



# PCARA Update



Volume 5, Issue 4

Peekskill / Cortlandt Amateur Radio Association Inc.

April 2004

## Field Day and more

PCARA has requested permission from the Palisades Park Commission to hold our Field Day 2004 activities at Perkins Memorial Point on Bear Mountain. This year Field Day is the weekend of June 26-27. To sign up for Field Day please contact Bob, N2CBH at n2cbh @ arrl.net.

Tickets for the PCARA Annual Raffle are now on sale. The prize this year is a Yaesu VX-2R Dual Band HT. Tickets are \$5.00 each, with a limit of 100 tickets to be sold. The winner will be drawn June 27, 2004 at the conclusion of Field Day. Tickets will be on sale at the April, May, and June meetings and from Malcolm, NM9J (or by mail via the PCARA P.O. Box 146).

PCARA is sponsoring a Foxhunt on the weekend of June 5/6, 2004. Bob, N2CBH and Mike, N2EAB will be organizing the hunt as well as playing the "foxes". Bob and Mike won the honor of leading the activities by winning the last very challenging PCARA Foxhunt on September 21, 2003. Further details will be provided at the April Meeting and on the PCARA website.

PCARA has taken a table at the Mount Beacon Amateur Radio Club Hamfest on Sunday, April 18, 2004. Members are welcome to bring any items they would like to sell. If you are successful in selling any of your boat anchors, all we ask in return is that you

consider making a small donation to PCARA to help offset the cost of the table.

I hope to see each of you at the April 4<sup>th</sup> meeting at Hudson Valley Hospital Center at 3:00 PM.

– 73 de Greg, KB2CQE

## How low can you go?

Join the fun Saturday and Sunday, June 5 and 6! The Fists CW Club station KNØWCW will be operating QRPp with less than one watt RF output. PCARA member Karl Zuk N2KZ challenges you to go the distance and catch his flea-powered transmitters in action! Look for callsign KN0WCW/2/QRPp on 7.040 and 14.060 MHz. Don't say it can't be done! These transmitters have been heard all over the United States and beyond! A special QRPp QSL will be issued to award your catch! Come along with me and catch the flea!

– Karl N2KZ

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## PCARA Officers

President:

Greg Appleyard, KB2CQE kb2cq@arrl.net

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Joe Calabrese, WA2MCR; wa2mcr@arrl.net

Secretary/Treasurer:

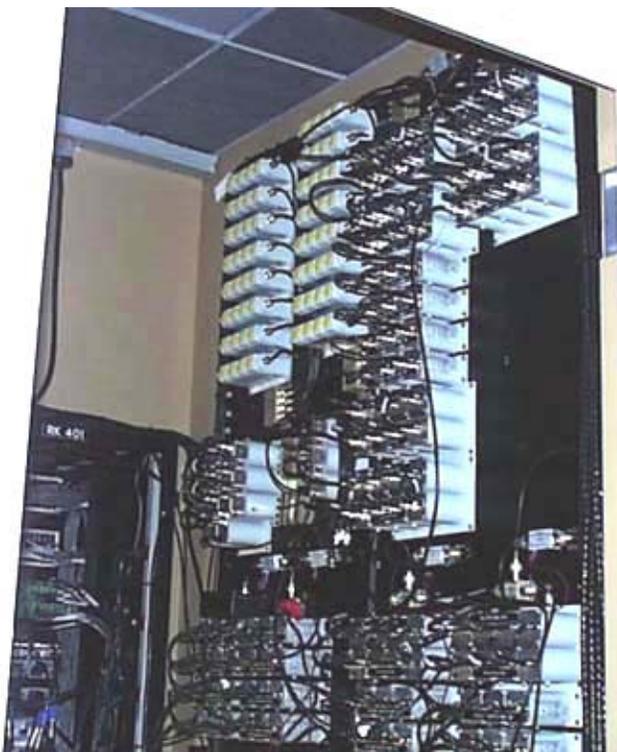
Mike Aiello, N2HTT; n2htt@arrl.net



Greg, KB2CQE mans the PCARA club table at the Orange County ARC hamfest on March 14. PCARA will also have a club table at the Mt Beacon hamfest on Sunday April 18.

