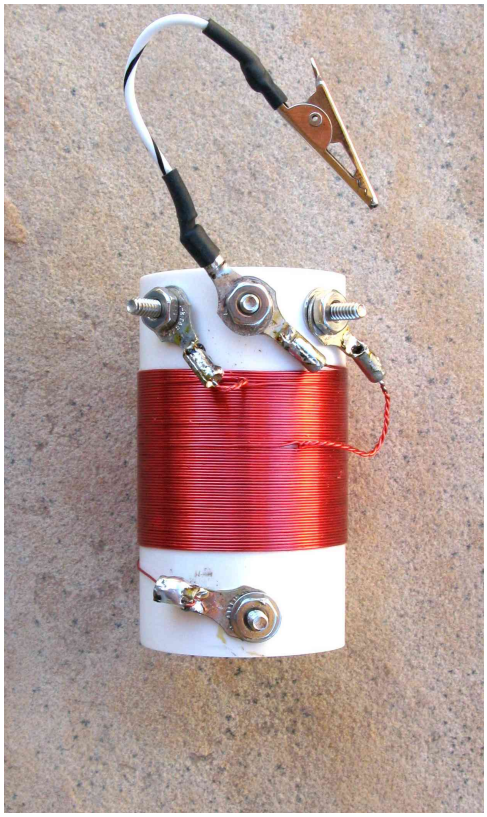
QRPGuys 80/60m Vertical Antenna Assembly Manual



DIFFICULTY LEVEL
EASY SMT

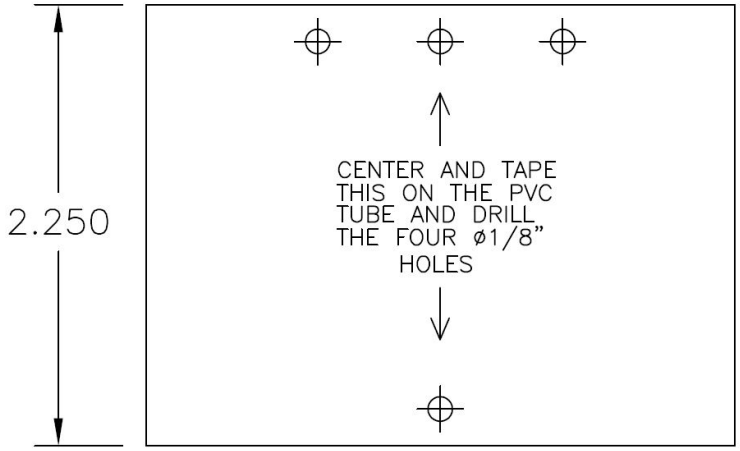
First, familiarize yourself with the parts and check for all the components. If a part is missing, please contact us and we will send one. You must use mailto:qrpguys.parts@gmail.com to request a part.

Parts List

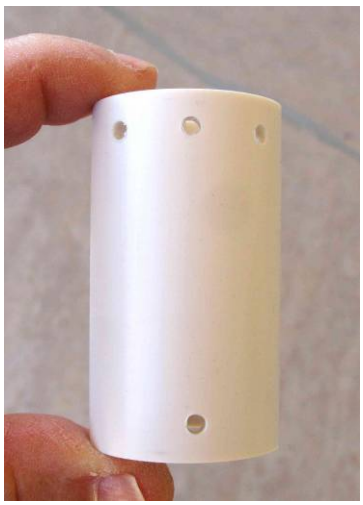
1 – 80/60m vertical base pcb
1 – antenna end support pcb
1 – Ø1” PVC pipe, 2.25” long
1 – 25’ #26AWG magnet wire
7 – #4 solder lug
1 – small alligator clip
1 – 4” #20 insulated stranded wire
1 – Ø5/32” x 3” heat shrink tubing
4 – #4 external tooth SS lock washer
4 – 4-40 x .50”L SS pan head phillips screw
4 – #4 SS flat washer
6 – 4-40 SS nut
1 – BNC female pcb mount
2 – 8-32 x 3/4”L SS phillips pan head screw
4 – 8-32 SS nut
2 – 8-32 SS wing nut
2 - #8 SS internal tooth lock washer

You will assemble the loading coil first, and should look like the picture below when finished.

Print this page and scale your printer if necessary to achieve the 2.25” dimension shown. Cut out the rectangle and tape it to the Ø1” PVC pipe coil form, centered on the length. If the coil form is not 2.25” long, trim down by sanding to length, or it might not fit in the base cutout.



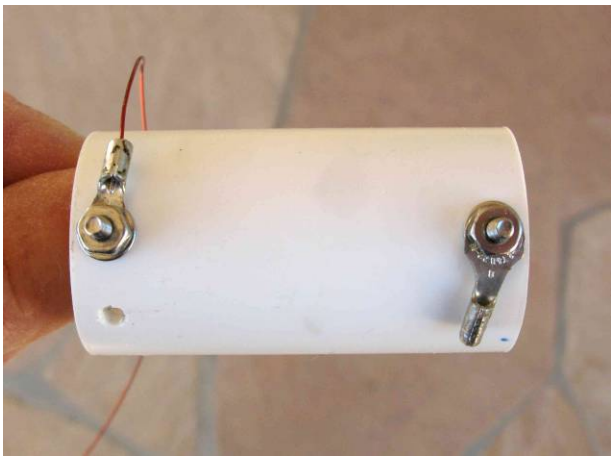
Drill the four Ø1/8” holes, as indicated below..

