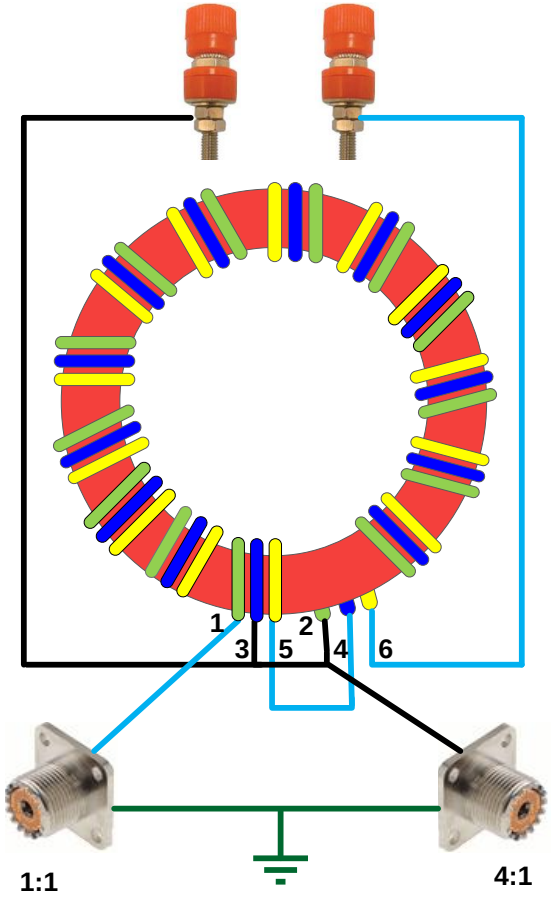
Dual Ratio 1:1 & 4:1 Balun for 3.5 – 30.0 MHz

This balun has been used at 100watts with a full-sized G5RV, Windom and 40m & 20m vertical antennas. It is essential that the Amidon™ toroid is housed in a watertight box, such as an IP56 Rated box. If other boxes are used then any screw heads securing the box lid must be taped over with electrical tape to stop water entering the box. For lower powers a smaller toroid with thinner wire can be used.

Mario G8ODE



NOTE:- The tri-filer winding has been shown in three colours to emphasise the way the enamelled copper wires have to be wrapped around the core.

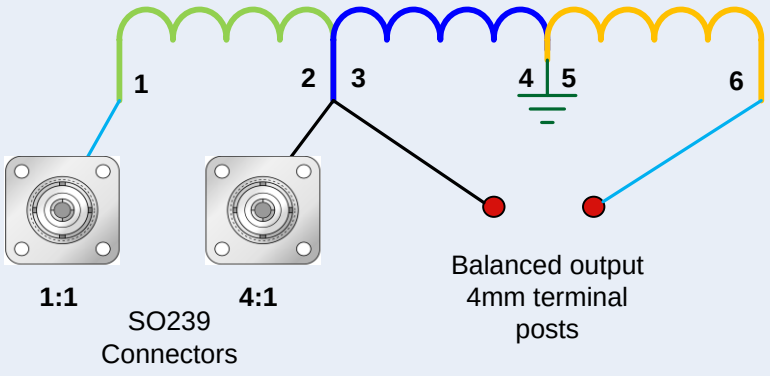
The toroid is an Amidon™ red T-200 50mm OD and 30mm ID. The tri-filer wound balun has 13 turns of 1.6mm enamelled copper wire. It is important to keep the three wires the same length on the toroid to maintain a good electrical balance.

Identify each winding by marking the three enamel wires with thin strips of coloured electrical tape use numbered ferrules. This will help to ensure that the three windings are interconnected correctly.

™ Means registered trademark

The Electrical Connections

1.6mm enamelled copper wires.



Note: the windings have been coloured to assist in identifying these on the toroid

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Photographs show the final assembly. The 1.6mm wire is quite stiff and easily holds the toroid firmly inside the box. However the wire needs to be carefully wound around the toroid, and this is a little fiddly. To connect the ends of the various windings 4mm crimp eyelet tags were used. These were of the type normally used on mains cables. The 100 ohm resistor connected to the balanced output is used to verify that the Balun works. With the transmitter set to low power, and connected to the 1:1 or 4:1 SO239 connectors the SWR should be 2:1.

The SWR for a pure resistive load is simply the mathematical ratio of ***[RL/ (Zo x N)]:1 or [(Zo x N) /RL] :1***

where RL =100 ohms, Zo = 50ohms of the TX and N is the transformer ratio.

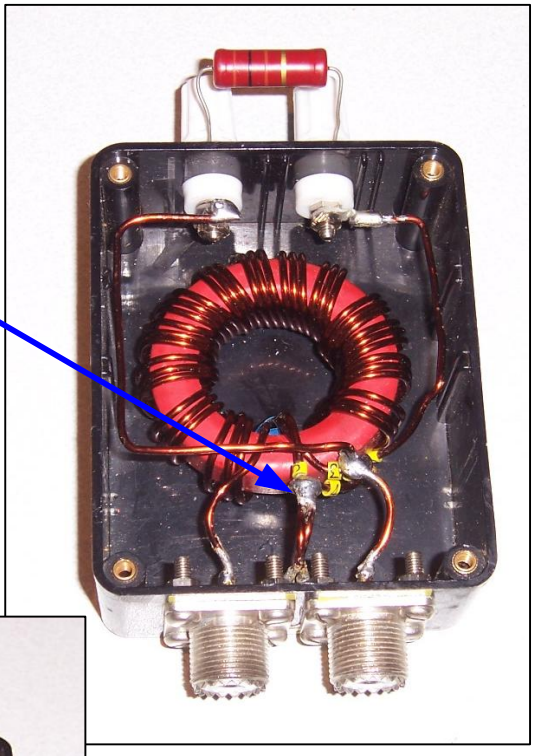
i.e. For this dual ratio balun

For the 1:1 socket = 100 / (50x 1) = 100/50 = 2:1
For the 4:1 socket = (50 x4) / 100 = 200/100 = 2:1

Photograph of the completed balun ready for testing with the 100 ohm resistor connected. The red Amidon T200 toroid has wires 4 &5 passed through as small brass nut and then soldered together.

