The Aero Aerial

The Newsletter of the Aero Amateur Radio Club
Middle River, MD
Volume 14, Issue 11
November 2017

Editor Georgeann Vleck KB3PGN

Website: http://w3pga.org
Facebook: https://www.facebook.com/pages/Aero-Amateur-Radio-Club/719248141439348

About the Aero Amateur Radio Club

Meetings

The Aero Amateur Radio Club meets at 7:30 pm on the first and third Wednesdays of the month at Essex SkyPark, 1401 Diffendall Road, Essex. Meetings begin at 7:30 p.m. local time. Meetings are canceled if Baltimore County Public Schools are closed or dismiss early.

Repeaters

W3PGA **2 M :** INPUT : 147.84 MHz, OUTPUT : 147.24 MHz, PL 123.0
W3PGA **70 Cm:** INPUT : 444.575 MHz, OUTPUT : 449.575 MHz, PL123.0
W3JEH **1.25 M:** INPUT : 222.24 MHz, OUTPUT : 223.84 MHz

Club Nets

Second Wednesday Net – 10 Meters (28.445 MHz) @ 8 p.m. Local Time
Fourth Wednesday Net – 2 Meters (147.24 MHz Repeater) @ 8 p.m. Local Time
Fifth Wednesday Net – 70 Centimeters (449.575 MHz Repeater) @ 8 p.m. Local Time

Radio License Exams

The Aero Amateur Radio Club sponsors Amateur Radio License Exams with the ARRL VEC. Examination sessions are throughout the year. Walk-ins are welcome; arrive no later than 30 minutes after start time. $15 charge.

2017-18 Examination Schedule

Time:	1:15 pm	1:15 pm	
Dates:	Sunday, November 19	Sunday, January 14	
Where:	White Marsh Library	White Marsh Library	

White Marsh Library, 8133 Sandpiper Circle, White Marsh, MD
Contact: Patricia Stone AC3F, email: ac3f@juno.com, landline: 410-687-7209

LOCAL AREA NETS

Day	Time	Freq. (MHz)	Net Name
Daily	9 – 10 am	145.330	Oriole Net
Daily	6 pm	3.820	Maryland Emergency Phone Net
Daily	6:30 – 7 pm	145.330 no PL	Balto. Traffic Net (b/u 146.670 PL 107.2)
Daily	7 pm & 10 pm	3.643	MD/DC/DE Traffic Net
2nd Tue	7:30 pm	146.670	Baltimore County RACES Net
2nd Wed	8 pm	28.445	Aero ARC Net
4th Wed	8 pm	147.240	Aero ARC Net
5th Wed	8 pm	449.575	Aero ARC Net
Fridays	7:30 pm	145.330	Back in the Day Net
When activated by NOAA		147.030	SkyWarn (primary)

NET REPORTS

10-11-17: 28.445 MHz, 20:00 to 20:38 local.

W3PGA Joe Essex (NCS), W3JEH Ron Perry Hall, KC3FBL Jim Parkville, W3VRD Phil Essex, KB3JVP Ken Middle River, KC3FRH Charles Parkville

6 members on the net.

10-25-17: 147.240 MHz, 20:00 to 20:23 local.

W3PGA Joe Essex,KB3JVP Ken Middle River, N3RES Ray Lutherville, W3JEH Ron Perry Hall, KB3VAE Rich Middle River, KC3AID Marty Rosedale

6 members on the net.

Upcoming Second Meeting Presentations

Date	*Topic*	*Presenter*
11/15	"HERO" Hospital Emergency Radio Operator	Wanda Montgomery KA3AHI
12/6	Ham Radio in the Modern Age	Keon KE3HAY
TBA	Contest Logging with N1MM	Bob ND3D
TBA	The Acu-rite Weather Station	?Kelly KC3APF

These presentations will be given at the Essex SkyPark FBO building after the business meeting.

November 15, 2017 Presentation
Topic: The Trinity: Hospital, Health Dept., EOC

Q: How do you do business when you can't do business?
A: "**HERO**" -- **H**ospital **E**mergency **R**adio **O**perator

Presenter: Wanda Montgomery, KA3AHI
ARES AEC PRGE County, MD - Hospital Program
MDC Assistant Section Manager - EmComm Health Care Program

Any questions call Joe Miko at 443-956-0197. Presenters who wish to submit a description of their talk may email it to Georgeann at KB3PGN@reagan.com for inclusion in the Aerial.

