

Dual-Band VHF/UHF Twinlead J-Pole Antenna

By James A. Williams

Want to get more range out of that handheld transceiver that just can't quite make that distant repeater all your friends brag about? Or how about an emergency antenna that you can easily put up and use when a tornado or other natural disaster takes down your main antenna, or lightning causes you to have to disconnect that beam you have 60 feet in the air? Or do you live in an apartment or deed restricted subdivision that will not let you have outside antennas?

If you have 30 minutes to spare, you can build a Dual-Band VHF/UHF J-Pole antenna that is guaranteed to get you on the air quickly, outperform the rubber duck antenna that came with your handheld, and solve all the above problems and then some.

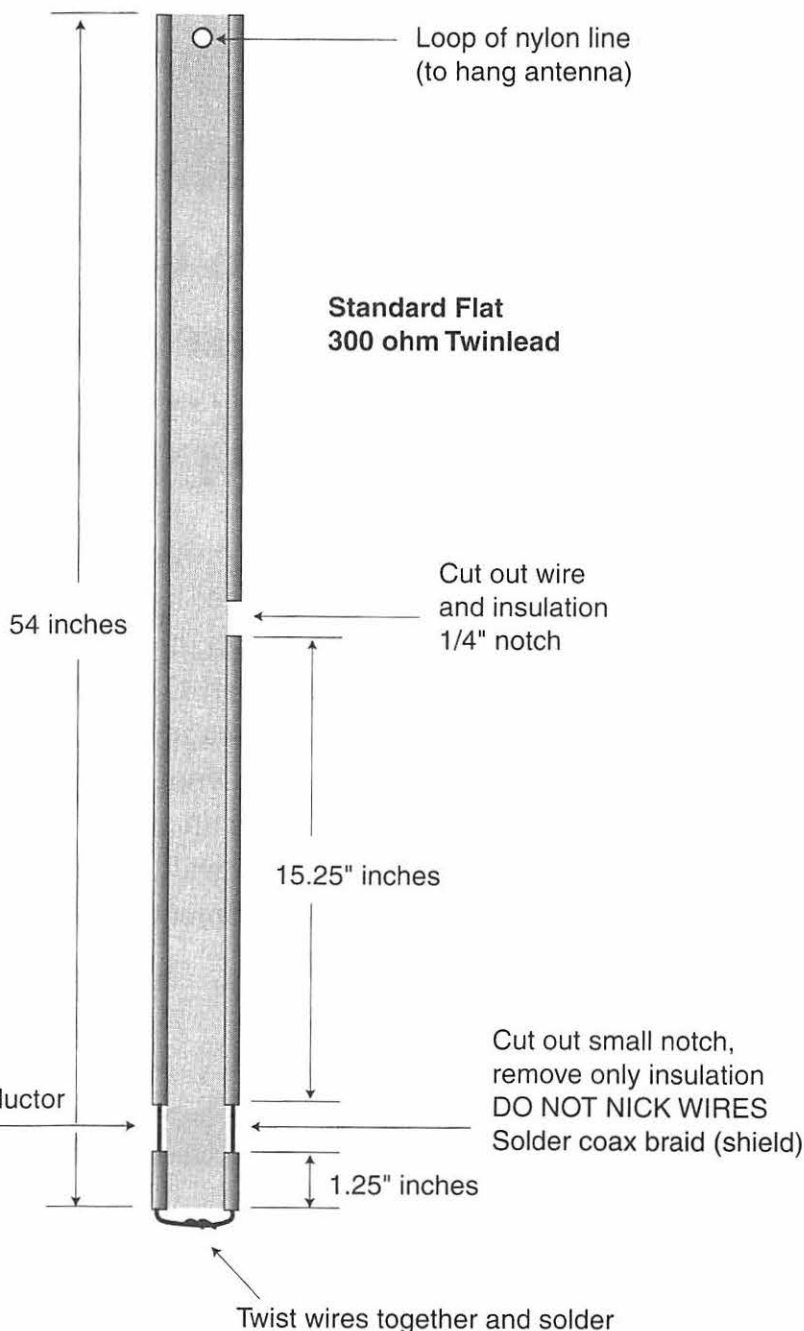
It will serve not only as an emergency antenna, but as a portable antenna system for anyone needing an easy-to-set-up antenna, such as travelers who want to monitor or operate from their hotel room. The low profile antenna can be set up and taken down quickly, and it stores in the space of an eyeglass case. It can be hung in a corner of a room, attic or other out of the way location for a more permanent installation, or can be put up and taken down when needed.

