

2023-05-23 Hamlet Net - Mobile Installs

Announcements:

- Test Session Info
 - Next VE session is this Saturday, May 27 in the Clover Building at the Boulder County Fairgrounds, and starts at 9am. It is a Patriot VE team session, so no additional charge to take the test, but you must pre-register for the session. For more info, see the Licensing/Testing page on the club web site, w0eno.org, under the Education menu.
- Chuck is putting together a special event to celebrate the 100 year anniversary of Peak-to-Peak involving multiple area radio clubs. Contact him if you'd like to help plan and participate!
- LARC is running Fox Hunt where participants hunt for a hidden transmitter. The hunt this Saturday, May 27th at 9AM until 12PM. The Fox will be located somewhere in Golden Ponds Park at and will be transmitting on 146.565 MHz. For more info, check out the club web site at w0eno.org (<https://w0eno.org/another-larc-fox-hunt/>)
- May 27th - Doug Sharp (K2AD) has invited the club to his house in Firestone to participate in the W1AW/0 event. This is part of the ARRL VOTA (volunteers on the air) event that is going on all year. Doug will have one of the RMHAM vans and other setups for hams to participate. Please contact Doug at doug@dougsharp.com for more info and to RSVP.
- The ARRL is running a survey regarding increasing their dues. If you are an ARRL member, you can provide your input at: <https://www.arrl.org/take-dues-survey>
- Field Day is coming up in June, and the club is starting to work on planning for this event. See the Club website 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: Mobile Installs

- Many hams have radio equipment installed in their vehicles
- This can range from temporary (such as tossing a magnetic mount antenna on the roof and connecting it to your HT) all the way to permanently-installed antennas and radio equipment.
- There are many uses of such equipment, such as something to do on a long road trip, vehicle tracking using APRS, mobile contesting/activating (roving), emergency communications, and HF operating on the road
- Installation of radio equipment in vehicles has its own set of issues
- Need to make sure equipment will not become a hazard
- Radios should be mounted securely so they don't fly around in an accident
 - a. Many types of Velcro are likely not strong enough to restrain a radio and/or radio display during a crash
- Should not interfere with the operation of the vehicle (blocking gear selector or blocking view) - including taking your eyes off the road when operating
- Need to make sure cables and especially radios are not installed in the path of air bags (unless you like Yaesu so much that you want a mirror image of their logo imprinted on your forehead!)
 - a. Check your vehicle's owners manual - they frequently have a diagram of where airbags deploy
- Permanent installation generally requires running power cables through the firewall into the engine compartment
 - a. There are usually existing holes that can be used - typically behind rubber plugs
 - b. Can also carefully make a hole in the plug for an existing penetration - for example, a wiring harness or around the steering column

- c. May also have to drill a hole yourself - make sure you know what you are drilling into (and what is behind it!)
 - d. Some pickup trucks have vents in the rear wall that can be used for cables
 - e. Some amateurs run wire under the vehicle chassis - if you do this, make sure wiring is protected from damage due to automobile exhaust systems and road and weather hazards
- Be sure to use a grommet or other protection around wires and cables to prevent wear - power wires can carry a lot of current - you do not want them to get shorted out by a sharp edge or screw
- Be sure to check the temperature rating of the insulation on the wire - wires should be rated at least 195 degrees for the passenger compartment and 220 degrees for the engine compartment.
- Split loom cable protection should be used for exposed wire to prevent damage
 - a. Be careful not to install cables in areas where they may be affected by the movements of doors, seats, tailgate or trunk lids
- Make sure the wire diameter (gauge) you use is adequate for the amount of power your radio equipment requires
- Proper wire choice involves considering the current and voltage requirements as well as the distance the wire will be run
 - a. Using an inadequate wire can result in a lower voltage at your radio (which will likely reduce its performance) and in extreme circumstances, can result in melting insulation due to heat, resulting in a potential fire
 - b. For example, the Kenwood TM-D710 specifies 13.8V DC +- 15% (that's 11.73 volts on the low end) and 13 amps on high power. It comes with a power cord containing two 15A fuses.
- When factoring in wire distance, the entire length is used (so if there is a 10 foot run from radio to battery, that's actually 20 wire feet)
- For no more than a 10% voltage drop over 20 feet when running 15 amps, you would need a minimum of 14 gauge wire
- Using larger diameter wire will result in a lower voltage drop at the radio
- Seems to be some disagreement on the need to fuse the negative lead, but many radio manufacturers supply power cords with both leads fused

