

What Antenna Should I Put Up?

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“What antenna should I put up?” asked the ham radio operator with a new General class license burning a hole in his pocket. Answer: “How about a SteppIR DB42 yagi¹ on top of a 170’ Luso crank-up tower?² And don’t forget to shunt-feed the tower and use the beam as a capacitive top-hat so you can work lots of DX on 160 meters!”³ “Sounds great; how much does this setup cost?” “Uh, don’t bother asking.”

Every ham who’s operated on HF would love to have that beast at the end of their coax. But for most of us, it’s not going to happen. There are too many issues to overcome: too expensive, not enough real estate, zoning restrictions, apartment dweller, condo police lurking about, a significant other or neighbor who simply doesn’t appreciate a highly visible and yet totally awesome antenna, etc. So, unless you’ve achieved ham radio nirvana you probably fall into one of these three categories:

1. I have some real estate and an understanding significant other.
2. I can probably get away with a wire antenna if I’m careful or lucky.
3. Even #2 ain’t happening. My antenna has to be stealthy and/or portable.

If you fall into category #1 here are some affordable, effective recommendations in no specific order. And to keep this short we’re not going to do any antenna modeling or provide tables of impedances for each band; help yourself if you’re so inclined.

1. 43’ ground mounted vertical. “Everyone” sells these or you can make your own. This is a full 1/4 wavelength on 60m and 5/8 wavelength on 20m. It’s a nice DX antenna on the upper HF bands with a low takeoff angle. However, it absolutely requires an external antenna tuner (not the one inside your transceiver) and a lot of radials to work well. Two 500’ rolls of 16 gauge TFFN insulated wire (less than \$100) from the Home Depot or Lowes will result in thirty 33’ radials.⁴ You can even get this antenna onto 80m or 160m but it will require impedance matching at the base of the antenna to minimize the losses.⁵
2. A 24-26’ tuned vertical like a Butternut HF6V or Hustler 6BTV.⁶ These also require a lot of radials to work well but you might not need an external antenna tuner since these antennas are tuned for each HF band. I worked 85 DXCC entities one weekend with a 6BTV (on top of 30 radials). Like the 43’ vertical, you can make these antennas work on 80m and 160m but they’ll be very inefficient and have very limited bandwidth.

¹ **Error! Hyperlink reference not valid.**<https://consumer.steppir.com/shop/horizontal-antennas/4-element-antenna-products/db42-monstir-pro-yagi-antenna-80m-6m-package/>

² <http://www.lusotower.com/USA/tower.html>

³ <https://www.dropbox.com/s/vjv9k1jtc6qjwc/160MeterShuntFed.pdf>

⁴ “How to Put Amateur Radio Radial Wires Down Without Digging” article in the Vertical Antenna Information section at <http://www.dxengineering.com/techarticles/verticalantennainfo>

⁵ <http://www.ad5x.com/images/Presentations/Vertical43RevA.pdf>

⁶ <http://www.dxengineering.com/search/departments/antennas/part-type/hf-vertical-antennas-and-packages>

3. Full wave 160m horizontal loop. If you have the room, put up a 560' loop (140' on each side) in a square, or reasonably rectangular, configuration and as high as you can get it using 12 (or 14) gauge copper wire. It doesn't have to be circular but the opposite sides of your loop should not be "too close" to each other. Feed it on a side or corner (doesn't matter where) with 300 ohm or 450 ohm ladder line and an external antenna tuner and you'll be on all the HF bands!
4. The old 1/2 wave dipole or, better yet, a ladder-line fed doublet. Here are some magical lengths to consider: 44', 88', 102', 135', 220', and 260'. Some of these lengths become an Extended Double Zepp (1.28 wave) on certain bands and can exhibit noticeable gain when compared to a dipole.
5. Maybe more than one of the above! Like radios, you can't have too many antennas.

If you fall into category #2 you'll need to be a little more creative. Ground mounted verticals are probably out of the question. Maybe you can only get away with one antenna. For multiple HF bands you'll want one of these:

1. Horizontal loop. Use a lighter gauge wire if it needs to be less visible and mount it around the perimeter of your house. Insulated wire can be tucked under the roof shingles but don't use too much RF power (100 watts maximum). $1005 \div \text{total perimeter of your house (in feet)} = \text{lowest frequency you can operate on (in MHz)}$. Round this frequency up to the next ham band.
2. Doublet. Half of the antenna could be hidden in your attic and the other half, starting at a gable vent, goes to a convenient tree. Like the loop, you want to feed this with 300 ohm or 450 ohm ladder line to minimize feedline losses on non-resonant bands. It doesn't have to be straight or horizontal!
3. A 71' random wire with a 9:1 unun. You'll need a tree or some other support at the end.

Don't despair if you're in category #3. You still have viable options.

1. I use a monoband mobile whip temporarily attached to my balcony rail and a 1/4 wave counterpoise wire tossed over the side of my condo's balcony (usually at night). Since I'm on the 5th floor, a 33' wire over the side easily gets me on 40m. I've worked and confirmed over 180 countries with this antenna on single-sideband, digital, and CW. One Sunday afternoon this antenna scooped up 30 countries on RTTY. They're great for FT8 since you don't need any frequency agility. These whips are available from most of the hamfest vendors for under \$20 each and sold under various names like Hamstick, Valor, Transel, Iron Horse, etc. None has any advantage over the other so focus on price. You can use a single wire for the 1/4 wave counterpoise by splicing in blade terminals at the appropriate length for each band. And 33' of wire is not so heavy as to pull the blade terminals apart when it's dangling over your balcony railing.
2. Loops or doublets inside your apartment. These might require an understanding roommate and they certainly demand low RF power due to the proximity to you and your transceiver. You can still work a lot of DX on CW, or on digital modes like PSK31 or FT8.⁷ Remember, the average power density of a 5 watt CW signal is equivalent to a 100 watt single-sideband signal!

⁷ <https://physics.princeton.edu/pulsar/K1JT/wsjsx.html>