

The SPARC NEWSLETTER

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A publication of the Southern PA Amateur Radio Club

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Solar Power

by

N3FMO

Coming in 2026

I am sure you all are aware that we have raised the membership dues to \$30 per year. The board deemed this to be a necessity because of our ever rising expenses. There has been a lot of grumbling about the electrical costs of heating the buildings. There also is all the equipment that is constantly running, consuming electric power.

First thing to consider is that our utilities are billed as a corporate account. I know, "...but we are a non-profit". Yes, but that doesn't matter to the power company. Even churches have to pay corporate rates. In addition to higher rates, a corporate account includes an additional peak demand charge. Since our power consumption is 24/7/365, we get socked by that also.

So what are we going to do? At the November board meeting we voted to proceed with installing a solar system at the site. We were able to buy 9 each 200 watt solar panels, a combiner box and a charge controller. The price was well below list price, so we already have

this project started. Let's look to finishing it. Here's why.

A little investigating revealed that we were using 800 watts just to power the equipment in the repeater building. We talked about just charging a 12 volt battery to power the repeaters but further investigation proved that most of that 800 watts was being used by the microwave system and computers which require AC. Also, using 48 volt batteries is much more efficient, and we want that.

So, here is what I am recommending:

| | | | | | |
|------|----------|------------------------------|--------------------------|------------|-------------------|
| 1 ea | Midnite | MNROSIE7048RE | 7000 Watt inverter | \$3,049.00 | \$3,049.00 |
| 1 ea | Midnite | MNE300ROSIE-240F | Junction box | \$700.00 | \$700.00 |
| 1 ea | Midnite | MNSPD-300-AC | Surge protector | \$75.00 | \$75.00 |
| 2 ea | Midnite | MNSPD-300-DC | Surge protector | \$80.00 | \$160.00 |
| 2 ea | Sun Gold | SG48100P | 48 volt battery assembly | \$1,050.00 | <u>\$2,010.00</u> |
| | | | 7000 Watt system total | | \$5,994.00 |

We could opt for a 4500 watt inverter and save about \$1000 but the 7000 watt unit should be able to handle any future needs. In addition we will need mounts for the panels, (didn't price that yet because I am not sure how we are going to do it) and some wire and cables.

This project would almost empty our checking account, but the power company is already doing that anyway. It's a slow, but consistent bleed.

I would like to obtain the above items now and start on the inside work during the cold weather and complete everything in the spring.

Please look at the component costs. Would you be interested in sponsoring one of the parts? Even if it is only a surge protector or a cash donation, every little bit helps. Remember that your donation is tax deductible.

So how about it? Did you know that there are two of those 300 MW AI "data centers" being proposed for Lancaster county? The word on 75 meter phone is that wherever they go in, the utilities around them skyrocket, as they eat power 24/7/365. Also TMI is going off line soon. No more cheap nuclear power. Consequentially, power costs are going to get crunched around here. Let's get ahead of the upcoming price hike! I mean, we also get free installation and engineering! Why not?

Esoteric Trivia

by

W3IHM

OK, last month, I posed this question:

“So, what is “Ohm” short for?”

I was going to quip a short answer, but that would not do justice to you, dear reader. You deserve a fuller explanation. Well, the answer got really quite long. It grew to a full length article. The reason I did this long explanation is not just to pull some esoteric ego-boosting hogwash out of nowhere, but to try and give us all a feeling of how really recent in the history of humanity the things we banter about so easily really are. One thing is the “ohm” of resistance.

Let’s say you get on your favorite jungle website and order a dummy load. It’s a 50 ohm dummy load we want mailed to us from China, right? Well, how do we know it will match our rig? How do we know what resistance actually may end up in our mailbox? What if there is a different “Chinese ohm” definition that just so happens to be cheaper to manufacture? Maybe another one is the “Tiwan ohm”. And of course there is the Russian ohm, having nothing to do with the imperialistic west’s ohm.

Well, enter the history of the ohm. Consider this. That “50 ohm” would have been considered pure gibberish if spoken to anyone on planet earth in 1850. But today, we can order a 50 ohm dummy load from anywhere in the world, and it will be the same resistance, on whatever meter we happen to have. Think about it. There are paltry few things globally agreed upon, but the ohm is one thing we all can agree on, everywhere. Why? How?

