Baluns and R.F. Transformers (part 2)

Orange Park Amateur Radio Club – Nov. 2007 – Dick Bennett K2LJZ

I. Need for Balun and/or RF Matching Transformer

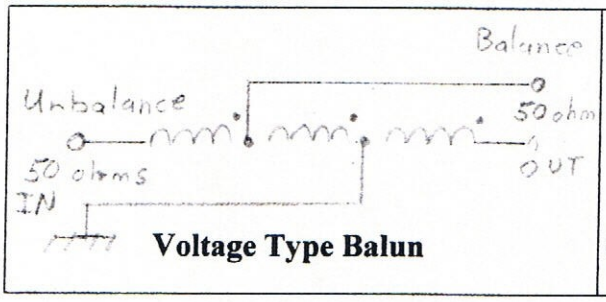
a) Balun needed to match unbalanced feed line to balanced antenna.

b) RF transformer needed to match feed line impedance to antenna impedance.

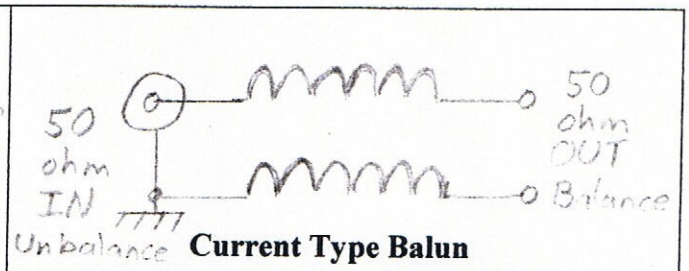
II. Voltage vs. Current Baluns

a) A voltage Balun will put a constant voltage out of the Balun, while a current Balun will put try to put out a constant current.

b) For antennas a constant current is desired in both sides of the antenna.



Voltage Type Balun



Current Type Balun

II. Common Commercial Baluns (1:1 50 ohm)

BRAND	Hi-Q, Van Gorden	W2DU Wireman	W2AU Unadilla	DX Eng.	Home Made
COST	$16	$31.95 Assy. $21 Kit	$23	$120	$20
TYPE	Air Core, Trifilar	Ferrite Beads over CoAx	Ferrite Rod	Ferrite Toroid and CoAx	CoAx (20ft.) on 4" dia PVC
Frequency Response	40M - 15M poor 80&10M	80M - 10M 50 beads min.	160M - 40M mfg. claim!!	160M - 10M lowest SWR	40M - 15M poor 80&10M
Power Rating	"full legal power"	2kw (PEP) can overheat	2kw (PEP) can overheat	2kw Constant 5kw Peak	1 kw
Type-Voltage or Current	Voltage	Current	Voltage	Current, Low Power Loss	Current

High SWR and high unbalanced loads can damage most of the above Baluns. DXE & CoAx are OK.

III. Transformer Baluns 4:1 (200 ohm to 50 ohm)

BRAND	MFJ 919	MFJ 913	KZ5R	W2AU Unadilla	DX Eng.
COST	$60	$30	$67	$25	$120
TYPE	Ferrite Toroid	?? Ferrite Toroid	Large Ferrite Toroid	Ferrite Rod	Large Ferrite Toroids
Frequency Response	160M - 10M	160M - 10M	1.5 to 30 mHz	?40M-15M?	1.8 to 30mHz
Power Rating	1500 Watts	300 Watts	3000 Watts Sevick design	2kw PEP	2kw constant
Voltage or Current	Current	Current	Current	Voltage	Current

Make Your Own Balun

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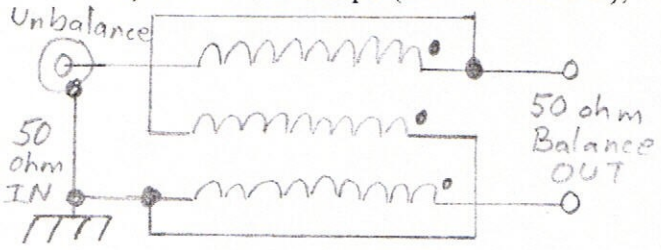
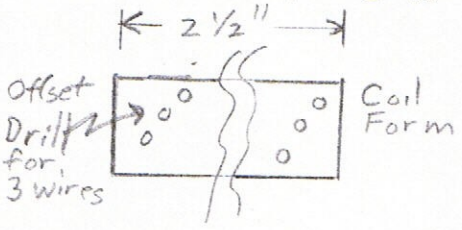
I. 1:1 Air Core - 50 ohm type

1) Use 3/4" Pvc Pipe (1.04" actual dia.), #14 wire, 9 turns Trifilar (Voltage type???)

