

Trevor's HF Mag Loop Antenna

I wanted to make a Mag Loop Antenna for HF to do QRP for FT8 etc, and I found this on Thingiverse.

The problem with this design is that it uses a 1mtr diameter 16mm od aluminium hoolahoop as the radiator. These are not generally available in the UK, and the one I found was £35!

I did have about 4mtr of 10mm od microbore central heating pipe lying about in the shed left over from a job, which seemed to me to be just about perfect to make the radiator. But how would I need to change the design to suit the new pipe?

I looked at a number of design tools on the internet, and liked vk3cpu's tool <https://miguelvaca.github.io/vk3cpu/magloop.html>.

This needs a number of input parameters, and produces graphical output reflecting the antenna's performance over a range of frequencies. I am looking to use this antenna for 20-40 m bands.

So, some initial boundaries. The pipe diameter is fixed at 10mm, and the maximum loop diameter is about 1.4 m.

Fiddling about with the Loop diameter gave me the best trade-off at about 1.2 m. This would require a capacitance between 20-140pf. The capacitor would have to withstand about 1.3 kv!

I was able to obtain dual ganged polyvaricon 280pf capacitors very cheaply and easily, and by seriesing the stators I could produce a 140pf capacitor with twice the voltage withstand.

I did a talk a few months back about modifying the original design to suit the new dimensions, so I will not repeat that here, but that said, I produced the new design.

The result of the redesign is six components. Two form the bottom frame and exciter coil mount, two form the top frame, and capacitor mount, and the last two are the capacitor box, and knob. (here are a set I printed earlier.)

That is the main loop, now for the exciter coil. The coil itself is a simple turn of wire supported on a small piece of PCB. This slips between the bottom mount parts at the top. The coil is about one fifth of the diameter of the outer loop.

The loop is connected to the PCB by the inner connectors of two 'Chocolate Block' Connectors soldered onto the PCB. The PCB has a groove isolating the two connector corners, and an SMB connector.

This antenna is not suited for external long term use.

When connected to a QRP Transceiver, the antenna tuning is easily demonstrated, on both the 40 and 20 m bands, as designed.

This is just a prototype, future experiments include:

- Modifying the radiating loop shape
- Modifying the exciter loop shape
- Modifying the exciter loop turns
- etc.