

STATIC



SEPTEMBER 2009

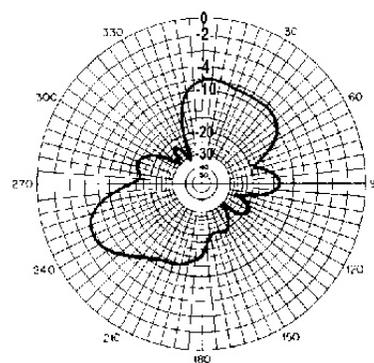
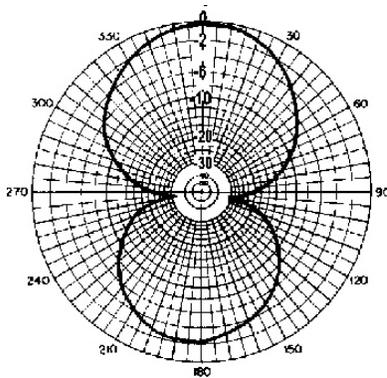
Ever wondered if your antenna system would benefit if you used a balun? Here's an article that could help you decide. It was written by KZ5R of Balun Designs and is presented here with his gracious permission. (also see his site: WWW.balundesigns.com/servlet/StoreFront)

Striking a Balance

When you connect center fed antennas, like dipoles, Vs, triangles, yagis, rhombics, loops and so on, to coaxial cable, unless care is taken, it is not difficult to end up with feeder radiation. Not only can the loss in power be quite significant, but the radiation characteristics of the antenna system will also be seriously compromised.

As the feedline becomes part of the antenna, currents can flow from the line into the mains and on TV cables, metal masts and yagi booms, causing a variety of EMC problems that can be very difficult to trace. Frequently these problems are simply due to unbalance - and the solution is the humble balun.

Tests carried out in an anechoic chamber to determine the affects of unbalance on radiation patterns of a half wave dipole (published April, 1980 in QST) show just how serious this can be and how important the function of the balun is in achieving predictable patterns.



- Left: Half Wave dipole with balun (not located at centre of support)
- Right: Same antenna without balun (moving the coaxial cable altered pattern significantly)

(continued on page 4)

LBARA MEETING SCHEDULE

MONTH	BOARD	REGULAR
SEPTEMBER	NOTE: BOARD	9/17
OCTOBER	MEETINGS WILL NOW	10/15
NOVEMBER	TAKE PLACE ONE	11/19
DECEMBER	HOUR PRIOR TO THE	12/17
JANUARY	REGULAR MEETING	1/21

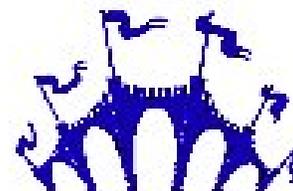
DON'T FORGET OUR FIRST MEETING OF THE NEW SEASON

**OUR FIRST MEETING AFTER A LONG AND HOT SUMMER
WILL BE HELD THIS COMING THURSDAY, SEPTEMBER 17.
IF YOU HAVE BEEN OUT OF TOWN IN COOL COUNTRY
COME AND SAY HOWDY TO ALL OF US BRAVE ENOUGH
TO DEAL WITH THE SUMMER HEAT!**

DICK JERNIGAN WILL PRESENT A PROGRAM ON JUST HOW THE COMMUNITY WILL BE HANDLING COMING FLU SEASON AND ANY RESULTING PENDING.

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



FALL FEST 2009

Saturday November 7, 2009

**Centennial Park (West Side)
Kingman, Arizona**

7 AM UNTIL ???

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Mohave



Amateur Radio Club

GRAND PRIZE!

**Yaesu FT-450AT
HF Radio**

SECOND PRIZE!

**Yaesu FT 7800R
Dual Band Mobile**

THIRD PRIZE!

**Yaesu FT60R
Dual Band Handheld**

TALK IN

**146.9400 - 151.4
448.6500 - 151.4**

Upcoming Activities and Hamfests

October 10/11	Arizona QSO Party (See: www.azqsoparty.org)
October 17	OPRC/RST Hamfest (See: www.tucsonhamfest.com)
December 5	Superstition ARC Hamfest, Mesa, AZ

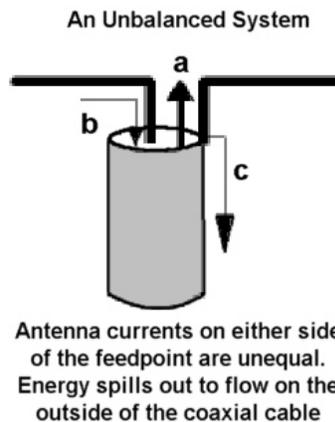
(Striking A Balance....cont. from page 1)

Although these results are indicative only and will vary according to each individual case, and whether receiving or transmitting, **the 5dB drop in peak amplitude in the receiving pattern of the unbalanced antenna without the balun is significant.**

Moreover, in real life, objects in the vicinity of an antenna will exert their influence on the radiation pattern as signals are bounced off them and re-radiated. So, how they are installed is crucial if the system is to be balanced and the desired performance achieved, as well as the quality and efficiency of the balun itself.

When the connection is to a coaxial cable this cannot occur because currents flowing inside the cable from the connection to the inner conductor are separated from those flowing on the outside from the connection to the shield, and the result is unbalance causing feeder radiation. However, if the two electrical circuit elements (antenna and coaxial cable) are coupled using a balun, balance will be maintained.

Essentially there are two types of balun, the Choke balun and the Transformer balun, each operating in a different way to achieve a similar end. The name derives from balance to unbalanced. Each aims to provide a solution to the problem but in quite different ways.



