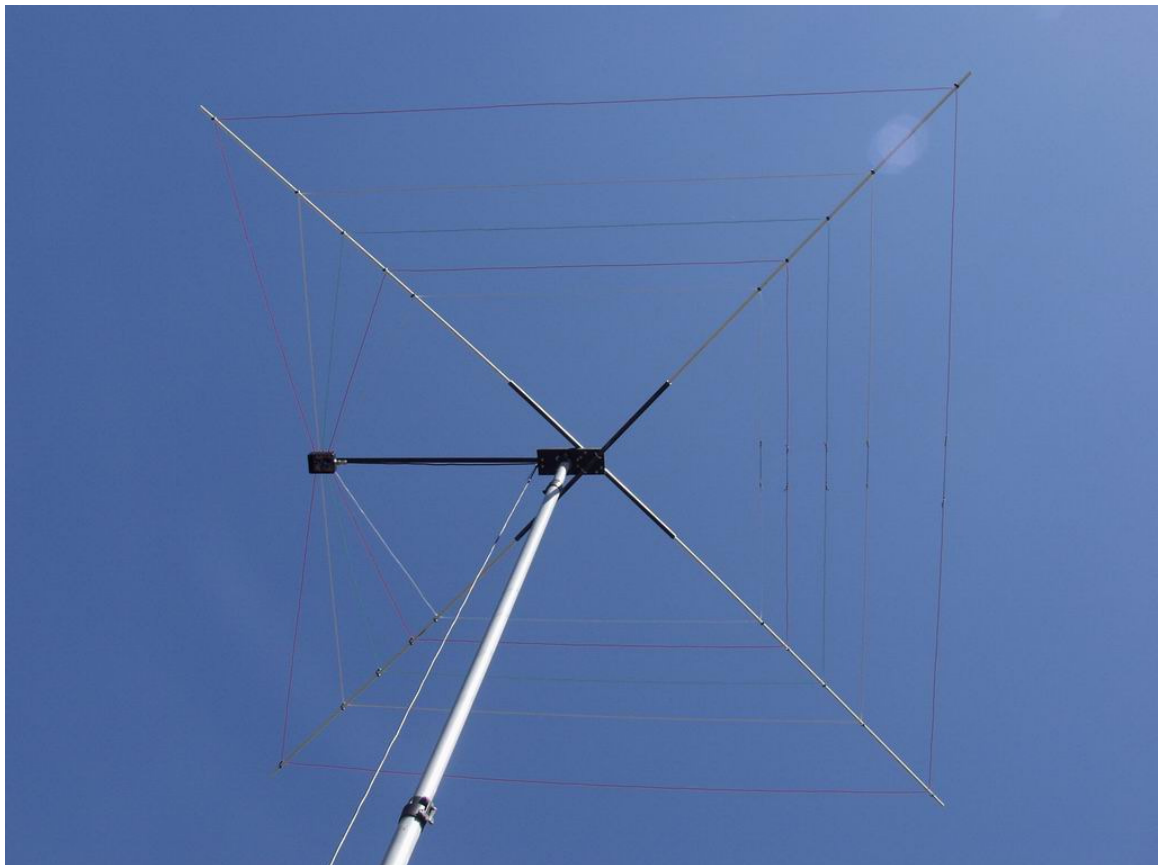




This is my version of the Cobweb HF Antenna originally designed and built by Steven Webb.

Click the link below to visit Steve Webb's website and you can purchase one from here if you do not want to make one.

<http://www.g3tpw.co.uk/index.html>



Buy one or make your own?

For me this was an easy option. Pay £300 for a pre made antenna which still requires to be assembled.....or pay around £80 and have your own antenna made.

LET'S GET STARTED

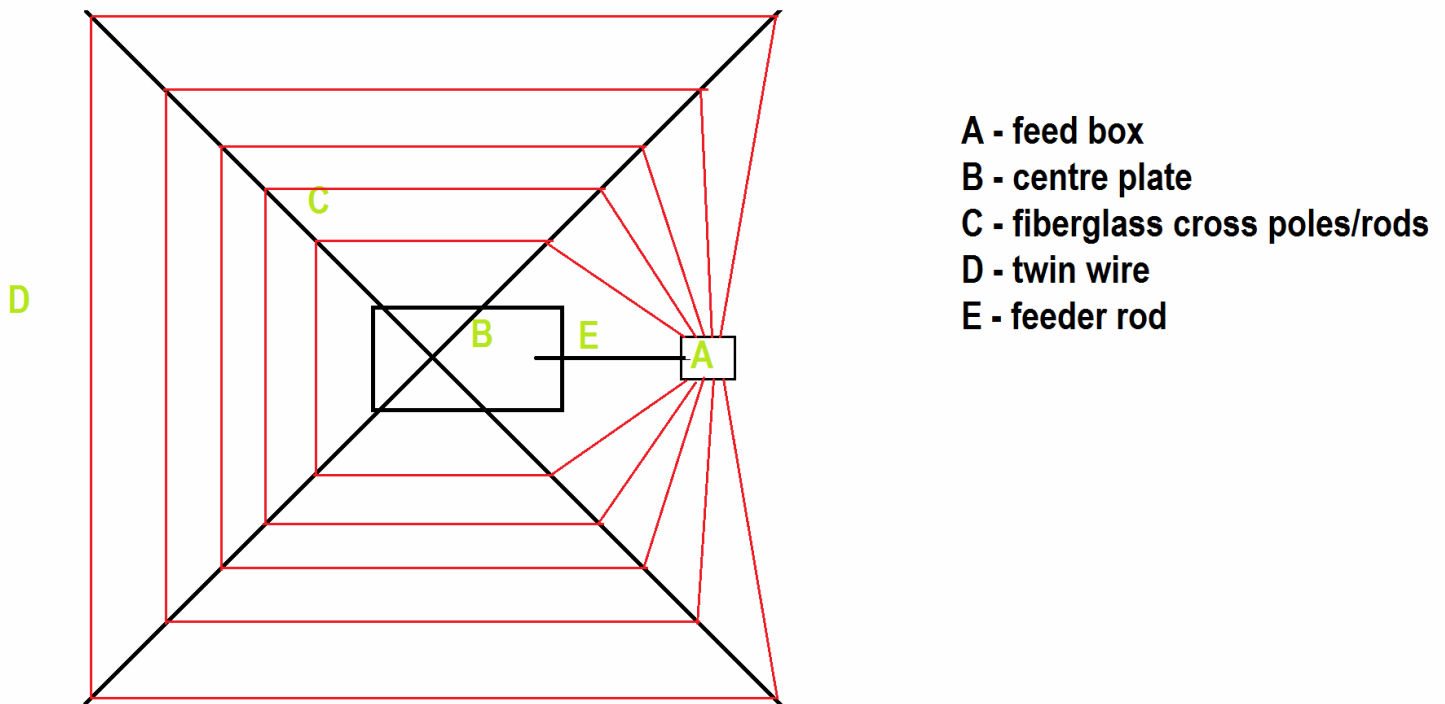
Here is a list of the parts needed in order to make you own antenna the same as my cobweb. Note you can replace these items with your options as long as it's similar you will get pretty much the same results. I have included in brackets where I purchased my items for reference should you struggle to find any of these components. The hardest parts to find were large fibre glass rods. However some people use fishing rods.