The J-Pole antenna has been used by ham radio operators around the world for years. It's one of the first antennas that most new hams hear about and wish to acquire. Several commercial antenna manufacturers make and sell this type of antenna in the price range of from \$15 to \$25 dollars each; you can make it for \$3 or \$4 dollars.

Cut out small notch, remove only insulation
DO NOT NICK WIRES
Solder coax center conductor

Cut out wire and insulation
1/4" notch

Cut out small notch, remove only insulation
DO NOT NICK WIRES
Solder coax braid (shield)



For this article we will concentrate on the most popular bands in this country: the 2 meter band (144 MHz to 148 MHz) and the 70 cm band (440 MHz to 450 MHz). I have found the antenna to have a voltage standing wave ratio (VSWR) of less than 1.5:1 across the entire 2-meter band, and less than 1.7:1 across the 70-cm band. As a scanner antenna (non-transmit) it is usable from 30 MHz through the gigahertz bands.

I will not get into the theory or math involved in the construction of this antenna, other than to state that it is a vertically polarized antenna with two elements: a 3/4 wave-

length radiator and a 1/4 wave length matching stub that operates like an end-fed halfwave antenna. If built to exact specs listed, there is no tuning needed for this antenna. Just build it and use it.

The Dual-Band Twinlead J-Pole antenna is made from standard flat 300 ohm twinlead TV antenna wire, available from most hardware and electronic stores. Most of us oldtimers will remember this wire as the twinlead used to connect a TV to the roof-mounted antenna that almost all homes in this country displayed before the advent of cable TV. You can use an old piece of twinlead you or a friend

may have lying around or buy a new piece 6 foot long.

You will need the following:

- 6 feet of flat 300 ohm twinlead
- 6 feet or more of RG-58 coax
- PL-259 or BNC connector (your choice)
- Soldering Iron and Solder
- Wire Cutters, strippers or knife
- Plastic electrical tape or heat shrink tubing

■ Building the Antenna

Begin by carefully removing 0.75 inch of insulation from one end of the twinlead, being careful that you also do not cut the wires. Once the wire has been stripped, twist the pair of wires together and solder. This is the bottom of the antenna.

Cut the twinlead to 54 inches exactly from top to bottom. Double check the length; it needs to be exact.

Measure 1.25 inches up from the bottom of the antenna and mark the insulation. From this mark, carefully remove the insulation for .25

inches above and below the mark, being careful not to nick the wire. Repeat on the other side of the twinlead.

Measure exactly 15.25 inches from the one of the notches you have just cut and remove a .25 inch notch from this point; remove both the insulation and the wire. This is the ground side (1/4 wave stub). The other uncut side is the radiator side (3/4 wave) of the antenna.

Using a piece of RG-58 coax at least 6 feet long, carefully remove .75 inches of insulation from the coax to expose the braid. Separate the braid from the center conductor and twist together. Remove the insulation from the center conductor. Connect the braid from the coax to the ground side (stub) of the twinlead and the center conductor to the long side (radiator) of the twinlead. Try to connect the coax so that it lays in the center of the twinlead. Solder the coax braid and center conductor to the twinlead.

