



PCARA Update



Volume 26, Issue 1 Peekskill/Cortlandt Amateur Radio Association Inc. January 2025

Look back, think ahead

We stand at the beginning of New Year, the year of PCARA's Silver Jubilee! What better time to look back at where we've been in 2024 — a retrospective of sorts. Once again I rely on the *PCARA Update* Archivist Malcolm NM9J for a comprehensive summary of the 2024 PCARA experience.

PCARA 2024 Retrospective:

- There were six VE. Test Sessions at Putnam Valley Library and at Putnam | Northern Westchester BOCES Tech Center. Two new Technicians, two upgrades to General and three upgrades to Extra were the result. Publicity for test sessions and processing of test results were upset by ARRL's "Systems Service Disruption", affecting the ARRL-VEC from May to October 2024.
- Sale of items from the estate of Henry KB2VJP continued at the Cortlandt Town Center CUE Room meeting on February 11, from PCARA club tables at the Orange County ARC Hamfest on May 5 and by Bob N2CBH at the October 12 BARA Hamfest.
- February 12 – Bob N2CBH carried out an emergency repair to the W2NYW 2 meter repeater on 146.67 MHz by replacing the previous equipment with a VHF Motorola MTR3000 repeater. (The 146.67 repeater first arrived on-air September 5, 1999, so has now been operating for 25 years!)
- Presentations at Putnam Valley Library — in April 2024 by KB2CQE on programming a Baofeng UV-17 Pro HT using a Smartphone app and Bluetooth adapter; in May 2024 by Charles N2SO describing donation by Quarter Century Wireless Association to increase club visibility and invest in digital aspects of the hobby; also in May on Meshtastic® by Lou KD2ITZ; in November by Bob N2CBH



PCARA Breakfast at Uncle Giuseppe's was postponed from Dec 21 to a rainy Saturday Dec 28 to avoid snow.

- on an Introduction to Vector Network Analysis and by Steve KD2OFD on Westchester County ARES/RACES.
- The presentation by Bob on VNA is now available on the PCARA YouTube channel, <https://www.youtube.com/@peekskillcortlandtamateur7670> courtesy of Rob AD2CT.
- ARRL Field Day on June 22-23 at George Washington Elementary School continued under the front entrance canopy, avoiding worst of the hot weather.
- Article on PCARA in *River Journal North* for September 2024 included interviews with Lou KD2ITZ and David KD2ITZ. (See *PCARA Update* for October 2024.)
- Support for Run Against Hunger on October 20, 2024 with some 15 amateur radio volunteers and runners — from both PCARA and WECA. (See page 6 for *Gazette* news report.) PCARA had first supported the Run Against Hunger in October 2014, ten years previously.
- Monthly PCARA breakfasts indoor and outdoor held at Uncle Giuseppe's throughout the year.
- PCARA Foxhunts held May 4 and October 26 at FDR State Park. The May Foxhunt included participation in "I Love my Park Day" clean-up. *Continued on page 2 ⇨*



Members were in seasonal mood for the 2024 Holiday Dinner, held on Sunday December 8. [Pic credit: AD2CT and Helen.]

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- Participation in the New York State QSO Party in October 2024 by Joe WA2MCR (using call W2NYW) and by Scott KE2CNS.

In December 2024 we had our **Annual PCARA Holiday Dinner** on Sunday December 8th at the Cortlandt Colonial Manor in Cortlandt Manor, NY. There were 22 present and everyone enjoyed themselves.

On Saturday December 28, 2024 at 9:00 a.m. there was a belated **PCARA Breakfast** at Uncle Giuseppe's Marketplace in Yorktown Heights, NY. Ten members were present. This was a rescheduled event since Mother Nature had other plans for December 21st (snow!).

The first **PCARA Membership Meeting** of 2025 will take place on Sunday January 5, 2025 at 3:00 p.m. at the Cortlandt Town Center CUE Room. Following the meeting, the **Annual PCARA Bring and Buy Auction** will be held. Please look through your inventories and bring those items you no longer use or need so that they can be shared with your fellow boat anchor collectors.



CUE Room (Cortlandt Upper Teens Entertainment Center) is located off Rt 6 in Cortlandt Town Center.

On Saturday January 18, **Breakfast** at Uncle Giuseppe's will be followed by an 11:30 a.m. V.E. Test Session at Putnam Valley Library.

This year we are celebrating **PCARA's 25th Anniversary**, a quarter century, our **Silver Jubilee!** We are looking for suggestions on how to commemorate this milestone.

I look forward to seeing each of you on January 5th. Happy New Year!

