

A 3-band Moxon

for

6m, 4m and 2m

Deciding on the frequency

For the purpose of my Moxon I chose center frequencies of:

6m - 50.250MHz

4m - 70.250MHz

2m - 144.200MHz

and then used the calculator at:

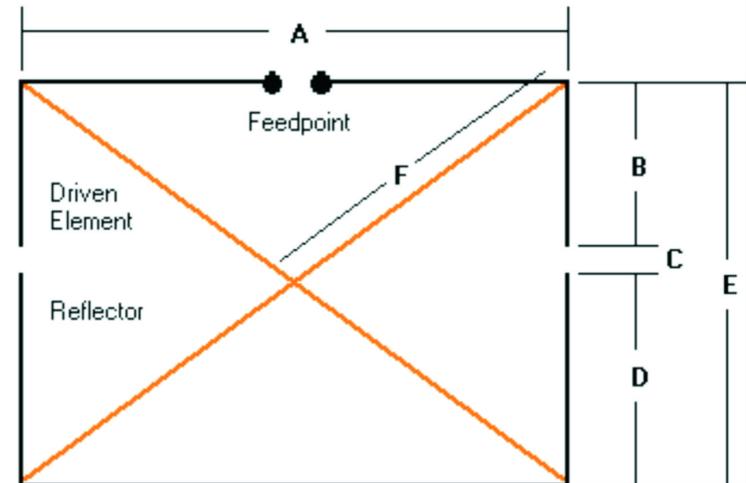
http://w4.vp9kf.com/moxon_design.htm

The calculation results for 6m

6m Calculations

Calculation Results

Frequency of Operation	50.250 MHz
Diameter of wire	1.2 mm
A	6.652 feet 2.028 metres
B	1.011 feet 0.308 metres
C	0.162 feet 0.049 metres
D	1.405 feet 0.428 metres
E	2.578 feet 0.786 metres
F	3.567 feet 1.087 metres

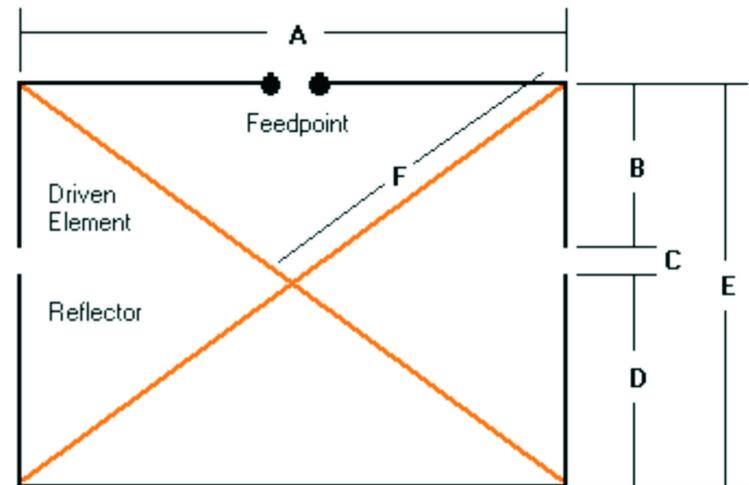


The calculation results for 4m

4m Calculations

Calculation Results

Frequency of Operation	70.259 MHz
Diameter of wire	1.2 mm
A	4.758 feet 1.45 metres
B	0.723 feet 0.22 metres
C	0.116 feet 0.035 metres
D	1.005 feet 0.306 metres
E	1.844 feet 0.562 metres
F	2.551 feet 0.778 metres

