LINCOLN LOG 2024
August
Lincoln Amateur Radio Club

LARC Meeting
Wednesday, August 14th - 19:3Ø
LARC Clubhouse | 442Ø NW 41st St, Lincoln, NE

Introduction to VNA's

The subject for the August meeting is an introduction to VNA's, or Vector Network Analyzers. I will be talking about the uses of a VNA for amateur radio, a little bit about setup and calibration, and how to interface with the computer. A VNA is a very complex piece of test equipment that has many uses beyond what we would use as amateur radio operators. It has many engineering applications. As a bonus, I will be giving away a VNA at the end of the meeting.

James Nelson, WØJRN

Calendar

August

Ø1-1Ø . Th-Sa ..... Lancaster County Super Fair
Ø5 ..... Mon ..... 18:3Ø .... Log Folding ..... LARC Clubhouse ..... 442Ø NW 41st St
Ø8 ..... Th ..... 19:3Ø ... SATERN Meeting .. Salvation Army ..... 2625 Potter St
14. ..... We ..... 19:3Ø. LARC Meeting .... LARC Clubhouse ..... 442Ø NW 41st St
18 ..... Su ..... 17:ØØ ... LARC Board Mtg ... LARC Clubhouse ..... 442Ø NW 41st St
27 ..... Tu ..... 23:59 .. LOG Deadline - Email articles & ads to log@kØkkv.org

September

Ø3 ..... Tue ..... 18:3Ø .... Log Folding ..... LARC Clubhouse ..... 442Ø NW 41st St
Ø5 ..... Th ..... 18:3Ø .... VE Exams ..... College View Church ..... 48Ø1 Prescott Ave
11 ..... We ..... 19:3Ø. LARC Meeting .... LARC Clubhouse ..... 442Ø NW 41st St
12 ..... Th ..... 19:3Ø ... SATERN Meeting .. Salvation Army ..... 2625 Potter St
15 ..... Su ..... 17:ØØ ... LARC Board Mtg ... LARC Clubhouse ..... 442Ø NW 41st St

Lincoln Amateur Radio Club KØKKV LARC LINCOLN, NEBRASKA est. 1953

Club Repeater KØKKV 146.760 (-) **Twitter twitter.com/k0kkv**
LARC Web Site www.k0kkv.org **Facebook www.facebook.com/LARCLincoln**

2024 Board of Directors

President	Aaron Rogge	NØADR	402/617-0234	nØadr@ajrogge.com
Vice President	Ed Holloway	KØRPT	402/326-1139	kØrpt@arrl.net
Secretary	Kim Cartwright	KEØTNR	402/430-1506	kcdragon3@gmail.com
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Member	Bryan Leavitt	WØBCL	402/310-1686	wØbcl@arrl.net
Member	Roark Pyle	WØLNE	402/318-1452	wØlne@arrl.net
Member	Kenneth Cohn	KCØHN	402/310-8526	kcØhn.ne@gmail.com
Club Station Trustee	Greg Brown	KTØK	402/937-3540	ktØk@arrl.net

2024 Committees (Committees may be subject to change)

Committee	Liaison	Chair	Phone	Email
Activities	KØSMM	Ken Cohn, KCØHN	402/310-8526	kcØhn.ne@gmail.com
Awards	KEØTNR	Ed Holloway, KØRPT	402/326-1139	kØrpt@arrl.net
Audit	W3ALX	Greg Brown, KTØK	402/937-3540	ktØk@arrl.net
Bylaws	NØADR	Alex Lewis, W3ALX	402/202-8830	alex.w3alx@gmail.com
Club Inventory	KØSMM	Kim Cartwright, KEØTNR	402/430-1506	kcdragon3@gmail.com
Club Station	KØRPT	Greg Brown, KTØK	402/937-3540	ktØk@arrl.net
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Estate Assistance	KØRPT	Shaun Munson, KØSMM	402/853-6523	kØsmm@arrl.net
Field Day	KØRPT	Shaun Munson, KØSMM	402/853-6523	kØsmm@arrl.net
Holiday Party	NØADR	Ed Holloway, KØRPT	402/326-1139	kØrpt@arrl.net
LOG Editor	WØBCL	Jean Leavitt, KØJSL	402/310-9964	log@kØkkv.org
Mentorship	KØSMM	Greg Brown, KTØK	402/937-3540	ktØk@arrl.net
Public Relations	KØRPT	Shaun Munson, KØSMM	402/853-6523	kØsmm@arrl.net
Public Service	KCØHN	Aaron Rogge, NØADR	402/617-0234	nØadr@ajrogge.com
QSL Cards	W3ALX	Greg Brown, KTØK	402/937-3540	ktØk@arrl.net
Tower/Antenna Crew	KØRPT	Shaun Munson, KØSMM	402/853-6523	kØsmm@arrl.net
Transmitter Hunts	KØSMM	Kim Cartwright, KEØTNR	402/430-1506	kcdragon3@gmail.com
TVI/RF	KØRPT	Shaun Munson, KØSMM	402/853-6523	kØsmm@arrl.net
Website	W3ALX	Aaron Rogge, NØADR	402/617-0234	nØadr@ajrogge.com

President's Message

Aaron Rogge, NØADR, LARC President

Thank you to everyone who helped with the Cornhusker State Games. This was the Game's 40th anniversary, and the Lincoln Amateur Radio Club has been involved every year. LARC's role has evolved, but our involvement is essential to this annual event.

