PVRC Newsletter
May

Newsletter Editor: John K3TN jpescatore@aol.com
Website: http://www.pvrc.org
Meeting Info: http://www.pvrc.org/chapters.htm
Facebook: https://www.facebook.com/groups/PotomacValleyRadioClub/

President's Letter – Doug AA3S

The yearly ARRL Sweepstakes contests (CW plus Phone events) have been a focus of the Potomac Valley Radio Club since its founding in 1947. PVRC continues to perform very well as a total club and as individual achievers. PVRC won last year, find the detailed 2023 Sweepstakes results in the May QST magazine and see if you can spot all the PVRC winners in several individual categories!

New 5M Contest for 2023-2024 Season

PVRC has a new contest in the PVRC 5M Award program for the 2023-2024 contest season. The Makrothen RTTY contest has a club competition sponsored by the Pizza Lovers 259 contest club on the second full weekend of October. In 2023 there were 674 logs submitted and 134,773 QSOs. (Makrothen is an ancient Greek word and means "great distance" or "some distance away" or "from afar")

Significant Interest in this contest on the part of PVRC members has existed for several years. PVRC won the contest in 2023 with 23 logs submitted and we were the top club in the world. See the first 13 club rankings below. PVRC also won the contest in 2021.

This contest adds to the few contests that support the continued use of the RTTY mode. PVRC member participation can help keep this mode alive as a communication option in the Amateur Radio Operator's toolkit and add to the pool of operators who are proficient in RTTY.

The Makrothen contest does not conflict with any existing 5M contest. The Makrothen RTTY Contest begins 0000Z October 12, 2024 and is composed of three 8-hour sessions:

October 12th, 2024
- 0000Z – 0759Z
- 1600Z – 2359Z

October 13th, 2024
- 0800Z – 1559Z

Rules

Makrothen 2023 Clubs - ranking

Place	Club	#Logs	Total Score
1	POTOMAC VALLEY RADIO CLUB	23	54,684,299
2	INTEREST GROUP RTTY	21	46,291,880
3	ITALIAN CONTEST CLUB	17	20,127,612
4	YANKEE CLIPPER CONTEST CLUB	5	13,236,706
5	FLORIDA CONTEST GROUP	5	12,099,621
6	NORTHERN CALIFORNIA CONTEST CLUB	8	12,075,304
7	REMOTE CONTEST CLUB	1	10,881,417
8	SOCIETY OF MIDWEST CONTESTERS	9	10,209,694
9	ARAUCARIA DX GROUP	8	9,914,028
10	BAVARIAN CONTEST CLUB	11	8,645,150
11	DARC	18	7,227,547
12	RHEIN RUHR DX ASSOCIATION	11	7,221,067
13	UKRAINIAN CONTEST CLUB	6	5,964,226

It may take a few weeks before the website 5M calendar is updated. If you have tips for operating in this contest, please post them on our Reflector as we get closer to the event. Have fun with this one!

The **Dayton Hamvention** begins Friday May 17. Our PVRC Secretary, Tim N3QE, expects to be there with the PVRC banner. If you attend, take photos of people and things you see at the Hamvention and consider submitting them to your PVRC Newsletter, John K3TN. Also consider writing a few words about what you like most about the Hamvention and submit that to the PVRC Newsletter.

73, Doug AA3S, PVRC President

Club Competition – Doug AA3S

Club Results from April:

PVRC wins CQ WPX RTTY 2024!!

Happening in May:

Only one 5M contest in May: **CQ WPX CW**: begins 8pm Eastern Friday May 25.

This CW event is combined with the SSB event that occurred in March to determine the overall winner. *PVRC won in 2023 for the first time in many years*! And we were #2 in the world! Of course, the usual U.S clubs will be looking to topple us this time…

Follow our Reflector postings for any contest tips that may apply to this contest.

State QSO Parties with Club Competitions

Only one State QSO Party with a Club Competition in May that I know of: the New England QSO Party which includes SIX New England states in one contest to increase participation and fun!

The Top Club (outside of New England) plaque is provided by the Florida Contest Group. Wouldn't it feel good to have FCG buy us a plaque (again, since **PVRC won in 2022**)? Can we do it again?

NEQP May 4-5 two sessions: 9 hours, a break and then 11 hours

*2000Z Saturday until 0500Z Sunday (**4pm EDT Saturday** until 1am EDT Sunday)*

1300Z Sunday until 2400Z Sunday (9am EDT Sunday until 8pm EDT Sunday)

In 2023 PVRC was #2 even though we submitted more logs than the winning club, Florida Contest Group. Self-spotting is permitted in all categories.

Read all the rules (https://neqp.org/rules/), but here are some highlights:

Work New England stations once **per band/mode**. Look for mobile stations that change counties, they are considered to be **new stations**, and can be worked for both multiplier and QSO Point credit.

QSO Points: Count one point per phone QSO, two points per CW (includes digital modes) QSO.

Multiplier: Stations outside of New England use **counties** (click to see the list) as multipliers for a total of 68 (CT/9 MA/14 ME/16 NH/10 RI/5 VT/14. Note that CT switched from counties to Regional Councils of Government (2024).

Be sure to specify Potomac Valley Radio Club as your club in your log submission, the sponsor's log submission process may have a pull-down menu for that. See NEQP.org

PVRC 2023 Donors – Ted WA3AER

A belated Thank You goes to the PVRC members in the list below who donated to support the club last year. There is no particular order to this list. The list does not include anonymous donations made to last year's PVRC Scholarship Fund. As Treasurer I specifically requested the ARRL Foundation to provide only monthly and final amounts to see if we had met our $4000 goal; and we did, thanks to you Unsung Heroes (let's do it again this year, so we may continue to award two $3000 scholarships).

These members helped keep PVRC solvent:

KG4USN	N8II	N4CF
K3WA	N4GU	NY3A
N3RR	K4XL	N1EK
K3TN	AG3I	N3MK
N3CKI	K2YWE	K4XL
W4KAZ	N3UM	W3UL
K4FTO	WA3EKL	WA3AER
AB3CV	WK3A	N4IW
W3XY	K3TC	ND3D
W3US	KB3VQC	Cobalt Pictures
KK4R	K3AJ	W3TAS
K1BZ	NC4SW	NC4S
W3MAM	W3US	N4ZR
K3RV	K4TMC	AA3S
K3SX	K4ZW	N3QE
		W3OU

I congratulate you for your generosity and hope you continue to be so. My apologies to any member whom I have inadvertently missed.

Respectfully, Ted Bauer WA3AER
PVRC Treasurer

Tribute to My Life-Long Friend Gary Vest NW5E (SK) – Alan WA3EKL

I met Gary in 7th grade at school, when he and his family moved from Huntington West Virginia to Linthicum Heights MD. My first encounter with his father Paul Vest W8GIO (SK) was when Gary invited me over to see his station two blocks away. My knock at the door was answered by a tall man standing there with only a pair of red and black boxers on, a can of beer in his hand and the word, "Yes?" After explaining who I was, Paul opened the door and said go down those steps and turn left, which I did and found Gary in the basement in a small corner with a Collins S Line and a 4-1000 A glowing red. No meters on the amp. I said, "How do you tune this thing?" Gary's response was "Do you see that white spot on the tube? You tune for minimum white spot. Shortly we were joined by another ham our age who also met Gary at the school and the three of us became lifelong friends.