VE CORNER

by Pat Stone, AC3F

Our next test session will be held at 1:15PM on Sunday, November 19, 2017 at the White Marsh Library.

Reminder: VE Testing Snow Plan

If Baltimore County Libraries are closed for a testing day (Saturday or Sunday) the VE Testing session for that day will be canceled. Testing applicants that have pre-registered will be notified by phone. Due to the scheduling requirements of Baltimore County Library, we can't schedule a makeup session. Testing will resume on the next scheduled testing date. VE's will be notified by phone in the event of a closure.

UPCOMING HAMFESTS and EVENTS

Glenn L. Martin Aviation Museum

Nov. 24: Train garden opening (check website for details)

Glenn L. Martin Monthly Speaker Series

Nov. 6: Cheryl Reed of JHU Applied Physics Lab, on DART and other space projects

Hamfests

Saturday, December 9, 2017 : Second Annual American Legion PGCERA SantaFest
American Legion Youth Camp, 9201 Surratts Rd., Cheltenham, MD 20623
Website: pgares.org/santafest/
Sponsor: American Legion and Prince Georges County Emergency Repeater Association
Talk-In: 145.230 (CTCSS: 110.9 Hz), K3ERA repeater, Greenbelt
Contact: Charles Hallock, AA3WS, 16203 Manning Rd., West Accokeek, MD 20607 , Phone: 301-535-1666, E-mail: selbynet@hotmail.com

Saturday, April 21, 2018: Delaware State Convention (Delmarva Amateur Radio & Electronics EXPO)
Cheer Community Center, 20520 Sand Hill Rd., Georgetown, DE 19947

Website: www.radioelectronicsexpo.com
Sponsor: Sussex Amateur Radio Association
Type: ARRL Convention
Talk-In: 147.090 (CTCSS: 156.7 Hz), Sussex County ARES® Primary Repeater, Millsboro, DE
Contact: Herb Quick, KF3BT, PO Box 1431, Seaford, DE 19973, Phone: 302-629-4949, E-mail: herb@hamiltongraphics.com

Saturday, June 30, 2018: Harrisburg Radio Amateurs Club Firecracker Hamfest
Harrisburg Area Community College, 3599 Industrial Road, Harrisburg, PA 17101
Website: http://www.w3uu.org
Sponsor: Harrisburg Radio Amateurs' Club
Talk-In: 146.76 (CTCSS 100.0 Hz)
Contact: Tim Lehman, KB3OZA, PO Box 453, Hummelstown, PA 17036, Phone: 717-461-3398, Email: kb3oza@arrl.net

You may view upcoming Hamfests at: http://www.arrl.org/hamfests-and-conventions-calendar

Feature Article

Baluns, Chokes, and Transformers[1]

by Joe Miko, WB3FMT

I may have too much time on my hands, but thinking about the antennas we use for Field Day and why some need a balun. It seems that this magical device should be utilized on most antenna systems to get the most out of it. That being said, I needed to find out what this magical device was.

Using my new 2018 ARRL Handbook I went looking for balun info, this is what I found. There is also a Power Point presentation from an ARRL Technical Specialist.

The term "**balun**" applies to any device that transfers differential-mode signals between a balanced (*bal-*) system and an unbalanced (*un-*) system while maintaining symmetrical energy distribution at the terminals of the balanced system.

The term only applies to the function of energy transfer, not to how the device is constructed. It doesn't matter whether the balanced-unbalanced transition is made through transmission line structures, flux-coupled transformers, or simply by blocking unbalanced current flow.

1 ARRL Handbook 2018, Baluns, Chokes, and Transformers, pg 20.23

Balanced and Unbalance Lines. Balanced lines are two identical side by side conductors. The line is operated so that electron flow through one conductor is equal and opposite to that at the same point on the opposite conductor[2]. 450 Ω Ladder Line and 300 Ω Twin Lead are examples of balanced lines.

