

VA7DH 2 m/70 cm Slim Jim

Last revision June 22/2009



Finished Slim Jim

First off let me say that I did not set out to build a dual band antenna, it just turned out that way. 70 cm is the 3rd harmonic of 2m and the antenna has a fairly wide bandwidth. The final product tuned up well on 2m and when checking 70 cm the VSWR was low and quite acceptable. Initially I was going to build a 2m Slim Jim according to instructions on Ham Universe at: <http://www.hamuniverse.com/slimjim.html>

I had difficulty purchasing 300 ohm TV twin lead in my part of Canada and managed to purchase some in a Radio Shack store near Seattle. The kind I bought had a foam core in it, something that I had never seen before. The

conductors were heavier, too, and the spacing between the conductors is wider. It's kind of like comparing RG-8 coax to RG-

58. It turns out that there is quite a difference in velocity factor between the two types of twin lead and so my measurements are substantially different from those at HAM Universe. The twin lead used here is:

Radio Shack part number 15-1175.

I cut a piece of the Radio Shack twin lead according to the Ham Universe guidelines and then attached my MFJ-258 analyzer to it. The resonance was somewhere down around 134 MHz instead of the 146 MHz I was seeking. I proceeded to trim the length down by moving down my upper shorting point (there is one at the top of the antenna and one at the bottom – see the diagram on the last page – points C and J). The transformer tap point H also had to be adjusted. Once I finally found resonance and impedance match (the overall length has most effect on resonance but the impedance tap has also some effect) I marked the dimensions onto a length of pre-primed 1 X 2 so that I could transfer those dimensions onto new pieces of twin lead for future copies of the antenna. The connections, shorting bridges, and one inch gap are all protected with heat shrink tubing. On my first antennas I used double layers of conventional heat shrink tube and that works not too badly. On the last couple of antennas I used a more expensive heat shrink that has a layer of hot melt glue inside. Using that you only need one layer as it's quite a lot stiffer.



Marking stick with piece of twin lead



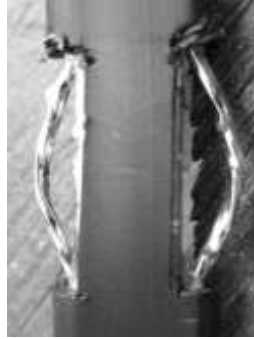
Use a sharp knife when cutting the insulation and be careful not to cut into the wires buried inside. If you do cut a wire it's no tragedy. Just solder a piece of wire across the break. You can cover up your error later with heat shrink tubing. If you cannot get heat shrink tubing then some vinyl electrical tape will do, it's just not as permanent, especially in hot weather. Warning: these knives are extremely sharp. Always cut away from you (experience).



Tap point with insulation removed



Wires pushed out



Wires tinned



3/4 inch of outer insulation removed from the end of a length of RG-58 coax cable



The ends of the coax have been tinned and soldered to the middle of the tap point. See point H in the sketch.



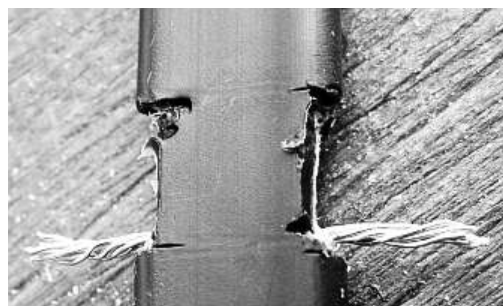
The cut out gap opening with one inch of conductor removed. See points D and E on the sketch.



The gap with heat shrink in place.



Removal of insulation at points B to C and J to K on both sides of the twin lead



Wires cut on both sides of the twin lead at points B and K



Wires overlapped and soldered

VA7DH Slim Jim 2m/70cm Dual Band Antenna

Latest Rev.: June 18 2009

Punched hole
one for the top to hang
the antenna with and one on
the bottom to attach a weight
to straighten it out if the
antenna resists
uncurling.

Remove bits of wire from
the notch

A. Overall cutting length
B & C - top and bottom of
first notch. Cut away
plastic with a sharp knife.
I used an Olfa box cutter
type knife. Cut the wires
at the top of the notch at "B",
pull them down so they
overlap and then solder at "C".
I use a special diagonal
wire cutter that has sharp
ends on the cutting
surfaces allowing me to
reach in and cut wires that
are somewhat recessed.