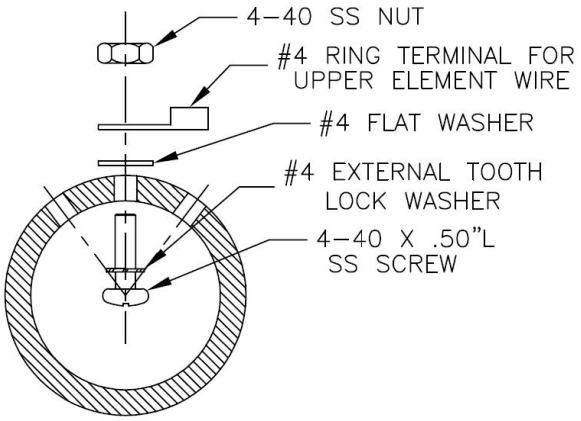


Winding the loading coil

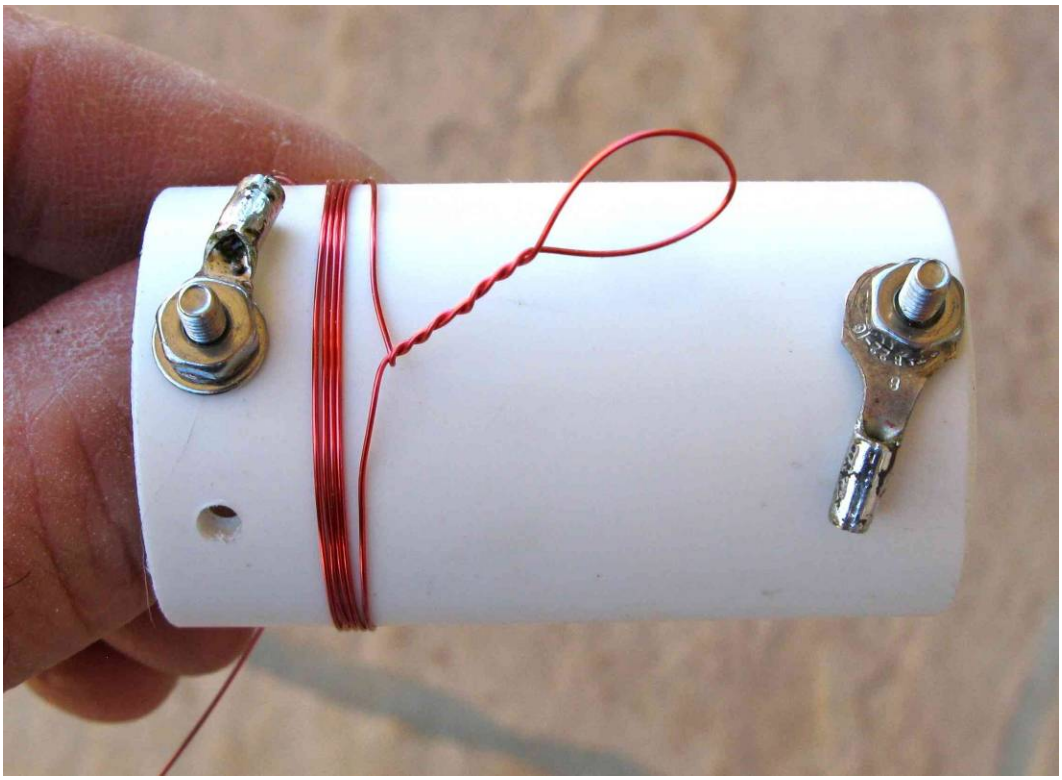
It is helpful to have another person tend the wire as you are winding so it doesn't get kinked, cause you to release it during the process, or lose count of the turns.

Un-coil and straighten the ~25' of #26awg magnet wire. Tin and solder one end of the magnet wire to one of the #4 ring terminals. We supply Thermaleze® wire, so no scraping is required, just heat it with solder to tin it. Attach it to the center hole shown below with the hardware in sequence also shown. You are starting to wind from the end with three holes. Attach the two ring terminals in the direction shown.

