

2M DF Antenna



Written by Chris - KC0TKS
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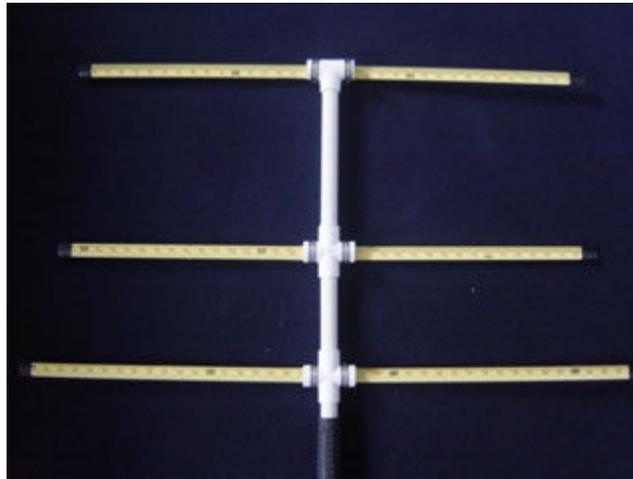


Fig. 1 - The 2M DF antenna

There are many uses for a hand-held direction finding antenna. Locating hidden transmitters during a fox hunt, tracking down harmful interference, figuring out which tower a repeater is on, finding the source of power line noise and the list goes on.

Presented here are plans for building a nice, simple, nearly unbreakable, 2 meter DF yagi that you can build in an afternoon for just a few dollars. Most people will have at least part of it laying around the workshop but even if you have to buy all of the parts, it's still in the neighborhood of 15 bucks!

The elements are made from pieces of 1" wide steel tape measure blades which makes it almost indestructable. You can run through the woods with it, or use it indoors without the fear of bending or breaking the elements. They are attached to the PVC fittings using hose clamps.

The 'hairpin' match gives a 1.5:1 or less SWR across the band so the antenna can be used for transmitting as well as receive.

I modeled this antenna on 2 different programs, one showed around 7dbi gain and a 50db front/back ratio. The other showed a little over 8dbi gain with around 30db f/b. The elements being flat instead of tubular make antenna modeling programs go bonkers sometimes! Either way, it works great for me. I am working on an attenuator for doing close-in hunting and when it is done I will post plans for it here too.

You will need:

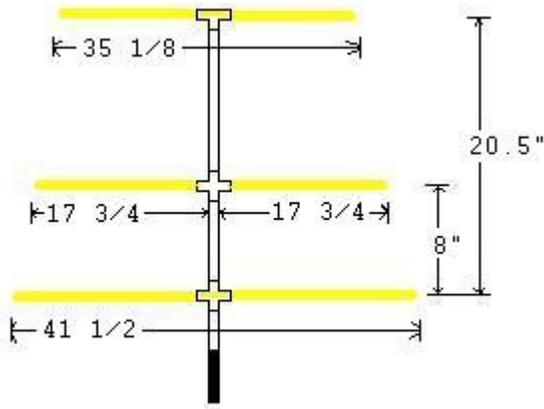
- A 1" wide tape measure at least 10 feet long (I bought a brand new 25' one for \$4.99)
- 2 feet of 3/4 inch PVC pipe
- 2 - 3/4" PVC crosses
- 1 - 3/4" PVC T
- 6 - 1 1/4" Hose clamps

A 6" long piece of #12 copper wire
A bicycle handlebar grip
A scrap of RG-58 coax
Your favorite connector

As you can see in **figure 1**, there are 3 elements. Starting with the one closest to the hand-grip you have the reflector, the driven element and the director.

1. The *reflector* is 41 1/2" long. It is the longest of the three. All position measurements are taken from the centerline of this element down the boom to the centerline of the next element, they are not the spacing between the edges of adjacent elements.
2. The *driven element* (DE) is 36 1/2" long tip to tip which includes the 1" gap in the center as shown in **Figure 2**. Therefore, the length of each half is 17 3/4". The DE's position is 8" from the reflector (positions are all center to center).
3. The *director* is the shortest of the three at 35 1/8" tip to tip and is spaced at 20 1/2" from the reflector.

The only element that is broken in the center is the driven element. The others are continuous.



