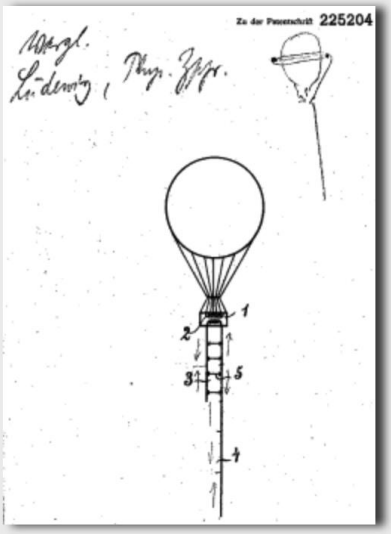
CVARC 2-Meter Slim JIM Antenna
Apr-27-2024 - With Construction Details!
KK6YAM

Background:
The Slim JIM antenna is a modification of the J-Pole antenna. The J-Pole or Zepp antenna is a design dating back to the days of Zeppelins. Approx 1909 this early patent was made.

Zepp antennas derive their name from the antennas used on the Zeppelin Airships. An early patent by German Hans Beggerow from 1909 illustrates the concept of an antenna equipped balloon.



Much later in 1978, the experimenter Fred Judd (F.C. Judd) published his Slim JIM design. JIM is an acronym for "J-type Integrated Matching stub". It is very similar to the J-Pole, which also achieves its 50 Ohm match via a stub. J.C. Judd was an avid experimenter, and it is worth noting that he also was a pioneer of electronic music in the late 50s and early 60s, with these sounds being used in kids sci-fi adventure series such as Space Patrol. Much more background can be found at the web site- check it out!

http://www.sothismedias.com/home/the-strange-world-of-fred-judd-g2bcx

Here is the original Slim JIM article:
https://www.hamuniverse.com/g2bcxslimjimantenna.html

J-Pole vs Slim JIM. The Slim JIM may provide higher gain in comparison to the J-Pole, but the Slim JIM will do this when in a more open and higher position – due to its lower angle of radiation. This may or may not be the case- some articles I reviewed describe higher gain at lower angle, while others claim no improvement over J-Pole.

Matching – getting 50 Ohms
A great detailed design description is at:
https://en.wikipedia.org/wiki/J-pole_antenna

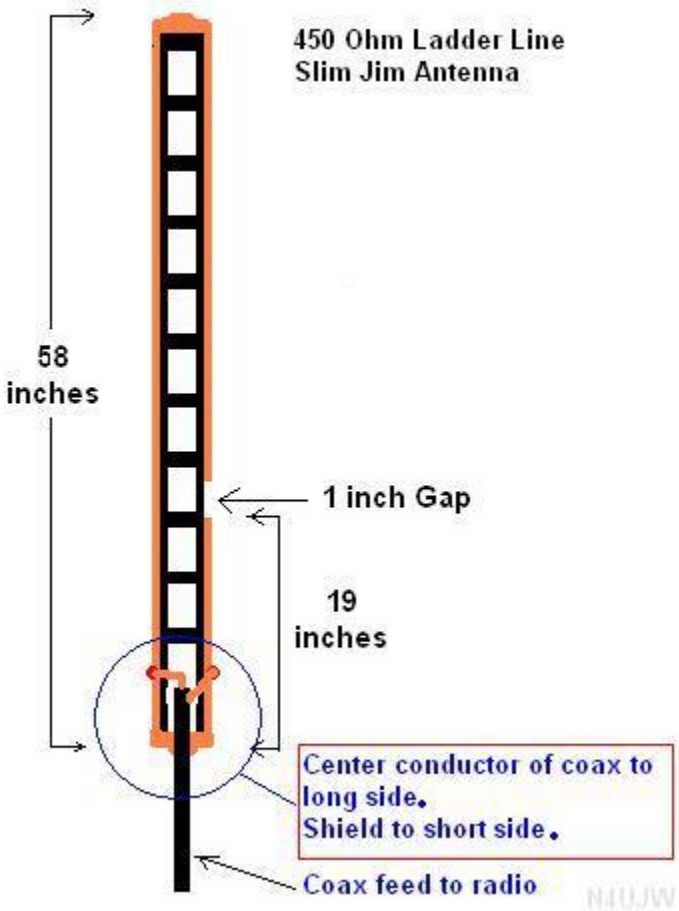
This includes the Slim JIM.
The matching happens by putting a ¼ wave end fed stub next to the ½ wave end fed antenna. By adjusting the feed position, a 50-ohm match over the desired band can be achieved.

