

STATIC



December 2010

About Baluns - Balun Fundamentals and Terms

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(www.dxengineering.com)

Balun is an acronym for BALanced to UNbalanced, which describes certain circuit behavior in a transmission line, source, or load. Most communications applications deal with two-terminal sources, transmission lines, and loads. This includes coaxial cables, open wire lines, and systems working against earth or a ground plane as the "second conductor".

Baluns are often selected based on the ratio between 50-ohm coaxial systems and the advertised impedance of another transmission line. As an example 9:1 baluns are often used to connect the normal 50-ohm impedance of our radios to a 450-ohm transmission line regardless of what the actual impedance is on the line or the impedance of the antenna. Sometimes, this is because designers and end-users fall into the habit of using the same balun others use. Sometimes, it is because of a mistaken idea of what a balun is supposed to do.

Balanced and Unbalanced

A two-terminal antenna, load, feedline, transmitter or signal source operating in ideal fashion will have **exactly** equal and **exactly** opposite currents flowing through each terminal. Current flowing out one terminal will be matched or duplicated by exactly equal current flowing in the other terminal at any instant of time. If the current is not equal and opposite on each conductor, the feedline will radiate and receive unwanted signals. This is true no matter how good a shield is, or how many layers of shields a cable has. **Even the grounded shield of a coaxial cable has the same current as the center conductor** (in a perfect system).

The difference between ideally operating unbalanced and balanced lines lies in system voltages, rather than currents. Balance is referenced to voltage, not current, in an ideal system.

An unbalanced (coaxial) line has significantly different voltage from each conductor to ground. In a perfectly working unbalanced (coaxial) line, the amount of voltage unbalance is infinite. One terminal (the shield) has zero voltage to the outside world, even while currents are equal and opposite. Current on the center conductor is balanced by an equal but opposite flowing current on the **INSIDE** of the innermost shield. No matter how we feed or connect a coaxial line, all current on the center conductor is always matched by an equal and opposite current on the shield. In figure 1, the 1-ampere shield current flows on the inside of the shield, nearest the center conductor.

(continued page 3)

LBARA MEETING SCHEDULE

MONTH	BOARD	REGULAR
DEC	NOTE: BOARD	12/16
JAN	MEETINGS WILL NOW	1/20
FEB	TAKE PLACE ONE	2/17
MAR	HOUR PRIOR TO THE	3/17
APR	REGULAR MEETING	4/21

DEEP THOUGHTS

- Save the whales, collect the whole set.
- On the other hand, you have different fingers.
- 99 % of lawyers give the rest a bad name.
- Support bacteria. They're the only culture some people have.
- Change is inevitable, except from vending machines.
- When everything is coming your way, you're in the wrong lane.
- Everyone has a photographic memory. Some just don't have any film.
- Eagles may soar, but weasels don't get sucked into jet engines.
- How many of you believe in psychokinesis? Raise my hand.

Monday Night Net (7 PM)

System	Location	Freq	Offset	PL
MCARS	Bullhead City	145.27	-	131.8
	Kingman	146.76	-	131.8
	Kingman	448.25	-	131.8
	Lake Havasu	146.62	-	131.8
	Willow Beach	147.12	-	131.8
CRRRA	Lake Havasu City	146.96	-	162.2
	Lake Havasu City	224.24	-	156.7
	Lake Havasu City	146.64	-	156.7
	Lake Havasu City	449.95	-	141.3
BARN	Lake Havasu City	447.54	-	136.5
	Las Vegas, NV	449.95		136.5
	Onyx(Palm Springs)	449.34	-	136.5
	Orange County, CA	447.54	-	100



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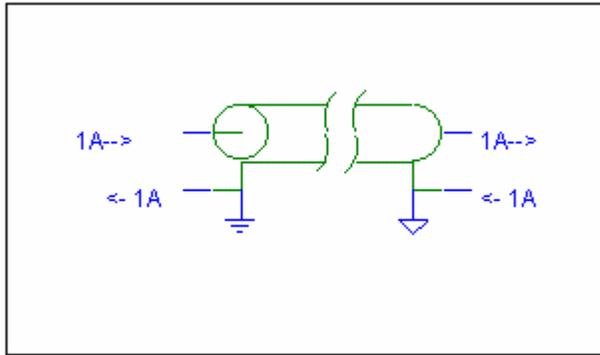


Figure 1. Coaxial line currents

If the two terminals of the load or source do not carry equal currents, some current will flow in a loop through the ground or along the outside of the shield. The outside of the shield or shields is isolated by skin effect in the conductor wall. At radio frequencies the **outside of the shield** can be treated as an independent conductor connected to the “inside shield” at the ends of the coax. Most coaxial baluns make the outside shield connection a high impedance while not disturbing the inside operation.