Gary and I joined PVRC together almost 50 years ago. We both occasionally checked into the 3898 or 3903 alligator net because we knew some of those old hams. I was running a pair of 813's that I built when I was 17. It's now sitting on 40 meters with a better power supply.

Gary's parents were building a house in Bunker Hill WV just outside of Charlestown/Harpers Ferry WV. Gary invited me to do Field Day at the house while it was still under construction. When I got to the house, way back in the woods, it only had sides and roof. Gary and a group of us lashed up a 4 element 10-meter beam with rotor, with 30 feet of Rohn 25 against the outhouse. We put a 3 element 15-meter beam on the chimney. I built a 3-element cubical quad for 6 meters from 1x2s laying around and lashed it to a 20-foot 2x4 which was then stuck down into a stack of bricks. That antenna worked stations from Florida to Maine that Field Day. The phone ops would call "CQ FD this is W8GIO WV" and we would get 5 or more stations from every call area coming back to us. We ate bologna and mustard sandwiches and drank Pepsi the whole weekend. Paul had already erected one 70-foot self-supporting tower. On the Friday night before Field Day Gary climbed up the tower about halfway and lashed an aluminum pole out the side of the tower. Then he mounted a ¼ wave ground plane vertical for 2 meters. We ran at least 150 feet of RG8 back to a Clegg FM22 transceiver which had about 30 watts output. Gary attempted to access the 16/76 repeater in Jessup MD. When he let the mic go not only had Gary accessed Jessup, he had also accessed the 16/76 repeater in Norfolk VA and the 16/76 repeater in Riley NC

I went up to help Gary install a "wide spaced," 3 element, 20-meter beam on the first tower. The boom was maybe 4 inches in diameter. It was so heavy we had to pull it up the tower with block and tackle and the lawn tractor. When the beam got to the top Gary could not handle it alone. He yelled down these words "Alan, get a belt on and get up here." This was my first ever climbing experience. I climbed to the top and Gary hooked up my belt. It took him 10 minutes to convince me to let go of the tower with both hands! Up there you can look down into the Shenandoah Valley. Just after we got the antenna mounted to the mast an old, two fuselage, prop plane started coming at us from a nearby mountain. We both thought we were going to die because the plane was so low. As the plane passed over, we waved at the pilot, and he waved back! I will never forget that.

Gary climbed the tower early Saturday morning and put another aluminum tube through the tower with pulleys and ropes at each end. We created a two element, diamond shaped, cubical quad antenna for 40M that was East, West switchable.

In 1974 Paul acquired a British Ham magazine that had an article in it called “Loop Ariels Close to Ground”. It was all about what we now call Delta Loops. The article showed the various patterns that could be obtained with a full wavelength loop triangles point up or point down and fed at the top, side or in the bottom center. Then the article compared those patterns with dipoles, vees and square loops fed on the bottom, top and sides. Paul, Gary and I began experimenting with triangle (delta) loops in 1975.

On the 20th of January, 20 degrees with a 15 MPH wind going, Gary invited me down to his house in Arnold to help him put up a 40 meter, point up triangle. (the worse the weather the better the antenna works) How true this statement was for Gary. With some type of weight and light line we threw the line over a high branch in one of his trees after a few tries. Then we went inside to warm up. Came back outside, tied the line to # 12 insulated house wire and pulled it over the branch. The one lower corner was a piece of rope with a bowline tied in it going over to another nearby tree. The other corner of the triangle is where the two ends met and were attached to ¼ wavelength of RG11, 75-ohm coax and that was attached to a tree after we had taken another break inside. The base of the triangle was 7 feet off the ground. The other end of the 75-ohm line was connected to a length of RG8 which went into Gary’s radio room. We attached the coax to the radio and the SWR was almost flat across the whole 40-meter band. (no insulators anywhere on the antenna just rope and tree limb) Gary was working DX like they were sitting in the back yard with him.

I had a 65-foot tower at the time with a 20 foot Aluminum “E” beam across the top; looked like a big “T”. It had inverted vees on each end for 40 and 80. I said “if I replace the vee with the 40 loop at 65 feet, the bottom will be at least 18 feet off the ground and I should get out better than Gary. Gary consistently blew me away and both of us were running the same power, about 20 miles apart, same soil conditions and at that time about the same altitude. Only when I lowered the antenna to where the base was about 7 to 8 feet off the ground could I keep up with Gary.

Gary was the president of the Anne Arundel Radio Club for a while. He invited me to participate one year with him at their field day event. AARC was running QRP battery power. This was my first experience with QRP. After that I never stopped QRP Field Day. At that time AARC had a 120-foot Rohn 25 tower mounted on top of a 30 high concrete pedestal making the whole structure 150 feet. Gary asked me to climb up as high as I wanted and put a pulley with rope so we could attach a 40-meter inverted vee. I have never liked heights, but I have climbed since I was 17 and had to stop per my doctor’s orders at 70. I climbed to 85 feet on the Rohn 25 and yelled down “that’s it I’m not going any farther.” That put the vee at 115 feet. With QRP, an 18-year-old girl, and an 8 year old boy in a tiny turquoise trailer on 40 phone the three of us with paper and pencil, paper logs sheets, paper dupe sheets, and no voice recorder we made 609 field day contacts

Gary was a true contester. He spent many contests at my home in Glen Burnie, MD. I leave you with Gary’s words long before the acronym BIC was ever invented.

“The way you win contests is to have warm bodies in front of radios making contacts regardless of the band conditions.”

73 Gary, I look forward to seeing you and Barbara in the future.

Evolution of a Remotely Operated Ham Radio Station – Mike W3IP

Over a 22-year period, lessons learned plus ever changing technology drove improvements in the capabilities and performance of the W3IP remote site.

In 2002, while still living in Maryland, my wife and I purchased some raw land on a ridge line in Virginia after a multi-year search looking for just the right property for a remote ham radio site. Over the course of the next year and a half, AC power was brought in, a tower and shack were installed, and

Figure 1 - The remote shack circa 2005

The W3IP Remote Station - Version 1 (2004-2010)
Radio - TS2000
Amps - none for HF, URT-32s for 2 and 432
Comms link take 1 - Icom ID-1 1296 Digital Radio and two 10 foot dishes
Comms link take 2 - Mom and Pop internet

company

What worked well
The Mom and Pop internet company provided about 1 megabit data rate (on a good day).

What worked poorly
The TS2000 receiver was overwhelmed by a "big gun" less than a mile away.
The tuning of both VHF amplifiers drifted due to large daily temperature variations in the shack - and they could only be manually tuned.
The ID-1 never worked right in my environment - 90% reliability for a digital link is horrible! The advertised 100 Kilobit data rate was actually the one way burst rate - the real two-way data rate was less than half that (with no errors).

some initial antennas were installed. The site was some 70 airline miles from our then home, and I had grand visions of broadband comms on the 1296 MHz amateur band that would bring the touch and feel of every piece of remote equipment back to the house. However, that 1296 link was never successful. Technology improvements like inexpensive commercial microwave transceivers for customer premises and later a home QTH change resulted in different solutions that did work. Along the journey towards a better remote station were many realizations and lessons learned.

