A FERRITE-CORE LOOP ANTENNA

It is fairly easy to build your own ferrite core loop antenna. Although it may not look as good as one of the commercially available models (depending on how much of a craftsman you are) it can give you effective nulls, as well as reasonable direction finding capabilities. The main advantage of this loop over the air-core loops is that it is compact, standing only 13" high and 15" across.

Joe Worcester discusses ferrite loops in detail and describes one (his "Space Magnet") in IRCA reprints A9 "The Shielded Ferrite Loop" and A10 "How to Build the Space Magnet". His loop uses a bipolar transistor amplifier; this one uses an FET/bipolar amp. They have similar gain and nulling ability. The following is a suggested method of construction, but the size and shape of the support isn't too critical.

Parts needed for loop and support:

1--Rubbermaid 10½" turntable
1--piece of ½" plywood 7 x 7½" ("D")
1--piece 2x2 fir or other wood 8½" long ("A")
2--pieces ½" plywood 2½" x 3½" ("B")
1--piece ½" plywood 15" x 1½". 1½" is an approximation. This dimension should be the same width as the 2x2 piece ("A") viewed end on. ("C")
2--pieces 2x2 fir 1" long ("E")
2--ferrite rods ½" x 7½", 125 permeability (available from Amidon Associates)
1--12" length polyethylene tubing, ½" inside diameter; 5/8" outside diameter.
11½ feet litz wire. Short lengths of litz wire are available from Amidon Associates. Otherwise, use #24 magnet wire, but gain and selectivity will be less.
8--3/4" x 4 wood screws
1--2½" x 3/16" bolt
2--washers to fit above
1--wingnut to fit above
2--1½" woodscrews (flat head)
2--1" long machine screws with nuts (any thickness)
1--screw-in "eye"

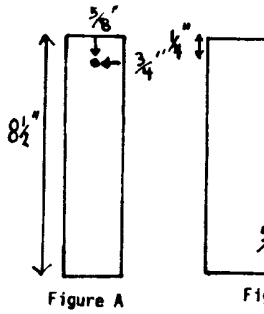


Figure A

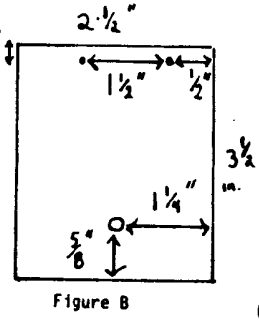
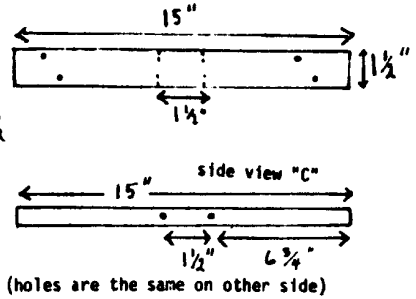


Figure B

Figure C---top view

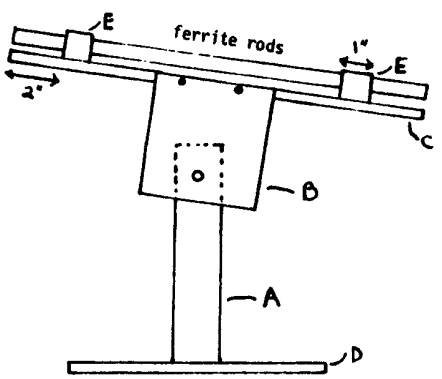


(holes are the same on other side)

This loop can give really solid nulls on locals. But any really sharp null on a strong station is very dependent on the proximity of your hand or other part of the anatomy. The same effect has been noticed on the Sanserino loop, NRC FET AA loop, Radio West MW-1 and the Space Magnet. In fact, by moving your hand around nearby the loop, you can hear the offending signal appear and disappear. This means unfortunately, that you won't always be able to set the loop's altitude and azimuth for a good null, then move away to adjust the receiver.

Operational instructions are similar to those for the Sanserino loop, except the loop tunes 525-1650 kHz without the range extending capacitor C2. The nulls are off the ends of the ferrite rods.

Construction of frame and loop



1. Drill a 7/32" hole through the 8½" piece of 2x2 ("A") 5/8" from one end; make sure the drill doesn't go through at an angle.
2. Attach the other end of "A" to the 7 x 7½" plywood ("D"),using the two 1½" woodscrews. "A" should be upright in the center of "D". Countersink the screw holes on the underside of the plywood as it must sit flush on the plastic turntable.
3. Center "D" on the turntable and drill 2 suitably sized holes through the wood and turntable. These holes are diagonally opposite one another on two corners of "D". Make sure the holes through the turntable are near the rim and don't run into the circular base of the turntable. Attach "D" to turntable using the 1" machine screws; place the screw heads under the turntable.
4. Drill holes in each on the 2½ x 3½" pieces of plywood according to Figure B. The larger hole is 7/32", the smaller are 7/64".
5. Drill 7/64" holes in the 15" x 1½" piece of plywood according to figure C.
6. Place epoxy glue on one end of each ferrite rod. Slide each ferrite rod into one end of the polyethylene tubing so that the epoxied ends meet in the middle of the tube. Make sure the ends are placed firmly together while the glue sets.
7. Wind 50 turns of litz wire on the plastic tube spaced out over 1½" of the total rod length, with a tap at the 25th turn. The ends of this winding should correspond with the input terminals of the amplifier, so check where you will place the amplifier.
8. Drill 5/8" holes centered through each of the two 1" blocks of 2x2 ("D"), i.e. the holes are through the 1" thickness of the block.
9. Mount one of these blocks on the 15 x 1½" plywood ("C"), 2" in from one end using two 3/4" wood screws. Slide the plastic enclosed ferrite rods through the hole in this block (approaching from the center of "C") until the end of the rod is just above the end of the plywood piece "C". Then slide the other block onto the rod from the other end and attach it to to "C" using two 3/4" wood screws.
10. Attach the two pieces of 2½" x 3½" plywood ("B") to either side of piece "C" using 3/4" wood screws. Now attach this assembly to piece "A" using the 2½" bolt, washers, and wingnut. By loosening the wingnut you can vary the angle of the loop which can often improve nulls.
11. Put in the screw eye near the bottom of piece "A"--the output cable from the amplifier will run through this.
12. Use the differential loop amplifier described in the article on the Sanserino loop for this loop. However, omit C2 and S1, as they are not needed when this loop is space wound with litz. Mount the amplifier box with a couple of small machine screws on piece "B" opposite the side with the wingnut. Position the amplifier so that the leads from the loop to the amplifier are the shortest possible. The center tap from the loop is grounded onto the lug on the amplifier.