



PCARA Update



Volume 25, Issue 7 Peekskill/Cortlandt Amateur Radio Association Inc. July 2024

Field of teams

Another highly enjoyable **PCARA Breakfast** was held on Saturday June 8, 2024 at 9:00 a.m. at Uncle Giuseppe's Marketplace in Yorktown Heights, NY. Turnout was amazing and the energy level was palpable! Thanks to all who attended and continue to make our breakfasts so successful. If you haven't had a chance to join us, give it a try.



Members moved outside for PCARA's June 8 breakfast, held at Uncle Giuseppe's in Yorktown.

A **Pre-Field Day Planning Session** was held on Wednesday June 12, 2024 at 7:00 p.m. at the George Washington Elementary School on Lexington Avenue in Mohegan Lake, NY. There were 12 members in atten-



Field Day planning took place on June 12 outside the entrance to George Washington Elementary School.



PCARA's Field Day took place under the covered entrance to George Washington Elementary School in Mohegan Lake.

dance. Due to the weather forecast for the coming weekend, it was decided to set up and operate from under the pavilion at the front entrance of the school as we had done a year earlier. Antennas, operating positions, radios, computers, and emergency generator were the same as those used for ARRL Field Day 2023.

ARRL Field Day 2024 was the weekend of June 22-23, 2024 and went smoothly and was thankfully uneventful. A detailed complete and comprehensive report on ARRL Field Day 2024 can be found in this month's edition of the *PCARA Update*. Thanks to ALL who participated! We couldn't do it without everyone's help! **PCARA ABLE, PCARA STRONG!**



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Please mark your calendars with these upcoming events:

- Sunday July 14, 2024 at 8:00 am: Sussex County Amateur Radio Club Hamfest, Augusta, NJ.
- Saturday July 20, 2024 at 9:00 am: PCARA Breakfast at Uncle Giuseppe's Marketplace, Yorktown Heights, NY.
- Saturday July 27, 2024 at 8:00 am: New Jersey Antique Radio Club Hamfest, Wall, NJ.
- Saturday August 17, 2024 at 9:00 am: PCARA Breakfast at Uncle Giuseppe's Marketplace, Yorktown Heights, NY.

I would like to wish each of you a happy and healthy summer. Keep an eye on our website, PCARA Google Groups, and Facebook for any announcements. Enjoy your summer!

- 73 de Greg, KB2CQE

PCARA Board

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Vice President Emeritus: Joe Calabrese, WA2MCR.

Net night

Peekskill/Cortlandt Amateur Radio Association holds a roundtable net on Tuesday evenings at 8:00 p.m. and a directed 'Old Goats' net on Thursday evenings at 8:00 p.m. Both events take place on the 146.67 MHz W2NYW repeater, offset -0.600, PL 156.7 Hz.

Join the roundtable to find out what members have been doing or join the Old Goats with net control Karl N2KZ for news and neighborly information.

VE Test Sessions

ARRL VEC disruption

PCARA's last VE Test Session took place on Saturday May 18 at Putnam Valley Library. As reported in the June newsletter, PCARA member Jeffrey KB1HVC of Wilton CT upgraded from General to Extra Class.

Although Jeffrey's paperwork was sent promptly to ARRL VEC, his upgrade was not acted on by the FCC

until **June 4, 2024**. The reason for the 2½ week delay was ARRL's "Systems Service Disruption", first reported on May 16, when ARRL stated:

"We are in the process of responding to a serious incident involving access to our network and headquarters-based systems. Several services, such as Logbook of The World® and the ARRL Learning Center, are affected."

It turned out that submission of exam results from ARRL-VEC to the FCC was also disrupted by the incident. On May 29, ARRL reported:

"Several services have been affected, including those administered by the ARRL Volunteer Examiner Coordinator (ARRL VEC)"...

"We have resumed the processing of Amateur Radio License applications with the FCC. This includes applications for new and upgrade licenses, individual applications, and club license applications. Exam sessions will be submitted to the FCC in chronological order, from earliest test dates to the latest. Please allow additional time for our processing as the exam session backlog is cleared."

Lou KD2ITZ and Mike W2IG had scheduled another VE Test Session for Sunday June 23 during PCARA's Field Day operations at George Washington Elementary School in Mohegan Lake. Although the session registration was submitted to ARRL-VEC in mid-May, it never appeared in the listings on ARRL's web site. The explanation from ARRL on May 29 was as follows:

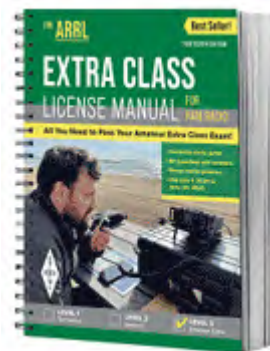
"ARRL Volunteer Examiners (VEs) should continue to submit exam registrations and material requests. While we are unable to post new or revised exam session dates and details to the website, we can ship out exam materials."

With the lack of publicity for PCARA's Field Day test, there were **no** candidates pre-registered with Mike W2IG for the June 23 VE Test Session.

Summer sessions

Although PCARA is now on summer break until monthly meetings resume in September, there will be at least one VE Test Session during the months of July-August. Please keep an eye on Google Groups messages and/or the ARRL Web Site for details of PCARA's next VE Test Session.

Bear in mind that the old Extra Class Question Pool expired on June 30 2024 so subsequent tests will be based on the **new** question pool. ARRL has recently published a new "Extra Class License Manual, 13th Edition" for examinations taken from July 1, 2024



Field Day 2024

Field Day preparations began in April 2024 when Joe WA2MCR applied to Lakeland Central School District and received permission to operate from outside



George Washington Elementary School in Mohegan Lake. Todd N2MUZ obtained publicity for the event by arranging a notice on the Ossining/Croton-on-Hudson Patch web site while Karl N2KZ placed announcements on the PCARA Facebook page.

