

2023-07-25 Hamlet Net - J Pole Antennas

Announcements:

- Test Session Info
 - We had a good test session this weekend - 5 new Techs, one new General, and one upgrade to Extra Class. If any of those hams are listening, then congratulations!
 - Next VE session is Saturday, August 26th in the Clover Building at the Boulder County Fairgrounds, and starts at 10 am. It is an ARRL VEC exam session, so there will be a \$15 fee to take the exam. For more info, see the Licensing/Testing page on the club web site, <https://w0eno.org/>, under the Education menu.
- The LARC July general meeting was last week, where Paul Simmonds, VK5PAS, discussed QSL cards. If you missed the meeting, the recording is up on YouTube, and can be found on the club web page at the "Presentations" link under the "LARC History" menu item, and can also be found on the club's YouTube channel (<https://www.youtube.com/@larc-longmontamateurradioc4836>) which you can find by searching for "Longmont Amateur Radio Club."
- Videos from all 2023 LARC General Meetings have been uploaded to YouTube, so catch up on anything you missed!
- LARC will be holding a simulated exercise this Saturday, July 29th. NASA has a satellite that is falling back to earth. Based on its trajectory, a piece of it will land somewhere in Longmont, CO. The piece will have a radio beacon on it transmitting on 146.565 MHz. Expected to hit on Saturday July 29th around 9AM somewhere in the area of Loomiller Park (bounded by 11th and 12th Avenue, and Sunset and Tulip Street. We should start looking around that time. The beacon is only expected to last for about 3 hours, so get out there before it gets too hot and help us find it!
- Chuck is putting together a special event to celebrate the 105th anniversary of the Peak-to-Peak highway involving multiple area radio clubs on September 30th. They're currently looking for volunteers to work this special event. They will be operating HF SSB voice, CW, and FT8 stations from 8am to 4pm with three operators at each station. There is a signup link on the club web page at <https://w0eno.org/>, or contact him for more information!
- We have some volunteer opportunities available where you can help out LARC:
 - Photographer / videographer - record team activities and upload to web site / YouTube
 - LARC Fest Coordinator -

- Newsletter Editor - put together the monthly Splatter newsletter
- Activities Chairperson - member of the Board of Directors
- After the ARRL's second annual Board of Directors meeting, they have announced their intention to increase dues by \$10 per year to \$59 starting in January 2024. They are also separating the printed magazine from the regular membership - all magazines will still be included in digital form, but if you want to continue to receive a print magazine, that will be an additional \$25 per year. They are also placing a temporary hold on any new lifetime memberships until they can come up with an equitable rate.

The reasons cited are inflation in general, as well as a sharp increase in postage costs.

- Our sister club up in Nederland is looking for some help with events they are running. They have a weekly Monday night net with no predetermined agenda, so you can lead it however you want. They are also planning a Field Day site at Golden Gate State Park and are welcoming anyone who wants to participate. Finally, they are looking for operators for the Ned Gravel run on July 8th. They have signup links for all these events, so head over to their web site <https://w0ned.org/> for more information!
- You can start earning your 2023 membership or future renewal by acting as NCS for at least 5 nets this year. You can run either this Tuesday night net or the Thursday night net (or both). We have scripts available for both, so all you need is a good connection into the repeater, and somewhere to keep track of names and call signs as people check in. If you're going to be on the net anyway, why not save some dough at the same time! There are four free memberships available for 2023, so don't wait to get started!
- Chuck has set a goal for the Club of running at least one activity a month. This can be a hands-on construction activity, an operating activity like Field Day, a fox hunt, or a special event station. The goal is to get people together to have fun with amateur radio! We have multiple locations at our disposal, as well as lots of Club equipment, so if you have an idea for something you think others hams would like to do, please let us know, and if you're willing to run it, even better!
- The Club is also looking for presentation topics for 2023. If you have any ideas, or better yet, would like to present, please let Chuck know and we'll get you on the schedule!
- All club activities are open to anyone - members and non-members. ~~If you have questions, ask them on a net or~~ send email to elmer@w0eno.org