Parts:

- 2 x aluminium plates - 150mm x 100mm x 6mm thick (*ebay*)
- 10 x u clamp's to clamp 20mm tube (*ebay*)
- 3 x aluminium tube 20mm OD with 14mm ID (*ebay*)
- 4 x fibreglass rod's - 2.5m x 12.7mm OD with 8.5mm ID
(<http://www.ecfibreglasssupplies.co.uk>)
- 1 x fibreglass rod - 1m x 12.7mm OD with 8.5mm ID
(<http://www.ecfibreglasssupplies.co.uk>)
- 2 x u clamps to clamp 50mm mast (*ebay*)
- 50m of dual 42 strand speaker wire 1.5mm thick (*ebay*)
- 1 x IP65 junction box 100mm x 100mm x 50mm thick (*ebay*)
- 2 x 5amp terminal blocks with 10 blocks on each strip (*ebay*)
- 1m of 1.5mm wire [this gets cut into small lengths for the feed box] (*ebay*)
- 1 x S0239 chassis mount connector (*ebay*)
- 1 x ferrite ring to make a 1:1 balun (*ebay*)
- 3 x 1m lengths of 18awg wire for balun (*ebay*)
- some string and cable ties
- 20 twin cable clips (the same ones that the sky man uses for the HD cable to nail to your wall) (*ebay*)

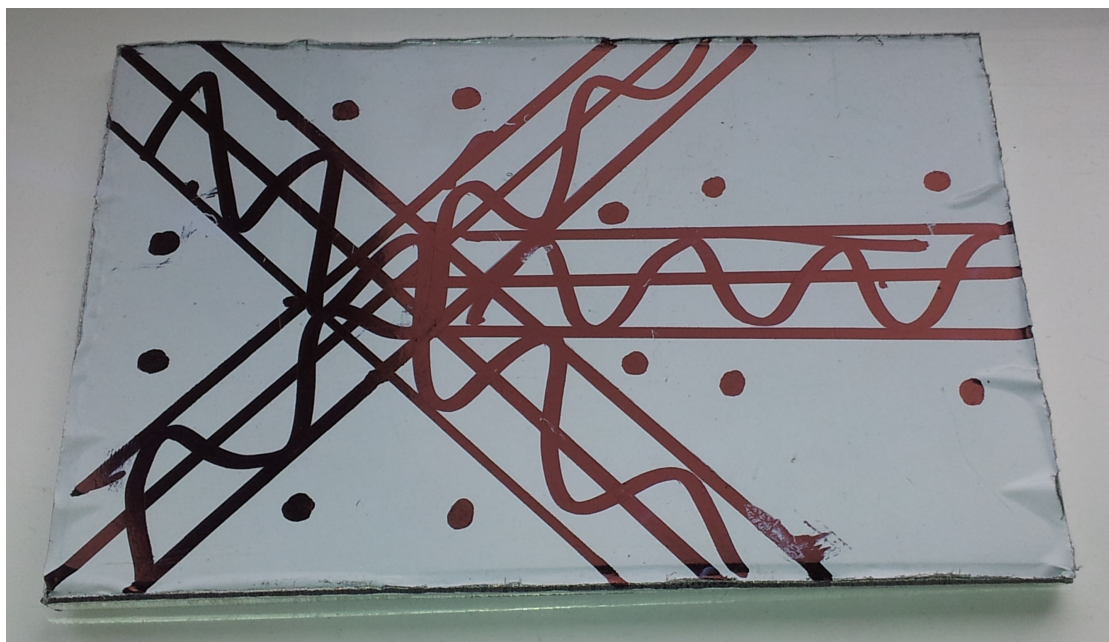
THE CENTRE PLATE

Ok you have two aluminium plates. One basically gets connected to the feed box rod and to the antenna mast. The other plate holds the aluminium tubes which hold the cross rods and feeder rod. What are these? Have a look at the diagram below:



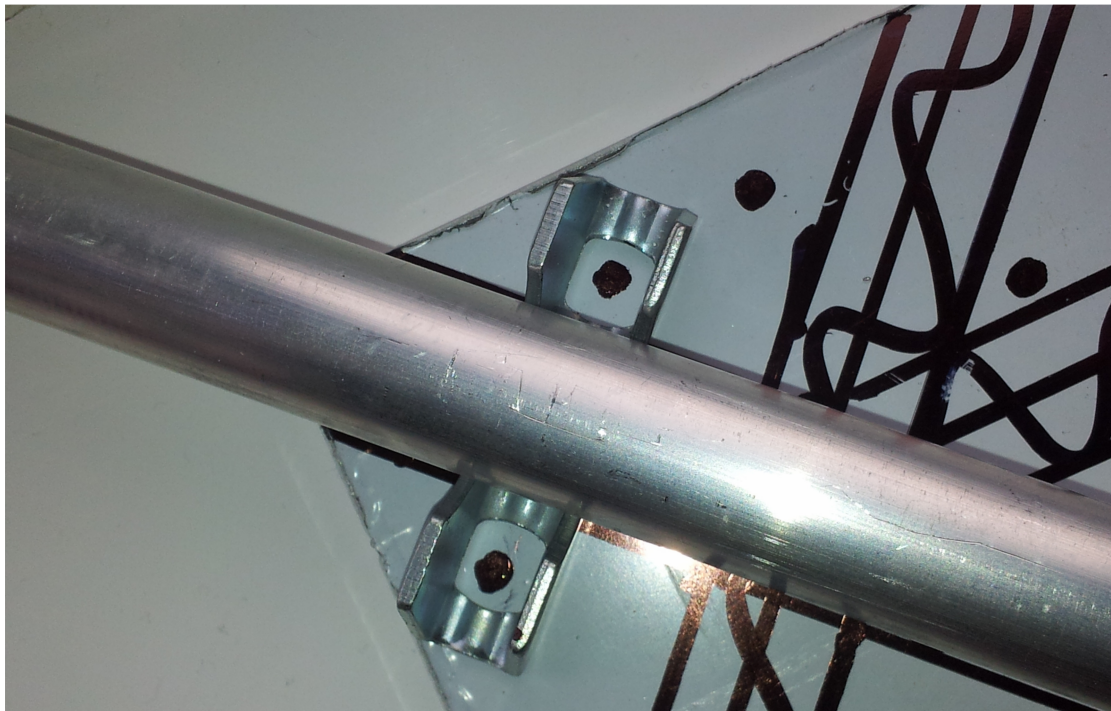
Take the centre plate and mark two 45 degree lines from the top left and bottom left corner. I used a set square to do this. After that, measure the thickness of the aluminium tube either side. In this case the tube is 20mm so 10mm either side of the 45 degree line.

Next find the centre of the plate and again measure 10mm either side of this line so that your plate looks like this.

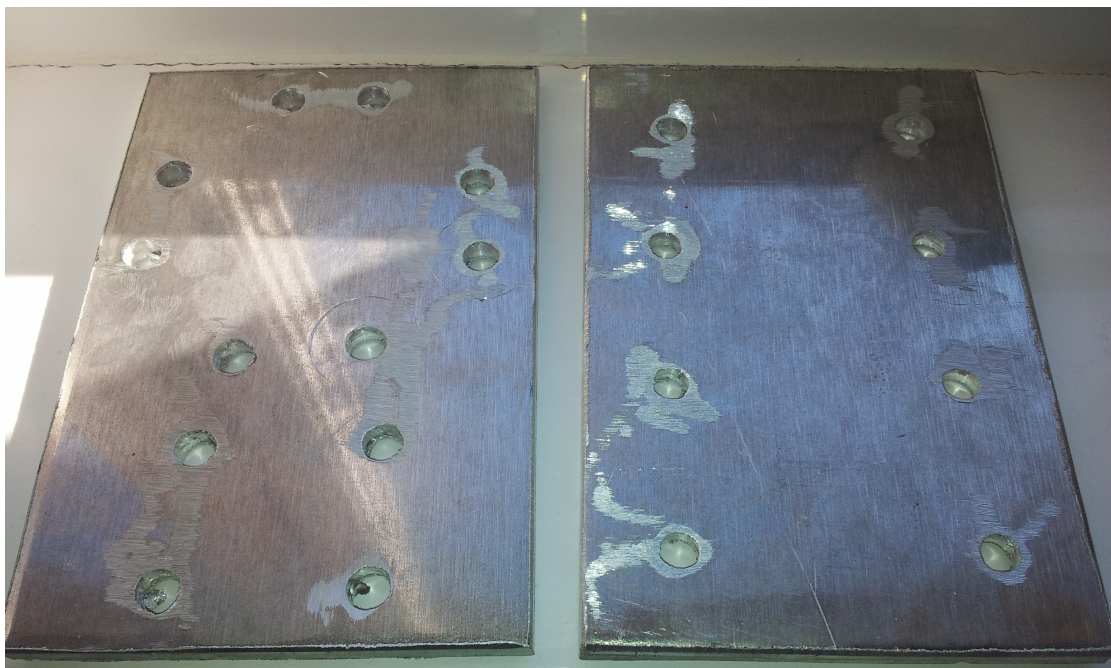


(Ignore the dots at this stage)

Ok so that's where the aluminium tubes will go that hold the fibreglass rods. Now we need to mark out holes, to drill, for the u clamps so they can go through to hold the aluminium tubes. Get the centre plate and sit the tube in place. Then fit the clamp around the tube marking out the position for the holes.

