

THE 2 METER SLIM JIM
COPPER TUBING
ANTENNA PROJECT
BY RICHARD
KE5FXU

(Credit for the original design goes to F.C. Judd, G2BCX)
Get that signal lower to the ground for better performance!

Why is the Slim Jim so much more efficient than the popular 5/8 wave or other ground plane antennas, despite the latter's claimed 3dB over a dipole?

The Slim Jim vertical angle of radiation is almost parallel to ground so maximum radiation is where it is needed: straight out and in all directions!

The vertical angle from the Slim Jim is about 8 degrees, while the common 5/8th wave ground plane antenna is about 32 degrees. With all ground planes, including those with radials a wavelength long, the vertical angle radiation is tilted upwards at an angle of 30 degrees or more.

This gives the Slim Jim a gain over a 5/8th wave of about 6dB when measured parallel to the ground!

Presented below is the Copper Slim Jim antenna project for 2 meters built by a new ham....KE5FXU.....RICHARD BUSH for your enjoyment.
Congratulations "Rich" on the new ticket and this fine Slim Jim antenna project!....N4UJW

2 Meter Copper Slim Jim Antenna Project
By Richard Bush KE5FXU

I have been wanting a " Ham ticket " for a long, long time !!
I met Don (N4UJW) about a year ago, and he persuaded me to get very, very interested in HAM RADIO, as a result, I received my Technician ticket and call sign, KE5FXU, in September of 2005!!!!. WOW!

I visited Dons' web site (Hamuniverse.com) and picked out the 2 Meter Slim Jim antenna project from the antenna project page and wanted to build it from copper tubing. I wanted to have it finished to use as a base antenna by the time I got my ticket !!

The bottom line is that the antenna works GREAT, except for one thing.....
I have too many trees !! They seem to attenuate the distant repeater signals a bit. My antenna " farm" is totally (including overhead) surrounded in all directions by a dense cover of tree trunks, limbs and leaves in assorted sizes and a couple of curious raccoons and a cat or two that helped in supervising the installation of

the antenna! (See picture below)

The trees were in full foliage when the antenna went up attached to the upper end of a 20 foot section of PVC pipe.
Now that the leaves are starting to fall with cooler weather setting in, I expect that the distant 2 meter repeaters will be stronger on my brand new Icom IC-V8000. I had a lot of trouble [programming it](#) but that is another story!

Construction of the 2 Meter Copper Slim Jim Antenna ([Slim Jim details here](#))



Completed antenna on left and shown standing in front of standard size door

The construction is really simple.. If you can sweat a copper joint, you will not have a problem (some of you may need help with reading a tape measure, using a tubing cutter, etc). The dimensions are not that critical, except for the finished length (58 ")..

MATERIAL LIST (ANTENNA ELEMENTS)

Antenna elements are 1/2 inch copper tube

I started with two sections of copper tubing 6' long purchased from Lowe's. You can get all of the sections for the Copper Slim Jim antenna from these with very little waste.

long side 56 1/2 " - 1 each

1/2 wave 36 1/4 " - 1 each

1/4 wave 18 1/4 " -1 each

1 3/4 " sections -2 each (these two pieces determine the width of the antenna, 2" center to center, one at the top and one at the bottom of the slimjim)

90 degree elbows - 4 each

End caps - 2 each (Install on the tubing ends at the air gap to keep out water)

FINAL lengths should be near or as close as possible to 58 inches long, end to end, with about 2 inch spacing center to center between both vertical elements at top and bottom. Insulated separators made from wood or other material are used between elements at top and bottom for mechanical stability. See completed antenna elsewhere on page.

The SWR "Adjuster"







Adjuster mounted on Slim Jim

Editors note.....this is a very novel idea from Richard, KE5FXU, for adjusting the swr during the final stage of tuning the copper slim jim antenna. It can be either

left on the antenna permanently or just used to find the attachment points of the coax for direct connection (solder) if you decide not to use it. You just attach your coax to the wing nuts and slide up and down!

SWR ADJUSTER PARTS LIST:

wood- 3/8" x 1" x 4" - 2 each

spacer 1" x 1" sq. - 1 each

carriage bolts: (galv. or plated) weather proof !!
(Flatten heads with file for better contact)

1/4"x 1" bolts - 2 each (these 2 bolts come up thru the bottom of the top piece of wood, all of the wing nuts are on top.)

1/4" x 1 3/4" bolt - 1 each (center hole)

1/4" flat washers - 3 each

1/4" wing nuts - 3 each

Total cost of antenna around \$13.00 U.S as of November, 2005
(no charge for labor...HEE HEE)

The adjuster is simple to make. It is two pieces of wood with a 1 inch square spacer in the middle. (See picture) I used some scrap oak flooring. Drill a 1/4 inch hole in the center of all three pieces. Glue the spacer in the center of the bottom piece. In the top piece, drill two 1/4 inch holes that coincide with the center of each piece of copper (with the long element on the left and the 1/4 wave element on the right). The 1/4 wave side is at the bottom of the antenna.....The coax connects to the adjuster bolts, center wire on the left, shield on the right..... Approximately 3 to 4" up from the bottom of antenna. The adjuster is moved up and down to find lowest swr point during tuning. Make sure you tighten the wing nuts each time you take an swr measurement and then loosen and move in either direction if more adjustment is needed. (Use LOW POWER)

If you take a good look at the picture of the adjuster, you can see the marks on the copper tubing where the coax could be soldered directly to the tubing. I decided to leave the adjuster on as a permanent fixture of the copper slim jim but you don't have to if you solder the coax connections directly to the antenna . This adjuster really helps in tuning this antenna and could be used on other antenna projects such as J poles or similar antennas. The final, installed swr

measurements using 50 feet of Rg8 coax feed line (taken with an MFJ 259b) were as follows:

Final installed SWR readings with top of antenna 20 feet above ground:

144mhz	1.6
145mhz	1.4
146mhz	1.2
147mhz	1.1
148mhz	1.1

These measurements indicate that the overall length is a bit short with swr lower at the higher end of the band but the length was not changed. The antenna length could be altered a bit (longer) for a bit better performance in the mid band region by closing the air gap slightly.. GOOD LUCK !!

Update - - Further testing and design with an [aluminum version](#) with a 1 inch gap works well. *Your results may differ depending on your construction.*

If you decide to build this antenna, please let us know your results. Any comparison results with any other 2 meter antenna would be greatly appreciated.

Please send them to n4ujw at hamuniverse.com

See additional final installation picture below:



Proud builder and Crew!

Antenna is located between red and yellow arrows in picture above mounted on PVC pipe. It is not certain which of the characters in the picture is Richard!

Optional suspenders and T shirt were missing when the picture was made so this makes identification more difficult!