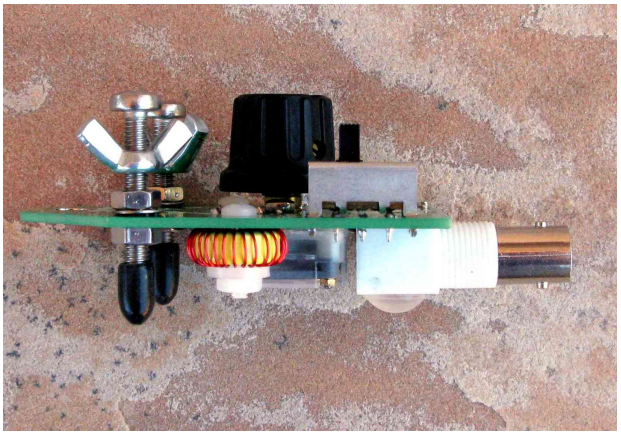
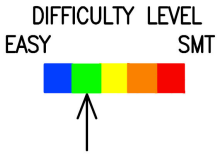
QRPGuys EFHW 80m Mini Tuner Assembly Manual





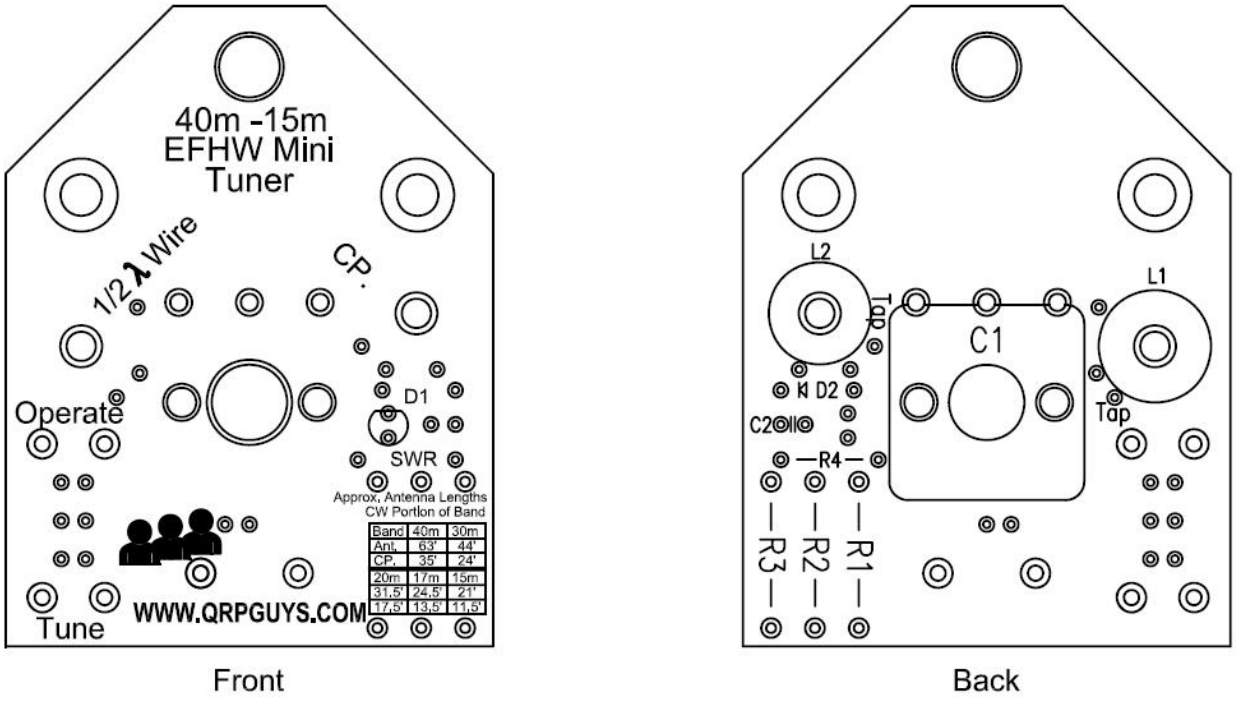
First, familiarize yourself with the parts and check for all the components. If a part is missing, please contact us and we will send one. To request a part, please use qrpguys.parts@gmail.com.