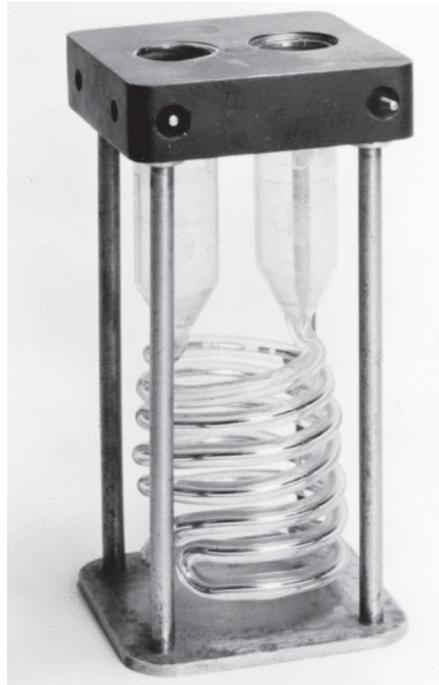
How did that miraculous grand convergence of humanity ever happen? This is a new thing in terms of history. Humans never unanimously agree on ANYTHING! Besides, it wasn’t until around 1845 that we could say what resistance was. How on earth did a technological definition, such as “ohm” ever get accepted so rapidly and universally?

Let’s go back. Before even the concept of “ohm” was well defined, resistance was inferred many ways. One was by saying you used lengths of copper wire, inferring a resistance, with so many voltage cells attached to it, thus some current and voltage, based on the number and type of cells and wire composition and diameter. This would pull in a telegraphic sounder with so much force.

So magnetic forces (current), cell numbers (voltage), and thus resistances are often described in academic papers as so many volta-cells with so many feet of copper or iron wire attached to such-and-such solenoid of so-many turns of whatever wire, pulls an iron bar with so much force.

Depending on who, what, and where, the descriptions varied all over the place. Laboratories were more prone to use some standard measures, so they could compare measurements. Standards, such as glass tubes filled with mercury, with certain dimensions, were sometimes used to compare from lab to lab.

Siemens (yes, THAT guy) suggested that one square millimeter by one meter in length would be a resistance standard, equal to so much miles of wire.



Wheatstone (yes, the bridge guy) suggested so many feet of a coil of copper wire as standard. Later he proposed a foot of copper wire weighing 100 grains as a “standard.” His friend, Jacobi, sent these foot long copper wire things around to try and get them adopted as some sort of resistance standard, but to no avail.

Arbitrary standards were also used based on magnetic force velocity, developed by Weber and others, using already defined units of force and velocities. Still, the apparatus and method of measuring the forces varied.

As an aside, notice the names here. Maxwell, Weber, Faraday, Jacobi, Wheatstone, Siemens, (Thomson) a.k.a. Lord Kelvin, etc. These were the academic pioneers of electric science and electrical engineering, familiar to any electrical engineer.

On the other hand, out in the fields, there were the telegraph engineers. Joe nobody. Telegraphers used things such as certain numbers of lengths of different kinds of wire, with so many voltage cells attached, for a certain manufacturer’s sounder or relay, which was different, depending on country.

Here is an old telegraph “station” I have in my junk pile. It is a relay, a transformer, a sounder and a key. This is a “new” relay station because it has something on the sounder that is stamped into the wood. Can you see it?



It says “4 OHMS”. I measured it, with my fancy four-wire super duper HP ohm meter, and I got 5.4002 ohms. Not four? Why? Maybe this is due to it having a corroded old 100+ year connection, or maybe, just maybe, it’s just old, and it’s “OHMS” weren’t quite defined yet.

Early on, when the ohm wasn’t defined, “4 OHMS” really meant so many of miles of “standard” telegraph wire.

But whose standard? For example, the Brits used miles of copper wire, with kilometers of iron wire in France, and miles of iron wire in Germany, and copper in the US. All these “standards” were often done with no regard for diameter (gage) or conductor purity. So numbers varied all over the place.

So the scientists and academics were hashing out a laboratory standard, while the telegraph industry engineers were trying to make something up that was useful, worked, and needed now. Add more batteries? Sure, but then the wire melted and you got fired. Dang!