PCARA's monthly meeting on Wednesday June 19 was under the covered entrance at George Washington Elementary School. In view of the forecast for Field Day weekend ("thunderstorms developing later in the day") a decision was made to operate for a second time under the school entrance, using simple wire antennas slung from existing supports.

One concern was the presence of a new solar power installation on the northern side of the school building. Signals from the power inverter were breaking squelch on 2 meter hand-talkies. Our new member Robert AD9S carried out a test from his FT-891 HF mobile located close to the equipment and reported no undue interference.



Solar power installation, GW Elementary.

Saturday start

Saturday June 22 dawned with a misty morning and a temperature of 73°F. The National Weather Service had a "Heat Advisory" for both Saturday and Sunday with a forecast high of 94°F (!) and a chance of showers and thunderstorms.

Loading of the U-Haul rental van at Joe WA2MCR's began at 8:00 a.m. with assistance from Mike N2EAB, David KD2EVI and Mike W2IG. Thirty minutes later the van was being unloaded at George Washington Elementary School.

Antennas aligned

Once the tables and chairs were unpacked, the first requirement was installation of antennas. Joe and Mike N2EAB successfully launched a nylon line over a



Saturday morning unloading at George Washington Elementary School.

tree adjacent to the school building. After several attempts with lamp-posts and more trees, another line was launched over a tree near the northern boundary fence. The central support point would be the school's flag pole, located in the parking lot near the entrance.

The G5RV antenna was hoisted in the air between flag-pole and building tree, with the multiband fan dipole for 40 - to - 10 meters supported between flag pole and north boundary tree. As the dipole was pulled tight, disaster struck with the 40 meter wire coming adrift from its end insulator and the antenna collapsing into the parking lot. Old, dried-out vinyl tape was to blame. The end of the wire was rapidly repaired and the antenna raised again.



Joe WA2MCR hoists two wire antennas into the air using the school's flagpole.

Compared with 2023, the HF wire antennas were higher on both tree and flagpole, their spacing was further away from the flagpole and the two antennas were

now arranged in-line with each other for minimum interaction. Coaxial feeder for the fan dipole was fastened to a shelter pillar with Velcro and a vise grip (Mole Grip in UK English) but the cable was still draped rather low across the vehicle exit. Warning signs were arranged using a whiteboard recovered from the trash, a traffic cone and step-ladder.



Whiteboard, safety cone, step-ladder and hazard tape mark the presence of low-hanging feeder for the dipole.

The six meter antenna for our Class 2A ‘free’ VHF station should have been Joe’s three-element Yagi, supported on Mike W2IG’s metal mast. Unfortunately, the wrong Yagi had been packed in the van so Mike N2EAB’s rectangular wire loop was once again hoisted into a tree, a little higher than last year.



Herb KF5YNX and Lou KD2ITZ prepare the 6 meter wire loop antenna.

Equipment online

Tables were set up in a similar pattern to 2023, with 40 meters, 6 meters and computer network on the left side of the front door and another table for 20/80 meters on the right side. Cables were run around the back of the tables to avoid problems with visitors tripping over wires.

Joe WA2MCR, David KD2EVI and NM9J had already checked out transceivers and computers during the previous week. N3FJP’s Field Day Log and Fldigi software had both required an update, while WSJT-X



Panoramic view of all three stations arranged in front of the school entrance. [Photo credit: Rob AD2CT.]

was still on the same version. The radios in use were Joe’s Icom IC-7410 with the Yaesu FT-450D for the HF bands and Yaesu FT-897D for 6 meters. Both Yaesu transceivers had been donated to PCARA after Henry KB2VJP became a silent key in April 2023.

Each transceiver had its own notebook computer for digital modes and logging. In view of previous problems with Wi-Fi on David’s Acer Aspire, all computers were connected to the network by shielded Cat 5 Ethernet cable. A fourth notebook acted as central server for the N3FJP logging software.

Once again, bandpass filters by Array Solutions and Dunestar prevented wideband noise and interference from one transmitter affecting other receivers nearby.



Scott KE2CNS and Joe WA2MCR at the table with (L to R) central logging notebook, network router, Lenovo logging computer, battery-operated fan, bandpass filter and Icom IC-7410 transceiver.

Power to go

During set-up, Mike W2IG provided temporary AC power from his Ecoflow portable power supply. Once the event started, power would be supplied by David KD2EVI’s Homelite portable generator. This was installed out of sight (and hearing) of the three stations, around the northwest corner of the school building. In view of the weather forecast for a hot, humid weekend, protection from the sun was provided by a wooden

blackboard, also recovered from the school trash.



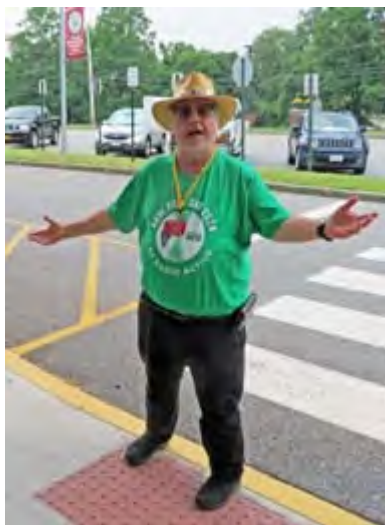
David KD2EVI fires up the Homelite AC generator.

Plans were in hand to claim bonus points for “Alternate Power”. Mike W2IG had a PowerFilm portable solar charger which was left out in the sunshine, charging an A123 12V lithium battery.



Mike W2IG's fold-out solar panel charges the 12V lithium battery (at right).

By 1:00 p.m. on Saturday, the generator was running, all three stations were ready to go and David made a food run for pizza. At this point we had a visit from ARRL Section Manager for Eastern New York John Fritze K2QY, accompanied by XYL Linda, K2QYL.



ENY Section Manager John Fritze K2QY in Field Day gear.

They're off!

At 1:58 p.m. there was a rumble of thunder — then at 2:00 p.m. all three Field Day stations were off and running.

Joe WA2MCR began on 40 meter SSB, Lou was on 20 meter FT8 and Mike N2EAB was on 6 meter FT8.