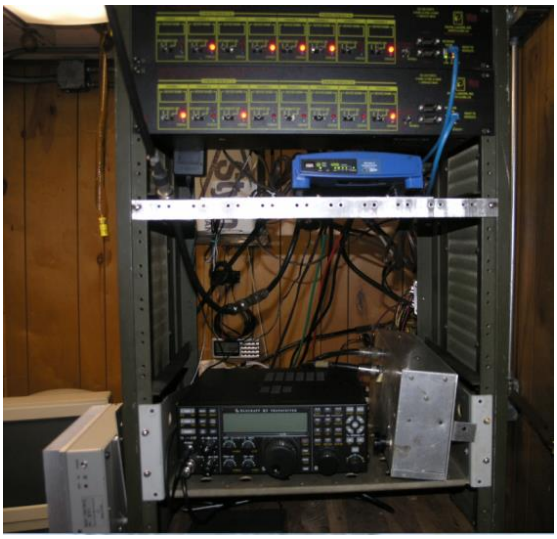


Figure 2 - The remote shack circa 2011

The W3IP Remote Station - Version 2 (2010-2021)
Radio take 1 - K3, individual band VHF transverters
Radio take 2 - upgraded K3, individual band VHF transverters plus microwave transverters
Amps - KPA500, homebuilt amps for 2 - 1296
Data transport - K3/0, Remote Rig, Ethernet power controllers
Comms link take 1 - Mom and Pop internet company
Comms link take 2 - 2.4 GHz WiFi link

What worked well
The K3 had much improved dynamic range
A QTH change in 2013 allowed the installation of a 2.4 GHz WiFi link from the new house to the remote site, bandwidth improved to a couple of megabits.

What worked poorly
Maintenance failures (mostly cables and connectors)

Good Engineering

The first realization was that a robust grounding and bonding plan for the antennas, tower and shack was essential for the survival of the electronics inside the shack. Much has been written on the subject, Ward Silver's N0AX "Grounding and Bonding for the Radio Amateur" is a great resource. Grounding and bonding is **not** a place for shortcuts.

Alongside the grounding and bonding plan there needs to be a wiring plan. In particular, digital wiring such as USB or Ethernet cables should be physically routed away from RF cables as much as practical. Ethernet cables should be shielded, and the mating jacks must also be shielded. This will reduce the leakage of spurious signals into sensitive RF circuits.

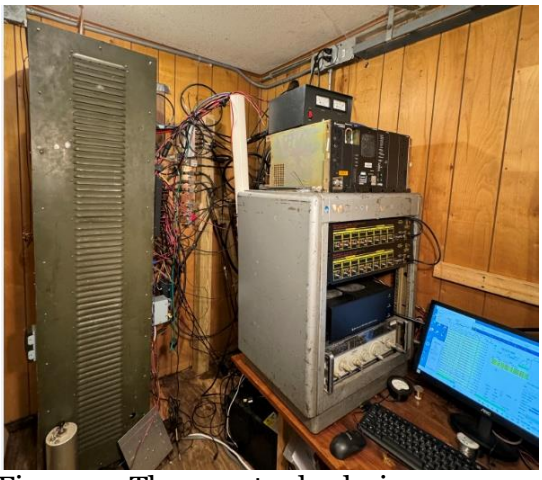


Figure 3 - The remote shack circa 2024

A Bullet Proof Comm System

The first lesson learned (the hard way) was that any comms system for a remote station (including external interfaces, routers, and any unique endpoints) must be absolutely bulletproof. When lost or corrupted data packets, lost AC power, or a depleted backup battery happen (*and it will)*, all of the equipment related to the comms system must be able to automatically reboot or be able to shrug off the errors. Three hours of driving just to restart a router was no fun. I bought an Ethernet controlled AC switch box from Digital Loggers that proved to be very stable. It could ping the first router that I used (which sometimes crashed) and cycle a relay to automatically restart the router as required.

AC Power

Especially during the first few years, my remote site suffered from many AC power outages. I soon discovered that my site was literally near the end of the power line and at the edge of the power company's service area. Repairs by the power company were not always timely. There were two other power companies within a two-mile radius (one on each side of the ridge) that were providing service to nearby areas. This complicated the process of resolving the many power line noise problems that I identified. A few years ago, the local power company finally figured out it was cheaper to bury the power lines than to keep repairing them after every ice and windstorm. I noticed the external noise level on the lower HF bands dropped significantly after those power lines were buried.

Equipment Control

Two decades ago, most ham radio equipment had only a serial port to remotely control their functions. Managing the serial communications of the main radio, rotor controllers, antenna controllers, switches, and comms equipment as more software programs wanted access to the equipment was a continuing problem. Some software that worked fine in hardwired situations quickly failed when jitter from an internet or wireless connection was added to the mix. The selection of a new computer was driven by the number of available serial ports and whether an empty slot was available for a plug-in serial board.

Ground Loops and Birdies

From day one, I noticed mostly low-level birdies across the HF and VHF spectrum. Out came the ferrites to try to knock them down. Many ferrites acquired at hamfests over the years were unmarked and proved to be of no help, so I built a simple ferrite test set (a metal box, two connectors, with a wire between the connectors that ran through the ferrite under test) for my VNWA network analyzer. With this test set, I was able to sort out which of the ferrites were actually useful at HF. Later, I figured out it was easier to just order the best mix and the right size of ferrite for the job (usually a #31 mix) from one of the major distributors. Almost every change of hardware or cables at the station results in some change in the number of ground loops and birdies, and their amplitude. Technology and the supply chain helped here as time went on - the availability of USB Codecs built into the radio, and the easy (and relatively low cost) availability of shielded Ethernet cables went a long way to reducing the number and levels of birdies, and all but eliminated audio ground loops.

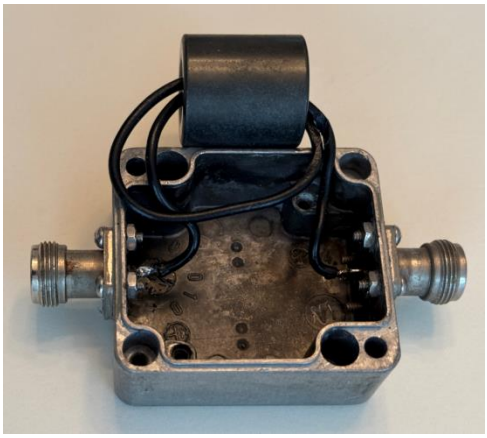


Figure 4 - A Simple Ferrite Test Set

The W3IP Remote Station - Version 3 (2021-2024)
Radio - K4, 5 band VHF transverter, microwave transverters. 10 GHz beacon
Amps - KPA1500, homebuilt amps for 2 - 1296
Data transport - Ethernet, Ethernet power controllers
Comms link - 5 GHz WiFi link

What worked well
Comms link - 20-40 Mbit supports dual panadapters

What worked poorly
The station wiring became a real rats nest, troubleshooting was a nightmare, eventually requiring a complete station rebuild.

