

DIY

Worthwhile projects you can build on your own



4-band Fan Dipole Antenna

For a no-nonsense HF antenna that's proven itself on Field Day, semi-portable SOTA operation, and a number of contests, this design is an adaptation of the one created by [W6HDC](#). It's resonant on 80, 40, 20, and 10 meters, but does require at least 25 feet of height.

Here's the parts list:

- ✓ 261 feet stranded 14 AWG insulated wire
- ✓ One 24" PVC 1-1/4" diameter tube
- ✓ Two PVC 1-1/4" slip caps
- ✓ One SO-239 flanged bulkhead connector
- ✓ Ten #8 ring terminals for 14 AWG wire
- ✓ One #6 ring terminal for 14 AWG wire
- ✓ Four #6 3/4" flat head machine screws
- ✓ Four #6 nuts and split washers
- ✓ One 2" x 1/4" eyebolt and nut
- ✓ Four 1-1/2" x 3/16" eyebolts and nuts
- ✓ Five 1/4" split washers
- ✓ Five 1/4" flat washers
- ✓ Four 15" zip-ties
- ✓ One package 4" zip-ties
- ✓ 200 feet black paracord
- ✓ Two dogbone insulators



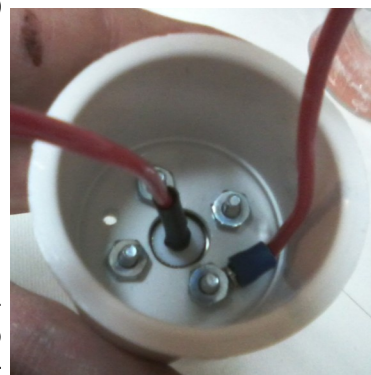
Either purchase two dogbone insulators, or cut two 2" sections from a piece of 1/2" or 3/4" PVC and drill two 1/4" holes near one end and two near the other end of each PVC section.

Attach one of the 1/4" eyebolts to the center of one of the slip caps, which forms the top of the center assembly. Cut two 6" pieces of the 14 AWG wire, and crimp or solder a #8 ring terminal to each. Solder one of the 6" 14 AWG wires to the center conductor of the SO-239 bulkhead. Crimp or solder a #6 ring terminal to the end of the other wire. Drill a 1/2" hole in the center of the other slip cap, and attach the SO-239 bulkhead to its outside, pulling the center conductor wire through. Drill four #6 holes to match the four bulkhead mounting holes. Attach the bulkhead to the cap with #6 machine screws, split washers, and nuts, making sure to connect the wire with the #6 ring terminal to one of them, on the inside of the cap.



Attach two 3/16" eyebolts on opposite sides of the tube 1/2" below where the slip cap would end when the tube is fully inserted into the cap, then drill two 1/8" holes 1/2" below the eyebolt holes.

Drill two 1/8" holes 5-1/2" below the top 1/8" holes. Drill two more 1/8" holes 4-1/2" below the second set. Drill two more 1/8" holes 3-1/2" below the third set, and attach two 3/16" eyebolts in the tube about 1/2" below the fourth holes.



DIY, continued

Four-band Fan Dipole Antenna



From the stranded 14 AWG wire cut two of the wires 66' each, two of the wires 34' each, two of the wires 19' each, and two of them 11' each.

Thread each 66' wire through one of the first (top) 1/4" eye-bolts, then into the 1/8" hole just below it, and down into the tube, to stick out about six inches below the bottom. Once you thread these wires through the tube, attach a piece of masking tape to the end of each wire sticking out the bottom, and mark which side it's on. Thread each 34' wire through the second drilled hole, each 19' wire through the third drilled hole, and each 11' wire through the fourth drilled hole on the same side as the others. Repeat this on the other side.

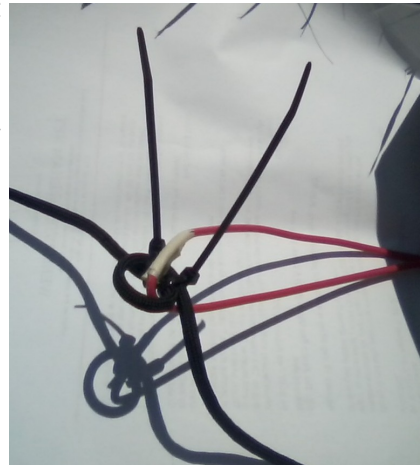
Crimp or solder a #8 ring terminal on the end of each of the eight wires sticking out the bottom of the tube. Secure all four wire ring terminals of one side of the tube, along with one of the ring terminals from the bulkhead, to the bottom eyebolt on the same side inside the tube, then repeat on the other side. This step can be a royal pain, due mostly to the narrowness of the tube.