Plan ahead

One concern from the previous year was possible interference to the school's alarm system. Shortly after transmissions began during Field Day 2023, two patrol cars arrived from Yorktown Police Department, followed by the school custodian. We assured the police that PCARA was permitted on the grounds by Lakeland Central School District and nobody had entered the building. Perhaps the alarm had been triggered by our RF emissions? For 2024 Joe WA2MCR warned about a possible recurrence, and fortunately there were no unexpected visits by police or custodian in 2024.

One surprise took place on Sunday morning when a fire truck from Lake Mohegan Fire Department



Surprise fire truck.

drove right in front of the school until stopped by Herb KF5YNX just before it reached the fan dipole. Had we set off another alarm? The answer was: **no** — the Fire Department sometimes uses the location as a vehicle turn-around point outside school hours.

There did not seem to be any additional noise from the solar power installation. And everyone was grateful for the portable toilet organized by David KD2EVI.



PCARA TARDIS

Taking things easy

In view of the high heat this year, your editor had reorganized plastic storage containers so that only essential equipment was transported to Field Day. I also arranged to take a break on Saturday evening to cool off at home and have a hot meal. On returning, I found that Joe WA2MCR had followed a similar approach — instead of staying at the site for 24 hours, Joe was given a lift home by Verle W2VJ for rest and recuperation. Joe would return around midnight.

Overnight — stats and bats

As the sun set and propagation changed, activity continued at all three stations. Ray W2CH was operating HF SSB where he noted that URE's “King of Spain” contest was also taking place on the HF bands. Ray was ‘running’ on 40 meter SSB, accumulating a long list of contacts at a **high** QSO rate.

Night time operations were conducted by Lou KD2ITZ on 80 meters, Verle W2VJ on 40 meters plus David KD2EVI and Mike W2IG on 6 meters. They reported an overnight flying visit from a great number of small bats zooming in and out in front of the school

and darting under the covered entrance. Joe guessed the bats were feasting on insects attracted by the school lighting. (Although bats can carry various diseases to which they are themselves immune, they also help to keep insect populations down. According to the USDA, “Many bats eat nearly their own body weight in moths, beetles and other insects every night,” — so we can look on them as a form of airborne pest control.)



Ray W2CH operating at night beneath a sign proclaiming “Proud to be a National PTA School of Excellence”. (This sign seemed to be attracting the bats.)

Despite rumbles of thunder on Saturday, the only rain at the Field Day site took place around 1:00 a.m. on Sunday morning.

Sunday clouds

When your editor returned to the site early on Sunday morning, temperature was a refreshing 72°F and the sky was cloudy. Despite approaching Solar Maximum, HF conditions did not seem as good as they should be. There was only light activity on 15 meters and even less on 10 meters.

Conditions on 6 meters were a little better, with the band opening to Florida and to the west mid-morning. Mike N2EAB attached a length of twine to the wire rectangle so his antenna could be turned to favor different directions.

Mike W2IG and Lou KD2ITZ took the opportunity to collect bonus points for “Alternate Power contacts”. The A123 12V lithium battery, now fully charged with



Lou KD2ITZ makes “Alternate Power” contacts with the FT-450D connected to a solar-charged lithium battery.

solar energy, was connected to the Yaesu FT-450D transceiver. Lou made seven contacts on 40 meter FT8 and 20 meter CW.

One scheduled event did **not** take place on Sunday. There had been *no* publicity on the ARRL web site for PCARA’s 10:00 a.m. VE. Test Session, so no candidates were forthcoming.

Later on Sunday, Mike N2HTT paid a visit to the site. He had brought along a diminutive Icom IC-705 HF/VHF/UHF transceiver along with its 3D-printed carry-case. This was for Herb KF5YNX’s benefit as Herb had expressed interest in a QRP transceiver for mountain-topping.



Herb KF5YNX watches Mike N2HTT demonstrating the Icom IC-705 QRP transceiver. (A possible GOTA station?)

Teardown time

By 1:30 p.m., activity on 6 meters had subsided so a decision was made to dismantle the VHF station early. The other two stations carried on making contacts right up to closedown time.

At 2:00 p.m. the sun was out, the temperature had reached 90°F and there were plenty of volunteers to take down antennas, dismantle stations, roll up cables and stow equipment in the rental van and other vehicles. The site was clear of equipment by 2:45 p.m.

Joe drove the rental van to his home, where it was unloaded by volunteers and ready for return to U-Haul by 3:05 p.m.

Results

A total of 19 radio amateurs took part in PCARA’s 2024 Field Day effort, along with two licensed amateurs from ARRL’s ENY Section and four visitors. The QSO count reported by N3FJP’s software was **108 CW**, **169 Digital** and **506 Phone**.

Bonus points were claimed for copying the W1AW bulletin (100 points), 100% Emergency power (200 points, 2A), Media Publicity, Public Place, Public Information Table, publicity through Social Media (tnx N2KZ), Safety Officer (tnx Lou) and a welcome return of Alternate Energy — all 100 points each.

Vincent KD2VAV made a number of contacts but we could only count him once for the Youth Participa-

tion bonus of 20 points. Results were submitted to ARRL using the web-based 'app' for an additional 50 points, making 970 bonus points in all.



Vincent KD2VAV operating FT8 at the 6 meter station.

Here is a summary of claimed points for PCARA in 2024 (bold column) along with a comparison of scores from previous years, and a breakdown by band and operator.