- 73 de Greg, KB2CQE

PCARA Board

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Net night

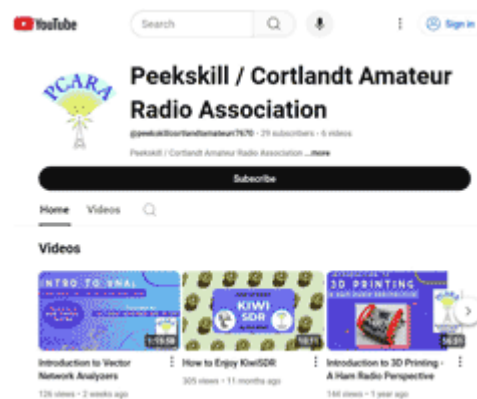
Peekskill/Cortlandt Amateur Radio Association holds a roundtable net on Tuesday evenings at 8:00 p.m. and a directed 'Old Goats' net on Thursday evenings at 8:00 p.m. Both events take place on the 146.67 MHz W2NYW repeater, offset -0.600, PL 156.7 Hz.

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. **Note:** There is **no** Old Goats net on Thursday Jan 2, 2025.

You Tube channel

Thanks to Rob AD2CT's efforts, the video recording of Bob N2CBH's Vector Network Analyzers (VNAs) presentation is now available on PCARA's YouTube Channel. The original presentation to PCARA members

took place on November 2, 2024 at Putnam Valley Library with the full title "An Introduction to Vector Network Analysis".



The Peekskill / Cortlandt Amateur Radio Association YouTube Channel can be found at: <https://www.youtube.com/@peekskillcortlandtamateur7670>. At the time of writing there are **six** video recordings available — with Bob N2CBH's presentation having been viewed 128 times. The other five presentations are:

- "How to enjoy KiwiSDR" – Karl N2KZ
- "Introduction to 3D printing – A Ham Radio Perspective" – Mike N2HTT
- "Pros and Cons of various vertical antennas" - Jay NE2Q
- "Radio Communication Oversights and the sinking of the Titanic" – David KD2EVI
- "Practical Horizontal Wire Antennas" – Jay NE2Q

V.E. test session

The VE Test Session for Saturday Dec 21 was postponed as no candidates had registered. The next VE Test Session is scheduled for Saturday January 18, 11:30 a.m. at Putnam Valley Library. This will be an ARRL-VEC session, so candidates must contact Mike W2IG beforehand using w2igg'at'yahoo.com.

Adventures in DXing

- N2KZ

Hear It Now!

At 1:00 a.m. on December 22, 2024, DXers all over the country stayed up late to see if they could hear something that they might never hear again. “Retro Radio WZON 62 The Zone” in Bangor, Maine was about to broadcast a specially arranged DX test using its daytime power of 5,000 watts through its single tower. WZON’s usual nighttime power is only 620 watts.



Owned by renowned author Stephen King and his wife Tabitha, WZON will leave the air on December 31, 2024 forever. King’s two FM outlets in Bangor, WKIT 100.3 and WZLO 103.1, will also go dark.

A recent press release explained their decision:

“While radio across the country has been overtaken by giant corporate broadcasting groups, I’ve loved being a local, independent owner all these years,” said King. “I’ve loved the people who’ve gone to these stations every day and entertained folks, kept the equipment running, and given local advertisers a way to connect with their customers. Tabby and I are proud to have been a part of that for more than four decades.”

Stephen and Tabitha became station owners in 1983. The WZON callsign is a reference to Stephen’s book “The Dead Zone.”

The DX test was aired thanks to WZON’s Director of Engineering Andy Soule, K1CZ. After a brief local news and weather cast (featuring below zero polar temperatures... *“the coldest night of the season”*) we heard: *“This is WZON Bangor on the air for testing and circuit adjustment purposes only. Regular programming will resume in a few minutes.”*

Morse code followed: “WZON BANGOR TESTING WZON BANGOR TESTING 73 DE K1CZ” Audio sweep tones and other distinctive test signals followed. These are often used during DX tests because they are easy to hear over the usual melee of AM broadcast frequencies and they produce very noticeable patterns in waterfall displays.

A singing station jingle played followed by (once again) WZON BANGOR 73 DE K1CZ in Morse. We then heard the song “Pac-Man Fever” including more electronic tones. It was quite a nice DX test. The final song played was Carly Simon’s ‘Nobody Does It Better.’ Maybe so! Thanks, Andy!

Why was this DX test such a sought-after event? The state of Maine is a difficult state to log. Maine is far afield from many domestic DXers and few dominant stations are on the air from The Pine Tree State. Hearing WZON testing at full power at night was a unique opportunity to log Maine before it becomes even more difficult to pull in a station from Maine after the first of the year.

DX tests are often arranged by listener clubs for their members — and the station owners — to enjoy. Two dynamic domestic radio clubs continue to unite AM broadcast band DXers even to this day! Check out The National Radio Club: <https://nationalradioclub.org> and The International Radio Club of America: <https://www.ircaonline.org/default.php> for details. I am a former President and Board Member of the IRCA and have been a member since 1981! Worldwide medium wave DXers enjoy the Medium Wave Circle: <https://mwcircle.org> based in The United Kingdom.



Credit: International Radio Club, used with permission.

Very Cold? Very good!

One Monday morning, Bob N2CBH messaged me saying that he had pulled in a couple of new and interesting DTV stations with his outdoor TV antenna: WASA-LD Port Jervis, NY on RF channel 13 and WKOB-LD (virtual channel 42) from New York City. “I built the original WKOB which was on channel 17 at the Empire State Building. Their virtual channel is 42 but what is their current RF channel?”