Audio Transport

Getting audio to and from the remote site has been a challenge. My personal preference has always been to listen to audio that has not been compressed, however that has not always been the best option. Over the years, I have tried both hardware-aided solutions (Remote Rig) and software solutions (Remote Desktop, Teamviewer, RemAud, RCForb, Mumble). Each solution has tradeoffs. Which is the best will be determined by the available bandwidth on your comm link and how the software handles jitter and dropouts on your specific link. My current preference is Mumble in the lowest compression and shortest audio packet setting. This works well for me today as my link bandwidth is much greater than the roughly 1 megabit per second of data that I receive from the site. That data includes audio from Mumble, two panadapter screens from Win4K4, and the remote desktop screen. All digital processing (WSJT or JTDX) is always done on the remote computer, avoiding any distortion that might be added by an audio compression algorithm.

Ditching the Internet

In 2013 we bought a new QTH about 5 miles from the remote site. The top of the tower was visible anywhere in the new back yard, so it wasn't long until the Mom and Pop Internet company I had been using was replaced by a direct 2.4 GHz point to point Wi-Fi link between the remote site and our new house. This link could reliably pass between 250 kilobits to 1 megabit of data per second. The slower speeds generally happened in the late afternoon and evenings during the week, and on weekends due to QRM from increased Wi-Fi activity from my neighbors and some unlicensed internet service providers. Last year, one of the transceivers failed, so I decided to try a newer generation 5 GHz Wi-Fi link. There was far less QRM on the 5 GHz band from the neighbors, resulting in consistent data rates of 20 plus megabits per second.

The Downside of Incremental Changes

Once I had the remote system up and running, I began to look at how to improve the station, including additions and changes in antennas, cables, and equipment in the shack. The changes seldom fit with the long forgotten original installation plan, which after several years, led a visitor to declare that the shack looked like a gigantic rat’s nest. Separation of RF, digital, and AC wiring had been lost. After 20 years, I made a new plan (with room for future changes), took everything out of the shack and started over to properly rewire the shack.

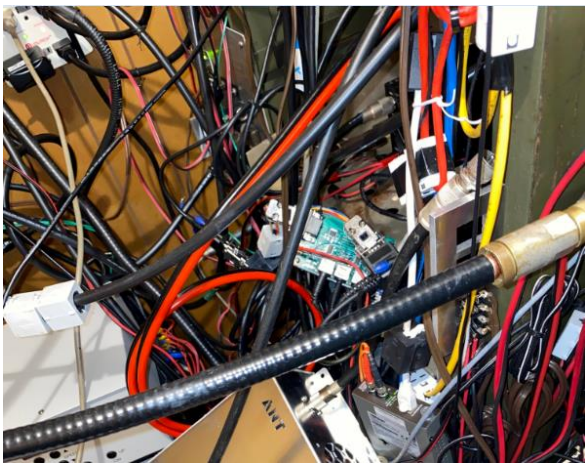


Figure 5 - before the cleanup

Figure 6 - after the cleanup
RF cables to the left, control cables on right

.

Maintenance

Maintenance, or rather the need for maintenance, is something to be avoided. An important lesson learned was how to properly make connectors, weatherproof those connectors and secure the cables in a hostile outdoor environment. The lesson wasn't learned until the first batch of cables and connectors started to fail after only a couple of years. Water ingress was a problem (the first batch of connectors didn't have a layer of Scotch 130 covered by a layer of Scotch 33) as were center pin problems with a couple of type N connectors ("close" to the dimensions stated in the connector assembly instructions was not good enough!). Connectors that have captive center pin contacts are generally better and more forgiving. Taping cables to the boom of yagi antennas is not good enough in a high wind environment. A hose clamp around the tape/cable/boom in at least one place will add to the longevity of the overall assembly.

Documentation

When I first set up my remote system, the block diagram was relatively simple. What could be so hard about remembering a couple of serial port and Ethernet addresses? A few years later, a new computer, more sophisticated hardware, and more software showed up. At that point, I realized that written documentation had become a necessity. Today, the site documentation consists of multiple layers - a page each devoted to bonding and grounding, USB and serial interconnections for the hardware boxes and for each software program, network design, entry panel RF wiring, AC wiring, and DC relay switching. I've learned (i.e. forced myself) to update the documentation whenever I make a change in the shack, otherwise the change is soon forgotten, and troubleshooting later on becomes more difficult.

Wrapup

For most of us, it is hard to anticipate where our interests and where technology will take us in the future of our ham radio journey. Especially for a remote station, make a plan, cover all the bases, learn about the right way to do things, tailor the plan as new opportunities present themselves. Try hard to stick to your plan, and make sure you document your work as you go along.

PVRCer K1RH Wins the 2023 VotA ~~Contest~~ Operating Activity

Across 2023, the ARRL held a year-long ~~contest~~ operating activity to celebrate volunteer efforts and PVRCer Rob K1RH was the clear winner!

Volunteers On the Air Year in Review

VOLUNTEERS ON THE AIR 2023

Bart Jahnke, W9JJ, ARRL Radiosport Manager

While the 2023 ARRL Year of the Volunteers celebration and Volunteers On the Air (VOTA) operating activity have concluded, like similar year-long events that have recently come before — such as the 2014 ARRL Centennial, 2016 National Parks on the Air, and 2018 International Grid Chase — the events remain fresh in our minds. They offered fond memories of experiences enjoyed with new and old friends, and meeting and contacting volunteers and prospective volunteers on our many amateur radio bands during the year.

VOTA 2023 provided abundant on-the-air contact opportunities for everyone. There were more than 134 million Logbook of The World (LoTW) contacts uploaded during the year. Of these, more than 835,000 unique call signs from separate participants that were evaluated for scoring were uploaded. LoTW took in more than 72,000 log-file uploads to amass these totals. Talk about awesome numbers!

During 2023, our VOTA activation calendar (**https://contests.arrl.org/docs/2023-VOTA-State-Activations-Schedule.pdf**) reported W1AW portable stations were activated in all 50 states, as well as in Washington, DC,

Top 25 USA

US Rank	Call Sign	Overall Rank	State Rank	QSOs	Points
1	K1RH	1	1 (MD)	24,622	194,096
2	N6PE	7	1 (CA)	19,963	149,376
3	N8HRZ	9	1 (OH)	19,338	147,252
4	W6MSU	10	2 (CA)	29,049	143,016
5	NF3R	11	1 (PA)	23,402	138,270
6	KC5TT	12	1 (TX)	17,027	136,973
7	AC0W	13	1 (MN)	15,579	135,014
8	K8JH	15	1 (MI)	7,247	133,216
9	K7BG	16	1 (SD)	13,619	132,654
10	AI0Y	18	1 (ND)	13,742	129,853
11	K8BL	19	2 (OH)	21,351	129,028
12	WD9HSY	20	1 (IL)	14,649	121,411
13	W8FSM	21	2 (MI)	17,298	120,324
14	N5EKO	25	2 (TX)	10,224	99,283
15	AD7J	27	1 (NV)	6,611	97,254
16	KX8X	29	3 (MI)	15,617	95,469
17	AB8MO	32	3 (OH)	11,877	93,999
18	N8CWU	33	4 (OH)	11,811	93,790
19	AA3B	34	2 (PA)	14,495	92,095
20	W7MY	35	1 (WA)	17,771	92,044
21	N0POH	36	1 (CO)	11,627	91,704
22	N5RZ	38	3 (TX)	12,954	90,064
23	N7UVH	39	1 (ID)	15,597	90,037
24	KV0I	43	1 (NE)	14,345	88,850
25	N4ZZ	44	1 (TN)	14,665	88,632

April 2024 QST

NC QSO Party Bling for N4YDU and WA4PGM – Marc W4MPS

Photos from today's awards presentation at the Raleigh Amateur Radio Society RARSFest. Nate, N4YDU (L) and Kyle, WA4PGM (R) received their First Place plaques in person for the North Carolina QSO Party 2024.

6 Meter Horizontally Polarized Omni Directional Array-Alan WA3EKL

My goal was to create an inexpensive, easy to assemble, 6 meter array for Ken KG4USN, so he could join us on 6 meters. Since Ken has many tall trees, I wanted to make a light weight, sturdy antenna that could easily be hung from a tree branch. Ken hung this design about 50 feet and got signal reports as good as my 2-element array at 68', mounted on my tower, most of the time with both of us running equivalent power. Ken and I are about 20 miles as the crow flies apart with equivalent soil conditions.

First some background information so you will fully understand what I made. A plain old dipole is ½ wavelength long, physically horizontal, fed in the center, with each side from center being ¼ wavelength and has an input impedance typically of 72 ohms when the dipole is one wavelength or higher above normal soil.

Now let's talk about a Folded Dipole. It consists of two ½ wavelength dipoles, one parallel with the other and very small distance between the two dipoles. Imagine just two lines of equal length horizontal across your screen. Now break the bottom line in the center. This is the feed point. Next on the left end and right end of the two parallel wires put a vertical line between the top and bottom wire. Now you have a typical "folded dipole" whose feed point impedance is 300 ohms. Another way of looking at the folded dipole is like taking a small full wave continuous loop and pulling it apart with your thumbs so the feed point is in the middle of one of the wires between your thumbs. A folded dipole is actually a full wave loop antenna squashed down to two parallel horizontal wires closely spaced apart! (don't stop here the best is yet to come!)

Some of you all remember Iain Kelly, AD5XI/M0PCB from the UK who was here with us for a while and a PVRC member. I was discussing what I wanted to build for Ken with him and he gave me the most amazing piece of information which was the "key" to solving all the above parameters I had set for Ken's antenna design. Iain told me of two British hams, G3TPW and G3TXQ who had done some experimenting with folded dipoles and found that when you make a folded dipole into a "Square Loop" the input impedance of the folded dipole becomes 50 OHMS!!! That was all I needed. I looked up their calls plus their web sites and found the documentation about the folded dipole and making it into and square.I decided to build one for 6 meters.

I used 450-ohm ladder line for the folded dipole. I lashed a couple of sticks together in an "X", made the folded the dipole, attached it to the "X," cut one side of the 450-ohm ladder line in its center and soldered an SO239 connector as the feed point. The outer ends of the 450-ohm ladder line were shorted together. I purposely made the dipole slightly longer so I could cut it to resonance if necessary. I hoisted the completed element, horizontally, about 20 feet off the ground and fed it with a multiple of ½ wavelength of coax at 50.2 MHz to my antenna analyzer. It was resonant at 49.5 MHz with an impedance of 50 Ohms. At that point I knew I could easily construct a phased array that would have gain. To the right is how I constructed the array. See completed array.

The elements that hold the 450-ohm ladder line are made of ½ inch PVC plastic plumbing pipe. The mast pole that separates the two elements is made of 3/4 inch PVC plastic plumbing pipe. All connections are glued together with the correct type of PVC glue. Searching through Home Depot I found a 4 element cross fitting.

This cross fitting holds the four spokes of the "X" which will hold the 450-ohm ladder line. Out of one of the ports on the cross fitting put a short piece of ½ inch PVC pipe. To that attach a "T" connector so that when the cross fitting is sitting flat on the table the "T" connector is sitting vertically straight up. The object is to get the distance between the edge of the "T" connector and the edge of the Cross fitting as close together as possible. Into the vertical top of the top of the "T" connector insert a ½ inch to ¾ inch reducer fitting, and again getting the two fittings close together.

The three other ports on the cross fitting should have PVC pipes extending out about 44 inches each from the cross-fitting connection. The port with the "T" fitting should also extend out 44 inches from the cross-fitting connection. All four pipes should be an equal distance apart.

Now duplicate exactly what you have just made. You now have the top and bottom fixtures to place your 450-ohm ladder line on. I used Scotch 33 electrical tape and wrapped three layers about 3 inches down from the tip ends of each element so the Zip ties holding the plastic clip, holding the 450-ohm ladder line would not slip down the slick PVC pipe. Once the elements and antenna are tuned I wrapped the Zip ties and clips (mine were black) with more Scotch 33 tape to prevent UV deterioration. Don't buy the smallest size they will break. Get at least one size up. DO NOT SOLDER the SO239 connectors on until you read down further about the phasing harness.

The two ends of the dipole will come together opposite the feed point and in the middle of an X. Align the loop on the X so the ends are about 1 to 1½ inches apart. Tune each element individually to wherever you want it to resonate in the band first by lengthening or shorting the ends of the element. Shorten or lengthen each end by an equal amount. Use a piece of 50-ohm coax that is a multiple of ½ wavelength per it's velocity factor for 50.2 MHz. If you don't then the feed line gets into the act, and you will never get the antenna tuned properly and it will not give you the gain you are expecting.

The longest piece of PVC pipe you can purchase is normally 10 feet. You want the elements to be 12 feet apart in order to get the best gain. So, you will need a PVC coupler and two 3/4 inch PVC pipes. To stiffen the ¾ PVC mast I inserted wooden dowel rods that just fit into the inside of the ¾ inch PVC tube. Use Schedule 40 PVC pipe for the mast section.

Phasing harness: This is made of 75 ohm polyethylene coax. Do not use 75-ohm foam lead of any kind. It is unreliable over time and you are not guaranteed of the impedance or the velocity factor with foam lead. Plus, the gas **will** leak out of the gas injected foam over time thus changing the characteristics of the center insulation material, and changing the impedance and the velocity factor of the coax. This is a phased array, and as any phased array depends on the correct phase of the signal getting to get each element via the velocity factor of the coax line to maintain the array's gain and pattern.

If a number of people want to build this antenna then maybe the group could order a larger amount or 75 ohm poly coax at a discount.

The phasing harness is made of two pieces of 75-ohm coax connected together with a coax "T" connector. One piece is ¼ wavelength long per the velocity of the coax and the second piece is ¾ wavelength long per the velocity of the coax.