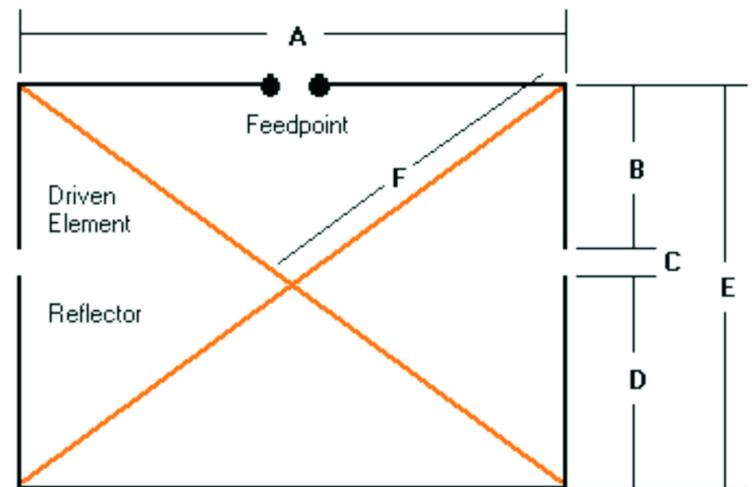


The calculation results for 2m

2m Calculations

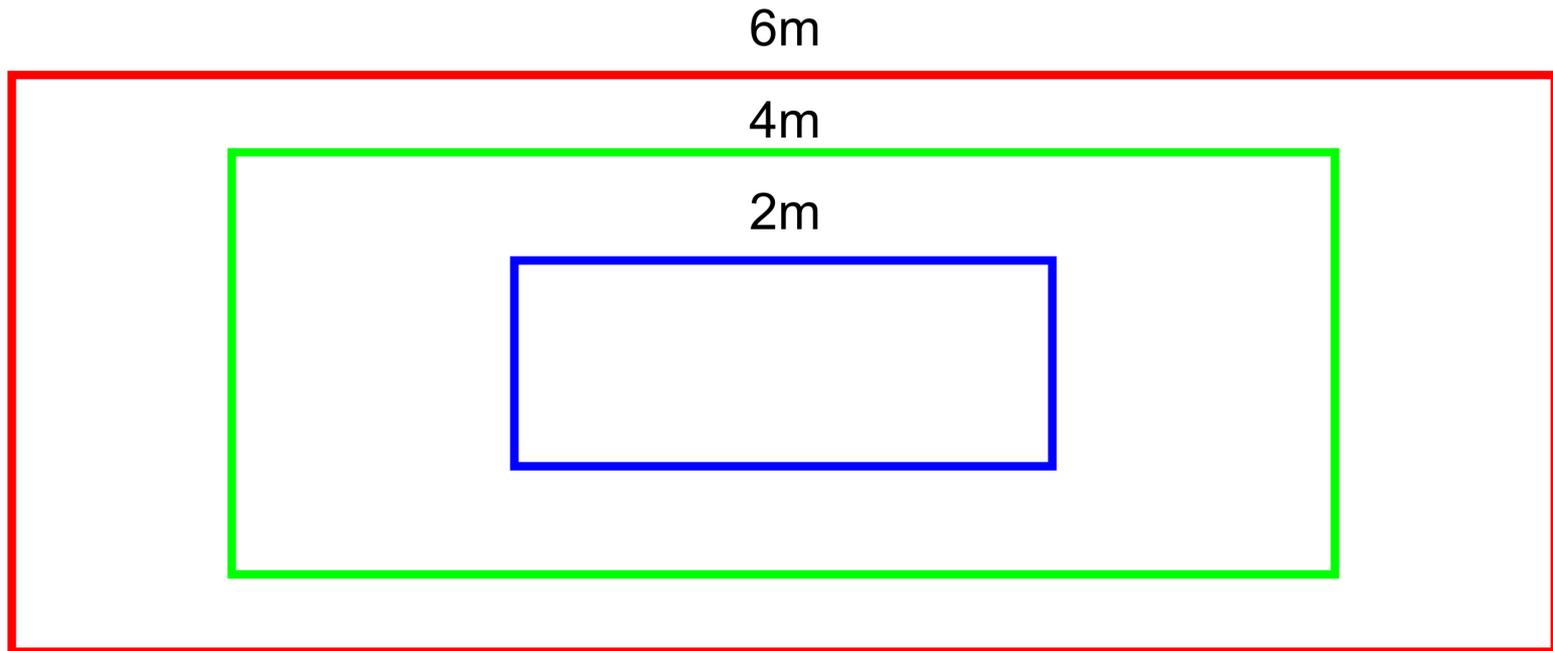
Calculation Results

Frequency of Operation	144.200 MHz
Diameter of wire	1.2 mm
A	2.318 feet 0.707 metres
B	0.352 feet 0.107 metres
C	0.057 feet 0.017 metres
D	0.49 feet 0.149 metres
E	0.898 feet 0.274 metres
F	1.243 feet 0.379 metres



Putting it on paper (1)

