

## 1:2.5 VOLTAGE BALUN

1:2.5 voltage balun using a FT140-43 Ferrite Toroid Core for 0.5MHz to 30MHz. Completed March 2022

Lucas KN4MEJ asked if I would have a look at a 1:2.5 balun and this is what I have come up with.

The balun is to feed a balanced antenna from an un-balanced line with a impedance step up from 50ohms to 125ohms, a 1:2.5 Voltage balun design using a FT140-43 ferrite toroid cores. It would be advised to have a 1:1 choking balun inline on the 50Ohm side to mitigate the possibility of common mode currents similar to [https://vk6ysf.com/balun\\_choke\\_balun\\_rf\\_reisert.htm](https://vk6ysf.com/balun_choke_balun_rf_reisert.htm)

### Construction

The 1:2.5 voltage balun has 4 and 6 turns wound evenly around the FT140-43 ferrite toroid core with the five individual windings wound close together.

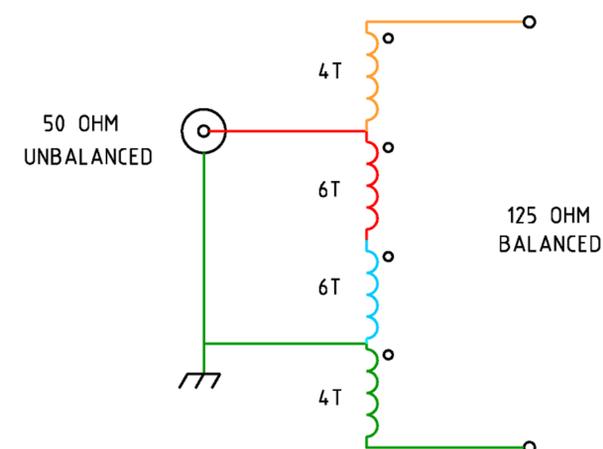


Figure 1 Schematic of the 1:2.5 Voltage balun

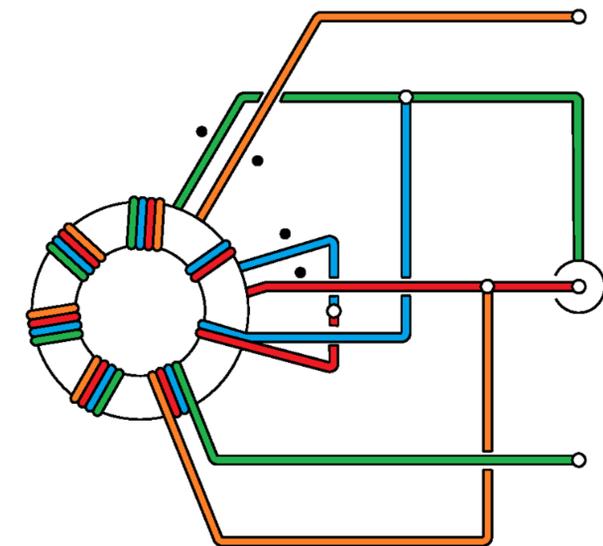


Figure 2 Wiring of the 1:2.5 Voltage balun.

Type	Voltage Balun
Ratio	1:2.5
Frequency Range	0.5 - 30MHz
Core Used	FT140-43 Ferrite Toroid Core
Number of turns	4 x 2 and 6 X 2
SWR	Low 1:1.2 (1.8MHz) High 1:2.5 (30.0MHz)
PEP Power Handling.	Approximately 100W



Photo 1 1:2.5 Voltage balun assembled.

The evaluation of the efficiency of the balun over the desired bandwidth (0.5 - 30MHz) was carried out by testing the impedance that could be seen from unbalanced side to a resistive load applied to the balanced side using an AIM 4170C antenna analyser. The below antenna analyser plot views a 125ohm resistive load attached to the balanced side of the balun and measured at a nominal impedance of 50ohms presented as anticipated an approximate 50ohm load to the analyser and produced about a 1:1 SWR

The performance of the balun from 0.5MHz to about 30MHz is good and shows little reactance, however there is a gradual rise in reactance above 30MHz along with a gradual rise in the SWR.



