



# PCARA Update



Volume 18, Issue 6 Peekskill/Cortlandt Amateur Radio Association Inc. June 2017

## Merry May & jolly June

We had a wonderful turnout of PCARA members for the Orange County Amateur Radio Club **Spring Hamfest** on Sunday April 30, 2017, some of whom brought items along for sale at the club table. The weather was great and the 'fest was quite busy. It was really fantastic to see so many of our members turn out to enjoy the hobby.



L to R: Henry KB2VJP, Lovji N2CKD and Mike N2EAB at the OCARC Hamfest on April 30.

The May 2017 PCARA meeting at NYP/HVH was well attended, 15 members were present and we gained a new member - Matt KD2FME. **Welcome!** Topics discussed during the meeting included financials, status of repeaters, Field Day preparations, Foxhunt, Taconic Road Runners Club Mothers' Day Run support, and club insurance. Show-and-Tell was provided by Jared KD2HDX with his Hammo-Can Pro 18 Go-box.

The May 13, 2017 **PCARA Foxhunt** was rained out, and has been rescheduled for Saturday June 3, 2017. Registration will begin at 2:30 pm at the Beach Shopping Center on Dayton Lane in Peekskill, NY, with the hunt beginning at 3:00 pm. As always, the Foxhunt is open to all. All amateurs and members of neighboring radio clubs are invited. The part of the Fox will be played by Mike N2EAB. Mike has had a couple of extra weeks to plan, so the hunt may be that much more challenging. At the



conclusion of the Foxhunt at 4:30 p.m., we will meet at a local restaurant or diner of the Fox's choosing for refreshments and dinner. The location of the diner will be announced on the 146.670 MHz repeater. If you can't make the hunt, please consider joining us for dinner. *[Rules are reprinted in this issue -Ed.]*

PCARA provided communications support for the Taconic Road Runners **Mothers' Day Race** on Sunday May 14, 2017 at FDR State Park in Yorktown, NY. A pre-race breakfast was provided for attending PCARA members by Jared KD2HXZ which consisted of bacon, eggs, and home fries (delicious). Bagels were supplied courtesy of Larry K2BLB, and coffee by Kevin N2KZE. The race went off well, without any incidents. Other members in attendance included Malcolm NM9J, Bob N2CBH, David KD2EVI, and Al K2DMV. Besides playing the role of Head Chef, Net Control was provided by Jared KD2HXZ. Add another PCARA success story to the books. **Thanks to all!** (See full story in this month's *PCARA Update*).

*(Continued on page 2.)*

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## PCARA Officers

President:

Greg Appleyard, KB2CQE; kb2cqe at arrl.net

Vice President:

Joe Calabrese, WA2MCR; wa2mcr at arrl.net

## Net night

Peekskill/Cortlandt Amateur Radio Association holds a weekly net on the 146.67 MHz W2NYW repeater on Thursdays at 8:00 p.m.

Join net control Karl, N2KZ for news and neighborly information.



[Contd. from p 1] ARRL Field Day 2017 is on the weekend of June 24–25, 2017. PCARA is planning on holding its Field Day activities at Walter Panas High School at 300 Croton Avenue, Cortlandt Manor, NY 10567. Field Day discussion and planning will be a major part of the June meet-

ing, with a separate meeting for participants nearer the event. Check out the PCARA *Yahoo! Groups* page: ([https://groups.yahoo.com/neo/groups/Peekskill\\_Cortlandt\\_Amateur\\_Radio\\_Assoc/info](https://groups.yahoo.com/neo/groups/Peekskill_Cortlandt_Amateur_Radio_Assoc/info)) and listen to the Old Goats Net for details. Also, keep an eye on our local media outlets for results of Henry KB2VJP's efforts advertising 2017 Field Day as PCARA Public Relations Coordinator. Please consider joining us for Field Day this year.