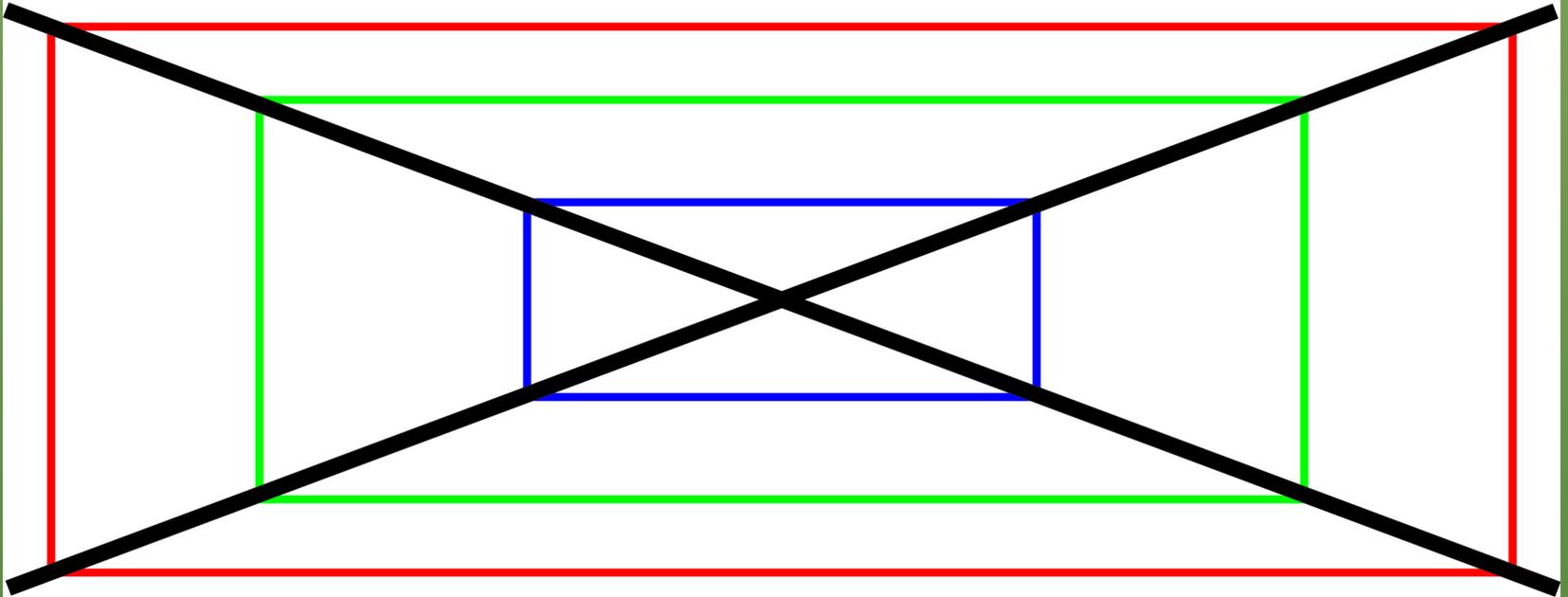
Overlay the 3 bands



The 3 bands and their physical relationship to each other.

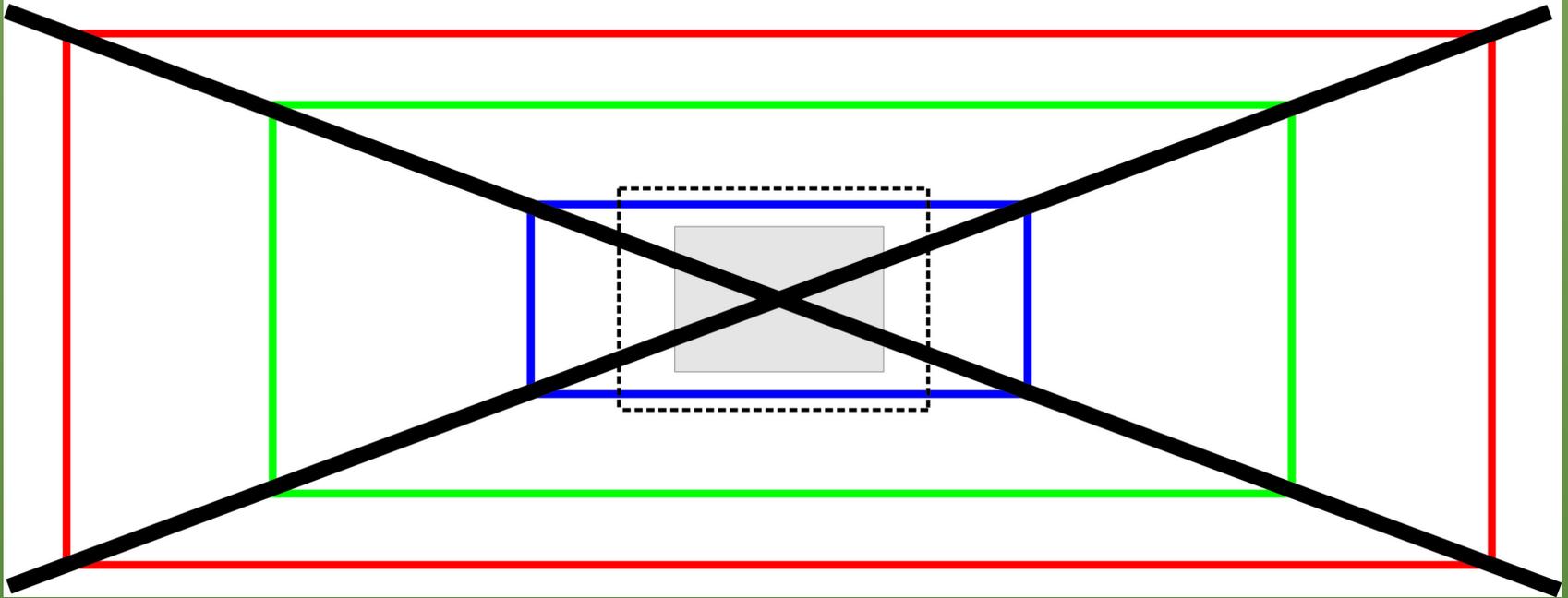
Putting it on paper (2)

