

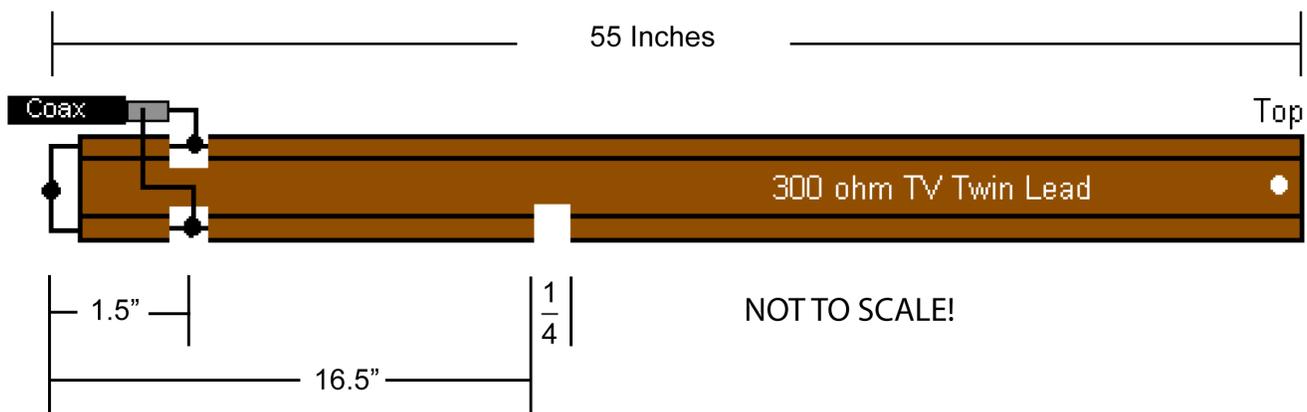
HOW TO BUILD W2IK'S LIGHTWEIGHT TELESCOPING "J POLE" ANTENNA FOR EMERGENCY OR FIELD USE

by Bob Hejl - W2IK ©2005 all rights reserved

Building a telescoping "J Pole" antenna for emergency or field use is much easier than you might think. Every serious emergency communicator should have one. It basically involves building a "roll-up" type two meter "J Pole" using 300 ohm TV twin lead and then inserting it into a length of 1/2 inch PVC tubing. There's more to it than that, so for proper construction and tuning let's go over the construction process from start to finish. When you're done you'll have an antenna that can be telescoped up to 17 feet, yet stores down to about 5 feet, weighs only 4 pounds including coax cable and is a wonderful product.

FIRST: BUILD A ROLL UP "J POLE"

(HERE'S HOW TO DO IT THE RIGHT WAY)



Take one length (55 inches) of 300 ohm twin lead (buy this from your local Radio Shack) This is the old type of TV twin lead we had on our TVs as kids. USE A NEW LENGTH, not an old run of wire ripped off from your house!! (See photos on next page.)

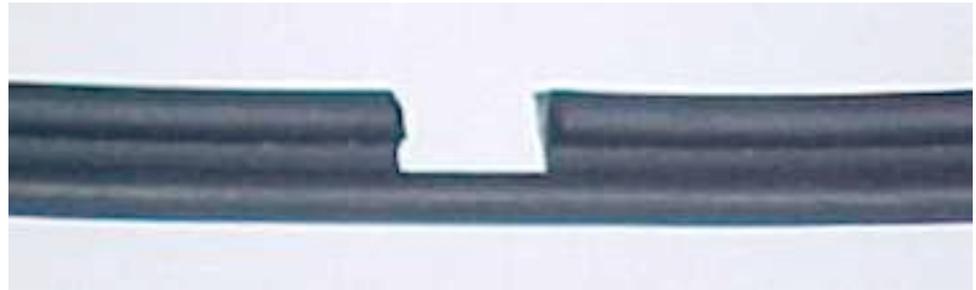
On one end, strip off about 1/2 inch of the insulation, exposing the parallel wires. Bend them towards each other so they TOUCH or overlap. Solder them together, making a nice, neat, tight connection. This is the bottom of your antenna.

Next, measure exactly 16 1/2 inches from the end that you shorted together and cut a notch in ONE of the wires in the twin lead. The notch should be about 1/4 of an inch.

Next, measure exactly 1 1/2 inches from the same bottom of the shorted ends and strip the insulation exposing about 1/4 of an inch of the wires on BOTH sides of the twin leads. At these two points, CAREFULLY solder in place a 25 foot length of RG 8X (mini) or RG8U coax, with the center conductor soldered to the long run (un-notched side of the twin lead) and the shield side soldered to the notched side. (*Trust me on this. It should NOT be the other way around no matter whatever you've read or been told.*)



Left: Bottom of twin-lead shorted as per text.



Notch on ONE conductor 16 1/2 inches from the bottom



Make a nice tight seal where the coax is attached to the twin-lead. extend the tape to cover the entire lower section of the twin-lead as shown

Double check all your connections and then carefully use electrical tape to cover the bottom 3 inches of the twin lead while holding the coax cable tightly against it so it makes a solid seal. Make sure that the coax connections to the twin lead aren't shorting together. Continue taping it until it seals all the connections you have made including the shorted bottom of the twin lead and beyond to just the coax cable for about 2 inches. This will seal all of the connections and add strength to your antenna/coax connection. Add a PL-259 connector to the end of the coax. Have an adapter handy so you can use this antenna with either your mobile radio or your HT.

