

April, 2021

LARC NEWS & VIEWS

N4LNR



Lenoir Amateur Radio Club Newsletter

Events

May LARC Meeting

Thu. May. 13, 7:00 pm
Webex Online Meeting
Topic: POTA & SOTA

International DX Convention

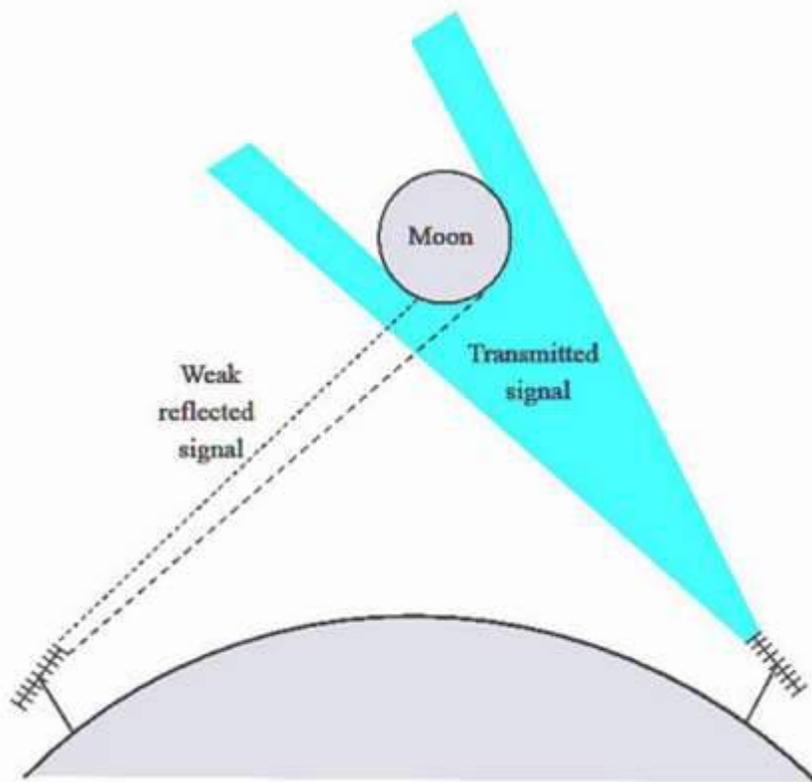
Sat.- Sun. May 15th - 16th
Online 10:00 am - 08:00 pm EST
www.dxconvention.com

Contest University

Thur. May 20th
Online 09:00 am EST
www.contestuniversity.com

Moon Bounce

At the last LARC meeting, *Gray Fulk WX4F* gave a presentation on Moon bounce. Earth-Moon-Earth (EME) known as "Moon bounce", is a two-way radio communication on VHF and above using the Moon as a passive signal reflector. Gray talked about his experiences and showed how his station is set up.



Gray Fulk's 4.5 meter (14.7ft) dish which he uses for his 1296 MHz Moon bounce.



This is what's in his outdoor shack.



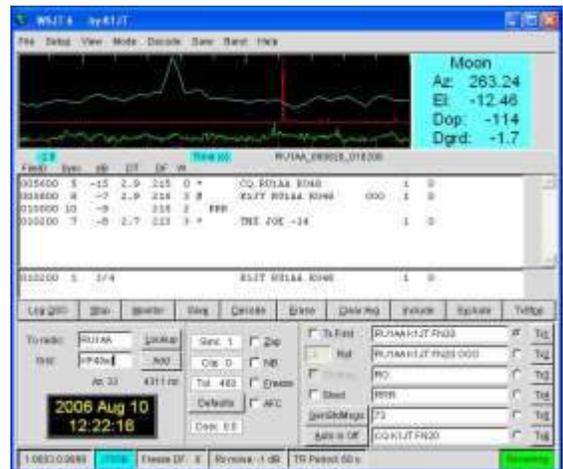
The moon is 238,900 miles from Earth and it isn't perfectly round. When a signal is sent and bounced back, most of it is absorbed and very little is reflected (only about 7%). Propagation Path Loss is 250 dB or greater and there's an Echo Delay of about 2.5 seconds. In the early days of EME, amateur stations needed huge antenna systems, very high power transmitters and complex receiving set-ups. Back then CW was the choice mode. You had to try to get the lowest possible receiver noise figure so you could hear it.



