

Low Cost Good 2m 146 MHz Droopy Ground Plane

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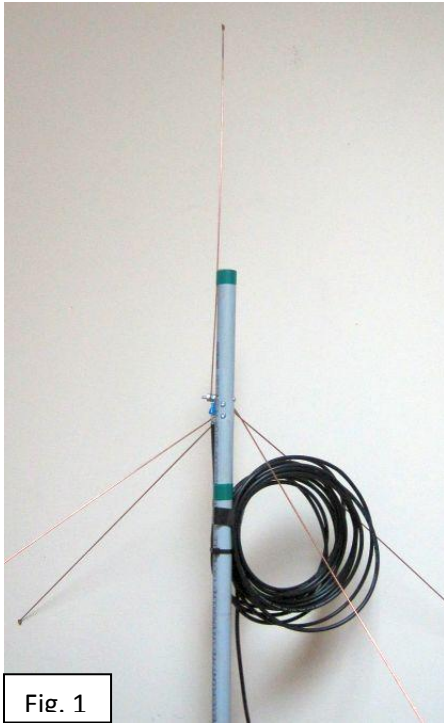


Fig. 1

This ground plane antenna is pretty basic. It is not a high gain antenna but more like a dipole, the radials acting as half the dipole. The virtues of this type of antenna are: it can be made to have a perfect match of 50 ohm impedance, it is relatively short and can fit inside most attic spaces and so is useful in restricted subdivisions. Generally the vent stack for the bathroom is at the rear of the house and so this may be able to be fastened to it and not attract the gaze of the neighbours as it has a pretty slim profile. By painting the antenna and coax the right color the antenna can virtually disappear so may be considered to be a stealth antenna. People often run the coax from stack mounted antenna through a roof air vent into the attic then through a small hole in the ceiling of a closet, etc.

Materials:

1 length of $\frac{1}{2}$ " diameter gray PVC electrical conduit cut to the desired length to suit your needs. You could use white PVC if the antenna will be indoors, gray PVC conduit has UV inhibitors so can be used outside. See the note regarding the PVC pipe in Fig. 12.

5 each standard 36 inch $\frac{1}{16}$ " copper coated steel welding rods . Other materials will also work such as wire coat hangers, uncoated brass brazing rod , etc., depending on the environment where it will be used (wet outside, dry inside).

3 each #6X32 $1\frac{1}{2}$ " machine screws , 3 each #6X32 nuts and 5 each washers in steel, brass, stainless steel depending on the environment.

Coax cable:

Coax: how long is the run to your radio? If it is only about 20 feet then RG-58 is cheap and probably adequate. If longer then go for something better such as RG-8 mini foam. It has half the loss of RG-58. If a very long run then go for LMR-400 but that will be more difficult to tie down on the terminals. The best thing to do is use a foot of RG-58 with a PL-250 connector on it and an LMR-400 cable with suitable PL-259 and a female/ female thru connector. That will all need to be weatherproofed. You will need to purchase a suitable connector for the far end of the coax so that it can be connected to your radio

Sealant to seal the coax from having moisture leak in. A good quality silicon sealant would be an excellent choice.

Two blue wire ends with holes sized to accommodate # 6 screws (see fig 11).

Instructions:



The elements all start out by having a triangular loop bent into the ends and then a drop of solder to close the gap so the loop is not seen as an inductive coil. The reason is to make the wire ends safer, especially for the eyes.

Preparing the Coax for Installing the Wire Ends:



Remove one inch of outer insulation, exposing the braid underneath.



Braid pushed back (bunched up).

Fig. 4

Use the pointed end of a pen or small screwdriver to open up a window in the braid exposing the plastic insulation over the centre conductor. Try to not break the strands in the braid.

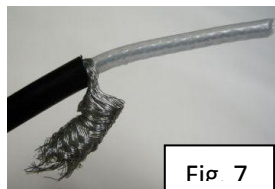


Fig. 5

Use the same pointed tool to dig through between the braid and the inner insulation and pry out the centre insulation and wire.



Fig. 6



The centre conductor with insulation.

Fig. 7

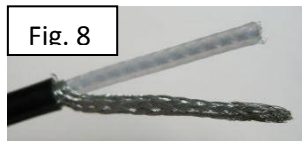
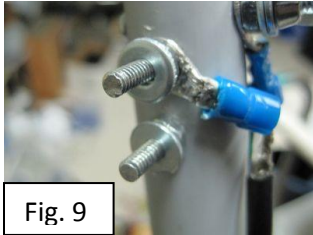


Fig. 8

The two conductors ready to be prepared to be attached to blue wire ends. Cut the braid back to just long enough to fit it into place in a blue wire end (about 1/2" of braid), see fig 9. Remove approx 3/8" of insulation off the center conductor and place a wire end on it as in fig 9. Please

note that whatever length that is exposed beyond the end of the outer insulation becomes a part of the antenna dimensions. Longer length at the connections means shortening the stinger will be required.



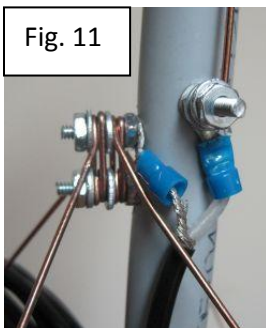
The screws are through the PVC pipe and the wire ends on the end of the coax with one nut tightened on and a first washer in place.

I suggest cutting the braid about 1/4" shorter than the centre wire because the braid goes to the radials which attach lower on the mast.



