Alachua County HF Baluns

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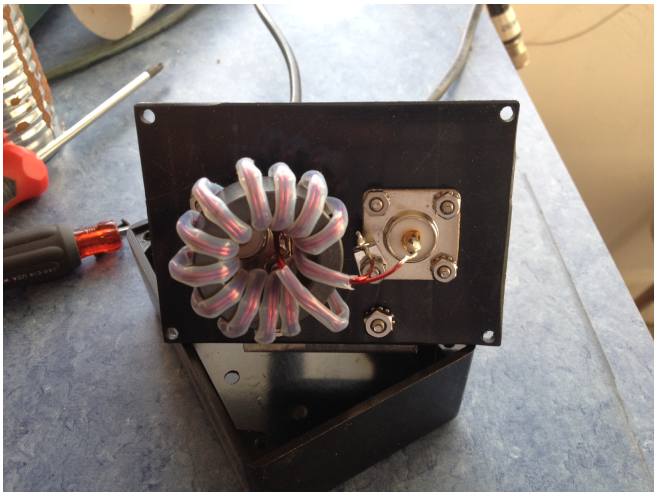
Why are baluns so mysterious? Baluns are just inductors ("chokes") or transformers that present high impedances to uwanted "common-mode" currents, and may at the same time have transformer action to change impedances if desired. The simplest is a 1:1 current balun (BALUN NUMBER ONE below) that can get rid of "RF in your shack" – you can buy one for $40 or build it for < $10

This article is old, but does a great job explaining a great deal about baluns, and includes the results of real and very practical experiments: http://www.arrl.org/files/file/History/History%20of%20QST%20Volume%201%20-%20Technology/AntComp1-Lewallen(1).pdf

His article explains a good bit about a 1:1 Current Balun (BALUN NUMBER ONE) – and in my limited experience, these things are WONDERFUL at stopping my digital stations from having problems. They can be made with bifiliar wire, or even by winding small diameter coax around a toroid. Cheap, and effective. You could make one and put it at the center of an antenna for way less than the commercial ones, if you preferred.

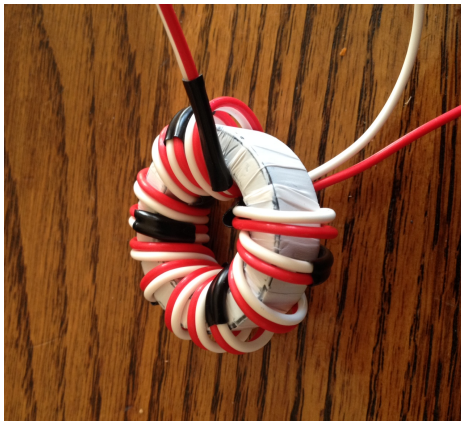
4:1 Baluns (BALUN NUMBERS TWO AND THREE) can be useful if you're trying to connect a tuner to a high impedance --- but beware, not always are antennas "high" impedance! Depending on your feedline transformations (remember the circle on the Smith Chart?) – you could be dealing with a LOW impedance! A bit of trial and error, or an antenna analyzer may help here. Remember you can flip a 1:4 balun around to make a 4:1! You can also replace with a 1:1.

BALUN NUMBER ONE
1:1 BALUN ("isolation balun")

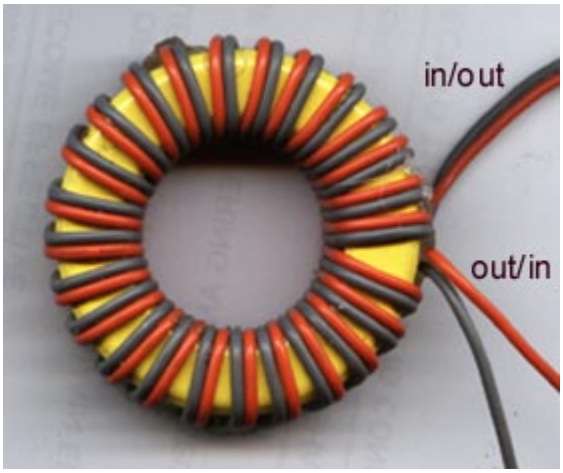


The MFJ isolation 1:1 current balun

This is absolutely the easiest balun to make for yourself.



