

## How To Build A Tuned Folded Dipole Antenna for 93.9fm.

1) Figure out the size of the wave that the radio transmits.

Wavelength=Speed of wave/Frequency

WL=300,000,000metres per second/93,900,000waves per second

WL=3.19M

2)Find  $\frac{1}{4}$  wave length

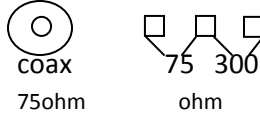
WL/4 so  $\frac{1}{4}$  wave=.79m

3)Multiply by the velocity factor of the conductor (copper)

.79 x .95 = .758m or **76cm** this is the  $\frac{1}{4}$  wave dimension we need for 93.9fm.

4) If at home you can receive the radio, but it is scratchy, then your new tuned antenna can go in your house, or perhaps on your roof. If you cannot get the radio (because fm transmits line of sight), then you will need to put your antenna up in a tree. In order to connect your antenna to your radio, you will need to make a transmission line and figure out 2 things, 1) how long of a transmission line you will need, and what type of connection your radio has for an antenna's transmission line.

Here is a typical back of a radio:



So more theory on transmission lines:

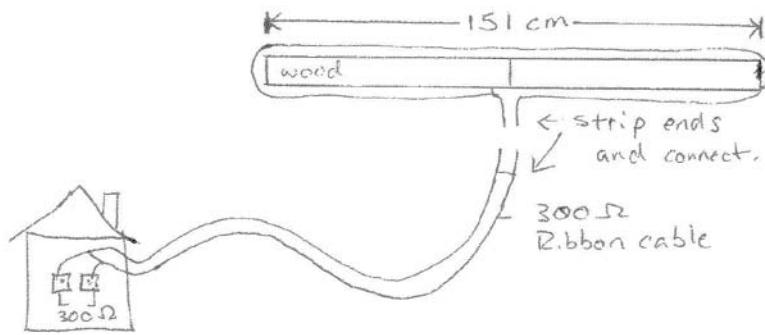
Household coax cable is typically 75ohms, while the older ribbon cable is 300 ohms. A folded dipole antenna is 300 ohms, and a plain dipole is 75 ohms. As you guessed you have to **match the two (antenna and transmission line)**. Food for thought, ribbon cable has less line-loss than coax, meaning if you need to run 100' transmission line, ribbon will be your better choice.

Regardless of what you choose, you can use a "balun" to convert from 300 to 75 ohms.

Antenna build time: See next page for drawing.

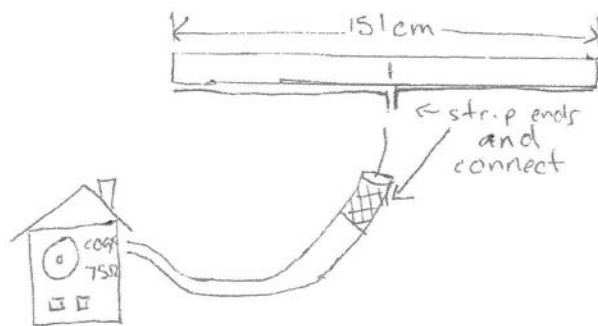
- 1) Cut a piece of wood or similar to the  $\frac{1}{2}$  wave length - 151cm, mark the middle, and round the ends.
- 2) Wrap your antenna material around the wood, with the ends terminating in the middle.
- 3) Secure the antenna to the structure.
- 4) Connect your transmission line preferably with solder and seal from elements.
- 5) Run transmission line to radio and connect in the appropriate manner.
- 6) Secure the antenna in a horizontal plane at your predetermined location.
- 7) Tune in to 93.9fm, and let the HI-FI dance party begin.

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300  $\Omega$   
Folded Dipole  
for 93.9 fm

Remember you can use a balun  
at the connection point to  
match antenna to transmission



75  $\Omega$   
Dipole for  
93.9 fm

Other useful links:

<http://users.wfu.edu/matthews/misc/dipole.html>

[http://files.radioscanner.ru/files/download/file311/practical\\_antenna\\_design.pdf](http://files.radioscanner.ru/files/download/file311/practical_antenna_design.pdf)

[http://www.w8ji.com/quad\\_cubical\\_quad.htm](http://www.w8ji.com/quad_cubical_quad.htm)

Wikipedia search dipole antenna or folded dipole.