

2024-08-20 Hamlet Net - FM Simplex Operating

Announcements:

- Test Session Info
 - Next VE session is August 24th in the Clover Building at the Boulder County Fairgrounds, and starts at 10 am. It is an ARRL session, so there is a \$15 fee to test. See the Licensing/Testing page on the club web site, <https://w0eno.org/>, under the Education menu.
- Tomorrow is the monthly club meeting. This month, Chuck has put together a video on amateur radio and is hosting a showing at Rogers Grove just north of the fairgrounds. There will be pizza and rootbeer provided, so bring your friends and family and join us at 6:30.
- The Denver Radio Club's Hamfest is this Sunday, August 25, 2024, at the Adams County Fairgrounds! Doors open at 9:00am and hamfest continues until 1:00pm. Admission is just \$6 with children under 13 free with an adult. Testing is available at 10:00 AM
- The CU-Boulder Buffalo Bicycle Classic needs volunteers (at least 1 more this year) to help with communications along the Peak-To-Peak Highway between Nederland-Allanspark-Lyons. There's no cell phone service along that route and they need ham operators to relay information and to assist any bike riders that need assistance. It's on September 8th this year. They start around 7 am in Boulder and should finish by 4 pm in Lyons. They were thin last year and are down another ham this year. If you have a bike carrier, that's great, but not required. We just need people to be able to drive back and forth for a few hours and look for anyone needing help. We need help with the Epic 75 and Epic Buff routes. For more info on the event, see their web site at: <https://www.colorado.edu/event/buffalobicycleclassic/>
- The ARRL is preparing comments urging protection of existing and future amateur uses in the Amateur Radio 902-928 MHz Band. The FCC accepted for public comment a Petition for Rulemaking filed by NextNav Inc., a licensee in the 900-MHz Location and Monitoring Service (LMS), to completely reconfigure the 902-928 MHz band and replace the LMS with high-powered 5G cellular and related location services.

All amateurs are urged to file their own comments describing their activities in this band and the expected effect of the proposed changes:

More info: tinyurl.com/2z6dvhwc

- Wednesday, September 18th is the LARC annual meeting where we elect officers. This year, we also have some changes to the Club bylaws that must be voted on by the

membership. There are quorum requirements for elections and bylaw changes to take effect, so please make every effort to be present at the meeting, or to provide your input via proxy so we can get this business completed. One bylaw change will create a Member at Large position on the Board, so if you are interested in running for this position, please let the Board know. See the club web site for more info.

- We are still looking for volunteers for Santa on the Air - we can use elves who act as net control, as well as Santas. We've got a script for the elf, and a list of questions for Santa to keep the net going when Santa doesn't have anyone to talk to. No experience is necessary. You can even participate over Echolink as well.
- There are a number of state QSO parties going on this weekend - Kansas, Ohio, and Hawaii. This is a good opportunity to get contacts in those states if you need them for awards!
- Amanda Alden, our ARRL Section Manager, runs a monthly section net on the second Monday of each month (the most recent one was yesterday).

This net is dedicated to all things related to amateur radio in Colorado, including updates from the ARRL. It's the perfect place to announce ham fests, club activities, request assistance from fellow hams, and share anything of interest to the Colorado ham community.

The best local places to participate are on the Colorado Connection VHF Repeater System, the Rocky Mountain Ham Radio Wide Talk Group 700, and the Northern Colorado ARC Buckhorn Repeaters.

For more info, see: <https://colorado-arrrl.us/arrrl-section-net/>

- We have some volunteer opportunities available where you can help out LARC:
 - Photographer / videographer - record team activities and upload to web site / YouTube
 - Newsletter Editor - put together the monthly Splatter newsletter
 - Social media manager
- You can start earning your 2024 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 2024. 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: Simplex on FM

- Right now, we are communicating via a repeater in what is called duplex mode
 - This is because we are transmitting on one frequency and listening on another
 - The difference between the repeater's receive frequency and its transmit frequency is called the offset
- While probably the most often-used, it is not the only way to use your radio
- The other method is called simplex
 - This is where you transmit and receive on same the frequency, radio-to-radio
 - FRS radios work in this fashion
 - GMRS is also frequently simplex, but also support operating duplex through repeaters
 - Simplex is also widely used on HF, but generally not with FM!
- Easier to program into your radio as there are no offsets, and typically no CTCSS or DCS tones
 - You can of course use tones, but if you do, you need to check the frequency before transmitting to make sure there is no one using it without tones
 - And remember, these tones do not impart any actual privacy onto your transmissions - anyone listening with no tone squelch enabled will hear your transmission

