2022-08-30 Hamlet Net

Announcements:

- Test Session
    - Had a successful VE test session this weekend. Three new candidates, two earned their Technician licenses, and one passed Tech and General. If any of them are listening, congratulations and welcome to the hobby!
- Sessions
    - 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!

- The Colorado state QSO party is coming up September 3rd. For more info, go to: https://ppraa.org/coqp (papa-papa-romeo-alpha-alpha-dot-org-slash-charlie-oscar-quebec-papa)

- 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

- If you are an ARRL member, or are just interested in finding out more about that organization, they've uploaded their 2021 Annual Report to their web site. You can see it by going to arrl.org (alpha-romeo-romeo-lima-dot-org) and looking for the post under "Latest News"

- 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)

- 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:

- Colorado and Tennessee state QSO parties this weekend

Presenter: Bryan, AF0W

Topic: Batteries

- I talked about solar power a few nets ago - something that comes along with solar power are batteries
- Of course, batteries can be charged by many non-solar methods as well - no matter what method you use to charge them, they provide you with the opportunity to operate from locations where there is no ready access to utility power, such as when operating handheld or on POTA and SOTA activations
- A battery is a collection of electrochemical cells connected in series (for greater voltage) and/or parallel (for more current)
- There are numerous types of batteries, each with their own characteristics and behaviors

Primary Batteries

- Primary batteries are those that are meant to be used once and disposed of, as they are not rechargeable
- Years ago, these were carbon-zinc, but today they include alkaline and lithium as well as smaller coin cell silver oxide and mercury batteries
- Advantages of these cells include higher energy per battery, longer storage times, and instant readiness

Secondary Batteries

- Secondary batteries are rechargeable, which is their only real benefit over primary batteries
- The most common rechargeable battery technologies today are lead-acid, Nickel-Cadmium, Nickel-Metal-Hydride and Lithium-Ion, all of which are used in amateur applications
- A benefit of Nickel-Cadmium, or Ni-Cad batteries is their low internal resistance, meaning you can pull a lot of energy out of them quickly, but they come with a "memory effect."

    a. This memory effect occurs when a battery is repeatedly discharged partially then recharged. After some time, it will actually fully discharge when used to the same amount.

    b. This effect can be erased by running the battery through a full discharge / recharge cycle.

- If you have an HT, it most likely came with a rechargeable secondary battery using one of these technologies
- For example, my Yaesu FT-60 has a Nickel-Metal-Hydride or Ni-MH battery, while my Baofeng UV-5R has a Lithium-Ion battery.
- As with many things related to amateur radio, you will find that there is virtually no cross-compatibility across radio models when it comes to battery packs - even among the same manufacturer!
- One way to bring a common-denominator into your set of HTs is to purchase dedicated battery packs that allow standard double-A cells to be used.

    a. These batteries are available at most gas stations and stores, whereas unless you come across a Ham Radio Outlet store, you're going to be out of luck finding a replacement battery for your HT while on vacation

- One thing you need to be aware of when using such a device is the voltage of the batteries you use it with. Until we started teaching licensing classes, I assumed all AA-sized batteries were 1.5 volts, but this is not the case.

    a. Zinc-carbon and alkaline batteries are nominally 1.5 volts whereas NiCd and NiMH are 1.2 volts

    b. The AA battery adapter I got for my Baofeng comes with a "dummy battery" that you replace one of the batteries with if you are using zinc-carbon or alkaline batteries. This results in 7.2 or 7.5 volts output, depending on which battery technology you use. The Li-Ion battery that comes with the radio is rated in the middle at 7.4 volts.

- If you step up to mobile radios, or those meant to be used in your shack, you will very likely need to provide at least 12 volts DC to operate your radio
- Many of these batteries are lead-acid, which is a type of rechargeable battery which is roughly constructed of a set of plates which are grids of lead coated with a lead-dioxide paste. The plates are subjected to an electrolyte, usually dilute sulphuric acid, which results in a chemical reaction generating energy.
- If the electrolyte is in a liquid state, the battery is called a "flooded lead-acid battery."

- A sealed lead-acid battery, or absorbed glass mat (AGM) battery uses a gel electrolyte and can be used in any orientation, have a longer useful lifespan, and also remove the need to maintain the electrolyte in a flooded battery

- The main advantages of lead-acid batteries are that they are relatively simple, inexpensive, durable, dependable, have low self-discharge rates (which is the rate at which they discharge when being stored) and are capable of high discharge rates

- Disadvantages include size and heavy weight, limited number of full discharge cycles, limited discharge levels, and environmental concerns

- Lithium-ion technologies have potential safety issues with thermal stability, which can result in fires during improper charging and use.

- A newer technology that has become a favorite for portable ham use is Lithium Iron Phosphate, or LiFePO4. LARC has a Lithium iron phosphate battery in our GoBox from a company named BioEnno Power.

- It is much lighter in weight than lead-acid batteries while having increased performance, is made with non-toxic materials, is longer-lasting, and has inherent thermal and chemical stability

- The Bioenno ham batteries are deep-cycle, meaning they are meant for extended continuous use as opposed to high-rate batteries which are meant for starter applications and not long, continuous use.