Tie-wrap each 66' wire onto itself around its eyebolt using two 15" zip-ties each, to provide a secure strain relief. Slip the other end of each of the 66' wires through two end holes of a dogbone insulator, such that the length from the eyebolt to the dogbone is 58' 6", then wrap the remaining wire onto itself, but do not cut any of the wire, to allow for tuning. Repeat with the 34' wires, to 30' 11". Repeat with the 19' wires, to 15' 8". Repeat with the 11' wires, to 7' 10".

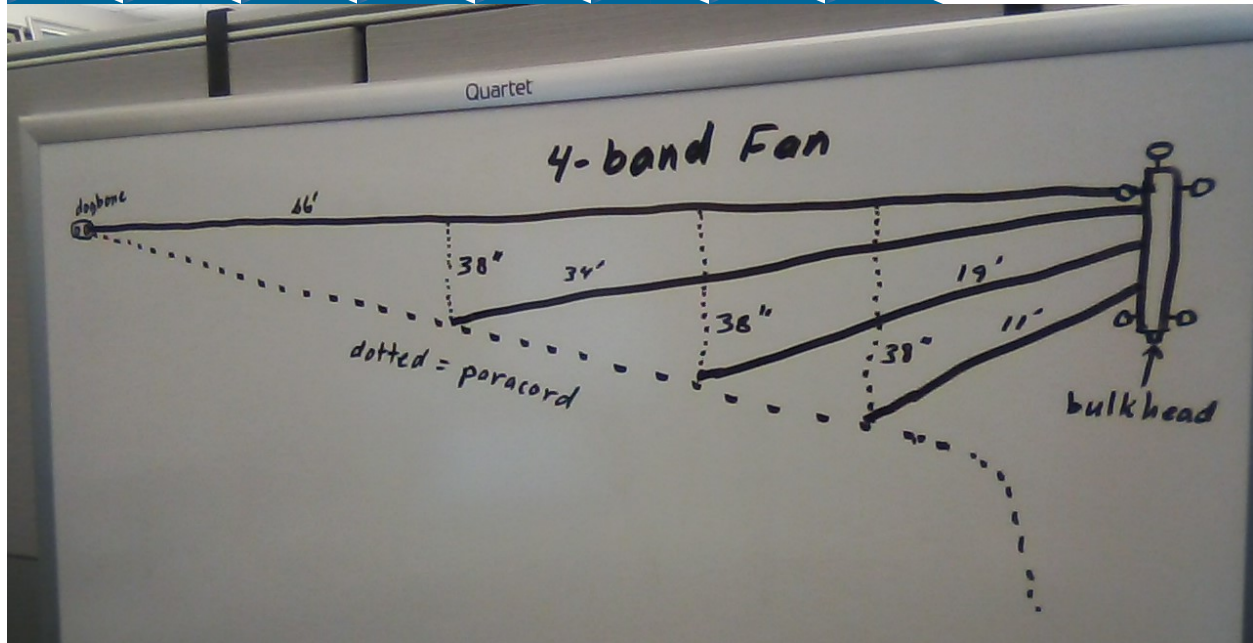
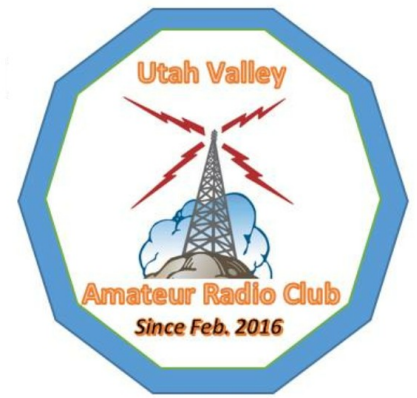
Lay out one side of the antenna on the ground to work on it as if it was up in the air,

keeping the 66' wire tightly straight. Tie a 75' length of paracord to the dogbone, and lay it down at an angle back to below the balun. Secure the free end of the 34' wire to this 75' paracord 38" below the 66' wire. Secure the free end of the 19' wire to the 75' paracord 38" below the 34' wire. Secure the 11' wire to the 75' paracord 38" below the 19' wire. To maintain distances between wires, tie paracord segments between each wire end and the wires above it. As you can see, I looped the 75' paracord around each looped wire end, then prevented the loop from slipping by applying a couple of 4" zip-ties to it. Repeat this on the other side.



DIY, continued

Four-band Fan Dipole Antenna



Attach a reliable antenna analyzer to the SO-239 connector by a reasonably long (25 to 50 feet) feedline. For each band, shorten or lengthen each wire to obtain an SWR of 1.7 or lower throughout the intended bands, but remember that close is good enough, or you might find yourself spending all night trying to fine-tune your antenna.

The design for this fan dipole is such that the top (80-meter, or 66') elements should be as flat (parallel to the earth) as possible and 180 degrees from each other as much as possible when it's mounted. Sloping (one end higher than the other) is fine, as long as the slope angle is no more than about 20 degrees to ground. But any slope or any deviation from a flat top or symmetrical mount will require some amount of re-tuning. And keep in mind that shortening or lengthening one wire can de-tune the others, so don't be surprised to find yourself repeatedly tuning and re-tuning each element.

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