

## CHOKING BALUN FOR HF BANDS

Reisert Choking balun for HF and upper MF bands. (1.5MHz - 30MHz). FT140-43 Ferrite Toroid Core

To isolate the potential feed-line common mode RF on the coax cable for HF/MF bands ranging from 1.5MHz to 30MHz, a choking balun is required. A ferrite toroidal core with a simple coax cable wound onto it was chosen for this purpose.

The antenna is a half sloper for the 40m band, meaning it has a length of a quarter wavelength on the primary band of 7 MHz and also works as a third harmonic band near 21MHz. Additionally, this antenna can be used on other bands besides 40m and 15m, making it quite versatile.

This antenna is considered a convenient option because it is made by cutting two insulators into a tower guy wire. Despite its simple construction, the antenna has shown good performance characteristics, which have been confirmed through measurements using WSPR.

The antenna is fed with coax cable directly to the apex, although it is not a well-designed setup, it is a common practice among amateur radio operators.

The issue with this antenna arises from the direct coax feed connection. It exhibits annoying multi-mode RF currents on the coax, which can lead to RF feedback issues such as crackling sounds in unconnected speakers. These speakers are not even connected to the radio in question.

Using a choking balun helps prevent unwanted RFI by eliminating feed-line common mode currents and radiation. It ensures that all power is directed to the antenna, improving efficiency. Additionally, it reduces noise or EMI picked up by the coax shield and balances the power between the driven elements of the antenna.

- Prevents unwanted RFI by eliminating feed-line common mode currents and radiation
- All power goes to the antenna, improving efficiency
- Reduces noise or EMI picked-up by your coax shield
- Power is balanced between driven elements of antenna

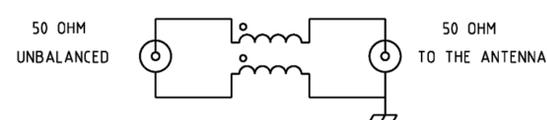


Figure 1 Schematic of the 1:1 choking balun

Type	Choking Balun
Ratio	1:1
Frequency Range	1.5 - 30MHz
Choking Impedance	3k Ohms (-30dB) min to >10k Ohms (-40dB) Ref: Figure 3
Core Used	FT140-43 Ferrite Toroid Core
Number of turns	19 (9.5 + 9.5) Ref: Figure 2
SWR	1:1 Ref: Figure 5

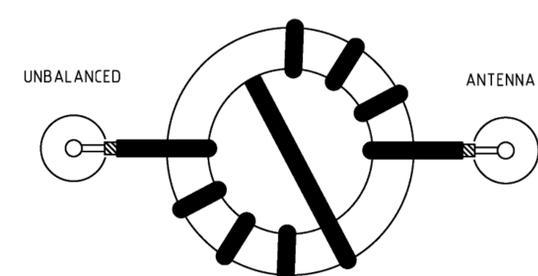


Figure 2 Winding details of the 1:1 choking balun

### Construction

The construction simply involved winding 9.5 turns of RG316 coax with a crossover and an additional 9.5 turns onto an FT140-43 Ferrite Toroid Core. This arrangement resulted in a total of 19 turns, which achieved an average lumped value inductive reactance of 40uH to common mode RF currents across a frequency range of approximately 1.0MHz to 30MHz.

- Parts list:
- FT140-43 Ferrite Toroid Core
  - About 1.0mtr of RG316 coax.



Photo 1 Choking balun assembled.

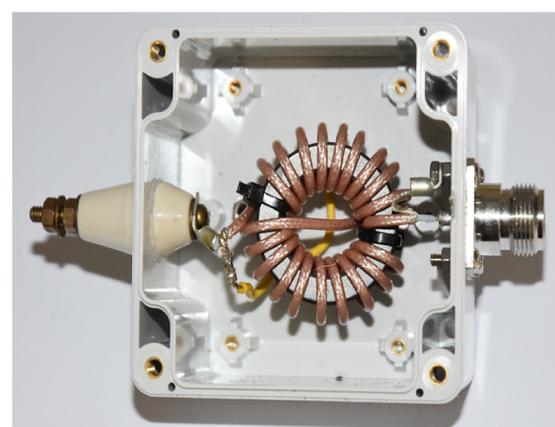


Photo 2 Choking balun assembled.