*Flashback to PCARA's Field Day 2016 when the club rented a medium-size moving truck to house two of the stations.*

The next **PCARA Breakfast** has been organized for 9:00 a.m. on Saturday June 10 at Turco's Yorktown by Jared, KD2HXZ.

Keep an eye on your mailbox for PCARA **Membership Renewals**. Joe WA2MCR will be sending them out soon. Please reply promptly and remember that we depend on your financial support. Thanks!

Just a reminder for the PCARA **Special Event Station** on September 9, 2017. We will be commemorating the 250<sup>th</sup> Anniversary of Old Saint Peter's Church located at the intersection of Locust Avenue and Oregon Road in Cortlandt Manor, NY. Please contact us at [mail@pcara.org](mailto:at@pcara.org) if you are interested in joining us.

The next regional Hamfest is the Mount Beacon Amateur Radio Club (MBCARC) Spring Hamfest on Sunday June 4, 2017 at Employee's Recreation Center (near Downstate Correctional Facility), 83 Red Schoolhouse Rd (County Route 36), Fishkill NY 12524. Doors open at 8:00 am.

Our next regularly scheduled meeting is **Sunday June 4, 2017** at 3:00 p.m. at New York-Presbyterian / Hudson Valley Hospital in Cortlandt Manor, NY 10567. I look forward to seeing each of you there.

-73 de Greg, KB2CQE

# Adventures in DXing

- N2KZ

## Sea and Sky

*'Twenty years from now, you will be more disappointed by the things you didn't do than those you did. So throw off the bowlines. Sail away from safe harbor. Catch the wind in your sails. Explore. Dream. Discover.'*

These words from Mark Twain still ring true. Why not explore new radio spectrum as you sail through the seas and skies? There is so much to discover!

Since I work along the northern shore of Long Island Sound, directly adjacent to a large marina in Stamford Harbor, listening to VHF FM marine communications is natural.



*One of the marinas in Stamford Harbor.*

On summer vacation, I also have the opportunity to listen in on all the fishing and recreational activity on Michigan's Lake Huron. What is going on out on the water? Summertime is prime time for marine radio. Just bring along a radio and find out!

My original scanner, a Realistic PRO-38, can only load ten frequencies at a time. I have to be concise



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*Realistic PRO-38 scanner ad from 1987.*



and find the most active channels possible if I want to hear the best of marine radio. I made some obvious choices and had great results! Three frequencies always get a lot of attention:

channel 6 156.300 MHz for safety  
channel 9 156.450 MHz for general ship-to-ship calling &  
channel 16 156.800 MHz for distress.

Coast Guard announcements and communications are found on two channels:

channel 22A 157.100 MHz and  
channel 23A 157.150 MHz.

Five channels are set aside for conversations between non-commercial pleasure craft:

channel 68 156.425 MHz  
channel 69 156.475 MHz  
channel 71 156.575 MHz  
channel 72 156.625 MHz and  
channel 78A 156.925 MHz.

If you have room for one more channel, or if you notice that one Coast Guard channel seems inactive, try squeezing in the channel 13: 156.65 MHz for bridge to ship contacts. This channel is very busy in Stamford Harbor and the surrounding marinas. It is used for calling skiffs and supplies to your boat or requesting mooring assistance.

Consider these ten frequencies as a good place to begin. Would you like to maximize your reception? Pick out some more frequencies for yourself! Try scanning the entire VHF marine band from 156 through 162 MHz and take good notes! With a 50 channel scanner, you can program nearly every marine channel that exists.

You can find a full listing and explanation of all marine channels with this handy sheet from the Coast Guard: <https://www.navcen.uscg.gov/?pageName=mtvhf>. (Look for the 'print-friendly' tab in the upper right.)

You can also continue to scan up to 162.55 MHz to listen to **NOAA Weather Radio** stations transmitting on seven frequencies at:

162.400 MHz	162.500 MHz
162.425 MHz	162.525 MHz
162.450 MHz	162.550 MHz
162.475 MHz	

NOAA weather stations were originally designed to serve the marine public — and they still do (and so much more!)

