

DX COMMANDER

DX Commander Classic 10m Antenna Kit User Guide Version 1.8 July 2021

SAFETY NOTE

DX Commander antenna components are designed for hobby radio amateurs who pass exams where health and safety is included in the syllabus. Please be careful in your handling, erection and general usage of any DX Commander parts so that yourself, property or a third party in the vicinity of your antenna experiments remain safe. Note also that engineered parts may have some sharp edges so be careful before handling roughly with bare hands.

POWER RATING: Tested to 1,500W continuous – 60 seconds max

ATU: Not required

ASSUMPTIONS: This manual assumes you will have watched the first part of the video for the DXC RAPIDE build here: <https://youtu.be/WeR5bSycksA>. Although not exactly the same model, the concepts and components are identical other than the plates and the pole and will assist your build.

Overview: The antenna runs up to SIX vertical elements on a 10m pole with a single feedpoint and is similar in concept to a fan-dipole, but turning the “fan” 90 degrees on it’s axis and placing one side of the fan vertically. Each element resonates automatically. The remaining wire supplied in the kit used as radials. No other hardware other than coax and guy stakes is required.

Supplied: 10m Pole (physical length circa 9.6m), 100m DX10 Antenna Wire, a Plate set and a bag of nuts/bolts etc. The 80m kit has an additional 100m DX10 wire for extra radials.

Option a) Run all 6 elements as quarter-waves in a naturally resonant manner giving you 40m, 30m, 20m, 17m, 15m (as a ¾ off the 40m element), 12m and 10m. The 40m element gives a perfect match on or around 50.150MHz. The 30m element resonates just above this, ideal for the FT8 portion of the band. In this configuration, you will also get a tune on 4m and 2m – and even 70cms but the radiation pattern for 70cms will not be conducive for anything other than short walkie-talkie type chatter. See cut-chart later in this document for element sizes.

Option c) Exchange 30m for an 80m element. See the 80m section later in this document. Or build 3 or 4 element kit (hole spacing on plates cater for this).

Parts list

- | | |
|--|--|
| 1. DX Commander 10m Pole | 10. Appropriate qty Stainless wing nuts |
| 2. Ground plate 3mm aluminium | 11. Stainless Washers |
| 3. Radiating Plate 3mm aluminium | 12. Fork connectors (elements and radials) |
| 4. Guy Plate - UHMWPE | 13. 8 Hose clamps |
| 5. Mid-Spreader - UHMWPE | 14. Some tubing |
| 6. Upper Spreader Plate – UHMWPE | 15. Length of 4mm marine shock cord |
| 7. Double Eye - UHMWPE | 16. Long length paracord (guying) |
| 8. SO239 Assembly with flying lead | 17. Plastic "snap" Carabiners for elements |
| 9. Appropriate qty 6mm stainless bolts | 18. Lengths glue lined shrink-wrap |

Each package is shipped with the single wrapped DXC pole, 100m DX10 roll of wire (or 2 x 100m if 80m configuration ordered), a box with the plates and a heavy-duty plastic bag for the small components.

Please make yourself familiar with all the parts and satisfy yourself that all is present and correct. Wendy, Loki and I pack these boxes so if something is missing, it's our fault. If we do make a mistake,

simply send an SMS / TXT message on the number that we sent you on the order confirmation / shipping and I'll sort it out ASAP. Remember to tell us your name. We appreciate you may be in Outer Mongolia - but we'll still sort it out.

We have a user guide for the 10M pole which can find the user guide on the m0mcx.co.uk website under User Guides.

The Build:

Remove all the nuts and bolts and other small items etc from the dispatch bag and place them safely on a tray.

Inspect the aluminium plates. These CAN BE SHARP. De-burr as necessary for sharp edges and screw the 6mm bolts in place using a 10mm spanner and torque these up sensibly (do not over-tighten else you will strip the threads).

NOTE: You only need a maximum of 7 bolts for the Driven Plate (6-elements plus SO239 connection) and 7 bolts for the Ground Plate. Any extras are supplied as spares only.

Extend the pole FULLY with a robust pull (and twist) between each section Lay the pole down horizontally, perhaps on two garden chairs. If you inadvertently pull one of the sections completely free, simply unscrew the bottom cap and reinsert it from the bottom. You will be securing these anyway so a small tolerance is acceptable.