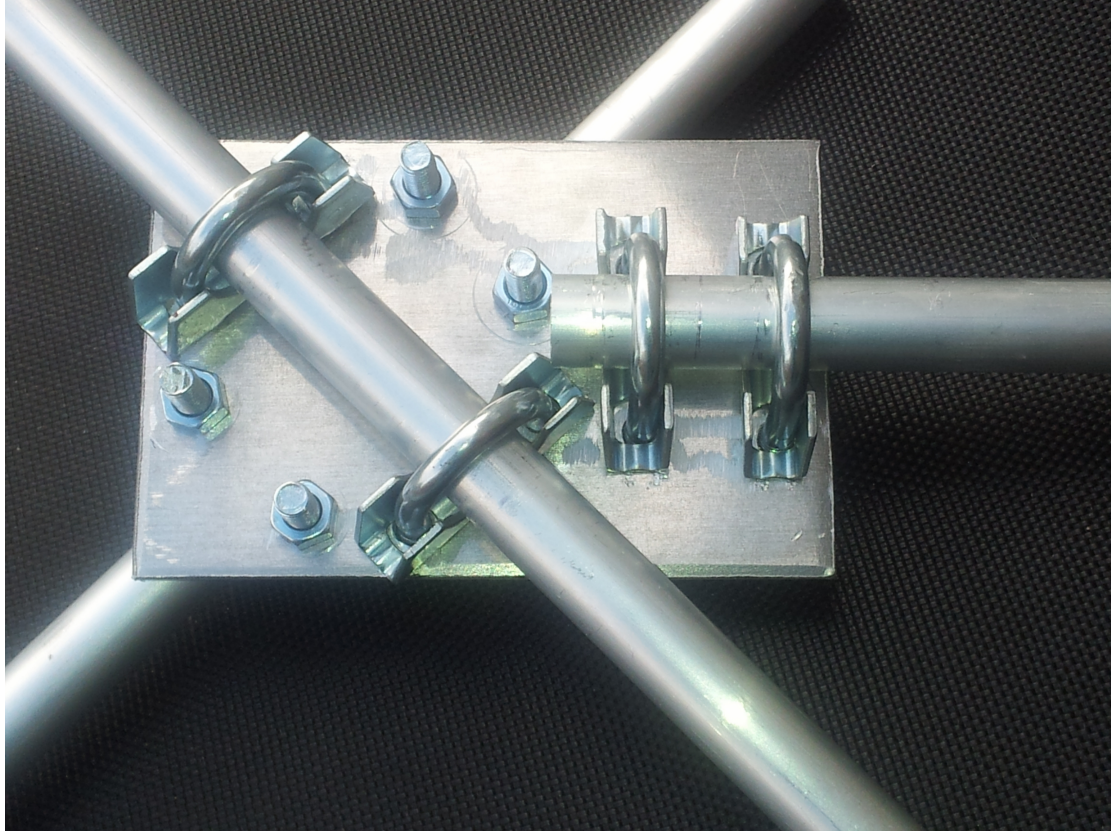


Do the same for all the clamps. Once all the holes have been marked out use an 8mm drill bit and bore out the holes. Your finished plate should look like this:

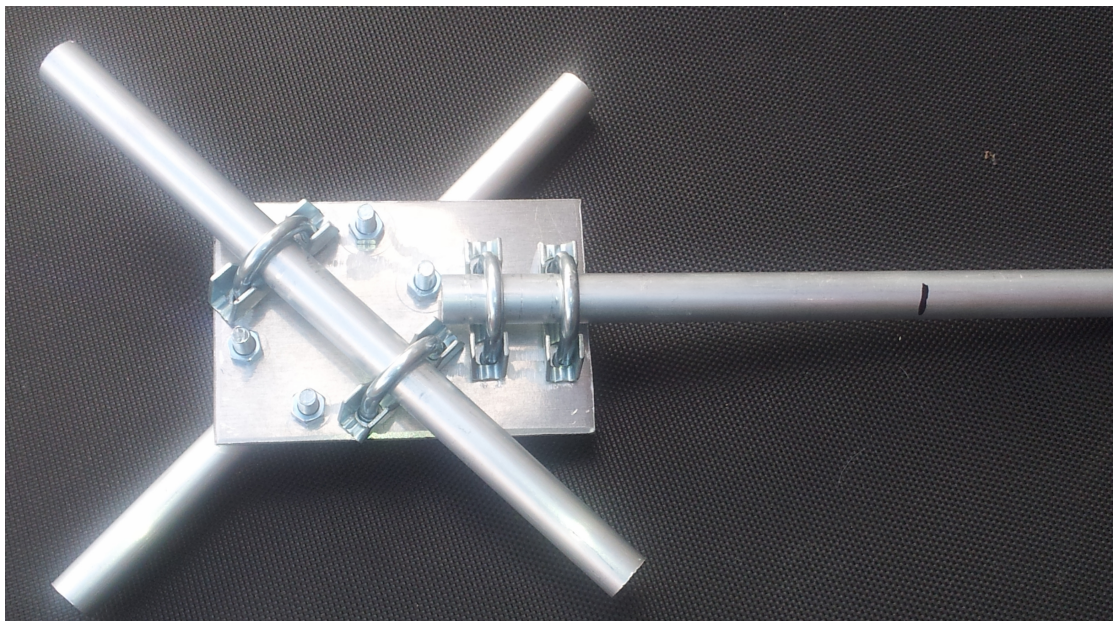
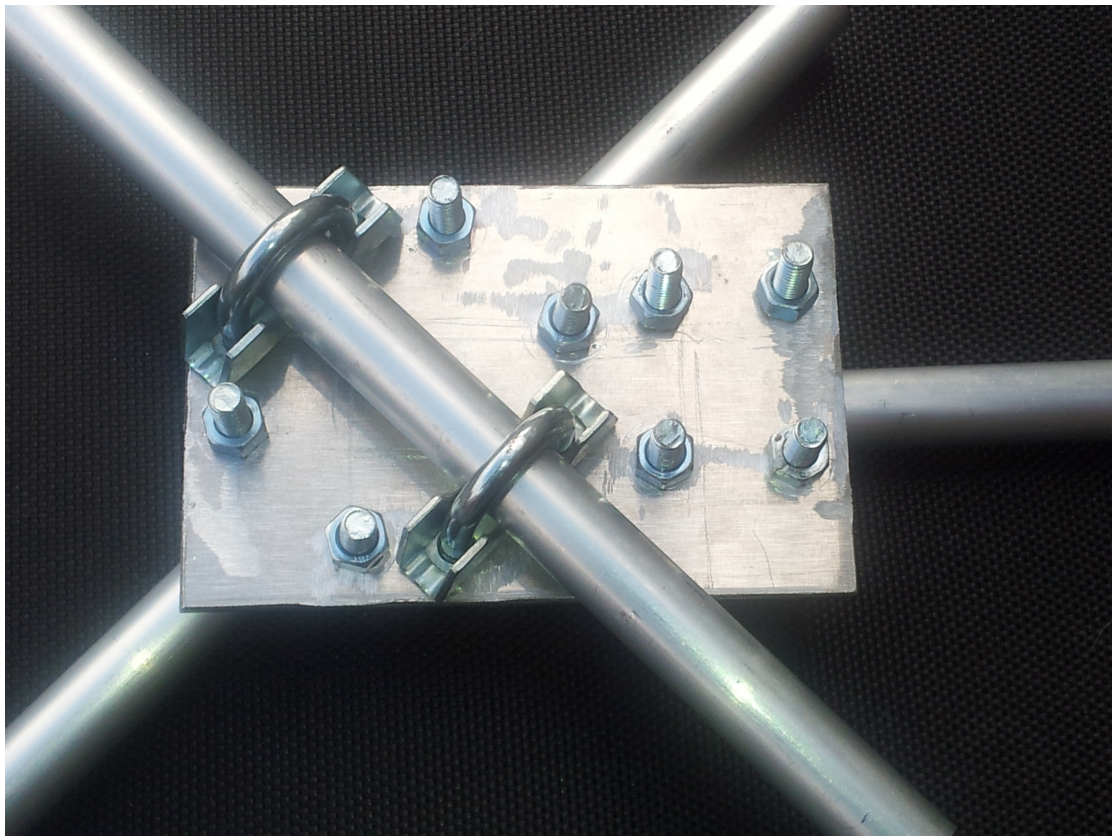


The plate to the left is the plate which holds the two cross rods and the feed rod. The plate to the right is the plate which connects to the feed rod and mast. (Also I've grinded around the holes as they were very sharp and dangerous)

Here are some photos of the centre plate assembly:

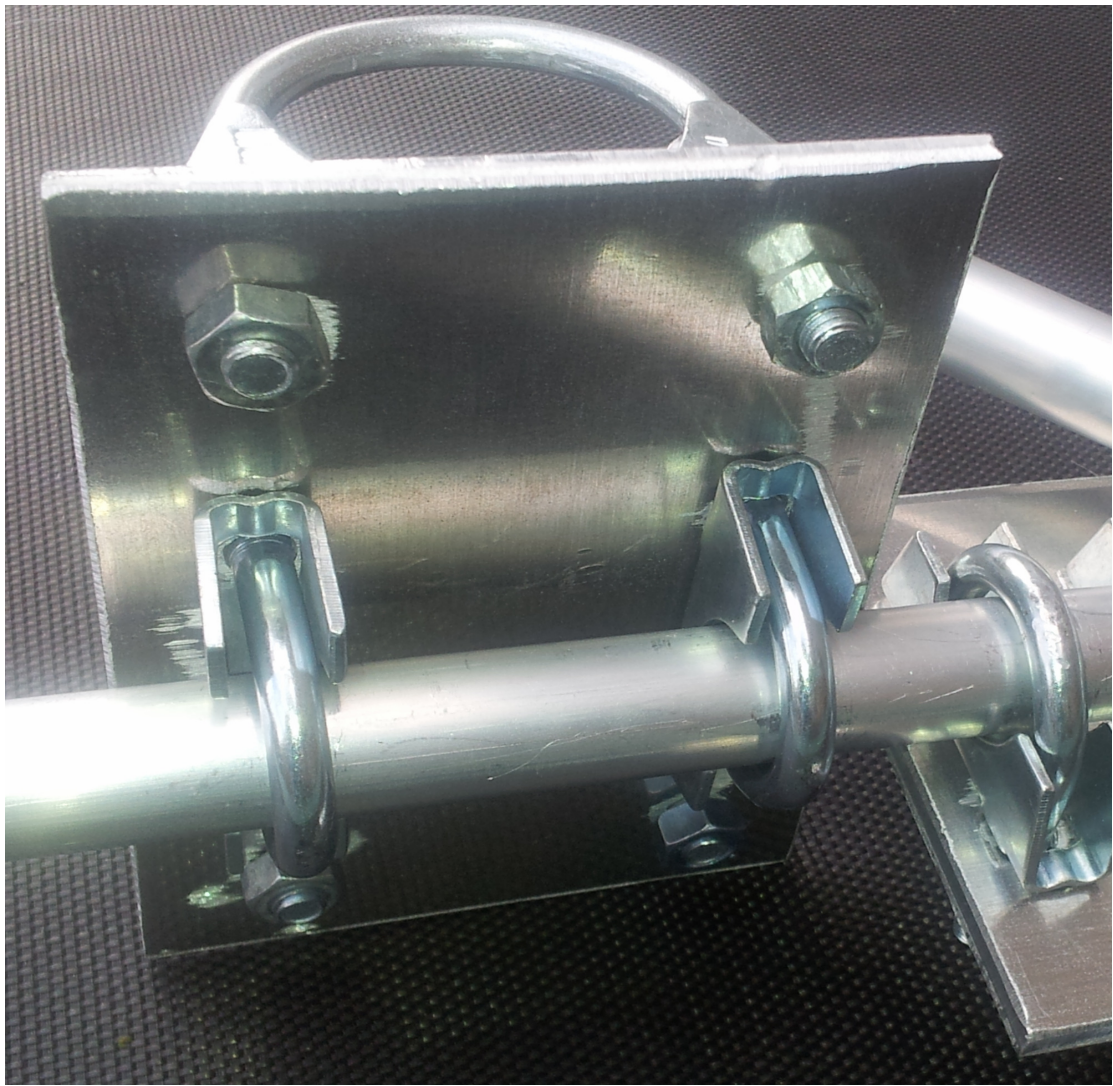


You can see one of the aluminium tubes that hold the cross poles (left) and right is the tube which holds the centre rod. The other aluminium tube is bolted below the centre plate so that it can fit on the plate. (See photo below)

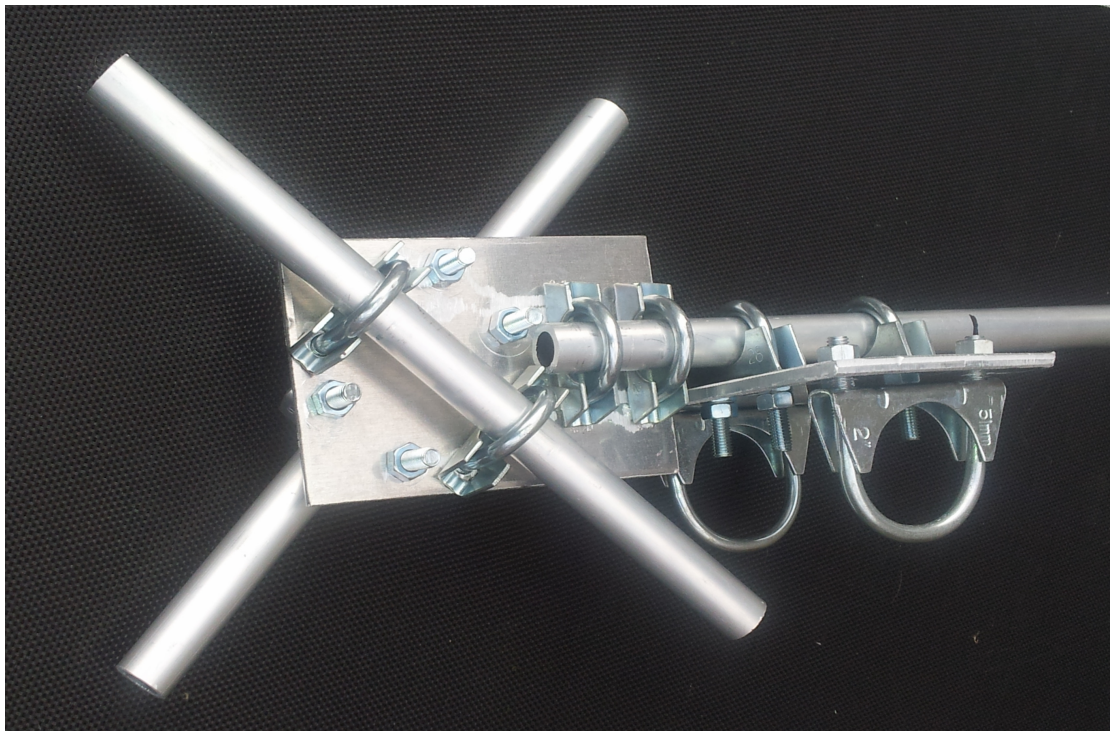


This is the overall look without the plate which connects the feeder rod and mast.

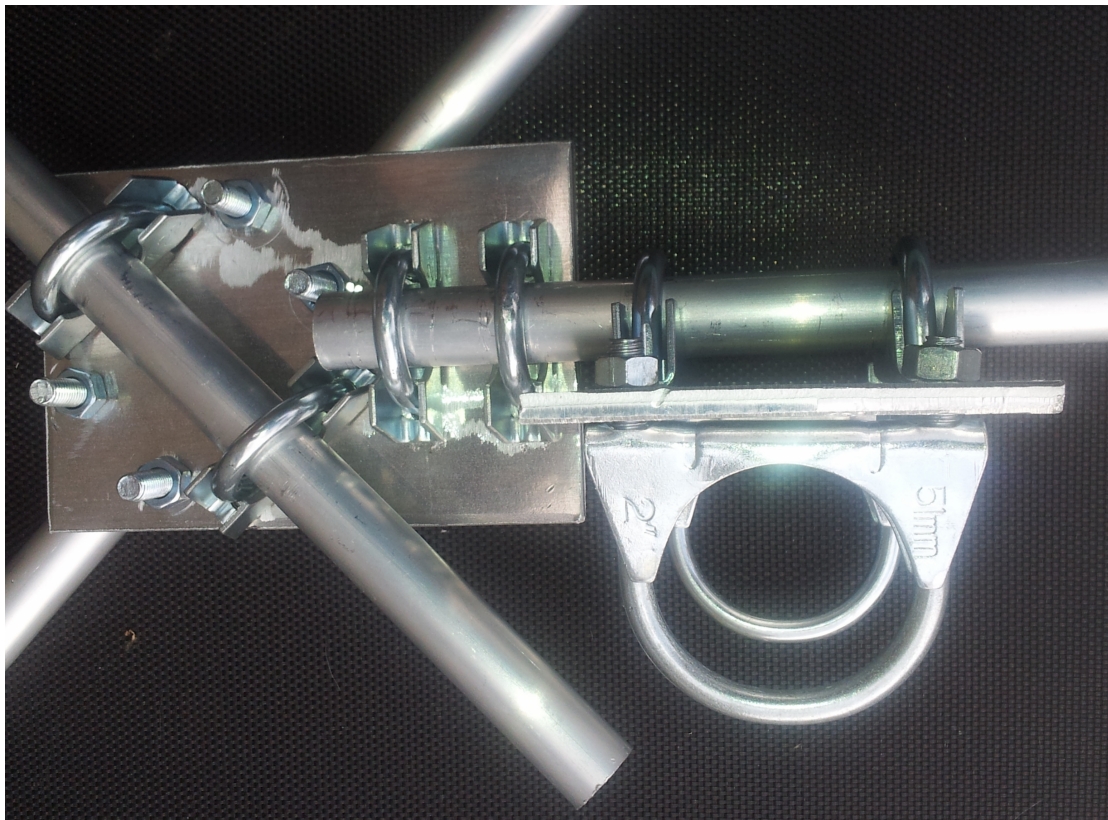
The mast plate has two large 50mm clamps for the mast and two small clamps that fit onto the 20mm tube like so:



You can see the two small clamps which allow the mast plate to connect to aluminium tube which holds the feeder rod.