## MTV RF — N2CBH

I was recently hired to design and oversee the construction of an RF filter system for MTV Networks in New York City. MTV uses wireless microphones almost exclusively for its Times Square studio location. The system comprises 50 mW transmitters and receivers. Wideband FM is used for high quality audio. The frequencies used fall within the broadcast television UHF band and it became increasingly difficult for MTV to find a clear spot to accommodate its needs. The FCC allows use of this equipment on unused TV channels. In the New York metropolitan area there are surprisingly few unused channels! The turn on of DTV stations and the relocation of several TV transmitters both right across the street from the studio has made it necessary to rethink the RF receive and transmitting system. Enter Broadcast Devices, Inc. my company. BDI is a manufacturer and a consulting firm specializing in broadcast equipment and R.F. systems.

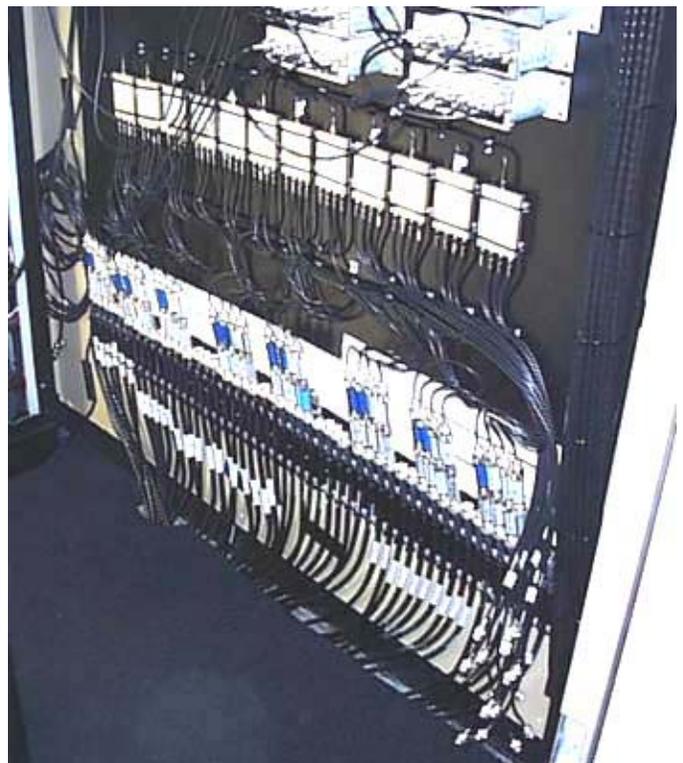


*UHF Filter wall at MTV Networks studio in New York City, developed by Broadcast Devices Inc. for wireless microphone reception. [Photos by N2CBH].*

I was asked to develop a receiving system that would filter out the adjacent channel interference and to selectively filter certain areas of the TV spectrum for use with wireless microphones. What we developed was a system of notch and pass networks, combiners, and splitters that would feed various clusters of antennas that are located throughout the studio complex.

One receiver would have to hear signals from many antennas simultaneously so that talent could walk around in virtually any location within the studio complex and have coverage. Working alongside Jim, N2KLC the studio chief engineer, we developed a system of antennas, feed lines and filter networks to do the job. Many of you know Jim as the club member who supplies our generator for Field Day. Because we were dealing with UHF, the systems were compact. The picture shown of the filter wall comprises several systems that cover different sections of the UHF television spectrum.

In addition to wireless microphone transmitters, the studio also uses transmitters and receivers for IFB (interruptible foldback). This is the cue system that is used from the studio to the technicians with the camera crews. The same technique was needed to combine several transmitters and feed common antennas with the combined signals. This is actually the tough part of the job because if signals are not combined properly, intermodulation distortion can be created causing interference. There are eight transmitters combined in one system. What was done was to try to group transmitters with frequencies as far apart as possible. Next, each transmitter was fed to a sharp band pass filter. This is done to keep the transmitters from “talking to one another”. FM final amplifiers run class C and are susceptible to accepting signals coming back down the antenna line and mixing with the transmitted frequency, causing additional frequencies to be generated. The respective band-passed signals can then be fed to a



*Lower view of UHF filter wall.*

linear combiner where one output containing all of the signals can then be applied to an antenna system.

