The MM5WIG 14MHz Antenna

Ian Macdonald MM5WIG describes the reasons behind his single band antenna, and how he achieved the parameters required.

Having tried, both a Carolina Windom and a W3DZZ as my Amateur Radio station multi-band antennas, I've found that they both performed very well. However, I also found that they were much more suited to the 3.5 and 7MHz bands. They also tended to produce some local TVI below 7MHz.

Multi-band antennas are always a compromise, some better than others. After I'd spent some time trying to cure the TVI problems, I decided that what was really needed was a dedicated dipole to work on 14MHz allowing the XYL to watch TV of an evening without picture patterning.

I love making wire antennas so I thought what I'd like would be an effective dipole that would stand up to the strong winter winds experienced at my coastal QTH. It also had to be reasonably cheap to build - and of course give minimum TVI problems. It should also be usable over the entire 14MHz Amateur band with good matching and low loss.

Resultant Antenna

The 'MM5WIG' as I have called the resultant antenna, is the result of my experiments and I have found to perform better than first expected! Basically it is a 'fat' dipole, a type which has been around for many years but is now largely forgotten.

The MM5WIG 14MHz twin dipole has been designed to meet the following criteria.

- No BCI or TVI
- Good s.w.r. over the entire 14MHz band.
- Good efficiency.
- Medium power rating. (50-100W)
- Robust construction to withstand high winds.
- Easy to obtain components.
- Low cost assembly.
- Easy to construct.
- Easy to feed from any rig.

The type of twin dipole I've made gives much better results all round than the straight single wire variety. When I was a student pilot, they used to say two wings were better than one. (I flew Tiger Moth Biplanes so I agree!).

The antenna is best used with an antenna tuning unit (a.t.u.) but will work happily on most rigs without one but giving slightly less efficiency. If you want a first time low cost 14MHz antenna for that most popular of DX bands then the MM5WIG is for you. It is easy to construct and not expensive.

The first task is to cut the 22mm plastic pipe into the required lengths. From a two metre length, begin by cutting off four lengths of 356mm long (end spacers) and the two of 265mm long (middle spacers). You should only have less than 50mm left as scrap. Cutting is easy with a good hacksaw, but try and cut it square across. File or sand the rough edges.

Drilling Holes

Now refer to **Fig. 1** for drilling holes in the pipe lengths. Carefully draw a straight pencil line with the aid of a ruler down each pipe length. Now measure and mark the holes to be drilled. Holes are all drilled right through the pipes. Use a 3mm wood drill with a hand drill.

The second step is to strip out the red and black insulated wires from the twin cable and measure out four lengths of about 5.2m of the single insulated wire. You'll have two lengths of black and two lengths of red insulated wire. The reason for this start length, is to allow for adjustment during setting up.

The actual theoretical length of each dipole arm is 4.75m from connecting terminal to end of antenna. Though the final length is decided with trial and error testing. Construction is simple and should take around two hours.

Loop one end of your first wire through the second hole from the top of an end pipe and twist to fix. Now slip on your first middle spacer. Finally, the wire goes through the second to top hole of the centre spacer. The end should now be put through the appropriate hole in the 'T' connector mount before you solder or fix a tag to the wire. If you don't have solder or tags do not worry. It will be okay with the nut/washer on the connector.

Now fix the other three wires in a similar fashion. See **Fig. 2** for details of how to construct the centre area. You should hold the middle spacers on the wires as shown in **Fig. 3**. The supporting ties for the antenna and centre mount should be of good strong line or cord. **Do not use wire as a support, as this can react with the antenna itself or cause arcing**.