The two ends had solder tags added for connection to the two SO239 connectors

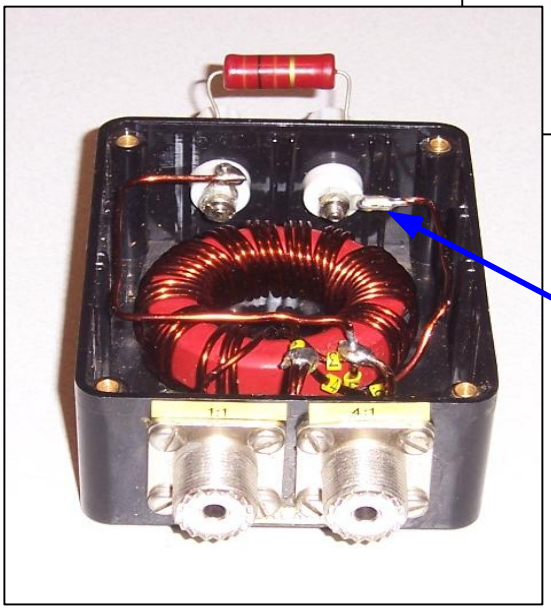
Similarly wires 2&3 were soldered together with an extra long wire to provide the connection to the left hand 4mm screw terminal.



G8ODE 1-1 & 4-1 Balun Checks
Using a 100 Ω Resistor & Autek VA1 Analyser

MHz.	SWR ref 50Ω		
	1 : 1		4 : 1
3.5	2.25		2.14
7.1	2.27		1.9
10.2	2.29		1.72
14.15	2.3		1.78
18.2	2.18		1.78
21.2	2.2		1.85
24.9	2.02		1.78
28.5	2.26		1.78

Autek measured 100Ω load resistor's SWR as 1.9:1 ref 50Ω



The crimp eyelet insulation is removed, then it is lightly crimped onto the wire and finally soldered.

Four tags are required to secure the two connections on each of the 4mm screw terminals and two more on each of the SO239 connectors for the earth.

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Dual Ratio 1:1 & 4:1 Balun for 3.5 – 30.0 MHz

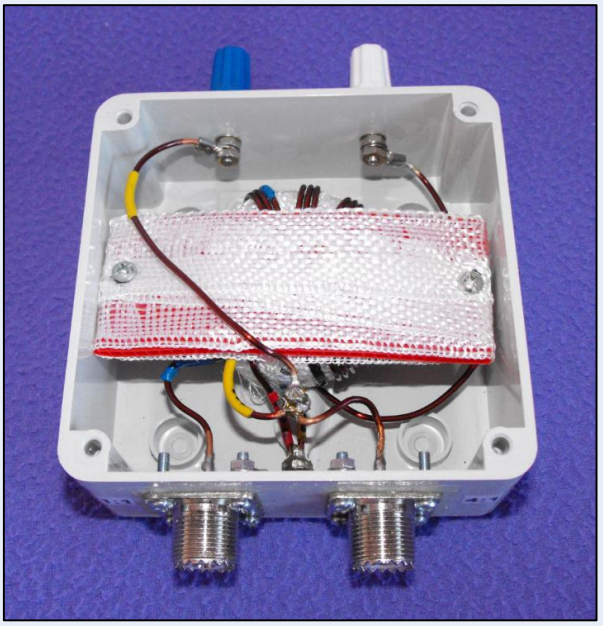
It's always nice to receive some feedback.

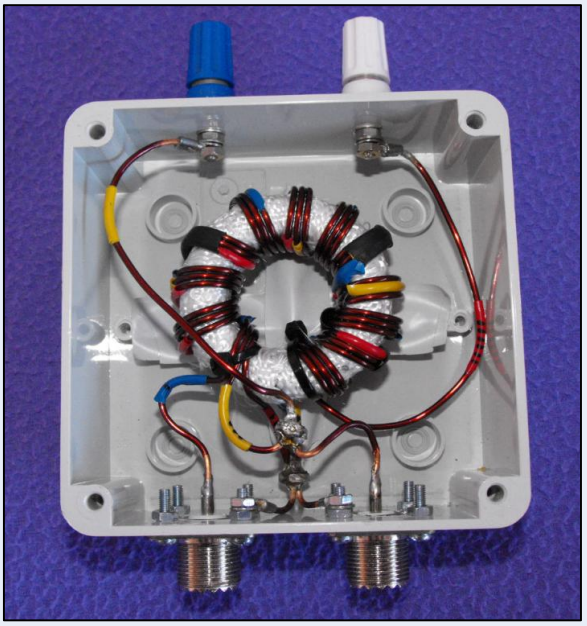
Hi Mario,

Here is a selection of photos of the BALUN that I constructed. Feel free to add them to your article.
The balun is housed in an IP56 case and the core wrapped in a fibreglass tape to protect it. I also added a piece of plastic wrapped in fibreglass tape, and secured it with screws to hold the whole core more firmly inside the case. The rest is as per your instructions.

73's Dimitris 2E0DIM

Dimitris 2E0DIM
Chippenham & District ARC
http://www.g3vre.org.uk





Photographs provided by **Dimitris 2E0DIM**

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