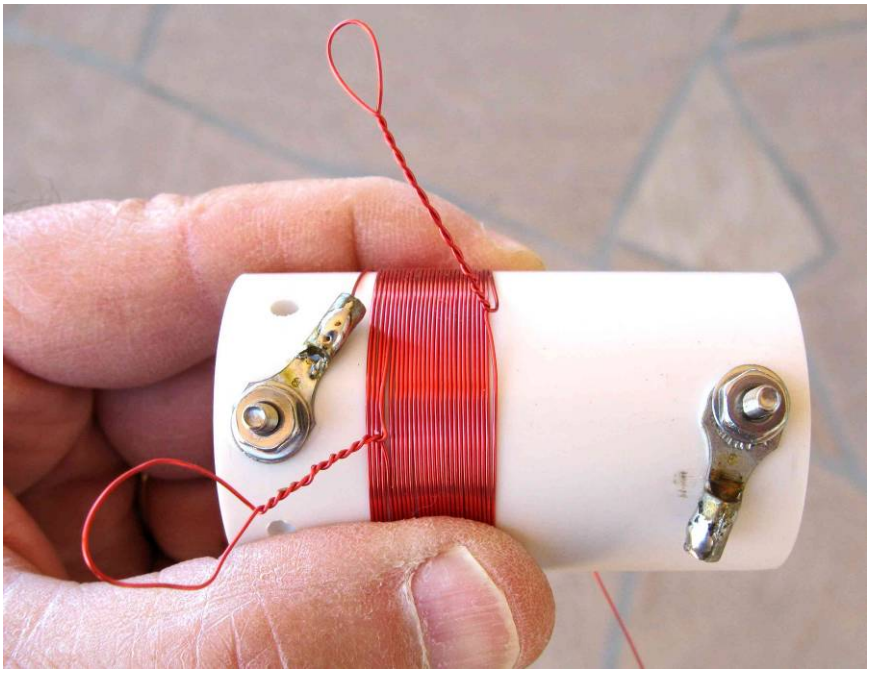




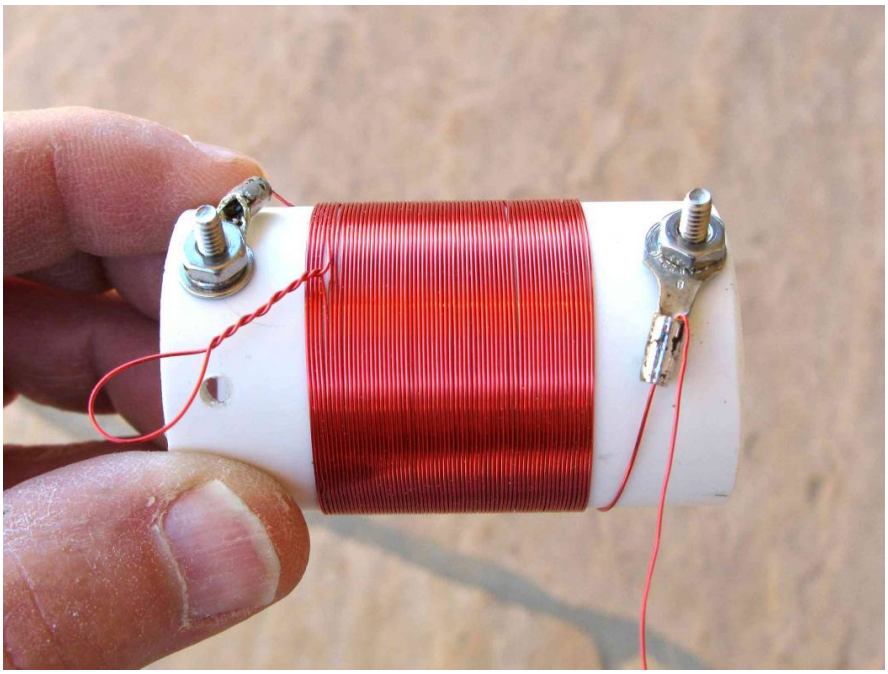
Wind **"5 turns"** and form a 1 1/2" long loop for the tap connection as shown.



Continue winding, and after you wind the **"28th turn"** *from the beginning*, form another 1 1/2' loop.

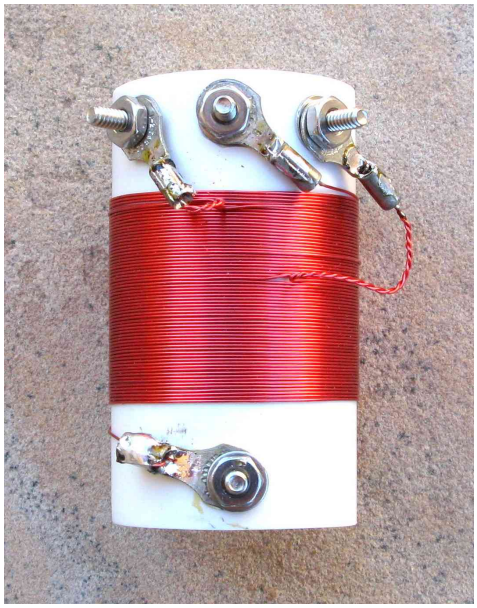


Continue winding for a **"total"** of **65** turns. Loop the wire through the end ring terminal sleeve and fold back as shown. ***Do not cut the wire.*** At this point it is easy to add or subtract a turn, if needed.



Carefully count the turns to verify the total of 65 turns. Take a digital picture and zoom it up, if that helps. At this time you can compress and neaten up the windings, but also center the total winding between the end studs. During this time, ***do not release the bent wire through the sleeve of the ring terminal.*** Tin the exposed end of the wire from the ring terminal and solder it to the *outside* of the sleeve. Do not risk nicking the wire by scraping, just heat the Thermaleze® wire with solder to tin it. You can now cut the excess magnet wire. You may wish to stabilize the winding with a coat of clear nail polish or clear acrylic.

