

HF Balun & Marconi T switch

By G8MNY

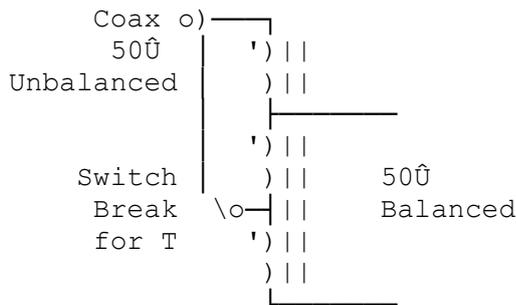
(New Jun 15)

(8 Bit ASCII graphics use code page 437 or 850, Terminal Font)

I tested out a junk sale buy "a transformer 1:1 balun with Marconi T switch", but it was useless. The large ferrite/iron dust core has 10 turns of 6 strand ribbon cable in it, all dipped in wax.

Basic 1:1 Transformer Balun (works OK with high Z RF earths!)

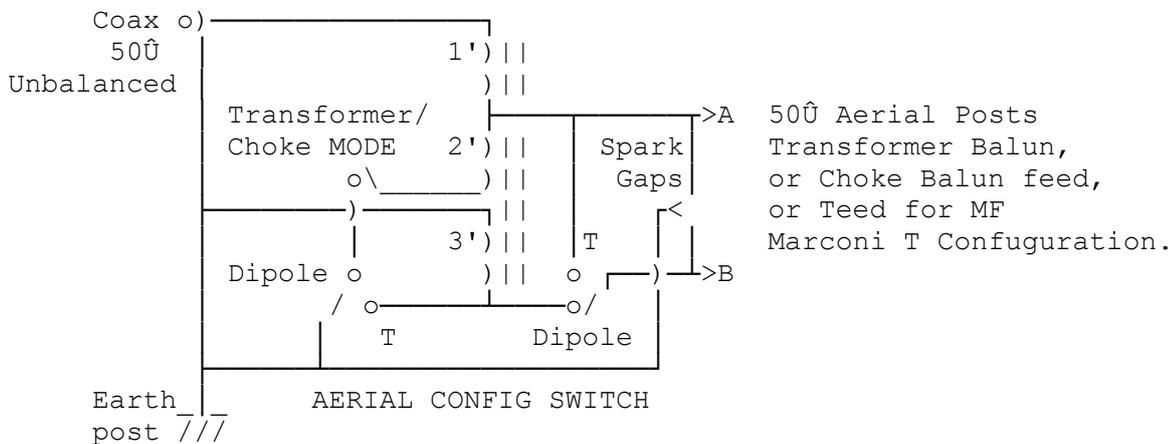
Core handles only 50% of the power



The transformer losses/SWR were bad & the Marconi T mode, just disconnects the earth, & so it did not drive the dipole equally & left some of the inductance in series.

G8MNY RE-DESIGN

So I reworked it with a much better ferrite core to handle 400W 160m-10m. Added a double pole changeover switch for proper Marconi T, AERIAL USE switch. And a switch for a low loss floating Choke Balun, MODE switch. As well as 3mm aerial spark gaps at the terminals.



HOW IT WORKS

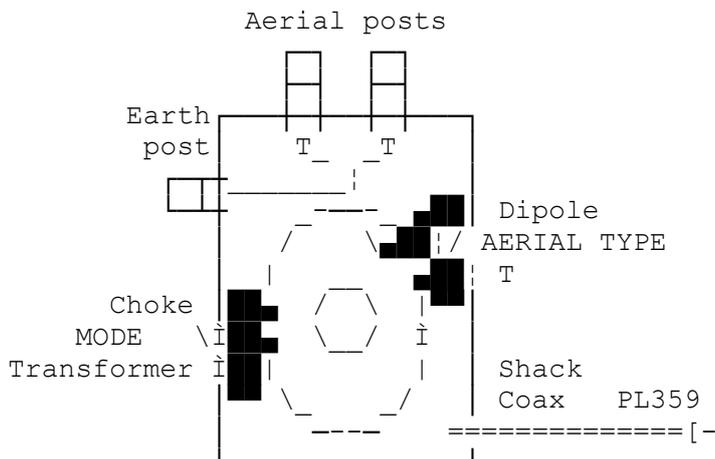
For Transformer Balun Mode, the 3 windings are all in series, with windings 1 & 2 seeing the unbalanced coax & windings 2 & 3 seeing the balanced aerial. The aerial balance is forced to be exactly half voltage on each side of earth due to the auto-transformer action. As the source & load see the same number of turns the Z is unaffected.

In Choke Balun Mode, the voltage equalising winding (2) is disconnected from earth. The aerial balance is free to float with respect to earth limited only by the choke inductance. If the 2 winding lengths are short & kept parallel (bifillia) the Z should stay close to 50Ω.

In Marconi T configuration, both legs of the aerial are fed directly (from ATU) The voltage equalising winding (2) is disconnected, & the inductance of winding (1) is shorted out as winding (3) is shorted.

CONSTRUCTION

All leads kept very short & balanced output leads twisted. Flat 3 wires (Trifillia) winding can is used for 1 2 & 3, or a 50Ω coax can be used for 1 & 3, with 2 just being a wire for, this will give the best match & lowest loss in Choke Mode. Care must be taken to get the 3 winding starts (') wired correctly.



TESTING

Put a non inductive 50R between the Aerial Posts A & B, the SWR should be perfect on all bands in Choke Mode.

In Transformer Mode, SWR should also be good across all bands, but may be affected by too low inductance L (too few turns) @ LF & too many turns for HF, where the total winding length of all 3 windings is > 5% of the wavelength or wires too far apart etc.

Balance tests of earthling A & then B, should show equally high SWRs in Transformer Mode & no SWR change in Choke Mode if the L is high enough @ LF.

In Marconi Mode only a 50R between either Aerial Posts A & B to Earth Post will give a good SWR.

If a QRO power source & a power balanced dummy load is available, then core heating & saturation tests can be done. SWR should not change with full power @ LF or heat up excessively @ HF. Do not throw the switches at full power!

IN USE

For external use, greasing up all terminals, switches & connectors is recommended, but water proof boxes usually fail or sweat. A small breathing hole at the lowest point will let any water out.

The Choke fed mode can give better feeder noise isolation, if the aerial is not perfectly balanced in practice.

See my tech bul "12 Uses of HF Trifilair L" for full Ferrite ring suitability test.

Why Don't U send an interesting bul?

73 De John, G8MNY @ GB7CIP