Parts List

1 – QRPGuys EFHW Tuner PCB
1 – Slide switch – DPDT
1 – C1, polyvaricon, w/shaft and mtg. hardware, 1 long, 2 short metric screws, and nylon spacer 3/8”L
1 - T50-1 toroid core (blue)
1 – FT37-43 toroid core (black)
1 – 60” of 26awg magnet wire for the toroids
1 – Medium size control knob
1 - BNC PCB connector
2 – 4mm x 30mm long SS Phillips screw
4 – 4mm nut
2 – 4mm lock washer
2 – 4mm SS wing nut
2 – 4-40 x 1/2” long nylon screw
2 – 4-40 nylon nut
2 – 3/8” diameter #4 nylon washer
2 - 1/8”diameter x 1/2” long vinyl Caplug
1 – C2, .1uF mono capacitor, marked 104
1 – D1, Red LED w/clear lens
1 – R4, 470 ohm resistor (yellow-violet-brown-gold)
3 – R1-3, 51 ohm 2W power resistor (green-brown-black-gold, or value is printed on the component)
1 – D2, 1N4148 signal diode, sm. glass, w/black band on one end
1 – 8mm round self-adhesive rubber foot

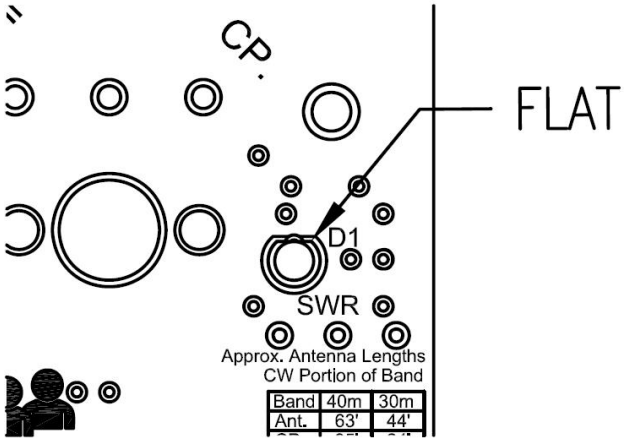
These assembly instructions are for the 80m tuner only. When you are completed it will only work for 80m. The 80m version uses the same PCB.

We will assemble the smallest components first. Not all components are on the same side of the board. Please note the graphic below, as to which is front and back of the PCB.

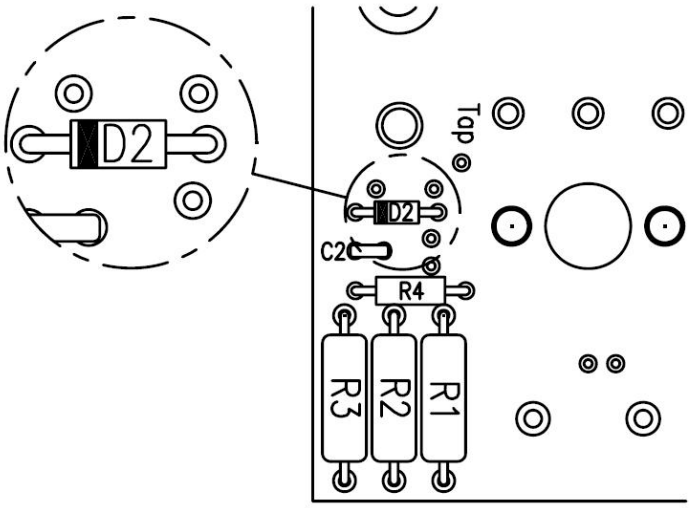


Front Back

[ ] Install D1, the clear lens LED on the **"FRONT"** side of the board. The polarity must be correct. The short lead is "negative" and goes towards the top of the board. There is also a very small flat indicating the negative side of the led, and an outline indicating the flat on the board. Seat the LED flush with the surface of the board.



