

The SOTABEAMS portable **Vertical Hardware System (VHS)** provides the building blocks that you need to create your own vertical antenna systems. The base plate has been designed to provide a flexible and rugged solution for guying a lightweight pole as well as forming part of the vertical system. The base plate is fitted with a high quality common mode choke/balun and a BNC socket. Sockets are provided for the radiating element of the antenna as well as for the radials, allowing you to construct many interchangeable systems. Band changing in the field is quick and easy.

Safety: when adjusting, erecting or otherwise using your antenna make sure that it cannot touch any power lines. Think of the safety of others by location the antenna so that people cannot injure themselves on it. Do not use the antenna when lightning is possible.

Supplied parts:

- 1 x Baseplate including common-mode balun
- 4 x 20mm M4 bolts
- 4 x M4 nuts
- 8 x M4 washers
- 2 x 24mm packing plates
- 2 x 28mm packing plates
- 2 x 32mm packing plates
- 6 x Mini-carabiners
- 4 x Top insulators
- 6 x 2mm stackable plug (green)
- 2 x 2mm stackable plugs (red)
- 1 x Set of instructions

Required items for construction and use:

Fibreglass telescopic pole or SOTABEAMS Travel
Mast
Stranded insulated wire
Nylon cord
Solder
Coaxial cable terminated in a 50 Ohm BNC plug
Cable ties

Tools required for construction:

Wire cutters
Wire strippers
Tape measure
Small vice
Antenna analyser or HF transceiver with SWR indicator

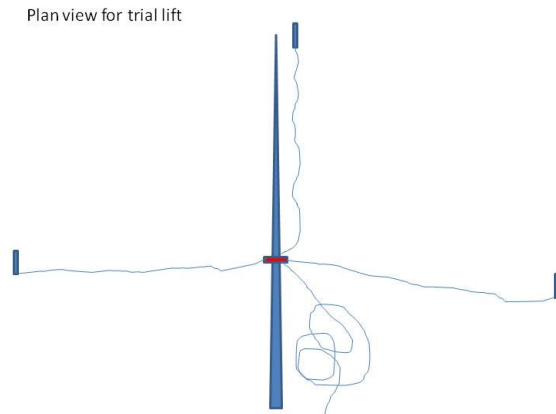


Figure 5.

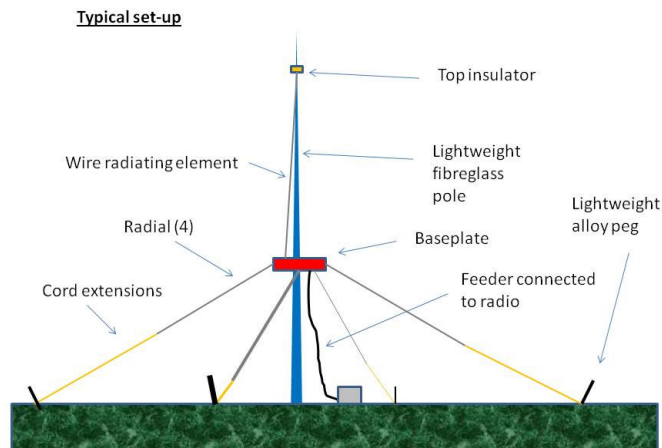


Figure 6.

Assembly instructions

1. Selecting the correct packing plates for the baseplate.

The base plate has one large hole that will slide down your telescopic pole. Telescopic poles vary in diameter so we supply a selection of packing plates together with four sets of bolts, nuts and washers. To decide which plates you need, first extend your pole fully on the ground and slide the top insulator down the tip of the pole. Use the smallest hole on the top insulator. Once you have slid it down as far as it will go, measure 5.1 metres down the pole from the top insulator. This will be the approximate height the baseplate will need to sit at for a 20m vertical antenna. It can also be used for high frequency bands (see later). Next slide the packing plates down to find one that will sit either at *or slightly below* the 5.1 metre position. There are three different sizes of packing plates and their diameters are engraved on them.

2. Fitting the packing plates

The packing plates are supplied in pairs. Once you have decided which plate is the right size, find the other plate of the same diameter. Fit the plates to the top and bottom of the baseplate using the nuts bolts and washers supplied. Figure 1. shows how this should be done. Be careful not to over-tighten the nuts as you may crack the plates.

For most folk this operation only needs to be done once so you may wish to use a thread-locking glue to stop the nuts shaking off. Keep the spare packing rings, they might be useful as mast guying rings or you may need them if you make major changes to your system.

3. Making the radials

How you make the radials will depend on your intended use for the vertical. If you are going to use it on just one band, all the radials can be the same length. If you are intending to use more than one band you will need at least one quarter-wave radial for each band. Whatever band configurations you plan on you will need four radials in total. Any insulated stranded copper wire will be suitable.

For our example I will assume that you want to use your vertical on four bands:

E.g. 20-17-15-10m

Cut a radial for each these bands according to the table in Figure 2.

At one end of each radial turn back 10cm and tie a figure of eight knot as shown in the photo. This end of the radial will be tied to a cord extension. This extension will be used for guying. The length of the cord extensions will vary by band to make the overall length (extension + radial) the same for all bands. The

Band	Cord Length (m)	Cord Length (feet)
30m	1.28	4 feet 2 inches
20m	3.28	10 feet 9 inches
17m	4.40	14 feet 5 inches
15m	4.97	16 feet 3 inches
12m	5.48	17 feet 11 inches
10m	5.82	19 feet 1 inch

Figure 3.

