

## Antenna Centre + 4:1 Matching Transformer Kit

### Assembly instructions

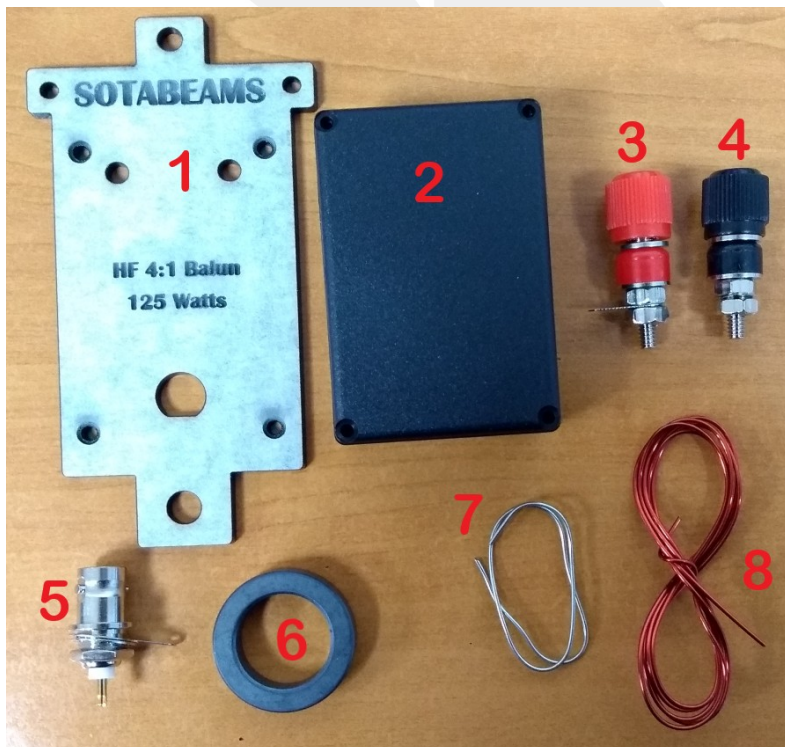
### Revision History

21 December 2021 Fully updated

### Packing List

It's a good idea to check that you have all the parts before you get started:

| Ref | Item                     | Quantity       | Comments                                     |
|-----|--------------------------|----------------|--|
| 1   | Front panel              | 1              | Remove protective covering                   |
| 2   | Black ABS box            | 1              | Self tapping screws inside box (4 off black) |
| 3   | 4mm binding post (red)   | 1              |  |
| 4   | 4mm binding post (black) | 1              |  |
| 5   | BNC bulkhead socket      | 1              |  |
| 6   | Toroid                   | 1              | grey   |
| 7   | Tinned copper wire       | 15 cm (6")     | for general wiring                           |
| 8   | Wire red enamelled       | 75 cm (19 ½ ") | for winding toroid                           |



If anything is missing, just get in touch for help.

## Assembly Instructions

The kit is easy to make and you will end up with a very useful and effective 4:1 matching transformer (balun).

Step by step instructions together with lots of photographs will make it easy to build your balun. It will take around 45 minutes work. As with any construction project, as soon as you feel tired, stop. If you don't mistakes will follow!

For all the assembly work, find a light place to work with plenty of room. A tea tray is useful to work on as the raised sides stop small parts rolling away.

## Spotted a mistake or need help?

Please let us know if you need help! Email [support@sotabeams.co.uk](mailto:support@sotabeams.co.uk)

## Tools needed

- 1 Small screwdriver (cross head)
- 2 Soldering iron and solder
- 3 Long nosed pliers
- 4 craft knife
- 5 Small spanners
- 6 Ruler
- 7 Wire cutters



## Mounting the hardware

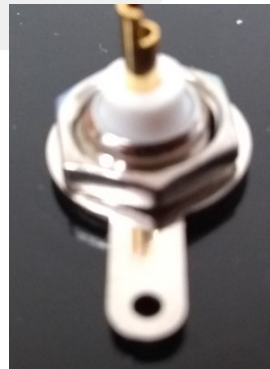
- Remove the protective film from both sides of the front panel. Use a soft cloth to clean any residue.