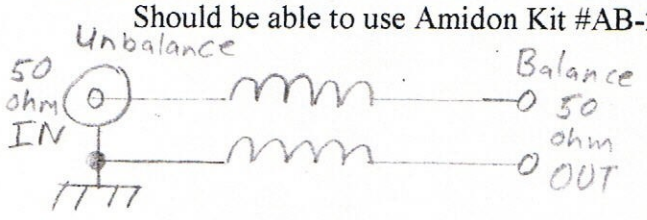


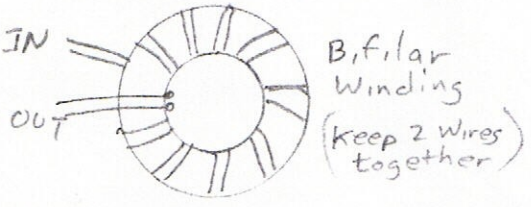


II. 1:1 Toroid - 50 ohm type - -Sevick Transmission Line type Amidon Book p.28

1) Use Amidon Toroid Core #FT-200-K, #14 wire, 10 turns Bifilar .

2) Frequency Response is 1MHz to 50MHz, 99% efficiency, 2kw continuous.
Should be able to use Amidon Kit #AB-240-Kit, with a similar rating. Cost is $9.



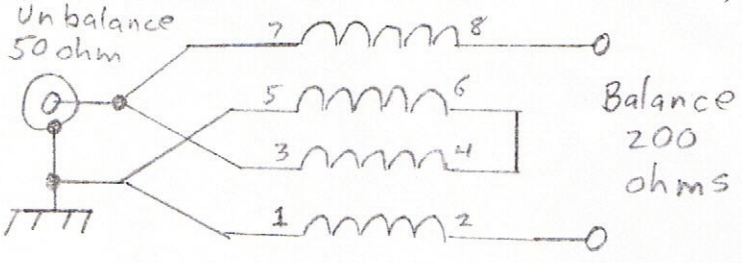


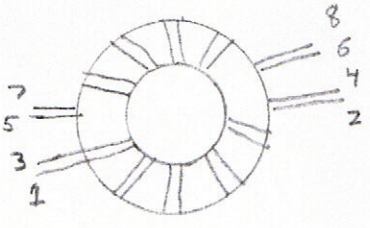
III. 4:1 Toroid - 50 to 200 ohms - - Sevick Transmission Line Type Amidon Book p.31

1) Use Amididon Toroid Core FT-240-250, #14 wire with 15 mil wall Teflon sleeve, wind two Bifilar windings of 8 turns. Each Bifilar should occup

2) Frequency Response is 1MHz to 50MHz, 98% efficiency, 2kw continuous.

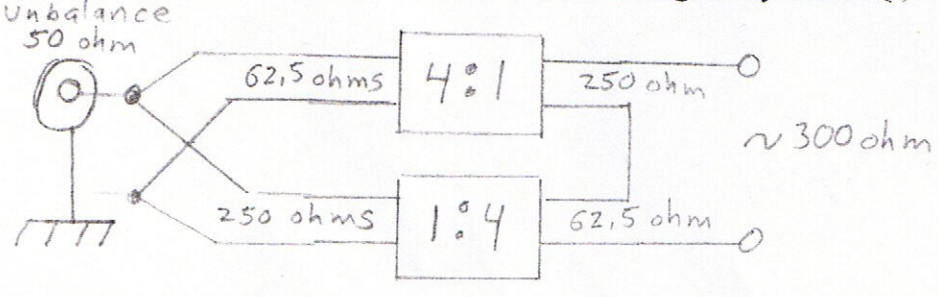
3) Use Amidon Kit # AB-240-250 which includes core, wire, Teflon tube, and Sevick book - $25.





IV. 6:1 Toroid - 50 to 300 ohms - Transmission Line Type, Google:"Balun 6to1 OFC dipole"

1) Uses two 4:1 baluns to make a 6:1 balun. Designed by VK2DQ , Ron Bertrand.



V. Required Reading – HA! Internet Sites that are good

1) Wireman.com for Balun Kits that look good
2) Amidon.com for Ferrite Toroids & Bars
3) Balun 4-1 Guanells type W1CG
4) W8JI.com/Baluns/balun_test.htm