B-PLUS

Albany **A**mateur **R**adio **A**ssociation – AARA

September, 2023

John Fritze K2QY
PRESIDENT
k2qy@arrl.org

Gerald Murray WA2IWW
VICE PRESIDENT
518 482-8700
wa2iww@arrl.net

Saul Abrams K2XA
TREASURER
518 439-5700
k2xa@arrl.net

Bruce Goldstein WA3AFS
SECRETARY/WEBMASTER
518 765-2893
wa3afs@arrl.net

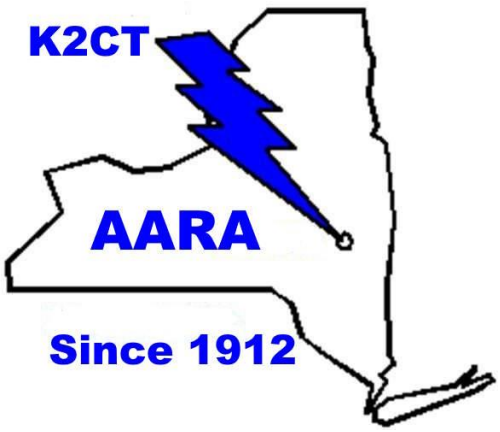
Don Herring KB2SCO
DIRECTOR
518 281-9986
dgherring@hotmail.com

Fred Lass K2TR
DIRECTOR
k2tr@arrl.net

Nathaniel Greenman KB2HPX
DIRECTOR
518 439-5008
ngreenman@verizon.net

Ernie Popp K2EP
TRUSTEE of K2CT
PAST PRESIDENT
k2ep@arrl.net

B-PLUS Editor



AARA September Meeting
September 6th, 2023 @ 7:30 PM
Slingerlands Fire Dept.

Topic: Restoration of Vintage Tube Type Audio Devices

PLEASE Pay Your Dues
Dues are $20
Checks can be sent to:

Saul Abrams, K2XA
307 Maple Rd.
Slingerlands, NY 12159

Words from *El Presidente:*

As we approach the end of August it is time to start thinking about meetings again. The last couple of months have certainly flown by! Our first meeting will be 7:30PM on September 6th, at Slingerlands Fire Department, 1520 New Scotland Rd, Slingerlands NY. Remember to park near the back of the lot as it is an active fire department.

On August 1st, several members of the AARA and the ACES clubs participated in Bethlehem's Annual Night Out at Elm Avenue Park. This was the 1st time we were invited to participate. The event showcases Bethlehem's Emergency Groups such as the fire departments, police and ambulance corps. Our booth was visited by many of the professional public service folks, town political persons and of course the public. The highlight of the event was the state police emergency medical helicopter landing right near our booth.

We have been told it is OK if we wish to provide refreshments as we have done several years ago B.C. (Before Covid). Mike Bergman WD2AJS has done a bang up job for many years but scheduling has made it difficult for him to attend our meetings. So give it some thought and I would like to see someone volunteer to take on this duty. It could be a simple as stopping by a Dunkin Donuts, grabbing a couple boxes of coffee and donuts. I am sure as a club, donations could cover the cost.

The next thing I would like to toss out there: would anyone be interested in a Mt Greylock activation? This would be a simple bring some portable gear (either HF or VHF/UHF), battery pack and lets have a bit of fun. Mt Greylock is a very beautiful location and counts as a "three-fer" (POTA, SOTA and Appalachian Trail POTA). This is an active park, so you will get the public asking what we are doing, thus giving the opportunity to talk about ham radio to the public. I am currently looking at Sept 9th or Oct 14th, 21st, or 28th (all Saturdays). Plans are for those that wish to stay can enjoy sunset beverage hour and have dinner in the Bascon Lodge. Details about dinner at the lodge can be found here: https://www.bascomlodge.net/ and look for dining. Let me know ASAP as the lodge books up early because of the AT hikers.

At a ZOOM conference with our Hudson Division Director, Nomar expressed the idea of a Hudson Division convention for 2024. He would like to hold it in the ENY Section. I mentioned that location wise it would be best in the Southern District and probably west of the Hudson River as it more centrally located to NLI and NNJ as well as ENY. West of the Hudson as it may be possibly done at a lesser cost than say Westchester county. If anyone has any ideas or thoughts on this I would appreciate your input.

Next, those that have participated in past years, helping to provide communications for the Delmar Duathalon, this year's event will be held on Sunday October 1st. This is a fairly large and complex event between providing parking assistance, start and finish announcements, shadows to officials, safety on the wooded running portion both at the

beginning and end of the race, and sweep vehicle and Steiner Sports communications for the biking portion. Last year we had some issues with low power handhelds trying to access the 146.64 repeater. I am looking into possibly using simplex for the entire operation. Details will be forwarded as they are worked out. If you are interested in helping, please let me know.

Lastly, I would like to thank Bruce, WA3AFS and Don, KB2SCO for jumping in and tackling the B+ Plus. They have been doing a great job. BUT, I am sure they would appreciate some help in either short articles or ideas for content. Even a short review of your latest new piece of equipment would be welcomed.