The photo above and below shows the full centre plate assembly



In conclusion when making your mast plate the key thing to remember is to put the mast clamps to one side and the u clamps to the other. Ensuring that the bolts for the U clamp don't get in the way of where the mast will be.

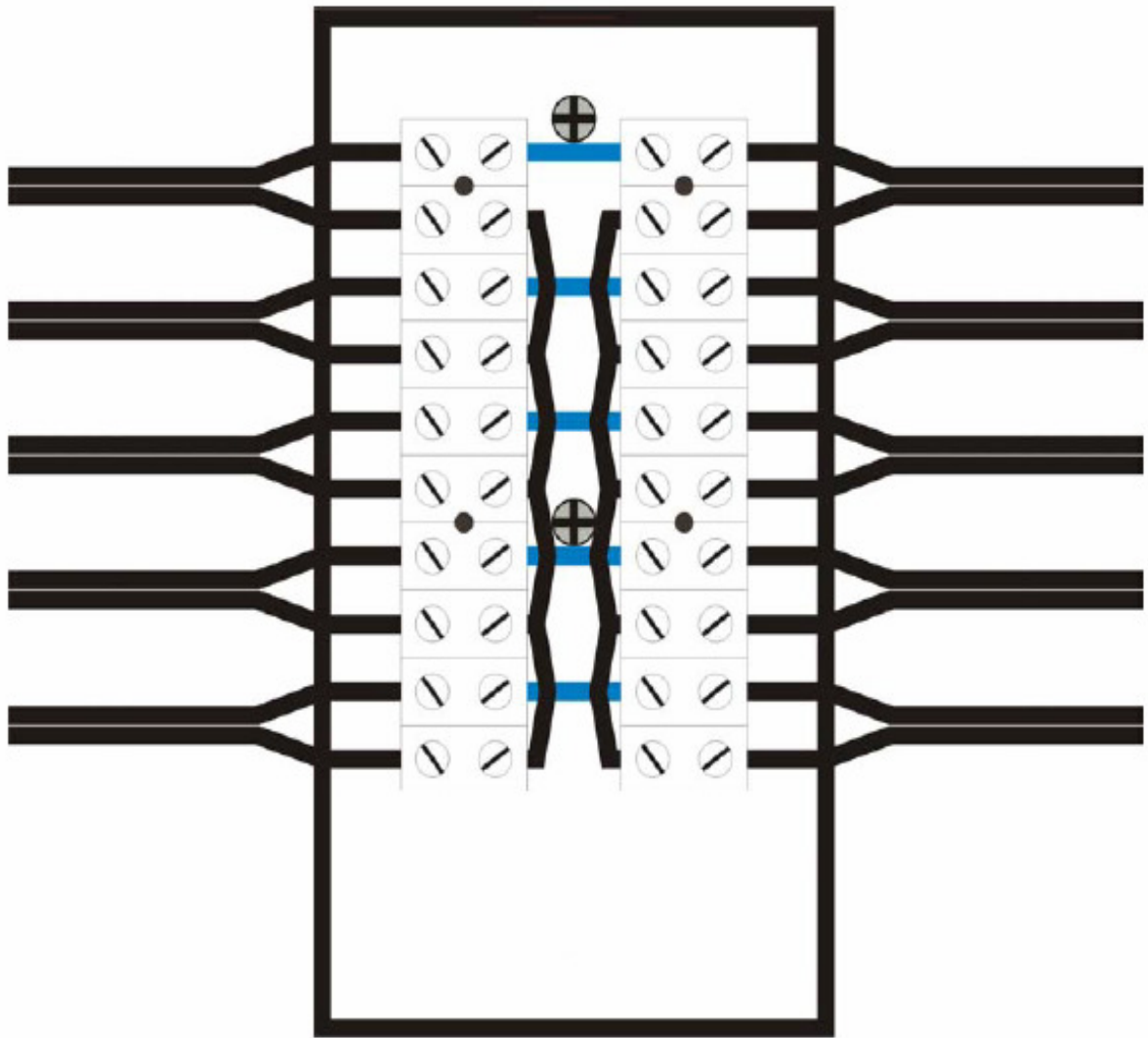
The centre plate is easy, just sit the rods where you want them and place the brackets round about the rods. Mark for the bolts and drill. I didn't bother with showing measurements as your rods and bolts may be different in size from mine so I just should how I marked it out, you can use the same method to get the same result no matter what size/ type of material is being used.

NEXT STAGE

That's the main metal working done for now the next stage is to assemble the feed point box. This is an electrical junction box that allows the feeder (coaxial cable) to connect to the antenna and feed the five wires from the one feeder.

Firstly you will need to get your feed point and your;
2 x 5amp terminal blocks with 10 blocks on each strip (ebay)
and screws these inside your electric box. I did this by using 4 x self tapping screws through the base of the electrical junction box into the holes of the terminal block (see the photos below)

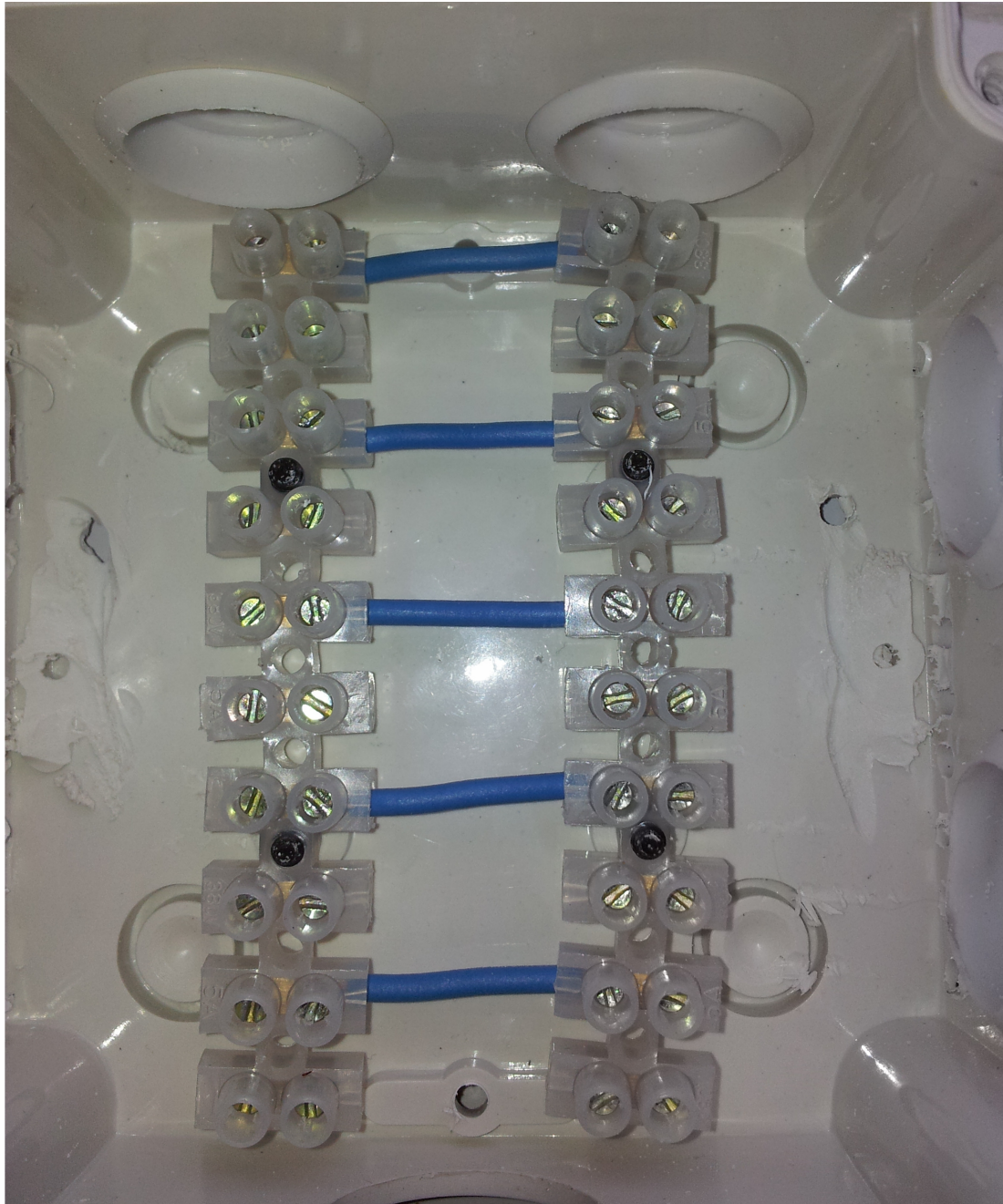
Here is diagram of how your junction box looks.