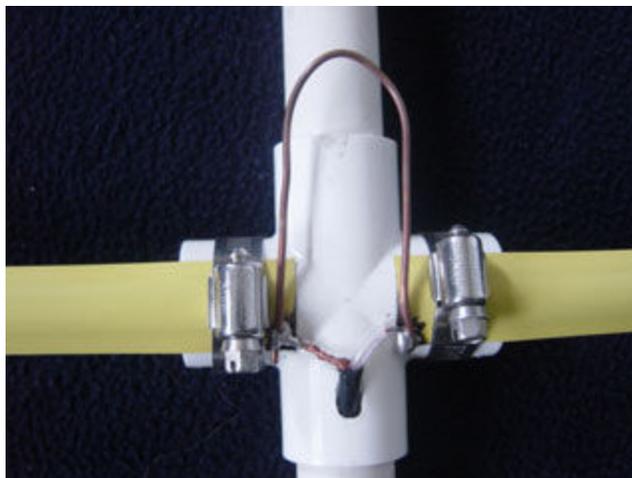


Fig. 2 - The driven element & 'hairpin' match

The hairpin match is simply a 6 inch piece of # 12 copper wire bent into the shape shown in **Figure 2** with the sides approximately 1 1/4" apart. It and the coax are soldered directly to the corners of the driven element and that is all there is to the match. Mine tuned <math><1.5:1</math> on the first try but you may have to experiment with the length of the wire or the width of the hairpin.



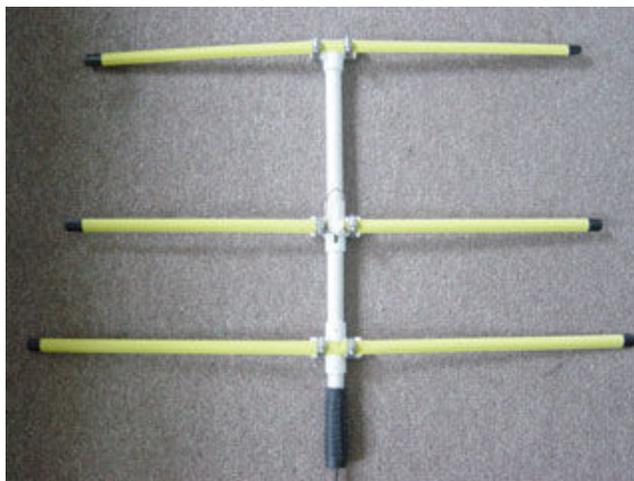
Fig. 3 - Tips of the elements, rounded & coated

The tape measure elements are very easily cut with scissors. They are very sharp and pointy so be sure to round the corners as shown in **Figure 3**. Also, to prevent cuts, it is helpful to wrap the tips with electrical tape or, like I did, dip them in Plasti-Dip. Plasti-Dip is a liquid plastic like what the handles of pliers or wire-cutters are coated with.

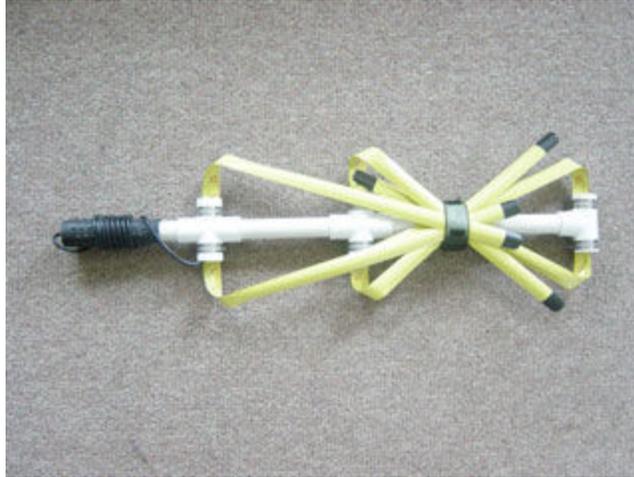


Fig. 4 - Coax routing and hand-grip

Shown here in **Figure 4**, I drilled a hole in the pvc cross that the DE is mounted to so I could run the coax through the boom and out through a hole in the hand-grip. This isn't mandatory but makes for a nicer looking antenna. Also note in this picture that the reflector is a continuous piece of tape measure, the DE (far right) has a 1" gap in the center. The director (not shown) is also continuous.



The back side



Folded for storage