There is one very important trick to make this phasing harness work correctly. The two loops **must** be physically 180 degrees OUT of Phase. This is easily accomplished. Solder the SO239 connectors on the bottom wire of the 450-ohm ladder line of each loop so that when both element are mounted one above the other on the mast the SO239 connectors will be on the bottom wire. (very important) Next if the top element has center conductor of the SO239 connector to the LEFT side of the bottom wire then place the other SO239 on the bottom element so that it's center conductor is connected to the RIGHT side bottom wire. The two elements are now being fed in phase with this harness.

Explanation: Starting at the "T" connecter the signal goes out the ¼ wavelength coax to the bottom element and is at +90 degrees. The signal also goes out the ¾ wavelength coax to the top element. At ½ wavelength the signal has gone 180 degrees. Then it goes another ¼ wavelength to 270 degrees or -90 degrees. The difference between the two ends of the coax harness is +90 to -90 or 180 degrees meaning the two ends of the phasing harness are 180 degrees out of phase. By switching the feed points on the elements themselves to opposite sides this puts the elements Physically 180 degrees out of phase which then gives each element exactly what it needs to put both elements and the array back in phase!

Try figuring this out with a four-element system. I did for 2 meters and when I started measuring out coax lengths using the .66 VF I found you cannot create a phasing network with elements spaced 5/8 wavelength apart because the coax is to short as you get farther out the harness! You must use all ¾ wavelength coax sections for the phasing harness. If anyone wants to try a four element array, I highly recommend the FREQTESTER square elements and build you own phasing array.

If you obtain RG11 with polyethylene center insulator (the old type) it's VF will be .659 or .66. Using that VF of .66 you will have exactly enough coax to go from each loop SO239 connector over to the mast pole and up or down to the "T" connector. Put the ¼ wavelength coax on the lower loop and the ¾ wavelength coax on the upper loop. On the "T" place a 90 degree elbow. See Picture II. Now all the coax can be tape to the ¾ inch mast the whole array can be hoisted up with a rope over the highest limb you can get it over. You will be amazed how well this antenna will work the higher you get it up especially during contests.

The pattern is more like a "broad leafed" 4 leaf clover which is what most square loops produce. The two side loops will produce the most gain. The front lobe a little less gain and the back lobe a little less then the front lobe. A 4 element version of this will produce 14dBi off the sides lobes, a little over 12 dBi off the front lobe and about 10 dBi off the back lobe.

Check out the pictures for details. We painted Ken's camo and you can barely find it if you don't know where to look.

6 meters is opening up for the season. This array in easy to build, inexpensive and has gain. Hope to hear some of you all on 6 with this array.

(Editor's note: Alan has construction detail pictures that were deleted for space. Contact Alan for more information and photos.)

PVRC DX Marathon Standings – Frank W3LPL

The club score in the DX Marathon is the total aggregate score from logs submitted by members in any entry category.14 PVRC members have submitted logs through April 2024.

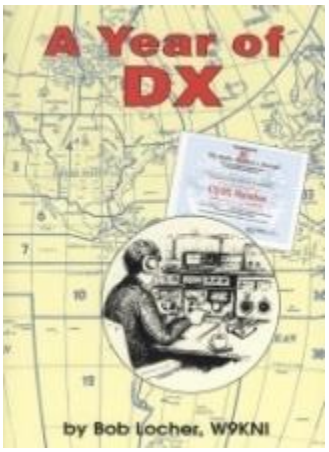
PVRC member participation is simple: just submit your entire 2024 log in ADIF file format. Updated log submissions can be made, your most recent log submission replaces your prior submission. Submit your ADIF log here.

Participating club members must reside within a 250-mile radius. **Exception:** If a member has been a standing member prior to January 1, 2024, and currently lives outside of this radius, that person will be allowed to claim his score towards the club score.

Plaques will be awarded to the winning club at each of three participation levels:

- 75 member log submissions or more.
- 26 to 74 member log submissions.
- 25 member log submissions or less

CALL	SCORE
K5EK	274
K3TN	232
W3LPL	224
W3LL	218
N3AM	204
N4ZR	194
N1EK	191
KK4ODQ	162
N3ZQI	156
N6DW	132
N4CF	128
N5HC	64



PVRC Digital DXCC Standings – Frank W3LPL

Below are the Digital DXCC totals for PVRC members, transcribed from the ARRL DXCC data as of the 20th of each month or so. Thanks to Frank for the data each month to make this a regular feature. Please report any omissions or errors to Frank.

CALL	DXCC	CALL	DXCC	CALL	DXCC
K3WC	353	N4MM	305	AA4NC	219
K4FJ	349	N4TL	300	KU1T	210
W4PK	348	W4VIC	300	WB3AVN	209
N2QT	345	KA4RRU	295	W3DM	197
K3SWZ	343	K4WNW	295	N3ND	190
W3UR	342	KG4W	294	K3WI	188
W4DR	341	W3GG	293	NR4M	186
W3OA	337	W2GG	292	KE4S	186
W3LL	331	W3BW	289	W3LPL	174
N3NT	330	W2YE	277	N4XYZ	174
K2PLF	327	WS6X	274	K3KY	172
K4CIA	327	W3IP	273	K3PU	171
K5EK	327	K3JT	265	KG7H	168
K1HTV	326	W8AKS	265	N4GU	163
N3KK	323	K0GD	261	NA1DX	162
WX4G	323	K1AR	258	KF7NN	161
K3WA	322	N3RC	256	N6DW	159
K4SO	319	N3QE	252	N3AIU	143
K3RA	316	N4JQQ	251	K4HQK	142
N4DB	316	N3KN	250	NE3K	120
W3KX	315	K3TN	247	K3IXD	114
K3SX	315	W3US	241	K4FTO	112
K6ND	315	W3DF	238	N3COB	112
W0YVA	314	W3MR	235	W3MAM	107
K5VIP	309	W3FOX	232	N4ZH	100
K1GG	308	K5RT	228		
N3MN	305	N4NW	221		

ARRL Digital DXCC rules: **Digital**: Contacts can include QSOs using any/all digital modes, in any combination (except CW) since November 15, 1945. Digital modes include FT4, FT8, RTTY, PSK-31, JT65, etc. and any modes that are only machine-readable, and any that use computer sound card technology, with the exception of digital voice, which counts for Phone.

Membership News – Tim N3QE

Chapter leaders please remember to complete the Meeting Attendance Report.
Members can check and update their roster details via the Roster Lookup.

Upcoming Contests – from WA7BNM

May 2024	
+ ARI International DX Contest	1200Z, May 4 to 1159Z, May 5
+ CQ-M International DX Contest	1200Z, May 11 to 1159Z, May 12
+ VOLTA WW RTTY Contest	1200Z, May 11 to 1200Z, May 12
+ His Maj. King of Spain Contest, CW	1200Z, May 18 to 1200Z, May 19
+ CQ WW WPX Contest, CW	0000Z, May 25 to 2359Z, May 26

RED – scores count towards PVRC 5M Awards or Challenge Program

Editor's Last Word – John K3TN

Thanks to W3IP, W4MPS, WA3EKL, WA3AER and W3LPL for contributions to this issue of the PVRC newsletter.

Between the eclipse and spate of solar storms, the sun was very busy in April. Looks like we may be in for an exciting June VHF contest this year and, with any luck, a very fun fall contest season.

Frank W3LPL tried something a bit different this month, tabulating Club members' rankings in the 2024 DX Marathon contest. Not quite as automated as doing the various ARRL DXCC updates Frank can do by downloading standings from the ARRL web site, so if you like this feature, let Frank know and he'll ask for your claimed status for the next update.

The quality and usefulness of the PVRC newsletter depends on contributions from members. If you have photos from Dayton, screenshots of new contest software, or writeups on station improvements or contest war stories, send them in any format to jpescatore at aol dot com.

From the PVRC Treasurer – Ted WA3AER

PVRC has chosen not to implement an annual dues requirement. We depend on the generosity of all our club members to finance our annual budget. In addition, active PVRC members are expected to participate and submit logs for at least two PVRC Club Competition contests per year.

When contemplating your donation to PVRC, each member should consider the benefit you are receiving from PVRC and its many opportunities for your personal growth in our wonderful hobby, then donate accordingly.

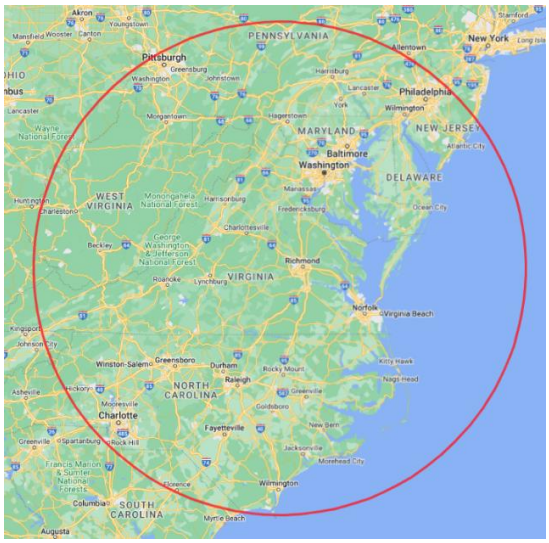
Direct donations to PVRC via Credit Card or PayPal may be made by clicking this "Donate" button and clicking the next Donate button that appears on your screen:

Donate

Donations to PVRC are not tax deductible

Eyeball QSO Directions

The latest info on local club meetings and get togethers will always be sent out on the PVRC reflector and posted on the PVRC web site.



Now a Word From Our Sponsors

PVRC doesn't ask for dues, but the Club does have expenses. You can also support the Club by buying from the firms listed who advertise in the newsletter!

We Make

Field Day Prep

Fast and Simple!

Enjoy the fastest shipping of *everything* you need for Field Day: transceivers, antennas, band pass filters, coax, and more—plus easy ordering and help from hams with decades of experience preparing for Field Day.

See us at Dayton Hamvention® May 17-19 to check out loads of gear on display from leading amateur radio companies, as well as trusted products designed and manufactured by the team at DX Engineering.

Make the Change to a More Satisfying Ham Radio Purchasing Experience

- Easy ordering by phone or web
- Products from over 170 leading manufacturers
- Friendly customer service from hams with a combined 1,000+ years in amateur radio
- Fastest shipping in the industry
- Responsive and ongoing technical support
- Not 100% happy? We make it right!

Order by Phone
800-777-0703 Country Code: +1
9 am to midnight ET, Monday-Friday
9 am to 5 pm ET, Weekends

Order Online
www.DXEngineering.com
Most orders over $99 ship free
Request a Free Catalog

Tech Support
330-572-3200
DXEngineering@DXEngineering.com
9 am to 7 pm ET, Monday-Friday
9 am to 5 pm ET, Saturday

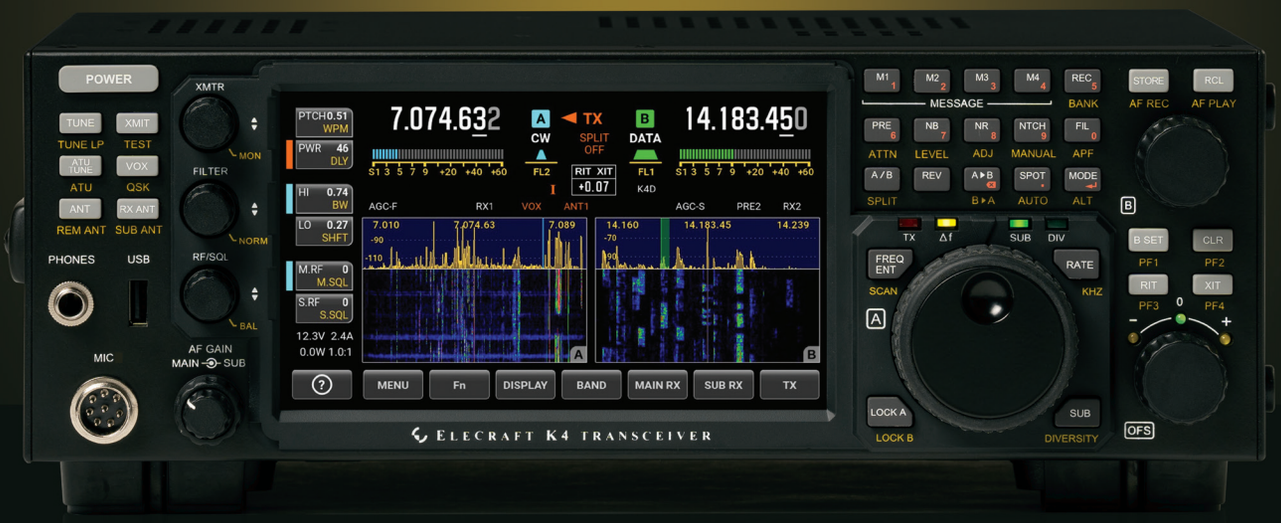
DX® ENGINEERING

CARLSON · VA6AM TRIPLEXERS-DIPLEXERS-FILTERS · REZ ANTENNA SYSTEMS · DX COMMANDER · butternut

See You at Dayton Hamvention,® Building One—1207-1210, 1307-1311, 1407-1411, 1507-1511, 1611

ELECRAFT K4

High-Performance Direct-Sampling SDR



A direct-sampling SDR you'll love to use

Our new K4 transceiver harnesses advanced signal processing while retaining the best aspects of the K3S and P3. It features a 7" touch display, plus a rich set of dedicated controls. Per-VFO transmit metering makes split mode foolproof. Band-stacking registers and per-receiver settings are versatile and intuitive. Control usage information is just one tap away thanks to a built-in help system.

Modular, hybrid architecture adapts to your needs

The basic K4 covers 160-6 m, with dual receive on the same or different bands. The K4D adds diversity receive, with a full set of band-pass filters for the second receiver. (Thanks to direct RF sampling, there's no need for crystal filters in either the K4 or K4D.) The K4HD adds a dual superhet module for extreme-signal environments. Any K4 model can be upgraded to the next level, and future enhancements–such as a planned internal VHF/UHF module–can be added as needed.

Single or dual panadapter, plus a high-resolution tuning aid

The main panadapter can be set up as single or dual. Separate from the main panadapter is our per-receiver *mini-pan* tuning aid, with a resampled bandwidth as narrow as +/- 1 kHz. You can turn it on by tapping either receiver's S-meter or by tapping on a signal of interest, then easily auto-spot or fine tune to the signal.