Install the SO239 connector in the bent-up tab of the ground plate. REMOVE and discard all the washers supplied for the SO239, they are not required. Tension the SO239 nut on the thread so that the flying lead faces inwards.

Wrap a section of self-amalgamating tape around the SO239 assembly (supplied) to eliminate possibility of water seeping in between the PTFE and thread body.

Remove the bottom cap of the pole by unscrewing the cap and install the ground plate, tab facing away from the base of pole. Screw the cap back in place. Be gentle when re-assembling. It is best to slightly unscrew the cap initially to get a feel where the threads are before screwing the cap in place.

Prepare all the hose-clamp assemblies by unscrewing each clamp apart and cutting and installing some of the rubber / PVC tubing to protect the tube from the bare metal clamps. TIP: Measure the tubing first by wrapping it around the tube and cutting to suit. You may cut a notch in the tubing for the screw-thread to fit nicely.

Slip over the driven plate. You may find this quite a neat fit. You can free any tightness with some sandpaper or a file on the inside hole of the driven plate before gently pushing it down. Conversely, you may remove any looseness between the plate and the pole by wrapping one or two turns of electrical tape just above the base before slipping over the plate for a snug fit.

Apply two firm wraps of electrical tape to each of the fiberglass joins. To create an even more secure fit, you may use lengths of self-amalgamating tape to each join BEFORE adding the electrical tape, as per the video.

Install the first hose clamp directly above the driven plate to stop it lifting upwards.

Place the second hose-clamp assembly just ABOVE the first join, where the guy plate will be installed. You will find it easier to install this clamp BELOW the guy plate to allow easy access to the screw of the hose clamp. Tighten appropriately, making sure the pole is fully extended and install the rest of the clamps and plates up the pole accordingly.

Connect the SO239 assembly flying lead to the driven element, creating a little loop in the process. This allows for the driven element to slightly "float" and not tear off the flying lead.

Elements:

DO NOT MAKE YOUR RADIALS YET – CUT ELEMENTS FIRST

Make up your elements according to the cut chart as follows:

- 10m – 2.50m
- 12m – 2.84m
- 17m – 3.89m
- 20m – 5.02m *
- 30m – 6.80m
- 40m – 11.15m *
- 80m – See section later in this document

Cut your elements 5cm / 2-inches longer than required and crimp / solder / connect one fork connector per element. Once satisfied over your fork-connector installation, measure again and cut to suit as per cut-chart. Don't include the whole fork-connector in your measurements, just the wire which is now embedded at the bottom of the fork barrel.

Cut just over a 12mm (half inch) section of glue-lined heat shrink and apply that to the exposed fork-connector, where the element joins the fork connector to keep out water and reduce corrosion.

Create a fold-over of 6cm long at the end of each element (not 20m or 40m) and secure with a small section of glue-lined heat-shrink or electrical tape. Do not add any more wire to your calculations to make this fold-over loop, use that as part of your cut (as per chart).

- * For 20m Element, create a fold-over of 20cm and apply glue-lined heat shrink to secure loop
For the 40m element, do **NOT** create any fold-over (yet)

Suggest you label or color/colour code your elements at this point and put them safely aside. I found a supply of children's number beads on eBay. These are not supplied in the kit but are great fun for labelling your elements.

Radials:

The ground plate allows for up to 7 radial connection points. You may fit up to four (4) radials per fork connector. You may fit more than one fork connector on each radial point.

It is genuinely up to you how long your radials need to be. After cutting all the elements, you will be left with around 70m of wire on the 40m kit. This document is not a discussion about "how many radials do I need". We have published many videos about that. This one might suit you: <https://youtu.be/M0qSRjltgoo> A very basic rule of thumb is more radials of a shorter length are better than fewer at longer lengths.

Here are some examples based on around 70m of wire and your 7 holes on the ground plate:

- 7 Radials 10m long
- 14 Radials 5m Long
- 21 Radials 3.33m long (our favorite)

If you have an additional 100m of wire and ONLY need to go as low as 40m band, then consider:

- 28 radials (4 per connector) at 6m long each

28 radials at 6m length will only give you around 1.5dB (approximately and debatable) extra gain over the 70m of wire (at say 21 x 3.33).