As we gear up for the Lancaster County Super Fair, I want to thank all who have volunteered to drive carts. Your participation is a testament to the spirit of our club, and I'm sure it will be a fun-filled event.

Our monthly exam session, a crucial element in the growth of ham radio, would not be possible without the dedication of our volunteer examiners. Your role in allowing new enthusiasts to join the hobby and existing members to upgrade their licenses is truly commendable. Thank you!

Do you know someone who has gone above and beyond in ham radio this year? If so, please contact our awards chair, Ed Holloway, KØRPT.

Are you looking for an opportunity to work HF but don't own a radio? Contact Greg Brown, KTØK, to arrange a time to work the club station.

Thank you for being a part of the Lincoln Amateur Radio Club. I hope everyone is having a great summer.

73
Aaron, NØADR

Log Folding

Jean Leavitt, KØJSL

Thank you to the July LOG folding crew: Jon Peterson, Ayden Rogge, Liam Rogge, Mitch Ryan, NØADR, NØJLR, KØJSL, KRØKAT, and KØKPH.

Join us for the next folding session!
Date: Tuesday, September 3, 2024
Time: 6:30 pm
Location: LARC Clubhouse, 4420 NW 41st St

ARRL Contest Calendar

ARRL

August

3-4	222 MHz and Up Distance Contest
17-18	10 GHz & Up - Round 1
18	Rookie Roundup - RTTY
24-25	EME - 2.3 GHz & Up

September

14-16	September VHF Contest
21-22	International EME Contest
21-23	10 GHz and Up Contest

VE Report

Chris Evens, KCØPJR, VE Coordinator

July VE Sessions

July was almost back to normal only having one session at the College View Church. Where it became irregular was that it wasn't the normal first Thursday of the month. This month had the session postponed to the second Thursday due to Independence Day the week before. My opinion is that also showed in how many candidates we had testing this month with only three. All of which passed their Technician exam. They are as follows:

TECHNICIAN

- Ryan Herman, KFØRCJ, Omaha
- Caleb Higby, KFØRCK, Palmyra
- Mary Higby, KFØRCI, Palmyra

Congratulations to our new licensees! Volunteer Examiners (VE's) who participated this month are:
KCØHN, KCØPJR, NEØTM, and WØBCL.

Thank you to all for giving your time to promote and advance the great hobby of Amateur Radio.

2024 Cornhusker State Games

Aaron Rogge, NØADR

Thank you to everyone who helped with this year's Cornhusker State Games. Together we drove 2,583.5 miles and spent 271.8 hours. Thank you to (miles, hours): NØADR (188.4, 13.1), WØBCL (177, 16.5), NEØBG (16, 1.Ø), NØFUF (Ø, Ø.5), KØGYK (6, 2.8), KJØHN (257, 15.Ø), KEØJBT (8Ø, 8.Ø), NØJLR (255.1, 12.2), K2JMW (138.1, 6.3), KBØK (59, 8.5), KRØKAT (2Ø9.7, 1Ø.Ø), KØKPH (64, 11.Ø), WXØL (215.3, 19.4), WØLNE (139.4, 11.3), KCØML (135.7, 9.8), KØNEB (9, Ø.5), KCØPJR (59.2, 1Ø.1), KDØPTF (64.2, 11.4), KFØPVU (44.8, 8.5), KFØRCH (52, 8.4), WØJRN (92, 5.7), KØRPT (7Ø, 8.8), KBØRZP (66, 6.2), KØSHC (34.8, 8.8), WØSHT (5Ø.5, 4.8), NEØTM (2Ø, 2.4), KEØUNL (14Ø.3, 7.4), NØWLX (12.6, 2.1), Sarah Arden (56, 12.8), Melissa Clow (Ø, 4.8), Kasey Peters (Ø, 1.4), Levi Peters (Ø, 6.2), Ayden Rogge (Ø, 12.7), and Liam Rogge (Ø, 11.4). All of your efforts are greatly appreciated by the Cornhusker State Games office and the sports directors we assisted.

NETS

Paul Mundt, KF9TV

The Lincoln Amateur Radio Club offers daily nets that welcome hams. he nightly ARES Net is daily at 21:ØØ local time.