Next, refer to the sketch below and install the following components on the **"BACK"** side of the board. Do not elevate the components.



[ ] Install C2, .1uF, marked 104

[ ] Install D2, 1N4148 signal diode, observing the black polarity band (cathode) location as shown above.

[ ] Install R4, 470 ohm resistor (yellow-violet-brown-gold)

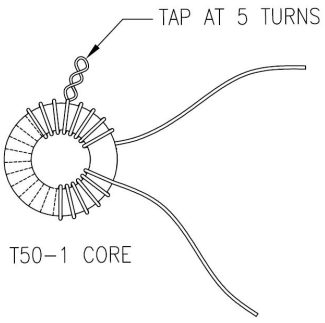
[ ] Install R1 – R3, 51 ohm, 2W, power resistor

Next to assemble are the two toroids on the **"BACK"** side of the board.

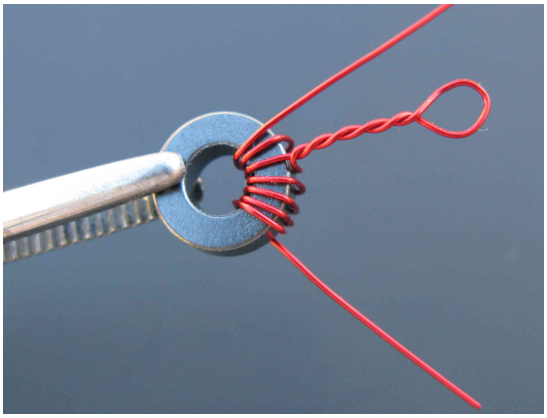
Note: When you wind the toroid for 80m, it will only load on 80m. It will not work on the original 40m-15m bands.

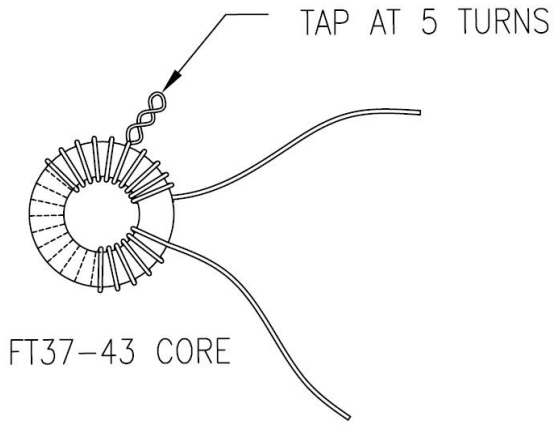
[ ] For L1, use the T50-1 (blue) core and 36" of the supplied magnet wire. You are winding a total of **45** turns, with a tap at **5** turns from the beginning of winding. The picture, and figure below show the twisted technique for the tap. The 45 total turns will completely fill the toroid.

Note: *Now is a good time to mention a good way for counting the turns on your toroids. Many times on toroids with a lot of turns, you lose track going around, as some are quite small. A good trick is to take a digital picture of it and blow it up on your computer screen. Counting is clearly a lot easier.*



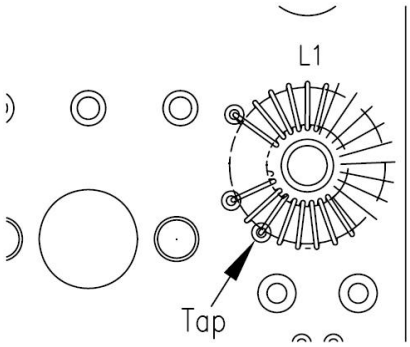
[ ] For L2, use the FT37-43 (black) core and 24” of the supplied magnet wire. You are winding a total of **25** turns, with a tap at **5** turns from the beginning of winding. Remember, every time the wire goes through the center of the core, it counts as one turn. Use the same twisted technique for the tap as L1. The total of 25 turns will completely fill the toroid.