Presenter: Bryan, AF0W

Topic: J Pole Antennas

- If you've been around ham radio for a while, you've probably heard of (and likely seen an example of) the J Pole antenna
- A J Pole antenna is a vertical, omni-directional, single-band antenna that is fairly easy to build
- If you've seen one, you know that the name comes from the physical shape of the antenna, which resembles an upper-case J
 - a. There are two vertical elements - one longer than the other - connected by a short horizontal element
 - b. The feed point is located near the bottom of the antenna
- This type of antenna was invented in 1909 for use in Zeppelin airships which trailed lengths of wire out of their gondolas for radio communications
- It has a few advantages over typical $\frac{1}{4}$ and $\frac{5}{8}$ wavelength antennas
 - a. One of the major advantages is that it does not require radials or a ground plane to function
 - b. This makes it easier to construct and install, and reduces wind resistance on the antenna itself
 - c. J Pole antennas provide a small gain of around 2 dB over a quarter-wave ground plane antenna
 - d. They also have low angles of radiation
- The J Pole antenna is effectively an end-fed half-wave antenna
 - a. The end of such an antenna is the point at which the voltage is at a maximum and the current at a minimum
- Ohm's Law (voltage equals current times resistance) can be rewritten as resistance equals voltage over current
 - a. High voltage and low current means this point on the antenna also has a high impedance - somewhere in the neighborhood of 1000 to 4000 ohms
 - b. This is much higher than the 50 ohms that are typically used for amateur feedlines and devices
- An impedance mismatch will result in a high standing wave ratio, or SWR, and poor performance from the antenna system

- To address this, the antenna feedpoint impedance needs to be transformed into something close to 50 ohms
- In the J Pole antenna, this is done by using a quarter wavelength of balanced feed line, only the feedline is part of the antenna itself
 - a. When looking at a J Pole antenna, you will see a long element on one side - this is the half wave radiator portion of the antenna
 - b. At the bottom of the antenna, there is a section with two parallel elements - one at the bottom of the half wave element, and the other spaced apart from it and connected to the first by the horizontal part of the antenna
 - c. These parallel elements comprise the quarter wavelength feeder that transforms the impedance
- The antenna is fed across the parallel elements at the bottom of the "J"

Construction

- J Pole antennas can be constructed from many different materials
- A common choice is copper pipe, but portable versions (sometimes called "roll up J Poles") can be made from 300 ohm TV antenna feed line or 450 ohm window line
- The upper section of the antenna is the antenna's half wave radiator, while the lower section is the quarter wave tuning stub
- If you recall from the Technician exam, you can calculate the wavelength in meters by dividing 300 by the frequency in MHz
 - a. Using a frequency of 146 MHz, which is at the center of the 2 meter band, this results in a wavelength of 80.9 inches
 - b. This formula assumes a very thin bare wire in free space
 - c. To adjust for constructing the antenna using $\frac{1}{2}$ inch copper pipe, this number is multiplied by a factor of 0.958, as determined from a chart in the ARRL Antenna Book - resulting in a corrected wavelength of 77.5 inches
 - d. Half a wavelength is therefore 38.8 inches, and one-quarter of a wavelength is 19.4 inches
- The other dimension needed for the antenna is the spacing between the quarter wave elements

- a. There is a link to a web page with calculations for determining this distance - it says the distance is not critical, and should be chosen to make the antenna easy to build
 - b. The distance does impact the feed point for the antenna
 - c. The web site suggests a separation distance of 2.5 inches
- The coax feeding the antenna is attached to the parallel section of the antenna -
 - a. The bottom of the parallel section of the antenna is shorted together by the horizontal element, and is at 0 ohms.
 - b. The top of the matching section is an open circuit, so the impedance is very high
 - c. The feedline is attached at the point where the impedance is approximately 50 ohms
 - d. The center conductor of the coax is attached on the side of the antenna with the half wave radiator, and the shield to the shorter side
- To tune the antenna for lowest SWR, move both feed point connections up or down
 - a. If the lowest SWR is not 1:1, change the radio frequency until it is.
 - b. If this frequency is lower than the center of the band, then shorten the halfwave radiator
 - c. If this frequency is higher than the band center, then you will have to cut a longer radiator for your antenna
- There is nothing to prevent you from making a J Pole for any band, but antennas for HF frequencies will be fairly large
 - a. Remember that the long side of the J consists of the halfwave and quarter wave portions of the antenna - for 10 meters, this would be over 24 feet!
- Suppression of feed line RF currents will likely be required - ferrites or open-air baluns comprised of loops of the coax feedline can be used for this purpose

Slim Jim

- You may have heard the term "Slim Jim antenna" and wondered if this is the same thing as a J Pole antenna
- The Slim Jim is actually a variation on the J Pole antenna

- It was introduced by Fred Judd, G2BCX, in 1978
- While it uses more material for the antenna elements, it exhibits no performance advantage over the conventional J Pole antenna design
- The construction of a Slim Jim antenna is the same as a regular J Pole, except there is a horizontal element at the top of the J which extends down almost the full half wavelength toward the bottom of the antenna
- The half wavelength radiator now appears similar to that of a folded dipole
- According to Michael Martens, KB9VBR, of KB9VBR Antennas, there are some differences between the Slim Jim and traditional J Pole antennas:
 - a. The overall length of his Slim Jim antenna is 11 inches shorter
 - b. The gain of the Slim Jim is twice that of the J Pole
 - c. The bandwidth of the Slim Jim is slightly over double that of the J Pole
 - d. The takeoff angle of the Slim Jim is much lower than that of the J Pole (8 degrees versus 20 degrees)
 - e. One downside of the Slim Jim is that the antenna needs to be isolated from the mast system, whereas the J Pole does not
 - For example, if you have a metal mast, you would need to do something like attach a piece of PVC pipe to the top of the mast, and then attach the Slim Jim to the top of that
 - f. Another is that the antenna requires more materials so costs more
 - As an example, he sells his 2m copper J Pole antenna for \$46, and the Slim Jim for \$58
- He also states that the J Pole is a good choice if you are mounting the antenna at a lower mast height or are in an urban area or valley - the Slim Jim would need to be mounted in the air at about the 20 or 30 foot level

