

DX COMMANDER

POTA / Venture Antenna Kit - User Guide – April 2025 V0.02

HEALTH AND SAFETY WARNING

DX Commander antenna kits 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 and smooth with file / emery paper where necessary.

BEFORE ASKING FOR SUPPORT PLEASE READ ALL OF THIS GUIDE

WHAT IS A DX COMMANDER?

Essentially, most DX Commander vertical antenna systems comprise a number of wire element suspended under tension on a telescopic pole.

The Venture was primarily designed for fast deployment and based around the requirement for 40m, 20m and another band.

40m is achieved with a small loading coil, 20m is a full quarter-wave element and we have also designed a 15m element – also a quarter wave.

The 40m loading coil gives a near-match to the 10m band and you will require an ATU to trigger best performance.

All other bands are catered for by internal ATU from radio.

***NOTE:** This kit can also supply a perfect tune for any three bands, say 20m, 15m and 10m.*

KEEPING IT SIMPLE

Please remember that all we are doing is creating resonant lengths of copper wire, held rigid on a telescopic pole using shock-cord to keep tension.

We can make this as difficult or as easy as we like but if you miss a bit of the user guide or don't understand something, remember this is just supposed to just work. And it will. The laws of physics won't change between Warwickshire and your place.

RADIALS

We supply 100m reel of DX10. Make your elements FIRST and then use about half the remainder of the reel to make ideally:

Five or six sets of radials

Each set will have 4 x radials

Each radial will be 2m (7-ft) long

You may make more if you want to, however, you will probably never notice the difference.

It is worth pointing out right now that even if you only fit say a 90-degree arc, the antenna will still work. We have proven beyond a shadow of doubt that the specific lengths of radial wire will NOT matter, what is more important is just getting SOME lengths of wire on the ground.

Also... More shorter ones are better than less long ones.

Have fun and enjoy your new antenna.

Callum McCormick

Callum McCormick, April 2025

Founder – DX Commander

OVERVIEW

The POTA / Venture DX Commander Antenna kit is supplied with the following:

- Telescopic pole (circa 6.7m long)
- Aluminium ground and driven plates
- Spreader Plates
- Various clamps
- DX10 Antenna Wire
- SO239 Assembly
- Selection of fork crimps, shock cord, nuts, bolts, washers and nylon clamps
- Shock-Cord
- Tiny piece of PVC tubing
- Ground Post
- Coil Former

TELESCOPIC POLE

The Venture “7m” pole has a snug fit assembly with a screw cap at the base and a rubber bung at the top.

Remove any packaging and lay the pole across some garden chairs or work-horses.

Carefully pull out each section and **firmly** lock into place with a **strong, firm tug-and-twist** action.

Note: Don't be shy about pulling each section out!

PLATE SETS

ALUMINIUM PLATES

Ground Plate

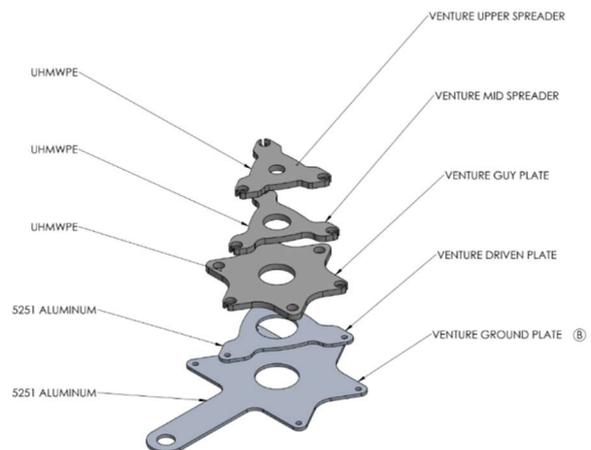
At the time of writing this user guide, we may supply a Ground Plate with either five or six radial points, however – right now, fit your SO239 Assembly to the ground plate and tighten the securing nut.

NOTE: You do not need the SO239 ground washer (if supplied). That may be discarded

Unscrew bottom cap, remove the rubber bung inside the cap (can be tight!) and fit the Ground Plate with the tab facing up the pole. Screw base cap back on firmly.

NOTE: Before you install the aluminium plates, it is easier to fit all the supplied bolts, washers and wingnuts to the aluminium plates (with the thread facing upwards).

Tip: In the field, put the bung and rubber cap IN YOUR POCKET else you'll lose them!