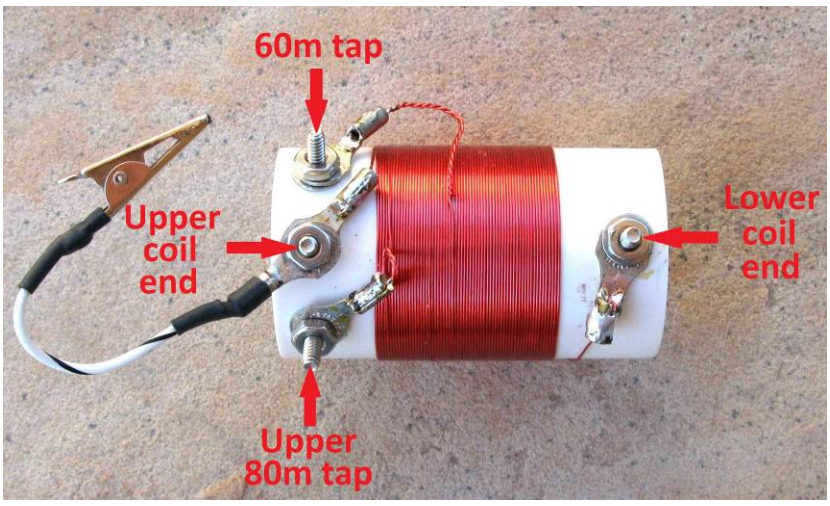
Install the #4 hardware for the tap connections in the same sequence as shown for the wire end connections. Tighten the #4 ring terminal on an angle as shown, also bend up so it does not touch the main coil winding. Tin the twisted tap and solder to the #4 ring terminal. Do not risk nicking the wire by scraping, just heat the Thermaleze® wire with solder to tin it.



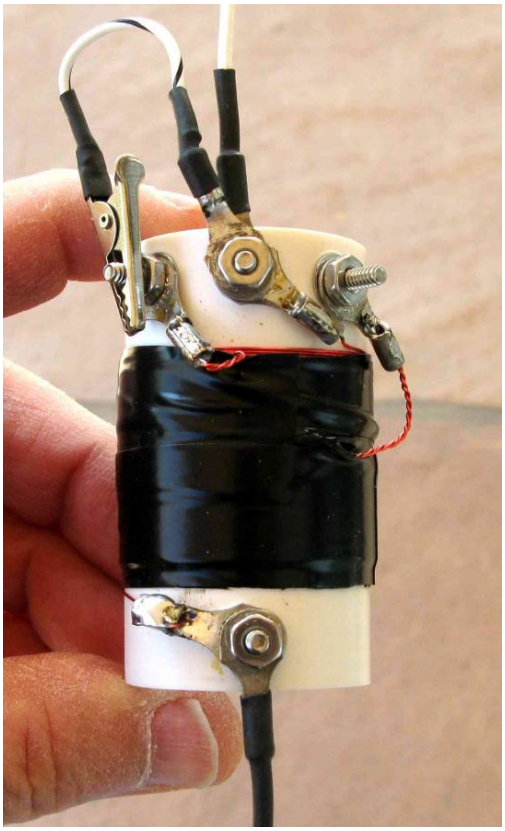
We have found that when heat is applied, soldering the ring terminals, it may cause the 4-40 hardware to loosen. Go back over the four 4-40 nuts and tighten the connections after soldering. Hold on to the ring terminal sleeve so it does not rotate during this process and break the magnet wire.

Prepare the alligator clip, #20 stranded wire, #4 ring terminal and heat shrink tubing as shown below.

Attach the clip assembly to the upper coil end post with a 4-40 nut, and secure.



The loading coil is designed to store inside the base pcb and have the element wires attached to it wrapped around for storage. To prevent any scraping or damage of the magnet wire, wrap a layer or two of electrical tape as shown below.

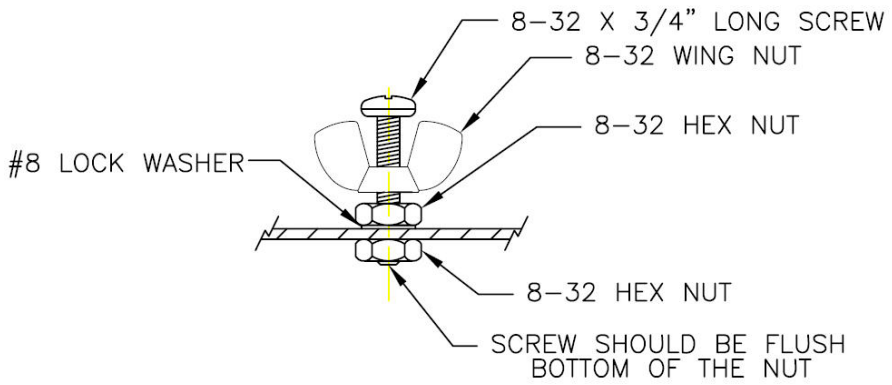


This completes the loading coil.