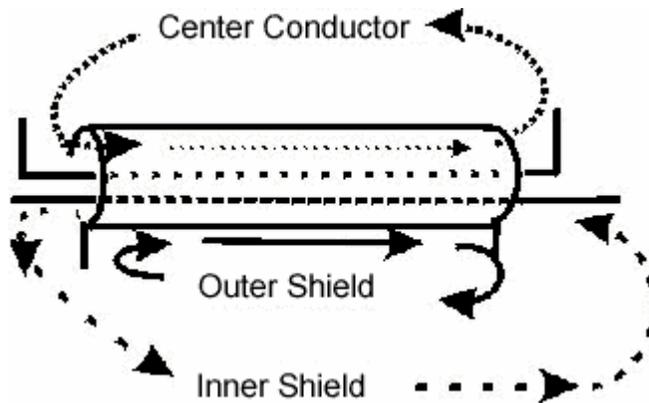


Figure 2. Coaxial line current directions

Note in **Figure 2** the direction of current outside the shield can be (and often is) opposite current on the inside. The shield’s outer surface current is independent of the balanced center conductor and inner shield current. The outside of the shield can easily pick up currents by passing too closely to an operating antenna. It will also radiate when excited with time-varying currents from an improper load or source.

(continued page 5)

Upcoming Activities and Hamfests

January 8
January 29
February 18-19
May 7

Thunderbird Hamfest, Glendale, AZ
Desert Rats Hamfest, Palm Springs, CA
Yuma Hamfest & Emergency Preparedness Show
Larry Warren Memorial Hamfest, Sierra Vista, AZ

SATURDAY MORNING'S BREAKFAST

You're all invited to join LBARA members for a great breakfast each and every Saturday morning at Rusty's Resturant located at the southwest corner of Lake Havasu Ave and Kiowa Blvd. Breakfast is served at 6 a.m. (or earlier if you want a good seat!) Most important, the food is great!!!!

QUARTZFEST* 2011

- When?** January 23rd thru 29th of 2011 (make sure you put Quartzfest 2011 on your calendar)
Where? 7 miles south of Quartzsite Arizona - on US 95 at La Paz Valley Road
Who Can Attend? **ANYONE!** If you don't have your Amateur Radio Operators License yet, we'll be offering Licensing Exams at 10:30am on January 25th, 2011.
What? Quartzfest is an annual HAM Radio RV'ers Boondocking event which is held in late January every year with dates coinciding with the Quartzsite Arizona "RV Show".

During the week of Quartzfest, RV's are everywhere across the desert, as far as you can see..every make and model you can imagine! There are hundreds of groups that meet in Quartzsite every year in different parts of the desert who share like interests. Our Annual Amateur Radio event is called "QuartzFest" and is open to ALL to attend. QuartzFest is not a club, no officers, no budget, no dues and is not affiliated with or sanctioned by any organization. QuartzFest's continued success exists because of the many HAM's dedicated to seeing it go on year after year, all of whom are volunteers. Quartzfest started out about 12 years ago and is just a bunch of HAM's getting together, camping in their RV's in the middle of the desert..no power, no restrooms, no running water. Solar Panels and Generators are in use everywhere (if you run your generator, you've got to be courteous to your neighbors). If you want to see how well you're prepared and how long you'll be able to hold out in the event of an emergency or disaster, "Boondocking" in the desert for a week will show you.

Quartzfest is similar to a mini-HamFest with a week full of scheduled activities. Seminars range in topics from Genealogy and Crafts for Non-HAM's to Technical information for the seasoned HAM, and introductory information for the new HAM. Also included in the week's activities are VE Testing, Antenna Shoot Out, Antenna Walkabout (touring other HAM's RV Antenna installations), 4x4 Trip in the Desert, Campfires..some with musical entertainment, Movies using the side of an RV as a screen, Hobo Stew, Shopping, Shopping, Shopping, and lot's more!

Cost? Camping on BLM (Bureau of Land Management) land is absolutely **FREE!!** and you can camp there for up to 2 weeks.

For more information, visit www.quartzfest.org

or

email our Quartzfest 2011 Organizers

Steve and Linda Weed

KO4QT KI6JUD

organizer@quartzfest.org

Are you looking to upgrade your license?

Give our VE Exam Team a call.

See Ed Gillespie, AB7EM at #453.7412

(continued from page 3)

A **perfectly operating balanced line** (Figure 3) has equal and opposite voltages, as well as equal and opposite currents, all along the length of the line. Any difference in opposing voltages along the line can cause the line to radiate, since that often means currents will become unbalanced. All operating balanced lines are surrounded by external magnetic and electric fields. This effect is caused by the necessary separation of conductors in the line. To minimize radiation, balanced lines should be twisted or transposed at fractional wavelength intervals. If you look at older open-wire telephone or signaling lines, they are periodically transposed.

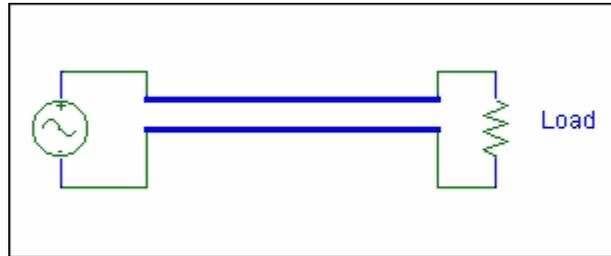


Figure 3. Balanced line

(The portion of current not equal in amount and opposite in phase on any transmission line is called the **common-mode** current. The amount of opposing phase current is the **differential-mode** current. Differential mode operation, the normally desired method of operating a transmission line, has impedance. This is the impedance we talk about when we say a line is 50 ohms, or 450 ohms. This impedance is different than the common mode impedance.)

Most lines fall somewhere short of perfect examples, but the closer to perfect the less energy lost as unwanted radiation. Perfection also means the feedline does not pick up unwanted signals and noise, and RF will not appear on equipment near the transmitter unless it is from antenna or equipment radiation. In short, your antenna becomes the point of most signal reception and radiation. Most of us want the antenna to be an antenna, and the feedline (which often runs near computers, radios, TV sets, and noise sources) to NOT be an antenna!

(Give DX Engineering a try. Quality products and excellent, speedy service...your Editor)

THOUGHTS

- **The gene pool could use a little chlorine.**
- **Procrastinate Now!**
- **I Have a Degree in Liberal Arts; Do You Want Fries With That?**
- **The trouble with life is there's no background music.**
- **Out of my mind. Back in five minutes.**
- **Beauty is in the eye of the beer holder.**
- **I'm not a complete idiot -- Some parts are missing.**
- **I Work Hard Because Millions On Welfare Depend on Me!**
- **You're just jealous because the voices only talk to me.**
- **They call it PMS because Mad Cow Disease was already taken.**

CHRISTMAS PARTY

London Bridge Amateur Radio Association

Date: Friday, December 17th

**Where: Golden Corral
(Northwest Dining Room)**

Time: 6 P.M.

**Cost: Simply pay for your food and
drink as you enter. Your choice of
anything on the menu.**

**Please bring a \$5 gift for each
person in your party to be shared
in our gift exchange.**

FOR SALE/TRADE

Your ad here.....with pictures if you like....contact the Static editor.

Kenwood 940AT Excellent condition. Used only once since factory overall. Includes all the manuals. Price is \$700 firm. Alan, N7QLL, at (928)855.6609 .



Champion 4000 Watt Generator 110/240 VAC at 30 amps. 12 V Charging at 10 amps. 6.5hp engine. 4 gal fuel tank. Runs 12 hrs. at 50% load. Wt. 99 lbs. Purchased new in 12/07. All paperwork and receipts. Carl, W7CRL, 928.680.7262, cell: 716.0852, <w7crl@yahoo.com>



Antennas for Sale: RS scanner (all bands) and 2 meter transmit with 10 ft mast. Ringo Ranger 2 meter antenna with 10 ft. mast. Any reasonable offer. See Dick, W7ZR, 928.208.7175

Zenith Trans Oceanic Model b600 Radio Good condition for a radio built between 1959 - 1962. Has a little audio buzz. Includes schematic, brochure, and manual. Flip charts are clean and unmarked. Asking \$65. See Tom Fulmer. 928.208.7417



Tower—60' of Rohn tower sections. Asking \$150. See Dick Jernigan (W6DXJ) #855.0670

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www.lbara.net

FROM THE EDITOR

If you have anything you would like to see included in these issues, please let me know. I'm always looking for articles, news items, construction articles, or anything that might be of interest to our readers. You can contact me at 928.855.7941 or email at grf@unedspeed.net or francej@ajsinsurance.com.

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STATIC

ATTENTION READERS

Please note that this issue represents a “work-in-progress” and there are a number of changes to be made in subsequent issues. I would greatly appreciate your comments, both good and bad, as well as any suggestions for future issues. This issue also begins our first attempt to deliver the **STATIC** to your doorstep electronically. Please keep me abreast of any email address changes you may have and I promise to have this delivered promptly and accurately. Also, I still have a number of articles awaiting publication and will do so in the future. This is your newsletter, so keep the articles, letters, and pictures coming. I can be reached at home (855.7941), at work (855.3081) or via email at grf@uneedspeed.net .

EQUIPMENT FOR SALE

EDITOR'S NOTE: List your items for sale here. Ham radio related only, please. Include a picture if you like (please use a jpg format). Email all to me at grf@uneedspeed.net) along with your name and phone number.