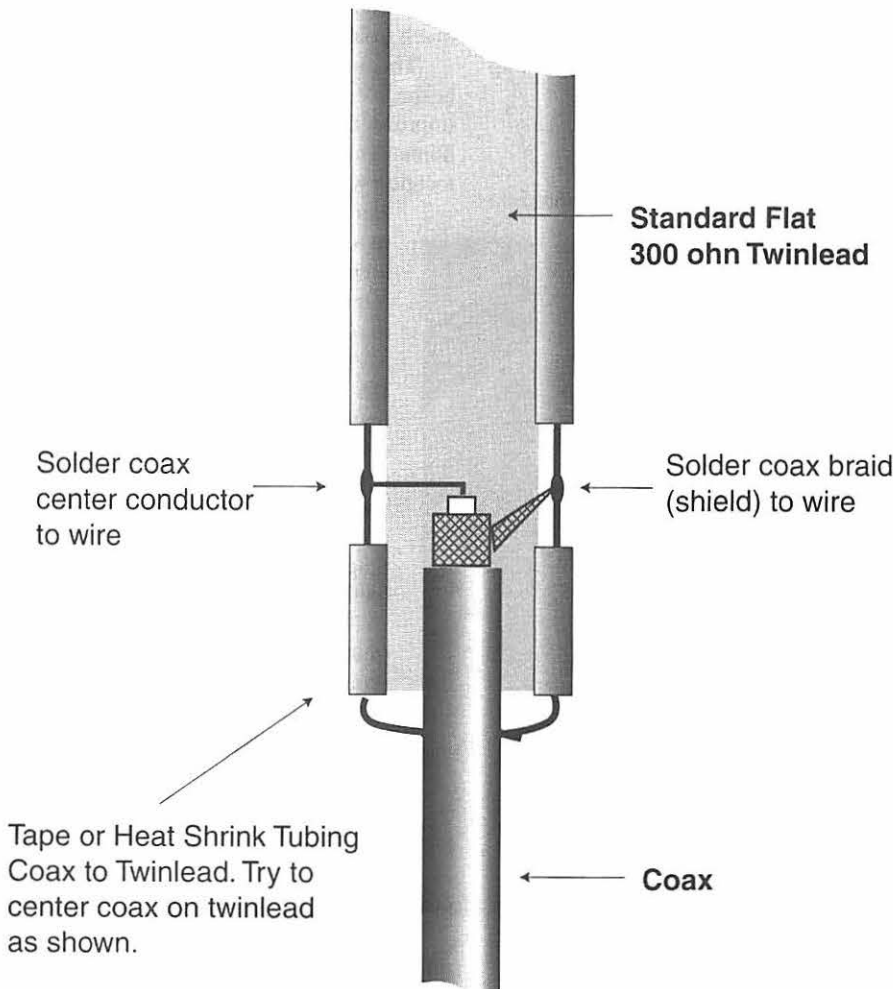
Use electrical tape or heat shrink tubing to secure the coax to the twinlead. This will help take the stress off the solder points and make the joint waterproof. Also tape or use heat

shrink tubing at the notch you cut out to make the ground side (stub) of the antenna.

Punch a hole at the top of the antenna at the center and tie a loop of nylon line (fishing) or another nonconducting line to hang the antenna from the ceiling, tree limb or other location. Install your choice of connector (PL-259, BNC, etc.) to the coax and use. You will find that the antenna will have a gain of 3 to 4 dB.

When using the antenna try to keep it away from metallic objects such as electrical wiring and plumbing. It is possible to detune the antenna if it is close to such objects. For a permanent outdoor installation, mount the J-Pole inside a piece of PVC pipe capped at both ends. Drill a hole in the bottom cap for the coax to pass through and seal around the coax with a good waterproof sealer. Mount on top of your mast or tower.

By building several of these low cost, easy to construct antennas you can keep one handy at all times—such as in your car glove compartment, briefcase or back pocket—and enjoy the improved performance of this antenna anytime.



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