That's how it was, until, *Joseph Taylor K1JT*, an American Astrophysicist and Amateur Radio Operator wrote a digital communications software program called **WSJT** for weak-signal VHF/UHF communications. WSJT contains series of digital transmission protocols which allow the reception and accurate decoding of signals far below the noise level, as low as -24 dB and beyond. WSJT was first released in 2001, but now it is open source. It was optimized for a number of different propagation modes:

- *JTMS, FSK441* for meteor scatter
- *ISCAT, JT6M* for ionospheric scatter
- *JT65* for EME at VHF/UHF, and for QRP operation at MF/HF
- *JT4* for EME on the microwave bands

Currently WSJT-X exist with modes: *FST4, FST4W, FT4, FT8, JT4, JT9, JT65, Q65, MSK144*, and *WSPR*, as well as one called *Echo* which are all designed for making reliable, confirmed QSOs under extreme weak-signal conditions.



Today, Amateur Radio Operators can Moon bounce with a reasonable VHF station and get long distance QSOs all over the world. EME can be done on bands from 50MHz up to 47GHz, with 144MHz and 1296MHz being the most popular bands for activity. Some EME activities have even taken place on the 21MHz and 28MHz.

You could use giant dishes and tower antennas,



or something smaller like one of these.



However, you can start with a "minimum station" and work the 144MHz.

What equipment would you need?

1. A VHF Multimode Transceiver.
2. A combo Amplifier and low-noise Preamplifier ("brick") - power output of >100 watts.
3. A DC Power Supply - for the amp/preamp.
4. A Yagi Antenna - with a forward gain of at least 12 dB.



5. A Small Rotor - a TV rotor for Azimuth adjustments will suffice. You may manually adjust Elevation but it's not necessary. EME contacts can be made during the first hour after Moonrise or the last hour prior to Moonset. A Yagi pointing to the horizon will normally allow you to work EME till the Moon is up to 15 or 18 degrees above the horizon.



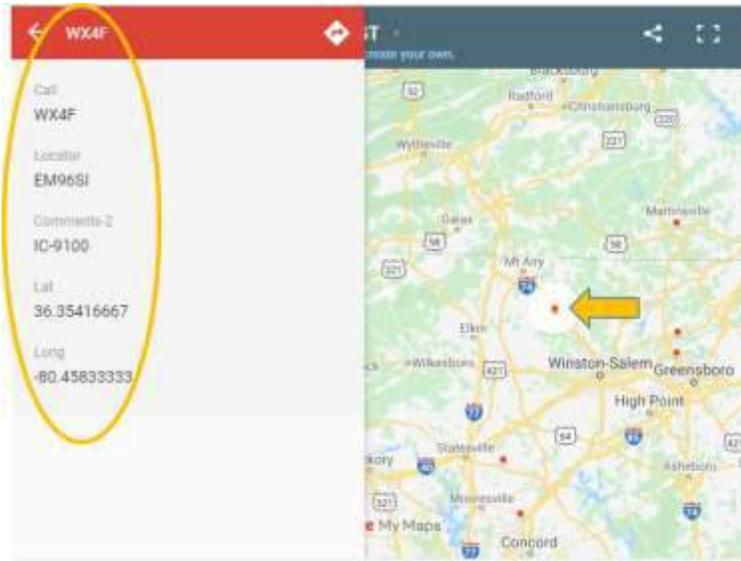
6. A Low-Loss Coax – (short <50 ft).
7. A Digital Mode Interface Controller - a **RIGblaster** or **Signalink** to connect your computer to the transceiver.
8. A Computer.