Scanning the popular VHF marine band provides really interesting listening. Fishermen discuss their catches, locations and bait choices. Coast Guard broadcasts keep you up-to-date with advisories about safety concerns. You'll hear about buoys and lights being out-of-commission, debris sightings, storm, high tide and flood warnings, vessels in distress and even whale



*Coast Guard Radio.*

sightings. On national holidays in Stamford harbor, you can listen in to the co-ordination of the ceremonial cannon blasting at noon! You never know what you will hear, especially on busy summer days with good weather.

Wherever you find a seashore or lake you can listen for marine radio. There is lots of ship-to-ship and ship-to-shore traffic every day. I am too far away from The Hudson River at my QTH to hear marine activity up and down the river but I would love to know what you hear. I would be glad to post your findings on our Facebook page or in a future article. Send me your loggings and I'll share them with everyone!

### Look Up

If you live too far afield from water, just look up. There are passing pilots and navigators transmitting high above your house and you can hear them too! Tune into aircraft frequencies on high VHF from 108 to 136 MHz **AM** and jump aboard!

Yes, you read that correctly. All aircraft communications use good old **amplitude modulation** instead of FM. There is a good reason for that! Even if you are just a casual FM broadcast radio listener you may have noticed that only one FM signal gets through at a time. This is called *capture effect*. The strongest signal on a frequency will be the one you'll hear loud and clear. This is an amiable trait for broadcasting but not for aviation communication.

When you are flying, more than one aircraft may transmit at any given time. AM radio lets all the signals on a frequency blend together and be heard. You'll always hear both voices when two people 'double.' Towers and aircraft controllers cannot risk not hearing a request. They rely on AM as the mode that will insure all messages get through.

Since aircraft can travel up to 40,000 feet or more, you can imagine that their transmissions can be widely heard. At my QTH, I can hear air traffic talking to 'New York Center,' 'Boston Center' and beyond. If you scan the entire aero band, you will most likely hear a lot of

transmissions, but what do they all mean?

You can organize your scanning by discovering the frequencies specifically allocated to local airports. I concentrate on two local airports: **Westchester County Airport** in White Plains (known as KHPN) and **Danbury Municipal Airport** (known as KDXR.) A great place to learn all about airports and their facilities is a website called AirNav. They provide incredible detail about technical specifications and radio frequencies. For example, take a look at their page for Danbury's airport: <http://www.airnav.com/airport/KDXR>.



Control tower at Westchester County Airport, KHPN.

Scroll down to the bottom of these airport summaries and you'll see a heading called 'Instrument Procedures.' You'll see several hyperlinks for terminal arrival and airport approach procedures. Click on the links and descriptive pages will load showing nifty diagrams of how planes approach and depart along with how the airport does business on the ground. At the top of these pages, you will often see mentions of the radio frequencies used for communications. Now you know where to program your scanner or HT!

Another great source for frequency information is the RadioReference site. Here's where you'll find their listing for Danbury Airport: <https://www.radioreference.com/apps/db/?aid=5269>. Similar pages are available for other airports and for marine frequencies, as well.

Here's where to listen:

**Westchester County Airport:**

Tower	118.575 MHz
Approach (landing):	120.8, 126.4 and 124.65 MHz
Departures:	120.55 MHz.

**Danbury airport:**

Tower	119.4 MHz
Approach & departure	126.4 MHz
Ground	121.6 MHz
Unicom (a simplex all-purpose frequency)	122.95 MHz.

Approach frequencies often have the most activity.

Pilots depend on up-to-date weather and airport conditions. Your radio might also be able to hear ATIS stations (*Automatic Terminal Information Service*.) The local ATIS in my neighborhood is called **Carmel**, known as CMK, broadcasting on 116.6 MHz AM. A continuous loop plays a synthesized robot-sounding voice reading current weather and airport conditions while an audio tone identifier sends C-M-K in slow Morse Code.

Each report read on the air announces time in UTC and a consecutive phonetic



CMK ATIS and VOR/DME transmitter site near Rt 35 in South Salem.

letter to insure the content is current and distinct from other advisories. The robot voice will say (for example:) "Westchester County Airport arrival slash departure information foxtrot. One zero five six zulu (1056 UTC/GMT)..." The next updated report will be called 'information golf' and so on. ATIS stations can be challenging to hear at ground level. ATIS antennas are specifically designed to transmit upward for aircraft reception and don't cast much of a signal for people to catch while earthbound!

If you don't have a scanner, you can still get a taste of aero communications via the Internet. LiveATC (Air Traffic Control) has a host of links to various live feeds of airport communications services. You can hear Westchester County Airport at:

<https://www.liveatc.net/search/?icao=KHPN>. Great fun can be had exploring this site!

Take a look at all your radio equipment. Many VHF/UHF radios have expanded range receivers capable of hearing marine, aeronautical and public safety communications. My trusty new Yaesu FT-60R HT can receive both the aero and marine bands. Even the most modest scanners can hear the high VHF band bringing marine communications to you. New sounds are waiting for you!

Speaking of VHF, don't forget the ARRL June VHF Contest running from 2pm Saturday June 10 through 7pm Sunday June 11. For complete details, see: [http://www.arrl.org/files/file/ContestResults/2017/2017 June VHF Full Rules.pdf](http://www.arrl.org/files/file/ContestResults/2017/2017%20June%20VHF%20Full%20Rules.pdf). Also, don't forget the PCARA Old Goats Net, Thursday nights at 8:00 pm on the PCARA 2 meter repeater at 146.67 MHz with a minus 600 offset and a 156.7 PL. All invited!

Until next month, 73 de N2KZ  
'The Old Goat'

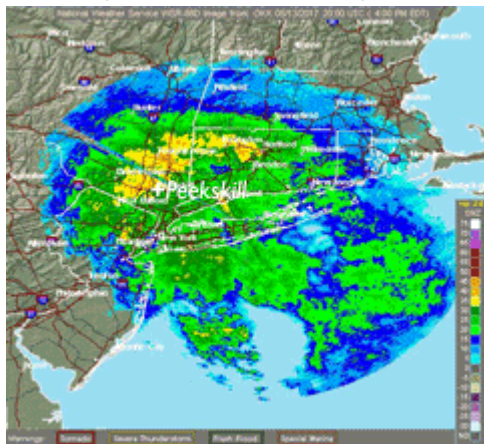




# PCARA Foxhunt

The PCARA Foxhunt, originally planned for Saturday May 13, had to be rescheduled. The revised date is **Saturday June 3**. The reason for re-scheduling was terrible weather on May 13, with rain falling continuously from early morning to later that evening.

Fox-hunting with a beam antenna involves mobile hunters jumping in and out of vehicles, complete with antenna, portable receiver, attenuator and compass in order to take multiple bearings on the fox's hidden transmitter. This would have been distinctly unpleasant in the weather of May 13.



Weather radar image from NWS Upton for 4:00 p.m. on Saturday May 13. Yellow tint shows heavy rain over Peekskill.