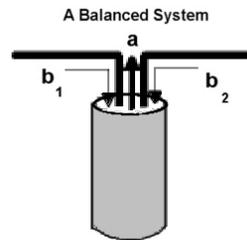
The Choke balun aims to choke the current off at the feed point by creating a large series impedance on the outside of the cable thus preventing currents from flowing. If the installation is asymmetrical, however, the choke balun may not be able to prevent surface currents from electromagnetic coupling further down the cable, especially if the feedline length is resonant. Therefore if surface current flow persists, more chokes are required at intervals down the feedline.

Adding a choke will not normally affect the VSWR, as it only affects the outside of the cable and cannot influence impedance inside the cable. **However unbalance will, as the feeder becomes part of the antenna system and load impedance is altered.** The choke merely suppresses surface currents and makes no attempt to create balance.

The Transformer balun, on the other hand, acts to create balance by forcing equal and opposite currents at either side of the feedpoint, through closely coupled windings within the transformer. With the transformer balun it is also possible to alter impedance by a factor, either up or down. As with the choke balun quality and efficiency are all important. Unwanted resonances due to distributed capacitance between the turns of the transformer can induce impedance mismatch and unbalance, as can leakage inductance from loose coupling between windings.

(continued on page 5)

(Striking A Balance....cont. from page 4)

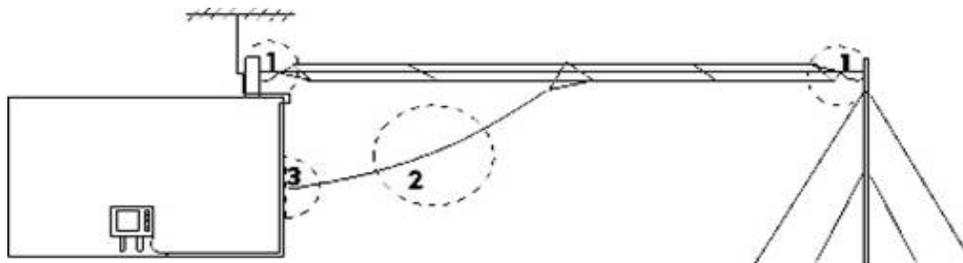


A balun ensures equal and opposite currents flow inside the coaxial cable

For total balance to be achieved on either side of the feedpoint, installation and environmental factors must also be taken into account. If any unbalance remains, the transformer balun will not suppress any resulting surface currents. However, these can be negated by the use of choke baluns further down the line.

Acceptable performance standard at the edges of the operating band are normally: balance within 1dB, a phase angle of 180 +/- 10 degrees and a VSWR of less than 1.5 into a balanced load. If loads are inaccurately matched, especially at HF where the length of the coiled transmission line may approach an electrical 1/4 wave, the balun cannot compensate and balun performance will be adversely affected. Environmental factors influencing balance are most critical at HF frequencies.

In practical terms, it is always important to maintain balance in the system. Where an antenna is located in close proximity to buildings unbalance can occur leading to feeder radiation and EMC problems (see diagram). If the antenna end conditions are different, a balanced antenna can become unbalanced negating the effects of a balun. If one end is connected to a metal building, the metal structure can act like a huge capacitor seriously compromising the design.



1. Antenna end conditions differ creating unbalance
2. Feeder radiation due to angle of feedline
3. Radiation from feedline reacts with household wiring causing EMC

Installation is complicated

The center feedline should always be at right angles to the wire, otherwise energy can flow on the outside of the coaxial cable due to the fact that it is running almost in the same plane as the antenna wire. The coaxial cable will then no longer act as a good screen. Energy will be conducted into the building reacting with the house wiring (and vice versa) causing EMC problems and noise interference in receive mode.

While the balun may seem insignificant in the larger more complicated picture, the smallest link in the chain, it is worthwhile remembering that its function is of critical importance. Tracking down problems that arise from unbalance can waste a great deal of time and money. Knowing your center fed system has been designed and built to give you predictable balanced performance leaves you only the installation to worry about.

LBARA HAMS ASSIST MOHAVE COUNTY EMERGENCY MANAGEMENT

Dick Jernigan, W7DXJ, and Jerry France, K7LY, aided Mike Browning, KC7CHY, the Mohave County Emergency Management Assistant Manager in setting up the ARES station at the new Bullhead City EOC. LBARA donated a new VHF vertical, cabling from the new vertical, and a new 2 meter rig. Somehow we all managed to keep from being underfoot with the EOC was filled with activity during the BHC River Tube Float Regatta.



Mike had the tough job installing the 2 meter vertical in all the heat.



Boy, I'm glad I'm not up in that hot crawl space stringing coax like Mike!



No, he's not asleep. Here is Dick adding connectors to the new coax cables.



Whew! It's finally done.

Are you looking to upgrade your license?

Give our VE Exam Team a call.

See Ed Gillespie, AB7EM at #453-7412

FOR SALE/TRADE

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

**GIANT AUCTION COMING IN NOVEMBER TO
OF 2009 TO BENEFIT THE LBARA. RIGS, ANTENNAS, MISC.
EQUIPMENT WILL BE SOLD TO THE HIGHEST BIDDER.**

- The math professor went crazy with the blackboard. He did a number on it.
- A bicycle can't stand alone; it is two tired.
- In a democracy it's your vote that counts; in feudalism, it's your Count that votes.
- With her marriage she got a new name and a dress.
- When a clock is hungry it goes back four seconds.
- A calendar's days are numbered.
- Acupuncture: a job well done
- When she saw her first strands of gray hair, she thought she'd dye.
- Those who get too big for their britches will be exposed in the end.
- He had a photographic memory which was never developed.

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VISIT OUR WEBSITE

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@uneedspeed.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.

