

Copper Cactus Dual-Band Super J-Pole Antenna Project

2 meter 70 Cm Home brew antenna



All the materials except the S0239 fitting can be found at any good hardware store, and the whole antenna can be made in less than an hour.

In my design I use 1/2" copper schedule M tubing and 1/4" soft copper tubing. I had experimented with using Teflon insulator, but have since changed my design to use a 9" length of hardwood dowel with three coats of lacquer as the insulator, for more strength.

Clean all the tubing, and then from the 1/2" tubing cut one piece each of the following lengths: 57-1/2"; 38"; 19"; 2", and a piece about 3" long for a stub to mount the antenna. In addition to the tubing, buy a 1/2" elbow, a 1/2" Tee, two 1/2" end caps a 1/2" threaded fitting, and a cast iron floor flange for mounting. Get a piece of 3/16" or 1/4" soft copper tubing 42" long. Find the center of the 1/4" tubing and bend it around a 1"-to-1-1/4" diameter water pipe or dowel.

Simplify the Feed Point of the J-pole



The feed point also needed to be made simpler, so I elongated one of the mounting holes of a panel mount SO-239 fitting and inserted a stainless steel adjustable band clamp. This goes on the 57 1/2" long section of 1/2" tubing. A short 2-3/4" length of # 14 copper stranded wire is soldered to the center terminal to go over to the 19" section. I used another stainless clamp to attach this. (See Photo B.) While experimenting to find the proper feed point, I found that the distance above the crossbar should be about 3".

Part's List

- 1 - 10-foot section of schedule M 1/2" copper tubing
- 1 - 1/2" copper elbow
- 1 - 1/2" copper Tee fitting
- 2 - 1/2" copper end caps
- 1 - 1/2" copper threaded fitting (for mounting)

- 1 - 1/2" cast floor flange (for mounting)
- 1 - Piece of 3/16" or 1/4" soft copper tubing 42" long
- 1 - Piece of 1/2" hardwood dowel or Fiberglass rod
- 1 - SO-239 panel mount coaxial fitting
- 1 - Piece of # 14 stranded copper wire
- 2 - 3/8" by 7/8" stainless band clamps

Tools needed

- Tape measure
- Tubing cutter
- Propane torch
- Solder and flux
- Electrical tape
- Caulking compound
- Screwdriver
- A weight to keep parts aligned while soldering
- Steel wool or a Scotch Brite pad (for cleaning all copper)
- Spray can of clear exterior lacquer (to finish-coat completed antenna)

Put the Heat to it

Now fire up the torch and start the assembly process from the bottom. See Figure 1. Use flux on all joints, solder the 1/2" threaded fitting to the mounting stub, and solder the 1/2" Tee fitting. Then proceed with the 57-1/2" section, 2" cross piece, and 19" section. Pay close attention to getting the 19" piece parallel to the 57-1/2" piece. After these have cooled, drill through both the 57-1/2" section of the 1/2" tubing and the hardwood dowel about 1/4" from the top end of the 1/2" tubing, and the bottom of the 38" section of the tubing. (See Photo A.) Then insert the 1/4" tubing to the 1/2" tubing and sweat solder the end caps. After these have cooled, clean the entire antenna, bend the half wave matching section to a half circle of about 4" radius around the antenna to help the balance and match.

Building Suggestions

1. You may use a Fiberglass rod as an insulator, but you will have to be very careful with the torch or you may weaken or burn the rod, or make it brittle.
2. When cutting the 1/2" copper tubing, cut the 57-1/2" piece from one end of the 10" length, and the 38" piece from the other end. By doing this you will have factory-cut edges for inserting the 1/2" dowel.
3. Be sure to keep the flame of the torch away from the insulator to avoid burning it.
4. Use paste flux on all joints when fitting the pieces together. Use enough flux, since you will be cleaning the entire antenna with solvent after assembly.
5. Use a weight to hold the 19", 57-1/2", and 2" pieces, and the Tee and the elbow, flat when they are sweat soldered together.
6. Use a ruler or caliper to check the spacing between the 19" and 57-1/2" pieces, to keep them parallel to each other.
7. When drilling the SO-239 fitting, use the drill press. Be careful not to drill into the threads of the fitting. After the holes are drilled, file the opening flat for a better band clamp fit.
8. After the best match has been found, you may want to solder the SO-239 and the stranded wire end to the 1/2" tubing.
9. When the antenna has been cleaned and matched, spray the entire antenna with a coat or two of clear lacquer to keep it looking nice.

10. After everything else has been done, apply silicon or a butyl rubber compound to the insulating section, then cover the joint with electrician's tape for a weather tight seal.
11. A 1/2" pipe coupling and a length of pipe may be used in place of floor flange for mounting in a roof tripod

First Name: Allen Call Sign: n0sck

Comments: I built the Copper Cactus Dual-Band Super J-Pole in 1992, twice. The first used the dowel, the second I used a PVC 1/2 inch female coupler and two threaded copper male adapters. I shortened the upper and lower elements by the amount the adapters added. I also drilled and tapped one of the flats of each adapter and used 1/4 inch compression to 1/8th inch male pipe adapters for the matching stub, again reducing the length by the appropriate amount. I also fashioned a mount for the SO-239 by splitting a 2 inch length of 1/2 inch copper lengthwise and flattening out 1 half while leaving the other half alone. During tuning I simply clamped this to the pole, after I found the perfect spot I soldered it in place. (See Picture)

This antenna has been up and in continuous use since 1992, It has never needed retuned (I use a MFJ 269 analyzer to check periodically. The winds in Kansas do blow and this is the only antenna that I have that has not needed repaired!

Call Sign: KE5NLK

Comments: I used 3/4 in. tube for the 57 1/2 in. and 38 in. tubing. Then did the same as N0SCK did and used 3/16 in. soft copper tube at 42 in. No balun and my swr is 1:1 at 146.00 , 1:3 at 144.00 , and 148.00. This was a lot of fun to make and will be to use!!!!

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