

2m Tape-Measure Yagi

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There are about as many variations on the 2-meter tape-measure yagi as there are Hams. But in this short paper, we will discuss a few of the more popular ones.

First, you must have or cut up a 1" wide tape measure, that has at least 9.3 usable feet. That means, any kinks or bends or tears must be positioned such that you can secure the following lengths: 41 3/8", 35 1/8", 17 3/4" and 17 3/4"

You will not want to use a 1/2" or 3/4" tape measure to cut these metal elements as they will not stand on their own. They will fold over or kink in the breeze. The cut ends will be sharp!

Second, you'll want to decide if you are making the mast or "spine" of the antenna out of 1/2" PVC or 3/4" PVC pipe. The difference in cost becomes remarkable when purchasing the 4-way cross connectors. Both 1/2" and 3/4" pipe and fixtures are commonly available. The pipe will often come in 10ft lengths, or 2 ft or 5 ft. An ideal length is 3 feet as we shall see.

The first length of PVC to cut is 11 1/4" which fits between the T-fitting and the first cross. When inserted, the distance between the center of the two junctions is exactly 12 inches.

The second length to cut is 6 7/8" which fits between the 2 cross fittings. When inserted, the distance between the two junctions is 8 inches. I think you can see why the 2ft length of raw pipe would not be enough. Whatever remains after cutting these two lengths becomes your handle or mast.

Next, the metal director element (35 1/8" long) and the reflector element (41 3/8") are normally held to the exterior of the pipe fittings by 1 1/4" metal hose clamps. Normally 6 are needed for each antenna, and they are sold in bulk at 10 per package. However, a recent idea has caught hold. These two metal elements may be inserted through the INSIDE of these two fittings and then held in place by the tight fitting of a 1" length of pipe used as a plug. They fit very tightly and may not want to be removed, so position your tape element very carefully before inserting these plugs.

This reduces the number of hose clamps needed to two. They are used to clamp each of the 17 3/4" driven elements to the outside of the middle cross fitting. We sand about a 1/2" of paint off the ends of each of these elements that are closest to PVC spine. This bare metal makes for a good solder feed point or clamping under the hose, metal to metal. This is also the point where a 5" jumper wire is soldered, connecting the two halves into one element.

Now, I have heard that it doesn't matter what type of jumper wire is used, and some have suggested that it can be eliminated with no effect on the antenna. I have always added one. But it should be noted that these four solder points become the weakest link in this antenna. Always check them for good connection before deploying the antenna.

You may be wondering how long a coax length is needed, and if RG-58 is the only type. A good starting length might be two feet, especially if it has a commercial connector attached. However some Hams prefer to wind an 8 turn balun in the coax around the mast (spine) immediately after the feed point. At first, it can be held by duct tape, but that always slips and gives way. The more permanent solution is to drill a hole completely through the PVC pipe to fit the coax end through. Then tightly wind 8 turns around the pipe before drilling a second hole through the pipe. This holds a nice tight balun in place and relieves strain on the feed point. Of course, if you are installing a connector on the end of your coax, you can run whatever length you would like.

However, most experienced FoxHunters prefer to place an in-line attenuator between their HT and the yagi antenna. This can be as simple as flip switches to add attenuation and dampen the signal, or an off-set attenuator to shift the frequency. Of course, any attenuator inserted will need a jumper to mate with the coax connector already installed.

NEVER TRANSMIT WITH AN ATTENUATOR INSTALLED IN-LINE. The attenuator is for cutting down the received signal from the antenna into the radio receiver. Damage will result if you attempt to transmit with an attenuator in line with your antenna!

The exact lengths of your metal tape measure elements will be determined by the specific frequency that you will be operating. If you know your receive frequency, you can almost tune your yagi to better reception, but a standard length (given above) will put you in the right 2 meter band. Every Ham has a different opinion on the exact lengths of the PVC as well as the metal elements.

My recommendation is to start with at least 3 feet of PVC, so that two feet will be involved in the mast or spine and another 4 inches of 1" plugs can be cut. The remainder becomes your handle and can be hand held or mounted on a verticle mast for more permanent mounting.