- Mount the BNC socket from the front of the panel.



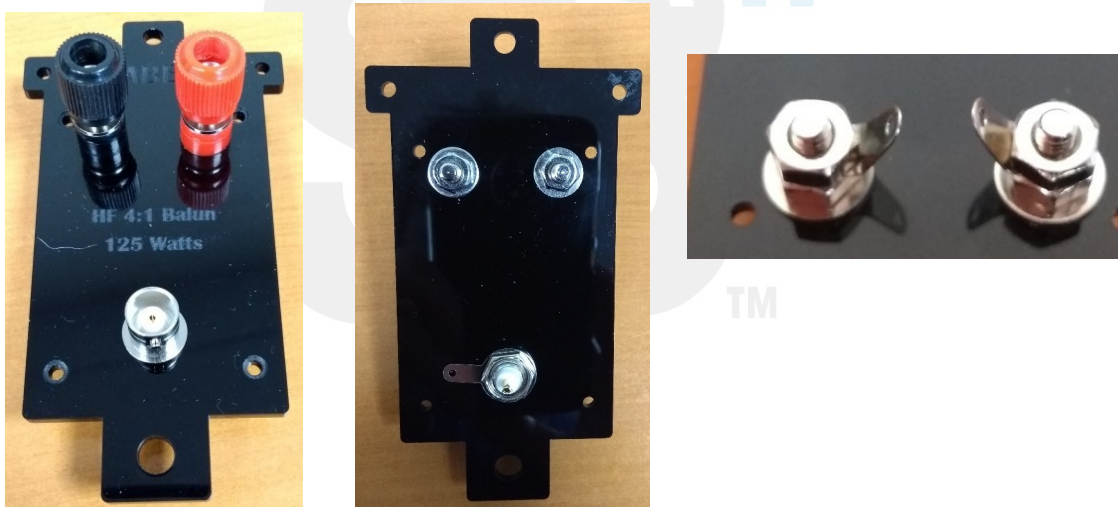
On the rear of the panel. The serrated washer goes on first, then the solder tag and finally the nut. Do not over tighten the nut as you could crack the front panel.



- ❑ Mount the two 4mm binding posts (one red, one black).  
 The red ones should be on the right when viewed from the front.  
 The plastic parts are on the front of the panel. The washer and nut fits on the rear.



Top Tip:- Unscrew the plastic tops of the binding posts a few turn before tightening the nut. Tighten the nut whilst holding the plastic post closest to the panel. Do not over tighten, otherwise the panel may crack.  
 Fit the solder tag and nut to each post angling the solder tag.



## Winding the toroid

- Straighten out the enamelled copper wire (red coloured).
- Fold it in half and twist the two strands together. We hold the open end in a vice and use a screwdriver or tent peg at the loop end.



- You will need to use approx 35 full turns
- Wind 9 turns onto the toroid, leaving about 6cm of wire before the toroid.



Cut the loop, untwist both legs as far as the toroid. Remove the enamel from the ends.

Using a multimeter to identify the windings.

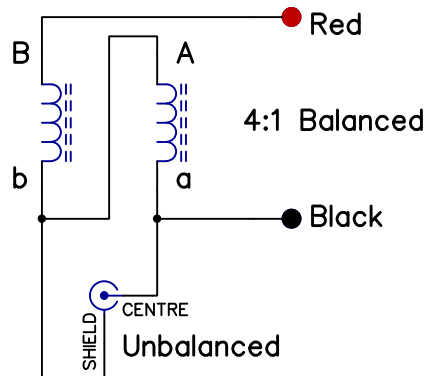
**A** → **a** 0Ω

**B** → **b** 0Ω

Adjust the wires to match the order shown below



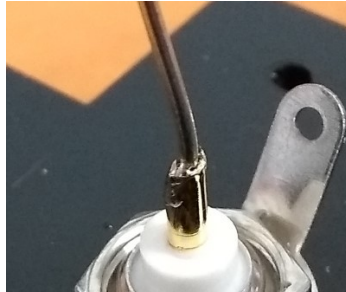
- Referring to the diagram below.



