

The "Joystick Antenna"

Reviving a classic restricted space vertical antenna design from years ago!

Editors note:

This antenna should be considered experimental. The Joystick antenna was used many years ago as an all band vertical HF antenna under restricted space situations that would cover from 80 meters thru 10 meters with a tuner and was a great commercial success! Some hams even had success with it on 160 meters.

Many thousands of hams worldwide used it for many years, but over time, like other commercial antennas, the Joystick antenna faded from existence on the commercial market. It was sold by a company called Partridge Electronics Ltd in the UK in the mid 1960's and they eventually faded into the ether and the popularity of the antenna dwindled. There are still a few of them around being used today as I write this.

I ran across this antenna accidentally a couple of months ago on the internet with very little information about it and thought that this antenna needed reviving for those of you who have restricted space limitations for HF antennas.

There was little information about it concerning the construction details so after a couple of months of searching the reflectors and using the "detective" work of Rick, VE3FMC, he finally located a source of plans for the Joystick antenna from Bob Morden, VE3EIM!

I contacted Bob and he was kind enough to share the information he had with me. Also during the research and detective work trying to locate information about the Joystick antenna, I also found a very nice drawing of it on the A.R.E.S Niagara web site. The webmaster, Peter, VE3HM was kind enough to allow us to use the drawing from their web site.

You will see presented below, two different designs for the Joystick antenna. One is fed from the top and one is fed from the bottom. You will also notice some variations in the wire used for the coil, number of turns, and length differences in the plans below. You can choose the one you like and take it from there.

Since you will be using a tuner with this antenna, nothing is extremely critical.

Please note that Bob provided the plans in graphic files, not text that can be readily copied. Just copy the picture files to your hard drive for future reference.

Now, Bob Morden, VE3EIM, who provided the plans below to us takes over from here:

THE JOYSTICK-SMALL IN SIZE, BIG IN PERFORMANCE

An oldey but a goody, that's what the all-band joystick antenna is. The original commercial version of this antenna was marketed by Partridge Electronics, Ltd., of the United Kingdom some thirty years ago. I first used the commercial version back then while operating Maritime Mobile under the call sign ZL2FF/MM down in the South Pacific. I don't believe that the antenna is commercially available today. For such a small antenna, it worked quite well. It finally ended up in the hands of an Ontario ham who lived in an apartment and wanted to get on HF.

About a year ago the need for a compact all-band antenna arose again. My junior op Randy, VE3RGU was planning a week's stay on Pelee Island, Ontario. He planned to operate HF from the Island to activate it for the Canadian Islands award. The award is sponsored by Gary, VE3XN. An all-band, compact antenna was needed that could fit in a vehicle easily, and be used with minimal support (The Island has very few tall trees). The Joystick fit the bill perfectly. I ran across it while skimming some articles in QST and CQ magazines looking for ideas. I immediately remembered the design, and how well it worked for me thirty years ago. With no commercial version available, I set out to construct my version of this proven performer.

The design calls for a centre loading coil using #12 enameled wire. I couldn't locate any, so I used #13. This isn't really critical, as your wire tuner will compensate for a wide range of differences. Just use the largest wire you can, and adhere to the lengths given in the schematic. The 1" wooden dowel is

available at any lumber store, and many hardware stores carry such common items. The hard drawn copper tubing and end cap are available at any hardware or Canadian Tire store. The wire you need can be bought at any Radio Shack store. You would be surprised, you probably have everything you need to build the Joystick already, even if you're a new ham and don't have a "junk box" yet. Even if you're forced to buy everything you need brand new, the bill should only amount to \$30 or so. The drawing is self-explanatory, so you shouldn't have any difficulty assembling your own Joystick. A few modifications can be made to the basic design to improve it slightly. A copper braid can be soldered in between the wire and copper end cap. This gives the wire more flexibility, allowing it to move in a wind without breaking. Another idea is to make the top section removable by making a loose fit where the wooden dowel joins the copper tubing. This allows transportation of the antenna in any car, and the re-assembly time is only dependent upon the speed you can turn a screwdriver.