At this point, due to variations in twin lead construction, you will need to "tune" the antenna by slipping it into a 60 inch piece of 1/2 inch PVC tubing, and hang it vertically, keeping it away from metal objects. Use a fellow ham's antenna analyzer to make adjustments as explained next. It will probably be a bit long, so the resonant frequency measured will be low (like around 138 MHz). Slide the twin lead out from the pvc and trim the top of the twin lead, by removing 1/4 of an inch from the top of the twin lead AND on the side that has the notch: for each 1/4 inch you have cut from the top of the twin lead notch out an additional 1/32 of an inch enlarging the original notch from the bottom of the notched area... like you'd be increasing the original notch length (but not really, just trimming the "short" side of the parallel lead). Do this until it tunes lowest SWR on 146 MHz when it is back in the pvc. (If you do not adjust it in this manner, you'll never get the lowest SWR or widest bandwidth.)

SECOND: NOW TO MAKE IT TELESCOPING

Take a 60 inch piece of 1/2 inch PVC pipe and on one end cut a 1 1/2 inch long slot about 1/4 inch wide. Snake the twin lead "J Pole" down into the pipe from this same end. When you see the twin lead appear at the other end, stop. By this time, the entire antenna has made its way into the pvc along with several inches of the coax cable. Now fit the coax into that slot you've cut so the coax comes out from the side. Using the proper pvc "glue," cement a pvc end cap to the top of the antenna, where the twin lead was starting to come out. There is no need to secure the antenna into the pvc as it will not collapse down. You do, however, have to put a small amount of epoxy where the coax has come out of the slot by stuffing a bit of paper into the pvc just near the coax and then dripping the epoxy into the pipe. This will prevent the coax, along with the antenna, from being pulled down.

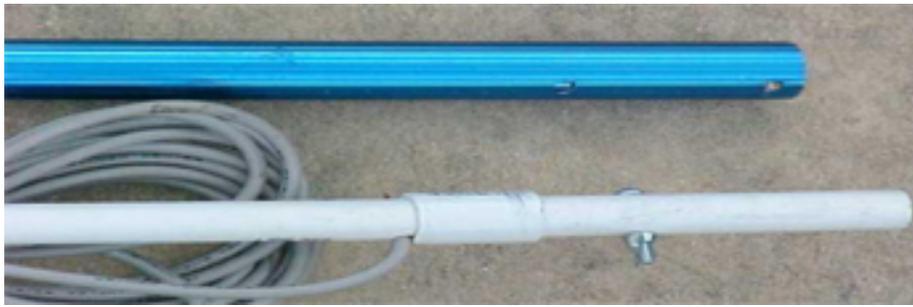


Next, take a 1/2 inch PVC coupler and cement it on to the end of the pvc tubing that has the coax coming out the side. Take an additional 9 inch piece of pvc pipe and cement it into the other end of the coupler.

When you are done, it should look like this at the coax end:



The antenna is not quite finished. For any antenna to properly work, you need height. This is easily done by buying a telescoping “pool pole” at a place like Lowe's (item # 102924 model #PO15) for about 13 bucks. This model is blue colored and telescopes up to about 12 feet and down to about 4 feet. It is light weight, yet strong. On the smallest diameter of the pole there is a vinyl handle. Remove the handle and you will see that the short (bottom) shank of your pvc antenna fits in there quite nicely. The pvc coupler acts as a stop. Once you have it inserted, drill a hole through the masting about 4 inches down until the drill goes through both the telescoping section and the short shank of the pvc. I drilled a 1/4 inch hole so it will accommodate a 1 1/2 inch, 1/4-20 bolt that I secure with a wing nut. This keeps the antenna in place. Thus, by extending the telescoping pole all the way out and either finding a base to place it on or lashing the pole to a tree—or if indoors, any available short vertical section—you now have a useful antenna that combines the height needed to communicate and the portability to use anywhere without having to search for a place to hang a “J Pole” and the entire system breaks down into two short (about 5 feet each), light weight pieces yet can be telescoped up to 17 feet tall. You need no tools for in-the-field setup.



Using a Wing Nut to hold the bolt in place allows for no-tools setup.

The two components side-by-side. Notice the bolt on the bottom of the pvc antenna assembly below the pvc coupler. If you wish, you can skip installing the end cap on the top of the antenna and just seal the top end with hot glue or epoxy (after putting a piece of paper in about 1/4 inch to stop the glue from running). This will allow you the ability to slip the antenna (upside down) into the telescoping mast for storage.

A side-by-side field test (using the same radio) of this antenna vs. a good mobile antenna on my truck yielded dramatic results. With the mobile antenna I reached a repeater with the received signal being recorded just under half-scale. Switching to the telescoping “J Pole” it showed a full-scale reading of the same repeater. Using the ability to telescope higher or lower will allow you to put this antenna up indoors, such as in a gym that is being used as a shelter, and have maximum height. A used, outdoor umbrella stand can act as a base to support the mast.



Left: The Lowe's "Pool Pole" and the J-Pole assembly.

Middle: Pool Pole and Antenna joined together.

Right: Bob Hejl W2IK with his J-Pole fully extended and mounted on a medium weight base.