will reach a point at which the signal peaks and the plates of the variable are completely (or very nearly so) meshed. For reference, we shall call this frequency ZZZZ kHz. Now mount a single-pole single-throw or slide switch on the masonite board next to the variable capacitor, connecting one terminal of the switch to terminal P and the other to terminal Q. Close the switch, keep the receiver tuned to ZZZZ kHz and repeak the signal. Continue tuning until you reach 540 kHz or you again reach a point at which the capacitor plates are fully meshed at a frequency above 540. If you reach 540 kHz and can obtain a sharp signal peak, then you're finished. The loop is ready for BCB DXing! If you don't reach 540 and the plates are again fully meshed, then the following procedure is to be followed: purchase several values of fixed capacitors in the range 50 to 100 picofarads (micro-microfarads). These units are cheap and can be obtained easily; they cost something like 20¢ each. Connect one end of one of these units to terminal P; the other end to terminal Q. Now, retune for a peak at 540 kHz. Use the smallest value fixed capacitor that will allow you to tune a sharp peak at 540 kHz.

DIAGRAMS