All corners can be connected diagonally



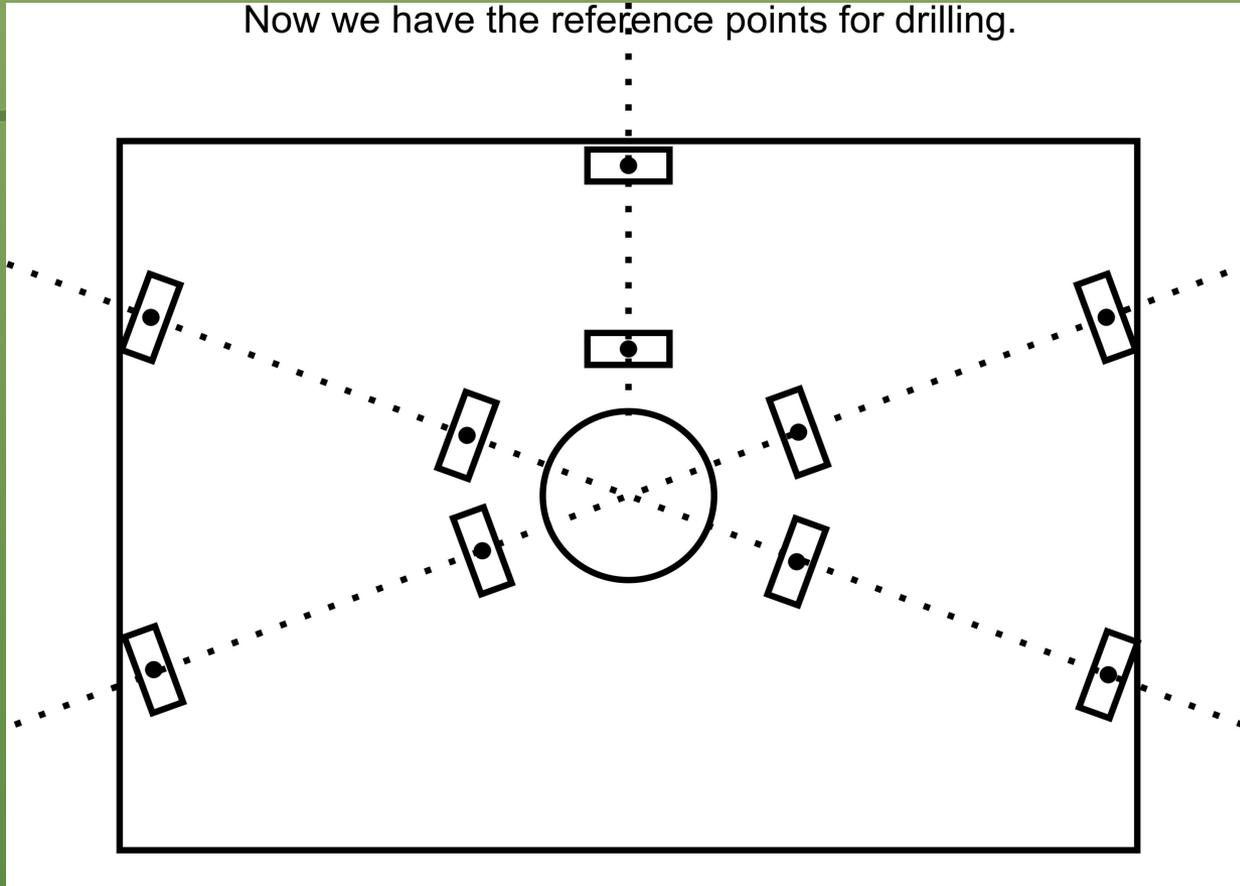
Putting it on paper (3)

Now we can add the perspex sheet



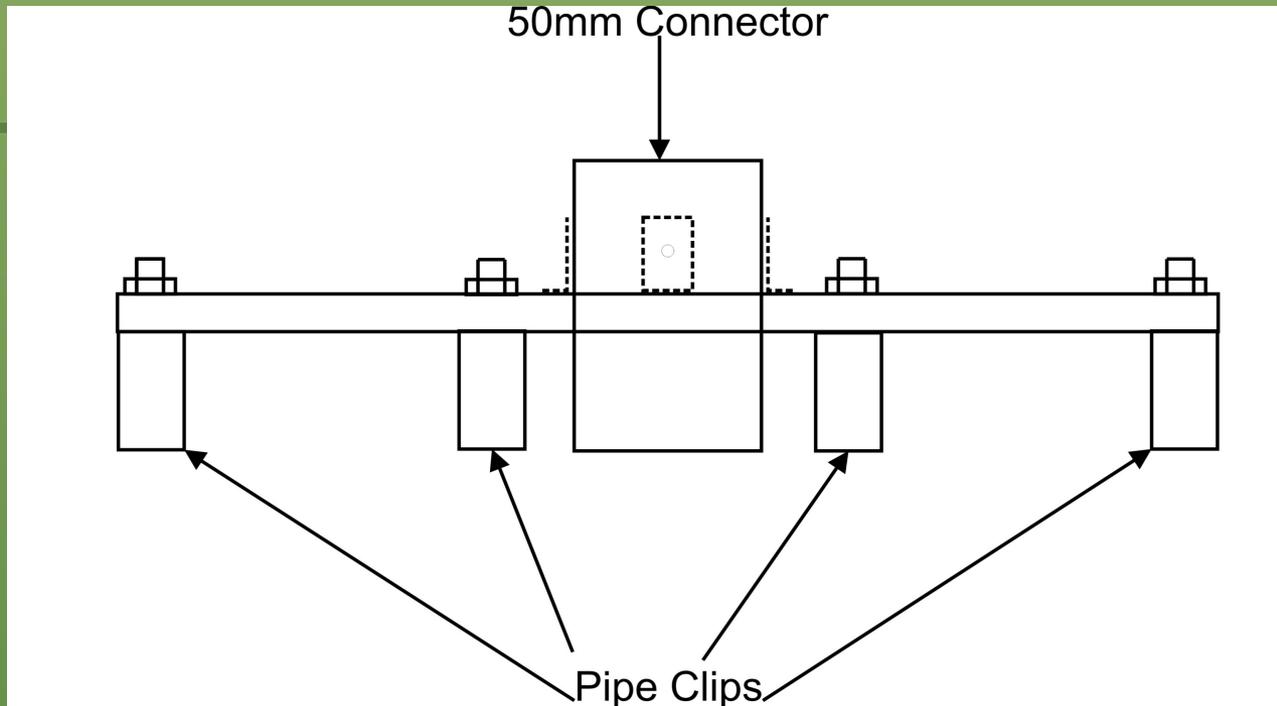
The acrylic sheet (A4)

Now we have the reference points for drilling.



Mark and drill the clip holes and centre hole, then screw the 22mm pipe clips to the acrylic sheet, ensuring the screw/bolt heads are countersunk and don't protrude into the clip.

Secure the centre



When you've attached all the pipe clips, turn the acrylic over and push the connector through till it rests on the work surface, place brackets on the acrylic sheet up against the connector, drill and screw to the connector and then drill through the acrylic, do not bolt to the acrylic at this time.

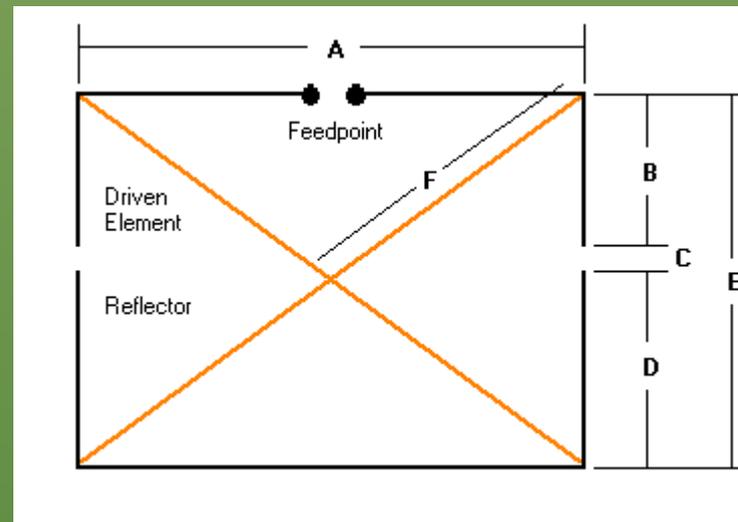
Turn the acrylic the right way up. Bolt brackets to the upper side using the holes drilled, then drill and bolt into the connector.

When this is all done take a length (I used 400mm) of 50mm plastic pipe and glue it into the connector.

The Moxon Arms

Going back to the calculations you will note dimension “F” on the 3 calculations, taking the dimension for the 6m calculation make 4 lengths of 22mm plastic tubing about 100mm longer than the “F” dimension.

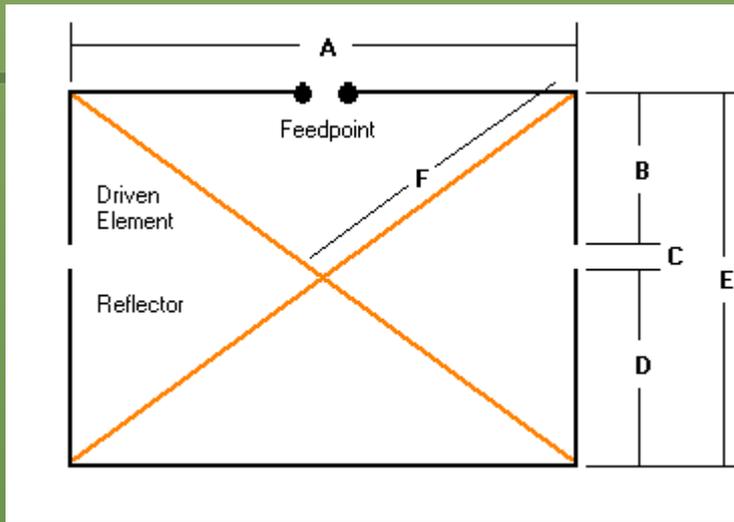
Push the 4 arms into their respective clips, I drilled through the centre most clips and through the end of the pipes, then placed a nut and bolt through the holes to secure the arm.



Now taking each “F” dimension, measuring from the centre of the acrylic sheet (centre of the 50mm connector), measure in an outward direction on each arm and mark the arm, you will end up with 3 marks per arm.

You are now ready to make the dipole centre...

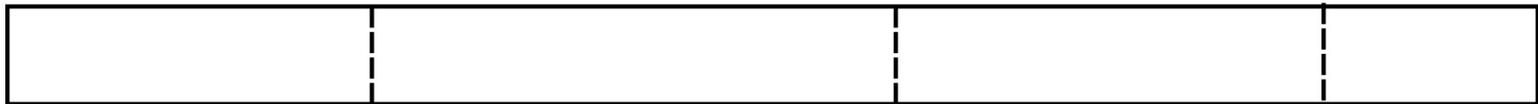
The dipole centre (1)



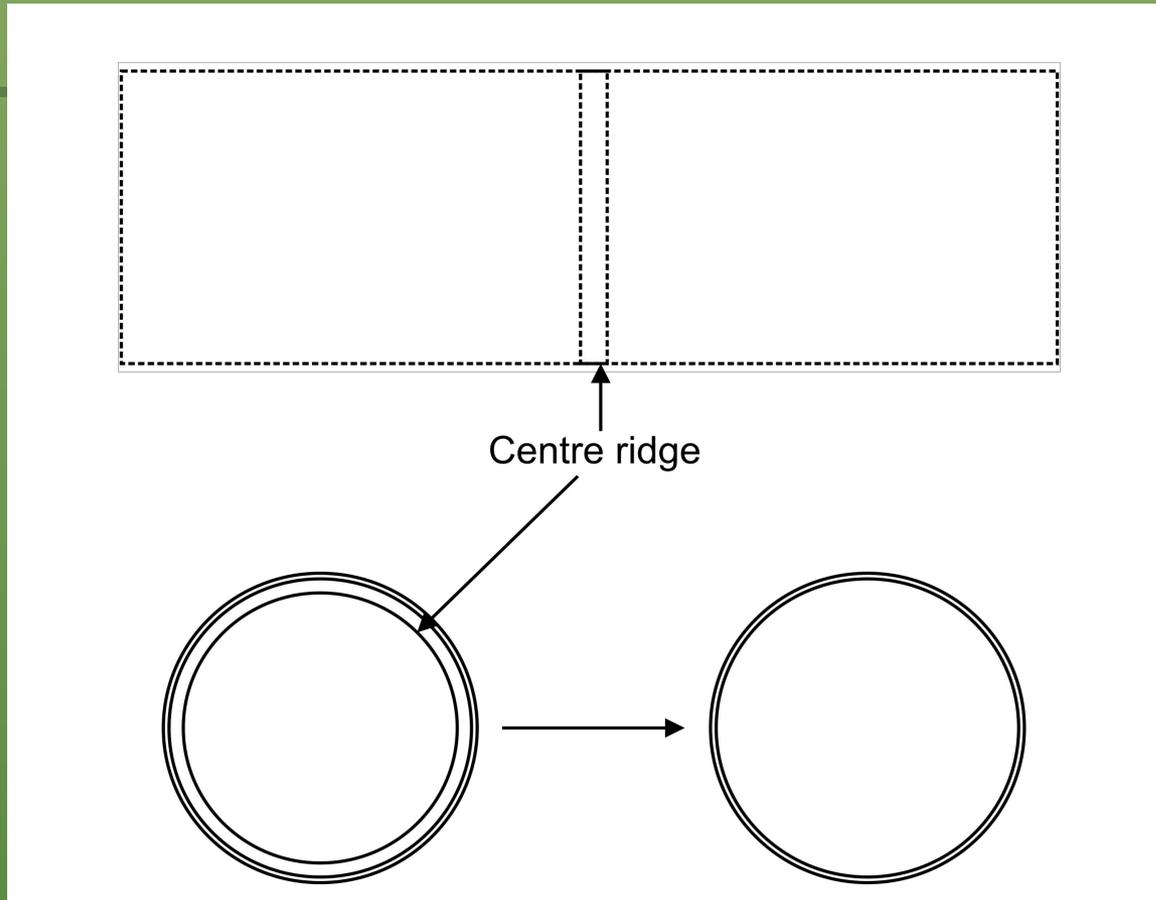
Checking the "E" dimension of the 6m band, cut a length of 22mm plastic pipe just over half the "E" dimension.

Push the plastic pipe into the 2 remaining pipe clips on the perspex sheet.

Measure from the centre of the 50mm connector in an outward direction along the dipole centre mark the half "E" dimensions of all bands on the pipe, you will end up with 3 marks.

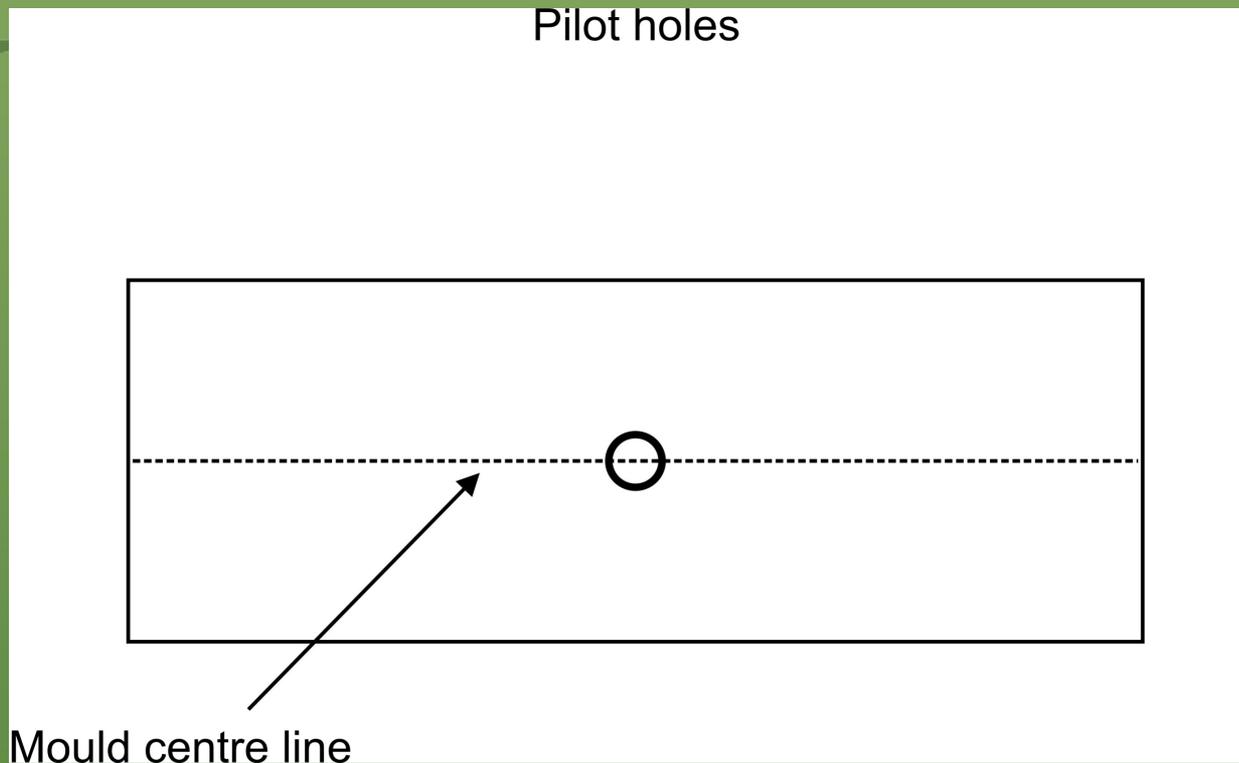


The dipole centre (2)