- Fuses should be mounted as close to the power source as practical - they are primarily there to protect your wiring from shorts (not to protect your equipment)
- Some also argue that the frame of the vehicle can (or should) be used for the negative connection. Others counter that this is not necessarily a low-impedance path on vehicles with many plastic parts, and that it will introduce noise from other vehicle systems into your equipment
- Probably best to follow directions that came with your radio
- One thing to be aware of - most vehicles nowadays have circuitry to monitor power draw from the battery. In this case, make sure you connect your radio power leads after the monitoring device - such as to the chassis ground point for the negative side of the battery
- Some amateurs install a dedicated battery to run their radio equipment. This prevents running your battery too low to start your vehicle, but requires additional equipment and wiring to charge this battery
- The cigarette lighter/power point is not a good place to draw radio power from as it does not provide a good, low-impedance connection. Also, the wiring harness may not be designed to withstand continuous, high power draws.
- Had an issue with our GoBox with the HF radio. If it was used for a digital mode with a high duty cycle, the voltage would drop low enough that the radio reset itself. We addressed this by installing a voltage booster to keep the input power to the radio constant.
- Good reference site for mobile installs is k-zero-bg.com - Click on the green "ABCs" button on the upper left of the page for a summary. Much of the page talks about mobile HF installs - there is a dedicated "VHF Options" button near the bottom for VHF/UHF specific issues.
- One thing to consider when purchasing a radio for mobile use is whether or not it has a removable faceplate
 - a. This allows you to mount the body of the radio (along with power and antenna cabling) out of the way in the trunk, for example, and just have a smaller unit to mount where it is visible
 - b. When comparing such radios, one thing to be aware of is that some radios come with everything needed to set up a remote radio front end, while others make you purchase a "separation kit" containing brackets and cables
 - c. Other separation issues include where the microphone connects to the radio (some radios, like the Kenwood D710 connect the microphone to the radio

chassis, while others like ICOM IC-706 Mark IIg have microphone connections on both the radio base and remote head.

- Many radios include warnings about installing them (or their displays) in direct sunlight due to issues with overheating

HTs

- If you don't want to install a dedicated mobile radio in your vehicle, another option is to use a handheld
- The metal body of the vehicle will block a lot of the signal from a radio and antenna used inside a vehicle, so one easy improvement is to locate the antenna outside of the car
 - a. This can be something as simple as an antenna with a magnetic base
 - b. I've also seen a window mount from MFJ (the MFJ-310) that allows you to mount an HT antenna on a clip that goes on the upper edge of your window. You roll the window up to hold the clip in place.
- A speaker microphone would be a useful addition to your HT in this case
- As with mobile radios, make sure your radio and associated cables do not interfere with the safe operation of your vehicle
- A "non-permanently-installed" radio can also be useful if you want to operate from a rental car or a work vehicle
- Some hams install multiple radios in their vehicles
 - a. For example, they may have one 2m/70cm dual-band radio for voice communications, a dedicated 2 meter radio for APRS, as well as an HF radio

Summary

- Installing one or more radios in your vehicle can open up a lot of new opportunities to obtain information or get on the air
- Keep in mind that some states or localities may have laws restricting the use of communications devices while driving
 - a. In Colorado, the Colorado Revised Statutes, Title 42, section 42-4-239 includes mention of amateur radio: "This section does not restrict operation of an amateur radio station by a person who holds a valid amateur radio operator license issued by the federal communications commission."
- Will cover more info on things like antennas in future nets.

Questions:

- **The question for the week is:** Do you have any radios installed in your vehicles? If so, what type (VHF/UHF, HF, etc.), what sort of antenna system are you using, is it permanently installed, etc.
- **In my case,**

More Info:

- K0BG ABC's: <http://www.k0bg.com/abcs.html>
- MFJ-4416C Battery Booster: <https://mfjenterprises.com/products/mfj-4416c>
- MFJ-310 HT Window Mount Clip: <https://mfjenterprises.com/products/mfj-310>
- CRS 42-4-239: :
<https://codes.findlaw.com/co/title-42-vehicles-and-traffic/co-rev-st-sect-42-4-239.html>
- Blue Sea Systems Fuse Blocks:
https://www.blueseasystems.com/products/category/16/Fuse_Blocks
- West Mountain Radio RigRunners: <http://www.westmountainradio.com/rigrunner.php>
- 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. K0DBL - Don - Mead
2. WA7EM - Ed - Erie
3. W0PPC - Steve - Lyons
4. KM6SJA - Steve - Longmont
5. AF0W - Bryan - Longmont
6. W0DPC - Donald - Longmont

Bracket that attaches to bolt under edge of hood

Auto-off feature of radio - also dedicated devices that either have timers, or monitor battery voltage

Door sill - make sure you aren't running power wires under screws

Saw a device that you could attach to your radio (think was speaker outputs) that would mute the outputs whenever a signal came through on the radio.

West Mountain Radio makes a system called a RigRunner that distributes power to sets of PowerPoles with a fuse on each pair.