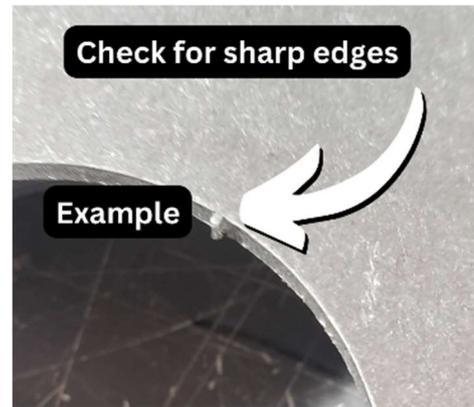
Driven Plate

FIRST DON'T FORGET to Fit the Herbie Clip (picture down)

NOTE: The Herbie clip insulates the driven plate from the alloy housing and the driven plate.

Slip the driven plate over the top of the pole, all the way to the bottom where it should sit snugly just above the Herbie Clip.

NOTE: Driven Plate might be a snug fit (by design). A file or some emery paper / sandpaper will smooth the inside of the plate to aid fitting if required. Do not force.



Securing the Driven Plate

To stop the Driven Plate from rising up the pole under tension, fit the EzyClamp and tension with 8mm box spanner. Don't worry if there's a little bit of wobble on the plate. It won't affect anything – however you can push the clamp downwards when tightening to reduce that effect. Trim off excess.

Fit the clamp just above the Driven Plate and pushing down as you tighten to ensure a snug fit.



STAINLESS BOLTS AND WING NUTS

Fit the bolts to the driven and ground plates, thread facing upwards. Screw on the stainless wing nuts.

Note: There is no direct engineering reason the threads must face upwards other than the fact that it is probably easier.

PLASTIC SPREADER PLATES

The three plates have a different inside diameter hole.

The plate with the largest inside hole slips over the pole first, and the plate with the smallest hole goes last. You will slide these into place so that each plate fits on every OTHER section, starting at the top of the second section from the largest diameter (bottom) section.

NOTE: *These plates should be a snug fit – they might not stop right on the join. Don't worry, push them as far as you can then leave them. Better that way than them all twiddling around in the wind.*

STAY UP KIT

Because this antenna is designed for /P and temporary working, no other clamps are supplied. In practice, if you extend pole thoroughly and fully with a good twist and pull action, you will not need any clamps.

They are available separately if required.



TESTING YOUR ANTENNA POLE

Once you have all the clamps and plates installed, we recommend that you test your pole out so that you may gain experience in how the pole flexes and handles at your location.

Before choosing a spot at your location make sure you are aware of any obstructions, electrical wires and consideration of any health and safety you may need to be aware of.

TIP: *Clear the area of pets - and people who are not directly helping you.*

WE SUPPLY A GROUND POST

We supply a Ground Post. This is designed to fit inside most Patio Umbrella Housings. Callum prefers the water filled types. Note that sand is 1.6 times heavier than water so once comfortable with the idea, perhaps swap over to sand (not supplied!)

MAKING THE ELEMENTS

Each element will require a fork connector at the base.

Don't worry if you have not got a soldering iron, crimping this hard will be suffice and the glue lined heat shrink will keep out moisture / corrosion.

Slip over the small section of glue lined heat shrink (that you have already placed on the element) and slip this down, right over the barrel of the fork and heat with gas hob / lighter or hot air gun.

40m Element

The 40m element has a coil half-way between the base and the first Spreader. The coil former is supplied. Cut 8.5m (28 feet) of wire from the DX10 reel.

Making the coil: You have two options

Tip: you don't need to make this complicated – just see the pictures

- 1) Drill two small holes about 4mm in diameter (just over 1/8th inch) 30mm (1 ¼ inches) apart from the middle of the coil former and wind the coil appropriately as per picture
- 2) Wind the coil and instead of using holes, wind insulation tape around the windings to stop them from coming apart. You may need two cable ties each end of the coil to stop it unwinding under tension.
 - For those who operate below 7.2MHz, you will need 11 turns on the coil former
 - If you operate above 7.2MHz, wind exactly 10 turns on the former

Leave a tail of about 70cm (27 inches) and wind your coil as photograph.



NOTE: Tape is not necessary if you drill the holes

To keep the aesthetics of the coil, suggest you run two Z loops with some shock-cord between the loops that pull to tension when the element is tensioned up. See picture above on right.

We can fit the shock-cord now using stopper knots (see later in this document). Un-tensioned, this will be about 20mm (1 ¼ inches) long.