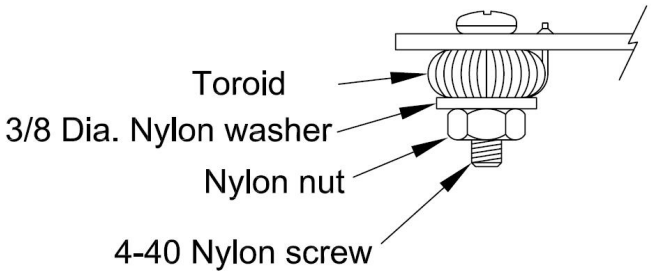


[ ] Next, bend the leads as shown below, trim to 1/4” long, and tin the leads prior to soldering them to the backside of the board. The magnet wire supplied Is Thermaleze® brand and will tin easily with a soldering iron. Always tin the leads before trying to solder them in place and you will greatly eliminate any continuity problems.

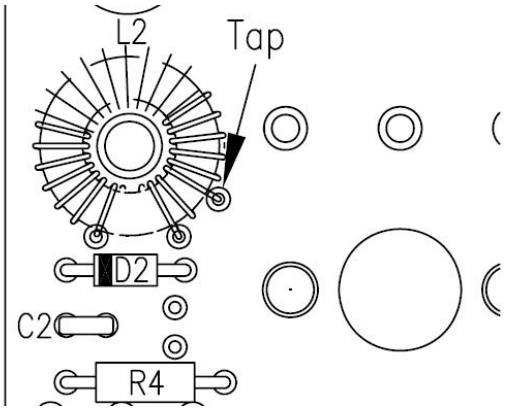
[ ] Solder L1 where indicated on the PCB, and centered on the screw hole. You will notice the tap hole is indicated, and is slightly larger in diameter to accept the double twisted wire. Install the toroid flush with the backside of the board. Do not elevate it off the board. We will be securing it with a nylon screw, nylon washer and nut.



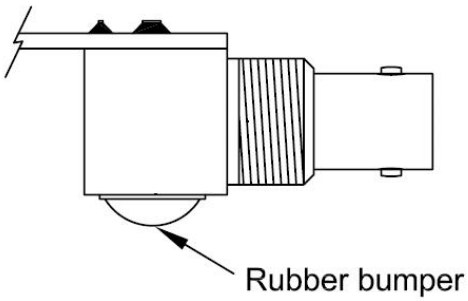
[ ] Secure L1 to the bottom side of the board using one of the 4-40 nylon screws, nylon washer, and nylon nut, as shown below. Tighten enough to secure and protect the toroid, but do not over tighten.



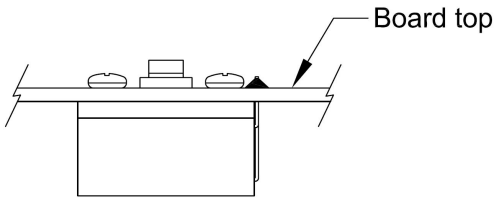
[ ] Solder L2 where indicated on the PCB, and centered on the screw hole. You will notice the tap hole is indicated, and is slightly larger in diameter to accept the double twisted wire. Install the toroid flush with the backside of the board. Do not elevate it off the board. Secure it the nylon hardware the same as shown above.



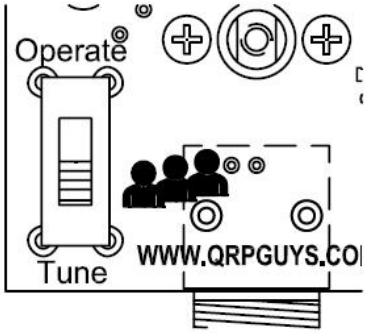
[ ] Install the BNC connector flush with the **"BACK"** side of the board, and solder the two locating pins and two electrical connections. Attach the rubber bumper as shown.