### Testing

The data points recorded and graphed in a spreadsheet, shown in Figure 3, using the mini-VNA antenna analyzer, indicate the attenuation measured in the coax shield. The results demonstrate a minimum attenuation of -28dB at 1.0MHz, reaching -33dB at 30MHz. Moreover, there is even greater attenuation of better than -40dB observed in the frequency range of 4MHz to 18MHz.

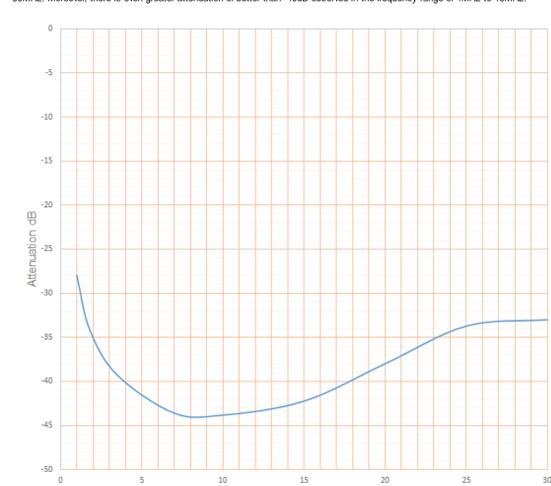


Figure 3 The evaluation of the choking attenuation of the balun over a bandwidth from 1.0MHz - 30MHz.

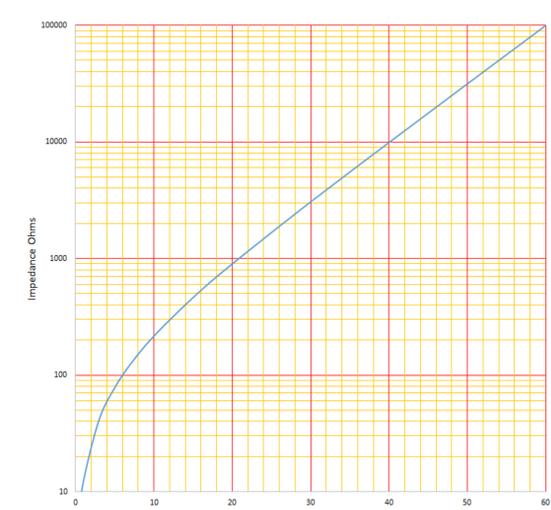


Figure 4 Choking impedance to dB of choking. 20dB attenuation should be considered the minimum.

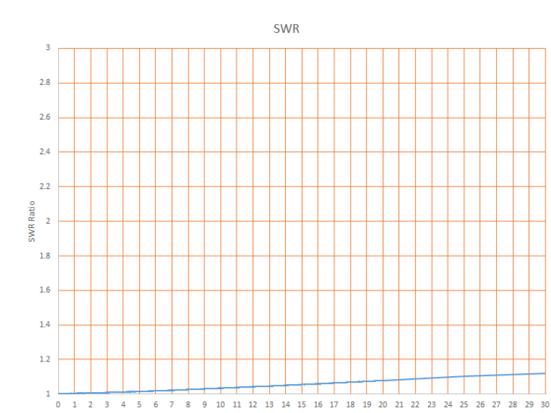


Figure 5 SWR from 0.1MHz - 30MHz

Also see other baluns and ununs:

- [BALUN 1:1 CHOKER & 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](#) 1:4 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 -VERSION 1](#) 1:1 Ruthroff voltage balun using a T-200-2 powdered iron toroid core (1.8 - 30MHz).
- [BALUN 4:1 VOLTAGE -VERSION 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 L15 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).
- [BALUN 9:1 VOLTAGE 0:1](#) 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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