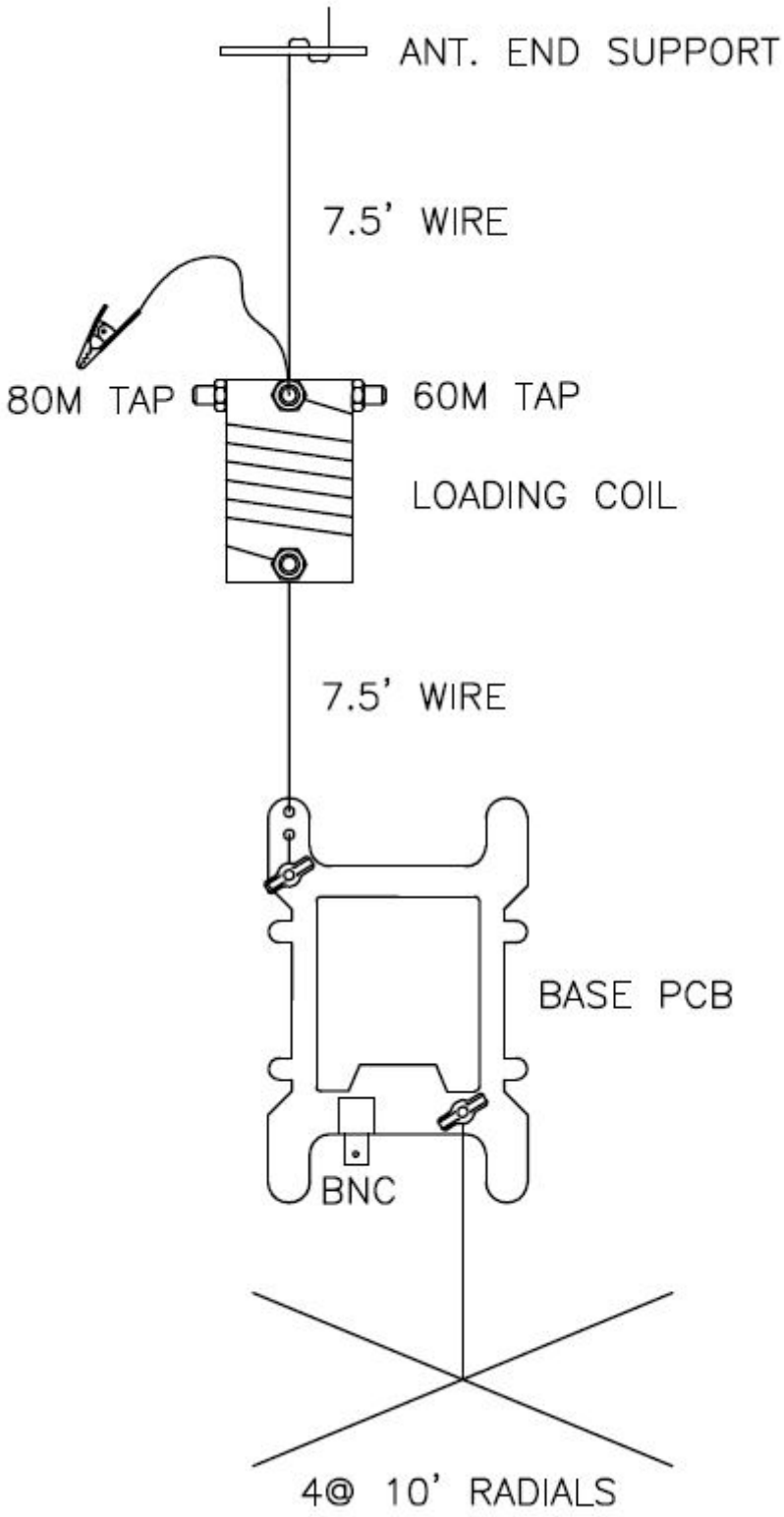
Base pcb assembly

[ ] Install J1, the BNC connector flush with the base board on the front of the pcb, and solder the two locating pins and two electrical connections.

[ ] Install the hardware posts, J2,3 on the front of the pcb for the antenna element and radial wires, as shown in the figure below. The post screw should be flush with the outside of the securing nut on the back side.

