

Here is the list of parts needed to build your own Quarter Wave Ground Plan vertical antenna:

- SO-239 connector (Radio Shack)
- 20 ft. 14 GA Romex wire (Home Depot)
- qty. 4 (4-40 stainless screws) (Home Depot)
- qty. 4 (4-40 stainless nuts) (Home Depot)
- At least 20 feet of 50 ohm CB Antenna coax (WITH PL259). Get it at Radio Shack or a truck stop; they are big CB fans and the stops sell this cable with the PL259 already installed.



This is the first thing you will need to build a Quarter (1/4) Wave Ground Plane antenna. It's called an SO-239. You can pick one up at Radio Shack or your favorite Electronic Supply. You might want to get a couple of them just in case you damage it on the first try. I don't recommend soldering the ground plane radials. Instead use 4-40 bolts (Home Depot) and the 4-40 nuts to fit them.

Before you attach any antenna radials, you will need to find an empty FM Frequency before you measure and cut your radials.

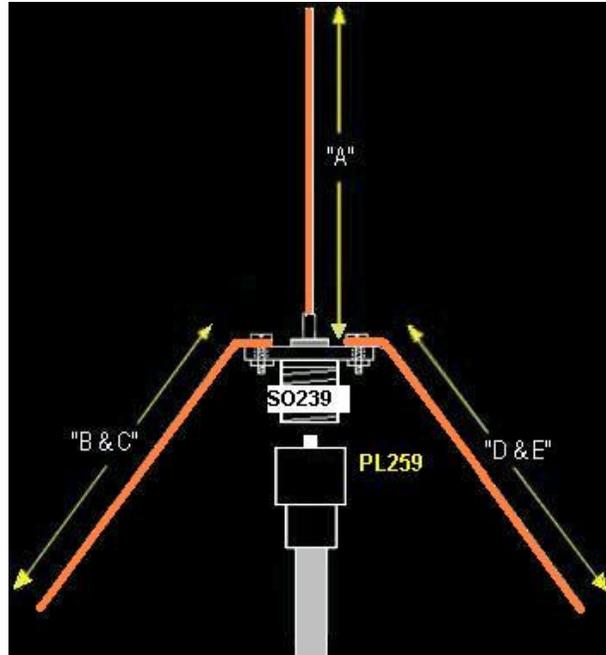
Go here to find empty slots here: <http://www.radio-locator.com/cgi-bin/vacant> and follow the instructions.

Here is what your antenna should look like when you are done with it. This is really easy compared to what you already do with lights.



How do you figure out what length to cut the transmitter and 4 ground planes after you find an empty FM frequency? Download this and it will automatically calculate it for you.

<http://www.diy-light-animation.com/wiki/images/8/82/N2imfcalculator.zip>

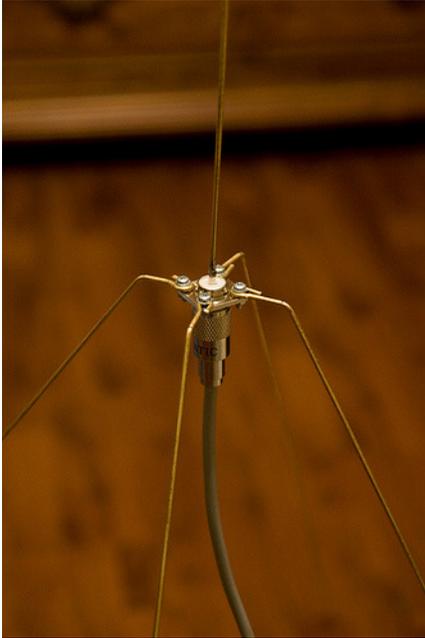


You don't have to strip all the Romex if you don't want to for the B&C/D&E. But you should have no insulation on the areas where you connect the wires to the SO239. I used the already bare ground wire for my Radiator (A).

Make sure you put a sharp bend at the top of the antenna radiator so you can hang it. Make sure the bend touches the radiator at the end of the bend. This tricks the radiator into thinking there is no bend in it. Yeah, the antenna has a mind and it can think. :-). Make sure the total length of the radiator (with the bend) is per the calculated length. Don't measure it out and then bend it to short.



Hang your completed antenna using a non metallic material from a light fixture or ceiling hook no less than 5 inches from the fixture you hang it from. I use cable zip ties. As long as you don't use wire you won't have any problems.



Now go to Radio Shack or a Truck Stop and buy at least 20 feet of 50 Ohm (CB coax) with the PL259 connectors already installed on both ends. Plug one end into the antenna, and you will have to also buy (Radio Shack or your favorite electronic supply store) the adapter(s) so you can plug the other end into your FM Transmitter. Take the transmitter with you and get help to make it work. Radio Shack has everything you need to make the transition from PL259 to whatever you have. Since I don't know what FM transmitter you have I can't be much help here.

In my case I had to adapt my Coax PL259 down to a plain old RCA plug and it was easy.

I guarantee with this antenna, you will get clear transmission. On my FM Transmitter, I have the ability to adjust the output wattage. I adjusted mine down to (1 mW) its lowest setting and I easily cover 400-500 ft. The sound is just as good as any professional radio station. If your transmitter is set at 10 mw or higher levels, you can pretty much guarantee you are out 1/4 mile or more. You don't want that!

Because you cut and measured your antenna for the frequency you are broadcasting on, the antenna is already as matched as you need. You will not be out of spec for your FM transmitter if you followed these instructions.

If you can't adjust your output down inside your transmitter, you will need to attenuate it. For every 3 db attenuator you will cut your output by 1/2. So, if you are transmitting 30 mW, when you put a 3 db attenuator on, it will be 15 mW. If you put a 6 db attenuator on, it will be 7.5 mW and so on.

Mill Watt	db Attenuator	Reduce 1/2 Power	Cum db	Percent	Log	Cal db
5000.00	3	2500.00	3	50.00%	-0.301029996	3.010299957
2500.00	3	1250.00	6	25.00%	-0.602059991	6.020599913
1250.00	3	625.00	9	12.50%	-0.903089987	9.03089987
625.00	3	312.50	12	6.25%	-1.204119983	12.04119983
312.50	3	156.25	15	3.13%	-1.505149978	15.05149978
156.25	3	78.13	18	1.56%	-1.806179974	18.06179974
78.13	3	39.06	21	0.78%	-2.10720997	21.0720997
39.06	3	19.53	24	0.39%	-2.408239965	24.08239965
19.53	3	9.77	27	0.20%	-2.709269961	27.09269961

Christmas.Joe
 Calculated Proof that for every 3 db you will reduce by 1/2 power.

Make sure your Attenuator is rated at the max watts and ohms your transmitter is rated at.

You can simply keep adding them in series to get the power you want. Or you can just buy the db Attenuator you need for the desired output.

Examples of what an attenuator looks like.



This little gem should be put as close to the antenna as possible. You can try putting it close to your transmitter, but it may cause interference. If you buy a good one it shouldn't matter.

One more final thought. If your music sounds distorted, it's because of your music file or you are either pushing from the Computer too much out of your line out (the green socket on your sound card) and that will cause distortion. Go to your sound configuration utility and turn down your speaker volume to no less than 75% and no more than 80%. If that don't work, then your music file is out of spec for your transmitter and that is a total different topic that is beyond the scope of this instruction.