## PCARA Foxhunt Rules

Revised date: Saturday June 3, 2017

1. Transmission: FM simplex on 146.565 MHz, horizontally polarized.



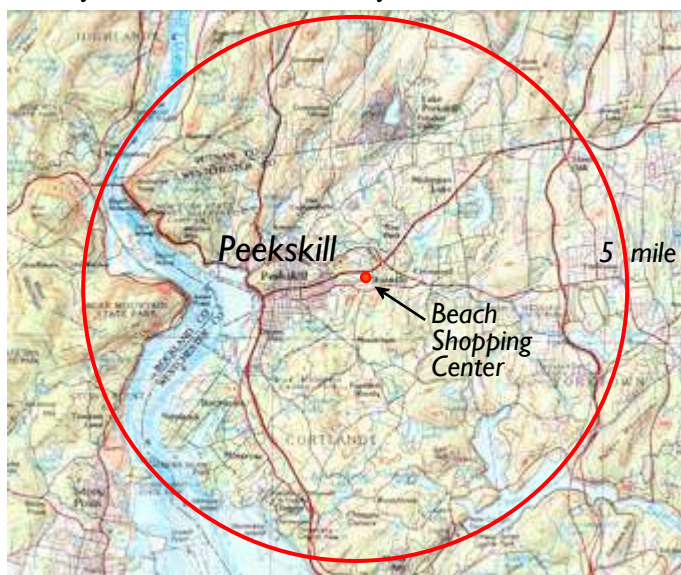
2. Transmissions start at 3:00 p.m. for 5 minutes, followed by 5 minutes off. Second transmission commences at 3:10 p.m. 3 minutes on, 7 minutes off. The fox will not move during this time. This cycle repeats at 10 minute intervals until the last transmission ends at 4:30 p.m. when the fox will announce its location.

3. The opening transmission will include a time check for watch synchronization.

4. All contestants who wish to be eligible for a prize must book in at the **Beach Shopping Center parking lot\***, in Peekskill before the start. Contestants will count as one team if more than one person occupies a car. (i.e. if three in a car, they don't get first, second and third prize.)

\* on the far west side, near Jo-Ann/CVS.

5. No contestant is allowed to move his/her car until the end of the first transmission, so take your time with the first bearing and make it a good one. The transmission will be audible from the start without a super-sensitive receiver.
6. Radio silence will be maintained by all contestants on all frequencies from the first to the last transmission.
7. No excess mileage penalty will be incurred but all contestants are reminded at all times to stay within the law and observe speed limits, parking restrictions etc.
8. The fox will be hidden not more than 5 miles from the start. The location of the fox will not be on property which is inaccessible by car.



The fox will be hidden no more than 5 miles from the start.

9. Upon a contestant finding the fox, please do not shout or in any way give the location away to other contestants. Report your name/callsign to the fox and retire to the place of refreshment immediately. This will ensure that other contestants do not discover the fox because a group of people is hanging around nearby. It is requested that you maintain radio silence even though the fox has been found and the fact that you have found the fox should not be revealed to anyone until the place of refreshment has been reached.
10. The first competitor to locate the fox and positively identify him/her will be presented with a certificate. This competitor will be invited to assume the role of fox for the next foxhunt event.
11. Competitors should convene from 4:30 p.m. at the place of refreshment, which will be announced on-air by the fox.

Rules adapted from Bury Radio Society Fox Hunt  
– Malcolm, NM9J

# Multi-voltage bench power supply - N2CKD

On a recent Earth Day (April 22 in 2017), I took some electronic items to the recycling facility, including several old desktop PC's. Before recycling, I salvaged parts from the computers including the power supply unit (PSU), CD/DVD-ROM drives, SATA drives, internal

clock batteries, power cords, cables, heat sinks and 12 volt cooling fans. The power supplies I salvaged are switched-mode PC-AT and ATX types (ATX = Advanced Technology eXtended). One label indicated a 375 watt



*AT-style power supply has two Molex 6-way connectors for the motherboard.*

power supply capable of delivering 15-18 amps at various voltage levels. These power supplies were probably manufactured between 1984 and the late 1990's.

With the parts on hand, I decided to build a multi-voltage bench power supply yielding +3.3V, +5V and +12V, for use in bread-boarding and other applications. Before starting construction I watched several *YouTube* videos and read power-supply conversion articles which were very useful. I have listed some references below, but many more are available.



*ATX power supply has a 24-pin Molex connector for the motherboard.*

## Housing the supply

I chose to mount my power supply in a mini-storage crate rather than drilling holes directly into the power supply's metal case. I chose the mini-crate because of its small size and easy access for mounting the PSU — with its multiple wire leads and attached connectors. *YouTube* videos and power-supply conversion articles suggest cutting off the wire leads and connectors — but I advise against it. In my method, I retain most of the wires and connectors for possible later use, for connecting accessories such as external

hard drives, CD/DVD-ROM drives, fans, etc.