Unbalanced lines are transmission lines in which the voltage on the two conductors is not equal with respect to ground. Normally, one conductor in an unbalanced line is at ground potential[2]. Antenna coax cables such as RG58, LMR 400 etc. are unbalanced lines.

A common-mode ***choke balun***, for example, performs the balun function by putting impedance in the path of common-mode currents and is therefore a balun. (*A choke is an inductance used to limit the flow of ac while at the same time allowing dc to flow.)*[2]

A ***current balun*** forces symmetrical current at the balanced terminals. This is of particular importance in feeding antennas, since antenna currents determine the antenna's radiation pattern.

A ***voltage balun*** forces symmetrical voltages at the balanced terminals. Voltage baluns are less effective in causing equal currents at their balanced terminals, such as at an antenna's feed point.

An ***impedance transformer*** may or may not perform the balun function. Impedance transformation (changing the ratio of voltage and current) is not required of a balun nor is it prohibited.

There are balanced-to-balanced impedance transformers (transformers with isolated primary and secondary windings, for example) just as there are unbalanced-to-unbalanced impedance transformers (autotransformer and transmission-line designs).

A ***transmission-line transformer*** is a device that performs the function of power transfer (with or without impedance transformation) by utilizing the characteristics of transmission lines. Multiple devices are often combined in a single package called a "balun." For example, a "4:1 current balun" is a 1:1 current balun in series with a 4:1 impedance transformer or **voltage balun**. Other names for baluns are common, such as "line isolator" for a choke balun.

Baluns are often referred to by their construction — "bead balun," "coiled coax balun," "sleeve balun," and so forth. What is important is to separate the function (power transfer between balanced and unbalanced systems) from the construction.

2 Dictionary of Electronic Terms, Donald E. Herrington.

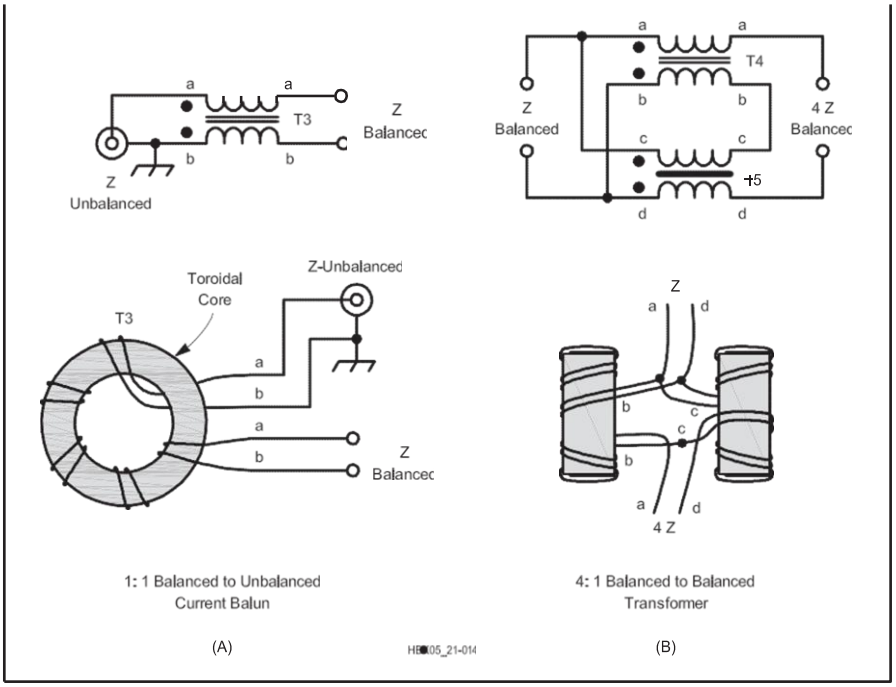

Figure 20.23 — Broadband baluns. (A) 1:1 current balun and (B) Guanella 4:1 impedance transformer wound on two cores, which are separated. Use 12 bifilar turns of #14 AWG enameled wire, wound on 2.4 inch OD cores for A and B. Distribute bifilar turns evenly around core. See text for ferrite material type.

