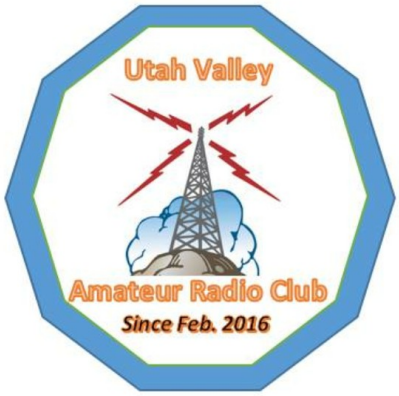
DIY

Worthwhile projects you can build on your own



20-meter roll-up dipole antenna

A few weeks ago, I was in a hurry, and needed a compact, lightweight antenna for 20 meters. I mean, my homebrewed dipole (*UVARC Shack*, July 2017) is a real winner, but the PVC balun is weighed down by the sheer amount of plastic and eye bolts and washers and nuts, not to mention the 14 AWG stranded copper wire elements. So I thought, No problem...I'll just whip up a roll-up dipole made from 18 AWG speaker wire. And in less than an hour I had a complete and compact antenna for 20 meters.

Essentially, I made this antenna from two wires and a connector, and it performs as well as a regular dipole. It's not nearly as weather-hardy as my other, regular homebrewed dipole, but it's not meant for long-term outdoor operation, so that wasn't a concern. But because the elements are thinner, I worried that its bandwidth might get compromised. Let's find out.

Parts list:

34 feet of 18 AWG speaker wire (17 feet of the pair)
5 inches of 2.0 mm heat shrink tubing
1 2.5 mm X 8 mm flathead, beveled machine screw
1 2.5 mm X 0.45 mm nut
1 BNC (female) solder bulkhead connector
2 16 AWG ring terminal for #4 stud
1 16 AWG ring terminal for ¼" stud
1 2.5 mm flat washer
1 2.5 mm lock (split) washer
1 BNC male-to-SO-239 adapter

BNC female solder bulkhead

speaker wire

ring terminals

BNC / SO-239 adapter

First, I started by calculating how long my wires should be. Using the typical frequency-to-feet conversion formula for a quarter-wavelength, I figured that each element (side) should be

234 / 14.175 MHz = 16.5 feet, or 16 feet 6 inches

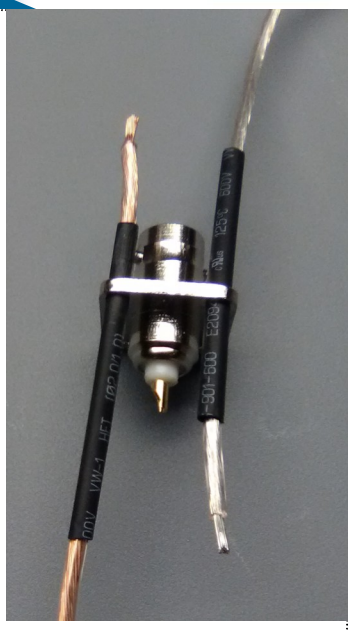
But taking the wire's velocity factor (0.95) into account (see *Questions of the Month* in this issue), the actual length should be closer to

16.5 feet X 0.95 = 15.675 feet, or 15 feet 8 inches

DIY, continued

20-meter roll-up dipole antenna

Construction



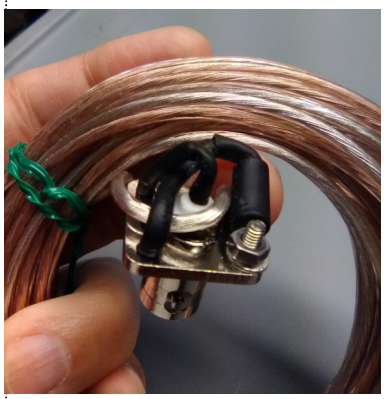
First, I carefully ripped the speaker wire pair down the middle to separate the two halves. Then, I slipped a 1″ piece of the 2-mm heat shrink tubing over each of the separated wire lengths, a couple of inches from the end of the wire, and stripped about ¼″ off each end. Next, I threaded each wire, along with its tubing, through one of the mounting holes of the bulkhead to relieve the strain on the wire against its connecting joints. In the end, the shrink tubing is applied more for protecting the wire insulation from cutting by the sharp mounting holes.

Next, I soldered one of the wires to the center solder pin of the connector, and shrank the tubing over the soldered connection. For the other wire, I soldered a ring terminal for #4 stud, then mounted it to one of the free holes of the bulkhead using a 2-mm bolt, nut, and split washer, then shrank its tubing as well.

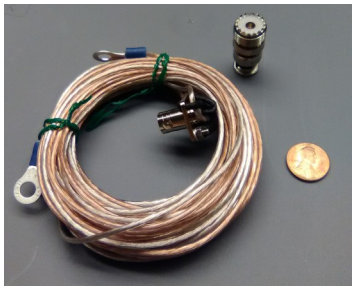
I measured and cut each wire 15 feet 8 inches from the bulkhead, then applied Super Glue to connect the wire to a ring terminal for a ¼″ stud. The ring terminal is only used as a mounting hook, so that I can stretch out the dipole in a flat-top configuration. The glue allows for a strong, permanent, and non-electrical connection between the wire and the terminal.

Testing the finished product

To test the antenna, I added a BNC-to-SO-239 adapter, then stretched it across some 6-foot-tall garden stakes I had in my garage. Ignoring the proximity to the Earth, I hooked it up through some coax to my antenna analyzer, and was very pleased with the results. The center frequency showed a low SWR (about 1.1:1), and the SWR bandwidth exceeded the stretch of the 20-meter band, so my fears about those left me, and I was left with a useful antenna. And to prove it was indeed useful, I got on the air right away and made five contacts, in AL, OR, OK, CA, and TX in less than twenty minutes. And that's six feet off the ground. Shweet.



Finished detail



Compact roll-up size