A quick look at a TV DXer’s invaluable website: RabbitEars, <https://www.rabbitears.info/> revealed the answers! Bob had actually logged just one low power DTV transmission carrying both station’s *ensembles*. Indeed both channels were transmitted together on RF channel 13. WASA-LD broadcasts channels 24-1 ‘Estrella TV’, 24-2 ‘Estrella News’ and 24-3 ‘Confess.’ WKOB-LD transmits 42-1 ‘Visión Latina’, 42-2 ULFN (Universal Living Faith Network), and 42-3 ‘Law and Crime.’ This stuffed package of broadcasts transmits from the top of One World Trade Center in Manhattan on



ESTRELLA TV

Credit: <https://estrellamediaco.com/media-assets/>

just 3 kilowatts but at an astounding 1395 feet above sea level with a broad directional pattern towards the northeast. Nice catch, Bob!

Bob explained the reception: "It was shallowed-out diffraction angle. It happens whenever it gets this cold!" (It was just 6°F outside on this brisk and chilly Monday morning.)

Why does WASA identify its city of license as Port Jervis, New York? *It's very complicated!*

It's a long story involving FCC station al-

locations. It was first a low-powered translator of Channel 5 WNYW using UHF channel 64 to help cure the TV reception 'ghosting' caused by the then-new World Trade Center twin towers. It later briefly served as a translator for WPIX channel 11 also using channel 64. In 2003, the channel 64 transmitter was re-allocated by the FCC to Port Jervis, New York (where Pennsylvania, New Jersey and New York meet) and became WASA-LP

After the nationwide retirement of analog TV took place in June 2009, WASA continued as an analog broadcaster due to its low-power status. In 2010, WASA finally converted to digital TV transmission and began broadcasting from the Condé Nast Building in Manhattan. Through one of the TV station 'repacks' to consolidate channel use (making room for more digital phone and data transmissions) WASA found itself low-power broadcasting on channel 13 sharing with WKOB — yet WASA still has a *city of license* as Port Jervis, New York! WASA also changed its virtual channel number from 64 to 24 since television broadcasts above channel 36 had now ceased. Kooky sidebar: the call sign 'WKOB' was once used by a famous Brooklyn pirate radio station in the 1970s!

Get Straight!

New Year's Day is a great time to start your career in slow CW. Check out the ARRI's **Straight Key Night**. It's a celebration of slow code sent by true brass-pounders all over the country and beyond. No rapid automatic electronic keyers or 'bugs' are allowed! Many hams only operate CW on this one night and lots of newcomers come out of the woodwork, too. You'll find very interesting and very unusual QSOs on the air sometimes combined with strange sounding signals emitting from very old gear. Straight Key Night runs from 7:00 p.m. on New Year's Eve until 7:00 p.m. New Year's Day, especially on 80 and 40 meters. Tune



Over the air screen capture of 'Estrella News 24 Horas' on WASA-LD, virtual channel 24-2. [N2KZ pic.]

around 3525 to 3600 or 7025 to 7060 kilohertz. Give it a try!

'Tis the season to be jolly! It is time to move past *auld lang syne!* May one of your resolutions be: 'A QSO a day keeps the doctor away!'. You'll also fill up your logbook and (maybe) even your mailbox! Remind yourself that even Technician level amateurs have HF privileges these days. All you need is a Morse Code key and a wee bit of ambition. If you like, I'll be pleased to meet you on the air for a v-e-r-y slow CW QSO. Technicians can even operate phone (voice) on the hot 10 meter band from 28300 to 28500 kilohertz. Ten meter antennas can be tiny and still be effective. Be there or be square!

Not operating? There can be no excuses! You don't need elaborate equipment to operate on HF. I have worked the world on ten meters from my car with just a shortened CB magnet-mount loaded whip antenna using an old 10 meter mobile rig running 25 watts. Is New Zealand far enough away for you? All you have to do is pick up a microphone and start calling. The world awaits you! On HF, Technicians have a power limit of 200 watts. This is no handicap. To me, this is about 200 times more power than you really need! Take advantage of the solar activity peak and see just how far you can go. Make the effort! See you there!

Happy Anniversary

New Year's Day is a time of holy obligation for this seasoned QRP CW operator. It has been twenty-five (!) wonderful years since I first went on the air. My first QSO was on January 1, 2000 at 4:30 p.m. Eastern Standard Time on 3700 kHz. I had a very brief QSO with Harold, W1EES, on 80 meter CW. A quarter of a century and many log pages later, I continue to work the CW bands with passion finding thrills daily. You can't beat this hobby!

Old Goats Net - delayed broadcast

PCARA's long-running weekly chat get-together 'The Old Goats Net' will be returning to the air on Thursday evening, January 9th, at 8:00 p.m. on the PCARA 2 meter repeater: 146.670 MHz, minus 600 kHz offset and a 156.7 PL. The net had been pre-empted due to Christmas and New Year's Day adjacencies on December 26, 2024 and January 2, 2025. The net welcomes all licensed amateurs to participate. We always welcome 'all the shortwave listeners' who just listen in, as well!