In addition to UHF television frequencies, MTV is licensed to use business band UHF frequencies for studio coordination, air monitor and IFB. I took several pictures of the Motorola rack that Jim and his staff put together. These radios may look familiar. They are Motorola under-dash Radius units. These are used for both transmit and receive. The transmitters are generally locked on for



Motorola Radius M1225 mobile radio



Rack-mounted Motorola mobile radios used for studio coordination at MTV Networks.

the duration of a show so they are run at low power levels to prevent them from overheating. Note the construction of the systems. Jim and staff were responsible for the design and fabrication of the equipment racks, power distribution and RF distribution. The MTV crew is top notch at “home-brewing” systems. I wish my home-brew projects looked this good! I wasn’t involved with the design of this system but I thought it warranted a few pictures as it is an impressive system.

The total system has been up and running now for a couple of months without a hitch. So the next time you see a wireless mike with an MTV logo on it, remember that a couple of hams had a hand in making it all work!

## Lithium-ion, keep cool!

During the last few years there have been some remarkable developments in battery technology for amateur radio and other portable electronic equipment. The latest innovation is the lithium-ion rechargeable battery – the type that is probably in your cell phone or notebook PC as well as the latest handi-talkies. Lithium-ion batteries are light and store a remarkable amount of chemical energy when charged. The “energy density” has been rising since they came into use in the early 1990s.

A recent article in *Infoworld* draws attention to one of the hazards of lithium-ion batteries that is sometimes forgotten. Conventional cells based on lithium cobaltite, LiCoO<sub>2</sub>, can undergo **thermal runaway** when heated. Battery technologists describe the results as an “event” – the lithium cell generates a great deal of heat, emits lots of smoke, vents flame and may even explode. There is an exciting video of some of these “events” on the web site of Valence Technology Inc. at <http://www.valence.com/SafetyVideo.asp>. If you see this video, you’ll never want to crush or drill into a lithium-ion cell again. (By the way, Valence Technology offers a safer “Saphion” technology based on lithium iron phosphate.)

How should we treat our existing lithium ion cells? My advice is to read the manufacturer’s safety sheet that was probably included with the battery when you bought it. For example, the PB-42L battery for my Kenwood TH-F6A transceiver comes with the following advice:

- Do not short-circuit the battery!
- Do not use or leave the battery near fires, stoves, or other heat generators (areas reaching over 80°C)!
- Do not charge the battery near fires or under direct sunlight!
- Do not pierce the battery with any object, strike it with an instrument, or step on it!

The *Infoworld* article prompts another warning.

**Do not leave your lithium-ion powered transceiver, cell phone or notebook computer in the trunk of a car, where temperatures can go over 140°F on a sunny day.**

Ignore the last item, and you might return to a “cooked” piece of equipment and a damaged vehicle.



Kenwood lithium-ion/cobalt battery

# QRP Kit review - N2KZ

This is not your father's Heathkit. The Oak Hills Research OHR-100A is a compact 5-watt single band transceiver sold in kit form. I built the 30-meter version casually in about 16 hours. I would recommend this kit only to those who have an established background in component level maintenance and repair or kit building. The instructions and documentation are comprehensive and fairly easy to understand. It is a thinking man's kit that requires consideration and planning. Read the manual thoroughly in advance! The results are a neat, full-featured QRP transceiver that is well designed and fun to operate.



*The Oak Hills Research OHR-100A single band CW transceiver.*

The most important step may be the first one. It took about an hour to inventory all the parts. This was an essential requirement since several components could easily be mistaken for others in the kit. There was also a confusing slip of paper that asked builders to use a 3 pF capacitor instead of a 2.2 pF capacitor. The kit provided only 2.2 pF capacitors; but a note in the paperwork added clarity. It seems picocaps are hard to obtain and the values supplied were close enough for this design. After you gain a good foundation for building, it's time to populate the board!

Remember the basics: Be as neat as possible and examine all your soldering several times. You will be the one to fix the problems if they occur! Mount all the parts in the same order. Resistor codes should read from left to right. Written values and legends on parts should all face the same direction and be seen. Bend leads with symmetry and care before soldering. Cut the leads before you solder, not after the joint has been made. Cutting first makes a better joint with no fear of micro-cracking the solder. I learned this tip in a MIL spec. soldering school I once attended.