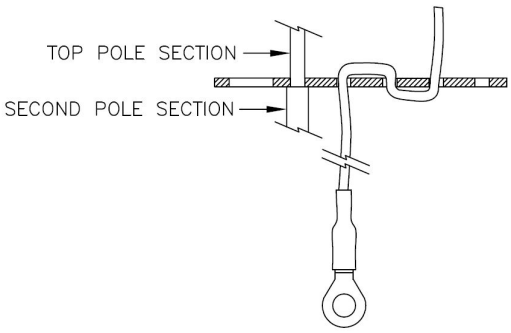


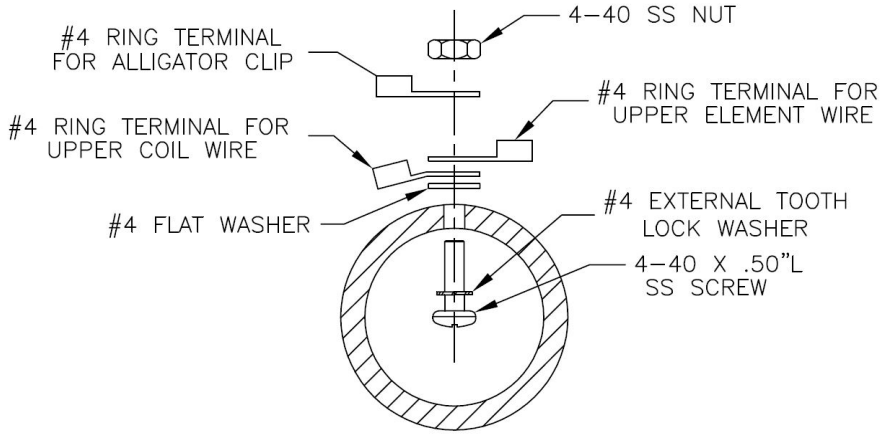
Tuner usage



This is a graphic representation of the antenna deployment.

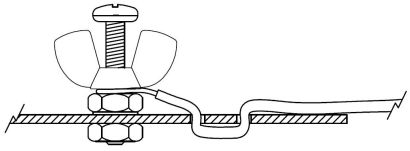
The antenna is rated at 20W, and is designed to be used with the popular 17' telescoping fiberglass fishing poles as the vertical support like our Tri-band Vertical antenna. These poles are available on eBay for approximately $10 US, delivered. The loading coil is designed to slip over the fiberglass pole and used as a center loaded coil. The user is required to supply two 7.5' (2.3m) #20-22awg wires to complete the assembly. Prepare them by soldering a #4 ring terminal to one end of each wire. Heat shrink a 3/4" long piece of the shrink tubing to act as a strain relief between the wire and ring terminal, and attach them to the loading coil end posts with the supplied 4-40 nuts. Attach the antenna end support to the upper element wire and to the loading coil as shown below. The antenna end support slips over the smallest top section of the fiberglass pole, resting on the top end of the second section. You can also tape the wire to the top of the second section. I try not to use the very top section, as it's a little fragile.





UPPER WIRE TERMINAL SEQUENCE

Strip, tin, and route the 7.5' lower element wire through the base pcb as shown below.



The base pcb is secured to the bottom of the fiberglass fishing rod with a couple of rubber bands. Connect the four 10’ radials, and a BNC coax to your radio.

Band selection

The alligator clip is clipped to the left coil tap stud, bypassing the first 5 turns of the coil, for the upper portion of the 80m band, and to the right coil stud bypassing 28 turns for the 60m band. It is unclipped altogether for the lower portion of the 80m band.

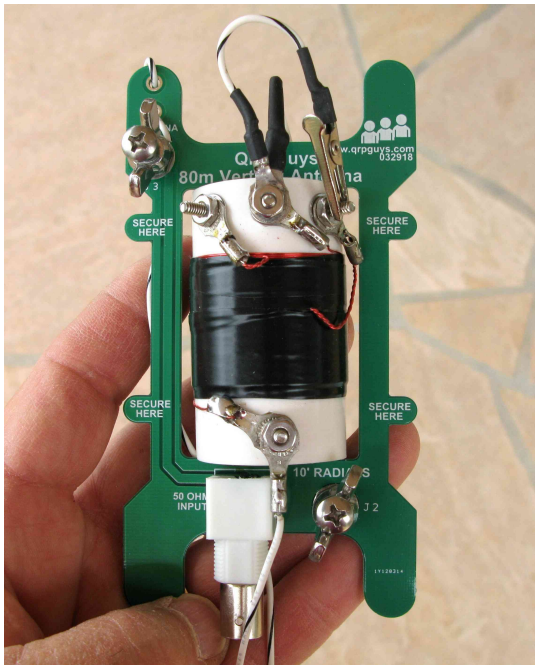
The figures below are representative of the findings we have found testing with an MFJ-259B and four 10’ radials deployed. Any user modifications may require a turn count or tap change. If you experiment, try to stay with 26awg wire. Wire diameter changes affect the turn count to a greater amount.

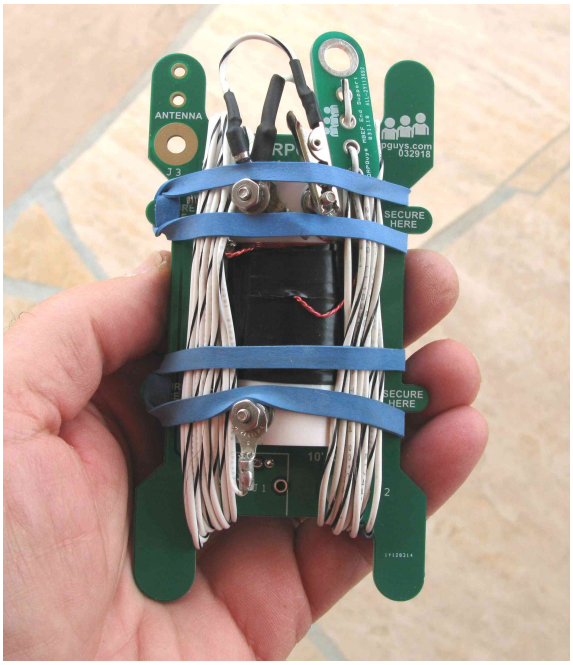
80m tap unclipped:	**80m at 5 turn tap:**	**60m at 28 turn tap**
3.575 – 1.2:1 SWR	3.940 – 1:1 SWR	5.370 – 1.2:1 SWR
3.555 to 3.595 - ≤2.0 SWR	3.910 – 3.966 - ≤2.0 SWR	5.320 – 5.440 2:1 SWR