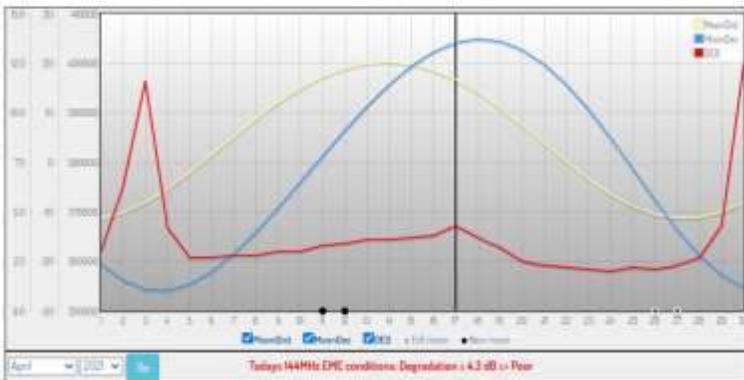
What software and programs would you need?

1. **WSJT-X** program with JT65 mode
2. PC Time Synchronization - WSJT modes require a very accurate PC clock
3. Moon Tracking – It's important that both stations can see the Moon simultaneously called "a common window". Here are a few useful websites:

- **EME Station Location Map**



- **EME (Moon Bounce) Calculator 1.2**
- **Moon Distance, Declination, Degradation**
- **Current Moon Position**



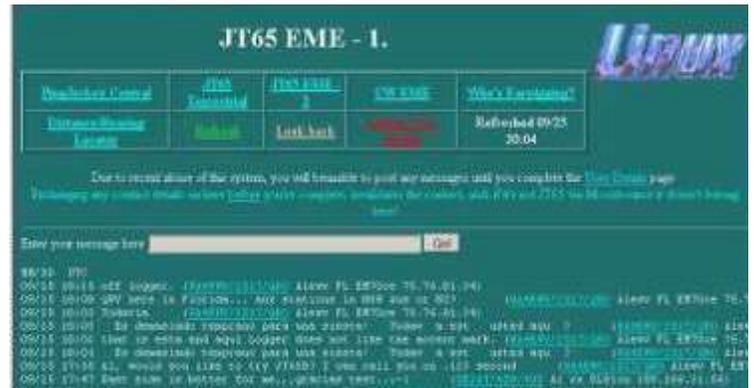
- **Rise and Set Calculator**
- **MoonSked**

The Complete Moon bounce Scheduling and Tracking solution for Macintosh and Windows and Linux.

How do you get on the air?

Scanning the band looking for signals is not a very good way to make contact. With minimal set up for 144 MHz, your signal may be too weak to be detected, so you will not hear your own echo off the Moon. However, many other stations with larger antennas will be able to detect it. Only stations with large arrays can detect the weak EME signals by ear. For your first few attempts, try arranging a "sked" with some of the bigger stations.

Look for the frequency of the stations calling CQ, in the DX-Cluster, or in the **JT65 EME Chat**, or in the **ON4KST EME Chat**, or in **LiveCQ** on 144 MHz.



The ON4KST amateur radio chat

We offer you a **FREE** service. Already more than 15000 registered users. No Spy-Ware, No Cookies and No Advertisements needed.

All HAMS throughout the world are welcome.

- [Enter into the 28 MHz chat here](#)
- [Enter into the EME \(all bands/modes\) chat here](#)
- [Enter into the 50 & 70 MHz chat here](#)
- [Enter into the 50 MHz IARU Region 2 chat here](#)
- [Enter into the 50 MHz IARU Region 3 chat here](#)
- [Enter into the 144 & 432 MHz chat here](#)
- [Enter into the 144 & 432 MHz IARU Region 2 chat here](#)
- [Enter into the 144 & 432 MHz IARU Region 3 chat here](#)
- [Enter into the microwave chat here](#)
- [Enter into the kHz \(2000 m - 630 m\) chat here](#)
- [Enter into the low band \(160 m - 40 m\) chat here](#)

LiveCQ By N144

All spots

Menu	Freq	Time
All spots	144.117	0237
Latest spots	144.120	0243
Who is online	144.130	0243
Add your CQ spot here	144.125	0243

- User config
- Contest style
- Simple design all spots
- Htbid
- CaB3
- QO-100
- LookBack HOUR

Then you can try to detect their signal and answer to their CQ. If there are signals that are too weak to be heard, you will see them decoded by the program on the waterfall display. Don't give up if you don't succeed in your attempts. There are many factors affecting the Earth-Moon-Earth path and some of them are unpredictable. Continue transmitting so that your partner station will have to chance to copy you when signal improves.