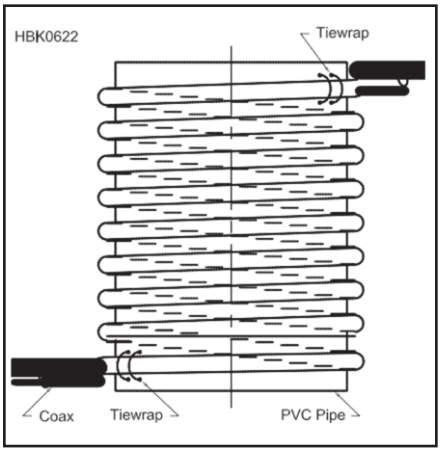

Figure 20.25 — Winding a coaxial choke balun as a single-layer solenoid typically increases impedance and self-resonant frequency compared to a flat-coil choke.

Table 20.6
Coiled-Coax Choke Baluns

Wind the indicated length of coaxial feed line into a coil (like a coil of rope) and secure with electrical tape. (Diameter 6-8 inches.) The balun is most effective when the coil is near the antenna. Lengths and diameter are not critical.

Single Band (Very Effective)

Freq MHz	*RG-213, RG-8*	*RG-58*
3.5	22 ft, 8 turns	20 ft, 6-8 turns
7	22 ft, 10 turns	15 ft, 6 turns
10	12 ft, 10 turns	10 ft, 7 turns
14	10 ft, 4 turns	8 ft, 8 turns
21	8 ft, 6-8 turns	6 ft, 8 turns
28	6 ft, 6-8 turns	4 ft, 6-8 turns

Multiple Band *RG-8, 58, 59, 8X, 213*

Freq MHz	
3.5-30	10 ft, 7 turns
3.5-10	18 ft, 9-10 turns
1.8-3.5	40 ft, 20 turns
14-30	8 ft, 6-7 turns

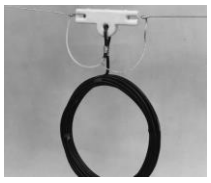

Figure 20.24 — RF choke formed by coiling the feed line at the point of connection to the antenna. The inductance of the choke isolates the antenna from the outer surface of the feed line.

Transmitting Ferrite Choke Balun

A ferrite choke is simply a very low-Q parallel –resonant circuit tuned to the frequency where the choke should be effective. (*Q is the ratio of the reactance to the resistance of a component or circuit. It provides a measure of bandwidth. Lower resistive losses make for a higher Q, and a narrower bandwith.*[2]

Figure 20.26 – Typical transmitting wound-coax common-mode chokes suitable for use on HF ham bands.

The following information are excerpts from a **Power Point presentation (PPP)** by Virgil Leenerts W0INK an ARRL Technical Specialist. The selected slide information will hopefully shed additional information on Baluns[3]. I have the PPP[4] if anyone needs it.

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3 Baluns: *What they do and how they do it*, by Roy W. Lewallen , W7EL. Article in "The ARRL Antenna Compendium" Vol 1. And *Understanding, Building, and Using Baluns and Ununs* by Jerry Sevick, W2FML. A book published by CQ Communications

4 ARRL Handbook 2000, Chapter 26.

Typical Antenna Problems:

- Radio Interference to nearby devices.
- Transmission line radiation.
- The above are due to "common mode currents" on the transmission line.

Common-mode currents are conducted and induced onto the outside of the shield of the feed line, which in turn radiates[2].

- Loss of power to the antenna due to mismatch between the coax and antenna.
- BALUNS can address these problems.

Generation of Common-mode Current from an Antenna

Common Mode Current (CM) is generated on the transmission line because of imbalance of displacement current around the center of a dipole antenna.

Problems Caused by CM Current

- Pattern Distortion – caused by radiation from transmission line due to CM Current on the transmission line.
- Radio Frequency Interference (RFI) to nearby devices like TV sets and telephones.
- Radio Frequency (RF) in the shack or transmitter location that can cause RF current to flow through the operator!

Types of BALUNS

- There are two general types of baluns.
- Current or choke type Baluns.
- => Eliminates "CM Current".
- Voltage type Balun
- => Provides for impedance matching of transmission line to antenna. An example us the TV antenna 300 ohm to 75 ohm matching transformer.

