

80m Vertical on a Spiderbeam 18m Fiberglass Pole

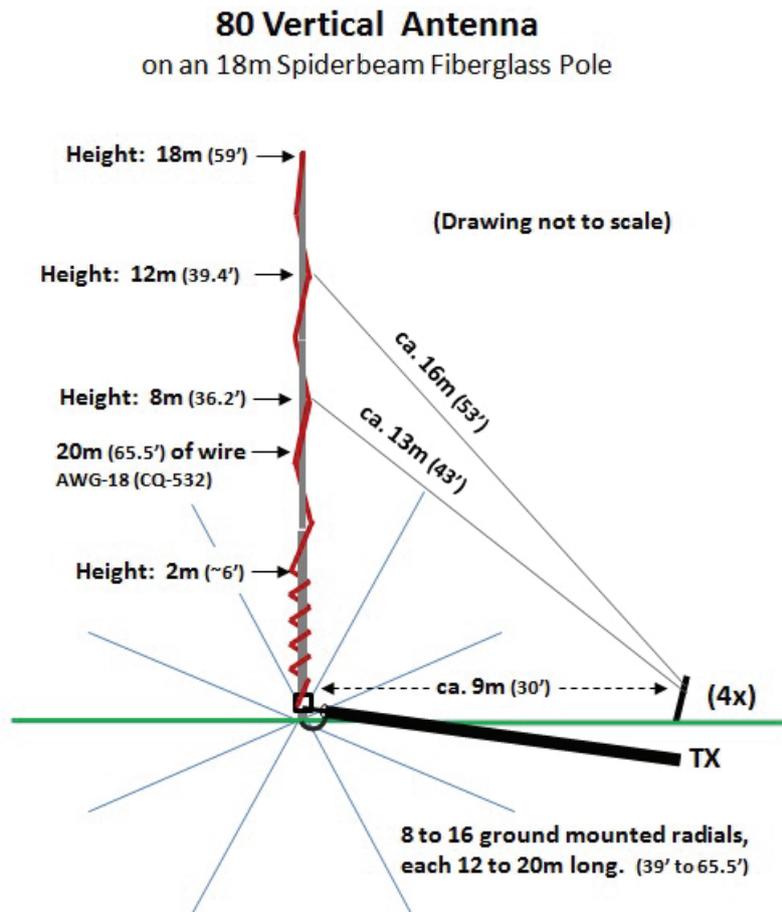
WHY the 80m Vertical?

Different operating conditions and objectives often mandate using different antennas. The quarter-wavelength vertical antenna is the best choice for DX-ers and contesters looking for an efficient antenna for low-band DXing.

In addition, most operators living in typical houses in the city do not have the space for full-size low-band horizontal antennas. Though trap verticals offer a means of getting on the air in these circumstances, they are very narrow-banded and their efficiency is not good.

Recent discoveries on space requirements for effective radial networks¹ have changed our view on the minimum ground space required for these antennas. Improvement in the cost and quality of telescoping fiberglass poles has opened new possibilities for many operators.

This article describes a very efficient 80m Vertical antenna which is easy to build, will fit into most backyards, and won't spring the family budget.



NOTE: for simplicity, only one set of guy ropes are shown in this drawing.

For good efficiency, use 8 to 16 ground mounted radials, each 12 to 20m long.

The radials connect to the shield side of the coax, and should be spread equal distance around the pole.

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Guy Ropes: The 18m Spiderbeam telescoping fiberglass pole should be guyed at two (2) levels (8m and 12m) and in four (4) directions (spread 90° apart). The optional Guy Belt Set available for this pole reduces the point-pressure of the guy ropes and automatically places the guy points at the correct heights. For guying use 2mm Kevlar rope. It is lightweight and is strong enough to do the job.

Feed Point: To attach the coax to the feedpoint of the antenna, you may either purchase the optional Spiderbeam Radial Connection Plate, or construct your own. Keep in mind that you MUST tune the antenna by adjusting the length of wire. This will require disconnecting and reconnecting the wire to the feed point a few times. Use heavy duty cable ties for attaching the feed point to the pole, or if you wish to use metal clamps, you MUST use a rubber cushion (rubber strap) between the pole and the clamp to prevent damage to the pole.

Building the Vertical:

- Cut 20 meters of antenna wire, AWG-16 or AWG-18 (e.g., CQ-532)
 - For very high power applications, you may use AWG-12 or AWG-14 wire for the BOTTOM HALF of the wire (maximum 12m).
 - DO NOT RUN AWG-12/14 TO THE TOP OF THE POLE. (It is too heavy).
- Attach one end of the wire to the top of the pole (at 18m height) using a strong cable-tie. Reinforce with several layers of electrical tape.
 - Do not use metal clamps with your Spiderbeam pole. Metal clamps can damage a fiberglass pole. A strong cable tie is sufficient to secure the wire antenna element.
- Secure the wire to the pole by spiraling (coiling) it around the lower sections of the pole at a rate of about one turn per meter, until it reaches the top of the bottom section of the pole.
- From this point, spiral (coil) the wire about 10 turns per meter around the bottom section of the pole, spacing the turns about 10cm (4 inches) apart, and connect it to the feed point about 10cm (4 inches) above the bottom of the pole.
- Connect a good quality 50Ω coaxial cable transmission line to the feed point. Connect the center conductor to the vertical wire element and the braided shield conductor to the ground radials. AFTER FINAL TUNING, insulate and weatherproof the connections.
- Connect the top and bottom guy ropes to 4 guy stakes located approximately 8 to 10 meters away from the pole.
- FINALLY, adjust the tension of all of the guy ropes.
 - Leave some slack in ALL the guy ropes. Do not pull them too tight. As you look up the guy ropes, they should be slightly sagging. This substantially reduces stress on the pole.
 - It is normal for the pole to bend and sway in the wind. That won't hurt it. It will straighten itself when the wind subsides.
 - As long as it remains flexible, it will survive harsh conditions.

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Tuning the Vertical:

- Measure the SWR and determine the resonance frequency of your antenna.
- You should find that the antenna resonates slightly below the bottom edge of the band. You will move the antenna resonance up to the desired frequency by trimming away some of the wire at the bottom of the coil.
 - Shorten the length of wire in small increments of a few centimeters or inches at a time, measure SWR again, then change again, etc. **Do not try to move resonance in big steps;** otherwise you may cut off too much wire.
 - After shortening the wire a little, you will need to re-wrap the windings on the bottom 2 meters of the pole, spacing them a little farther apart, such that the wire just reaches the feed point.
 - When you are finished tuning, don't forget to insulate the connections.

¹ For more information on the deployment of radials and its impact on performance, we recommend reading the excellent article by Rudy Severns (N6LF), in the December 2010 issue of QST. This article summarizes the information put forth by Rudy in a series of 7 articles for QEX magazine.