Why would a Ham want to operate EME?

- It's a rare achievement to be able to send a signal to the moon and back.
- It's one unique way of DX-ing.
- All Hams at any License level may operate EME.
- It's an opportunity to explore Digital mode.
- You'll learn about propagation, antennas, polarization, space object tracking and other aspects of Amateur Radio.
- You'll get to tinker and build your own antenna and station.
- You will be a better well-rounded Amateur Radio Operator.

So if your are ambitious, or even slightly curious, give EME a try. Here are some [YouTube](#) videos to explore:

- [1946: Radar makes round trip to the Moon](#)
- [How We Used the Moon to Send Radio Messages](#)
- [Getting started on EME \(Moon bounce\) with a basic station](#)
- [Portable EME moon bounce setup](#)
- [Moon bounce, radio signals bounced off of the moon](#)
- [10 GHz: An Introduction to X-Band for Amateur Radio](#)
- [Bouncing radio signals off the Moon? Yeah, but on X Band - 10 GHz?](#)
- [Ham Radio EME with a Portable, Small Dish | Earth Moon Earth, Microwave Update](#)
- [Dr. Allen Katz EME Done Simple: Digital Modes, 50 Watts, Yagi](#)
- [VE2ZAZ - 3.2m dish for 1296MHz EME \(Moon bounce\)](#)



72nd IDXC 2021



The 72nd International DX Convention, aka “Visalia,” will be held on Saturday and Sunday, May 15th -16th. This 2-day virtual event via Zoom is sponsored by the Northern California DX Club (NCDXC).

There will be eight DX-related webinars on Saturday and eight vendor webinars on Sunday. Free pre-registration is required and is now open. Participants will be eligible for several door prizes. All webinars will be recorded and posted later to the [NCDXC website](https://www.ncdxc.org/).

For advance registration go to :

<http://dxconvention.com/pages/registration.html>

For more information go to:

<https://www.dxconvention.com/>

<https://www.dxconvention.com/pages/program.html>

Contest University 2021

The 2021 Contest University (CTU), held in conjunction with the Dayton Hamvention will be on May 20th 9am - 5pm EST. Ever since the on location Dayton Hamvention was canceled in 2020, due to Covid-19, they have held interesting and informative virtual webinars. The live Zoom webinar event is free and **registration** is now open. The program Topics and schedule is available on the Contest University website. The Event runs all day with each talk session running about an hour. Even if you are not a contesteer you will learn a lot about Amateur Radio and hear the techniques and critiques of many of the world's foremost Hams. If you cannot attend the live event you may view it at a later time. Contest University will be recorded and available on YouTube following the event. However, if you want a chance to win a door prize (four ICOM radios) given away at random times, you must be registered in Zoom and

present during the random time drawing.

For more information go to:

<https://www.contestuniversity.com/>

<https://www.contestuniversity.com/course-outline/>

FCC Updated RF Exposure Standards



The Federal Communications Commission (FCC) have updated the 2019 Report and Order governing RF Exposure Standards going into effect on May 3, 2021. This does not change existing RF exposure (RFE) limits, but require that stations in all services, including amateur radio, be evaluated against existing limits.

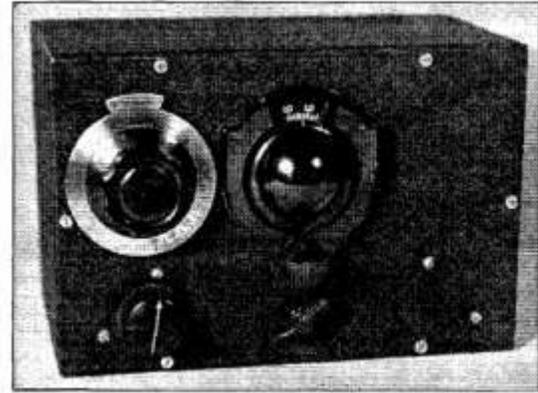
Stations already in place have 2 years until May 3, 2023 to conduct an evaluation and can no longer avoid performing an exposure assessment simply because they are transmitting below a given power level. Starting May 3rd 2021, any new station, or any existing station modified to change its RFE profile, will have to perform an assessment by the time of activation or change.