Peekskill/Cortlandt ARA, W2NYW, Class 2A

	2002	2003	2004	2005	2007	2008	2009	2011	2012
QSO pts:	718	733	968	853	1019	1109	694	879	968
Power:	2 (<150W)								
Partcpts:	15	11	12	10	14	10	10	14	15
Tot scor:	2,096	2,328	2,996	2,798	2,906	3,460	2,746	2,602	2,920

	2013 (1A)	2014	2016	2017	2018	2019	2021	2022
QSO pts:	775	722	816	813	731	829	1366	712
Power:	2 (<150W)							
Participats:	14	16	19	22	22	29	25	24
Tot scor:	2040	2460	3018	2734	2886	2764	3662	2234

	2023	2024
QSO points:	940	1060
Power:	100W	100W
Participants:	27	19
Total score:	2810	3090

Breakdown by band, in order of QSO number

40 meters – 481 QSOs; 20 meters – 132 QSOs
 80 meters – 82 QSOs; 6 meters – 48 QSOs
 15 meters – 40 QSOs

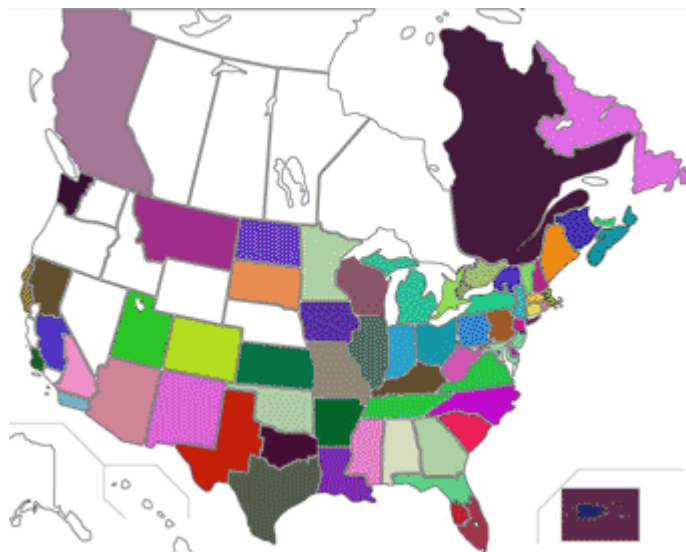
Breakdown by operator (top 9) in order of QSOs

Operator	QSOs	%	Operator	QSOs	%
W2CH	237	30	WA2MCR	117	15
KD2ITZ	100	13	W2IG	89	11
NM9J	69	9	KD2EVI	60	8
N2EAB	52	7	KD2VAV	26	3
W2VJ	16	2			

The breakdown by operator may not be completely accurate as some members forgot to update the setting in N3FJP's logging software after they changed operator.

Thanks to all

PCARA's claimed score in Field Day 2024 was a substantial improvement over the previous year. There were fewer participants, perhaps because of the hot weather, but familiarity with the new location, antennas raised a little higher, a second year with FT8 available on all three stations and the Alternate Power bonus all helped.



Map shows ARRL and RAC Sections worked by W2NYW during Field Day 2024. Coverage to the southwest was improved. [Graphic: N3FJP software 'ARRL Field Day Contest Log'.]

Thanks to everyone who contributed to this effort including: David KD2EVI, Herb KF5YNX, Ray W2CH, Marylyn KC2NKU, Dave KF2BD, Vincent KD2VAV, Lou KD2ITZ, Mike N2EAB, Joe WA2MCR, Greg KB2CQE, Verle W2VJ, Mike W2IG, John KF2PV, Scott KE2CNS, Brendan AC2ZI, Rob AD2CT, Mike N2HTT and Kevin N2KZE.

Final thoughts

PCARA's third Field Day at George Washington Elementary School shows the advantage of using the existing building with its large shelter. The grassy field at the back of the school has adequate space for large antennas — including the 40 meter wire beam designed by Jay NE2Q — but extra time is required to set-up under canvas and then cope with bright sunlight streaming into the operating positions.

The shelter at the front of the school provides adequate protection from sun and rain, a pleasant breeze blows between the columns, and we had a good supply of fans to keep equipment cool.

Digital modes played a part in PCARA's 2024 Field Day effort, but to a lesser extent than in 2023. Our secret weapon was Ray W2CH who made a large number of phone contacts, running on one frequency for hours on end.

Radios and computer equipment were all well-behaved, and we should say another thank you to Henry KB2VJP (SK) and daughter Jen for Henry's foresight in choosing two Yaesu transceivers, suitable for portable operation at Field Day.

Radio conditions were not great, especially on the higher HF bands. Let's keep fingers crossed for a terrific ten meter band in 2025.

- NM9J

Small device photo-voltaics

Two neighbors recently had solar cells installed on their roofs. Fortunately, there does not seem to be any accompanying increase in HF noise levels. Under my own roof, I have Casio and Texas Instruments pocket calculators employing solar cells as their primary power source. I also have a Casio “Tough Solar” wrist watch — which keeps on ticking thanks to a solar cell surrounding the display.



Roof-mounted solar cells.



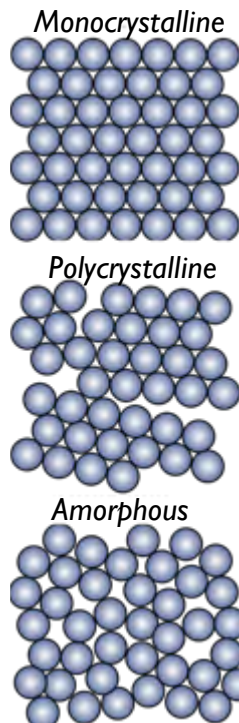
Two Casio calculators and “Tough Solar” wrist watch powered by solar cells.

connected to the 120 volt AC supply requires one or more **batteries**, which need to be replaced or recharged on a regular basis. Failure to do so can result in corrosion and damage to the electronics as reported in “Shack spring clean”, PCARA Update April 2024. Spent cells that are simply dumped in the trash represent a major waste of energy and raw materials.

Silicon sorts

The solar cell technology used in calculators since the 1980s is based on **amorphous silicon**, a low-cost material with conversion efficiency of 5% - 8%, only suitable for very low power devices.