Figure 3 SWR data from the AIM 4170C antenna analyser plot viewing a 125ohm resistive load through the voltage balun. Note the 125ohm resistor appears as 50ohms due to the 2.5:1 balun ratio resulting in an ideal SWR of 1:1.

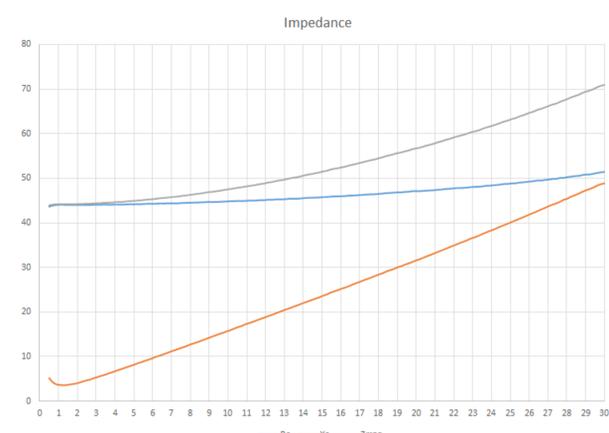


Figure 4 Impedance data from the AIM 4170C antenna analyser plot viewing a 125ohm resistive load through the voltage balun. Note the Rs = Resistance, Xs = Reactance, Zmag = Impedance

Also see other baluns and ununs:

- [BALUN 1:1 CHOKE & 1:4 BALUN](#) HF ladder feed-line to coaxial cable combination choke and 1:4 balun. (0.1MHz - 30MHz).
- [BALUN 1:1 CHOKING](#) Choking balun for lower HF and MF bands. (200kHz - 10MHz).
- [CHOKING 1:1 BALUN - HF BANDS](#) Reisert choking balun. (1.0MHz - 30MHz). FT240-43 Ferrite Toroid Core.
- [CHOKING 1:1 BALUN - HF BANDS](#) Reisert choking balun. (1.5MHz - 30MHz). FT140-43 Ferrite Toroid Core.
- [CHOKING 1:1 BALUN - LOW VHF BAND](#) Choking balun. (10MHz - 60MHz). FT140-43 Ferrite Toroid Core.
- [BALUN 1:1 CURRENT](#) 1:1 Guanella Current balun using a L15 ferrite core (1.8 - 30MHz).
- [BALUN 1:4 CURRENT](#) 1:4 Guanella Current balun using a L15 ferrite core (1.8 - 30MHz).
- [BALUN 1:4 SINGLE CORE CURRENT](#) 1:4 Guanella Current Balun, single FT240-43 ferrite toroid cores. (0.3MHz - 30MHz).
- [BALUN 1:1 VOLTAGE](#) 1:1 Ruthroff voltage balun using a T-200-2 powdered iron toroid core (1.8 - 30MHz).
- [BALUN 4:1 VOLTAGE](#) 4:1 Ruthroff voltage balun using a T-200-2 powdered iron toroid core (1.8 - 30MHz).
- [BALUN 6:1 VOLTAGE - VERSION 1](#) 6:1 Voltage balun using a FT140-43 Ferrite Toroid Core (1.8 - 30MHz).
- [BALUN 6:1 VOLTAGE - VERSION 2](#) 6:1 Voltage balun using a FT140-43 Ferrite Toroid Core (1.8 - 30MHz).
- [BALUN 9:1 VOLTAGE - VERSION 1](#) 9:1 Voltage balun using a L15 ferrite toroid core (1.8 - 30MHz).
- [BALUN 9:1 VOLTAGE - VERSION 2](#) 9:1 Voltage balun using a FT140-43 Ferrite Toroid Core (0.5 - 60MHz).
- [UNUN 9:1 VOLTAGE](#) 9:1 voltage unun using a T-200-2 powdered iron toroid core (1.8 - 30MHz).
- [UNUN 9:1 VOLTAGE VERSION 2](#) 9:1 voltage unun using a L15 ferrite core (1.8 - 30MHz).
- [UNUN 9:1 VOLTAGE VERSION 3](#) 9:1 voltage unun using a FT140-43 ferrite core (0.5 - 60MHz).

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