If you wish to learn more about RF or need help with evaluating RF exposure limits, visit the [ARRL website](https://www.arrl.org/rf-exposure-and-you) for a free book (**RF Exposure and You**) and information.

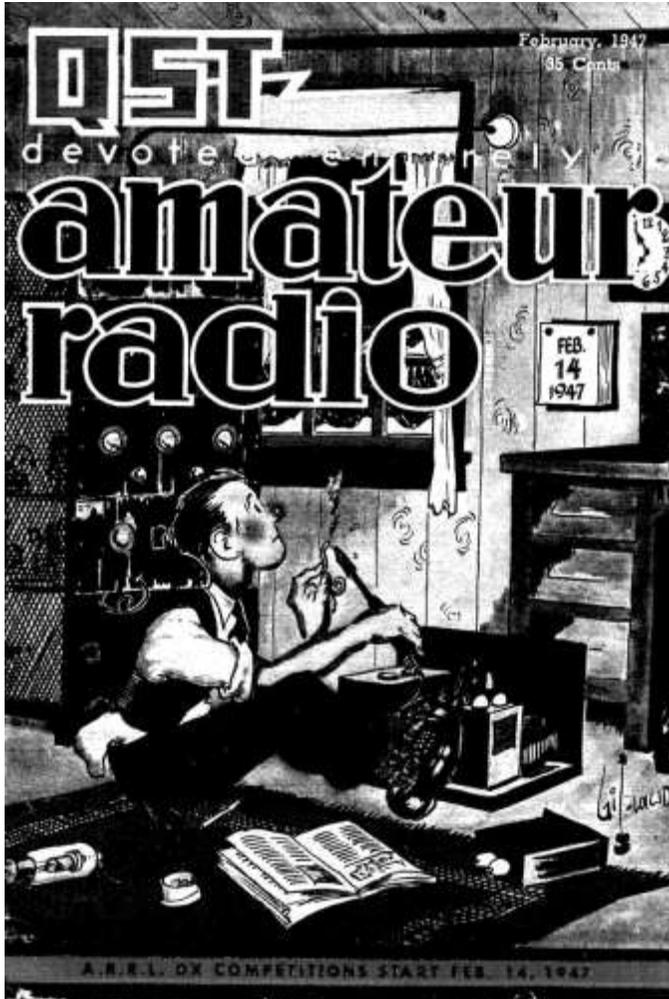


Radio Museum Acquired 1939 Radio

The Asheville Radio Museum recently was the recipient of a 1930s-era ham radio station reproduction built by Rick Rogers, K5RCR. Rick, a former LSU professor of Electrophysiology, constructed the receiver based on a schematic published in the February 1947 issue of QST.



A four-tube regenerative receiver, all dressed up and ready to go places. The main tuning dial is in the center—the hand-set dial is at the left. The lower knobs are for regeneration and audio gain control.



Rick further explains, "The first 6SQ7 is hooked up as a cathode follower between the detector and the first audio amp. This enormously improves stability. You have only a vague idea of the frequency you receive, although you can get a pretty good idea about the center of the crystal frequency for the transmitter with some practice. This is like the old novice days with crystal-controlled transmitters and inexpensive "novice-grade" receivers. I had my first QSO on this rig within a few minutes of its initial firing up. It was with K8JD - about 1000 miles north of my QTH. That feeling can't be beaten - working someone that far away on a rig that was a pile of old parts the week before!"

Rick's station can be viewed at the Asheville Radio Museum, but due to COVID restrictions, the museum may be closed during regular hours. Please check their website for current information or to request a private tour for up to four visitors.