You can see the twin wire enters your plastic box. The top wire of your twin wire gets continued all the way through (i.e. no breaks in the wire) so to do this we connect a wire between the blocks. I used some wire that I had when fitting down lights in my bathroom 1.5mm² twin and earth mains wire which I stripped the blue wire out off.

The other side of the wire gets connected to the bottom of all the wires this is where your antenna will be fed. These are all connected together so one feed wire can be used. Again I used the brown wire from the 1.5mm² mains wire for this.

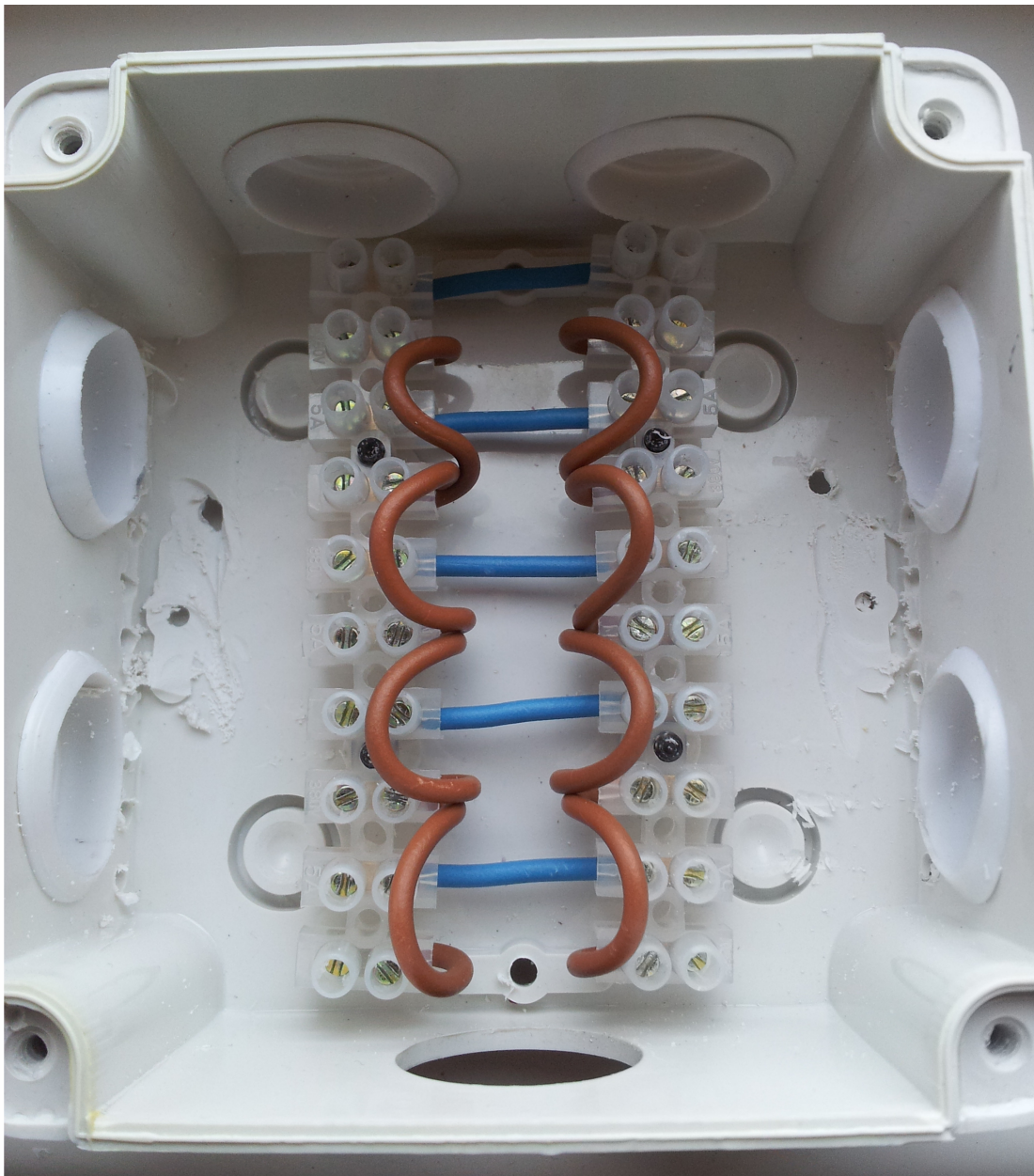
See the image below:



This is inside my junction box. You can see the terminal blocks on a strip (10 blocks in total 2 sets for each wire). You can see the black self tapping screws which I screwed from the bottom. The easiest way to do this is sit the terminal blocks in your junction box. Drill a small pilot hole down out the bottom of the box and then put a screw in its position.

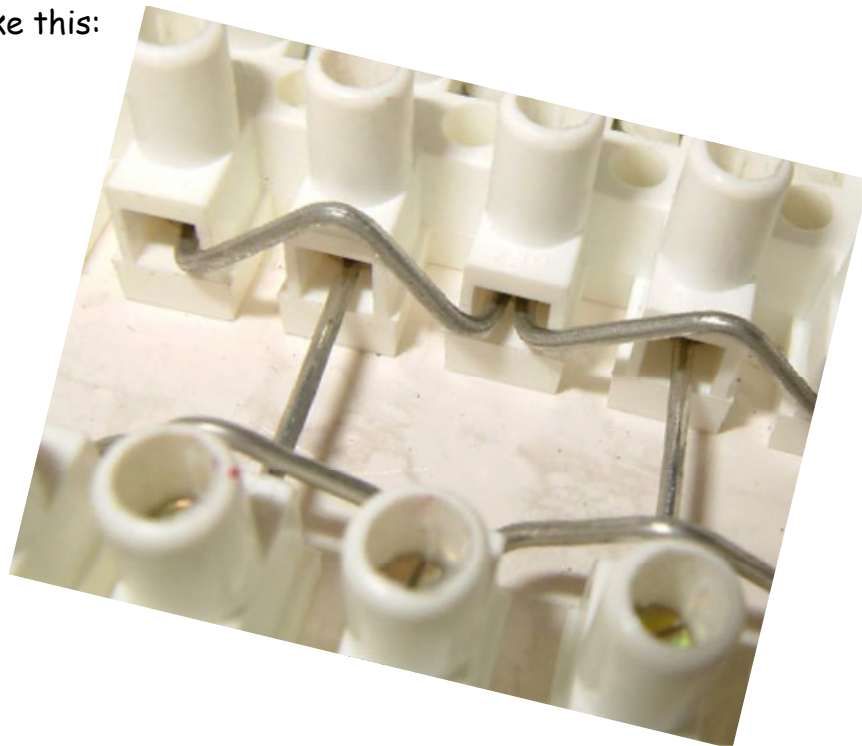
The blue wire is the 1.5mm² wire from mains cable which I had lying around. You can use similar or any rigid wire that you may have lying around. This is a solid core wire not stranded so mains wire is perfect for it.

Next we need to make the Jumper wires that go over the blue wire and into the bottom terminal block:



The Jumper wires are the same rigid wire from mains cable which goes over the blue wire connecting all the bottom terminal blocks together.