Of course, you may also cut these shorter (probably not less than around 3m) and create more radials too.

Strip around 25mm (1 inch) of the insulation of the ends. LIGHTLY twist these together depending on how many radials you want per fork connector (maximum is 4). Do not over-twist these little lengths. The more twist you induce, the fatter the little bunch will become and it will be more difficult to insert down the fork-connector barrel (which may be widened if necessary with a small screwdriver).

Cut approximately 25mm (1 inch) of glue-lined heat shrink from the pack and slip this section over the exposed copper wires in preparation of sealing this connection from the weather.

Insert the wire into the fork-connector and crimp or solder.

Apply the glue lined heat-shrink and heat with a flame or a hot-air gun.

Element Installation:

You may elect only to have a 3-element or 4-element system. The hole patterns allow for this. Let us assume we are building the 6-element system (diagram in blue).

The placement of each element on the driven plate will have a slight effect on the lengths of other elements. The cut chart assumes that the elements are connected as per drawing.

Although it does not matter which element you start with, let us start with the 30m element for sake of argument. Connect the fork-connector to the aluminium driven plate by slipping a washer over the top of your fork connector and secure with a supplied wing nut.

Line up all your plastic plate sets and thread the 30m element through the guy plate, the mid-spreader and the upper spreader.

At around 30cm (1-foot) from the upper Double-Eye, make up a small loop, large enough to be able to clip a plastic carabiner to. Secure the loop with electric tape. You can finish this off in time permanently with a small section of heat-shrink.

Make up a single-ended shock-cord extension of approximate length that will eventually extend your element to the upper double-eye with a snap-hook carabiner via this loop you have just made.

Connect this little extension to the upper double-eye and tension the shock-cord for a trial fit by hand down to the loop you have made previously. Consider where a knot should be tied for the snap-hook base. Remember to mentally add about 25mm / 1-inch in your mind for the end of the snap-hook carabiner for full tension.

Slip over the base of one of the snap-hook carabiners and tie a single overhand knot to stop it coming off. When you are comfortable with the likely fit, you may connect the other part of the snap-hook to make a permanent dedicated length for use with that element in future.

We recommend tensioning the shock-cord to around 90% of full stretch. Repeat for all the other elements.



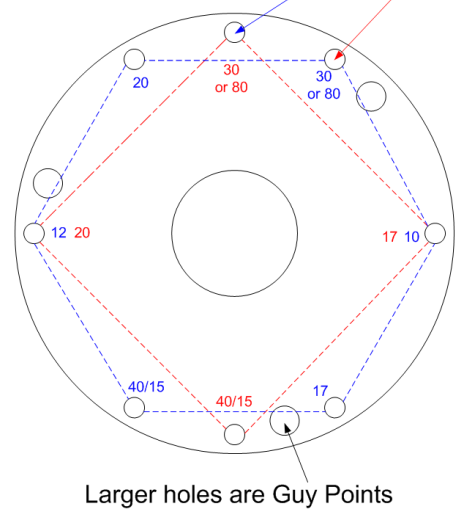
40m element: Make a small tensioning loop parallel (and at the same distance from the driven plate to where the 30m element stops). In other words, match the loop for the 30m element. This is to keep all the elements below the upper double-eye at a steady tension. Again, use electric tape or heat shrink to secure it.

Continue the element to the top, optionally go through the little metal eyelet and come back down towards the upper-spreader. Supplied in the kit are TWO different diameters of PVC tubing. Cut these into half-inch sections and use some of these to slip over the end of the pole and secure the 40m element in place.

NOTE: USA / Region 2 Ham Radio: Reduce the foldback (cut the wire) by around 12-inches for resonance above 7.2MHz.

The remaining elements connect to the top spreader (with shock-cord extensions) apart from 10m and 12m. Connect these only to the second UHMWPE plate. They do not need to continue to the top.

10m ABV Classic HOLE PATTERN
Square (4-element) or Hex (6 element)
For 3-elements, cut use every-other Hex hole
4-Element (in red) and fit SO239 here
6- Element (in blue) SO239 here



Erecting your antenna

Install three guy-stakes (not supplied) 120 degrees apart and approximately 1.2m (4-feet) away from the base of your proposed installation.