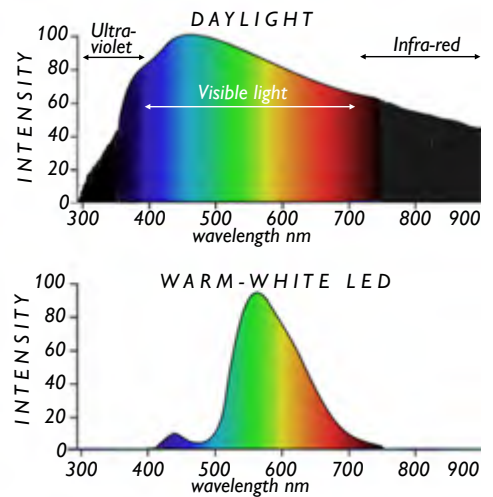
Polycrystalline and **monocrystalline silicon** — as used in rooftop solar cells — has a higher conversion efficiency, around 25%, taking advantage of the wide energy spectrum of sunlight, which ranges from ultra-violet, through visible light (400 – 700 nanometers) and out across the infra-red wavelengths.



Allotropic forms of elemental silicon [after Cdang, cc-by-sa-3.0, 2.5,2.0,1.0, GFDL, Wikipedia].

But calculators and watches were all I could think of when it comes to small devices powered by photovoltaic (PV) cells. Everything else that is not

Silicon solar cells are constructed like a semiconductor diode with a p-n junction consisting of a layer of n-type silicon grown over a layer of p-type silicon. When sunlight strikes a solar cell, electrons (e^-) are ejected from the silicon atoms, forming positive “holes”— gaps left behind by escaping electrons. When this happens within the local electric field of the p-n junction, electrons are dragged to the n-type layer and holes to the p-type layer. Excess electrons can then move around an external circuit through the load.



Comparison of the wide spectrum of outdoor sunlight (top) with narrow spectrum of an indoor LED lamp (below). [After sunlightinside.com]

Indoor Things

Small devices, including modern “Internet of Things” (IoT) electronics are mostly used indoors, away from direct sunlight, where light levels are much lower than outdoors. Modern indoor lighting — based nowadays on white-light LEDs — does not have the same wideband spectrum as outdoor sunlight. As a result, crystalline silicon solar cells have a lower efficiency of only 3% - 6% when used with the narrow 400 – 700 nm spectrum of indoor LED lighting.



Internet of Things. [Image: Flaticon.com]

Researchers have been seeking new photovoltaic materials that might overcome these problems, especially for the growing market of IoT devices. One possible material is the semiconductor **indium gallium phosphide**, $In_xGa_{1-x}P$, already used for high efficiency solar cells in space applications and for high intensity red LEDs. This material has a conversion efficiency of 40% under white LED light, but is far too expensive for mass-produced IoT electronics.

Another possible material for solar cells might be **perovskites** — compounds with formula ABX_3 where A and B are cations (positive charge) and X is an anion (negative charge). Perovskites such as methylammonium lead tri-iodide, $CH_3NH_3PbI_3$ have recently been found to act as solar cells with conversion efficiencies up to 25%. The Swiss company Perovskia Solar AG has developed inkjet printing technology to fabricate stable, efficient perovskite solar cells that can be custom

designed and printed onto glass or onto a PCB. In 2021 they announced a custom solar cell for a wearable medical-tech device, eliminating the need for batteries or charging. A more recent design is for the 'BHeart' health-tracking bracelet developed by French company Baracoda. This bracelet transforms a traditional watch into a health-tracking device that does not need to be charged as it uses body heat, movement of the user and ambient light captured by Perovskia Solar's product incorporated into the band.



Baracoda BHeart bracelet includes a Perovskia Solar cell. [Credit: Baracoda]

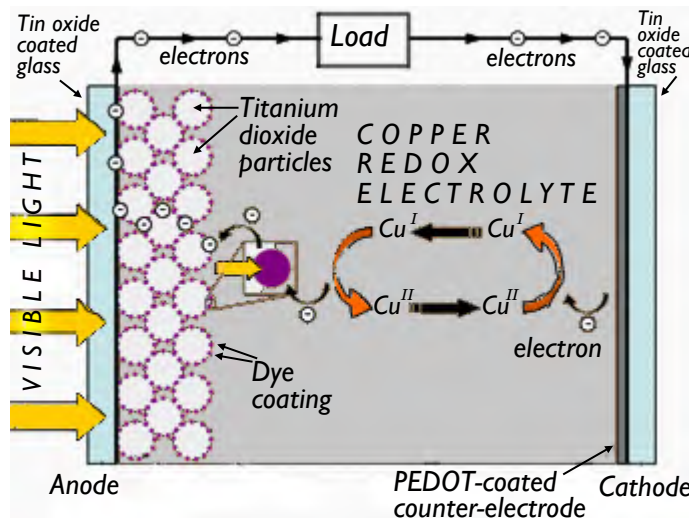
A third candidate for IoT use is the **dye-sensitized solar cell** or **DSSC**. This approach mimics photosynthesis in plants where the green pigment chlorophyll absorbs red and blue photons from sunlight, exciting electrons to power an electron transport chain that pumps hydrogen ions H^+ and ultimately reduces carbon dioxide to sugars.

The dye layer of a dye-coated semiconductor absorbs light, creating electrons/positive holes. The electrons then travel through the semiconductor to the anode and external circuit.

A new manufacturer in the DSSC field is Ambient[®] Photonics of Scotts Valley, California. Their devices are built on a coated optical glass substrate with a thin coat of titanium dioxide spread over the surface. This will become the anode. The TiO_2 is treated with dye solution so it becomes photosensitized. A second layer of glass coated with catalyst constitutes the cathode. The gap between electrodes is filled with an electrolyte solution.



When the cell is illuminated, the dye absorbs visible



Dye-sensitized solar cell (DSSC). [After Ambient Patent Application US 2023/0154691 and Gamry diagram.]

light, becoming excited and transferring electrons to the titanium dioxide semiconductor. Electrons flow toward the transparent anode where they are available to power the external load. Electrons are returned to the cell via the cathode, also known as the counter electrode, and flow through the catalyst-conducting layer into the electrolyte. The electrolyte then transports electrons back to the dye molecules and regenerates the oxidized dye.