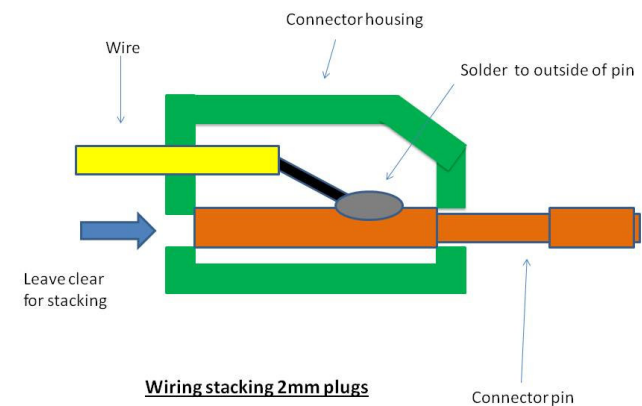


Figure 4.

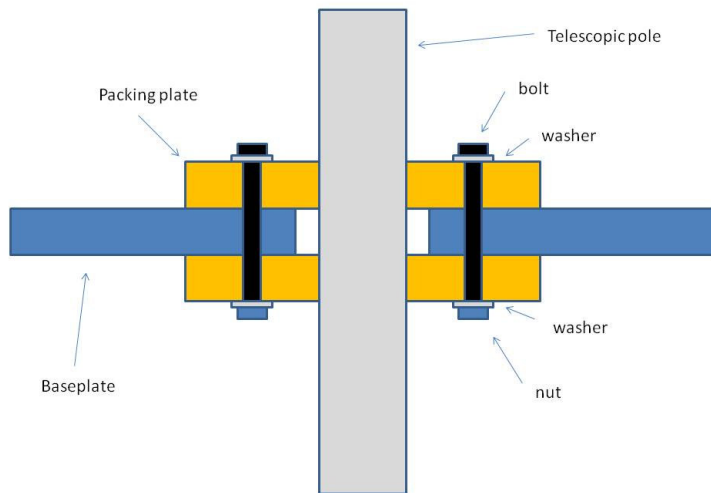


Figure 1.

Band	Length (m)	Length (feet)
30m	7.22	23 feet 8 inches
20m	5.22	17 feet 1 inch
17m	4.1	13 feet 5 inches
15m	3.53	11 feet 7 inches
12m	3.02	9 feet 11 inches
10m	2.68	8 feet 9 inches

Figure 2.

table in Figure 3. shows the cord extension lengths. Tie the cord extensions to the loops at the ends of the radials using a couple of overhand knots.

Turn back 10cm at the far end of each cord extension and tie a pegging loop using a figure of eight knot.

At the open end of the radial, measure back 22cm along the radial and form another loop with a figure of eight knot.

Solder a 2mm plug (supplied) to the end of each radial and put one of the mini carabiners through the loop in the radial nearest the 2mm plug. Figure 4. shows how to solder the plugs correctly so that they can be stacked.

You should now have four completed radials plus extension cords that are about the same total length.

4. Trial set up using the new radials

Slide the baseplate down the telescopic pole with the BNC connector pointing towards the bottom of the pole. Clip the four carabiners into the holes in the corners of the baseplate. Peg three radials as shown in Figure 5. Lift the pole and peg the fourth radial to hold the pole. Inevitably the first time you do this you will need to make some adjustments so that the pole is vertical, the radials are tensioned correctly and the angles between them are 90 degrees.

Once you have it set up perfectly, it's a good idea to

note just where the pegs are in relation to the base of the pole so that you can put the system up more easily next time!

5. Making the radiator

Cut a length of wire according to the table Figure 3. Measure 20cm from one end and tie a figure of eight knot. Solder a 2mm plug to the wire end nearest to the knot. Clip a carabiner through the loop.

With the baseplate still on the pole and the pole on the ground after step 4. above, tie a loop of cord onto the baseplate as shown. Clip the radiator carabiner to the cord. Check that the 2mm plug will plug into the red 2mm antenna socket on the underside of the base.

Lay the radiator out parallel to the mast towards the top insulator. At the top end of the radiator, turn back 10cm and tie a figure of eight knot to form a loop. Tie the loop to the top insulator using a length of cord.

Lift the pole up and peg as in stage 4.

Plug all four radials into the two radial sockets (green). Each socket will take two radials using the stacking facility of the connectors—see photograph.

Connect a feeder to the baseplate. Using a reusable cable tie, attach the feeder to the pole to provide strain relief. You can now adjust the radiator length in the usual way for lowest SWR on your chosen operating

frequency. You do not need to trim the radials—just the radiator. If you need to shorten the radiator a little, you will need to lengthen the cord that ties onto the top insulator .

Figure 6. shows a typical setup.

Tip: I often use two connector blocks in the radiator to give a section that can be shortened or lengthened.

In our case, with radials for different band, you can make the corresponding radiators for the bands you have chosen.

In use you can change bands by swapping out the radiators—quick and easy! Just make a few different radiators.

Items that may be helpful

SOTABEAMS stocks:

- Reusable cable ties
- Hi-Viz cords
- Wire Winders for tangle-free cables.
- BNC-BNC cables
- Carabiners
- Spare 2mm plugs
- Top insulators
- Lightweight antenna wire

...all at www.sotabeams.co.uk