Cut the paracord into three sections and secure to your guys stakes. Bring each of the three paracord lines towards the centre of your working area where the antenna will be.

Make a small loop just over half-way between the guy stake and the guy point will be. To confirm, this will be around 50cm / 2-feet from the guy plate.

Site your antenna and lean it on your shoulder, reach down and grasp the first guy. Insert the end of the guy rope through one of the guy holes in the guy plate, and pull it down towards the loop you have just made. Place this return line through this little loop and tie off with a gentle half-hitch.

Repeat for the other two guys, then adjust where necessary. For fine-tuning the vertical appearance, you can simple relocate the base of the antenna a small amount.

Double-tie off your guys with more half-hitches.

NOTE: **DO NOT** use the supplied carabiners for guying. You may use 3rd party carabiners for the guy plate.

Wind gust protection:

It is possible that storm winds may have enough severity to cause local damage to buildings, infrastructure and even antennas. We do a replacement service for the antenna if this happens. Just get in touch with us and we can ship you another telescopic pole at cost.

To protect your investment though, we recommend a number of solutions to assist in keeping your antenna working, even through stormy weather.

1. The base of your antenna can move (rare)
 - a. You can drill a small hole in the base of the screw cap and sit the pole on a small wooden dowl hammered into the ground below the pole
 - b. You can add ground guys: Connect loops of cord between the driven plate and the ground plate and connect these directly to your guy stakes
2. Storm damage
 - a. You may also use light cord from the Upper Spreader to the same guys stakes you used previously. You can lightly guy these only. They are there only to assist your pole in the event a large wind gust attempt to tear down your installation

It should be noted that the vast majority of users report years of service without conducting any of this additional work and the price of a replacement pole is light compared to a new system. However if you really know that you are going to be experiencing a serious storm ahead of time, perhaps loosen one guy and lay the antenna on the ground.

Tuning

The antenna will tune perfectly as is. The cut chart we have created will give you perfect tunes on all bands at centre of SSB operation.

If you want to tune your element lower, say for dedicated FT8 or CW, you can use this SWR calculator to determine where you would prefer the tuning to be: <https://www.m0mcx.co.uk/quick-swr-calculator-for-vertical-and-dipole-ham-radio-antennas/>

80m Notes

In the event you wish to experiment with 80m, disconnect the 30m band and install an inverted L for 80m instead. You will find this will work on 80m very well and you will still get a tune on 30m with your ATU button as a third-harmonic.

Cut 19.5m of wire and make a regular element with a 6cm fold-back for holding your inverted L. Go up to the Upper Double Eye and thread your element through here and connect the very end to the nearest tree or fence post.

In time, you will notice wear between the element and the plastic. You can circumvent this by making up a very small 6-inch shock-cord extension with 2 x plastic carabiners and creating a small loop for the element to hold on to. If you have already previously made a 30m element, just use the same shock-cord extension here.

OPTIONAL: If you prefer to have less bend for your installation, you can instead come off the Inverted L at the 5m point; the Upper Spreader. The pole is more substantial at this point. You will notice probably no difference in signal quality either however you will only need 19m of wire if you make it this way.

Radials for 80m kit:

You will find that after cutting your radials, you will have around 150m of wire left over.

Your options for radials are therefore:

- 14 Radials 10m Long
- 28 Radials 5m long (my favorite – with a little wire left for making adjustments)

ADJUSTMENT NOTES:

DX10 wire can be extended easily. Just join as you would any piece of copper wire by stripping around 25mm (1 inch) of insulation and twisting the wires together. Solder is optional because glue-lined heat shrink will stop oxygen and moisture entering the join.

Glue lined heat-shrink can easily be removed by carefully slitting the heat-shrink down the middle with a sharp knife.

MAINTENANCE

We suggest inspecting your installation every 12-months for early warning signs of inappropriate wear or element damage etc.

Waterproofing connectors: Callum M0MCX always uses Vaseline on the SO239 threads and PL259s and then coats the whole connection assembly with one half teaspoonful of petroleum jelly on his installations. He repeats annually and has never had a water ingress failure.

Callum, M0MCX June 2021.