Construction:

Parts needed are: 450 Ohm feed line, 50 Ohm coax with pre-crimped and molded BNC connector, electrical tape and a thin-walled PVC pipe to act as a support if you choose. A soldering iron will be used to make connections, and wire cutters and stripped will be used to form the antenna.

Overall design- A length of 450 Ohm window or ladder line style feed line is cut a little longer than the 2M ½ wavelength. Then both ends are stripped and soldered together at a pre-determined distance (same as the antenna I constructed). Then a cut is made at the ¼ wave point on one side of the antenna. A pre-crimped BNC coax will be stripped and soldered to the lower end of the feed line.

Here is the basic design- we will use the lengths of our reference antenna.
Since there is a gap cut, it can best be made in one of the 'solid' sections, to help keep the antenna mechanically stable- instead of having a single wire at the gap.



CONSTRUCTION

<u>The reference antenna dimensions are:</u>

-Distance from BASE to Solder Point of Coax = 2.75 inches.
-Remember the GROUND side of coax goes to the short side, coax CENTER to long side.
-Distance from BASE to CUT = 19.0 inches.
-Distance from BASE to TOP = 57.5 Inches.

Where to cut the end???
Ideally the ladder line has a solid area where the GAP is made- to keep it from bending at the cut.
Also, it's nice to be able to tie-wrap the coax to the lower part of the latter line to act as a strain relief.

The ladder line has an odd pattern of windows, so I found:
Find a point where cut could be made within a solid area.
Then 19 inches back looks like can make the ends- connection and have some surface for coax mount.
The cut is at the 19-inch position, and the coax attachment is at about 2.25-inch position.

We will start at the bottom – cut about 1 inch below then strip and solder ends together.

Cut:	Strip:
	

The wire is a copper-plated steel stranded wire. It's easiest to first cover the stripped wire with solder, then bend the two ends together and then solder them together. This keeps the strands together.

Solder:


Now make the other end soldered together using the same technique - 57.5 inches away from bottom. Cut at 58 inches and strip back a half inch then solder the ends together.

Prep the RG-58 coax- strip and tin center and braid, cut the aluminum foil shield.

Prep the RG-58 coax- strip and tin center and braid, cut the aluminum foil shield.	Then 'tin' by adding solder to it.
	

Solder the braid 2.75 inches up from the bottom – the shield will be soldered to the side which will be cut (short side). The center conductor will be soldered to the long side.

To solder the coax to the ladder line- first carefully melt the insulation to expose the wire at the sides. Try not to melt the center of the latter line so that it remains mechanically strong. The plastic insulation has a low melting temperature, and the soldering iron can melt it on contact so be careful not to strip too much. Wrap the tinned coax lead and solder then trim excess.

Then put some tape on it to hold coax for now.

Last step before checking the tuning is to make the cut on the coax braid side.

I made a slightly less than ½ inch wide cut 19 inches away from the base. The edge of the cut is 19.0 inches from base. This cut should be in a solid area of the ladder line as we had planned out at the beginning.

Now check the antenna tuning. The second antenna I constructed that copied the 1st antenna dimensions did not need any adjustments – whew!

Final construction is to put some tape on the ends and secure the coax to the ladder line.

The antenna can be placed into a THIN-WALL PVC (which has less absorption of RF than sch-40) pipe for self-standing. Other options are to use a telescoping rod- like a collapsible fishing pole or simply tape it onto a bamboo pole. It should be kept away from metal for best operation.

It can be rolled up and easily transported using the provided Velcro straps.