There is also a Lunch Brunch Net on Monday, Wednesday, and Friday at 12:ØØ. This is an informative and fun net, once again open to all. These nets are on 146.76 and 442.7 MHz.

Join us if you can!

How Sunspots Affect the Ionosphere and HF Propagation

Bryan Leavitt, WØBCL

Editors note: Much of the information and figures presented come from an article by Ian Poole, G3YWX that was published in the September 2ØØ2 ARRL QST magazine. https://www.arrl.org/files/file/Technology/tis/info/pdf/Ø2Ø9Ø38.pdf

The ionosphere is composed of multiple layers. In order of increasing height they are: D, E, F1, and F2. The D layer absorbs MF such as the AM radio band. At night the D layer disappears and the F layers combine resulting in just E and F layers. This is why you can pick up distant AM stations at night but not during the day.

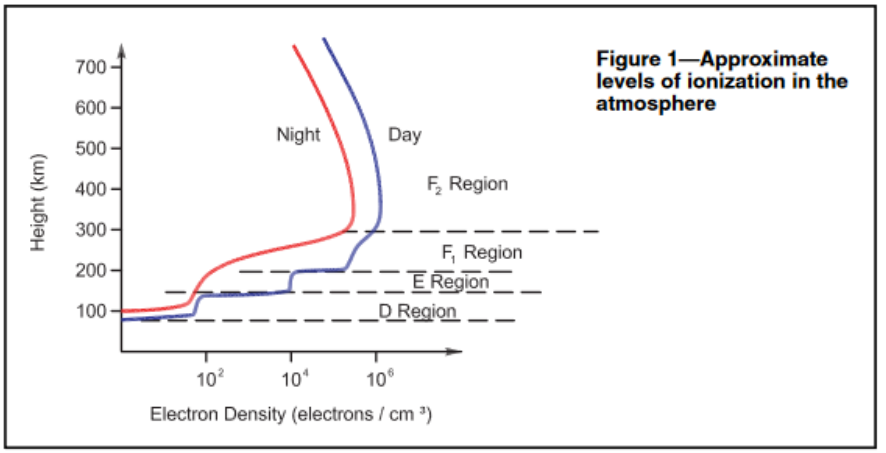


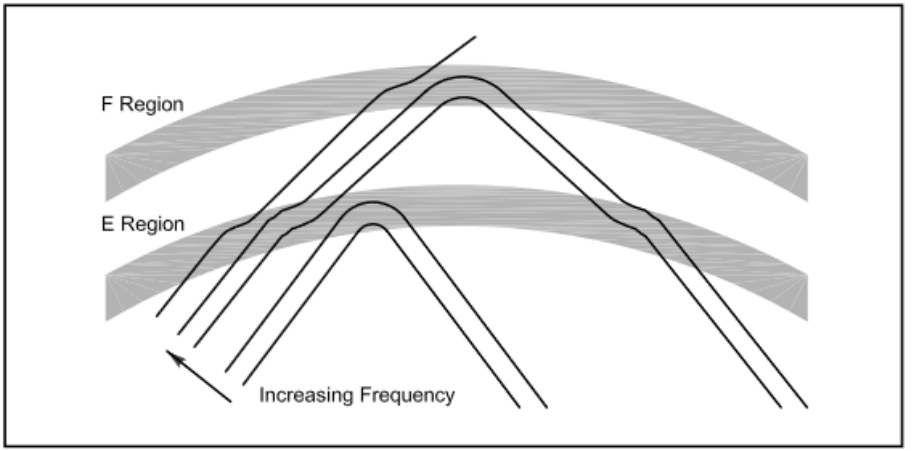
Figure 1—Approximate levels of ionization in the atmosphere

There are several possibilities for HF signals interacting with the ionosphere.

They may be:

- Absorbed or attenuated
- Reflected
- Refracted
  - Enough to return to the surface of the earth
  - Insufficiently to return to the earth's surface and therefore escape to outer space
- Trapped and
  - Never escape
  - Escape to the earth's surface
  - Escape to outer space
- Transmitted

The most important factors in determining how a radio wave interacts with the ionosphere are the frequency of the wave and the ionosphere's electron density.



For each of the HF bands there is a Maximum Usable Frequency (MUF) and a Lowest Usable Frequency (LUF). Frequencies above the MUF escape to outer space and frequencies below the LUF are absorbed by the ionosphere. If the LUF equals or exceeds the MUF the band is closed.

Sunspots increase solar activity which in turn increases the electron density, especially in the F layer, of the ionosphere. Higher electron density increases the MUF of the layer. Solar flux is a measurement of the activity of the sun and is defined by the amount of radio noise emitted at 28ØØ MHz (1Ø.7 cm). It correlates very well with the electron density of the F2 layer. Solar Flux Units (SFU) range from approximately 5Ø to 3ØØ. A low SFU indicates poor HF conditions, while a high SFU would indicate better HF conditions.