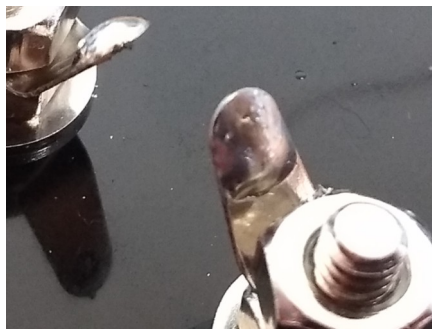
Connect **A** to **b**, twisting the wires together. Arrange as shown below. Clean the enamel from the end and apply solder (this will be soldered to the tag of the BNC connector).



- ❑ Solder the silver tinned copper wire to the centre pin of the BNC terminal.



- ❑ Tin the two post solder tags and BNC solder tag.

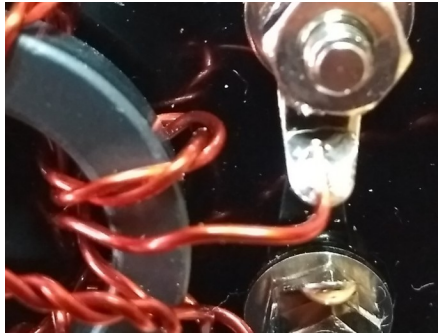


- ❑ Place the toroid on the panel and adjust the twisted **A** and **b** wires, so they run above the toroid and can be soldered to the BNC tag. Note the position of the tag and bend the tag to make it vertical. The length can be trimmed using cutters. If you find the length too short, use the silver tinned wire to extend the **A** and **b** wires. Solder **A** and **b** wires to the BNC solder tag.

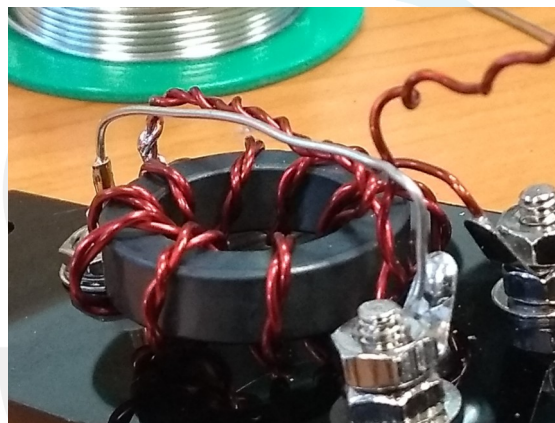




- ❑ Cut wire **B** to length and clean the enamel from the wire. Solder wire **B** to the red binding post solder tag.

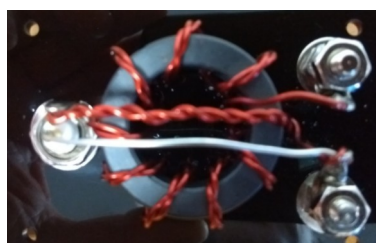


- ❑ Bend the tinned copper wire to run parallel to wires **A**, **b** Bend the wire down to the black solder tag, cut to length.



Wire **a** is soldered to the same tag. Remove enamel from wire **a**, and twist it around the tinned copper wire (trim to length). Tin the twisted wires and solder to the black post solder tag.

- ❑ Adjust the tinned wire and twisted wire from the BNC they should be parallel but not touching.



- You can test your balun by connecting a 200Ω resistor across the binding posts and looking at the SWR at the BNC socket. The SWR should be better than 1.2:1 across the HF spectrum. The impedance should be 50Ω.



- If the SWR is high move the position of the twisted pair and/or the tinned wire to the BNC connector (see photo on previous page ).
- Attach the base of the plastic box over the toroid using the four self tapping screws (tight).
- Your 4:1 transformer is now ready for use.
- Optionally you can run a bead of silicone sealant round the joint between the box and the faceplate.