2022-09-05 Hamlet Net

Announcements:

- Next scheduled test session is Sunday, September 18th at 9am at 350 Terry Street
    - Patriot VE session, so not fee to take the test, but you must pre-register at hamstudy.org
- To test before this (or online), go to hamstudy.org -> Find a Session (make sure you search for online sessions!

- Ed, WA7EM, has announced that he will be running a 2 meter fox hunt on September 10th at 9:30am, which gives you plenty of time to build a tape measure yagi antenna and to attend the Saturday morning breakfast at the Hidden Cafe! For more details, see his post on the club web site at w0eno.org

- If there are any newly-licensed hams listening, QRZ and GigaParts have announced a New Ham Jumpstart program, which will provide new hams with a welcome package containing a dual-band HT and programming cable.

  If you obtained your first license within the last 30 days, then you are eligible! The program runs through October 31st. To sign up, go to www.qrz.com/jumpstart, that's www-dot-quebec-romeo-zulu-dot-com-slash-jumpstart

- The Northern Colorado Amateur Radio Club will have its annual picnic on September 17th at the Fossil Creek Lake Pavilion in Fort Collins. They are supplying burgers, hot dogs, chips, and drinks, and welcome you to bring a dish to share. The event will start at noon and run until about 3pm. LARC members have been invited, and I'm sure they'd welcome hams who are not members of either club as well. For more details, see their web page at ncarc.net (november-charlie-alpha-romeo-charlie-dot-net)

- Elections coming up in October for Board - let Chuck know at k0itp@w0eno.org

- 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**

- Club breakfast Saturday mornings at 8am at the Hidden Cafe in Longmont

    - Come meet other Club members and discuss amateur radio

Misc:

- Alabama state QSO party this weekend

Presenter: Bryan, AF0W

Topic: Radio Power

Battery Booster

- One issue with battery power is that problems can arise when the input voltage drops below 13.8 volts, which is the typical automotive voltage of a battery being charged
- A device called a battery booster can help in this situation, by boosting the battery voltage back up to 13.8 volts
- Low battery voltage can cause output signal distortion, reduced output power and even transceiver resetting
    a. We experienced radio reset issues with the LARC Go-Box and its 12v Lithium iron phosphate battery when the radios were used at high power
- In addition to a discharging battery, low voltage conditions can be caused by voltage drops due to power wiring runs
- In a mobile environment, the battery output voltage can rapidly drop from 13.8 volts to 12 volts when the vehicle's engine is turned off and no longer charging the battery
- A battery booster can address these problems by maintaining the 13.8 volts, even as the input voltage drops to 9 volts
- MFJ has two such devices which are designed for mobile use:
    a. The MFJ-4416 and the MFJ-4418
- Of course, these devices are not magic. They have voltage boost and regulation circuitry that functions similarly to a switching power supply
    a. This does mean that they have the potential for causing RFI in your station
- Boosting the voltage comes at the cost of increased current consumption, which will deplete the battery faster
- One way the MFJ devices address RFI is by supporting an enable signal that can be tied to a radio's amplifier keying line to enable the boost function during transmitting, but disable it (and any associated RFI) during reception
- They also support setting thresholds for cutoff when the input voltage falls too low, disabling the boost functionality until the voltage drops to a certain level, and setting timing for disabling the boost function once the input voltage rises
- There is also a device from West Mountain Radio called the N8XJK (november-8-xray-juliet-kilo) Super Booster that additionally supports RF detection and the ability to connect multiple units in parallel for increased current flow

- All three devices support dedicated remote control heads, so you can mount the booster close to your radio and mount the controls in a convenient location in your vehicle

    a. You want the booster to be installed close to the devices that are being powered so that it can compensate for the voltage loss in the cabling, fuses, and connectors between that device and the battery.

- These devices are fairly bulky and heavy, so they're probably not appropriate for portable uses such as SOTA and POTA activations where you have to carry all your gear

Power Wiring

- I mentioned that one of the causes of low voltage at the radio is losses due to power wiring
- All wiring adds resistance
- When DC current flows through a resistance, a voltage drop occurs
- The relationship between DC voltage, current, and resistance is reflected in Ohm's Law which states that voltage is equal to the current multiplied by the resistance
- There are tables that give the resistance as a function of wire size, or gauge, and length, as well as online calculators that will compute the voltage drop given the specifications of the power cabling and operating conditions
- For example, most solid-state transceivers are supplied with a 10 foot long power cable, usually around 10 gauge
- The Kenwood TM-D710GA draws around 13 amps transmitting at 50 watts, which would result in a total voltage drop of approximately 0.26 volts
- Replacing the wire with 8 gauge wire would lower that drop to 0.16 volts, while downgrading it to 16 gauge speaker cable would result in an increase in the drop to 1.04 volts
- Remember that you must account for the length of each wire - both the positive and the negative, so that 10 foot length of factory power cable actually incurs 20 feet of resistive losses
- Cables aren't the only source of voltage drop - fuses and fuse holders as well as connectors contribute to the overall losses
- The resistance of a typical 30 amp ATC automotive fuse and holder is around 2 milliohms, while PowerPole connectors are around 0.6 milliohms

- Remember that a single PowerPole connection actually involves 4 connectors and their associated resistance - positive and negative on each end of the cable
- While these resistances are not huge, they do all add up
- So all things being equal, use larger cable and minimize the overall wire length and number of connectors as much as possible to minimize the total voltage loss

Wire Construction

- While on the topic of wiring, and especially wiring for mobile installs, another important characteristic is the insulation temperature rating of the wire itself
- According to the k0bg.com web site (kilo-zero-bravo-golf-dot-com), wiring used in the passenger compartment should be rated to at least 195 degrees Fahrenheit, while wiring in the engine compartment should be rated at 220 degrees
- Any exposed wire, especially in the engine compartment, should also be covered with protective split loom and be tied down so it is not caught in any moving vehicle parts
- I found that much of the red and black zip wire that is typically used for power cables are not temperature rated for the engine compartment, so be sure to check the wiring specifications before you buy
- You also need to be careful not to damage the insulation when installing the wire or when replacing trim pieces over the wire
- Make sure to use grommets if the wiring penetrates metal panels such as the firewall

Summary

- All of this is not to say that you will have power-related issues if you grab some random red and black zip cable off Amazon, but hopefully it gives you some ideas if you do run across issues when using your equipment.
- For example, before we purchased the battery booster for the GoBox, we could work around the radio reset issue by using only one of the radios at a time or by lowering the transmit power when using them simultaneously.
- As with many things in amateur radio, there are many different ways to do things, and experimenting is part of the fun!

Questions:

- **If you have any stories or insights into power cabling, by all means, please mention them, but if not, the question for the week is have you built any amateur radio antennas, and if so, what sort and for what bands?**

- **Most of my antennas are store-bought, but I did build a dual-band 2 meter / 70 centimeter ground plane vertical antenna. These are really easy to build by attaching the radiating element and ground radials directly to an SO-239 jack.**
- **I've also got an end-fed HF wire antenna for which I cut the radiating element and counterpoise, but I bought the 9 to one transformer off eBay, so it's not completely homemade.**

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

KN6CFI was an electrician, and is now an electrical engineer and works with power cables a lot. When he first learned to drive and had to jumpstart car - touched wires together and got sparks

Ed uses Anderson PowerPoles, word of caution - make sure you use ones rated for it.