Until next month, 73s and dit dit de N2KZ 'The Old Goat.'



Run Against Hunger

– News Report

The 44th Harry Chapin Memorial Run Against Hunger took place on Sunday October 20, 2024. An initial report on PCARA and WECA radio activities appears in *PCARA Update* for November 2024, pages 9-13, describing members who ran in race events as well as those who manned the radio stations for the three runs.

In previous years, your editor would have been expecting a visit from Henry KB2VJB, with the (Croton) *Gazette's* end-of-year edition, containing the Run Organizers' official report on this annual event. Henry passed in April 2023, so I reached out once again to



Trail Car and Westchester County RACES Emergency Communications vehicle, parked outside Croton-Harmon High School during the Run Against Hunger 2024.

Todd N2MUZ in Croton-on-Hudson who kindly provided a copy of the relevant pages of the *Gazette*.

As expected, the Run Organizers had compiled their own comprehensive report on the October races that take place in and around Croton, thanking all participants and occupying several pages of *The Gazette* for Dec 19

2024 – Jan 1, 2025. A short excerpt describing the radio support

provided by PCARA and WECA members is depicted alongside, with the text written by Race Director Mike Grayeb appearing below.

“In addition to working with police, fire and EMS, we worked closely with volunteers from two community-based communications groups, including the Peekskill / Cortlandt Amateur Radio Association (PCARA) and Westchester Emergency Communications Association (WECA). Kathleen O’Keefe, the public service director of WECA, and Greg Appleyard and David Fred-

sall, both of PCARA, helped with our safety planning and they and their colleagues provided valuable “eyes and ears” as volunteers on our courses and emergency communications for all of our events. Among their respective volunteers who provided on-course communications back to a central communications hub at the high school on

race day were Callum KE2BWA, David KD2EVI, David K2WPM, Greg KB2CQE, Malcolm NM9J, and Vincent KD2VAV.

“We are indebted to the leaders and members of both of these groups for working together to help ensure safe participation by our runners and walkers. We also thank Chuck Kitchen, who again served as our course safety controller, driving through both our 5k and 10k race courses immediately before these events started to make sure all volunteers were in position and wearing safety vests. All of this made a big difference in ensuring safe and fun events.”

The full report concludes by noting that the 44th Annual Harry Chapin Run/Walk Against Hunger achieved record-breaking success in the number of participants and the amount of funds given away. 1,372 registrants took part in the in-person and virtual events — 140 more than last year — and \$56,000 was distributed to non-profit organizations that fight hunger. These included the Croton-Cortlandt Food Pantry, Croton Caring, Caring for the Hungry and Homeless of Peekskill, Fred’s Pantry, Hillside Food Outreach and Feeding Westchester. The organizers look forward to the 45th year of the Harry Chapin Memorial Run/Walk Against Hunger on Sunday, October 19, 2025.

- NM9J

manage traffic at key locations and to help foster a safe route for the runners.

In addition to working with police, fire and EMS, we worked closely with volunteers from two community-based communications groups, including the Peekskill-Cortlandt Amateur Radio Association (PCARA) and Westchester Emergency Communications Association (WECA). Kathleen O’Keefe, the public service director of WECA, and Greg Appleyard and David Fredsall, both of PCARA, helped with our safety planning and they and their colleagues provided valuable “eyes and ears” as volunteers on our courses and emergency communications for all of our events. Among their respective volunteers who provided on-course communications back to a central communications hub at the high school on race day were Callum KE2BWA, David KD2EVI, David K2WPM, Greg KB2CQE, Malcolm NM9J and Vincent KD2VAV.

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Short extract from the (Croton) *Gazette*, December 19, 2024 – January 1 2025. [pic: N2MUZ].

Mobile power memories

One of the delights of amateur radio is the ability to take your radio station out on the road — and operate **/mobile**. My own mobile adventures began more than a half century ago and have seen some remarkable changes in technology.

When I was first licensed in the U.K. in the mid-1960s, amateur radio was still using much military surplus equipment.

Radio rooms of the time had a mixture of home-brew and World-War-II gear, including receivers such as the National HRO, RCA AR-88, and Marconi CR100. These receivers were



World War II B28 communications receiver was the British Admiralty's version of the Marconi CR100.

large, heavy and designed for situations where AC power was available — not at all suitable for mobile operation where space was limited and the only power source was the 12 V DC vehicle battery.

Rotation

Some amateurs — myself included — had HF (short wave) receivers intended for **airborne** use in



Marconi R1155L MF/HF receiver as installed in Avro Lancaster bombers, with a companion T1154 transmitter.

World War II such as the RCA-designed **BC-348** and the Marconi **R1155**. They were lighter and more compact than fixed station receivers...

but they were originally designed to run from the aircraft's 14 V or 28 V DC battery using a **dynamotor** or rotary converter for the B+ (high tension) supply.