Possible Modification:

Reviewing the data above, you have probably noticed that extra taps in the first five turns of the coil can give an excellent SWR anywhere in the 80m band. Taps don't need to be on even turns, and can be anywhere around the periphery of the first five turns, and multiple taps can be easily accommodated for your favorite "sweet spots" of the 80 meter band. So the 40-50KHz window needn't be an issue. The pictures below show one possible inexpensive alternative. The only cost is some extra hardware. I avoided using the alligator clip tapped to just a twisted loop on the coil, because I did not want to stress the coil wire with repeated use. If you still want to store the loading coil in the base, be sure to position the extra taps and terminals so they do not interfere with the pcb cutout.

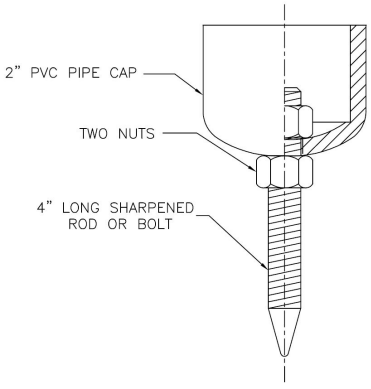
For storage, just disconnect the radial wires. Leave the element wires and loading coil attached. Place the loading coil inside the base pcb cutout. Wrap the upper element wire on one side and the lower element wire on the other side. Secure the assembly with the rubber bands you used to attach the base pcb to the fiberglass mast.

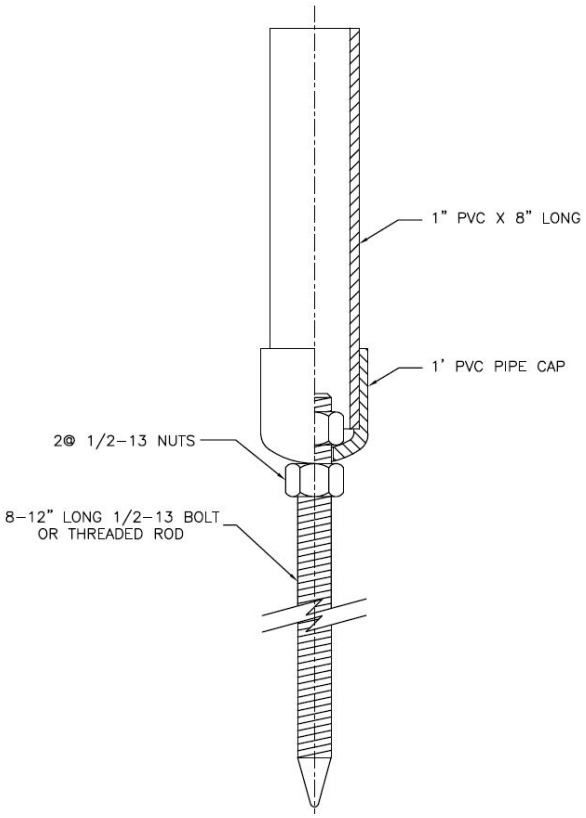




On the right is a simple device to hold the fiberglass fishing pole is shown below, or you can opt for the $19.95 Husky® Work Light Tripod from Home depot. If your particular fiberglass pole is larger in diameter at the bottom, and will not slide into Ø1" pvc, just make it out of the next size up, Ø1 1/4" pvc pipe.

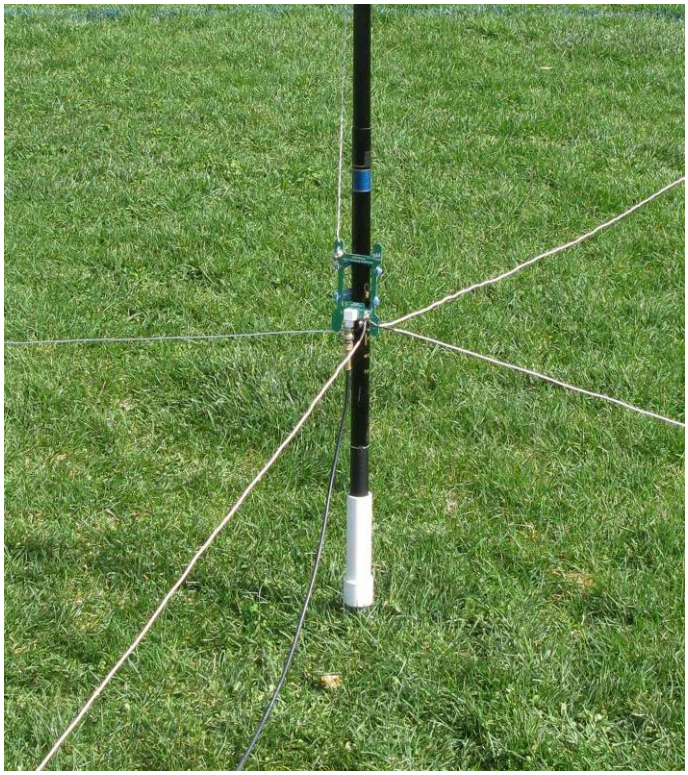
On the left is a simple device for a guyed "Jackite" pole to keep the wind from kicking out the bottom.