- When would you use this?
 - No repeaters in range
 - Don't know information on local repeaters (i.e. traveling)
 - Close enough to talk radio-to-radio
 - One **reason for this that is frequently mentioned** is to free up the repeater for users who are not in close proximity, but if you've listened to any amateur repeaters lately, you'll realize that this is not really a problem
 - In fact, conducting your conversation on a repeater allows other operators who are listening to join in or at least be informed about the topic you are discussing
 - For events of contests where repeater contacts are not allowed
 - Most recognizable use would be Parks on the Air or POTA
 - Other events include Field Day, Summits on the Air (SOTA), and ARRL VHF contests
- Follow national and local frequency use plans
 - Colorado's is put out by the CCARC (Colorado Council of Amateur Radio Clubs) - <https://www.ccarc.net/> -> Use Plans and Hotspots - Frequency Use Plans "FM Voice Simplex Frequencies"
 - There are 26 2 meter FM simplex frequencies and 48 70 cm FM simplex frequencies you can choose from
 - Can also access existing repeater coordination information under Existing Coordinations -> Colorado Public Repeater Info

Calling Frequencies

- The simplex frequencies in the use plans includes a calling frequency for each band
- So what is a "calling frequency?"
 - The idea is that you establish contact on a calling frequency and then move to another frequency for the actual conversation, thus freeing up the calling channel
 - Original purpose was for when radios had a limited number of fixed crystal-controlled frequencies

- Everyone would have crystals for the calling frequency plus a few other simplex frequencies
 - Would establish contact on the calling channel, then figure out another frequency that you both had in common and move to it to free up the calling channel
- Nowadays, they are frequently used by traveling hams to try to make contacts as they go through an area, since they may be unfamiliar with local repeaters
 - I've seen a few cars with white round oval stickers with 146.52 in them - presumably indicating that the driver is monitoring that frequency
- While they are likely the most-often monitored simplex frequencies for each band, this does not mean that there is anyone listening at any particular time
 - In the CB radio service, channel 9 is recognized as the emergency channel, and at one time, it was frequently monitored by law enforcement to assist motorists.
 - If you are in Colorado, there is a group called the Colorado Emergency Reporting Network, or CERN, that monitors the Colorado Connection's set of linked repeaters and will help anyone requiring assistance.
 - The Colorado Connection maintains a set of about 15 2 meter repeaters which are all linked together.
 - CERN's goal is to have someone listening 24 hours a day, 7 days a week, but I'm not sure if they currently have enough volunteers to do this. There is an outdated schedule on their web site that has a lot of holes in the early morning hours.
 - Nevertheless, it would be a good idea to have some Colorado Connection repeaters programmed into your radios, just in case.
 - The closest repeater to Longmont is located in Denver and is on 145.310 MHz with a - offset and requires an 88.5 Hz input tone and transmits with a 123.0 Hz output tone.
 - You can find out more about CERN on their web site: <https://co-cern.org/>
 - Information about the Colorado Connection is at: <https://colcon.org/>
- If you have your radio scanning through repeaters, you may find it beneficial to include calling frequencies in your scanning list

- Typically don't call CQ, but is good to include your frequency as others will likely be scanning many frequencies - something like "This is AF0W - alpha-foxtrot-zero-whiskey looking for a contact on 52" - if you just gave a quick "af0w", it's likely you would not be heard
- **Does anyone know what the 2 meter and 70 cm calling frequencies are?**
(146.520 and 446.000)
- To see if you are within simplex range when communicating via a repeater, you can each individually enable "reverse mode" on your radio while the other user is transmitting
 - This swaps your receive and transmit frequencies so that you are listening to the other operator directly (by listening to the repeater input frequency), and transmitting on the repeater's output frequency
 - If you can hear them, and they can hear you, then you are within simplex communication range
 - Be sure to switch your radio back out of reverse mode when done testing!
 - If you don't you'll get really frustrated when you can only hear some people on the repeater (those who are within your simplex range)!
 - To toggle reverse mode on Baofeng radios, press the ***SCAN** key quickly - an "R" will appear at the top of the display - press it again to switch back to normal operation (the "R" will go away)
 - On a Yaesu FT-60R, press the HM/RV key - you will see a flashing dash on the display to indicate the radio is in reverse mode. Press the button again to return to normal mode.
 - Note that if you have your radio set for low power mode to use a repeater, you may have to switch to a higher power mode to work a station via simplex
 - To toggle power levels on a Baofeng when in channel (or memory) mode, press the # key (an L will appear at the top of the display when the radio is transmitting in low power mode).
 - To toggle power levels on an FT-60R, press the F/W key followed by the 3 key. Then adjust the power level using the dial knob to select High, Medium or Low power, followed by the PTT button.
 - You can use high power for a single transmission by pressing the F/W key then transmitting using the PTT switch as usual. The radio will return to the programmed power level when you release the PTT button.

- Another time you use simplex on FM is when using digital protocols
 - Examples include Winlink, packet radio, APRS, SSTV
 - You also use it if you have a simplex hotspot that you are using with a digital voice protocol such as D-STAR and DMR
 - Operating a hotspot simplex does have one big issue - since only a single transmission can occur at a time on the hotspot frequency, if you are connected to a busy Brandmeister group, the transmissions from the hotspot may not stop long enough for you to get in and control your hotspot
 - This is where a duplex hotspot comes in handy - you can transmit to your hotspot at the same time it is transmitting to you, which would be able to to change to a different talkgroup, for example
 - If you are setting up a hotspot, note that the CCARC web site also includes guidelines for selecting an appropriate frequency to use
- There is also such a thing as a simplex repeater
 - While a normal repeater simultaneously retransmits received signals, a simplex repeater first records incoming transmissions, and then when the incoming signal drops, replays the recording on the same frequency
 - Using a simplex repeater also means that the frequency is actually occupied for twice the duration of any transmission
 - It can also be annoying to other operators who can hear the transmitting station directly, as they will hear them make the initial transmission as well as the repeater replaying
 - One thing to note is that this mode of operation does only require a single radio (as opposed to duplex repeaters which have both a receiving and a transmitting radio)

Appalachian Trail Golden Packet

- One interesting application of simplex FM is the annual Appalachian Trail Golden Packet event on the third Saturday of July
- Created by Bob Bruninga, inventor of APRS in 2009

- During this operating event, participants attempt to pass a APRS message packet via multiple stations spread out on 15 mountaintops along the Appalachian trail - a distance of over 2200 miles without the use of any infrastructure
- The first successful transmission through all stations occurred in 2014, and was repeated in 2016 at 9600 baud
- Phase 1 of the event uses Kenwood packet-capable radios (such as the TM-D710G in the LARC GoBox) configured as digipeaters (or digital repeaters) - even though the name implies duplex operation as with a voice repeater, digipeaters actually operate in a store-and-forward simplex mode
- Phase 2 allows owners of non-Kenwood radios to participate using a purpose-built setup based on the Direwolf software running on a Raspberry Pi Zero W with a specific audio interface.
 - The group found that the Direwolf stations actually performed better than the Kenwoods!
 - I've read on the internet that people have had better luck with Direwolf than dedicated hardware TNCs

Summary

- Simplex is also used when transmitting CW or SSB on 2 meters and 70 centimeters, but this requires a more advanced radio than your typical dual-band HT or mobile radio.
- As you can see, there is much more that you can do on your dual-band radio other than just talking on repeaters
- In the past, LARC ran an exercise where each participant individually transmitted on FM simplex and other stations kept track of whether or not they could hear the transmitter.
 - This information could be useful if there is an event that takes out repeaters in the area
- If you are bored with the repeater action in this area, you might want to give simplex FM operating a try!

Questions:

- **The question for the week is:** Have you ever operated simplex (i.e. not through a repeater) on 2 meters or 70 centimeters with your radio?
- **In my case,** I've used APRS for sending position reports and messages, made Winlink connections using 2 meters, and also tried making a Winlink digital contact point-to-point

with Chuck in Firestone, but we were unsuccessful. I've also participated in a foxhunt which was conducted on a simplex frequency.

More Info:

- CCARC Frequency Use Plans; <https://www.ccarc.net/wordpress/frequency-use-plans/>
- Calling Frequencies: <https://www.qsl.net/n7fan/comm/amateur/calling.htm>
- Colorado Emergency Reporting Network: <https://co-cern.org/>
- Colorado Connection: <https://colcon.org/>
- Appalachian Trail Golden Packet: <https://www.atgoldenpacket.net/>
- CCARC Guidelines on Hotspots: <https://www.ccarc.net/wordpress/hot-spots/>

Notes:

- 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 - Winlink, APRS every morning on drive to work, satellite, QSO down 119 using simplex (they were about 7 cars in front of him). Monitors 2m and 70cm calling frequencies
2. AF0W - Bryan - Longmont -
3. W7PGF - Philip - Frederick - Not very often. Knws how to do it, but doesn't use regularly.
4. WA0JJC - Bob - Boulder - Returned a call from someone on calling frequency. Occasionally hear someone driving through area.
5. KF0AGY - Steve - Lyons - no response
6. N0PZ - Rachel - Boulder - Tape measure Yagi from indoors. Worked at that at her house the other night. Bob took his analyzer and tuned antenna.

Ended: 7:50pm

LiFePO4 charger - Chuck -