Current Balun

- Current balun are typically 1:1 – Z out = Z in but can have other ratios.
- Primary use is for the reduction of CM currents.
- Can be used for unbalanced to balanced loads like dipole antennas and beams.
- Typical construction is ferrite beads over coaxial cable or wires on a ferrite core.

Voltage Baluns

- Voltage baluns have varied input to output ratios and have true balanced ot unbalanced outputs as determined by the design.
- Primary use is for impedance matching of typically of transmission line to an antenna.
- Typical construction is the use of coaxial cable or wire on a ferrite core.

WHY USE A BALUN?

- Baluns are used for two primary reasons.
- One: Eliminate CM current on transmission line!
- Two: Matching antenna impedance to the transmission line.

Selecting a Balun

- ALWAYS use a current balun to eliminate common mode current and if matching is needed, current baluns can also have a ratio (4:1 or 9:1) as required to match the antenna.
- Use a voltage balun only for impedance matching of antenna to transmission line.
- Becoming knowledgeable on how and why baluns work, will insure success.

Purchasing a Balun

- The description of a balun, may or may not include that is a current or voltage balun.
- A 1:1 current balun is sometimes described as a choke balun.
- An example is the catalog description of the W2AU ferrite balun usually does indicate that it is a voltage balun.

Make a Balun

A current balun can be made by winding several turns of coax to form an inductor.
Another choice to make a current balun is to place a number of ferrite beads over coax.

From the Skies over Mt. Essex

SKY Events for November 2017

Nov 3rd - Full Moon "Beaver" for the Traditional American and the "Hunter's" for the English Full Moons

Nov 5th – DST ends, starts March 11, to Nov 4, 2018

Nov 6th – Aldebaran 0.8° S of the Noon, 22:00 EST 11/5

Nov 8th – Edmond Halley born in 1656.

Nov 10h – Last Quarter Moon

Nov 13th –Venus passes Jupiter 0.3° separation in the morning sky.

Nov 17th –The Leonids meteor shower peaks, Moon past New, approx 20 per/hr.

Nov 18st - New Moon

Nov 23rd – Mercury 22° East of the Sun.

Nov 26st – First meteor photograph in 1885.

Nov 26th - First Quarter Moon

Nov 27th – Neptune is 1.2° N of the Moon at 00:00 EST

Nov 28th - Mercury and Saturn are within 3°

Planet Lookout at mid-Month

Sunrise 06:50 EST and Sunset 16:51 EST

Mercury Evening sets 17:50, mag -0.4, 6.2 arc sec.

Venus Dawn rises 05:44 mag -3.9, 10.1 arc sec

Mars Dawn, rises 03:36, mag 1.7 and 4.1arc sec.

Jupiter Dawn, rises 05:29, mag -1.7 and 31arc sec

Saturn Eve sets 18:49, mag 0.5 size 15.2 arc sec.

Uranus Eve rises 15:23, mag 5.7, size 3.7 arc sec.

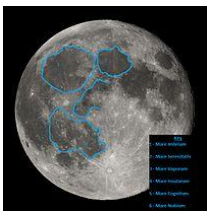
Neptune Eve sets 00:53 5, mag +7.8 size 2.3 arc sec.

Lady in the Moon!

Even though only men have landed on the Moon, there is a lady there. The lady is a compilation of lunar seas and craters. How or why do we see these figures is called Lunar pareidolia.

Lunar pareidolia refers to the pareidolic images seen by humans on the face of the Moon. The Moon's surface is a complex mixture of dark areas (the lunar maria, or "seas") and lighter areas (the highlands). Many cultures have seen shapes in these dark and light areas that have reminded them of people, animals or objects, often related to their folklore; the most famous are the Man in the Moon in Western folklore and the Moon Rabbit of Asia and the Americas. Other cultures perceive the silhouette of a woman, a frog, a moose, a buffalo, or a dragon (with its head and mouth to the right and body and wings to the left) in the full moon. Alternatively, the vague shape of the overall dark and light regions can resemble a Yin Yang symbol. @ Wikipedia

Lady



Man

Rabbit

Frog

Sitting Indian

You can also see figures in the clouds, but that's another story.