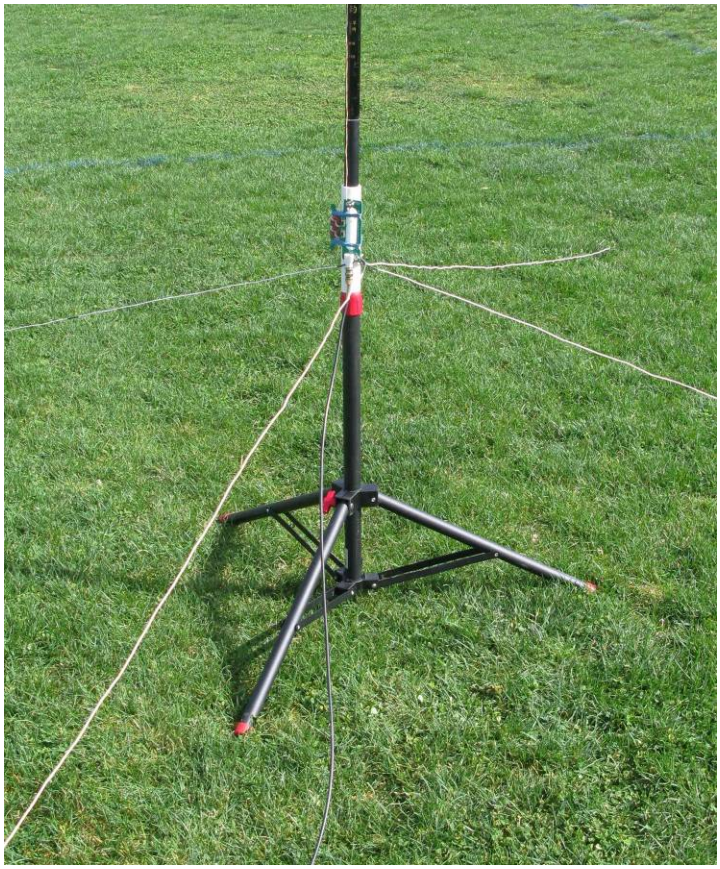


This is another clamping variation I made that could be used for a picnic table or apartment balcony railing. It can be adjusted for vertical, or on an angle to miss an overhang or roof eave. I used the same pvc components, a small piece of aluminum angle, and a garage sale c-clamp.

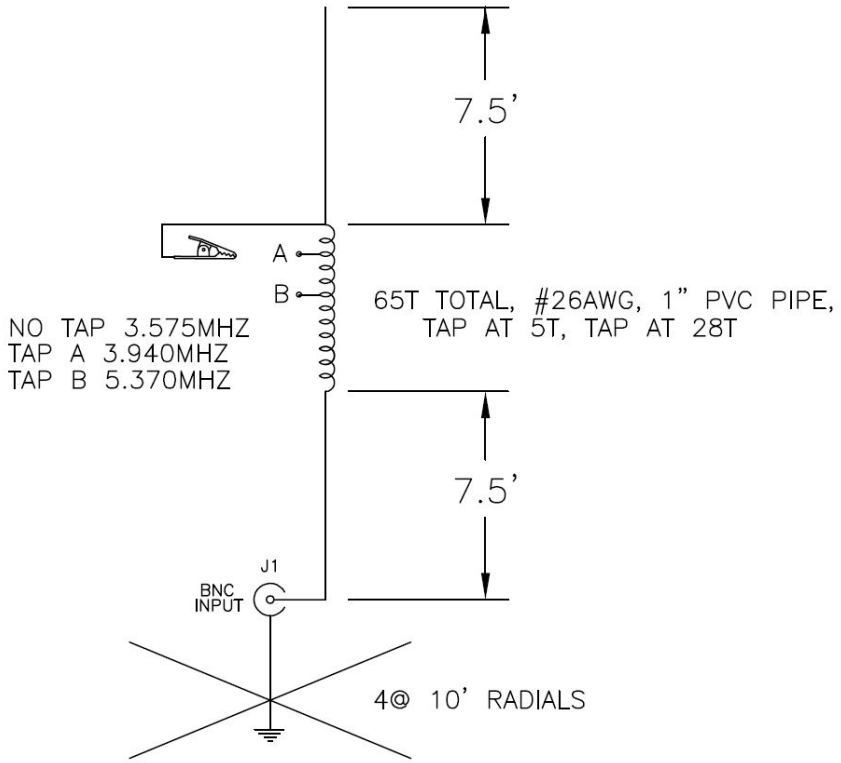
80/60m Vertical Antenna, 10’ radials, above PVC holder, 17’ telescoping fiberglass fishing rod, 26”(.66m) collapsed.



80/60m Vertical Antenna, 10’ radials, with Husky® light stand, same pole.



Schematic:



Notes: