

MOXON ANTENNA

10 / 11 Metre Band
27.0 – 30.0 MHz Adjustable

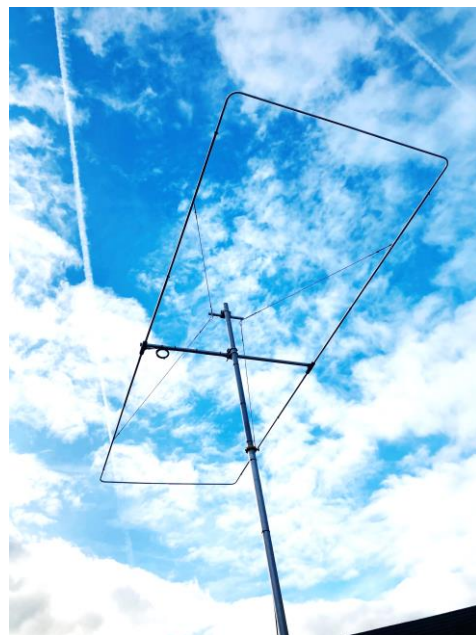
CEECOM

Amateur Radio Antennas

www.ceecom.co.uk

ESTIMATED RADIATED POWER
6 dBi GAIN

INPUT > ERP
1 WATT = 2.4 WATT
10 WATT = 24 WATT
100 WATT = 240 WATT



The Moxon antenna was first introduced by Les Moxon (G6XN) and is a truly superb antenna.

The ends of the two elements are bent backward (radiator) or forward (reflector) acting as a capacitive load achieving greater bandwidth and lower losses

This antenna is a simple and mechanically robust two element design giving modest directivity with a null towards the rear. The antenna achieves a high front to back ratio typically with a wide beamwidth.

ELECTRICAL / MECHANICAL SPEC

BANDWIDTH: 1MHz Bandwidth with VSWR below 1.6:1

DIMENSIONS:

10 Metre Band: 147cm x 390cm

11 Metre Band: 147cm x 410cm

WEIGHT: <4.2KG

POLARISATION: Horizontal

FEED POINT: 50ohm SO239 (N-type also available)

POWER HANDLING:

SO239 1000W, N-Type 1500W

GAIN: 6dBi Freespace +/- 0.3dBi

BEAMWIDTH: V-Plane 133 deg, H-Plane 78 deg Freespace

FRONT TO BACK: 42 dB

FREQUENCY: Adjustable 27–30 MHz. Use tuning chart. (1MHz Bandwidth)

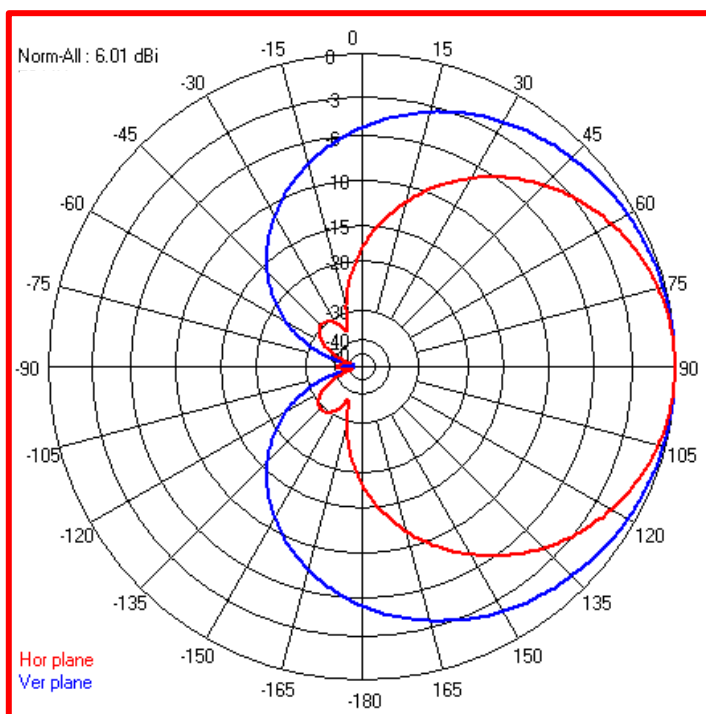


Fig 1. (27.5 MHZ) Freespace plot - Antenna in horizontal position in Freespace

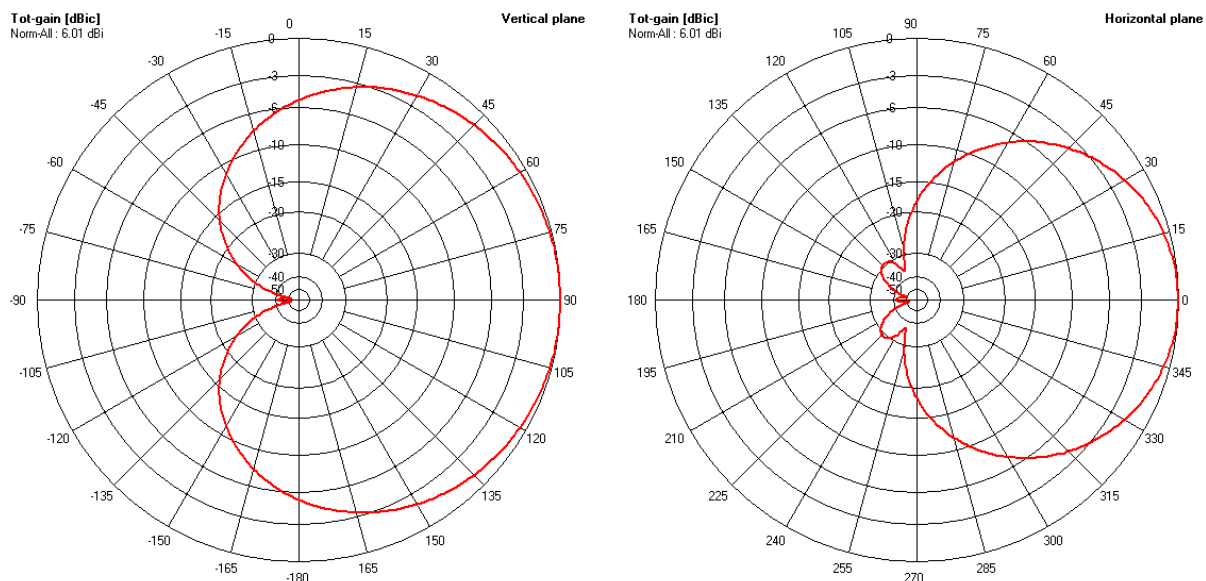
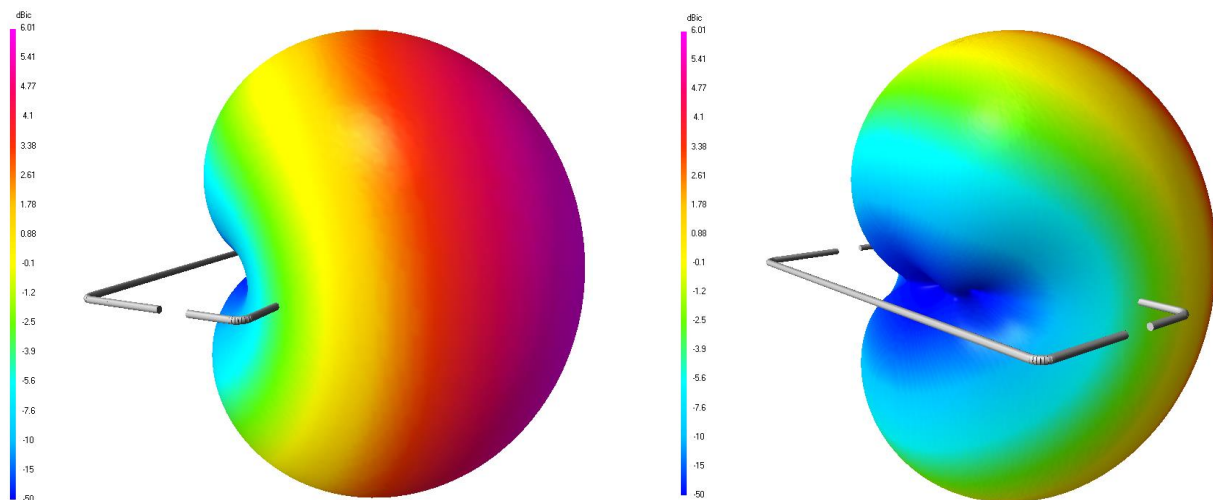


Fig 2. (27.5 MHZ) Freespace 3D Plot - Antenna in horizontal position in Freespace



27.5 MHz Moxon shown for reference
 Suggested model generated using NEC software
 Freespace beamwidth: V-Plane 133 deg, H-Plane 78 deg.

Fig 3. (27.5 MHZ) Mounted 10 Metres above ground plot - Antenna in horizontal position.

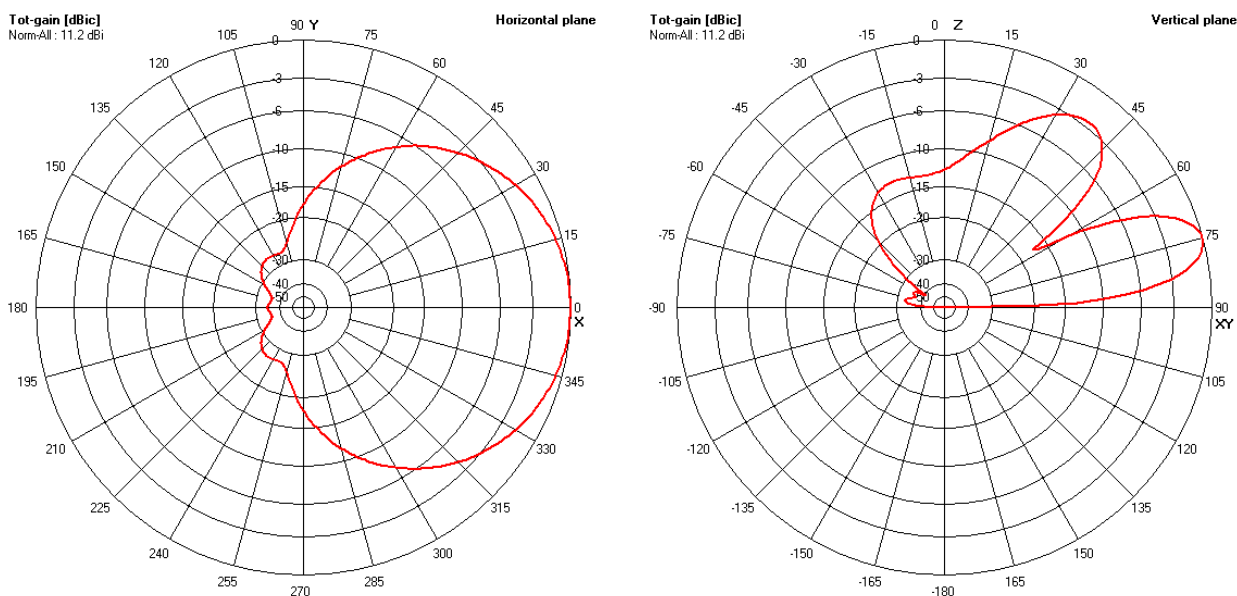
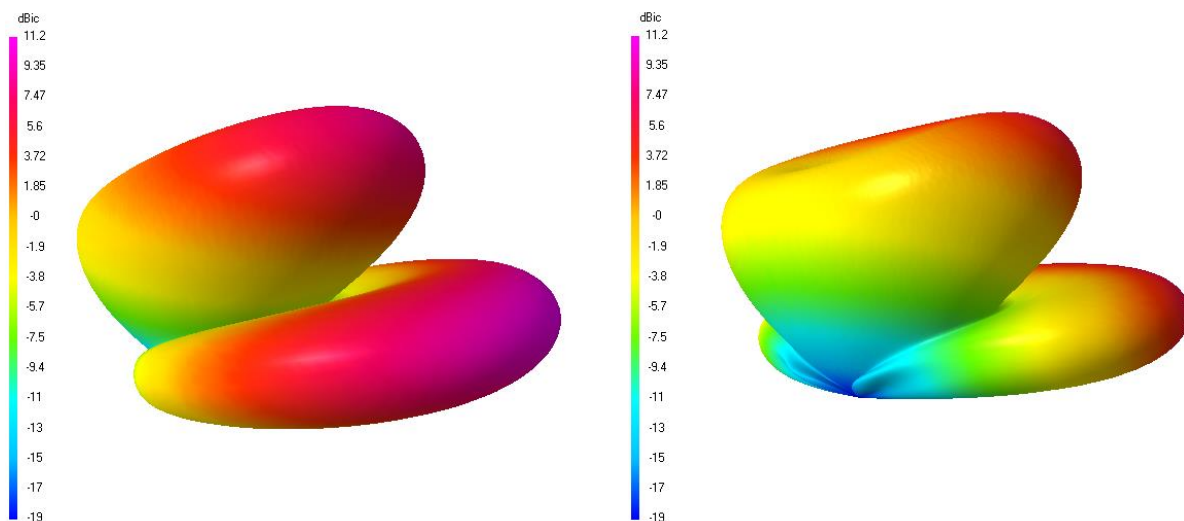


Fig 4. (27.5 MHZ) Mounted 10 Metres above ground 3D plot - Antenna in horizontal position.



27.5 MHz Moxon shown for reference
 Suggested model generated using NEC software

Suggested Beamwidth @ 10m above ground:
 Upper lobe V-Plane 10 deg @ -3dB, H-Plane 78 deg.
 Lower lobe V-Plane 16 deg @ -3dB, H-Plane 78 deg.

Suggested take-off angle @ 10m above ground:
 Upper lobe take off angle 52 deg above ground @ -3dB
 Lower lobe take off angle 15 deg above ground @ -3dB

Tip: Raising the height of the antenna lowers your take off angle. For example:
 @10m high = 15 Deg @12m high = 13 Deg @14m high = 11 Deg and so on and so on...

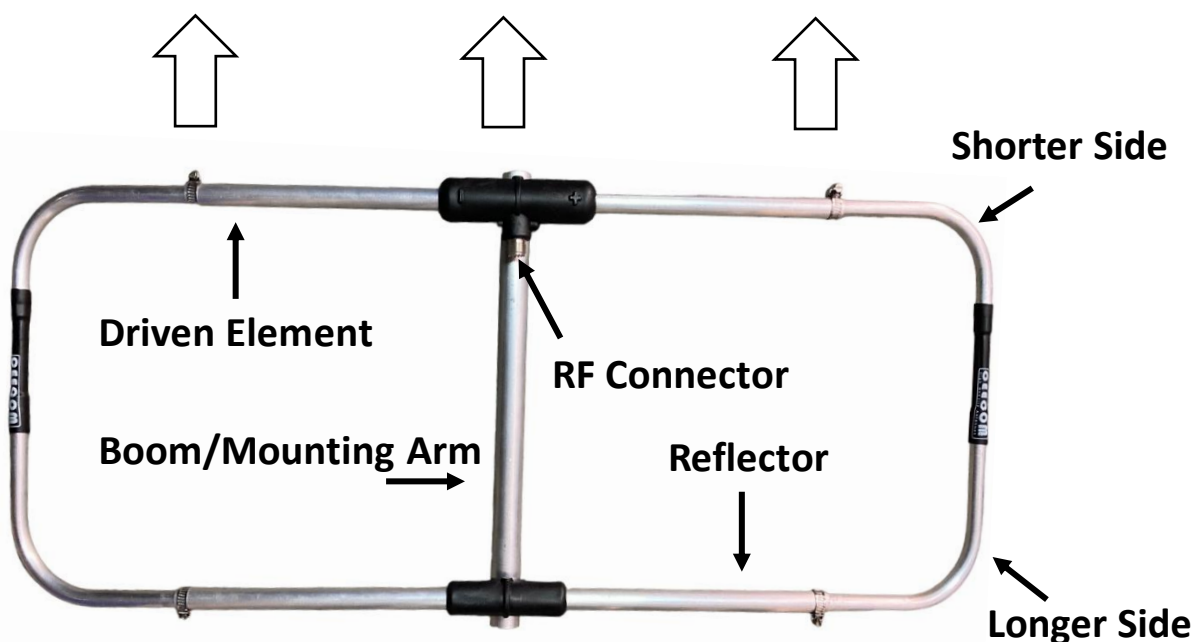
Lets talk GAIN

Lots of manufactures falsely advertise gain, making it very difficult to understand the true performance of an antenna. Gain figures advertised by Ceeecom are based only on freespace calculations making comparison to other antennas simple. Some manufactures advertise figures based on 'above ground' at different heights and other such factors that can inflate the figure. You may notice some figures are advertised as dBi, dBd or just dB which causes confusion. We have compiled a table showing comparison figures of this antenna using different scenarios. In the commercial radio industry 'freespace gain' is typically quoted to allow comparison to other antennas.

27.5 MHZ Moxon Antenna.	Gain dBd	Gain dBi
Horizontally positioned in FREESPACE	3.86	6.01
Horizontally mounted onto a 2" mast/pole 10 metres above ground.	9.05	11.2

Moxon Antenna Basics

RF DIRECTION OF TRAVEL – AIM THIS SIDE TOWARDS TARGET



Setup Instructions

Now the fun begins 😊

Identify the following components:

1 x Larger Mast Clamp (Ref A)



1 x Smaller Mast Clamp (Ref B)



1 x Larger Boom Arm (Ref C)
(Contains mounting plate in the centre)



1 x Smaller Boom Arm (Ref D)
(Contains 2 eyelets at each end)



1 x Driven Element (Ref E)
(This part contains the RF connector)



1 x Reflector Element (Ref F)
(This part does not contain the RF connector)



4 x Aluminium Elements (Ref G)
(Each of the 4 parts contains an eyelet)



2 x Folded Elements (Ref H)



4 x Support Cords (Ref I)



Fixings (Ref J) (Contains 1 spare of each)



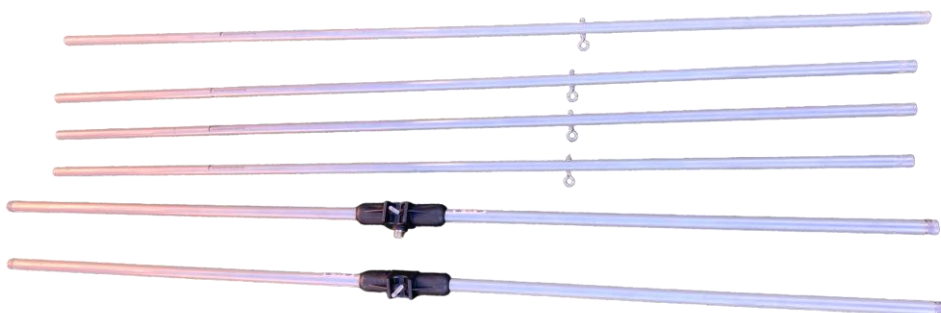
Setup Instructions

Setup and assembly can be done in any order from the instructions below. If mounting on a rooftop it may be easier to assemble on the ground first. If mounting on telescopic mast such as illustrated in these instructions, it may be easier to assemble on the mast at ground height.

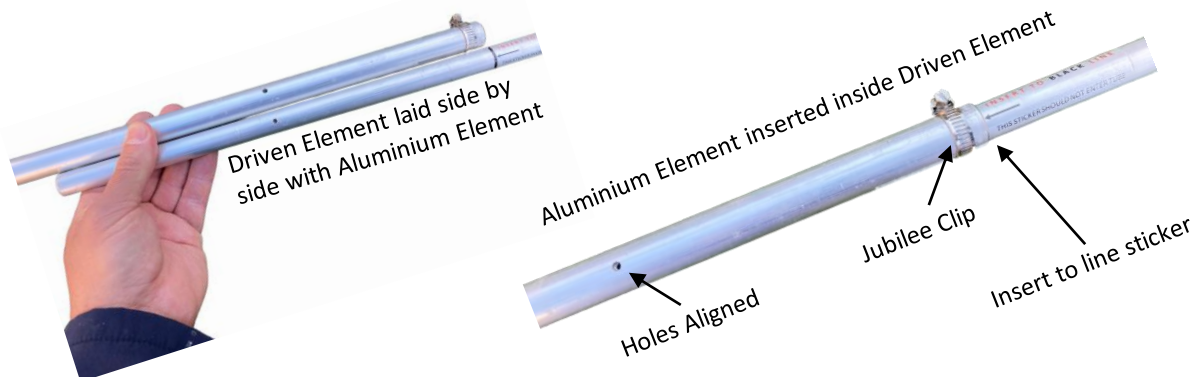
You will require the following tools (not supplied):

- 19mm Spanner (or adjustable)
- 13mm Spanner (or adjustable)
- 10mm Spanner (or adjustable)
- Medium size Philips / cross head Screwdriver
- Medium size flat head Screwdriver
- Tape measure (or 30cm Ruler at very least)
- Common sense and a bucket of Enthusiasm 😊

Lay the Driven Element (Ref E), Reflector Element (Ref F) and 4 x Aluminium Poles (Ref G) on the ground with the fixing bolts and eyelets facing upwards. Loosely place 4 x Larger Jubilee Clips over the ends of the Driven Elements and Reflector Elements



Now insert each of the Aluminium Elements (Ref G) into each end of the Driven element (Ref E) and Reflector Element (Ref F), inserting up to the black 'insert to line' sticker. Align the holes from each pole and insert and tighten the self tapping screws from the fixing pack. Once the screws are tightened then move across and tighten the Jubilee Clips to secure the Aluminium Elements in place.



Setup Instructions



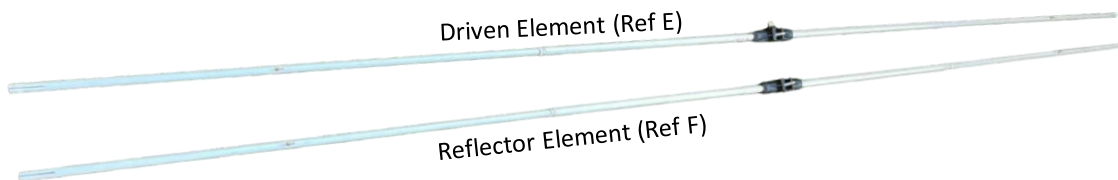
Tighten each self tapper screw into place



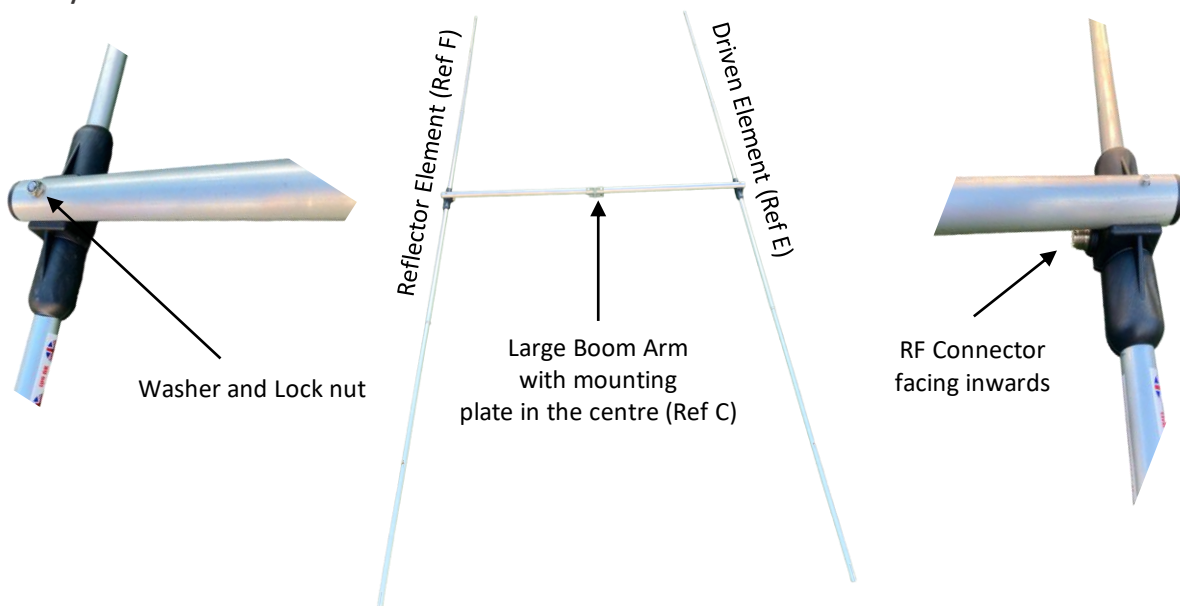
Once the screws are tightened move across and tighten each Jubilee clip into place



You should now have two large antenna parts that resemble the below:

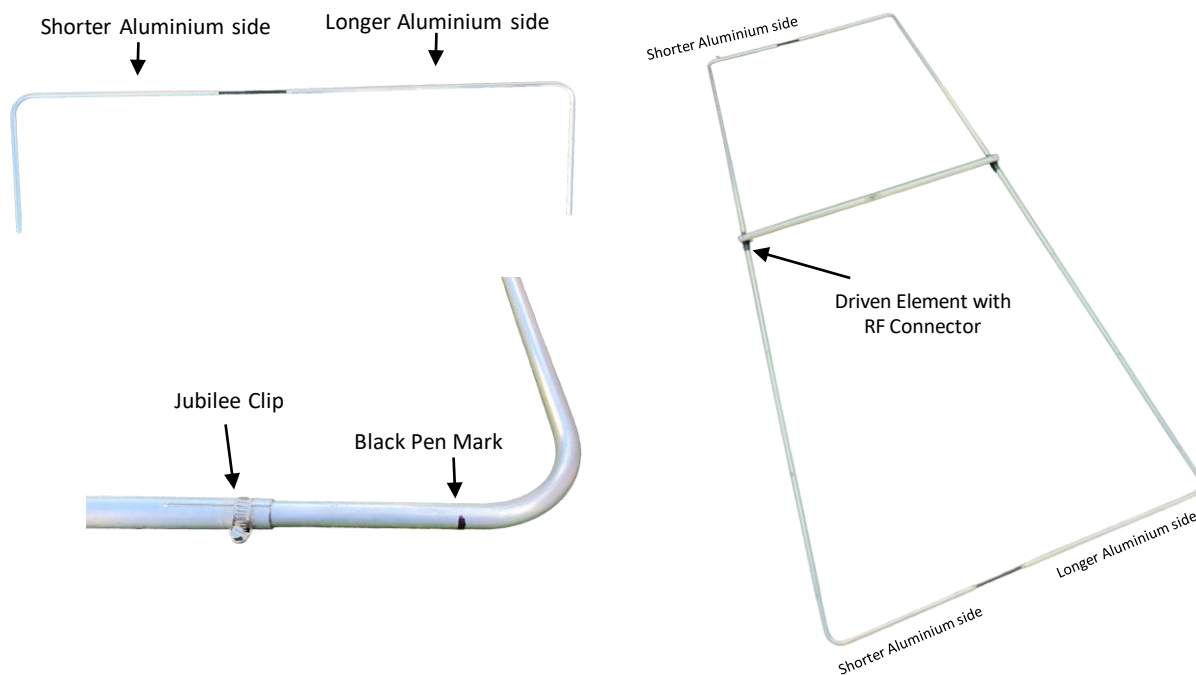


Next, mount the Large Boom Arm (Ref C) onto the Driven Element and Reflector Element as shown below. It doesn't matter which way around the Boom Arm is mounted. Make sure the RF connector is facing towards the inside of the antenna. The Reflector element can be mounted either way around. Place the M6 Washers over the mounting bolts and then tighten the M6 lock nuts into place, make sure the nuts are tight but not so tight that they distort and buckle the tube.



Setup Instructions

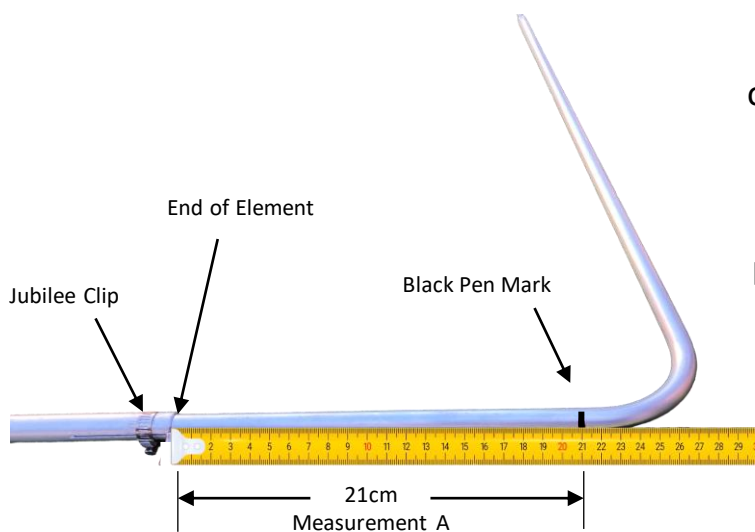
Next loosely place the remaining Jubilee clips over the 4 ends of the antenna you have just assembled. Now mount the two Folded Elements (Ref H) into the ends of the antenna to complete the rectangular shape. Its important to mount these the correct way around. The shorter aluminium side of the folded element connects to the Driven Element side (The side with the connector).



Now this is where it gets tricky... be patient 😊

Determine the frequency range you require to operate on. See tuning dimensions table below. For the purpose of these instructions we'll assume setup for 27-28 MHz operation.

For 27-28 MHz operation measure 21cm between the end of the Elements to the Black Pen Mark and tighten the Jubilee Clips. Do this to all 4 corners of the antenna. This is labelled as measurement A on the tuning table



Alter this measurement for other Frequency Ranges. See below table for measurement A.

If regularly operating mobile you may want to add insulation tape as future marker for assembly

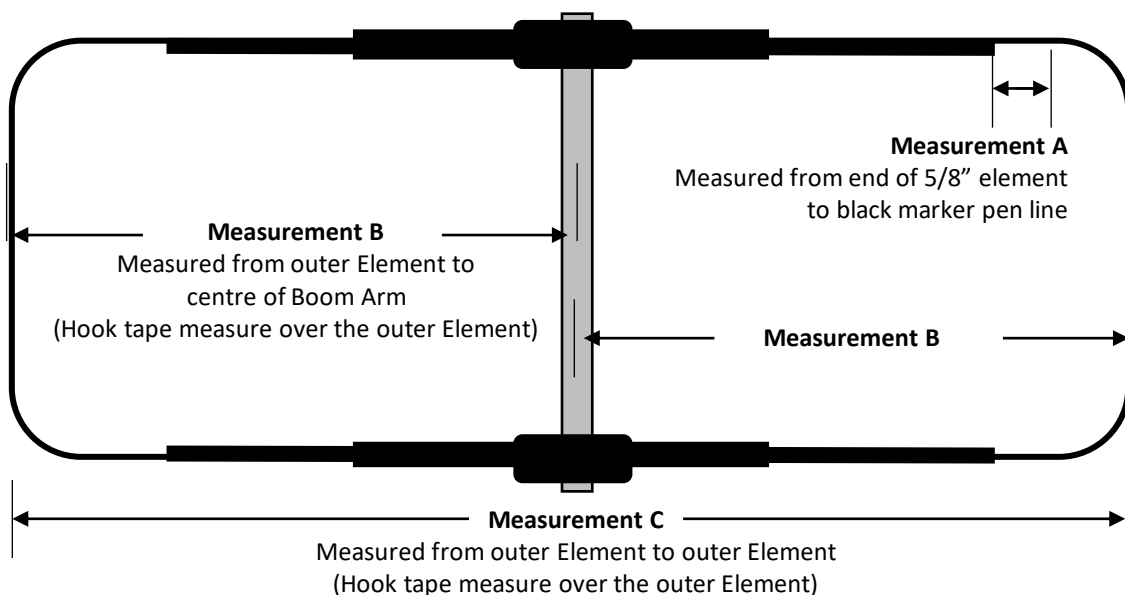
Setup Instructions

Tuning Measurements: The Moxon has 1 MHz bandwidth with VSWR below 1.6:1 and typically below 1.2:1 at its resonant frequency. The Resonant Frequency is not centre of its useable bandwidth, it sits about 400 KHz above start of bandwidth due to the VSWR curve.

Measurements are a guide only, depending on height above ground and surrounding objects, you may need to tweak this further. Extend the folded elements outwards to lower the frequency and shorten them to raise the frequency. Always run at lowest RF power possible when tuning to avoid damage to your transceiver.

We have provided measurement to use at a later date in the event that the marker pen reference point has worn off due to weathering. For initial setup you only need to use Measurement A

Antenna Frequency Range	Measurement A (cm)	Measurement B (cm)	Measurement C (cm)
27.0 - 28.0 MHz	21	205.5	411
27.1 - 28.1 MHz	20	204.5	409
27.2 - 28.2 MHz	19	203.5	407
27.3 - 28.3 MHz	18	202.5	405
27.4 - 28.4 MHz	17	201.5	403
27.5 - 28.5 MHz	16	200.5	401
27.6 - 28.6 MHz	15	199.5	399
27.7 - 28.8 MHz	14	198.5	397
27.8 - 28.8 MHz	13	197.5	395
27.9 - 28.9 MHz	12	196.5	393
28.0 - 29.0 MHz	11	195.5	391
28.1 - 29.1 MHz	10	194.5	389
28.2 - 29.3 MHz	9	193.5	387
28.3 - 29.3 MHz	8	192.5	385
28.4 - 29.4 MHz	7	191.5	383
28.5 - 29.4 MHz	6	190.5	381
28.6 - 29.7 MHz	5	189.5	379
28.7 - 29.7 MHz	4	188.5	377
28.8 - 29.8 MHz	3	187.5	375
28.9 - 29.9 MHz	2	186.5	373
29.0 - 30.0 MHz	1	185.5	371
29.1 - 30.1 MHz	0 - Adjust to black line	184.5	369



