

Copper Tube Loop project

Most AM receiving loops are made of multiple turns of wire on a wooden frame. This can be wound flat as a spiral loop, or in a stacked form as a box loop. The resultant loop is then tuned by a capacitor to the desired frequency. Coupling to the receiver can be by a direct balanced high impedance connection, or by a single turn inductive pickup. Both work well.

There are disadvantages to this form of loop. First, it doesn't lend itself to remote use outdoors as tuning is an issue. Second, it's physically fragile and very hard to weatherproof effectively.

Some time back while looking at a web site about [VLF natural sounds reception](#), I saw a single turn loop made of copper tubing. It was incredibly simple to build, and very rugged. The output was taken from a ferrite toroid core slipped over the tubing at the bottom center. The output was taken from turns wound on the toroid as the secondary of the transformer thus created.

I decided to build one to see if it would work at AM frequencies. The first test version was built ten feet on a side and made of common 3/4" plumbing tubing and elbows. A toroid salvaged from an old transmitter board was used. Later I bought some Amidon FT-240-77 toroids which work well. After experimenting, four or five turns on the toroid was determined to be best. The original twenty turns provided very little output at all. This was tested in steps of one or two turns down to two turns. The wire was twisted for a length of a foot or so, then wrapped through a pair of Radio Shack chokes to reduce common mode currents and effectively balance the output. This did reduce noise pickup somewhat.

The loop in the pictures below was made from one ten foot length of 1" copper tube cut into quarters, and four elbows. Standard plumbing solder and techniques used. Nothing special.

Results were good, though a [preamplifier](#) was helpful on the weaker stations. Nulling was on a par with other loops used in the past. Not needing to tune to the receive frequency was a big plus. I had useable results from about 150KHz in the longwave band up through the CB band at 27MHz.

The next facet of this project involved disassembly and adding an identical toroid pickup at the top center of the tube loop. Both outputs were then connected to the two inputs on a home-built phaser, similar to the [Quantum](#), or one of [Mark Connolly's](#) or [Dallas Lankford's](#) designs. What this did was give the ability to apply a virtual tilt to the loop to deepen the null. Conventional loops must be tilted off vertical one way or the other to get the deepest null on a station. Having to mechanically move the loop in two planes adds significantly to the complexity and tuning skill required. That also is quite impractical for outdoor remote use. This dual

feed untuned model merely requires a common light duty rotor. Two equal lengths of coax are required, but paired RG-6 meant for satellite TV use is cheap and readily available.



This dual feed configuration has allowed deep nulls on my local stations so I can hear stations on the same frequency. WHJJ-920 was brought down so CKNX in Ontario was at a listenable level. The previous version of the loop couldn't do that.

I have two of the single feed versions mounted in the back of my Chevy Blazer at 90 degrees to each other. One goes lengthwise, the other sideways. I have a two position switch to select the desired one into the truck radio. Noise pickup is significantly lower than the common vertical. Even without a preamplifier it provides better reception than the stock whip. Being able to select antennas easily while driving provides some interesting choices in stations heard, or external noise reduction. The sideways loop picks up far less street side AC line noise than the lengthwise loop,

for example. The fiberglass bed cover of the Blazer makes this work. A steel roof would attenuate the signal below useability. With a preamp it makes a very good portable DX setup. Phasing the two loops does work, but only while parked.

I will be doing further development on this as time and ideas allow. Please feel free to build and test this design and let us know what you have found.