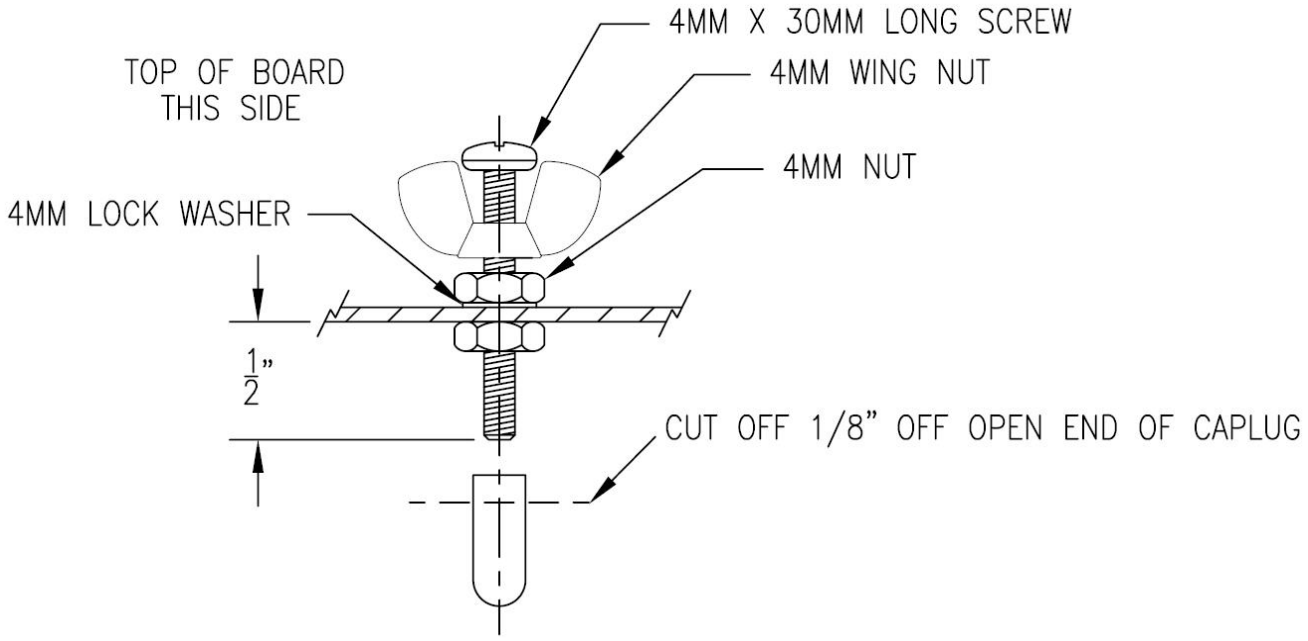
[ ] Install the polyvaricon capacitor on the **"BACK"** side of the board by carefully bending the three leads towards the shaft end of the capacitor. Feed the three leads through the board and secure it with the two short metric Phillips screws from the top. Solder and clip the three leads flush.



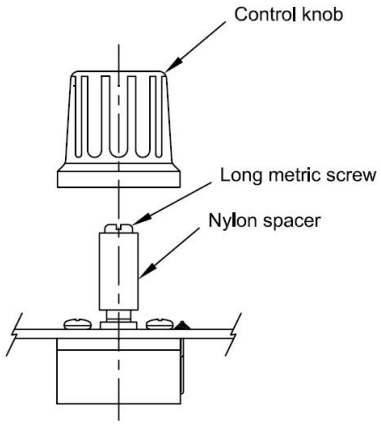
[ ] Install the slide switch on the **"FRONT"** side of the board, soldering all four corners and electrical pins.