In this photo the radial elements have been cut. I started by adjusting the length and then bending the last part of the wire over the top screw. Re-measuring, and correcting where necessary, then bending around the bottom screw and cutting off the excess. Note in Fig. 12 that the length is measured from the center of the screw to the end of the radial.

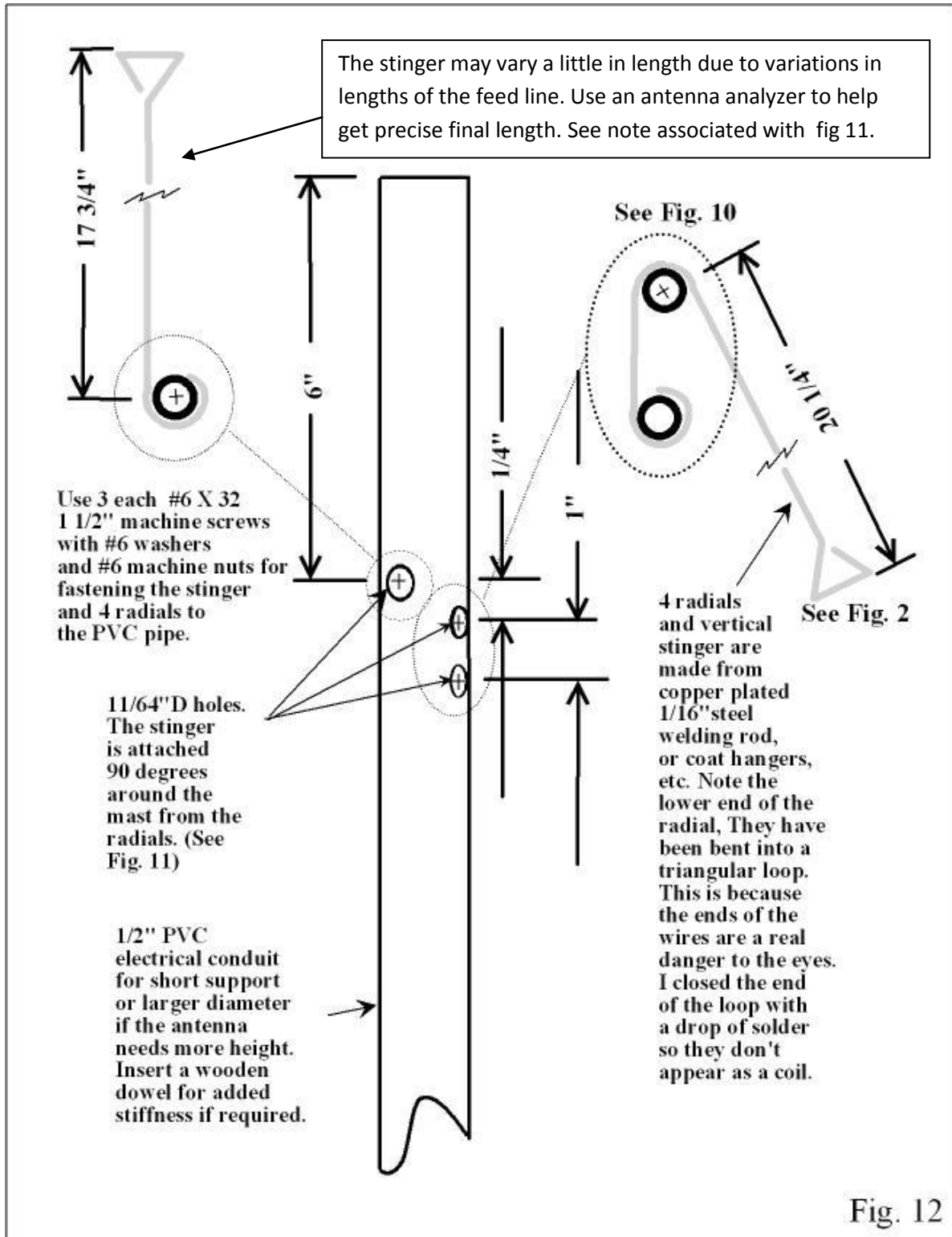
I then removed the radial and copied it three more times.



In this photo all of the radials are on. I laid them on one right, one left, washer, one right, one left, final washer, and then a nut tightened up over them. The radials are bent about 45 degrees off vertical and the rear two bent backwards and the front two forwards in a square sort of pattern (a radial every 90 degrees). **Note that the braid exposed in fig 9-11 is really too long. It should have been shortened to about 1/2" long so the braid is not visible in the photo. Just long enough to fit into the blue wire end. I suggest soldering the wire end in place rather than crimp it.**

The driven element (stinger) is similarly mounted to the upper screw . Put in screw, put on first nut and tighten. Put on stinger, washer, and final nut. I put two wraps of tape around it at the top of the mast until finished and then put a black zap strap over top of it.

After assembling the radials I put a zap strap around the coax about 6 inches below the screws. All of that to make sure everything stays in place and no undue stresses can be accidentally put onto the connections.



Note: This antenna can be used as a take-apart one that can be pulled down and stored in a tube for transport or put into a grab-and-go kit. The changes are simple to make. Substitute 2" machine screws for the 1 1/2" ones. Substitute wing nuts for the outer nuts that hold the driven element and radials in place. The two screw holes for the radials were spaced only 1/2" apart in the original build so that's what you see in the pictures on the previous pages. I have increased the space to 1" so that wing nuts could be used. The additional space gives more room for finger tightening the wing nuts. The antenna can be supported by a string tied to the loop at the end of the driven element or a series of PVC pipes and joiners and some sort of base from below.