Now measure the distance between the end of the Z shaped loop and the very beginning of the element where we will fit our fork connector - and cut at 56 cm / 22 inches



Then apply a fork connector, similar to how we attach the radials, but only use one wire – the one you just cut.

Note: 40m only: Don't do anything more right now, just move to next element.

20m Element

Cut exactly 4.81m (189 ½ inches) of wire off the reel. Make a loop of 6cm (2 ¼ inches) and make a foldback / loop here. Secure ONLY with electrical tape for the time being. Leave a “hole” to put a stopper knot in of around 15-20mm (around ¾ inch). Apply a fork connector to the other end.

15m Element

Cut 3.31m (130 ¼ inches) off the reel. Fold back 32cms (12 ½ inches) and tape this foldback so that it doesn't flop around. Leave a “hole” for the stopper knot.

Note: This 15m element will assist tuning the other bands so always fit it.

ELEMENT FOLDBACKS

We discussed these foldbacks. Don't add any more wire to suggested cut, just cut as per measurement.

Make the fold-overs (20m and 15m elements only). Do that now and secure the folded-over loop with some electric tape on a TEMPORARY basis.

When you make your loop, leave 15mm (¾ inch) “hole” at the top of each loop to allow you to push a shock cord knot through in the field. For now though, use electric tape.

- **Remember:** Replace all the electric tape after checking the SWR curves with glue-lined heat shrink (supplied)



SHOCK CORD

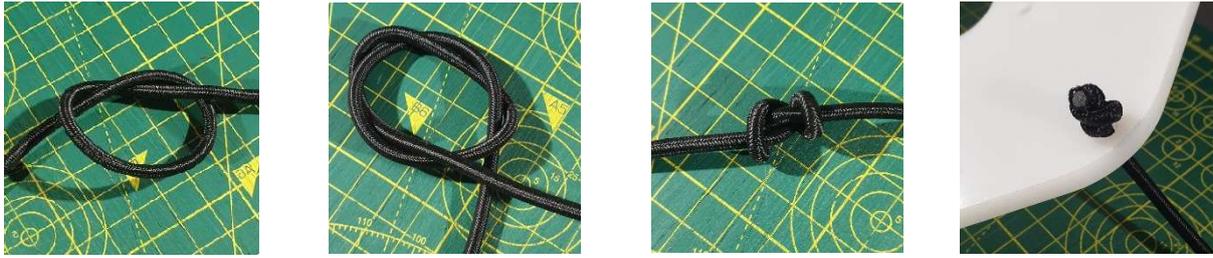


Elements are secured with shock cord between the end of the element and the next available plastic spreader.

We supply 4mm Marlow Dyneema genuine marine shock cord which stretches to 200% length. In real-world use for our purposes, we are aiming for a stretch of around 180% which holds our elements just tight enough. This may be increased once tuning is complete.

NOTE: It is important you understand a simple stopper knot, sometimes called a double-overhand knot. Please practice on a small piece of shock cord before proceeding.

TIP: If you don't over-tighten these knots, you can easily undo them before final tune.



Evolution of a Stopper knot

Some people prefer a figure-of-eight knot however the knot shown is preferable because it makes a better “lump” and in practice holds the element very well.

TIP: A double over-hand (“stopper”) knot is just a regular knot with one extra turn.

Note: Leave the elements to one side now – let us make the radials

RADIALS

For the Venture, we recommend either five or 6 sets (depends on the Ground Plate supplied) of four radials each. Each individual radial will be 2m (about 7 feet) long.

Please remember to make your elements **FIRST** before making up your radials else you may use up too much wire from the kit.

General Note on Ground Radials

As a rule of thumb (and depending on ground), 1 wavelength of radial wire at the lowest frequency of operation (cut to almost any random length[s]) laid out in a radial pattern will achieve only 1.6dB less than 120 radials of ¼ wavelength radials.

2 wavelengths of radials will give you 0.4dB more than 1 wavelength.

Of interest, cutting the radials down from 1/4 wavelength to 1/8 wavelength BUT doubling the number has almost zero effect on efficiency. Same amount of wire, just more of them (science experiment courtesy of Rudy Severns N6LF).