Here are some specific tips for those who will assemble an OHR-100A in the future: The toroids are very easy to wind. Don't tin the leads of the enamel wires before you solder them to the board. The neatest way is place the toroids onto the board, with wires through the correct holes, snip them to size and then scratch away enough of the enamel wire to make a

good connection. Pre-tinning the leads looks sloppy! Align crystal Y100 very carefully to allow for room for jack J100 so that both will fit nicely on the board. Press firmly on the Molex connectors P101 - P105 when you mount and solder them. Tack in one post while holding the other two (so you don't burn your hand) and then solder the remaining two posts. Wait until the last minute before inserting the chips into their sockets and soldering the antenna wire to J105. These should be the very last two steps before dropping the PC board into place. Instead of bending out and breaking the tabs from the various pots, bend them in and flush, resulting in a nearly sealed pot. When you solder one wire of the capacitor that attaches to J104, keep in mind where the RCA plug will sit and keep that area clear of solder. The length of the Molex connector wires for P103 should be cut to 5 inches long, not 4½ inches as suggested in the manual. Mount the SO-239 antenna connector so that the legend "SO-239" faces right side up and is legible.

Two design items that could be improved: The headphone jack is a mini-jack mono design. Since nearly all headphones are 3-conductor stereo versions these days, an appropriate jack should have been included. Otherwise, you need an external adapter or you'll suffer one-ear-only listening. The "Key" jack is an RCA female. I guess this caters to the external keyer with paddle crowd. Gone are the days of the ¼ inch phone plugs. I would have liked a mini phone jack, at least. Both of these items are personal preferences.

If you happen to also purchase the memory keyer option, drill the hole for the necessary pushbutton before anything goes into the chassis box. Also clean the paint from inside the "Paddle" hole while you are at it. OHR should add to their design a way to retain the text memories of the memory keyer when you disconnect the power. It may become laborious to reprogram the keyer every time you reassemble your station to a new location.

The most difficult part of the project is the tortuous alignment. Alignment is a two-day process. In day one, you carefully toy with coil L114 until its circuit produces a frequency perfectly on 19.100 MHz. You



*The OHR-100A circuit board with all components installed.*

then seal the coil windings with nail polish to fix them in place. Heed my warning: When the nail polish is first applied, the frequency drops and then begins to return to

# Adventures in DXing

## How low can you go? - N2KZ

How much power do you really need to have a nice long rag chew?

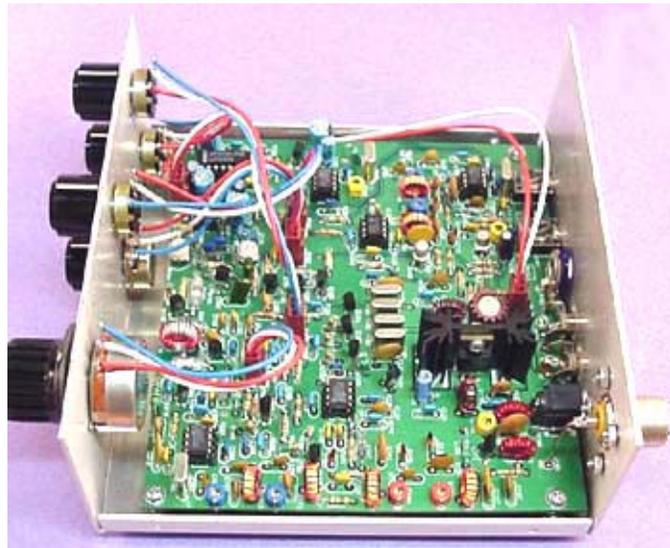
On leap day, Sunday, February 29, I had a wonderful QSO with my pal Paul, VE1DY located in Lower Sackville, New Brunswick, Canada. We were burning holes in the

ionosphere with our gear. I was using a Small Wonder Labs Rock-Mite operating with about 250 milliwatts.

Paul was using a Tuna Tin 2 design, constructed in “ugly” fashion on a copper plate board, with 275 milliwatts. Our total cumulative power was just over half a watt!



*Tuna Tin 2 QRP CW transmitter*



*Circuit board mounted inside the lower case of the Oak Hills Research OHR-100A. Photos by N2KZ.*

19.100 MHz as it dries. It never quite makes it back to 19.100! In my case, it came to final rest at about 19.097 MHz. You should try to compensate by sealing your coil while it is slightly higher than 19.100 MHz. If your end result does not sit perfectly on that frequency, you will have to compensate by moving the front panel knob into proper position to gain accurate final dial calibration. This procedure is goofy. There should be a small trimmer to make this easier to do. Wait a day for the polish to dry and then move on to the rest of the alignment.

You really need a “main station transceiver” to align this kit properly. Without it, you simply can’t continue and achieve viable results. The adjustment of the BFO tone is arbitrary and awkward. I had to tinker with this for quite a while before I understood what was going on and tweaked it to where I liked it. The adjustments for receiver sensitivity and maximum power output were relatively simple. The setting of the sidetone level and sidetone frequency requires some thought but was relatively painless. You can align this kit by yourself, but it requires thought, patience, a frequency counter, a multimeter and an accurately calibrated transceiver.

My persistence paid off. The rig worked on my first try and I had a nice QSO with a ham in Ohio who gave me a 579. I’m sure I will enjoy and love this rig. This is not a thousand dollar spectacular technology display. It is a simple, concise rig that draws little current and is light as a feather. The feature that drew me to purchase the kit was the variable bandwidth control. It works and works well. The receiver is alive and quite sensitive. The transmitter produces a nice sweet note. The QSK is immediate and seamless.

With only a few reservations, I give the OHR-100A a hearty “bravo!”

- Karl Zuk N2KZ

Paul and I first met a few weeks before on the same frequency: 7040 kHz on 40 meters CW. I was using my Rock-Mite while Paul was using his Ten-Tec Argonaut operating QRO at 20 watts. Why he would need so much power, I’ll never know. Paul and I exchanged QSLs. Paul wrote on his card that he would love to try having a QSO with me QRpp to QRpp with his Tuna Tin 2. A couple of e-mails later we were cheering at both ends, quite pleased with our feat. 7040 was actually pretty crowded at my end, with the usual QRP traffic going on during a typical Sunday afternoon. Paul had smooth sailing up north, with very little QRM. We heard each other with rock solid copy. My 250 milliwatts traveled over 500 miles! An amazing feat!

Of course, this is not the end of the story. Paul had a friend who had just finished a Pebble Crusher, another homebrew QRpp rig: Barry, VE1QY, of Kentville,



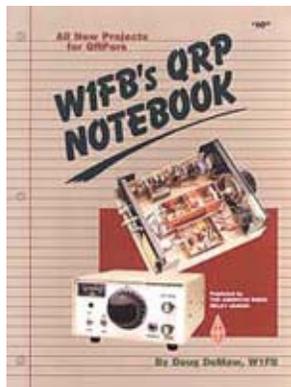
*Pebble Crusher CW QRP transmitter*

Nova Scotia. Paul arranged for Barry to meet me on 7040, at the same time of day, to touch base. Again, it was an easy catch. We worked each other easily using about 250 milliwatts at each end.

It's amazing just how efficient 40 meters can be. All of us used Spartan antennas with simple designs. My antenna is my miracle dipole up about 30 feet using RG-58 coax. One leg actually touches a tree branch and then heads down to a pine tree. I can't imagine what this antenna could do if it were twice the height. One thing for sure: QRPP brings you a lot of fun without a great deal of effort or expense!

The three of us are now discussing just how low we can go and still make contact. Our next challenge is to lower our output powers by a factor of ten. We enjoyed our QSO comfortably at a quarter of a watt. At least in theory, we should still be able to work each

other at 25 milliwatts. Other hams have gone farther and operated in the microwatt range. The challenge is enticing. I have found a single transistor circuit in *W1FB's QRP Notebook*, Doug DeMaw's classic collection of QRP projects and tips. Doug's Mighty Mite design produces about 60 milliwatts with a handful of parts including just one transistor: a 2N4401. The Notebook is available from



the ARRL for only \$10. Frank, W2IX, suggested using an in-line attenuator to reduce my power. This could be another option.

Beware! When you operate QRPP, you might gain celebrity status. After the word gets out that there is a Rock-Mite or other milliwatt rig on frequency, you may become the object of a pileup of hams trying to work your tiny signal. I have experienced this a couple of times. I dare you to find more fun on the air! You may also experience the opposite response. I had a contact sign off with me because he knew I was not on a Rock-Mite. My signal was just too strong! "I don't QSO with liars!"

