

80 Meter Doublet Antenna Construction

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Antenna length cut to lowest frequency

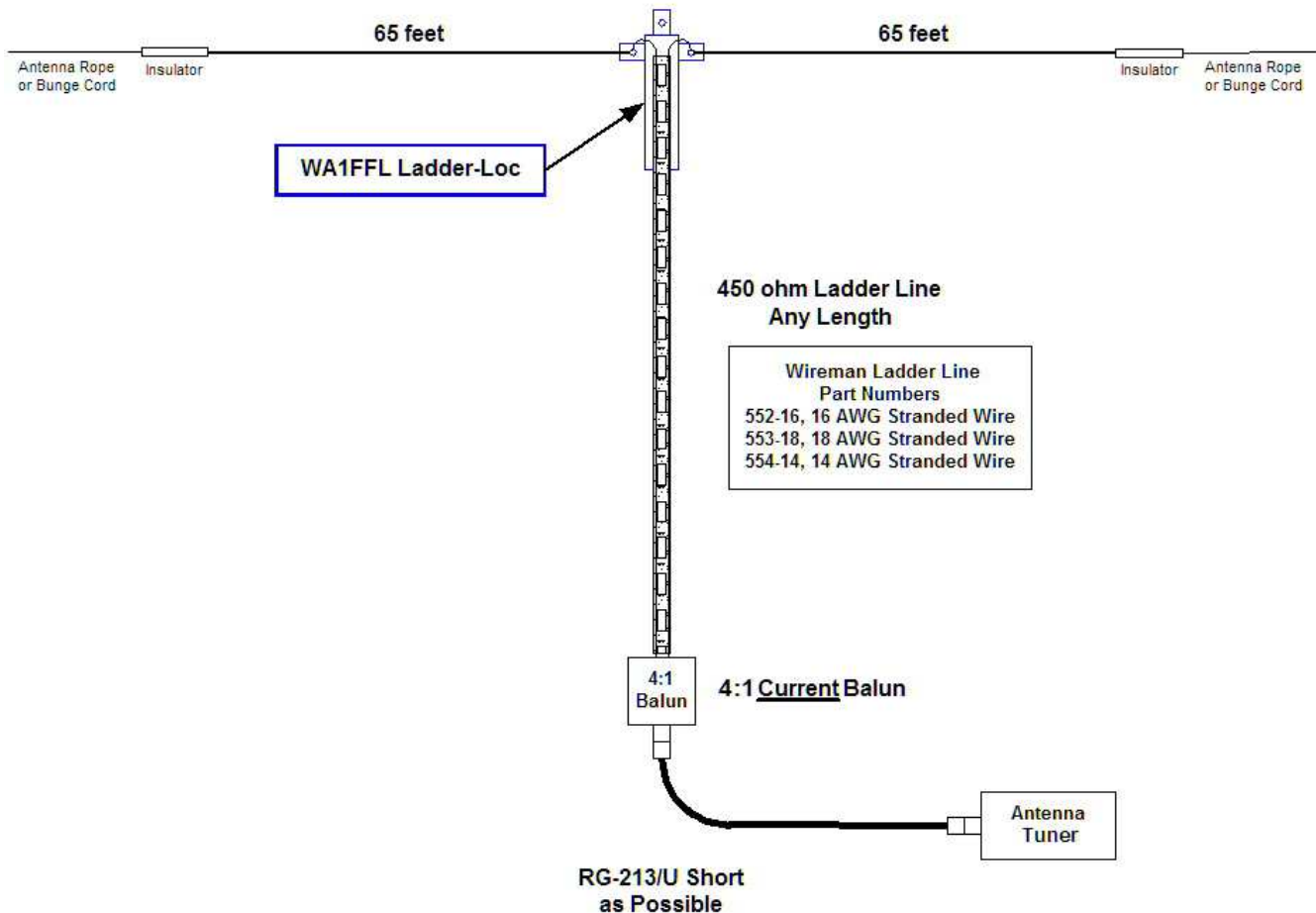


Figure 1.

Figure 1 shows the basic doublet antenna design using 450 ohm ladder line to a remote 4:1 Current Balun; a short coax jumper to go into the house (shack); then connecting to an antenna tuner. The antenna tuner can be a manual unit or an automatic unit; that connects to an amplifier or directly to a transceiver. If you have the ability you can feed the ladder line through the house to a balance line antenna tuner. Just keep in mind that ladder line (or any parallel transmission line) cannot come in close or direct contact with metal objects, nor can it come into contact with the ground outside (i.e. soil, grass, concrete, etc.). This is why I use the remote 4:1 Current Balun with coax as a feed-thru jumper.

The antenna length is shown as 65 feet per leg for a total of 130 feet long. My antenna uses #12 Gray Stranded Insulated THN wire that you can purchase at any Lowe's, Home Depot, or Menards stores. I use gray insulation since it is harder to see than most other colors. Doubling the length will make it more usable on 160 Meters, but it will work with limited capability on 160 with the length shown using a good quality antenna tuner. I am using a Palstar AT2K Manual Antenna Tuner. You can use a MFJ-998RT or MFJ-993RT remote antenna tuner, or any indoor antenna tuner that will handle the power you require, and a wide range of impedance variations.

The antenna uses a WA1FFL Ladder-Loc to interface the wire antenna to the 450 ohm Ladder Line. This can be purchased at either Ham radio Outlet or DX Engineering. It provides a strong mounting solution for the ladder line/antenna wire connections.

The 450 ohm window line is purchased from the wireman (www.thewireman.com) and is available in 16, 18 or 14 gauge wire. The model numbers provided are for stranded wire which has a much better life expectancy than the solid wire variety.

The balun is a 4:1 2-core Current Balun, not a Voltage Balun. The two-core current balun has better Common Mode rejection than a single core current balun, and definitely better than any voltage balun, period. You can make one or buy one. In any case I suggest a heavy duty design that uses two high quality 2.4" ferrite (Ambidon Type K) cores, heavy coated #14 enameled copper wire with a #12 Teflon jacket. Wind each core with a bifilar winding of #14 enameled polyimide wire with Teflon jacket. You can purchase the #12 Teflon from www.ambidon.com. Use a Reisert crossover winding that provides terminals at opposite sides of the core. Shown below in Figure 2 is a crossover winding for a single core 50 ohm choke using a bifilar #16 gauge enameled wire.



Figure 2.

Use a 2" square of poly material or plastic about 1/4" thick to separate the two stacked cores making sure that the input/output wires are aligned above each other. You then solder one side in parallel (left wire connects to the left wire and right wire connects to the right wire of each core winding). The other side is soldered in series so that the inner winding of each core is connected to each other. The two outer windings will connect to the 450 ohm ladder line.

Figure 3 shows a design that uses two side-by-side cores showing series connection on the coax connector side, and parallel connection on the antenna side. My balun places the two cores on top of each other so it can fit inside a 4" x 4" x 2" plastic box.

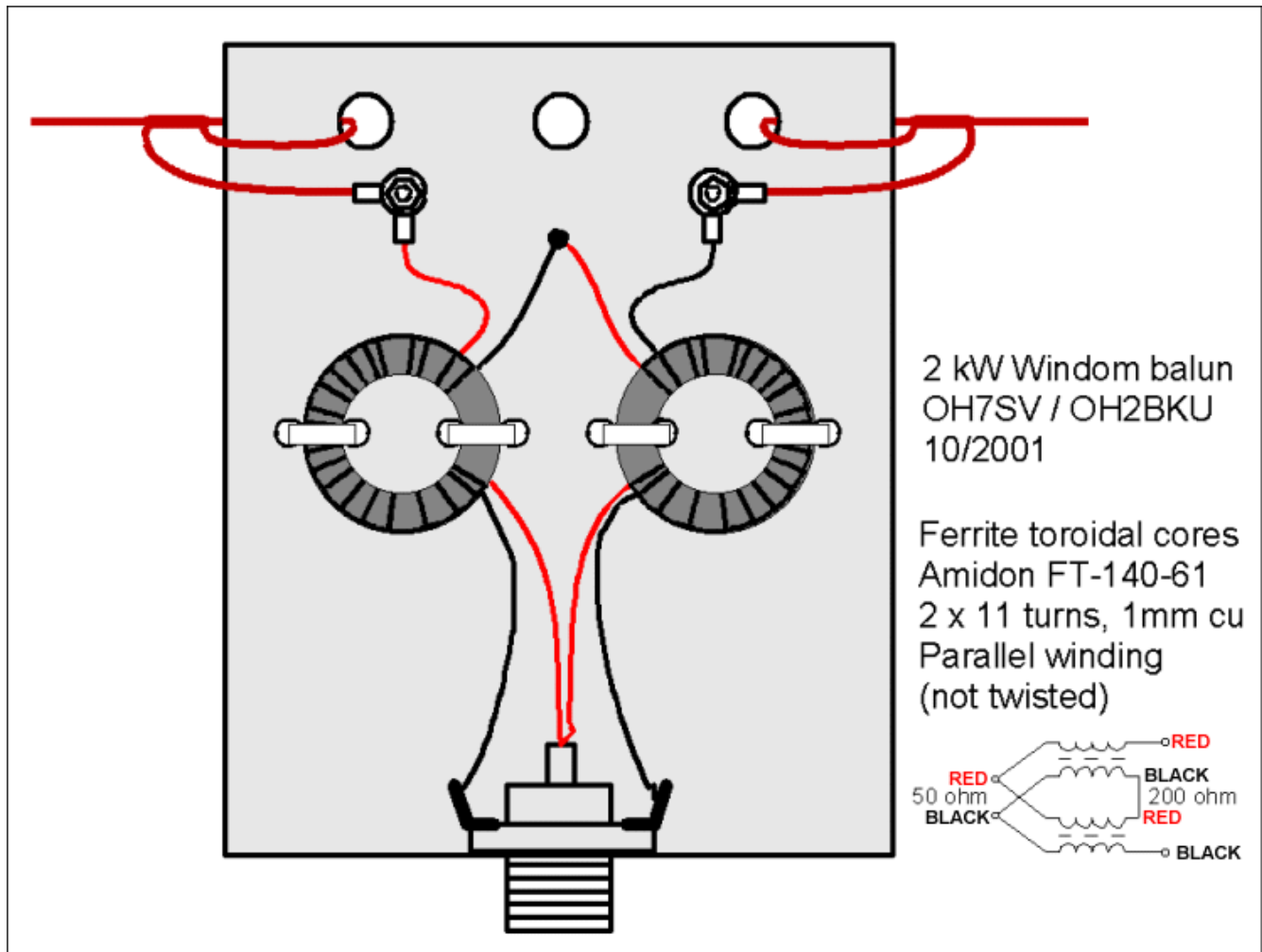
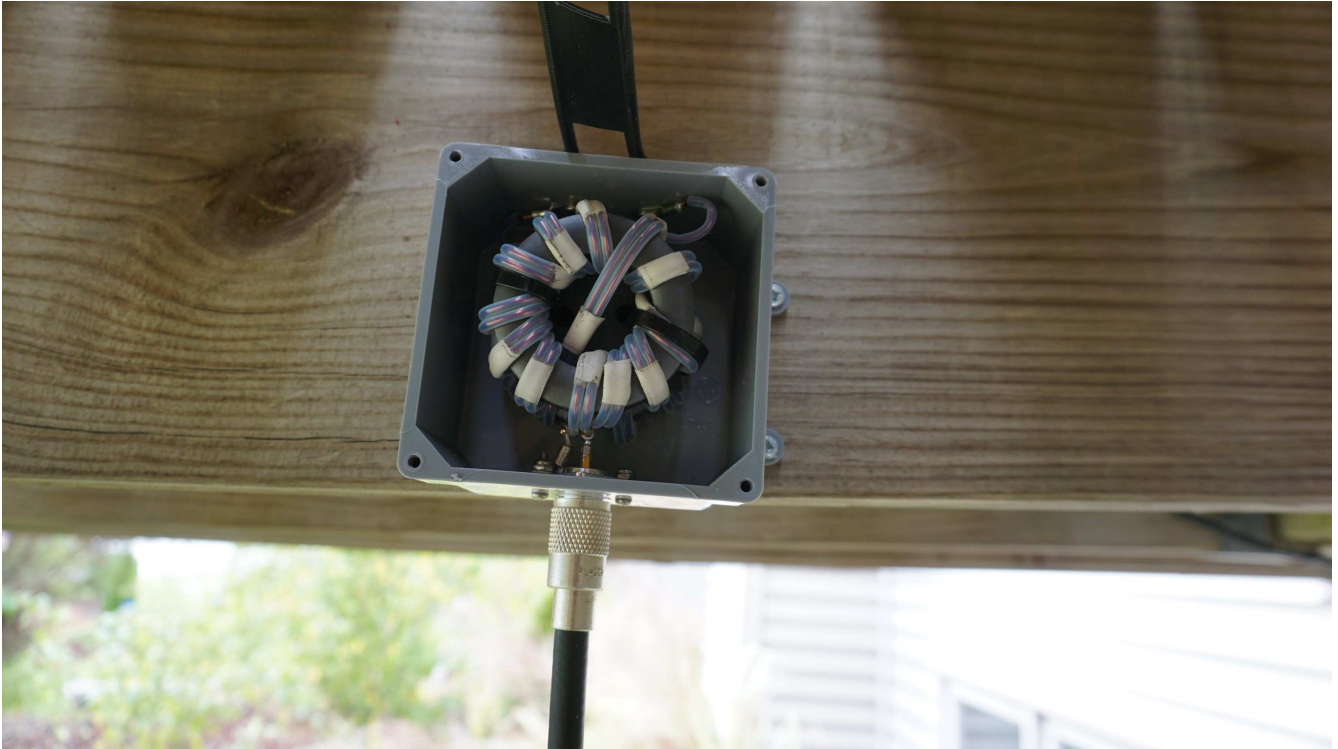


Figure 3.

If you take an ohm meter to any port connection it will show a DC short. This is not an RF short, just a DC short. This design will place both wires and both sides of the RF connector to ground. This provides a low atmospheric noise level design. You will still need to physically disconnect the antenna coax connection in the house to prevent lightning protection.



Picture of 4:1 Balun showing detail winding on cores. Note #14 Enameled Wire inside #12 Teflon sleeve held together with fiberglass tape. Mounted inside 4"x4"x2" weather resistant PVC box.



Picture of window line connecting to balun on top; coax connection on bottom. Coax goes to grounded bulkhead connector before entry into the house.



Plastic hanger under deck supporting window line to balun. Hooks are plastic ½" copper pipe hangers available from Lowe's.



WA1FFL LADDER-LOC mount under eave of house 22 ft above ground level. Right wire goes to bush at 9 feet above ground. Left side goes to tree at 15 feet above ground.



Right wire to bush about 9 feet above ground. Wire wraps around bush half way to fit lot.



Left wire goes to tree secured with bunge cords about 15 feet above ground.