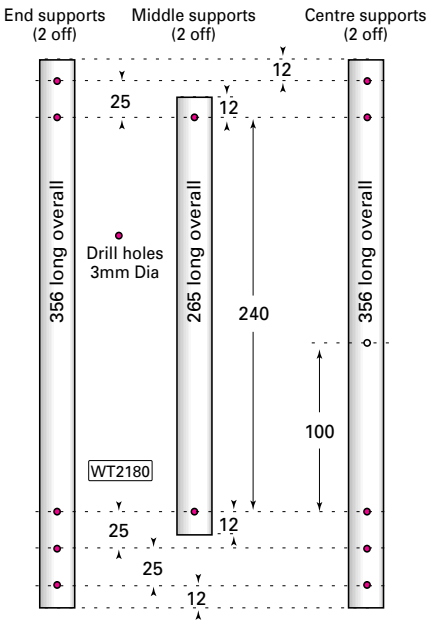
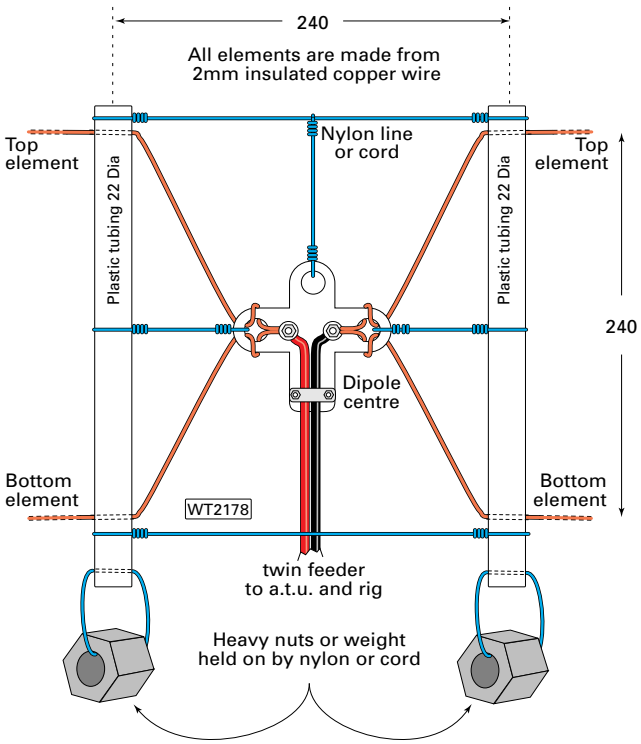
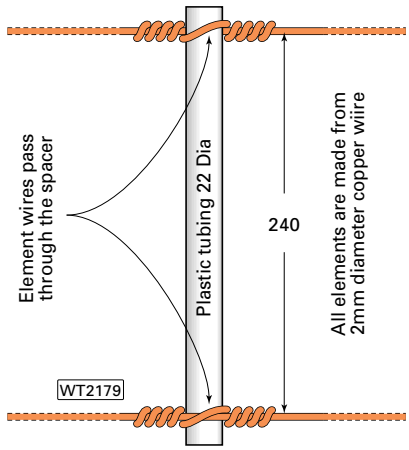
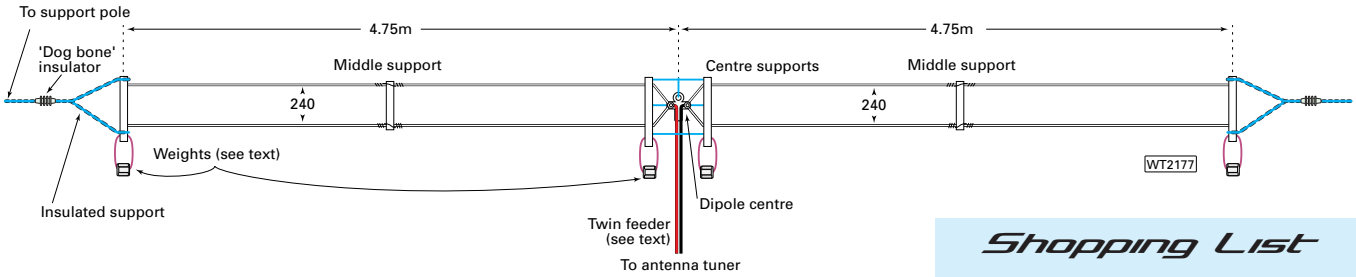


Fig. 1: The drilling details for the thee types of support spacers, all made from 22mm diameter plastic tubing (see text for more details).





- Fig. 2 (left): Detail of the central area of the MM5WIG antenna. Almost any weight may be substituted for the suggested wheel nuts (see text for more details).
- Fig. 3 (above): Detail of the supporting middle spacer and how it is secured in place.
- Fig. 4 (below): The overall look of the MM5WIG antenna.



Wheel Nuts

Tie small wire rings with heavy motor wheel nuts or similar to the bottom holes of the spacers to help the antenna hang vertical to the ground the overall look of the antenna can be seen in the illustration of **Fig. 4**. A 75Ω Twin Feed Line is preferable over coaxial cable, as the feeder from the rig to the antenna.

You can use 50Ω coaxial cable as an alternative, but you must fit a 1:1 Balun if this method of feeding is employed. Please note that TVI problems and poor s.w.r. might persist if coaxial cable is used, as well as adding needlessly to the cost.

The ideal height for the antenna is about eight to 10m above ground but mine works a treat at a little under five metres up. The connecting terminals were coated in petroleum jelly and taped up with pvc electrical tape.

So, having constructed the antenna, how well did it work? The proof of any antenna design is in the operating and use of it! The MM5WIG works very well for such a simple type of antenna.

I used an MFJ-949E antenna tuning unit and the Tuner settings remained the same over the whole band. The 'settings' on my MFJ-949E were at: 'Transmitter' = 10, 'Inductor' = H and 'Antenna' = 9. The tests were carried out at a transmitter output power set to 50W. Setting the s.w.r. at band centre to 1:1, it remained there throughout most of the band, except at the low end where it rose very slightly.

Received Signals

Received signals proved to be very perky and much better than either the Carolina Windom or the W3DZZ antennas. If the s.w.r. varies more than described, above try altering the length of the arms a little at a time to see if it improves. Normally the actual length, when set to 4.75m does the trick and seems to work reasonably well in all cases.

Now for some real 'on-air' tests, rather than just a simple 'how-well-does-it-match' test! My first contact using the MM5WIG antenna was with a G station in Dover. My location is in South West Scotland so, I could work down the length of England well enough.

The second contact using the antenna was with a DL station in Munster, in the middle west of Germany. I had the opportunity to carry out some comparative tests with this station. During tests with the German station, I had much better reports when using the MM5WIG antenna, compared to my signals with the Carolina Windom, which I used as a reference antenna.

The MM5WIG makes an ideal 14MHz QRP dipole if you have limited space. It can even be mounted as an inverted 'V' if you have a small garden. I am looking forward to a happy winter now on 14MHz with the MM5WIG and the XYL says she now loves me again, now the TVI has gone! So, that can't be bad.

The MM5WIG antenna has been used for some months now and worked my first VK in Australia using it with only 30W, North American stations have been workable with only 10W of transmitter power. So, come along all you M3s ... this is proof of the pudding! The antenna does work well and could improve your station if you were to use this antenna on 14MHz!

When you've completed your MM5WIG antenna and have had time to try it out, I'd appreciate hearing your results. You can contact me by E-mail at: **weebooks@globalnet.co.uk** with your reports. Good DX!

PW

Shopping List

- 12m of 1.5mm² flat twin electric mains cable. You may have to buy 'twin & earth' (T&E cable) just strip out the bare Earth wire. You can use 2.5mm² for higher power handling.
- One antenna 'T' centre piece (for twin feed connection).
- Two 'dog bone' insulators (100mm).
- A 2m length of 22mm white plastic overlflow pipe.
- Nylon line or venetian blind cord.
- Some old heavy nuts (the type used for motor car wheels are ideal).
- Required Length of 75Ω heavy duty twin feeder. I've found the soft polythene flexible Black/Red twin used for 12V power supplies is ok.