

2 Meter Vertical Base Antenna

by John Bell, N6ZJB

This antenna, which is built inside a 10 foot piece of 3/4 inch PVC water pipe, can be constructed for less than \$10. It is a J-Pole with an extra 1/2 wave element added to the top. Phasing of the top section is accomplished by inserting a coil between the top of the J-Pole and the extra 1/2 wave element. Both parts of the antenna have to be in phase to get the most gain. The antenna is omnidirectional and has the gain of a small beam.

This is what you will need:

- 1 each 10 foot long, 3/4 inch IPS SCH. 40 PVC pipe.
- 1 each end cap for the PVC pipe (keeps rain out of the top)
- 1 each 1/2 inch wood dowel rod, 2 inches long.
- 20 inches of 300 ohm twin lead (not foam type).
- 10 feet of 14 gauge copper magnet (varnish coated) wire or 10 feet of 20 gauge solid insulated hook-up wire.
- Some RG-58 coax, you decide how much, with a connector on one end that fits your radio.
- A piece of copper clad circuit board material, 1 inch by 1 inch.
- A piece of foam rubber to stuff into the bottom of the pipe to keep bugs out.

Assembly

First we will make the bottom of the J. Strip about 1/2 inch of insulation off the end of the 300 ohm twin lead on both wires. Twist these wires together and solder them. This is the bottom. Next using a sharp knife expose a small section (1/8 inch) of the twin lead wire on both sides 3 inches up from the bottom and solder the coax shield to one side and the coax center to the other side. Tape or tie wrap the lower 3 inch section to the coax. Now, measuring from the bottom, cut the twin lead to 17 inches. Strip 1/2 inch of

insulation from the top of the twin lead and cut off the 1/2 inch exposed wire that is on the shield of the twin lead. The remaining exposed wire will connect to the rest of the antenna.

Next, cut a 2 inch piece of dowel rod and drill two holes spaced 1.1 inches apart that the wire you chose will fit through. Wind a coil around the dowel with 13 turns and the ends coming through the holes in the dowel with each end being 38 inches long plus a little (1/4 inch) for stripping. Take the circuit board material and cut it into a circle that is bigger than the inside diameter of the PVC pipe and smaller than the outside diameter of the pipe. Drill a small hole near the center of this circle and solder one end of the coil wires to it. The distance from the end of the coil to the circuit board disk is 38 inches +/- 1/8 inch. Solder the other end of the coil to the exposed wire of the twin lead. The distance from the top of the insulation on the twin lead to the coil is 38 inches +/- 1/8 inch.

Drill two 1/8 inch holes at the bottom of

the PVC pipe so a tie wrap can act as a strain relief for the coax. Now carefully insert the unconnected end of the coax through the top of the PVC pipe. Make sure there are no kinks in the wire or anything is twisted and pull the antenna into the pipe until the circuit board stops you. Glue the end cap on the top and put a tie wrap around the coax at the bottom through the 1/8 inch holes for strain relief. Stuff a piece of foam rubber into the bottom of the pipe to keep bugs out.

Mark a line around the PVC pipe 94 inches from the top (26 inches from the bottom). When mounting the antenna, do not put any mounting hardware above this line. Mount the antenna as close to vertical as possible to get the best performance.

In case you're wondering, the antenna doesn't use radials. The addition of radials will degrade the performance. If you have a SWR meter, you can adjust the match by moving the place where the coax taps into the 300 ohm twin lead.

73, John, N6ZJB