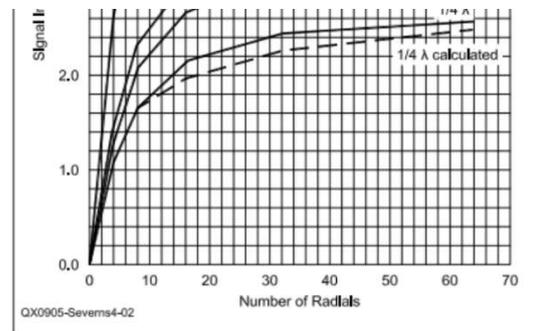


Figure 2 — Typical improvement in signal as ¼ λ radials are added to the basic ground system (a single ground stake).

FITTING FORK CONNECTORS TO RADIALS

Cut all your radials in bunches of four, trim approx. imately 30mm (1 ¼ inch) of insulation from each radial. Twist these 4 bare copper strands LIGHTLY together and then slip over around 25mm (1-inch) of glue lined heat shrink.

Place your twisted together radials inside the barrel of a fork connector and crimp.

NOTE: before we had fancy crimp tools, we used a pair of regular old (blunt!) side cutters to make a good (squashed) connection here before optionally soldering.

Heat up the fork connector with your soldering iron by adding a small blob of solder here. Let cool for a few seconds and slip over the small section of glue lined heat shrink that you have already placed on this radial set. Place this right over the barrel of the connector and heat with gas hob / lighter or hot air gun.



Construction of set of 4 x radials

INSTALLING ELEMENTS

Note: Before you check ANY tuning, you MUST install all three elements since they will affect each other slightly. Small increments of tune will have no effect on another element – but if the element is completely missing, you can accidentally tune up incorrectly.

40m

Remove all the white Plates from the pole and slip over the 40m coil, connecting the base to a spare place on the Driven Plate with the fork connector.

Put all the plates back on the pole. Pull the element taught and measure 150mm (6 inches) down from the first spreader and make a Z shaped loop and heat shrink this with a hot air-gun or flame.

Take the shock cord (don't cut it!) and make a stopper knot in one end and slip the whole section through the loop.

Now make another stopper knot about 7cm (3 inches) long so that you can tension the element to the first spreader via the "Speed Slot".



Note: These very small loops as a percentage of wavelength have almost zero impact on your tune, do not worry.

- Middle Spreader: cut a 50mm / 2 inch section of heat-shrink and slip this over the element and heat shrink it where the element passes the Middle Spreader.
- Top Spreader: Z shaped loop and shock cord as First Spreader.

The idea of the intermediate tensioning points is to keep the 40m element nicely balanced in tension when the wind blows.



Steps to create a mid-way tensioning loop

Now take the element not right to the top but:

Region 2: 7.2MHz and above (assuming 10 turns on coil) take the element to within 17cm (7-inches) from the very tip and come back down the pole by around 18 inches. In the interim time, you can make a regular “hole” at the top of the element here and carefully put three or four gentle wraps of tape back down this foldback.

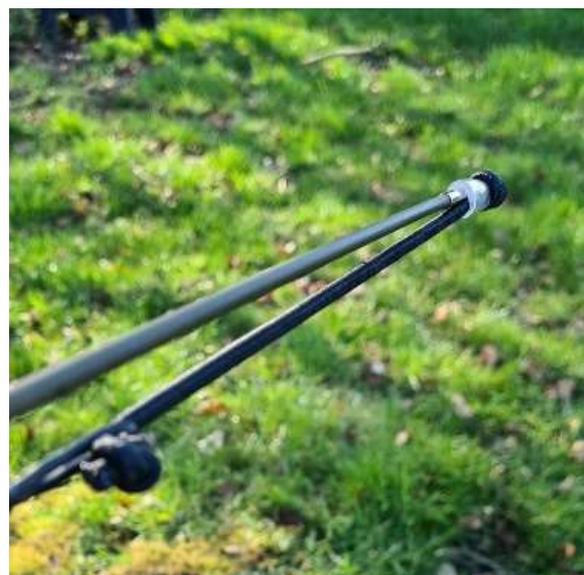
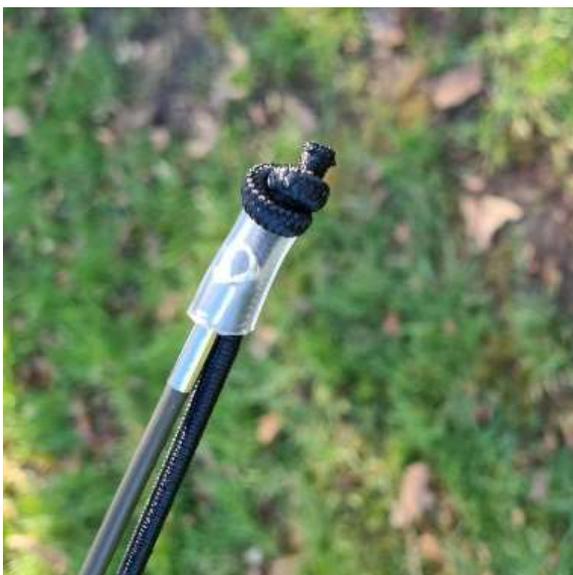
Region 1: (EU / UK etc) 7.2MHz and below (assuming 11 turns on coil) take the element to within 50cm from the very tip and make a foldback of 6cm long as per 20m elements.