Ambient has over 40 proprietary organic dyes available and an industrial screen-printing-to-glass process. As a result small cells might only cost around \$1.00 each, with up to 90% efficiency and a power output of $\sim 150\mu W$ per 10 square-centimeters in low-light conditions.

One device powered by Ambient's technology is the **UEI Eterna XLR** remote control by Universal Electronics Inc. This remote features a UE961 low power SoC chipset that powers the remote and controls Bluetooth communication. The photovoltaic panel from Ambient Photonics is optimized for harvesting available light in living room situations, allowing the backlit remote to operate for 7 years without having to change batteries.



Eterna XLR remote. [Credit: UEI.]

Ambient Photonics has been working with Taiwan keyboard manufacturer Chicony to introduce a light-powered wireless computer keyboard for launch in 2024. Other applications in the pipeline include smoke alarms and E Ink's electronic shelf labels.

Back to the shack

You can probably think of half a dozen devices in your radio room that might be powered by inexpensive, indoor-light solar cells. I would certainly like to see my electronic keyer, CW keyboard, 'atomic' clock, SWR meter (with PEP circuitry), and computer mouse made battery-free. Headsets without wires or batteries would be another improvement. If the available power could be increased — or perhaps boosted by a super-capacitor — we might look forward to test equipment such as a digital multimeter, antenna analyzer, nanoVNA, signal generator or LCR meter that would never need batteries. Looking further afield, I have a Brother portable label maker plus several weather stations that consume AA and AAA batteries like there is no tomorrow. Perhaps we could dream of a dual-band HT that kept its batteries topped-up with light energy. And how about Meshtastic IoTs, anyone?

- NM9J [Source credit: C&E News.]

Northeast HamXposition

[The following article was contributed by Bruce, K1BG, of HamXposition's Marketing and Promotion Committee.]

Robust lineup of vendors and speakers

Plans are shaping up for the 2024 Northeast HamXposition and New England Division Convention on August 22-25, 2024 in Marlborough, Massachusetts.

This year's convention will be held at the Best Western Royal Plaza Hotel & Trade Center, 181 Boston Post Road W, Marlborough, MA 01752. This venue is located off of I-495 on Route 20 West. It offers many



The Best Western Royal Hotel & Trade Center is located some 30 miles west of Boston, Mass. [KD2EVI pic.]

amenities and lots of nearby family-friendly attractions and dining options.

The festivities kick off on Thursday evening, August 22, with entertainment provided by

nationally known comedian Juston McKinney. Seating is limited to 250 people. Tickets are just \$35, and also available as part of the "Convention Plus" package.

Join your fellow hams for a delicious DXCC/Contest Banquet on Friday night with Yuri Onipko, VE3DZ, as he recaps his 50 years of DX and contesting activities and shares his operating experiences from a variety of locations around the world.

Steve Goodgame, K5ATA, will present the keynote on Saturday morning. Steve leads ARRL's Education and Learning Department. He has a passion for youth outreach, and works constantly to find ways to engage more youth in wireless technology and help teachers ELEVATE their STEM programs.

The Saturday evening Grand Banquet will feature special guest Dr. Tamitha Skov, WX6SWW. Known as "Space Weather Woman" in social media, Dr. Skov forecasts and analyzes space weather processes — in the heliosphere and exosphere.

Several new vendors will have their wares on display at the convention this year: FlexRadio, Elecraft, and SteppIR Communications Systems. We'll also feature Halibut Electronics, Club Gear Online, Reliance Antennas. Remote Ham Radio, VE2DX Electronics, Gold Medal Ideas, AG Custom Gifts, and others.

New for 2024 is "Mini-Contest University," based on K3LR's popular Contest University. CTU has been featured at the Dayton Hamvention since 2007 and has

been presented in 15 countries to over 10,000 participants.

Mini CTU is a series of contest-oriented talks and presentations

offered at HamXposition all day Friday.

HamXposition is pleased to offer a Parks On The Air (POTA) track featuring presentations designed for both newcomer and experienced POTA operators alike. There will be a functioning portable station operating on the hotel grounds designed to show beginners how to "chase" POTA contacts. In addition, an actual POTA activation will occur in a nearby state park following the prize drawing and closing ceremony.

This year, volunteers will staff a special "Get On The Air" station, W1XPO, to mentor and assist newcomers in making their first HF contact.

Our popular EmComm track will be back for 2024. Veteran emergency communicators will share their knowledge and experience to help others to "up their game." In addition to talks and presentations, convention-goers will get to see operational emergency communications vehicles on display in the parking lot.

As always, the Northeast HamXposition will feature a robust flea market, open to tailgaters on Friday, Saturday and Sunday.

No major convention would be

worth its salt without great prizes. Along with hourly drawings, we're pleased to announce that one lucky person will receive the grand prize — an Icom IC-705 QRP all-in-one transceiver. Second prize will be a Xiegu X6100 QRP HF/6m transceiver. The third prize will be an Icom ID-50A VHF/UHF/D-Star handheld.

For more information, go to: <https://hamxposition.org>. Tickets can be purchased in advance by visiting: <https://ticketing.hamxposition.org>.

- Bruce, K1BG



The 2024 Northeast HamXposition on August 22-25 incorporates the 100th Anniversary ARRL New England Division Convention.



Northeast HamXposition flea market area. [KD2EVI pic.]

WWVB problem

In mid-June, I noticed that clocks and watches that are synchronized with WWVB on 60 kHz were not receiving a reliable signal every night. Devices with an LCD display were missing the radio tower symbol to denote successful reception. As a result, time displays were drifting off by 1-to-2 seconds each day. I checked online and found the following statement from NIST, the National Institute of Standards and Technology.

“Radio Station WWVB - Official Notice”

“Commencing from 0000 Coordinated Universal Time (UTC) on April 7, 2024, the southern antenna of WWVB has been rendered non-operational due to damage sustained from wind gusts exceeding 90 MPH. Please be advised that WWVB continues to function at a diminished overall power, utilizing only its northern antenna.”