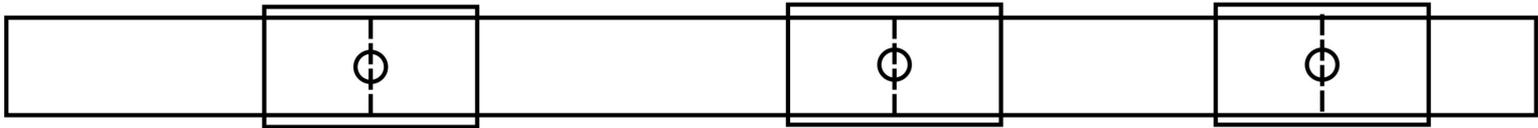
Take 3 22mm plastic pipe connectors, remove the ridge in the inside centre of the connectors (you can do this with a penknife), this will enable the connectors to slide along the length of the pipe.

The dipole centre (3)



Using the mould line on the connector, drill a pilot hole central to the length on both sides. Repeat for the other 2 connectors.

The dipole centre (4)



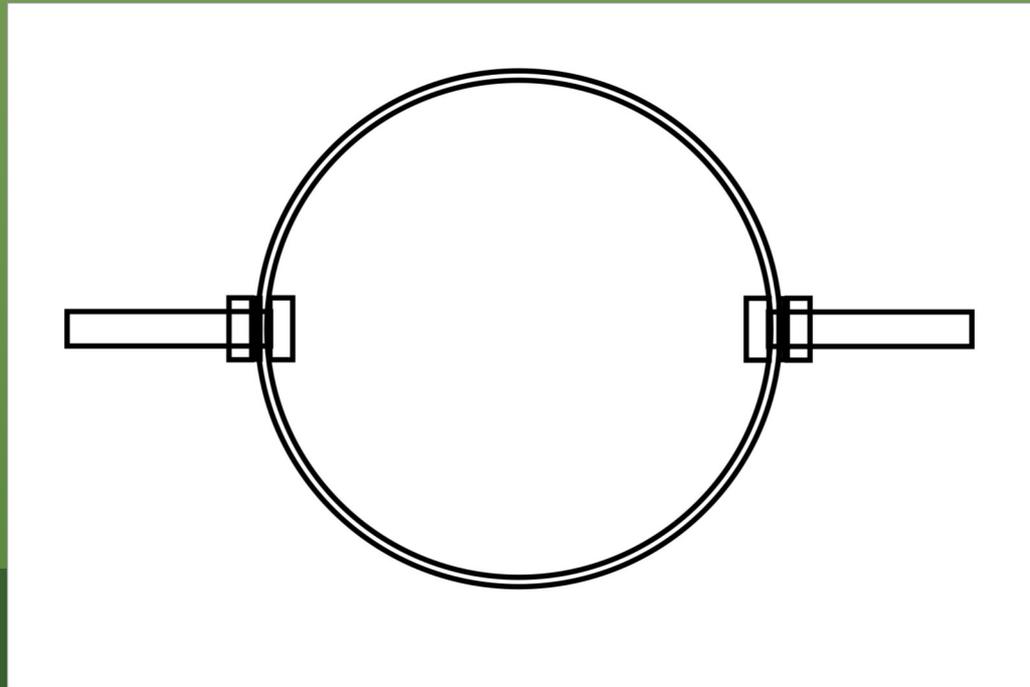
Remove the dipole pipe from the pipe clips and slide the connectors over the pipe and line up a pilot hole on each connector on a mark on the pipe, ensure all connectors are in line.

Drill through both sides of each connector into the pipe and remove the connectors from the pipe.

The dipole centre (5)

You will need 6 nuts, bolts and washers for the connectors - open out the pilot holes in the connectors to the size of the screw threads.

Place a screw from the inside of the connector putting a washer and nut on the outside, repeat this for all the connectors, ensure the nuts are as tight as possible, you will end up with the below:



The dipole centre (6)

Taking the dipole centre pipe, open out the pilot holes large enough to accommodate the screw/bolt head on the inside of the connectors.



Cut the pipe through the centre of each hole, you will end up with 4 pieces of pipe, do NOT mix up the order!

Taking a connector, glue the leftmost pipe piece into the connector ensuring the screw/bolt head locates in the half hole. Now take the next pipe piece and glue it into the other side of the connector, repeat until all pipe pieces are glued into the connectors, ensure all the bolts line up correctly.