Tip: Do not waste the shock-cord by cutting into random sections, instead use it up gradually for each element. In the event that you do want to make an extension one day, you can use some 550 paracord cord and tie it to the shock-cord using a “fishermans” knot. This webpage explains it nicely: https://www.netknots.com/rope_knots/fishermans-knot

Tensioning the 40m element: Use the small piece of clear tubing in the kit and thread some shock-cord through it. This piece of shock-cord is critical, not too tight and not too loose – but enough to stop it all wobbling about.

Connect the very top of the element now – with shock-cord to the plastic tubing and push it right over the top of the pole. See picture for example

Now connect to the top of your 40m element and tension. We are seeking a slight “bow and arrow” shape to the top which demonstrates the element is taught.



The 15m and 20m elements

We will not use any of the Z Shaped tension loops but to stop the elements from freeing themselves from the speed slots, we will add about 50-75mm (2-3) inches of heat-shrink where the elements go past the speed slots.

This means that we can easily thread the element through the Speed-Slot in the field, but the glue-lined heat shrink will hold it steady.

All that remains to do is connect the SO239 to one of the shared Elements (I used 20m) and connect the radials.

TUNING

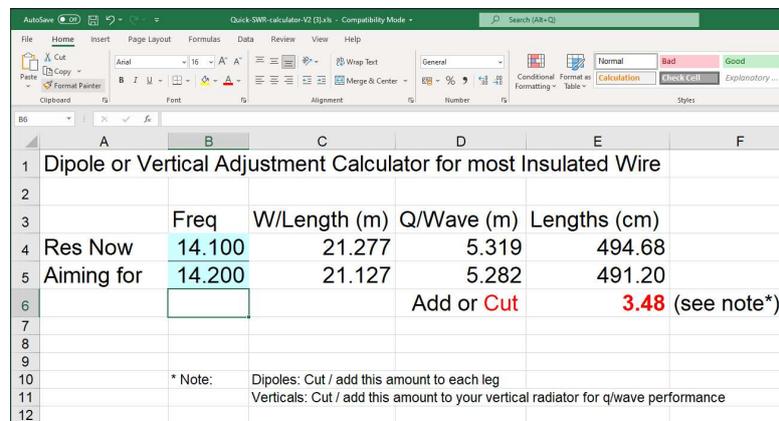
- 40m (Venture) One turn on the coil means 300kHz. That means more turns, the lower the frequency
- 40m Foldback: Around 30cm (12-inches) of foldback is equal to around 50kHz. More foldback (lower frequency), less foldback (higher frequency).

The 20m and 15m element should be fine – but if they are not, read on: Some people get confused if they should shorten or lengthen their antenna. In simple terms, if your antenna has best tune too LOW, then it's generally too LONG. If it tunes too high, it's too short.

TIP: If you remember that LONG and LOW both start with letter L, you will not forget 😊

To assist us with tuning, we created a very simple SWR cut chart calculator found here:

<https://www.m0mcx.co.uk/quick-swr-calculator-for-vertical-and-dipole-ham-radio-antennas/>



	A	B	C	D	E	F
1	Dipole or Vertical Adjustment Calculator for most Insulated Wire					
2						
3		Freq	W/Length (m)	Q/Wave (m)	Lengths (cm)	
4	Res Now	14.100	21.277	5.319	494.68	
5	Aiming for	14.200	21.127	5.282	491.20	
6				Add or Cut	3.48	(see note*)
7						
8						
9						
10		* Note:	Dipoles: Cut / add this amount to each leg			
11			Verticals: Cut / add this amount to your vertical radiator for q/wave performance			
12						

FINAL TUNE - Once your elements are perfect:

- a) replace all your electrical tape with glue-lined heat-shrink
- b) fully tighten up the shock cord to almost maximum tension – probably around 190%

MORE PICTURES FOLLOW OVERPAGE:

