

## A 4:1 Air-wound Balun

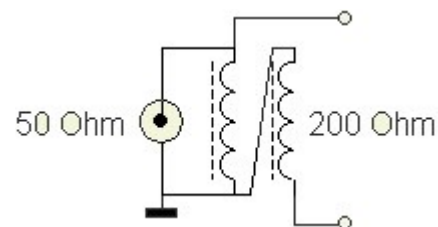


Since some time I have been using the Diamond CP6 multi band vertical for my HF activities. While this antenna performs well on 6m, 10m, 15m and 20m and also does a reasonable job (for it's length) on 40m, it does not work at all - for me anyway - on 30m and 17m. The latter is one of my more favorite bands to listen on, so it was time to do something about it. Even though my LDG AT-100Pro automatic tuner keeps the IC-7000 happy while transmitting on 17m, the signal does not really get out and reception is poor.



My home has an attic and that was big enough to string some wire up. I decided to have a play around with a 17m long delta loop fed with open wire feeder. The feeder was salvaged of an old G5RV given to me by a friend (thanks Hennie). Theoretical calculations show the impedance of a delta loop cut at its fundamental frequency to be 150 Ohms when fed from the side. So using this setup, I was in need of a 4:1 balun to present the AT-100Pro with a more reasonable load and at the same time transform the balanced line back to unbalanced.

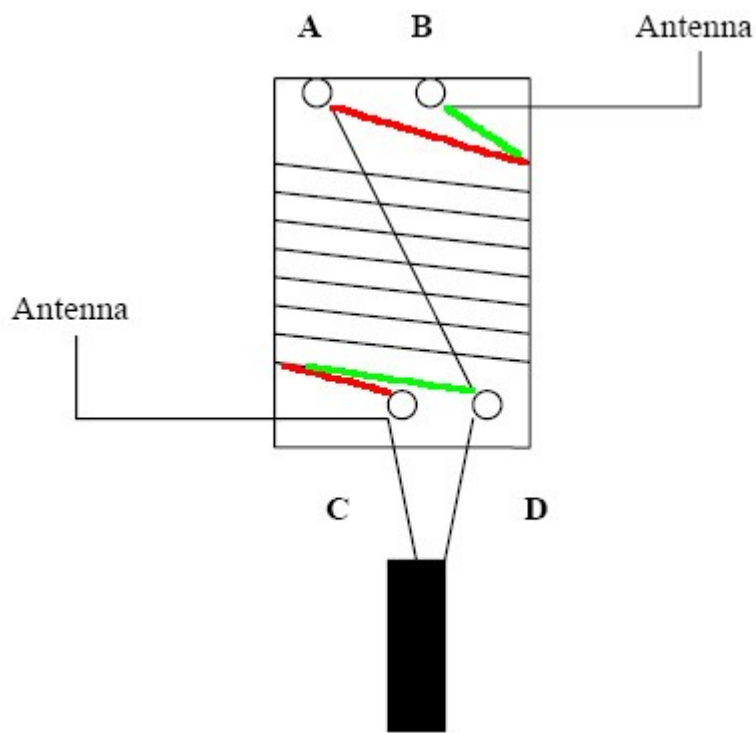
**Definition :** *A balun is a device that joins a balanced line (one that has two conductors, with equal currents in opposite directions, such as a twisted pair cable) to an unbalanced line (one that has just one conductor and a ground, such as a coaxial cable). A balun is a type of transformer: it's used to convert an unbalanced signal to a balanced one or vice versa. Baluns isolate a transmission line and provide a balanced output.*



Quite often toroids are used to make baluns with. Even a ferrite rod from an old AM radio can be used. I however have something against using ferrite materials in baluns. If you are not careful, the ferrite can get saturated and heat up. You won't be the first blowing up a balun when using QRO. So instead of ferrite, I went with an air-wound balun. This air-core balun is wound using the following components :

- 40mm diameter grey PVC pipe with a length of 9.5cm
- 2 end caps 40mm PVC
- Simple zip cord (multi-stranded core insulated wire)
- 8 turns bifilar wound
- 2 banana type chassis connectors
- 1 SO239 socket

When fed with the 50 Ohm coax from the AT-100, the balun transforms this impedance to 200 Ohms which is close to matching 150 Ohms. The image below shows how to wire the balun :



Terminals B and C are wired to the banana chassis connectors for hooking up the feed line. The SO239 terminal center pin is wired to C and its shield to D. Make sure to connect D and A together. As can be seen on the image at the top of this page, the wiring enters the PVC pipe and all connections are made internally. In my case - since I am using the balun inside - I did not glue the end caps to the pipe but used a couple little screws instead. This way the balun is easy to service should the need arise.