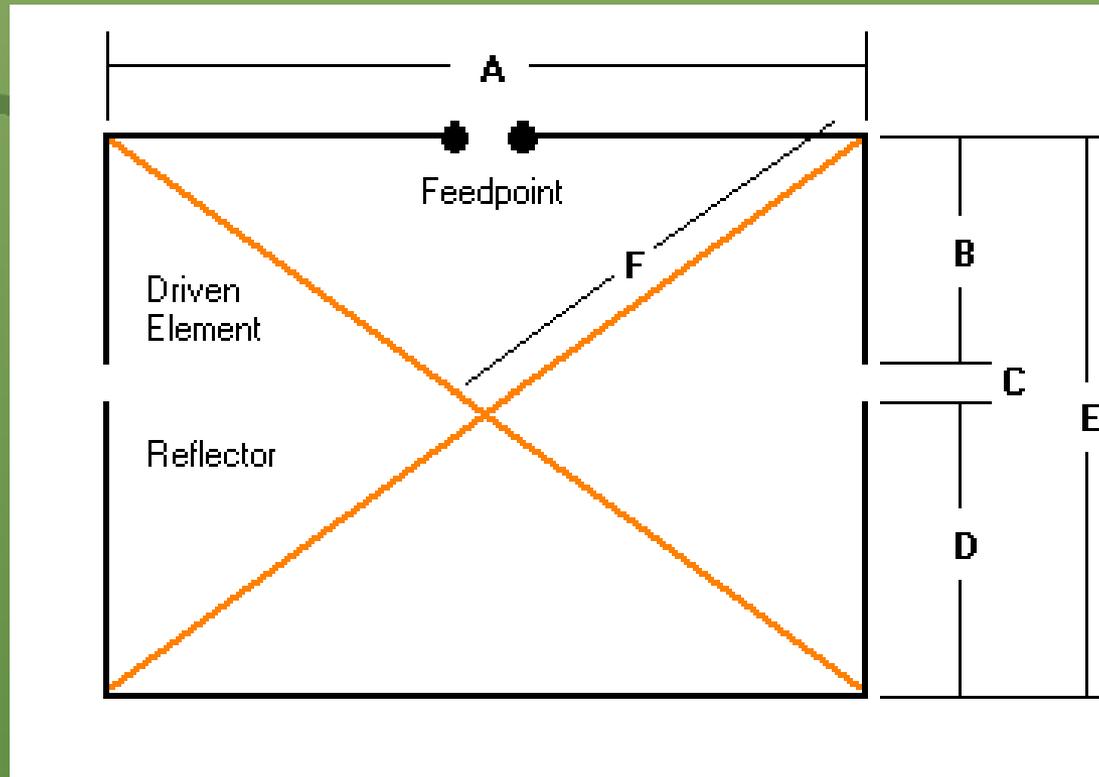
Preparing the arms

There are 3 marks on each arm and 4 arms. Take 12 22mm pipe clips and drill a hole through the bottom side, large enough to take the 1.2mm wire.



Now push the pipe clips onto each arm lining up the centre of the clip with the mark on the arm, the clips must be mounted upside down.

The bands (1)



For each band, cut 2 wires of half "A" dimension plus "B" dimension and add 50mm, cut one length of "A" dimension plus 2 "D" dimension and add 50mm. Solder a tag to one end of both the shorter lengths.

The bands (2)

Prepare the spacers with holes drilled the correct distance (dimension "C") apart.

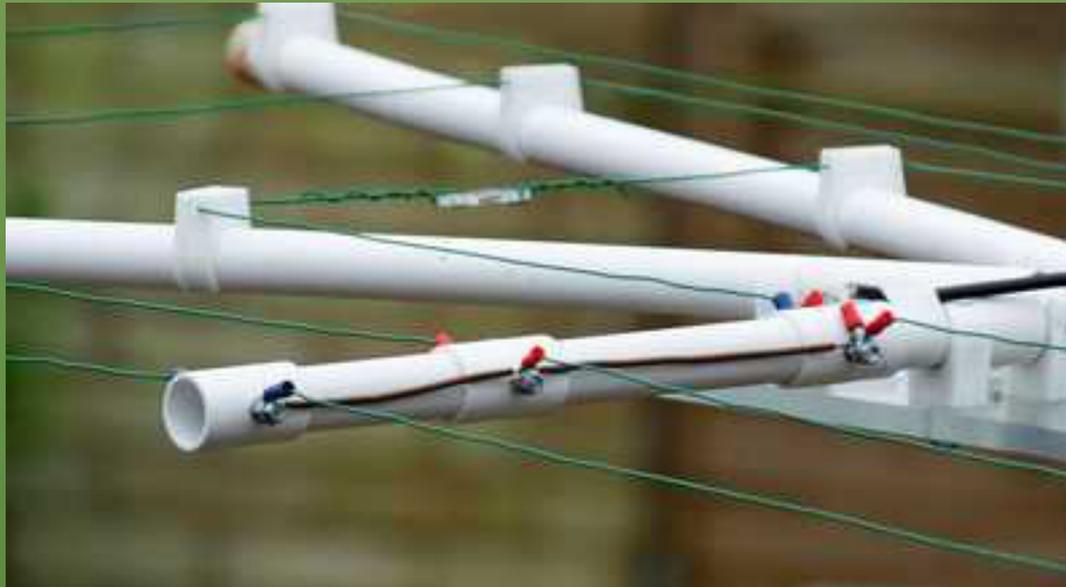
Take a piece of insulated copper wire and attach it to one of the end screws on the dipole centre, run it to the centre screw on the same side and loop it round, then take the wire to the end screw and loop it round, repeat for the other side..



The bands (3)

Connect each pair of tagged wires to their respective screws/bolts, line up and tighten.

Thread each wire through its wire clip. Place an insulator on the end of each of the wires at the correct position, repeat for all driven elements.



The bands (4)

Thread the reflectors through the remaining clips and attach to the other ends of their respective insulators.



Adjust the position of the clips (by sliding them) until the wires are taut.

Mount the Moxon, check the SWR and make any adjustments necessary.

Have fun!