- In addition to the battery cells themselves, their battery packs include a battery management system that provides internal cell balancing, over charge, over discharge and short circuit protection, and a charging circuit.

- Bioenno does caution that their batteries will not function in series with each other, and should generally not be used in parallel either, due to the complexities of the cells

- There is, of course, a difference in cost. For example, here are some information on equivalent-capacity batteries:

    a. Batteries Plus has a 12v flooded lead-acid motorcycle battery for $75. It weighs 6.7 pounds and measures 5 x 3 x 6 inches.

    b. They also have a Duracell 12 v, 12Ah AGM SLA battery for $60. It weighs 8 pounds and measures 6 x 4 x 4.

    c. Bioenno has a 12 volt, 12Ah LiFePO4 battery for $125. It weighs 3.3 pounds and measures 8.5 x 2 x 3 inches.

- Bioenno advertises that their 12 Ah battery will power a 100 watt transceiver for about 6 hours when used for transmitting roughly 20% of the time.

Charging and Discharging

- Each battery technology has different discharge and charging characteristics
- It is important to make sure you use a charger that is compatible with the type of battery you are charging
- Some batteries can also be permanently damaged if they are drained too low - for example, lead-acid batteries depleted below around 10.5 volts may not be able to be fully recharged and may be damaged
- There is a lot more information out there on battery and charging technology
- The batteryuniversity.com web site has a lot of information, as does the bioennopower.com web site
- James Cizek, KI0KN (kilo-india-zero-kilo-november) has a couple of battery-related presentations that he's put on recently.
    a. One was a presentation for RMHAM which can be found by going to their web site at rmham.org (romeo-mike-hotel-alpha-mike-dot-org) and clicking on "Past Course Syllabus, History and Video" under the "RMHAM University" menu at the top of the page. Scroll down to his January 9, 2021 presentation titled "All About Batteries."
    b. The other was to the Northern Colorado Amateur Radio Club, and is on their YouTube channel. Go to Youtube and search for "batteries for amateur radio james"
    c. I don't know if these are the exact same presentation or not

Questions:

- **Do you have any batteries that you use for non-HT use for your ham equipment, and if so, what type?**
- **In my case, I've got one SLA battery that's the size of a car battery mounted in a plastic battery box with a West Mountain Radio PWRGate, which is a device that lets you implement a sort of uninterruptible power source. You connect your battery, 12 volt power supply, and radios to it. When there is utility power, it will use your power supply to charge the battery and power your station. When utility power is lost, it switches over to running your station from the battery. They have a newer version that says it supports charging Lithium Ion batteries as well as lead-acid.**

- **I've never tried running from the battery for a long period of time, so I don't know what sort of runtime I have - the battery is fairly old, so it may not work for long.**
- **The battery system is quite heavy - I bought it from a silent key that used to be a member of our club. The last time he used it for a field event, he brought along a handcart to help transport it from his car to the picnic table, so it's not something that can be used for SOTA!**

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

Grand Island, Nebraska

KN6CFI - John - Have Milwaukee power tools batteries

KF0EAJ - Steve - He does. Goal Zero Yeti 3000X power pack, 3000 Wh LI power pack, WiFi and BT battery monitoring, compatible with 200 Watt solar panel brief case

- Don - QRP transceiver, 2 x 12v 3 Ah - $40 ea

K0ITP - Chuck -

WA7EM - Ed - Deep-cycle battery and low cost QRP battery

KV0N - Raman - Miyagi ? Ah and 12 Ah battery with IC-705, anf with MX-something amp to get 30-50 watts out

KM6SJA - Steve - Bioenno 12v 3ah running mobile Elecraft KX3

KF0FVI - Robert - Purchased 100 Ah LiFePo battery along with a solar panel a few months ago and a PWM charger, pretty techy guy, so have all sorts of noise at house

N3FT - Tracy - not there

AF0W - Bryan -

KC0CT - Joe - Bioenno Power 12aH battery for POTA and Burro Races, 8 hrs at 50% duty cycle

AI7JW - Ian (Longmont) - not there

KE0RWV - John (Erie) - Went to Walmart and bought plastic battery box and mounted cigarette plug and meter, and looking for battery type to put into it. If below freezing, can damage battery when charging.

KF0AGY - Steve -

KF0EAJ - Steve in Lyons - Red Dog ham club, had meeting and elected officers and adopted bylaws. Have applied for a club call sign. WB4FAS - he's VP, and happy to let someone else do it! :)

Battery Booster - boosts voltage at expense of current/runtime, MFJ-4416 and 4418

Use power tool batteries for ham radio - Looked at Dewalt 12v 5.0 Ah 2 pack for $99 - 1 lb

Bioenno - no series or parallel -

Chuck - $3100 for Nancy at hamfest

IPRC got their repeater moved to Sugarloaf mountain - 448.550 -5 PL:141.3 Charlie is club president (something-NYN)

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