HF FEED-LINE INTERFACE CHOKE AND 1:4 BALUN

HF ladder feed-line to coaxial cable choke and 1:4 balun. (0.1MHz - 30MHz)

The main HF antenna is a 42m multi-band Doublet antenna fed with open wire ladder-line and enters the radio room wiyh a sort length of coax run through the roof and building wall to a TMatch tuner. The un-balanced coaxial cable is connected to the balanced feed line with the combination of a 1:1 choking balun and a 1:4 impedance step up balun connected in series. The antenna, feed lines, balun and antenna set-up is shown in below in Fig 1.

The 1:1 choking balun is to mitigate common mode RF currents on the coax cable, reduces noise pickup on the coax from within the building entering the antenna system and also produce a balanced antenna system that will have a more predictable radiation pattern .

The 1:4 impedance step up balun is included to more broadly match the range of impedance at the antenna/feed line with the nominal 50-ohm impedance of the coax.

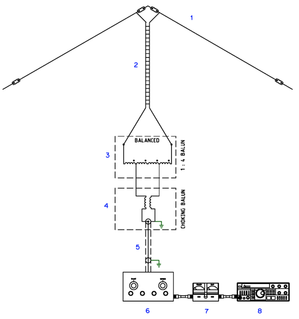

Figure 1 Multi-band Doublet, feed-lines and balun configuration

Basic Multi-band Doublet Arrangement
(1) Inverted 'V' Dipole. (42Mtr total length)
(2) 450 Ohm Ladder Line. (8Mtr)
(3) 1:4 Current Balun. See Balun Guanella Current 1:4 Single core
(4) 1:1 Choking Balun. See Balun Choke HF
(5) LDF4-50 Heliax (5.5Mtr)
(6) TAMatch Tuner. See T Match Tuner
(7) VSWR Meter
(8) HF Transceiver.

Construction

The 1:1 choking balun is a length of RG58 50ohm coax wound with 14 turns on a single FT240-43 ferrite toroid core. See Fig 2 for the connection details and Balun Choke HF for the 1:1 choking balun details.

The 1:4 current balun has two ideally 100ohm transmission lines wound evenly spaced in the same direction around a single FT240-43 ferrite toroid core. See Fig 2 for the connection details and Balun Guanella Current 1:4 Single core for balun details.

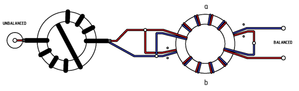

Figure 2 Detail Balun configuration

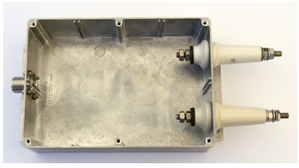

Photo 1 Balun housing for coax to ladder line interface.

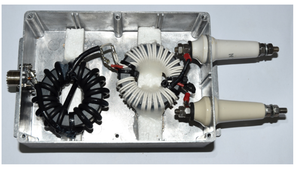

Photo 2 Balun assembly.

Testing

The AIM 4170C antenna analyser recorded the balun impedance transformation efficiency and common mode choking for a frequency range from less than 100kHz to 30MHz.

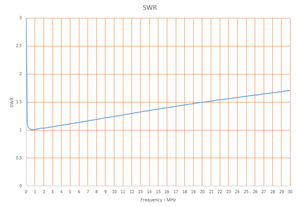

Figure 3 AIM 4170C antenna analyser plot viewing a 200ohm resistive load through the feed-line balun. Note the 200ohm resistor appears as 50ohms due to the 1:4 balun ratio resulting in an ideal SWR of 1:1. This plot shows an SWR of no greater than 1.7:1 with from 100kHz to 30MHz.

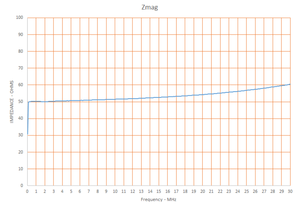

Figure 4 AIM 4170C antenna analyser plot viewing a 200ohm resistive load through the feed-line balun. Note the 200ohm resistor appears as 50ohms due to the 1:4 balun ratio. This plot shows an 50 – 60 ohms from 100kHz to 30MHz.

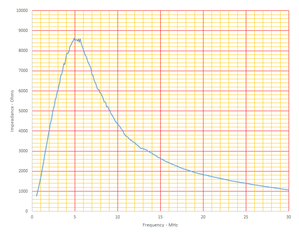

Figure 5 The evaluation of the choking impedance of the balun over a bandwidth from 0.5MHz- 30MHz.

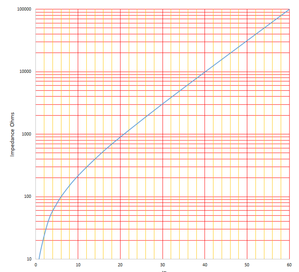

Figure 6 Choking impedance to dB of choking. 20dB attenuation should be considered the minimum.

Also see other baluns and ununs:

1:1 Choking balun Choking balun for lower HF and MF bands. (1.8MHz - 10MHz) T250-26 Powdered Iron Toroid Core.

1:1 Choking balun low band VHF Choking balun for lower band VHF. (14 ~ 54MHz) FT140-43 Ferrite Toroid Core.

1:1 Guanella current balun 1:1 Guanella current balun (1.8 - 30MHz) L15 ferrite toroid core.

1:4 Guanella current balun 1:4 Guanella current balun (1.8 - 30MHz) L15 ferrite toroid core.

1:1 Ruthroff voltage balun. 1:1 Ruthroff voltage balun (1.8 - 30MHz) T-200-2 powdered iron toroid core.

4:1 Ruthroff voltage balun 4:1 Ruthroff voltage balun (1.8 - 30MHz) T-200-2 powdered iron toroid core.

6:1 Ruthroff voltage balun 6:1 Ruthroff voltage balun (1.8 - 30MHz) L15 ferrite toroid core.

1:9 voltage unun_n1 9:1 voltage unun (1.8 - 30MHz) T-200-2 powdered iron toroid core. Version 1

1:9 voltage unun_n2 9:1 voltage unun (1.8 - 30MHz) L15 ferrite toroid core. Version 2

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