<https://www.avlradiomuseum.org/>

"I've been a ham since I was 14," said Rick. "As I grew into the hobby during the 1960s, I was curious to understand what it was like for a ham of modest means during the height of the depression to build and operate a simple station. It was a very eye-opening experience as its construction required a lot of hard work and long hours!"

The station consists of a crystal-controlled transmitter, regenerative receiver and power supply—all home built with available parts. From his QRZ page, Rick explains, "The transmitter is a "new" version of a common (for 1939) homebrew two-tube, 10-watt transmitter using a 6AG7 and 807 tubes. The 4-tube regenerative receiver has a 75, two 6SQ7s, and a 6F6 tube. A home brew power supply provides the necessary power."



A Bit of LARC History....

How The Call Sign N4LNR Came About

By: Ro Maddox K4HRM

As we all now know, the [Lenoir Amateur Radio Club](#) was formed in 1986 and that the members installed its first Club repeater atop a power pole later in 1987-1988. But it would be another 25 years before LARC get the call sign N4LNR. What's the history behind the Club call sign?

The Club repeater was located on private property owned by Club member *James Bradshaw N4NIN* and the repeater signed as N4NIN for the next 10 years. During 1994-1995, a tower was erected for the repeater at this site and became operational January 1996.

At the October 1995 meeting, a member suggested a call sign specific to the Club be obtained from the FCC. A motion to pursue obtaining a Club call sign was approved by member vote at the November 15, 1995 meeting. The required paperwork for a Club call sign was submitted and the FCC issued the call sign KF4WOD in March 1998 (real speedy FCC action). Now, the Club had an official call sign! Immediately its members were grumbling that the new Club call sign was a bear to transmit in Morse Code. / - . - / . . . - / . . . - / . . . - / . . . - /



Two years after receiving the call sign, the Club went dormant and was not revived until 2004. During this dormant period, the Club lost its coordinated frequency pairs assigned by the Southeastern Repeater Association for the Club repeater. It would

not be until May 2008, that the Club repeater would be back “on the air.”

Its important to interject here that Club member *Duane Ayers N4AVU* was owner of a repeater on Hibriten Mountain 147.330. From the time the Club was a gleam in the eye of its founders, Duane had given access to the Hibriten repeater to the Club for its activities, including weekly Nets. During the periods when the Club repeater was “out of service”, the Club could always rely on the Hibriten repeater. Even when ownership of the Hibriten repeater changed to *Phillip Crump KG4BCC*, the working relationship with the Club has remained these many years.

Scott Livingston KC4SWL became Club president in 2012 and his first action was to propose the Club obtain a vanity call sign that had “relevance” to the Club and the community. Club member *Jerry Gragg AD4JG* had researched the available vanity call signs and proposed several possibilities. The members chose N4LNR and Jerry submitted the required paperwork to the FCC. The new Club call sign N4LNR was issued in February 2012. Since the code requirement had been dropped by this time, there was little discussion of how easy/hard it was to transmit in CW. / - . / . . . - / . . . - / - . / . . . / You be the judge!

Vanity License - N4LNR - LENOIR AMATEUR RADIO CLUB

Call Sign	N4LNR (Vanity)
Status	Active
Dates	
Grant	02/10/2012
Effective	04/16/2020

Prev. Op. Class	
Prev. Call Sign	KF4WOD

Frequencies

146.625- 94.8

Club Repeater (N4LNR)

147.330+ 141.3

Hibriten Mountain Repeater
(KG4BCC)

145.535

Simplex

29.6

Simplex FM

28.374

Simplex USB

Nets

LARC Weekly Net

Tuesday, 7:00 PM
146.625 Minus PL 94.8
Alt. 147.330 Plus PL 141.3

Caldwell ARES Net

Sunday, 9:00 PM
147.330 Plus PL 141.3

DMR Digital Net

Tuesday, 8:00 PM
Lenoir Local DMR

Lenoir Amateur Radio Club, Inc

P O Box 3276

Lenoir, NC 28645

N4LNR.org

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Family Member \$25/year

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