Rotary converters have been in use from the earliest days of electricity supply around the 1890s. One requirement was to convert utility alternating current to direct current for powering DC motors — as used in electric trains and trams. Before the days of mercury vapor rectifiers and solid-state rectifiers, this was ac-

complished by connecting the AC supply to an electric motor. The motor's rotating shaft then drove a dynamo (DC electric generator) with suitable windings and commutator to provide the required DC voltage.



DC generator driven by an AC synchronous motor. [Metropolitan Vickers, Manchester.]

My 1966 ARRL "Radio Amateur's Handbook" has a section on **dynamotors**. The dynamotor is a type of motor-generator that combines a DC electric motor with a DC dynamo in a single unit. The motor coil and generator coil are wound as a double armature, each



BC-348 HF receiver as used in USAAF aircraft of WWII. Internal dynamotor (arrowed) provided +220V DC.

with its own commutator. The dynamotor inside a BC-348 receiver was powered from the aircraft's 24 V-28 V DC supply and provided +220 V DC for the vacuum tubes. Tube heaters

were wired in series/parallel so they could be fed directly from the 24-28 V DC supply.

Rotary converters for the R1155 receiver mounted in the aircraft could be powered from either 12V or 24 V DC power. They provided 220 V DC for the vacuum tubes and 7 V DC for the tube heaters.

While the rotary converter is running, carbon brushes resting on the commutator produce tiny sparks — so input and output

connections require heavy-duty filtering to remove electrical noise that would otherwise swamp the radio receiver. All components are then mounted inside a shielded metal case.



Commutator and brushes of a BC-348 receiver's dynamotor. There is another commutator at the far end of the dynamotor.

When these aircraft receivers were put into amateur radio service, the dynamotor was usually replaced with an AC power supply, running from 120 V or 240 V 50-60 Hz AC mains. Worth noting — the +220 V DC

supply might *not* have its negative line grounded as this floating line was also used to provide negative grid bias for the vacuum tubes.

Dynamotors were not very efficient devices; typical efficiency was only 40-60%. The rotor, commutator and brushes all contributed to frictional and electrical losses. This may not be significant when you have four Rolls Royce Merlin engines charging the aircraft battery — as in an Avro Lancaster bomber — or the six electrical generators of a B-29 Superfortress.

But if you were operating a World War II “Wireless Set Number 19” in an armored vehicle, the dynamotor would draw 10+ amps from a 12 V battery to produce +275 V DC on receive and +500 V HT on transmit for the 807 PA tube. With 120+ watts supplied from the 12 V battery, RF power output was just 1 - 2½ watts of AM, or 3 - 5 watts CW.



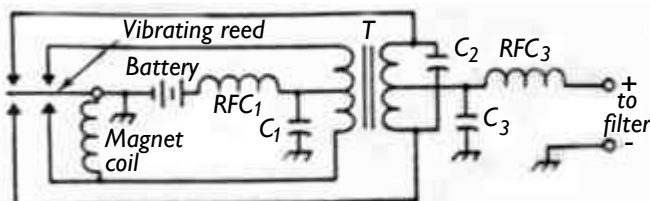
Wireless Set No. 19 as employed in WWII tanks and Jeeps. Dynamotor power supply at left. [CC BY-SA 4.0, Autopilot]

An *additional* generator was needed to keep all the 12 volt batteries charged for radio use. And all those rotating devices required routine maintenance.

Vibration

In my early days of mobile operation, I had an ex-Army B44 transceiver and an elderly Pye Ranger mobile transceiver for the UK 4 meter band. Both units employed vacuum tubes for transmit and receive. High tension for the tubes was derived from the 12 V DC battery using a **vibrator** supply.

My 1966 ARRL *Handbook* explains how this type of power supply has a step-up transformer combined with a vibrating interrupter. In a **synchronous** supply, the vibrating reed first connects +12 V DC across one half of the center tapped transformer primary winding then across the other half. At the same time a second pair of contacts grounds one side of the secondary winding then the other, so the square-wave output from the center tap is rectified to produce a positive



Synchronous vibrator power supply as described in ARRL *Radio Amateur's Handbook* for 1966.

high voltage supply for the vacuum tubes.

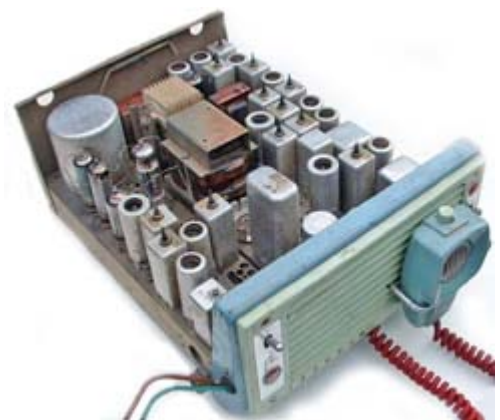
Sparking at the vibrator contacts can produce broadband RF interference, so RF filters have to be incorporated into the input and output leads, with all the circuitry carefully shielded. Conversion efficiency could be as high as ~70%.

