

Ham 147 - Triad antenna vhf-uhf

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Antenna maker has been a popular project. Then you get to redo your design. The co-author had laid out a design for a VHF quarter-wave vertical antenna using a 4" octagon box. After building five test runs, the author looked at it and suggested that is not what you want. There is a cleaner approach. Yep.

Material list. All parts are available from Sutherland Hardware, except SO-239 connector.

- 1: SO-239 to solder 'bulkhead' connector with 5/8"-24 panel nut. (see figure).
Alternate, SO-239 to solder 'panel' connector plus 2: 6-32 x 3/8" bolts.
- 2: 1/8" x 18" brass rods.
- 1: 1/8" x 27" brass rod.
- 2: lug crimp connectors for #10 solid wire.
- 2: 8-32 washers, star is preferred.
- 1: Octagon electrical box, 4" x 1.5" deep.

Mount. Prepare a 4" steel box.

Drill a 5/8" hole in the short corner opposite the mounting screws. This will be the top. Use a 5/8" lock-nut to retain the SO-239 bulkhead connector. Alternately, for a panel mount, drill & tap 2: 6-32 holes to retain in place.

Radiator. Brass is preferred. Aluminum is great, but needs to be tubing for strength.

Brass has 10% better conductivity than steel and gives lower SWR. Bend a 27" rod. 19.5" on long end, for 2-m. 7" on short end for 70-cm. Separate the sides about 10 mm (0.4-in). Solder the bend to the SO-239, holding the two sides vertically. Attach the SO-239 to the mount with a nut or two screws.

Counterpoise. Attach a spade lug to one end of each 18" rod.

Crimp and solder. If you do not have a soldering iron, ask an Elmer to help. Place lug under washers for the existing 8-32 bolts on the mount. Align each rod parallel to sides of box, then tighten the screws.

Attach box to post, wall, stud, or mounting strap with zip-tie or screws.

Coax. Connect RG213/U for > 25-ft, or RG8X for less, to the SO-239.

Add 4 ferrite beads, mix 31 near the mount. These isolate the coax shield from the counterpoise.

Antenna analyzer. Test the SWR on 2-m and 70-cm.

To tune: raise frequency by lower wavelength, via cutting off 1/4-in segments. Retest and repeat.

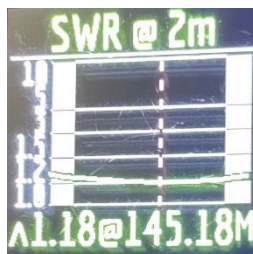
My final lengths were VHF = 19" and UHF = 6.5".

SWR was 1.2:1 on VHF and a little higher on UHF.

That is a first class looking and performing small antenna.

Of course, she was right.

Life is good. Enjoy!



For the technical experimenter, some Triad options to consider.

A radiator is nominally $\lambda/4$ (~20.3-in) but physically reduces to ~19-in because of velocity factor and other real-world constraints.

With a $\lambda/4$ radiator, counterpoise can be shortened from $\lambda/4$ to $\lambda/8$ (<12-in).

Increasing radiator length slightly from 0.25λ to 0.31λ (23.5-in) allows shortening the counterpoise from 0.25λ to 0.083λ or $\lambda/12$ (~7-in).

Interestingly, this is the counterpoise length on Diamond X-50 antennas.