If you were a wire manufacturer, you could also ship anything as far as resistance went, and your customer would be none the wiser. In fact, the first transatlantic cable order contract had no specification of copper purity, so was a failure before it was even built. The resistance of the wire was too high to ever work. New wire had to be made, for a second attempt to even be possible. I don’t believe it was malicious. People just did not know.

Finally, around the early 1860’s, the British government put telegraphers and electrical engineers into rooms with the academics and scientists. Britain had her empire, and telegraph was needed to connect the international empire together. Her majesty needed this

sorted out so long telegraph lines could be designed and set up reliably to connect the empire.

Thus, things started to get more defined. At first, the British pow-wows suggested a unit called “Ohma” that would have something to do with electrical potential, called a Volt, and magnetic force, producing some particular velocity in meters per second. Something a telegraph sounder would respond to. Still, though, questions like:

“If I ran 120 miles of this copper wire, would this sounder work?”

or:

“How far apart do I need to space my repeater relays?”

would have to wait to be answered. Many times, wires were run, and cells were attached until the thing worked, or didn’t.

Remember that nobody even thought “resistance” yet. Most everyone agreed that there seemed to be these properties in conductors that did something to telegraph signals and the electromagnets they actuated. There also seemed to be some interaction between number of cells attached, turns of wire on the magnetic solenoids, types of wire used to connect them, number of cells used, and even the speed at which the operator sent. Still, no good definitions existed.

Since the drive for some sort of measurements were being pushed by practical telegraphy, these units probably should be defined in known physical units derived from electrostatic and magnetic forces.

So, as a first attempt, a permanent magnet would be spun within a coil of wire, with a potential applied, and the torsional forces measured. From all this, with so many cells, and so much torsional forces, something called the “Ohma” was argued about to express the characteristics of losses in conductors.

All well, but how about insulators? Don’t these have some resistances, too?

Meanwhile, out on the telegraph poles, a telegraph lineman got no use for precision balances and force vector theories. They just wanted to get the things working, and thus keep their jobs.

This went on for about 10 years. By the mid-1860’s, the new modified unit that described a conductor’s ability to create a magnetic field in a distant telegraph sounder was to be called the “Ohmad”. We finally have a measurement of wire and insulator “resistance”.

This was in the right direction, but these tentative resistive definitions were too small for the telegrapher to be of any use, so the academics agreed to multiply them arbitrarily by 107 in hopes that telegraphers would use them. So the Ohmad was based on a mile of “the usual” telegrapher’s wire, whatever that was, and related to the torsional forces by the magic 107 number. But this was arbitrary.

Incidentally, measuring a hunk of US style mile long “reference wire” would amount to

about 10 ohms of resistance, nowadays, so they are getting close to what we use now.



By 1867, the rotational magnetic torsional forces were defined such that the unit of resistance known as the Ohmad was finally defined, and the name was thus shortened to the Ohm. It is what is used today.

So the answer to the question originally posed is “Ohmad”. That was shortened to “Ohm”.

But that’s not where it ended. Since telegraph lines covered the globe by then, the Ohm went along with them. Every country switched to the Ohm for resistive measurements, along with the Ampere and Volt, soon to follow. Everyone that had telegraph lines in their country also started using the Ohm, thus international cooperation was automatic. Universally, every country’s engineers and scientists used the same Ohm, Amp and Volt. Telegraph engineers from different countries could hook their wires together, and have some way of describing the interconnect.

Then came electrical power, that used the same V/A/Ohm units. Power could be connected across international boundaries. This later spread into all electrical endeavors, and still is persistent today.

For more, check here.

https://ethw.org/Milestones:Standardisation_of_the_Ohm,_1861-1867

Also, watch the “Cable and Wireless” talk by Bill Burns on the Antique Wireless Association YouTube channel. It’s excellent, even though the audio is lousy.

Although all this is great, I have a bit of bad news. I have noticed recently that some Chinese wire merchants, in order to scrimp on copper, have now started to undercut wire diameter AWG (American Wire Gage - not a global standard), so Chinese wire can sometimes have a thinner gauge and/or more impurities, yielding in higher length ohmic resistance. So ask for it’s resistance in ohms.

If you wonder about the wire you order, try to get the unit length resistance and chemical

purity in Ohms, out of the manufacturer. Also, pull out your calipers and actually measure the wire.