The **Wireless Set B44** was a 3-channel military VHF radio from 1952 covering 60-95 MHz for short-range communication with a light anti-aircraft control center (LAACC). RF output was 3 watts AM on 60 - 95 MHz. It was designed for operation from a 12 volt lead-acid battery, which sat underneath the set when mounted on a tripod. Current consumption was around 3.5 amps on receive (standby) and 5 amps on transmit. It was *not* suitable for mobile in-motion use, as the 12 V battery would be charged by the vehicle dynamo to around 14 volts. This higher voltage tended to weld the vibrator contacts together, and operation would cease. Solution – remove the vibrator can and strike with a hammer!



British Army B44 AM transceiver for 60-95 MHz AM, mounted on tripod with batteries below.

The **Pye Ranger** from 1955 was intended for mobile use. The original design had an all-tube receiver, all-tube transmitter and an asynchronous vibrator power supply with metal rectifier, each on its own metal chassis. The set could produce 5 watts of AM in the VHF range from 25 to 174 MHz. Power draw from a 12 volt battery was 3 amps on receive, 4.8 amps on standby (with TX heaters on) and 8.75 amps on transmit. My own Ranger was a dash-mount unit



Pye Ranger VHF mobile transceiver had transmitter chassis left, receiver chassis right and vibrator power supply at center.

with steel chassis weighing 22 pounds. I had it suspended from the parcel shelf (remember those?) of a small Hillman, where it threatened to pull the shelf down. The RF power amplifier employed a Mullard QQV03/10 (US 6360) VHF dual tetrode.

The Pye Ranger was fine when the vehicle engine was running, but with engine off, the standby current of 4.8 amps might soon drain the battery, if not in good condition.

Vibrator power supplies had significant problems with efficiency and reliability. The vibrator itself was mounted inside a plug-in metal can for easy replacement and generated a loud “buzzing” noise while in operation.



Plessey vibrator.

Transistorization

To overcome the mechanical problems of vibrator power supplies, Pye introduced their **Transistor Ranger**

around 1960, using the same transmit and receive chassis as the original design, but with the vibrator power supply replaced by a built-in transistorized in-



Pye Transistor Ranger radiotelephone with front panel heat sink for inverter transistors. [Credit: Science Museum CC BY-NC-SA 4.0.]

verter. The germanium switching transistors were concealed behind a diecast heat sink on the front panel.

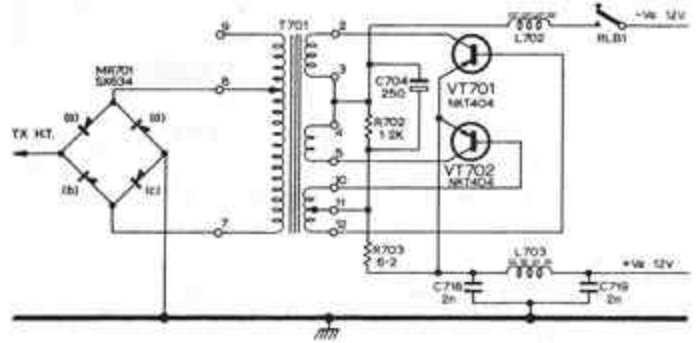
Even with a transistorized power supply, the Ranger could still place a heavy load on the vehicle battery while in standby, with tube heaters on.

Development of germanium transistors such as the Mullard OC171 and AFZ12 for HF/VHF allowed design of a mobile transceiver where the entire receiver, from RF amplifier to audio output stage, was solid-state.



Pye Cambridge mobile radiotelephone with all solid-state receiver and transistor inverter for the vacuum tube transmitter.

The **Pye Cambridge** debuted in 1963 as the first VHF radiotelephone with an all-transistor receiver — and I had several. Power consumption with the vacuum tube heaters switched *off* was only 0.3 amp — so a channel could be monitored for hours on end without fear of draining the vehicle battery. On standby with the tube heaters on, current draw was 1.5 A, increasing to 4.6 A on transmit, with the transistorized inverter running. Power output was 5 to 7 watts AM on 25 - 174 MHz.



Transistor inverter for Pye Cambridge generates high tension from the 12 volt DC supply (on right). Transistors VT701 and VT702 act as a push-pull blocking oscillator, feeding primary of transformer T701. AC output from secondary winding is rectified by four silicon diodes of bridge rectifier MR701 and filtered, generating +260-280V DC.

I also had a remote-mount **UHF Pye Cambridge** from 1966 which operated on FM. There was no heater drain on standby because the

transmitter employed three quick heat tubes, Mullard type YL1130 double-tetrodes. When the press-to-talk button was depressed, the transistor in-



Trunk-mount Pye Cambridge with remote-control box, microphone, loud-speaker and connecting cable.

verter started, with a special transformer winding connected to the three tube heaters. The cathode of the YL1130 was a directly-heated filament rated at 1.1V / 2.9 A that could provide 70% of maximum power output in less than 0.5 second — according to the Mullard specification. In practice, you had to hold down the PTT button, count to three, then begin talking — otherwise the first word or two might be lost. (Not unlike modern-day DMR!)