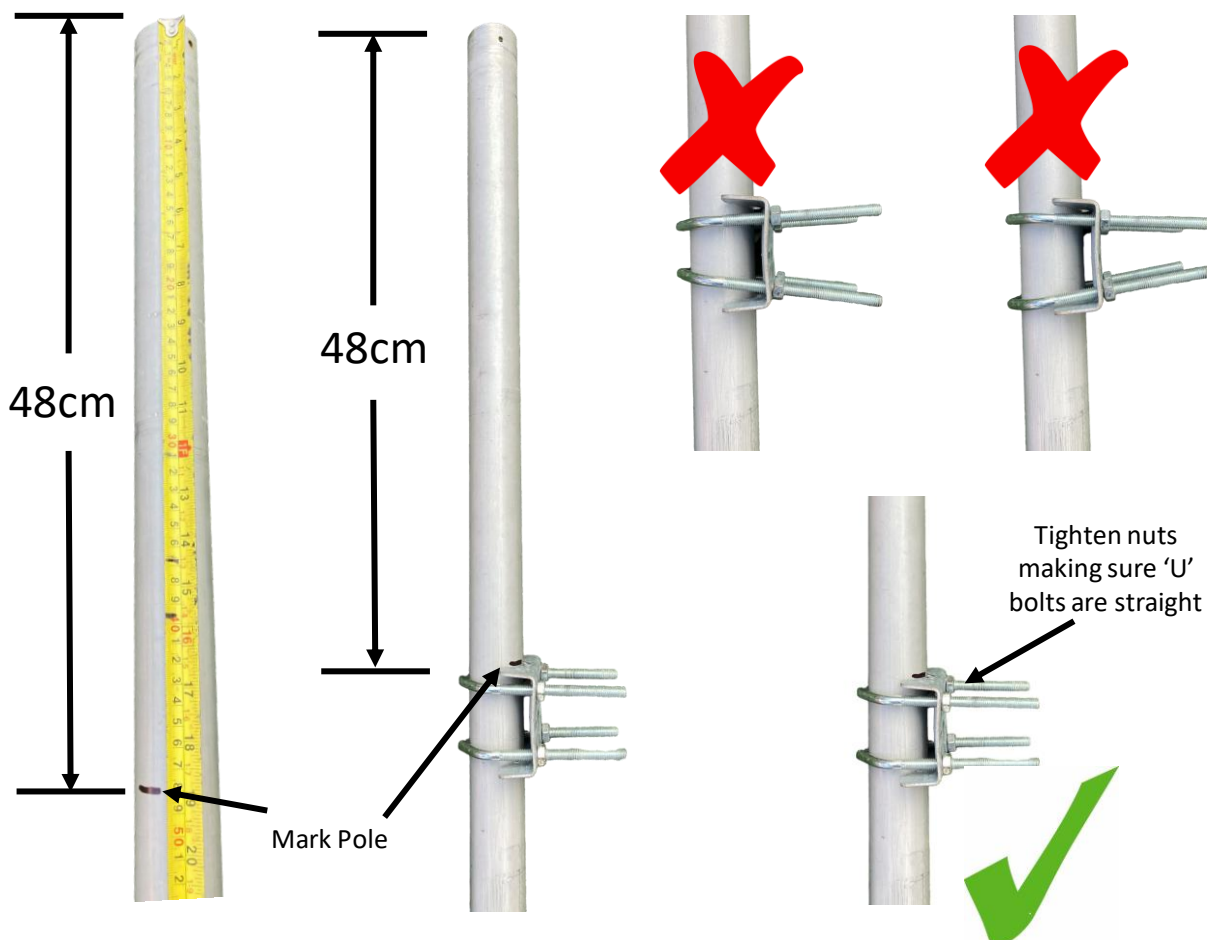
Setup Instructions

Next, attach the support cords (Ref I) to the antenna elements (Ref G) and leave hanging loose for now

Attach the cords like so:



Next, locate the mast pole and tape measure. We recommend using a minimum 2" diameter thick walled tube such as a scaffolding pole or an existing mount on a rotator. Measure down from the top of the mast pole by 48cm's and mark the pole with a pen or tape. Now mount the Larger Mounting Bracket (Ref A) just below the marked line. Fully tighten the nuts making sure its secure. Be sure that the U bolts are straight.



Setup Instructions

Next, attach the Boom Arm mounting plate to the Larger Bracket you have just installed on the mast pole like so:



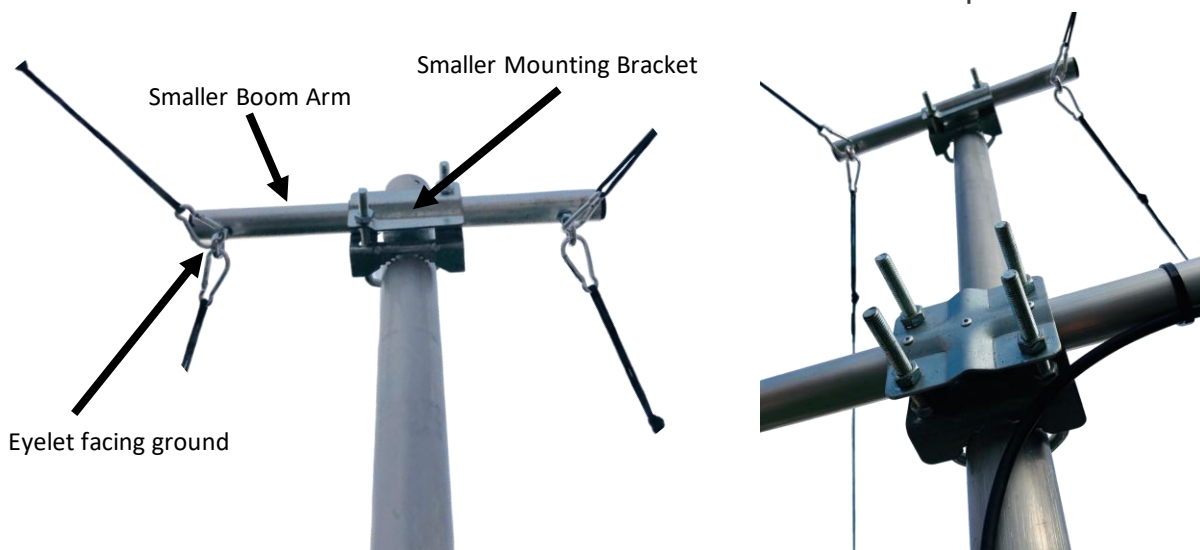
Adjust top and bottom nuts to level off antenna. Fully tighten nuts so that it cannot come loose over time. **DO NOT** rely on the 3 Pot Rivets to secure antenna. The Pot Rivets are there to help align the antenna and do not offer structural strength.

Note: Antenna should be mounted beneath the Boom Arm so its effectively hanging towards the ground. The eyelets should be facing towards the sky. The RF connector should be at the bottom of antenna, not at the top! You've got it 😊

Next, loosely attach the Smaller Mounting Bracket (Ref B) and the Smaller Boom Arm (Ref D) above the Larger Mounting Bracket on the mast pole. The eyelets should face downwards. Attach the 4 support cords that are hanging loose from the antenna elements to the Smaller Boom Arm eyelets, use the metal carabiner clips to attach. Make sure the cords are straight with no twists or tangles and make sure the bracket is in the centre of the Smaller Boom Arm.

Once the cords are attached, push the Smaller Bracket upwards keeping the Smaller Boom Arm parallel to the Larger Boom Arm below. Push up until you feel tension so that the cords fully stretch out supporting the weight of the antenna, now tighten the bracket in place.

Note: Both brackets to be mounted on the same side of mast pole!



Setup Instructions

Next, attach the coax to the antenna connector. Using zip ties, attach the cable to the boom arm and run down the mast. We recommend using self amalgamating tape over your RF connection to prevent rain water ingress to the cable. We recommend winding 4 turns of coax to form an ugly balun at the feed point (diameter approximately 4 inches). This step is not essential but can help prevent RF travelling back down the coax.

If you have assembled correctly it should resemble this:



CAUTION: DO NOT MOUNT THE ANTENNA NEAR OVERHEAD POWER LINES!

And that's it... Enjoy chasing that DX ! Over and Out... 73 !

Ceecom Antennas Limited reserve the right to modify or amend any antenna or specification without prior notice.