[ ] Install the hardware posts for the antenna wire and counterpoise, as shown in the figure below. The posts should extend1/2" below the surface of the board. Complete the installation by cutting off 1/8" from the open end of the two small vinyl caps and sliding them over the exposed threads of the posts.

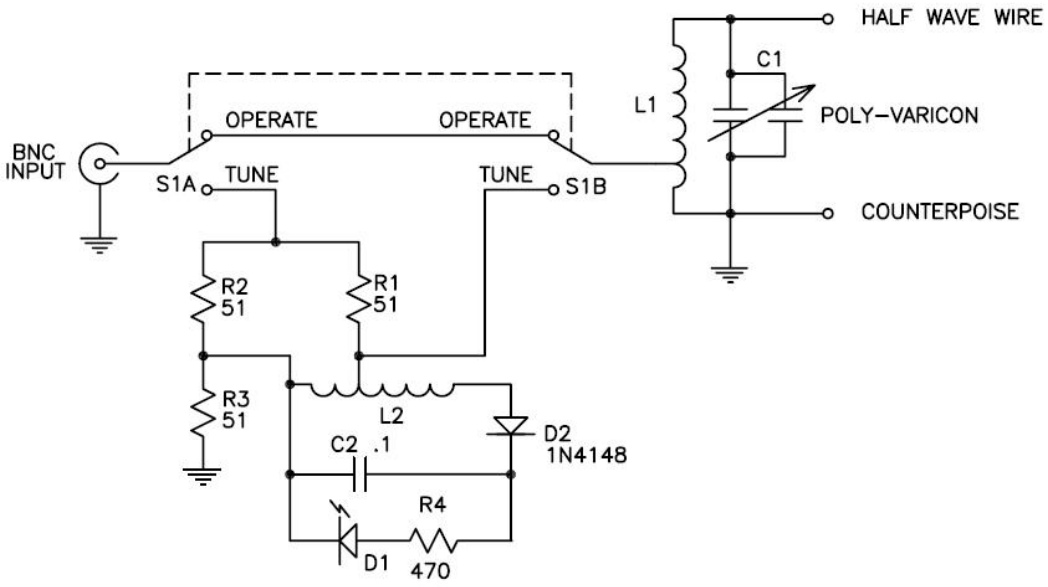


[ ] Install the nylon spacer shaft, retaining screw, and control knob onto the polyvaricon as shown.



This completes the electrical and mechanical assembly.

Schematic:

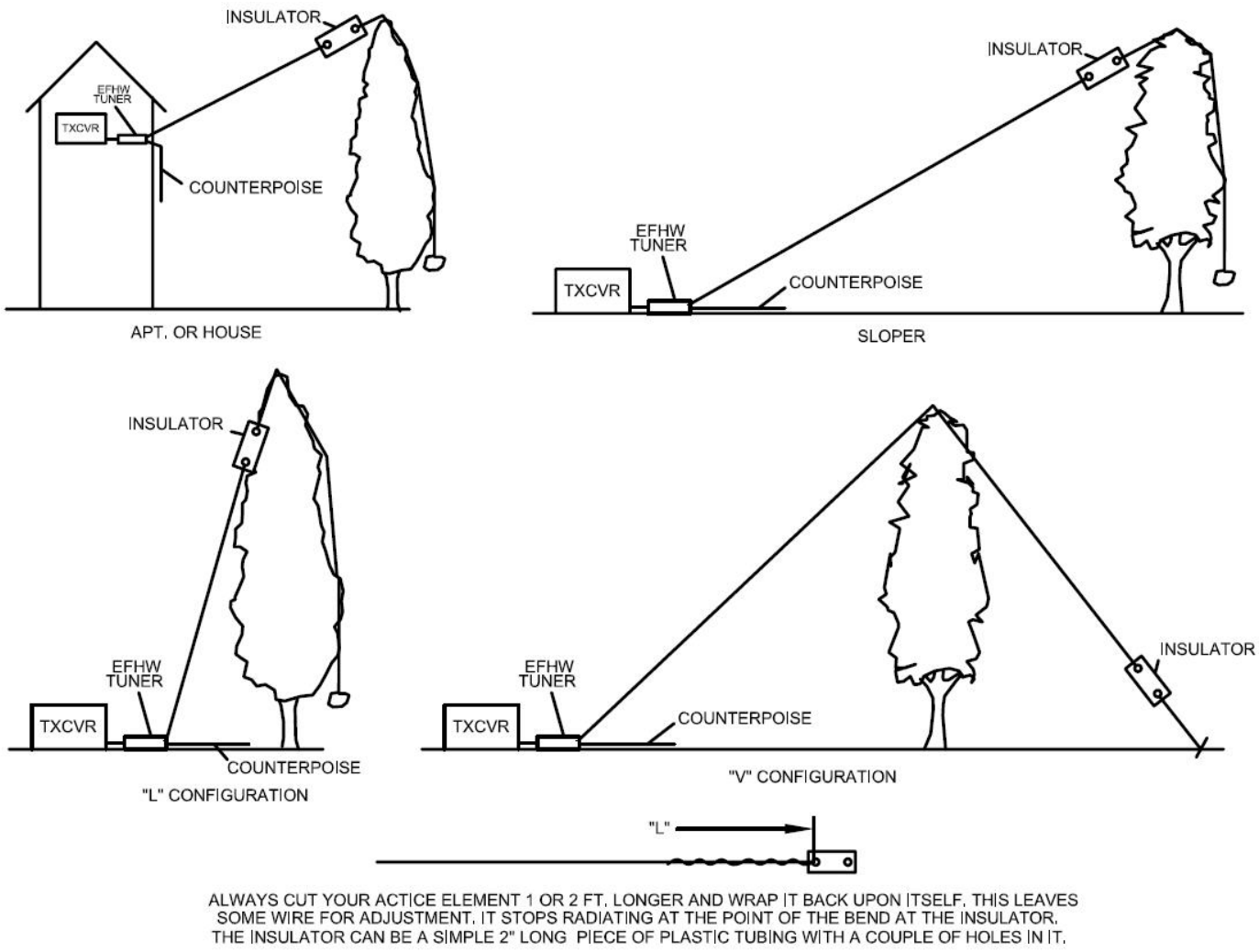


Tuner usage

The tuner is rated at 5W CW, 10 watts PEP max. and incorporates the N7VE LED absorption bridge circuit for sensing SWR. In the TUNE position, you cannot damage your transmitter caused by a high SWR. The worst your transmitter is looking at is a maximum of 2:1 SWR in the TUNE position. The LED is only showing reflected power. At full brilliance your SWR is 4:1 or greater, at half brilliance your SWR is approximately 2:1, and the LED will completely extinguish at 1:1. *Tip from Dan…If your led does not go out at 1:,1 there may be a little too much gain on L2, the indicator transformer. Just reduce the turns on the high side (side with the most turns) of the tap by a turn or two.*

Use all the normal cautions throwing wires up in the air near power lines. For *80m, start with 135'* of wire, you can always fold back at the far end for adjustment. Adjust the length through experimentation as needed. How the wire is configured depends greatly what you have to work with in terms of support trees and structures. The simplest configuration is an inverted "V", where the active element runs from the antenna connection of the tuner, up to a tree branch, and back down towards the ground.

An “L” configuration may work well if you can get the part of the wire from the tuner up to the tree as vertical as possible. If you use a counterpoise try to lay it out in a straight line, when possible.



Additionally, after the antenna is tuned up, keeping the bridge in the circuit (Tune position) will reduce the power by a factor of four to a matched antenna. This can occasionally be useful when trying to bring a 3w QRP transmitter to under the 1w level for certain sub-one watt contest multipliers.