### **You have to laugh!**

I have discovered that you really don't need more than about five watts to work nearly everyone you can hear. I also operate with a Small Wonder Labs DSW-II (4 watts), an Oak Hills Research OHR-100A (5 watts) and a 30 year old Heath HW-7 (3 watts) together producing a logbook filled with exceptional DX. I use a collection of dipoles to find resonance. Try sitting out in your backyard with your QRP rig running on batteries Field Day style. You will be hooked for life!

The beginning of your QRP career may be closer than you think. Many modern transceivers are capable of variable output power. Take a look at your rig's operating manual. You may be able to lower your power with a simple adjustment. Drop down to 5 watts or below and take your chances. Of course, it's even more fun when you build your QRP gear from a kit or from scratch. At our last PCARA meeting, we saw the smiling faces from the Mike Brothers, N2HTT and N2EAB, and their collection of impressive handmade



*L to R, Mike N2EAB, Karl N2KZ and Mike N2HTT with their fine collection of home-brew QRP equipment at the March PCARA meeting.*

QRP gear. Try it! You'll like it!

With just a little casual operating, I have worked 12 states and 2 Canadian provinces with my Rock-Mite at 250 milliwatts. Some QSOs have been extra fun. Rich, N4HAY, in Morrisville, North Carolina, worked me easily with his NorCal 40 using an indoor dipole. My most distant Rock-Mite catches have been from Texas and Minnesota. Stay tuned!

### **The Penguins Have Arrived!**

Never let logic rule your operating practices. I have just received a QSL from Mike, RW1AI/ANT, at the Russian Vostok Base in Central Antarctica. I worked Mike on September 25, 2002 at 10:50 pm on 15 meters with my trusty Heathkit HW-16 feeding a 40-meter dipole. My output power was about 25 watts. He was virtually in the clear, without a pileup, and an easy catch. The golden rule: Always call even if the band sounds dead! No one will hear you if you do not transmit! Remember to use beacons as a good clue to current band conditions. If you hear a beacon from Paraguay, you can work Paraguay. Just keep trying!

### **Is Anyone Watching?**

Observing the progress of our local HDTV broad-

casters is like watching your garden in springtime! The growth is slow but steady. WABC-TV is now broadcasting a full schedule on their second digital channel 7-2. You can see a variety of shows produced by Channel 7 on weather, consumer issues and other concerns. They often rerun



their local newscasts during prime time. Channel 7-2's signature shows are crusty reruns of the late 1960's western classics such as Chuck Connors in "Branded" and "The Guns of Will Sonnett" featuring Walter Brennan. You can ride sidesaddle with these old boys as they fight for justice on the prairies. Channel 7-2's schedule can be found at [http://abclocal.go.com/wabc/ontv/wabc\\_hdtv\\_schedule.html](http://abclocal.go.com/wabc/ontv/wabc_hdtv_schedule.html). You'll never know when you will be surprised. I have seen the ABC-TV's Engineering Lab HDTV test tape run for hours at a time without warning on digital channel 7-1.

Both WABC and The New Jersey Network are beginning to feed program information data along with their shows. This service provides HDTV over-the-air tuners with the same kind of pop-up data users of DirecTV and some digital cable systems are familiar with. Still, it is frustrating that some New York City broadcasters do not take their HDTV services seriously. WNBC, WPIX and WNET are all technically on the air, but their microsignals are hard to receive unless you happen to be very close to their jury-rigged transmission sites. I can barely pull-in WNBC and WPIX with an 8-bay bowtie array and an antenna mounted pre-amp. Friends swear to me that WNET-DT is on the air, but with just an exciter producing a few watts into a directional antenna pointed towards New Jersey, I see no sign of them at all.

It is possible to DX digital television; and when you lock in a signal, it looks perfect. I can usually see the digital transmissions of WMHT (PBS analog 17/digital 34) in Schenectady and WFSB (CBS 3/33) in Hartford along with several other stations from Connecticut and Long Island. ABC's Channel 6/64 WPVI in Philadelphia has a 24-hour a day weather map on their virtual channel 6-3. I'd really like to see what I would receive when the tropospheric skip arrives this summer. Still, I often wonder if this version of television broadcasting will ever catch on.

Enjoy the warm weather and see you on the air!

— Happy trails de N2KZ Karl.

**Footnote:** Karl reports that the famous Tuna Tin Two QRP transmitter first described by Doug DeMaw in 1976 is being offered once again as a kit. Take a look at <http://www.amqrp.org/kits/tt2/index.html>.



New Jersey Public  
Television & Radio

## PCARA Annual Raffle



**Tickets now on sale!**

**1st Prize:**

**Yaesu VX-2R**

**2 meter/440 Transceiver**

Perfect for beginning Techs and  
great for all Hams

Tickets are \$5.00 donation each.

Limit of 100 tickets sold.

Proceeds to help offset our liability insurance  
premiums and keep our dues low.

**Drawing to be held**

**June 27, 2004**

**at Field Day 2004**

Tickets available at meetings, Hamfests and via  
PCARA, PO Box 146, Crompond NY 10517.

# Peekskill / Cortlandt Amateur Radio Association

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

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E-mail: NM9J @ arrl.net

*Newsletter contributions are always very welcome!*

## PCARA Information

PCARA is a **Non-Profit Community Service Organization**. PCARA meetings take place the first Sunday of each month at 3:00 p.m. in Dining Room B of the Hudson Valley Hospital Center, Route 202, Cortlandt Manor, NY 10567. Drive round behind the main hospital building and enter from the rear (look for the oxygen tanks). Talk-in is available on the 146.67 repeater.

## PCARA Repeaters

**W2NYW:** 146.67 MHz -0.6, PL 156.7Hz

**KB2CQE:** 449.925MHz -5.0, PL 179.9Hz  
(IRLP node: **4214**)

**N2CBH:** 448.725MHz -5.0, PL 107.2Hz

## PCARA Calendar

**Sunday Apr 4:** April meeting, HVHC, 3:00 P.M.

**Sun Apr 18:** Club table, Mt. Beacon Hamfest.

**Jun 5-6:** PCARA Foxhunt weekend, Fists CW station.

## Hamfests

**Sat Apr 17:** Roseland ARC (IRAC) Hamfest, West Orange HS, 600 Pleasant Valley Way, West Orange, NJ. 8:00 a.m.

**Sun Apr 18:** Mt Beacon ARC Hamfest, Tymor Park, LaGrangeville, NY. Doors open 8:00 a.m. **Club Table.**

**Sun Apr 25:** Southington ARA Fleamarket, Southington HS, 720 Pleasant Street, Southington CT. 9:00 a.m.

**May 14-16:** Dayton Hamvention.

**Sun May 23:** Gt South Bay ARC, Hamfest, Sunrise Mall, Massapequa, NY. 8:00 a.m.

**Sat May 29:** Bergen ARA Hamfest, Westwood Regional High School, 701 Ridgewood Rd, Washington Township, NJ. 8:00 a.m.

## VE Test Sessions

**Apr 4:** Yonkers ARC, Yonkers Police Dept., 1st Precinct, E Grassy Sprain Rd, 8:30 A.M. Contact: D. Calabrese, 914 667-0587.

**Apr 8:** WECA, Fire Training Center, 2 Dana Rd., off Rt 9A, Valhalla NY 10595. 7:00 p.m. Preregister with Sanford Fried, (914)273-2741.

**Apr 17:** IRAC Hamfest, West Orange HS, 600 Pleasant Valley Way, West Orange, NJ. 9:00 a.m. Contact: Anthony J Testa, 973 667-4033.

**Apr 19:** Columbia Univ ARC, Watson Labs, 612 W 115th St. New York, NY, 6:30 p.m. Contact Alan Crosswell, 212 854-3754.

**Apr 19:** Split Rock ARA, Hopatcong High School, Rm C-1, Hopatcong NJ. 7:00 p.m. Contact Sid Markowitz, 973 724-2378.

**Apr 23:** Bergen ARA, Westwood Reg HS, 701 Ridgewood Rd, Washington Twnshp NJ. 7:00 PM. Contact Donald Younger 201 265-6583.

**Apr 24:** PEARL, EOC Putnam Co Office Bldg., 40 Gleneida Ave, Carmel NY. 9:00 a.m. Contact Malcolm Pritchard, 914 736-0368



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