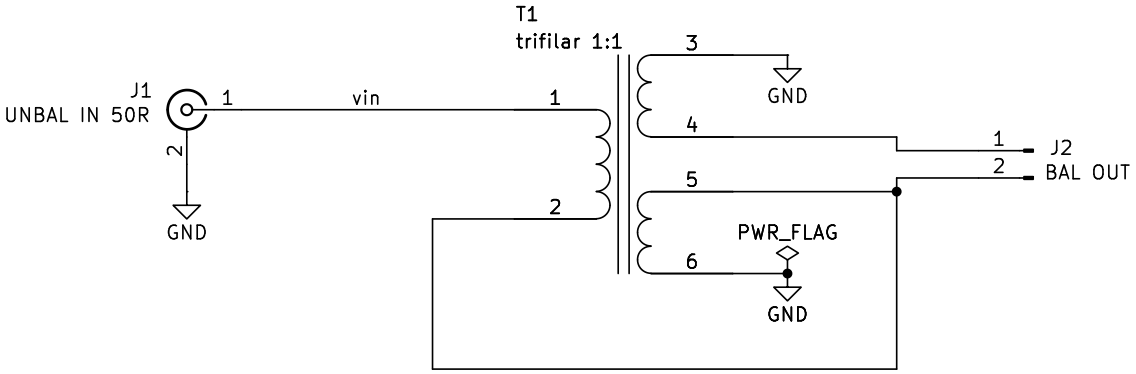
1:1 Trifilar True (Current) Balun

80m 40m 30m 20m 17m 15m 12m 10m · 50 Ω · sim-pass
EMRFD p. 3.35

Connects an unbalanced 50 Ω coax line to a balanced 50 Ω load, such as a dipole, and forces equal and opposite currents in the two output leads.



Windings (dot end first): W1 = pins 3–4, dot to ground, 4 = output p. W2 = pins 5–6, dot = output n, 6 to ground.

W3 = pins 1–2, dot = unbalanced input, 2 = output n. EMRFD shows the balanced load R across p and n.

Core and turns: QRPedia pick, FT-37-43 with 10 trifilar turns (not from EMRFD).

BUILD LIST: TICK AS YOU GO

	Ref	Value	Qty	Part / notes
☐	J1	UNBAL IN 50 Ω	1	
☐	J2	BAL OUT	1	
☐	T1	trifilar 1:1	1	FT-37-43 ferrite toroid; 10 t on FT-37-43 (trifilar)

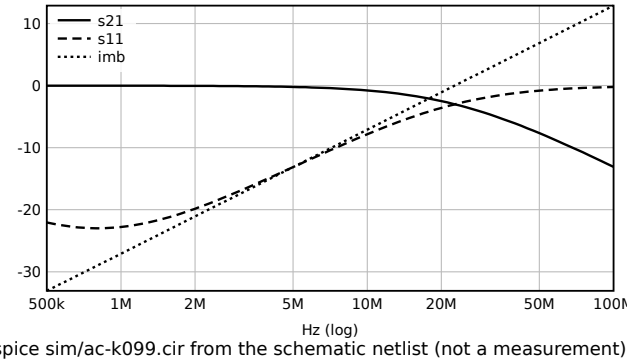
BUILD NOTES

- Core and turns aren't in EMRFD. QRPedia's pick is 10 trifilar turns on an FT-37-43, for receive or low power.
- Twist the three wires together before winding to keep coupling tight. Pins 1, 3 and 5 are the dot ends.

Test: Terminate the output in 50 Ω and measure return loss at the input with a return-loss bridge across the bands.

CHECK AGAINST

Check	Expect	Basis
Insertion loss at 14 MHz	0.0175 dB ± 0.05 · sim 1.41 dB ± 0.3	simulated
Return loss at 30 MHz	17.6 dB ± 1.5	simulated



ngspice sim/ac-k099.cir from the schematic netlist (not a measurement)

Full page:
https://qrpedia.com/circuits/matching/true-balun-1to1/
Interactive sim, KiCad project, netlist and errata.

SPECIFICATIONS (FULL)

Spec	Value	Basis	Reference
Insertion loss at 14 MHz	0.0175 dB ± 0.05	simulated	sim/ac-k0999.cir, k = 0.999
Insertion loss at 14 MHz	1.41 dB ± 0.3	simulated	sim/ac-k099.cir, k = 0.99
Return loss at 30 MHz	17.6 dB ± 1.5	simulated	sim/ac-k0999.cir

Simulated values are this build's ngspice results (± the build's check tolerance); book and measured values are as published.

HOW IT WORKS

Three windings on one core. Two carry the signal to each side of the load; the third ties the output's virtual center to ground reference, so common-mode current sees a high impedance. Performance depends strongly on coupling: with k = 0.999 the simulated loss is 0.02 dB at 14 MHz, but with k = 0.99 it rises to 1.4 dB (**simulated**, both).

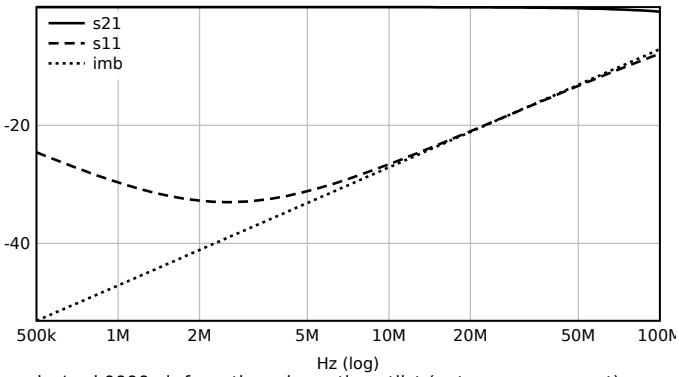
WHERE IT COMES FROM

A 1:1 current balun from Experimental Methods in RF Design, Chapter 3.

SOURCES

- EMRFD Fig 3.78, p. 3.35

MORE SIMULATION



ngspice sim/ac-k0999.cir from the schematic netlist (not a measurement)