

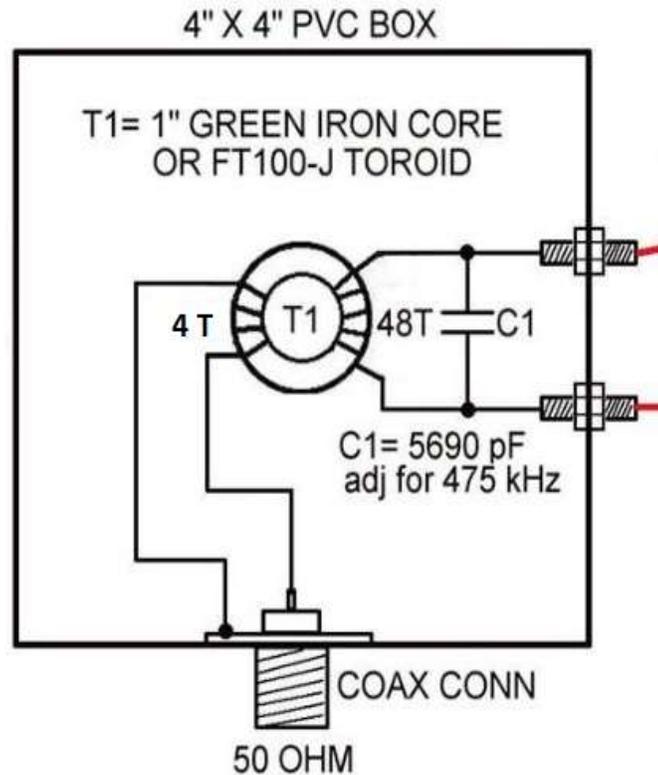
Simple 630 Meter Loop -W5DFN

After using a WB4JWM 16' loop for several weeks, I wondered if a bigger loop would work better. Logistically, because of geographical limitations, building and mounting the 28 foot version was daunting. So I decided to build a square loop using PVC tubing with a single turn of CAT5 inside fed from the bottom.

CAUTION: This antenna is strictly for receiving!



TUNER DESIGN COURTESY OF AND WITH PERMISSION OF TOM MILLS WB4JWM



C1 is a mica compression capacitor approximately 450pF – 1200pF with fixed caps in parallel, took a bit of experimenting adding and removing caps to get a suitable resonate frequency and swr around 1.5:1. It could be done with fixed caps, but a lot of swapping caps would be involved.

Besides the tuning network, parts list is minimal:

- 4 10' joints of PVC Schedule 40 (I used 1" but any size larger could be used)
- 4 90° elbows
- 1 Tee
- 1 10' plus joint of heavier PVC to make center support and mast
- 2 SS hose clamps to fasten mast to loop

The base mount consists of a larger size of PVC mounted about 3' deep in the ground. At this time, bearing surface allowing rotation is simply greased PVC on greased PVC. As soon as a suitable thrust bearing can be located, that will be used instead. Of course, if you desire only a single bi-directional installation, your options are much simpler.

How well does it work? It is an improvement, for distant stations by several db over my ½ wave dipole. Initial testing was done receiving low frequency beacons and the antenna shows

a pronounced null as you would expect looking through the “hole” with any DF antenna. Nearer stations are sometimes better on the ½ wave dipole, likely due to its NVIS aspect.

So the new square loop worked pretty much to my expectations, feeding the TS-2000 through a WB4JWM tuned preamp, using the dedicated receive port, which seriously simplified T/R switching. However, being old and lazy, I quickly tired of manually turning the loop to this azimuth or that. I remembered that I had lying fallow among my junk, a couple of Channel Master TV remotes. Since the new loop was far too heavy and the mast too large to work directly under the loop, I started figuring a way to turn the antenna with the lightweight rotor.

Since I only needed to turn it 180° to cover all directions, a 2:1 turns ratio of the rotor to the antenna would do the job, plus allow a gearing down of the rotation to make it easier on the rotor. The antenna at natural rest would be North and South, so I buried the feet of a tripod antenna mount South of the antenna mast. The short mast on top of the rotor measured exactly 1” and a couple of layers of Gorilla tape made the diameter of the antenna mast close enough to 2”.

Several wraps of poly rope on each mast, with the center wrap on each taped to the respective masts, and I had my pulley/belt assembly. Because the antenna mast to mount bearing has some friction, the rope would stretch as enough torque built up on the antenna mast to overcome the drag. To adjust extra slack out of the rope, one end has a loop that the other end goes through, and half hitches keep it tight.

Once I have a suitable bearing under the antenna, I will use rope with no stretch and eliminate the lag and catchup I deal with now. I used a ground guy from the top of an aluminum rod (well-greased) inside the rotor mast to keep from the tension from trying to pull the tripod out of the ground and keep the distance between antenna mast constant.

The hardest part of the operation now is remembering that 2° on the remote rotor control box equals 1° of actual rotation and that not only does the antenna rotate to say 90° when I send 180° to the controller, the antenna is also aimed at 270°.

The images below show the antenna at 000° on the controller and at 360° on the controller. Note that the antenna is on opposite sides of the rotor mast.



Of course, this is merely a working prototype and proof of concept. With more resources at your disposal, I am sure some can come up with more elegant designs.