Vacuum tubes with their requirement for high DC voltages and high-current heaters were on the way out. Silicon transistors capable of high-power VHF operation arrived in the mid-1960s. Pye introduced its **Westminster** range in 1967, claiming the world’s first all solid-state mobile radiotelephone. With no heaters and no inverter to worry about, standby current was only

200 mA, with transmit current of just 2.5 A for 12-15 W FM output. In the 1970s, I had a dash-mount Westminster for use in the shack and a trunk-mount UHF Westminster that I installed in my VW Beetle, crystal controlled on the local repeater frequencies.



Pye Westminster W15FM from 1967 was all solid-state.

Synthesis

Mobile radios have seen several improvements since the first all-solid-state sets of the late 1960s. Integrated circuits arrived in the early 1970s for the IF amplifier and audio output. Frequencies were still quartz-crystal-controlled, requiring a separate transmit and receive crystal for every channel. This could be quite an expense for a 6-channel or 10-channel transceiver, with custom crystals costing £2.16 each + VAT (12½%).

CRYSTALS FOR THE NEW 70CM CHANNELS

GET SWITCHED ON! to the NEW British 70cm Band Plan, with repeaters on RB2 (434-65/433-05), RB4(434-70/433-10), RB6 434-75/433-15), RB10 (434-85/433-25), and RB14 (434-95/433-35) and simplex channels SU8 (433-20) SU16 (433-40), SU18 (433-45) and the new calling channel SU26 (433-50). SU12 (433-30) is designated for RTTY use. N.B. RB = Repeater British System. SU = Simplex UHF. We are stocking the following channels for the new band plan: RB2, RB4, RB6, RB10, RB14, SU8 and SU20 (TX & RX) for use with: PYE UHF Westminster (W15U), UHF Cambridge (U10B), Pocketfone (PF1) and STORNO CQL/CQM 662 all at £2.16 + VAT (12½%). For the PYE U450L Base Station, we have all the above TX crystals plus SU8R and RB14R at £2.16 + VAT (12½%). The other RX crystals for the U450 Base Station together with the remaining SU channels for all the above equipments are available as per class (b) 2 metre crystals.

Part of "P.M. Electronic Services" ad from RSGB 'Radio Communication' June 1976 showing quartz crystals available for Pye UHF equipment.

Frequency synthesizers arrived in the mid-1970s. The Yaesu Sigmasizer 200R of 1974 had a rotary frequency selector, providing 200 channels spaced 10 kHz apart in the 144-146 or 146-148 MHz range. The Yaesu CPU-2500R transceiver, introduced in 1979, had an optically-coupled frequency selection knob and microprocessor (CPU) to control the PLL synthesizer and LED display. The Pye/Philips MX294 VHF FM Mobile transceiver of 1982 had a digital frequency synthesizer capable of generating 256 operating frequencies.



Yaesu CPU-2500R transceiver from 1979 covered 144-148 MHz with four memory channels, scanning and 25W power out.

More memories

As synthesizers, computing power and displays grew more powerful, standby current steadily increased. A modern transceiver such as the Yaesu

FTM-150RASP with over 1100 memories, draws **0.5 amp** on receive and 11 amps on transmit for its full-power 55 watt output. That half-amp receive current is



Yaesu FTM-150R dual band transceiver has **1103** memories and 55W output. still a whole lot better than my old Pye Ranger, which drew **4.8 amps** on standby — with zero memories!

- NM9J

Write for the newsletter

Your editor is always grateful for articles submitted to the *PCARA Update* newsletter. Whether submitted monthly or just occasionally, articles are always welcome, ensuring our pages are filled with interesting ideas. If you have never written for the newsletter, could you be our next contributor? Of course!

What should I write about? Almost everyone in Amateur Radio has a story to tell. It might be about how you became interested in the hobby and the part played by your 'Elmer'. It could be a visit to a convention or Hamfest. You could write a review of your latest acquisition or describe a recent construction project. Make notes as you go along, take photographs, then send to the Editor at the email address on the last page.

What about writing style? Some members have a natural style which is perfect for the newsletter and requires little or no editing. If you have not written anything in a while, try to put yourself in the reader's shoes. What would your reader enjoy? Do you need to set the scene before beginning the body of the article? Do you need to explain new, technical terms? How would you sum up the experience in a final paragraph?

Don't worry about occasional language lapses. It is the editor's job to fix these and check any doubtful facts. Send your text in Microsoft Word format (docx)— though other file formats can also be handled.

What sort of photos? A picture is worth a thousand words — or roughly 40 thousand bytes in each newsletter file. So — take digital photographs and send as separate .jpg files rather than incorporating them into the text file.

If you are photographing radio equipment, try to isolate it from the general clutter in your shack. A plain white or gray background is best. Take care with lighting. If you use flash, shoot at an angle to avoid reflections off shiny surfaces. When using a smart phone, try not to get too close to equipment as it distorts the perspective — back off a foot or two.

- NM9J

Being a unit

Question: What do these four electrical units have in common: milliamps, kilovolts, megohms and microwatts?

Answer: They are all named after scientists and engineers from the 18th – 19th century.



Left to right: André-Marie Ampère, Alessandro Volta, Georg Ohm. [Public domain, Ampère tinted.]