My first homemade balun is pictured above. You just wind two parallel wires around the core and connect them to input at one end and output at the other. Done.



From a construction article

This is exactly what is inside the MFJ-2912 wall mount isolation balun – just fewer turns. (more like 10 or 12) $40.

When I measured the common-mode impedance (you want it to be high) it was about 600 ohms by the beginnning of the 80 meter band, and then went above the capabiities of my instrument almost all the way to 30 MHz.

It's a long write up, but I got that photo from this web page: http://vk5ajl.com/projects/baluns.php Note that for the signal you are TRYING to send....there is no magnetization of the core at all! Only the common mode (unwanted) current does any magnetizing of the core at all. The other two currents are equal and opposite and cancel.

You can dress it up with SO-239's on each end, or just solder on some coax and put PL-259's on the ends and connect to your rig and off to your SWR meter. Whatever you wish. Once you leave the core windings, go back to coax within a couple inches.

You can of course put something like this right at the center of your antenna where the feedline connects.

There's another way to make this, which is to put 30 or so ferrite beads clamped around your coax. It has the same effect of opposing the unbalanced (commmon-mode) current. Just costs more.

BALUN NUMBER TWO: 4:1 VOLTAGE BALUN FOR SIMPLE WINDOM COAX FED ANTENNA

Purchased Commercially: $60

+

You can easily build that balun or a much better one for a LOT LESS MONEY.

You can build this yourself obviously, and it doesn't have to be on this same PVC holder if you don't want. It appears to be possibly the Carlon 3/4” PVC transition box: https://www.lowes.com/pd/CARLON-3-4-in-PVC-Transition/3129683 $3

Pictured above is what is on the insides of a commercially sold balun for off center fed antennas, said to be capable of running 500 watts SSB. As you can see, it is nothing more than a 4:1 “voltage” balun. It consists of about 8 turns of two parallel wires (bifiliar) around a core, and the windings are used to double the voltage. This halves the current (conservation of power) and the result of twice the voltage divided by half the current is 4 times the impedance. In this case it is housed inside an electrical PVC item, with an SO-239 coax jack and two connections for the antenna and two eye-hooks screwed into the pvc.

Here's an article on how to build that balun using powdered iron toroid (type 2), complete with photos and all construction information: http://vk6ysf.com/balun_4-1.htm This is OK, but you can do better –

Here's a longer but much better article that shows you might do better to wind that 4:1 voltage balun on type 61 ferrite: http://g8jnj.webs.com/Balun%20construction.pdf
He also gives a LOT of information about what to do to make these things WORK BETTER. How you wind them makes a huge difference, and it is clear why everyone does either “bifiliar” or coax.

A youtube on that same type construction: https://www.youtube.com/watch?v=gAwYrURNKkk

4:1 CURRENT BALUN – possibly a better way to do a 4:1 balun.

MFJ 4:1 Current Balun

At the left of this photo is an MFJ-911 4:1 CURRENT balun – a fairly nice balun for only about $25 (add shipping). That's not a bad deal,but you can make it for even less!

$25 isn't that much money but you can build THAT balun with #18 wire (much bigger) and a bigger core for a lot less money. It should hand a WHOLE LOTTA POWER easily then.

It is made by just making two 1:1 baluns, and then connecting them appropriately to step up the impedance:

http://www.ad5x.com/images/Articles/Current%20Balun%20RevA.pdf

This guy gives another set of instructions: http://www.kn9b.us/guanella-balun

Some simple advice with a lot of photos: http://www.hbphoto.com/Radio/Baluns_101.pdf

An ARRL older article on baluns: http://www.arrl.org/files/file/History/History%20of%20QST%20Volume%201%20-%20Technology/AntComp1-Lewallen(1).pdf