In use, the Joystick requires a random wire tuner. These can be bought quite inexpensively, as they aren't very complicated. Better yet, you can build one. There are good designs in most handbooks, and all the parts you need can be bought at any hamfest for a couple of dollars. You must make sure, however, that it is a random wire tuner, not a coax tuner, or regular line tuner. They just don't have enough inductance for the job. The second item needed is a good ground. In practice, even a cold water pipe will do, but the better the ground, the better the signal. Use as heavy a gauge ground wire as you can, and make sure the

connections are snug. Radial wires work, and even a single wire can be laid out beneath a floor carpet. Just use the best ground you can. The antenna will work even with a poor ground, but not the absence of one ! The copper pipe section must be vertical, or as near vertical as you can get it. The wire must be atop the pipe section, not upside down. Try and run the wire back to the tuner in straight lines. One long straight line is best, but bending around corners is OK, just don't bend the wire back upon itself. If you're in an apartment, run the wire out in as many straight sections as possible. Along the wall, floor, ceiling, it doesn't seem to matter, just as long as it's roughly straight. If you can get the whole thing outside, great, but if not, don't worry. My junior op uses one in a basement apartment, with the wire running along the walls, and a cold water pipe for a ground. He often works Europe and South America on 15 and 20 metre CW and RTTY, with only 160 watts. Remember, that's below ground level. We have regular skeds on CW from his home in Lindsay, Ontario, to mine in London, Ontario. That's a distance of about 180 miles as the crow flies, and he's usually 579 to 589 on 80 metres. About the only trouble he's had with it was loading it up on 20 metres. After adjusting the ground lead length a little, it's now a flat match on 10, 15, 20, and 40 metres, and only a 1.3-1 SWR across the entire 80 metre band. He's even used it on 160 with a little success, although this may be pushing it a little. The idea of the joystick spread, and now several of my friends are using them in apartments, limited space locations, and indoors where outside antennas are prohibited. I hear nothing but good reports. This certainly isn't the last

word in all-band antennas, but if you are hankering to get on HF and don't have an acre lot, or you just need something portable for field day, you might just find some joy in the Joystick.

Next month I will describe a simple, suitable random wire antenna tuner that you can build to use with the Joystick at a very reasonable cost from readily available parts. Til then, 73.

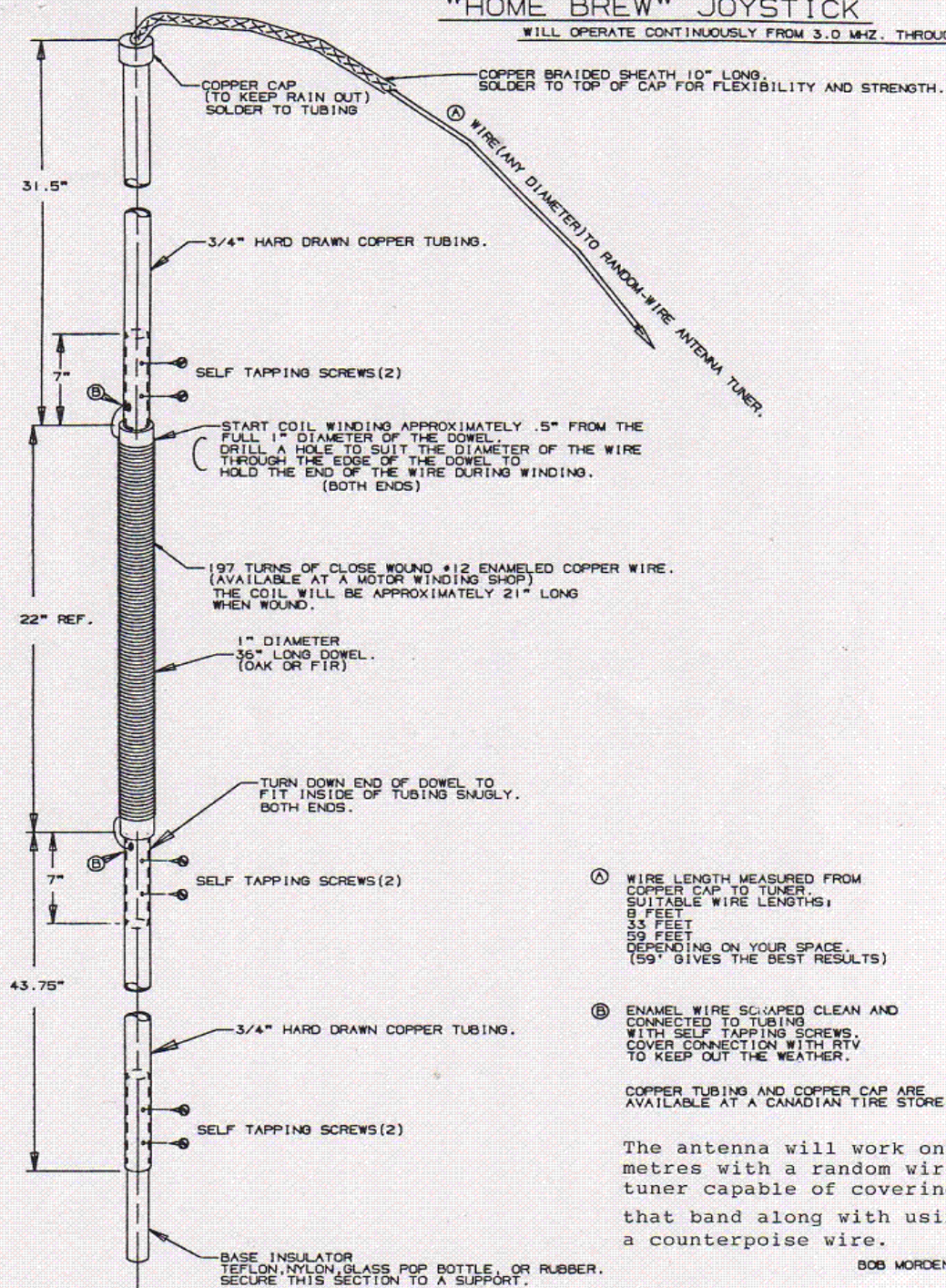
Bob , VE3EIM.