Sunspots can also disrupt HF propagation. When a large flare erupts from a sunspot a burst of shortwave ultraviolet radiation is released which, eight minutes later, can increase the electron density of the ionosphere to the point that it becomes opaque to HF frequencies resulting in a radio blackout on the sunlit side of the earth. When a flare erupts it may also produce a Coronal Mass Ejection (CME) which is a mass of charged plasma sent into space from the sun's corona. CME's can interact with the earth's magnetic field and can cause severe disruptions of radio communications, electrical grids, damage satellites, etc. See the Carrington event of 1859. https://en.wikipedia.org/wiki/Carrington_Event

Two indices are used to measure disturbance to the geomagnetic field, K and A. Both are based on magnetometer readings. HF propagation degrades with higher values especially near or across the poles. Trans-equatorial routes are less affected.

Best HF conditions are obtained after several days of the SFU > 15Ø and the K index < 2.

The General Relationship between A and K Values

A	*K*	*Comments*
0	0	Quiet
2	1	Quiet
3	1	Quiet
4	1	Quiet to unsettled
7	2	Unsettled
15	3	Active
27	4	Active
48	5	Minor storm
80	6	Major storm
132	7	Severe storm
208	8	Very major storm
400	9	Very major storm

Glossary of Solar Index Terms

ap index: A measure of the general level of geomagnetic activity over the globe for a given day. A mean, 3-hourly "equivalent amplitude" of magnetic activity based on K index data from 11 Northern and 2 Southern Hemisphere magnetic observatories between the geomagnetic latitudes of 46 and 63 degrees.

Ap index: A daily index determined from eight ap index values.

Geomagnetic activity: Natural variations in the geomagnetic field classified into quiet, unsettled, active and geomagnetic storm levels.

Geomagnetic storm: A worldwide disturbance of the Earth's magnetic field, distinct from regular diurnal variations. A storm occurs when the Ap > 29, a minor storm when 29 < Ap < 50, a major storm when 50 <= Ap < 100 and a severe storm when Ap >= 100.

K index—A quasi-logarithmic local index of the 3-hourly range in magnetic activity relative to an assumed quiet-day curve for a single geomagnetic observatory site. First introduced by J. Bartels in 1938, it consists of a single-digit 0 through 9 for each 3-hour interval of the universal time day (UT).

Kp index—The planetary 3-hour-range index Kp is the mean standardized K-index from 13 geomagnetic observatories between 44 degrees and 60 degrees northern or southern geomagnetic latitude. The scale is 0 to 9 expressed in thirds of a unit; e.g., 5– is $4^{2}/_{3}$, 5 is 5 and 5+ is $5^{1}/_{3}$. This planetary index is designed to measure solar particle radiation by its magnetic effects. The 3-hourly ap (equivalent range) index is derived from the Kp index.

Additional resources:

- https://www.spaceweather.com/
- https://www.swpc.noaa.gov/products/planetary-k-index

The Lincoln Amateur Radio Club, Inc. (LARC), is a nonprofit organization devoted to the promotion of Amateur Radio. The club sponsors activities and programs to promote growth in Amateur Radio, further the experience of those already licensed, and create international goodwill.

The Lincoln LOG is mailed monthly to all paid members of LARC and Lancaster County,Nebraska Hams.

The LOG and other LARC information are available at kØkkv.org and facebook.com/LARClincoln and may be used freely. Permission is granted to other publications to reprint articles, provided that source credit, author, and previous print source appear in the reprint.

Lincoln Amateur Radio Club, Inc.
P. O. Box 5006
Lincoln, NE 68505

Those interested in paying their club dues online, should email treasurer@kØkkv.org for more information.

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Lincoln Amateur Radio Club Registration Form

Name:_____ **Call Sign:**_____

Address:_____

City:_____ **State:**_____ **ZIP+4:**_____

Phone:_____ **Email:**_____

License Class: [ ] None [ ] Novice [ ] Tech [ ] General [ ] Advanced [ ] Extra

Memberships

[ ] LARC ($15.ØØ Full, $1Ø.ØØ Associate*) Year:_____ $_____

[ ] LARC ($1Ø.ØØ First-time members-first year only) Year:_____ $_____

[ ] Lincoln Repeater Club ($1Ø.ØØ/year) Year:_____ $_____

Donations

[ ] General Fund [ ] Equipment/Clubhouse [ ] Activities [ ] Other $_____

Enclose check payable to:
Lincoln Amateur Radio Club Inc.
PO Box 5ØØ6, Lincoln, NE 685Ø5-ØØØ6

Total Due: **$**_____

* Associate members must be family members residing at the same address as the full member 2024 V1