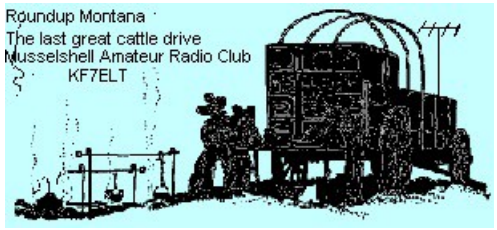

Volume 16
Issue 9
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MARC/YRC Newsletter
Contact: keith@kregli.com

Upcoming Events:

YRC class/testing September 12/19 9:00 am

MARC Picnic

We had a pretty good turnout for the picnic with plenty of good food. Temperatures and smoke were down enough that we could enjoy the outside seating until lunchtime. Paul KF7SOJ managed the grill and Elisabeth KI7NVQ wrangled the crowd and Keith K7KAR made the stirfry and the bacon. While folks were finishing up we were able to hold a VE testing session and Jerry KK7PDK upgraded his license.

September YRC Tech Talk

Contesting, also referred to as "Radio Sport" in Europe, represents a very popular activity for a subgroup of amateur radio operators. This talk will be introduction to how contests are structured, how they range in difficulty, and how "non-contesters" use them for other purposes. For example, "non-contesters" use them for DX hunting, obtaining the Worked All States Certificate, and obtaining the coveted "Clean Sweep Mug" in the mother of all US radio contests: November's Sweepstakes. Don't retreat to the WARC bands when the band is crowded with contesters! Even if you are not going to submit a log learn how to make a few contacts and why contesters depend on "non-contesters" ! Learn how contests can be fun for casual operators who are not "in it to win it."

MARC breakfast meeting 9/12 at 9 am. Backporch Restaurant, 101 Main St, Roundup.

YRC regular meeting 9/21 at 7pm. United Way of Yellowstone Building, 2173 Overland Ave, Billings.

CMARC regular meeting 9/7 at 6:30pm. 305 W Watson St, Lewistown.

Get a copy of your license.

There are two types of license copies: a reference copy and an official copy. Both are obtained through the Universal Licensing System (https://www.fcc.gov/wireless/universal-licensing-system).

The reference copy is obtained by selecting “License Search”. Enter your callsign and then click on your callsign on the following page. The result has a link near the top of the page for “Reference Copy”.

The official copy is obtained by selecting “File Online”. This requires your FRN and password (same as CORES). Once you login click on the link in the green box near the top of the page, select the license you want and click the DOWNLOAD button in the lower right. Don’t rename it! The filename is part of the security used to verify the authenticity.

MARC Website YRC Website

Frequency	Tone	Repeater Shift	Location
446.600 (*)	100hz	simplex	Majerus Rd
147.360 (*)	100hz	+ 600kHz	Red Lodge
446.700(*)	100hz	– 5MHz	Red Lodge
447.500	100hz	- 5MHz	Red Lodge
448.500	100hz	- 5MHz	Majerus Rd

(*) Linked repeaters providing wide area coverage.

Local Nets:

M– F 0800 145.410/147.360.
Tuesday 7:00pm 145.410/147.360,
Wednesday/YL 6:30pm 145.410/147.360
Wednesday/Tech 7:00pm 147.000
Saturday 10:00am 145.410/147.360

Renewing your license.

Every ten years I panic as I get a note from the ARRL telling me my license is about to expire. You can't renew your license until 90 days before it expires and you can't get on the air after it expires. You do have a grace period to renew of two years after expiration.

How do you renew? First thing you do is grab the copy of your license that you keep with your station (you have one don't you?). Then look on the back where you've attached your CORES account username and password (you have that don't you?). If you don't have all that stuff you can recover it...see below.

You start by going to the FCC Universal Licensing System (https://www.fcc.gov/wireless/universal-licensing-system). Under the title "Filing" you'll see "File Online" – go there. You'll have to log in which requires your FRN (on the front of your license) and your password. Here you select the license want to renew. On the next page you'll have the option to renew your license. Once you have selected that it will give you the option of going to the CORES system to pay the $35 application fee. You'll need to log in to the CORES system which requires your username and password and a security code sent to your email. Then you can follow the links to FRN Financial where you can pay the invoice. After that check the ULS system the next day to make sure your expiration date has been updated.

If you don't remember your CORES (https://apps.fcc.gov/cores/userLogin.do?csfrToken=) account username or password you can do a license search with your callsign on the ULS system and get your FRN. Then you can get the CORES system to reset your password. If you're still having trouble call the FCC help line (877-480-3201). The folks there are usually very helpful.

Planning for Solar

People use solar power for many applications; RVs, homes and repeaters among them. When you start planning your system you have to decide what your goals are. If you're looking to be independent from the power company it will be a much different system than if you just want to get by an hour long power outage.

Elements of your system will include some of: solar panels, batteries, charge controller, inverter, transfer switch and perhaps some monitoring gadgets. If you want power when the sun isn't shining you'll need batteries and possibly a transfer switch. If you want to run 120V AC equipment you'll need an inverter and may want an inverter/charger to keep your batteries charged when connected to the grid.

Let's make the assumption that we want to survive some level of power outage. That means we need a means of storing energy – batteries. The first question to ask yourself is: How long do I need to have power when no charging power is available? You might be satisfied with an hour, or overnight, or you may be off-grid and need to last several days without sunshine.

Once you make that decision you can determine how much energy storage you need. Batteries are measured in Amp Hours (AH) which is a measure of how quickly a battery will be drained.

What you'll need to do is figure out how much power you will use during the "no charging power" There are a couple of ways to determine this number. The best method is to simply measure how much power you use during a comparable period. If you have access to the power company meter you can just read it at the

start and end of a test period. In an off-grid situation you'll probably need to add a shunt into your power circuitry and a meter to see the results.

The other method is read the labels on all the electrical appliances you'll be using and determine how much power they will consume.

Let's look at some sample appliances to get an idea of how to make that calculation:

A 120V cube fridge shows 200 KW hours/year.
A 120V fan shows 48W.
A 120V laptop charger shows 65W.
A 12V Yaesu FTM-500 is 0.5A Rx and 10A Tx.
LED lights show 12W each.

Notice that the devices show several different kinds of ratings. We'll convert all of these to Amp Hours for the desired "no charging power" period. For this we'll use a 24 hour "no charging power" period. For our calculations we'll assume 12V batteries.

The refrigerator will be on the entire period.
200 KWH/Y to Watts/Hour (8760 hours/year):
200 KWH/Y * Y/8760H = 22.8 W/H
22.8 W/H to A/H at 12V (P=E*I):
22.8 W/H * 1/12V = 1.9 A/H
In 24 hours it consumes 1.9A *24H = 45.6 AH

For the devices that a wattage rating we just have to decide how much of the 24 hours the devices will be turned on, so say the LED light is on for 12 hours, we get:
12W/12V = 1A times 12H = 12AH

Let's say the Laptop charger is used 3 hours and the fan is used 14 hours.
65W/12V = 5.4 A times 3 hours = 16.2 AH
48W/12V = 4 A times 14 hours = 56 AH

Let's say the Yaesu is in Rx 10 hours and Tx 1 hour.
.5A times 10 hours = 5 AH
10A times 1 hour = 10 AH

Add it up and you get nearly 150 AH.

If you consider microwaves, air conditioning, coffee makers, etc. you'll get a lot higher numbers, but our small sample is enough to demonstrate the methods.

Batteries designed for this purpose often come in multiples of 100 AH at 12V. With Lead Acid batteries you should only use 50% of the capacity, so you would need three in parallel to cover 150 AH.

We'll ignore the small inefficiency of an inverter that converts the 12V DC battery power to 120V AC for appliances.

Now, let's turn to recharging those batteries! If you're connected to the grid or use a generator you just need a standard battery charger. But we're here to talk solar, so let's go there.

Solar panels produce power from the sun. They are generally rated in watts at a nominal voltage. The actual voltage varies quite a bit with the amount of sun so you need a solar controller to regulate the voltage to match what your batteries need.

A 100 watt panel will produce 80-90 watts at noon in mid-summer. The rest of the time it will be less. Without lots of work you have to use an approximation. I generally use 40% averaged over 8 hours of sunshine.

We need 150 AH each day. So in the 8 hours of sunshine we need 150 AH/8 H = 18.7 A. A 100 W panel produces 100 W/12 V = 8.3 A times 40% = 3.3A. 18.7A/3.3A = 6 x 100W panels.

I've only scratched the surface of this topic (people write whole books about it). But, now you have a handle on how to do your own calculations! You can find dozens of YouTube videos and articles on the internet. Most of it is about moderately simple arithmetic.

YRC News

Paul Roberts KJ7YTW has resigned his duties with Yellowstone Radio Club. The Board met and made the following appointments to fill the unexpired term of vice president and the appointment of a new net coordinator.

Vice President: Stephanie Kraai KR7STF offered to serve as YRC vice-president completing the term of office and would accept appointment by the Board. The Board voted unanimously to accept her offer, she is now the YRC vice president.

Net Coordinator: The Board voted to ask Gil Leonard NG7IL to serve as net coordinator. He has accepted and is now the net coordinator.

With the appointment of Stephanie to the office of vice president, her “other director” board seat is now available. The unexpired term for these Board seats must be filled by a vote of the membership at the next meeting. Gil Leonard has offered to run for this seat, other nominations may be made at the meeting.

(Editorial Comment: The YRC Bylaws are “interesting”).