“Update 20 May 2024: The components necessary for the refurbishment of the southern antenna’s triatic* are currently being manufactured and shipped. The projected timeline for the completion of these repairs is tentatively set for the latter part of June 2024. We would like to emphasize that this is an estimated timeline and may be subject to alterations based on a variety of factors. We greatly appreciate your understanding and patience during this process.”

“NIST radio station WWVB is located on the same site as NIST HF radio station WWV near Fort Collins, Colorado. The WWVB broadcasts are used by millions of people throughout North America to synchronize consumer electronic products like wall clocks, clock radios and wristwatches. In addition, WWVB may be used in other consumer timekeeping applications, such as appliances, cameras, and irrigation controllers, as well as in high level applications such as accurate time synchronization.” (<https://www.nist.gov/pml/time-and-frequency-division/time-distribution/radio-station-wwvb>)

* Triatic = the rope between a ship’s mastheads.

History time

Since 1965, WWVB has been broadcasting binary-coded decimal time information on a frequency of 60 kHz. Initial power level was only 13kW. From 1997 three modern AN/FRT-72 50kW PEP LF transmitters were acquired from recently decommissioned Navy facilities. Each FRT-72 has two identical power amplifiers (PA), with a pair of 4CX15000 tubes in push-pull. As a first step, one of the 50kW transmitters was connected to a

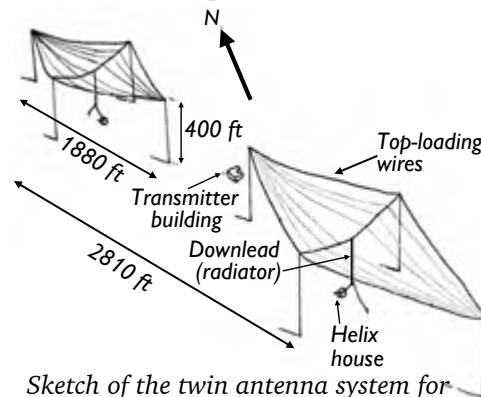


One of the Continental Electronics FRT-72 transmitters installed at WWVB, Fort Collins, Colorado. [Credit: NIST]

single antenna, increasing radiated power to 25kW ERP. This allowed the introduction of low-cost radio-controlled clocks for the United States.

The updated antenna system consists of two separate antennas spaced 2,810 feet apart. Each has four 400 ft towers, supporting a vertical wire antenna with a diamond-shaped horizontal capacity “top-hat”. Each vertical wire is fed from a ‘helix’ house on the ground incorporating a loading coil and variometer. This phased array has a gain of 1 dB in the east-west direction.

For the next power increase in 1999, one FRT-72 transmitter was connected to the north antenna, a second FRT-72 was connected to the south antenna, and the third transmitter was available as standby. With two transmitters operating into the two separate antennas, radiated power was increased to 50kW ERP. A further increase to 70kW was achieved in 2005. This results in a field strength of at least 100 μ V/meter at some time of day/night over most of the USA. But with only one antenna in operation, power is reduced to 30kW ERP and field strength is also reduced.



Sketch of the twin antenna system for WWVB, on 60 kHz. [Credit: after NIST.]

Photo of the four 400 ft towers supporting one of the twin antennas for WWVB. Top-loading wires and radiating downlead have been emphasized for clarity. [Credit: NIST.]



Photo of the four 400 ft towers supporting one of the twin antennas for WWVB. Top-loading wires and radiating downlead have been emphasized for clarity. [Credit: NIST.]

Especially during summer, this weakened signal may disappear under the influence of local interference, short nights and increased electrical storms. Current information about WWVB antenna and power use is available at: <https://www.nist.gov/pml/time-and-frequency-division/time-distribution/radio-station-wwvb/wwvb-antenna-configuration-and>.

- NM9J

13 Colonies 2024 - K2WPM

13 Colonies has become a popular **Special Event** in U.S. Amateur Radio, chalking up over 237,000 QSOs last year. No, it's not a contest. But what is it?

When?

The special event occurs from July 1, 2024 at 1300 UTC (8:00 a.m. EDT) to July 8, 2024 at 0400 UTC (midnight EDT). The website for this event is located at <http://www.13colonies.us/>

What?

The concept is for the 13 original colonies to get on the air during the week surrounding Independence Day, July 4, and make lots of contacts. Each colony is assigned a unique call sign, for example New York is **K2A**. Amateurs then try to contact all 13 colonies for a "clean sweep." There are three additional bonus stations, GB13COL (Great Britain), WM3PEN (Philadelphia) and TM13COL (France).

The event is organized and apparently was created by Ken KU2US.

Why?

The event is for fun, and is intended to remind us of our early history, which is why the event embraces the July 4 week. Many of us who have activated stations under the 13 Colonies call signs (in my case, **K2B** for Virginia) have tried to include in our talk-time, a few facts about our respective colonies' early history.

The certificate is much-desired by amateurs. Based upon the log submitted, KU2US will print a custom certificate showing not just your call, but also how many colonies you contacted. A "clean sweep" merely requires logging contacts with the 13 Colonies.



Where?

All amateur bands (except 60 meters) and all modes are in play. The ham activators will be transmitting from the 13 Colonies (or Great Britain / France in

the case of bonus stations). Any radio amateur anywhere, is invited to participate. This year, we are putting a special focus on getting satellite contacts.

Who?

The 13 Colonies, as well as the bonus stations, are staffed by operators within the respective jurisdiction(s). I have the privilege of being **K2B Coordinator** for Virginia Colony this year. In that capacity, I have selected some 30 hams all around the state, and set up a schedule of operations over the seven-day event. If you hear K2B, I'm hoping you will work us and spot us!

- 73, David K2WPM

Newsletter production

Color disaster

Welcome to the *PCARA Update* production office. Once a month a mix of Microsoft Word documents, text files, jpg pictures and gif diagrams arrive at the Editor's desk. The ingredients are combined together using desktop publishing software. Initial editing takes place on the computer screen... But the only way to make sure each page looks good is to print on a sheet of paper then read again, c a r e f u l l y .