If you are going to buy a heap of wire, get out a long piece and measure it. And thank that the Ohm on your meter is standard with whoever's meter. No one who is taken seriously will argue about the Ohm. Good manufacturers publish resistance and composition anyway. Thieves will be quite obscure, or may just lie. Caveat Emptor.

Website Updates

by
Matt, N3NTJ

Have you checked out the website lately? Supposing you wanted to see a past newsletter. Well, you are now in luck. I created a "SPARC Newsletters" page on the website and have most of the 2025 newsletters already posted. It is under the "About SPARC" tab on the website. Now, you can go back and peruse past newsletters at your leisure. That brings up another thing....

SPARC Market Place

by
Matt, N3NTJ

Do you know that you can sell things directly to the club members? Sure, but it has to be ham radio related. For instance, the new Marketplace page I created on the SPARC website already has some items. It's for members who have stuff for sale or are looking for items. We already have three items listed. There's a tab at the top of k3ir.org for members to easily find the page.

The club currently has these three items for sale to help pay for the solar system, and ultimately reduce our power bill. So you can buy something, and feel good about contributing to the club's well-being, too. Check the website, for more recent items listed/sold.

1. **Tokyo HC-2000 HF Antenna Tuner.** With the price of eggs nowadays, the eggs are not included. Sorry. Tuner only. \$400. For sale by SPARC. Contact Harry at hbauderrm@gmail.com



2. **Icom AH-4 Remote Tuner.** HF+6m. New – still in box. \$425. For sale by SPARC. Contact Harry at: hbauder@gmail.com



3. **Yaesu FT 2900** 2 meter transceiver. 5, 10, 30, 75 watts. \$175. For sale by SPARC. Contact Harry at: hbauder@gmail.com



If you're a member of SPARC and have an item for sale or an item that you are looking for, contact us to place your ad here.

Meeting Night

Like most clubs, there sets in a sort of monthly pattern of meetings, etc. Like, for SPARC, the usual average monthly general membership meeting is held the fourth Tuesday of the month, at 7:00 PM, at Lancaster County Public Safety Training Center (LCPSTC). Sometimes these things change, especially in the winter. Why are you looking at this newsletter for such information? Go to K3IR.org and check the calendar tab.

License Test Sessions

Want to upgrade your license? How about get a license? You will need one to be a ham operator. There IS a test. You are required to know something. It's not just a \$\$\$ thing. Demonstrating that you indeed know something is another matter altogether. So you will

need to study some materials. There is plenty of on-line information to help you get your license. Ask us. We are here to serve. Go to k3ir.org and ask for help.

Usually, testing is conducted at the SPARC site on the first Tuesday of every month. The fee to take the exam is usually \$14.00 payable on the K3IR website or in person, cash or check only. Go to K3IR.org and check the calendar tab to make sure.

If you do not already have one, go to fcc.gov and register for a FRN (Federal Registration Number). You will need this to interact with the FCC.

You can also pre-register to take the technician test, or upgrade, at Hamstudy.org. There is also a link on the K3IR web site to follow. Check the k3ir.org website for the latest in fashionable ham test news.

Upcoming Hamfests

The season is in winter hibernation. That means it's time for winter field day! W3RRR is at Welsh Mountain, W3AD will be up at Cornwall, and K3IR will be at the club site. Go show your face somewhere, but check to make sure first. It promises to be a brutally cold-cold single digit weekend! Make sure to check the web for more information.

Start: 11:00 AM EST 24 JAN



End: 05:00PM EST 24 JAN

Volunteer – The club needs you.

SPARC currently has 131 “active” members on the roster. We have a lot to offer to our members. At this time we have a dedicated group of hardworking volunteers who keep the site running. Some say this is typical with most organizations. I don't think SPARC should be “typical” We need more real active members. Jobs range from the highly technical to the mundane but ALL are important. Please look at the list below and see if there is a place for you.

IT Team

Tower climbers and ground help

Operating building maintenance and cleaning

Operating building equipment maintenance and improvement

Porta Potty cleaning (not Pumping!)

Adopt a Highway crew

Elmers and Elm'ettes

Hamfest help, planning, etc.

Meeting programs and talks

Antennas! ...always more, bigger, higher.

Someone to take the trash home and pitch it when it's full.

Someone else to either eat or toss the old stuff in the fridge.

Someone to put the 6 meter beam up on a rotor.

Solar power wizard experts.

Fiscally rigorous scrupulous bean counters.