* Editor's Footnote:

The Joystick can be moved about 45 degrees away from the vertical with no ill effects. Man-made noise like ignition pulses and line noise can sometimes be nulled out by varying the vertical angle of the straight pipe section away from 90 degrees (straight up and down). Make sure the pipe section is well insulated from supporting objects.

"HOME BREW" JOYSTICK

WILL OPERATE CONTINUOUSLY FROM 3.0 MHZ. THROUGH 30 MHZ.



The antenna will work on 160 metres with a random wire tuner capable of covering that band along with using a counterpoise wire.

BOB MORDEN VE3EIM

You just read Bob' article about the Joystick antenna as written years ago.

Below is the second version of the Joystick antenna. You will notice by comparing with the one above, that the lengths and wire sizes are slightly different and it is fed from the bottom.

Home Constructed "Joystick"

Load with Johnson Matchbox, or what have you!

Why The Sucker Works Is Beyond Me? All I Know Is I Get Contacts All Over The Place On 40M. It Does Have A Narrow Bandwidth & Requires Readjustment Whenever You Move 10-15 Khz. But That's A Small Price To Pay For An Ant. That Requires So Little Room And Is So Easily Concealed!!

1 In. Hardwood Dowel With Both Ends Turned Down To Let Copper Pipe Slip Over For Approx. 3 In. Total Length of Dowel Is 13 In.

Ends can be capped with rubber or plastic caps from CTC store.

32 $\frac{1}{2}$ " in. $\frac{3}{4}$ " OD. copper pipe

COIL: 1 in. dia. 7 $\frac{1}{6}$ " long #20 AWG Enamel Wire Close Wound Approx. 210 Turns.

44 $\frac{1}{2}$ " in. $\frac{3}{4}$ " OD. copper pipe

Note: All dimensions were determined by very carefully measuring a commercial model.

Feed Point.

Drawing Courtesy Niagra A.R.E.S

Additional notes for use and construction:

Joystick overall length 90 inches. Coil 14-1/2 inches long. Fir or oak wooden dowel .735 inches (approximately 1 1/4 inches) in diameter. Coil constructed using # 14 enameled wire, 219 turns. The Inductance of the coil is 45.158 micro-henries. Copper pipe .854 (13/16) inches in diameter.

I might add, for those without access to a wood lathe to turn down the ends of the wooden coil form so the form will fit into the copper pipe at each end. Using the copper tubing as a guide, merely pencil around the copper tubing on the centre of the top and bottom of the dowel and using a Hack Saw (with apologies to those who use a hack saw properly by cutting only metal!) and cut to form a square on the dowel the length according to the diagram and then using a wood file carefully file the square round until it fits the copper tubing. As I mentioned before, on one end I made a loose fit so the antenna can be easily dismantled and placed in a trunk of a car for transport to a portable location. I found a hack saw was easier to control the cut on the dowel rather using a coping saw which tends to wander.

I would suggest the builder use copper tubing as the coil is wound with copper wire as opposed to using aluminum tubing to avoid reaction between two dissimilar metals which might cause rectification at those points with eventual poor contact between the coil and the tubing. The contacts should be covered with Dow Corning RTV or coax seal to keep out the effects of weather.

Some diagrams show the Joystick being fed at the top and others from the bottom. I think you will agree if you are using only 8 feet of wire from the Joystick to the rig, it would be fed from the top. If the Joystick is hanging from a tree, it probably would be better fed at the bottom. I have tried both ways and didn't detect any difference except you will notice that the feed line goes to the longest length of copper tubing in most cases.

Use 1/4 wave length radials. One or more for each band if possible. Experiment!

More Joy Stick antennas

The G3XOV JoyStick Antenna

WA3WZR Modernized "JOYSTICK" Antenna Project