Your jumper wires should look like this:



The above images are from Steve Webb's own construction PDF. The easiest way to make this shape is by bending your wire in a U shape and connecting them into the terminal blocks. Once they are connected just bend the wire up the way. This makes the second part of the shape.

That's the complicated wiring out of the way. The next step is to drill 10 4mm holes each side of the box. This is where the wires will enter the junction box. I roughly just guessed the space I didn't measure it out.



Again this isn't complicated stuff just drill away with a rough space between each hole.

With Steve's design he used a choke balun from coaxial cable however in my design I used a 1:1 balun with a ferrite ring. There's plenty of stuff online on how to make your own 1:1 current balun. I used a T-200-" core for mine with some enamelled copper wire which turned out like this:



A piece of RG 213 is used to connect the balun to the so239 connector.

WIRES

Get your speaker wire and cut them to the following sizes:

20m band - 10.600m (big)

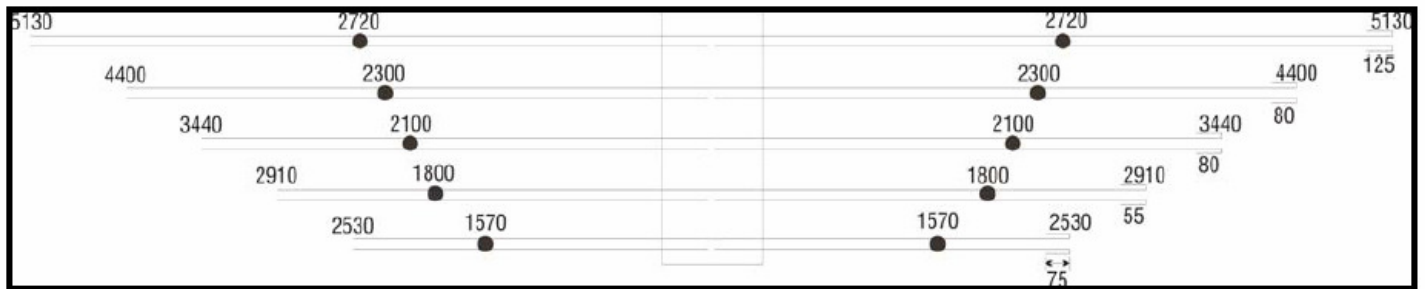
17m band - 9.0m (big)

15m band - 7.1m (big)

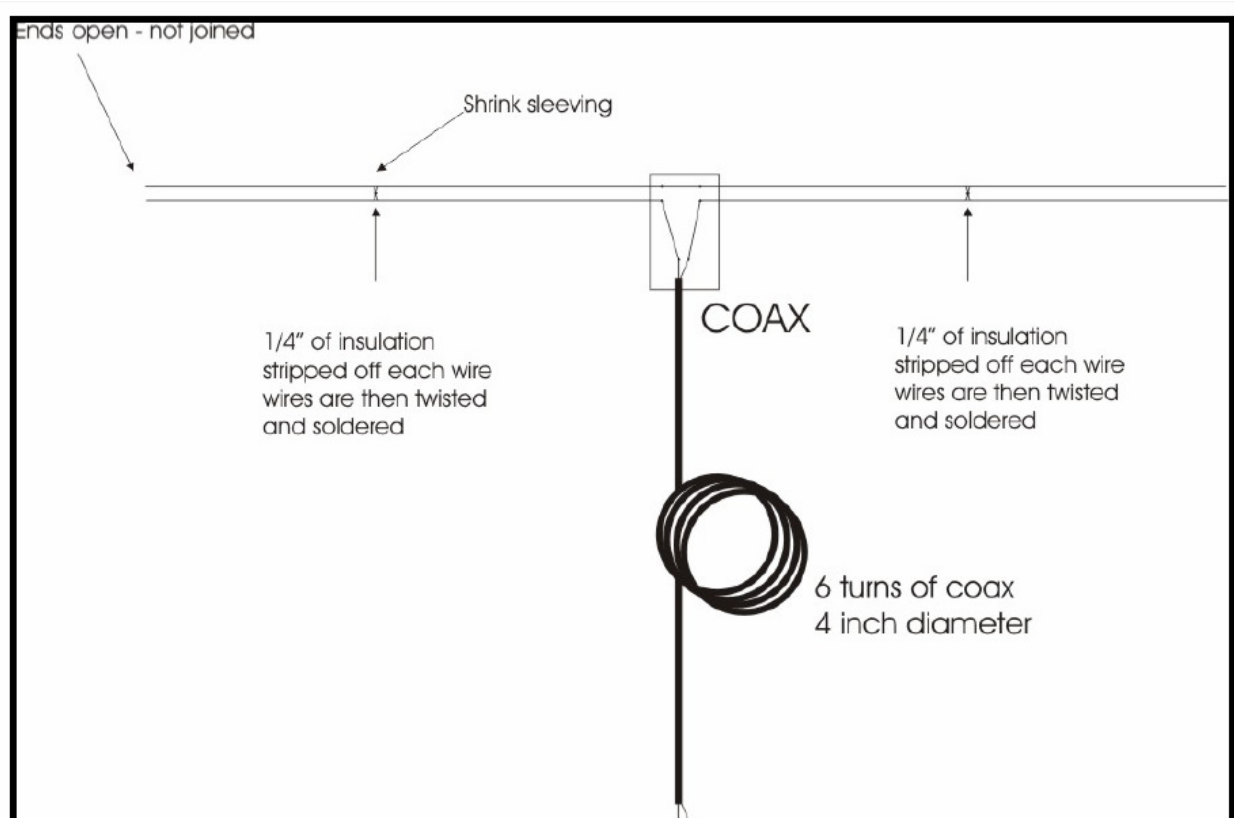
12m band - 6.0m (big)

10m band - 5.3m (big)

Once you have cut the dual strand wire to the above sizes we need to fit a "short" at specified sizes. Have a look at the sizes below from Steve Webb's design.



The sizes are from the centre to each end and the black dots represent the "short". The small size to the right is how much the wire dipole is folded back on it's self. (Photos below).



Pull back about 12mm of insulation from each wire at the sizes above, like so:



Twist the wires like so:



Now twist both sides of wire and solder them together:



Place some heat shrink over the top of this short. This protects the short from the elements of the weather:

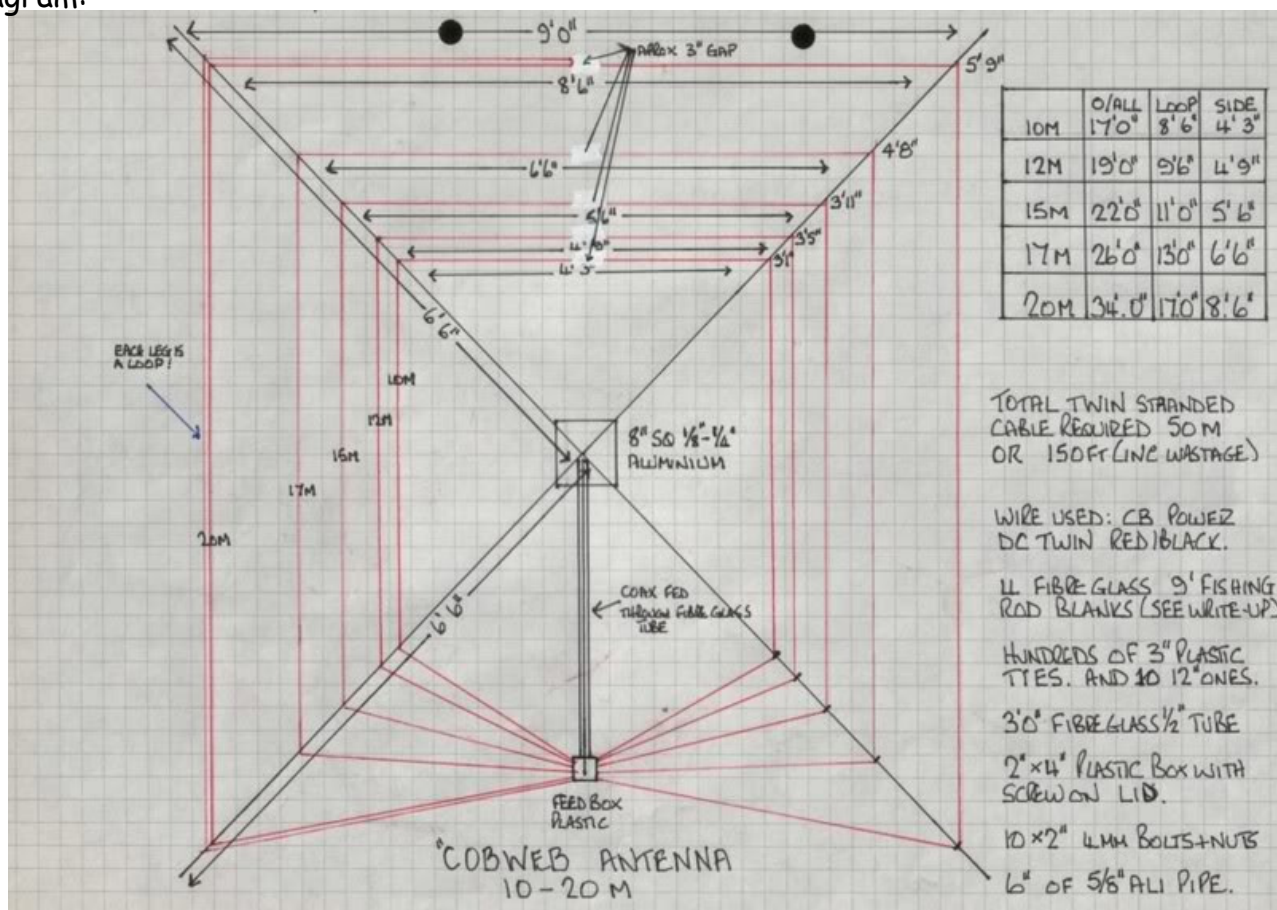


Once the shorts have been fitted and the wire connected to the feed box you should have to loose ends. Simply fold them back roughly as per the sizes above. As the wire is cut longer these will be adjusted to get the correct SWR.



A piece of electrical tape which temporarily holds the wire in place pending vswr adjustment.

Next mark out the locations of the wires on the rods as detailed in this diagram:



At the positions on the rods I screwed small blocks onto the rods. These allow the wire to sit flat and being secured in place with a cable tie.



Simply place the wire in the plastic block. Feed the cable tie through and then tighten. Once that has been done place another cable tie going the opposite direction so that it is an X shape with cable ties. This holds all wires as they should be.

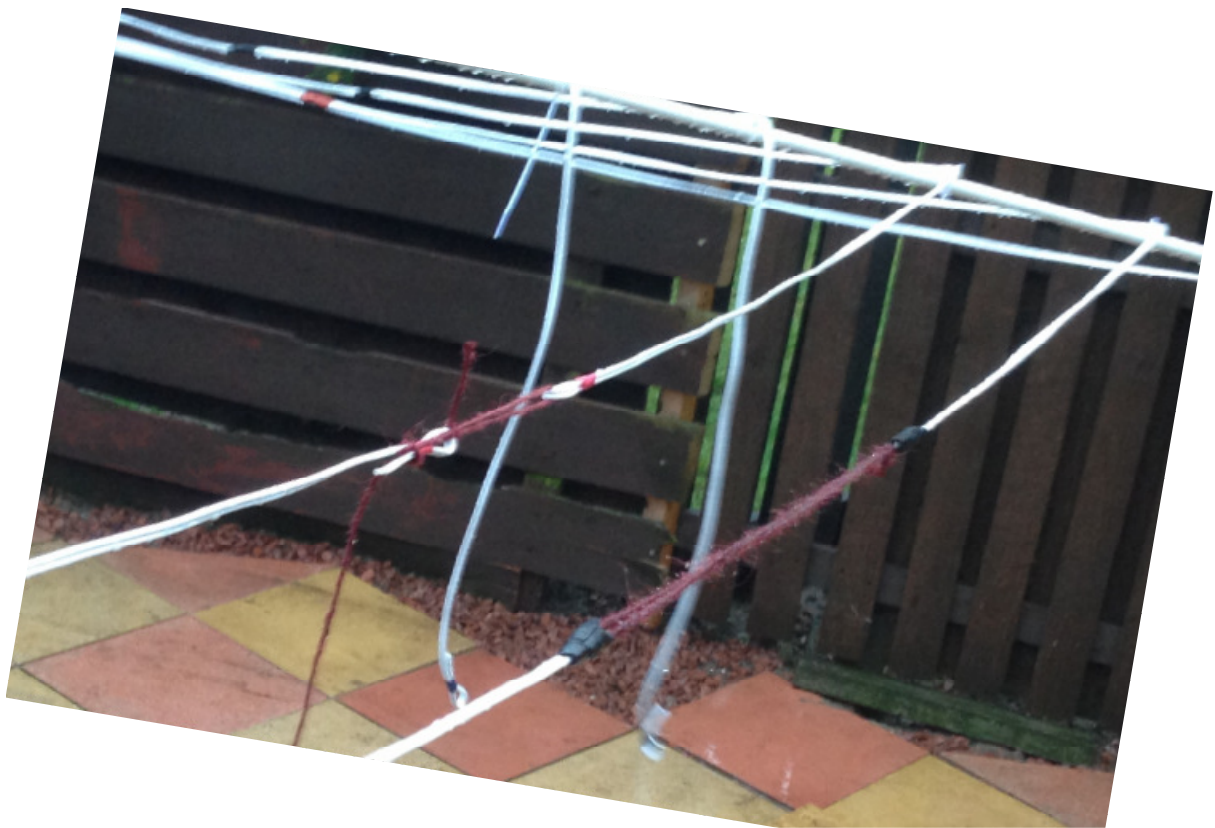
TUNING

Ok lets get onto the tuning of this antenna. Which for me was a pain in the back side.

Once you have all the wires set and tied onto the rods get the cobweb on a mast (I use a 5 ft mast for adjusting the end of the wires.



Above you can see the cobweb on a short mast for adjusting the VSWR. Adjust the longest element first. Simply fold the elements ends over to adjust the swr. Note you may need to cut small pieces (10mm) at a time off the ends if you have left wire long for swr adjustment as the fold at the end of each element has to be at the correct length.

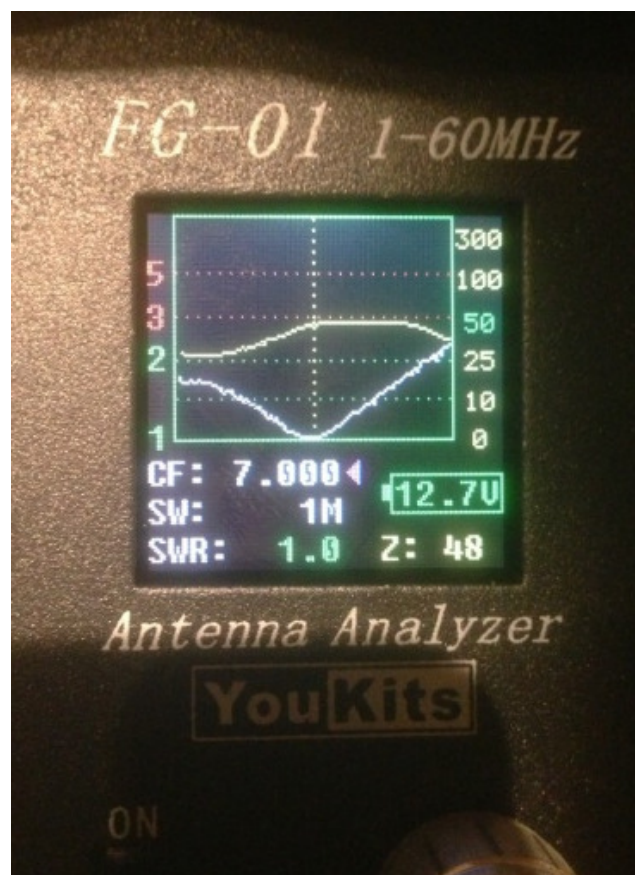


Once the adjustment has been made no minimum swr cable tie the ends off and then I wrapped them in self amalgamating tape to protect the ends from the elements of the weather.

Remember start with 20m band first and then work towards the feed box.

What I found out when I was adjusting for swr was - if you over tightened the string between both wires it would slacken off the previous element (ie adjusting 17m to tightly will affect the 20m elements) due to flex in the spreader arms.

A 1:1 ratio for swr can be achieved I found that during the 20m tuning the vswr was high on 20m but look how good it is on 40m!



During the tests I put a CQ call out on 40m from the 5ft tuning mast and made contact with VE!!!! This antenna is a DX antenna however requires a lot of work when tuning.

Note this antenna can be constructed from single wire rather than twin lead for each element however a 4:1 balun must be used at the feed for matching.

Have fun with your cobweb and any questions drop me an email:
e_2m0csp@yahoo.co.uk