Vry 73 de

John

K2QY

K2qy@arrl.org

Fred's Sandbox; How I use my NanoVNA

I know that many club members already have a NanoVNA and use it to measure antenna SWR. The accuracy and detail from a NanoVNA is far better than an SWR analyzer. The downside of using a NanoVNA for measuring SWR in the field is added complexity of the user interface, and fragile SMA connectors. I have used my NanoVNA for other purposes and I thought I'd share these stories with you.

First I'll cover a few simple basics about a VNA. It uses a frequency synthesizer to generate signals that cover a spectrum range specified by the user. Next the instrument is precisely calibrated by using known terminations of open, short, and 50 ohm load. If the calibration is done at the end of test cables and adapters, any mismatch and loss of these items are eliminated. The measurement of SWR is usually a graph displayed as return loss, which is converted to SWR using a conversion table. This is where experience in TV broadcasting is helpful. I know that to eliminate ghosts in an analog TV transmitter, the reflections must be less than 34 db. This value of return loss is an SWR of 1.04:1. That's good enough for any ham. The antenna impedance can also be graphed on a Smith chart, which can be helpful if you want to design a matching network.

Prior to the availability of a VNA, a TV transmitting antenna was checked using a sweep generator and a diode detector. If the sweep on a oscilloscope showed a small variation over the TV channel width, the SWR was good. If the sweep had many undulations, the antenna needed tuning. You really didn't know the SWR or the impedance of the antenna, all you knew is that the antenna was matched to the transmission line that you were using. The use of a VNA allows an engineer to tune individual pieces of the coaxial system, such as transformers, for optimum performance. At WRGB, I bought a “lower” cost portable spectrum analyzer/VNA made by Rohde and Schwartz for about $14,000. It saved the day during the TV channel repack in 2021 as there were three UHF stations on temporary antennas that needed to be measured prior to operating the transmitter into them.

To me the real advantage of a VNA is the ability to measure the performance of a filter network. This was useful when tweaking the Triplexor that I built for winter field day last year. My first layout had magnetic coupling between the coils which caused crosstalk and insufficient isolation between 15 meters and the other bands. Next, I tried 3-D mounting the coils all 90 degrees to each other, but the PVC pipe fittings I used caused excess losses. The solution was to space the 10- and 15-meter coils apart and make them orthogonal plus use a toroidal coil to eliminate stray magnetic coupling on 20 meters.

Prior to summer field day I measured the performance of the Triplexor when using bandpass filters made by W2PV. I discovered that the 20 meter filter worked well, but the 15 meter filter did not have sufficient isolation. Looking inside, the 20 meter filter was a Pi design with parallel

tuned circuits on the input and output and a series tuned circuit between them. The 15 meter filter was a Tee design, with series tuned circuits on the input and output and a single parallel-tuned tank in the middle. The 20 meter filter worked better because the Triplexor already had a series tuned circuit inside, so the result netted two extra filter poles on 20 meters. We ended up working around the problem by using the Dunestar filters that the Troy club owned.

Another VNA project was repair of N2DU's TA-33 Jr antenna. Dave brought it to Field day in June but it only worked on 10 meters, and 10 wasn't really open. I brought the traps for the antenna home, ordered an aluminum piece to replace the broken element tip, and disassembled the trap to find the problem. Note that the coil forms were cracked and the aluminum coils were pulled apart.

This picture is what a new trap looks like. (Stolen from a YouTube video.)

Next, I wanted to replace the soft aluminum wire. My dial calipers measured it as #18, and for strength purposes, I wanted a better aluminum. I happened to have some #17 aluminum fence wire, which was the perfect hardness, but slightly thicker. This is what the two traps looked like after rewinding them and compared to the undamaged traps.

After rebuilding the traps I used my NanoVNA to verify that they were on the right frequency. To do so, I connected two short clip leads to a pair of connectors mounted on a circuit board and used the VNA to measure the parallel tuned resonance frequency. Unfortunately, the traps were mistuned, as a combination of the thicker wire and repaired epoxy caused shorted turns. I would not have been able to determine this without using a NanoVNA.

So here I am, a TV guy who wants to measure TV receiving equipment, which is all 75 ohms, and now I have a 50 ohm VNA. The trick is to transform from 50 to 75 ohms and calibrate the VNA using a 75 ohm open, short, and termination. For 75 ohm filter measurements, you also transform the second port from 50 to 75 ohms. I was expecting to build my own minimum loss L type attenuators, but discovered the exact pads I wanted on E-bay. This is a picture of my NanoVNA custom calibration kit

for 75 ohms.

If you have any questions, comments, or suggestions for future columns, please email me at felasstic@yahoo.com

---

Saratoga County Amateur Radio Association

Hamfest 2023

S.A.R.A. will host its annual hamfest on Sept. 9th at the Saratoga County Fairgrounds, 162 Prospect St, Ballston Spa, NY 12020.

Gates open at 7:00 a.m.

GRAND PRIZE: Yaesu FT-710 AESS

Important Links:

Find a license class in your area: www.arrl.org/class

Find a license exam in your area: www.arrl.org/exam

The Eastern Iowa DX Bulletin:

http://www.eidxa.org/EIDXBulletin.html