By not cutting off the main 24 pin ATX connector it becomes much easier to troubleshoot PSU loading and start-up issues — through access to the color-coded connector wiring... for example the green, purple, orange, brown and gray sensing wires that are terminated at the connector pins. It also makes power supply modification easier.



*Storex mini-crate for storing CDs measures 9" x 7 3/4" x 6" high.*

## Strict demands

The original power supply for the IBM PC-AT was designed for a minimum load of 5 amps on the +5 volt line and 2.5 amps on the +12 volt line. More modern ATX power supplies have less demanding minimum current requirements, but without some load on the +5 volt bus, together with proper signals on the brown, gray or green voltage sense wires, the power supply may not start up, or might shut down.

In the early 1980's many older computers that were shipped without an installed hard drive were internally wired with a load resistor connected to the +5V or +12V line. For example, the PC-AT had a 5 ohm 50 watt load resistor connected to the +12V line to simulate the missing hard drive and draw sufficient load current. One of my salvaged power supplies has this load issue and will not power up until connected to a resistor.

For a PC to operate properly, the various voltages from the power supply must be within specification and stable.

When AC power is first applied, the ATX power supply checks whether a motherboard is connected by monitoring the green "power on" line, which it



*ATX 24-pin power supply connector plugged into a computer motherboard.*

is holding at +5V through a pull-up resistor. When this line is grounded by the motherboard through the computer's 'On' switch, the power supply performs an internal self-test and waits for its main output voltages to stabilize. A +5V "power good" signal is then sent out through the gray "PWR\_OK" line to inform the motherboard that it is safe to start the central processor.



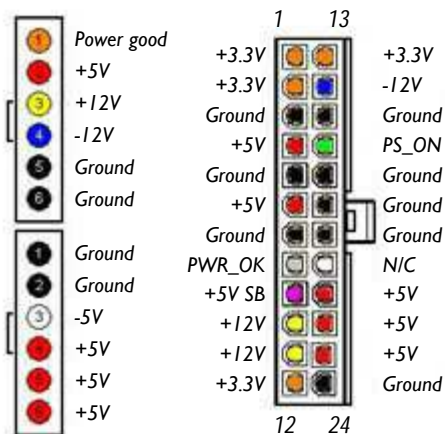
As a result, if an ATX power supply is used *without* an attached motherboard, it needs a power-on switch connecting between the green “power on” line and one of the black ground wires to simulate the signal from the motherboard.

### Colorful cables and pin-outs

Certain PC brands including Dell and HP sometimes use proprietary pin-outs and color codes for the power supply connections — but most PC-AT and ATX power connectors use standard color-coded power leads as follows:

+3.3V supply	Orange
+3.3V Remote-sense	Brown
+5V supply	Red
-5V supply	White
DC Power On (+5V)	Green
+5V standby power	Purple
+12V supply	Yellow
-12V	Blue
0V Ground	Black
Power-OK	Gray

The original AT power supply had a very simple cabling set-up, while ATX power supplies include additional colored sense leads to monitor voltages. When used as a bench power supply, the ATX orange 3.3V supply lead and brown 3.3V sense lead should be connected together. The green ‘DC Power On’ lead (PS\_ON, carrying +5V) and black ground lead



*Color-coding for wires to the motherboard from (left) a PC-AT power supply and (right) an ATX power supply equipped with 24 pin connector. This view is looking up into the ends of the (free) connectors, opposite the wire-entry side.*

should also be connected together via a toggle switch to power-up the PSU. The purple standby power line serves as a +5V power source for standby circuitry on the motherboard whatever the state of the PSU, so an indicator LED or lamp can be connected between this line and 0V (black ground wire). All wire leads — except the sense wires — are 18 AWG so after conversion the high current outlets should have at least two leads of the same color wired in parallel to the same

banana jack to ensure the copper wires can handle the current.