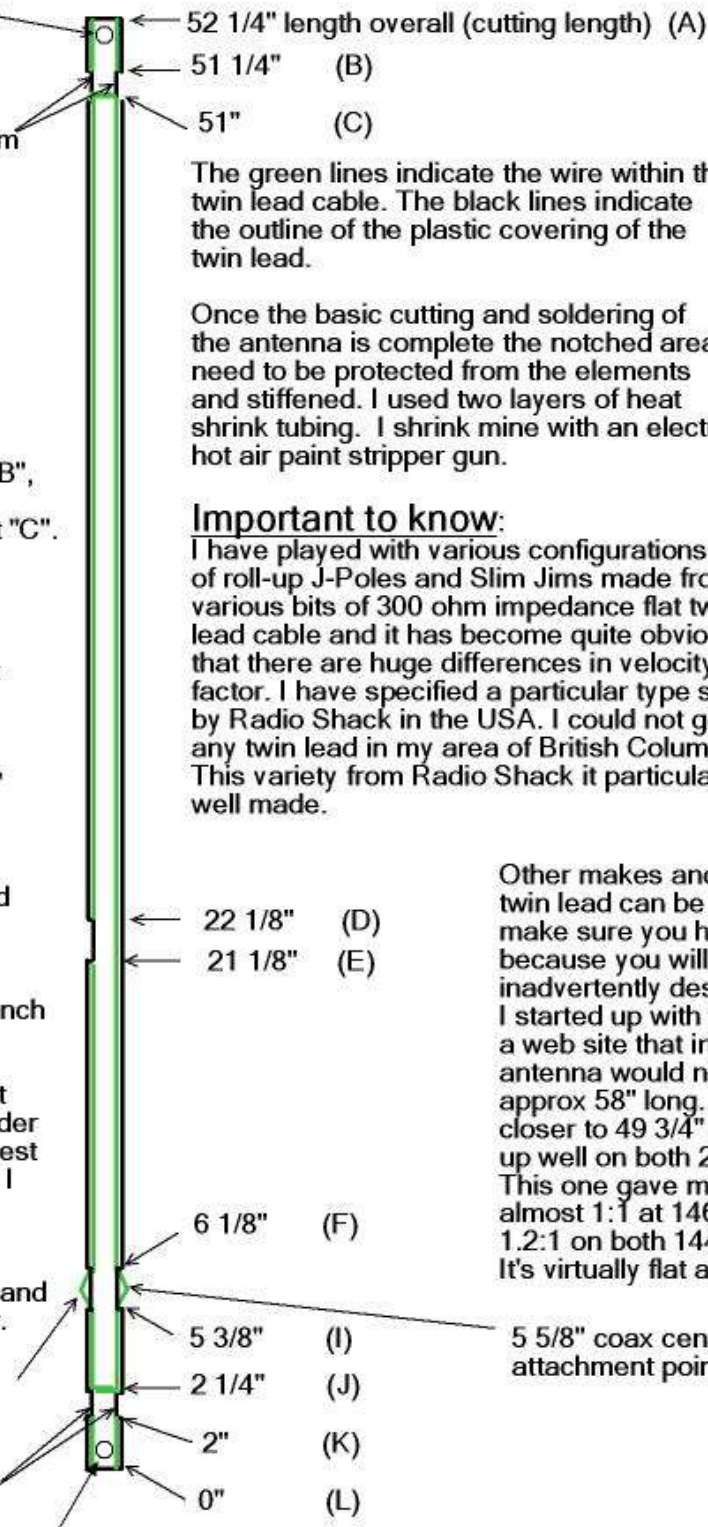
J & K - Same idea as B & C
except cut the wires at "K"
at the bottom of the notch
and solder at "J".

D & E Cut away the plastic and
remove a 1" long piece of
wire from one side only.

F, G, H, & I - Remove half an inch
of insulation exposing the
wires. Carefully bend the
wires out about 1/8" without
breaking them. Tin with solder
and attach the coax. I suggest
RG-58 for runs under 20 ft. I
use my slim jim with a
hand held radio with SMA
connectors and so install a
BNC connector on the end and
use a BNC to SMA adapter.

Coax braid connects
to this point (H)

Remove bits of wire from
the notch



The green lines indicate the wire within the
twin lead cable. The black lines indicate
the outline of the plastic covering of the
twin lead.

Once the basic cutting and soldering of
the antenna is complete the notched areas
need to be protected from the elements
and stiffened. I used two layers of heat
shrink tubing. I shrink mine with an electric
hot air paint stripper gun.

Important to know:

I have played with various configurations
of roll-up J-Poles and Slim Jims made from
various bits of 300 ohm impedance flat twin
lead cable and it has become quite obvious
that there are huge differences in velocity
factor. I have specified a particular type stocked
by Radio Shack in the USA. I could not get
any twin lead in my area of British Columbia.
This variety from Radio Shack it particularly
well made.

Other makes and models of
twin lead can be used but
make sure you have extra
because you will end up
inadvertently destroying some.
I started up with a plan from
a web site that indicated my
antenna would need to be
approx 58" long. Mine is
closer to 49 3/4" and it tunes
up well on both 2m and 70cm.
This one gave me an SWR of
almost 1:1 at 146 MHz and
1.2:1 on both 144 and 148 MHz.
It's virtually flat at 440 MHz.

5 5/8" coax centre conductor
attachment point (G)

Punched hole

Radio Shack 300 ohm flat twin lead cable Catalog #: 15-1175