For viewing initial drafts I use a Brother black and white laser printer. The last issue of the newsletter required 34 double-sided pages to be printed out. Fortunately, the per-page cost for laser printing is low.

On publication day, I generate a PDF file from the desktop publishing software, then print out a single copy in



June newsletter showed severe 'banding' in masthead and color photos.

color. The reason for the color copy is to check quality of photos and diagrams in the PDF prior to distribution.

For the June 2024 issue, I had reached this stage when disaster struck... pages coming out of my HP Envy 7645 inkjet printer were severely “banded”, affecting the color photos and masthead. Cyan ink in the 62XL tri-color cartridge was running low. I had another 62XL tri-color cartridge in-stock, but found the new cartridge was **not** printing cyan at all! I restored the old cartridge and decided it was time for a rethink.

The cost of color?

My Envy 7645 multi-function color printer is eight years old and I had been monitoring costs over time. When purchased in 2016, the price was \$109.99. Since then I had purchased eight black cartridges and six tricolor cartridges at a total cost of \$588. So total cost of ownership was approaching \$700, or by my estimate, 40 cents per color page!



HP 62XL tri-color cartridge contains 4.5 ml of cyan ink.

Inkjet cartridge printer ink is one of the most expensive liquids in the world, costing around \$3,000 per gallon. Consumer inkjet printers are sold on the “razor and blades” or “dual-part” basis, where the true cost of initial hardware is heavily subsidized by the high cost of essential supplies. See: <https://www.bbc.com/news/business-39132802> .

Decision time

Replacement of the faulty 62XL tricolor cartridge plus one more as spare would have cost me \$106.00. I decided to put this money toward a new **tank printer**. I had been keeping an eye on Epson’s EcoTank range. *Consumer Reports* was generally favorable but reported “scans not as good as most” for the ET-4850 model I was interested in.

HP had introduced its own range of tank printers. Its ‘Smart Tank 7602’ was rated better than the Epson ET-4850 on graphics, photo and scan quality. The ink cost for the HP tank printer works out at 0.3 cent per monochrome page and 0.9 cent per color page. I found an HP 7602 in-stock at the local big-box electronic store and paid the higher initial cost for the hardware.

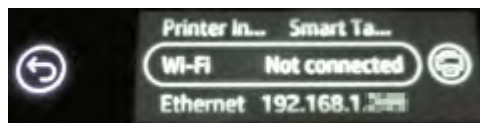
Installation

Printers in the newsletter production office are set up as **networked** devices. They have *wired* Ethernet connections to an Ethernet switch *via* shielded Cat 5E cables. Static IP addresses are assigned to each printer. The HP Smart Tank 7602 has a small monochrome

touch-screen on the top surface which only appears when the printer is powered up. I set the static IP address there.

I followed the instructions for filling the ink tanks. Filling was straightforward, with not a drop of ink

spilled. (Be careful not to mix up the colors). Two printheads then have to be installed — they are fed with ink from the tanks through silicone rubber tubing.



Tank printer touch-screen display.



Filling the yellow tank with HP 31 ink.

In use

With the “basic-feature” printer and scanner software downloaded from HP’s web site, I was ready to print out some test pages. I was pleased to see the quality of text and color photos was the equal of the old inkjet. Scanning was also working satisfactorily.

I’m looking forward to more color printing without the high per-page cost of cartridges and with the ability to top up tanks separately as different colors are consumed at different rates. PCARA’s blue color scheme and the blue skies of summer consume a lot of cyan!



- NM9J

Peekskill / Cortlandt Amateur Radio Association

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PCARA on Facebook: <https://www.facebook.com/pcararadio>

YouTube Channel: <https://www.youtube.com/@peekskillcortlandtamateur7670>

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Newsletter contributions are always very welcome!

Archive: <http://nm9j.com/pcara/newslett.htm>

PCARA Information

PCARA is a **Non-Profit Community Service**

Organization. PCARA meetings take place every month (apart from July/August break). See <http://www.pcara.org> for current details.

PCARA Repeaters

W2NYW: 146.67 MHz -0.6, PL 156.7Hz

KB2CQE: 449.925MHz -5.0, PL 179.9Hz

N2CBH: 448.725MHz -5.0, PL 107.2Hz

PCARA Calendar

PCARA membership meetings are on summer break during July and August.

Sat July 20: PCARA Breakfast, 9:00 a.m., Uncle Giuseppe's, 327 Downing Dr. Yorktown Heights, NY.

Sat Aug 17: PCARA Breakfast, 9:00 a.m., Uncle Giuseppe's, 327 Downing Dr. Yorktown Heights, NY.

July/August: Monitor PCARA's Google Group for details of upcoming VE test sessions during summer break.

Hamfests

Check with organizers before leaving.

Sat Jun 29: W2QW Raritan Valley ARC Hamfest, Piscataway HS, 110 Behmer Rd., Piscataway, NJ, 8:00 a.m.

Sun Jul 14: Sussex County ARC Hamfest, Sussex County Fair Grounds, 37 Plains Rd, Augusta, NJ, 8:00 a.m.

Sat Jul 27: New Jersey Antique RC Hamfest, InFoAge Sc, 2201 Marconi Rd., Wall, NJ. 8:00 a.m.

VE Test Sessions

Check with the contact before leaving.

Jul 6, 13, 20, 27: NYC-Westchester ARC, 43 Hart Ave, Yonkers NY. 12:00 noon. Must contact VE, k2ltm'at'aol.com.

Jul 11: WECA, Westch Cnty Fire Trg Center, 4 Dana Rd Valhalla NY. 7:00 p.m. Contact: N2gdy'at'weca.org.

Jul 19: Orange County ARC, Munger Cottage, 40 Munger Dr., Cornwall NY. 6:00 p.m. Contact: w2bcc'at'arrl.net.



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