Ed Fong Antenna

- Another popular antenna is from Ed Fong, WB6IQN, available as either the DBJ-1 dual band base antenna, or the DBJ-2 Dual Band Roll Up Antenna
- Ed designed these antennas to perform as half wave radiators for both the 2m and 70 cm bands (remember, the traditional J Pole antennas are designed for a single band)

- The roll up antenna is an extremely portable antenna that is great for hiking and camping
- Ed has graciously provided detailed plans for building these antennas in his articles published by the ARRL (DBJ-1 in Feb 2003 QST, and DBJ-2 in March 2007 QST) so you can make one yourself
- He's also got a tri-band model, the TBJ-1 that adds 220 MHz support.
- He also sells antennas which are produced by his graduate students - both the DBJ-1 base antenna and DBJ-2 rollup antenna are \$50
- The DBJ-1 base antenna will handle up to 75 watts, while the DBJ-2 roll up antenna will handle 50
- Ed did a presentation at a LARC meeting back in January of 2021. A recording of this meeting can be found on our Club website and Youtube channel (<https://www.youtube.com/watch?v=JR9BGE2HcDw>)
- N9TAX also sells a dual band rollup Slim Jim antenna for \$33 that handles 100 watts

Questions:

- **The question for the week is:** Do you use a 2m and/or 70cm antenna for a base station antenna, and if so, what type do you use?
- **In my case,** I've got three different base station antennas. My primary station that I am using right now is connected to an Ed Fong DBJ-1 antenna I have mounted in my attic. I also have one of his DBJ-2 rollup antennas that I purchased for operating while out of the house - I've used it on multiple vacations connected to an HT to listen to local nets and communicate via APRS. Finally, I have a secondary station with a collinear dual-band antenna from Diamond Antenna, the X-50. It looks similar to the PVC pipe used on the Ed Fong DBJ-1 antenna, but it does have three ground plane elements.

More Info:

- ARRL Membership Dues Increasing: <http://www.arrl.org/member-bulletin?issue=2023-07-23>
- Copper Pipe J Pole Antennas: http://www.cvarc.org/resources/Tech_Articles/buildpole.html
- J Pole Vertical Antenna: <https://www.electronics-notes.com/articles/antennas-propagation/vertical-antennas/j-pole-vertical-antenna.php>
- J Pole Antenna on Wikipedia: https://en.wikipedia.org/wiki/J-pole_antenna

- Slim Jim and J Pole Calculator: <https://m0ukd.com/calculators/slim-jim-and-j-pole-calculator/>
- J Pole Antenna Design Calculator: <https://www.hamuniverse.com/jpole.html>
- Slim Jim 2 meter Aerial: <https://www.hamuniverse.com/g2bcxslimjimantenna.html>
- Slim Jim Antenna Project: <https://www.hamuniverse.com/slimjim.html>
- Slim Jim vs. J Pole Antennas: <https://www.jpole-antenna.com/2012/10/21/slim-jim-vs-j-pole-antennas/>
- Ed Fong's Antennas: <https://edsantennas.weebly.com/>
- Ed Fong's antenna plans (DBJ-1, DBJ-2, TBJ-1): <https://edsantennas.weebly.com/about.html> (scroll to bottom of page)
- Review of DBJ-1 Antenna: https://www.miklor.com/COM/Review_DBJ1.php
- N9TAX Labs: <https://n9taxlabs.com/>
- Diamond X-50 Antenna: <https://www.diamondantenna.net/x50a.html>
- Spectral IsoPole (mentioned on net): <https://www.isopole.com/index.php#productos>

- If you have ideas for net topics or general meeting topics / presenters, please let us know! Tell us on a net, or send email to k0itp@w0eno.org

Email to elmer@w0eno.org

1. K0ITP - Chuck - Firestone
2. N0FTI - Steve - North Longmont
3. AF0W - Bryan - Longmont
4. KV0N - Raman - Lafayette
5. W0PPC - Steve - Lyons
6. AE0DO - John - N of Longmont
7. W7PGF - Philip - Frederick
8. KF0FVI - Robert - Dacono

N0FTI - Have an event coming up to support the Boulder County Fair Parade. Saturday, Aug 5.
Looking for volunteers to help provide communications. Email cprobbino@gmail.com
518-466-9101 Starts at 8am, parade at 10, done by noon.