Comprehensive I/O, plus full remote control

The K4's rear panel includes all the analog and digital I/O you'll ever need. All K-line accessories are supported, including amps, ATUs, and our K-Pod controller. The USB display output supports its own user-specified format. Via Ethernet, the K4 can be 100% remote controlled from a PC, notebook, tablet, or even another K4, with panadapter data included in all remote displays. Work the world from anywhere–in style!

K4 KEY FEATURES

- Optimized for ease of use
- Modular, upgradeable design
- 7" color screen with touch and mouse control
- ATU with 10:1+ range, 3 antenna jacks
- Up to 5 receive antenna sources
- Full remote control via Ethernet

The K4 interfaces seamlessly with the KPA500 and KPA1500 amplifiers

'The performance of their products is only eclipsed by their service and support. Truly amazing!' **Joe - W1GO**

ELECRAFT®

For complete features and specifications visit elecraft.com • 831-763-4211

HAM RADIO OUTLET®

WWW.HAMRADIO.COM

*Free Shipping and Fast Delivery!

FTDX101MP | *200W HF/50MHz Transceiver*

• Hybrid SDR Configuration • Unparalleled 70 dB Max. Attenuation VC-Tune • New Generation Scope Display 3DSS • ABI (Active Band Indicator) & MPVD (Multi-Purpose VFO Outer Dial) • PC Remote Control Software to Expand the Operating Range • Includes External Power With Matching Front Speaker

FTDX10 | *HF/50MHz 100 W SDR Transceiver*

• Narrow Band and Direct Sampling SDR • Down Conversion, 9MHz IF Roofing Filters Produce Excellent Shape Factor • 5" Full-Color Touch Panel w/3D Spectrum Stream • High Speed Auto Antenna Tuner • Microphone Amplifier w/3-Stage Parametric Equalizer • Remote Operation w/optional LAN Unit (SCU-LAN10)

FT-991A | *HF/VHF/UHF All ModeTransceiver*

Real-time Spectrum Scope with Automatic Scope Control • Multi-color waterfall display • State of the art 32-bit Digital Signal Processing System • 3kHz Roofing Filter for enhanced performance • 3.5 Inch Full Color TFT USB Capable • Internal Automatic Antenna Tuner • High Accuracy TCXO

FTDX101D | *HF + 6M Transceiver*

• Narrow Band SDR & Direct Sampling SDR • Crystal Roofing Filters Phenomenal Multi-Signal Receiving Characteristics • Unparalleled - 70dB Maximum Attenuation VC-Tune • 15 Separate (HAM 10 + GEN 5) Powerful Band Pass Filters • New Generation Scope Displays 3-Dimensional Spectrum Stream

FT-710 Aess | *HF/50MHz 100W SDR Transceiver*

• Unmatched SDR Receiving Performance • Band Pass Filters Dedicated for the Amateur Bands • High Res 4.3-inch TFT Color Touch Display • AESS: Acoustic Enhanced Speaker System with SP-40 For High-Fidelity Audio • Built-in High Speed Auto Antenna Tuner

FT-891 | *HF+50 MHz All Mode Mobile Transceiver*

Stable 100 Watt Output • 32-Bit IF DSP • Large Dot Matrix LCD Display with Quick Spectrum Scope • USB Port Allows Connection to a PC with a Single Cable • CAT Control, PTT/RTTY Control

FTM-300DR | *C4FM/FM 144/430MHz Dual Band*

• 50W Output Power • Real Dual Band Operation • Full Color TFT Display • Band Scope • Built-in Bluetooth • WiRES-X Portable Digital Node/Fixed Node with HRI-200

FT-2980R | *Heavy-Duty 80W 2M FM Transceiver*

• 80 watts of RF power • Large 6 digit backlit LCD display for excellent visibility • 200 memory channels for serious users

FTM-200DR | *C4FM/FM 144/430MHz Dual Band*

• 1200/9600bps APRS® Data Communications • 2" High-Res Full-Color TFT Display • High-Speed Band Scope • Advanced C4FM Digital Mode • Voice Recording Function for TX/RX

FTM-500DR | *C4FM/FM 144/430MHz Dual Band Xcvr*

• Front Firing Acoustically Enhanced Speaker System • True Dual Band Operation, C4FM/C4FM Digital D-D Dual Receive • 2.4" High-Resolution Full-Color Touch Panel Display • Built-in High Precision GPS Receiver • Wireless Operation Capability with Optional Bluetooth® Headset

FT-70DR *C4FM/FM 144/430MHz Xcvr*

• System Fusion Compatible • Large Front Speaker delivers 700 mW of Loud Audio Output • Automatic Mode Select detects C4FM or Fm Analog and Switches Accordingly • Huge 1,105 Channel Memory Capacity • External DC Jack for DC Supply and Battery Charging

FT-5DR *C4FM/FM 144/430 MHz Dual Band*

• High-Res Full-Color Touch Screen TFT LCD Display • Easy Hands-Free Operation w/Built-In Bluetooth© Unit • Built-In High Precision GPS Antenna • 1200/9600bps APRS Data Communications • Supports Simultaneous C4FM Digital • Micro SD Card Slot

FT-65R | *144/430 MHz Transceiver*

Compact Commercial Grade Rugged Design • Large Front Speaker Delivers 1W of Powerful Clear Audio • 5 Watts of Reliable RF Power Within a compact Body • 3.5-Hour Rapid Charger Included • Large White LED Flashlight, Alarm and Quick Home Channel Access

FTM-6000R | *50W VHF/UHF Mobile Transceiver*

• All New User Operating Interface-E2O-III (Easy to Operate-III) • Robust Speaker Delivers 3W of Clear, Crisp Receive Audio • Detachable Front Panel Can Be Mounted in Multiple Positions • Supports Optional Bluetooth® Wireless Operation Using the SSM-BT10 or a Commercially Available Bluetooth® Headset

5 Ways to Shop!

- RETAIL LOCATIONS – Store hours 10:00AM - 5:30PM - Closed Sunday
- PHONE – Toll-free phone hours 9:30AM - 5:30PM
- FAX – All store locations
- ONLINE – WWW.HAMRADIO.COM
- MAIL – All store locations

YAESU The radio

ANAHEIM, CA (800) 854-6046	PORTLAND, OR (800) 765-4267	PHOENIX, AZ (800) 559-7388	MILWAUKEE, WI (800) 558-0411	WOODBRIDGE, VA (800) 444-4799	WINTER SPRINGS, FL (800) 327-1917
SACRAMENTO, CA (877) 892-1745	DENVER, CO (800) 444-9476	PLANO, TX (877) 455-8750	NEW CASTLE, DE (800) 644-4476	SALEM, NH (800) 444-0047	ATLANTA, GA (800) 444-7927

*On most orders over $100 in the continental US. (Rural locations excluded.) Contact HRO for promotion details. Toll-free including Hawaii, Alaska and Canada. All HRO 800-lines can assist you. If the first line you call is busy, you may call another. Prices, specifications and descriptions subject to change without notice.