Take a look at the large table below of SI (Système International) **electrical units** and the people they were named after.

In common with other SI units, each **unit symbol** derived from a *proper* name is printed with the first letter in **UPPER CASE** while the full **unit name** should be printed in all-lower case. For example, 4.7 **V** or 4.7 **volt**; 440 **Hz** or 440 **hertz**.

Prefix symbols such as kilo (k), milli (m) etc. are attached to unit symbols *without* any space between prefix symbol and unit symbol, for example **MΩ**, **kHz**.

With the exception of da (deca), h (hecto), and k (kilo), all **multiple prefix** symbols are **UPPER CASE** letters, for example: tera (T) 10^{12} ; giga (G) 10^9 ; mega (M) 10^6 — while all **sub-multiple** prefix symbols are lower case letters, for example: milli (m) 10^{-3} ; micro (μ) 10^{-6} ; nano (n) 10^{-9} . This is the explanation for

Prefix	Symbol	Base 10
tera	T	10^{12}
giga	G	10^9
mega	M	10^6
kilo	k	10^3
milli	m	10^{-3}
micro	μ	10^{-6}
nano	n	10^{-9}
pico	p	10^{-12}

the symbols for megawatt (MW), milliwatt (mW) and microfarad (μF).

Becoming a unit

If you would like to see your *own* name in print as a scientific unit, it would help if you were an 18th-19th century male scientist from Europe with a famous discovery, law or invention.

But — if you were looking to achieve similar fame in the 21st century, your first step would be to discover a new phenomenon that other people need to measure. This achievement might seem unlikely — but remember that every amateur radio station provides an opportunity for science and engineering experiments where you could discover something new next week.

Incidentally, it is no use applying if your name is the *same name* as an existing unit. Anyone named Faraday, Hertz, Henry, Kelvin or Mole as of today need not apply — your new unit name would be too confusing. If your name *begins* with the same letter as a well-known existing unit, you can say goodbye to a single letter symbol, but a two-letter symbol might be allowed — look how we distinguish the henry (H) from the hertz (Hz) and the watt (W) from the weber (Wb).



Left to right: Michael Faraday, Joseph Henry, Heinrich Hertz. [Public domain, Hertz tinted.]

Finally, it would help if your name was chosen for the new unit *posthumously*. It takes a while for new technology to be thoroughly investigated and for your scientific achievement to be internationally recognized. One lifetime later is usually sufficient.

- NM9J

Measurement	Unit name	Unit symbol	Scientist name	Science	Nationality	Dates
Current	ampere	A	André-Marie Ampère	Physicist	French	1775–1836
Potential	volt	V	Alessandro Volta	Physicist / chemist	Italian	1745–1827
Resistance	ohm	Ω	Georg Ohm	Physicist	German	1789–1854
Conductance	siemens	S	Werner von Siemens	Engineer	German	1816-1892
Charge	coulomb	C	Charles-Augustin de Coulomb	Physicist	French	1736–1806
Capacitance	farad	F	Michael Faraday	Physicist / chemist	English	1791–1867
Power	watt	W	James Watt	Engineer	Scottish	1736–1819
Inductance	henry	H	Joseph Henry	Physicist	American	1797–1878
Frequency	hertz	Hz	Heinrich Hertz	Physicist	German	1857–1894

Table of Système International (SI) electrical units and the scientists/engineers they are named after.

Peekskill / Cortlandt Amateur Radio Association

Mail: PCARA, PO Box 146, Crompond, NY 10517

E-Mail: mail 'at' pcara.org

Web site: <http://www.pcara.org>

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

Sun Jan 5 2025: PCARA January meeting followed by Bring & Buy Auction, 3:00 p.m., Cortlandt Town Center CUE Room.

Sat Jan 18: PCARA Breakfast, 9:00 a.m., Uncle Giuseppe's, 327 Downing Dr. Yorktown Heights, NY.

Sat Jan 18: PCARA V.E. Test Session, 11:30 a.m., Putnam Valley Library, see below.

Hamfests

Check with organizers before leaving.

Sat Jan 4 2025: Ham Radio University & Long Island Section Convention, LIU/Post, 720 Northern Boulevard, Brookville, NY. 9:00 a.m. See: <https://hamradiouniversity.org/>

VE Test Sessions

Check with the contact before leaving.

Dec 28: NYC-Westchester ARC, 43 Hart Ave, Yonkers NY. 12:00 noon. Must contact VE, k2ltm'at'aol.com.

Jan 9: WECA, Westch Cnty Fire Trg Center, 4 Dana Rd Valhalla NY. 7:00 p.m. Must contact VE, N2GDY'at'weca.org.

Jan 17: Orange County ARC, Munger Cottage, 40 Munger Dr, Cornwall NY. 6:00 p.m. Contact VE: w2bcc'at'arrl.net.

Jan 18: PCARA, 11:30 a.m., Putnam Valley Library, 30 Oscawana Lake Rd., Putnam Valley NY. Must contact V.E. Mike W2IG, w2igg'at'yahoo.com.



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