### Conversion parts list

- Mini-storage crate (available at Walmart, \$1.35).
- 4 mm banana jacks: red, yellow, orange, black, (white, blue optional).
- Insulated board – e.g. kitchen cutting board to mount the banana jacks.
- Red, yellow or green LED as power-on indicator.
- Automobile tail lamp: 2-filament 12V bulb (½A/2A) or 10 ohm 10W resistor as power load.
- SPST switch to connect between green and black wires for power-on.
- In-line 12V fuse holders with appropriate fuse (available at any auto store).
- Optional additions - Automobile 12V socket, 5V 1A USB socket, mini voltmeter.



*Banana jacks (sockets).*

### Construction steps

1. Remove ATX power supply from the old PC with all wire leads and connectors (Molex 24 pin, etc.)
2. Cut and mount an insulated board to fit one side of the mini-storage crate. Attach with nuts and bolts.
3. Mark and drill holes on the insulated board to mount the switch and 4 mm banana jacks for +5V (red), +12V (yellow), +3.3V (orange) and ground (black). Drill optional jack holes for -5V (white), -12V (blue). Select one red, yellow, orange and black wire — or

or connect two wires of the same color in parallel for higher current output. Cut off and discard connectors from the selected colored wire leads only. Solder these red, yellow, orange and black colored wires to the appropriately colored banana jacks.



*Power-on switch (left) and (right) four banana jacks are mounted on the insulated board. [N2CKD pics.]*

(Note: if you decide to build a multi-voltage power supply *without* any attached connectors, you can cut off all connectors then bundle cables of the same color together. Connect these colored wires to the appropriate banana jack. You don't need to use a mini-storage crate if you drill holes and mount the banana jacks directly on the PSU case. Always disconnect AC power

and be careful not to touch any charged capacitors while the case is open.)

4. Connect a SPST switch between the green “power-on” wire and any black ground wire. I made my own switch connections by inserting wire ends into the 24 pin connector (see picture). This switch is required to turn the power supply on.
5. If you see a brown sense wire not connected to an orange +3.3V wire lead, connect them together.
6. Leave the gray “power-ok” wire alone. It is not required for this modification.
7. Connect a 10 watt 10 ohm load resistor or an auto tail lamp (12V, 2-filament) to a red and black wire to create a load on the +5V bus. If the resistor is flat-bodied, it should be held against the power supply case to act as a heat sink. The lamp bulb can be directly soldered or mounted in a socket. Some newer ATX power supplies have a load resistor built-in — so you may be able to skip this connection. But keep in mind that if your PSU does not start then it may be looking for a load on the +5V line before it will deliver power on the +12V leads.
8. Connect an LED (use a suitable resistor in series) between the purple wire and black (ground) wire to act as an indicator lamp. The purple wire has a constant +5V regardless of load.
9. If you need the PSU to supply -5V (white) and -12V (blue) you should connect a white wire and blue wire to the additional banana jacks. (Note that the -5V and -12V outputs are low current).
10. Wire an in-line fuseholder in the +12V and +5V leads to provide circuit protection. *Tuck all wires into the mini-storage crate before placing the lid on.*
11. Tuck all wires into the mini storage crate and put a lid on. The lid can be cardboard, tin or thin plywood.
12. Print out labels for the various output voltages, apply them next to the appropriate banana jacks.



*Wires for the ‘Power-on’ switch were simply pushed into the 24-pin connector.*



## Testing time

Install an adequately-sized fuse within the in-line fuseholder(s), based on maximum current usage.

Connect a load such as an external DVD drive or an automobile 12V bulb to a 12V connector plug on the power supply — assuming you did not cut off the disk-drive connectors. Connect a multimeter to measure voltage



*Testing output of the multi-voltage power supply between the yellow (+12V) and black (0V, ground) banana jacks.*

between the red, orange, or yellow banana socket and ground. The red socket should produce +5V, green socket +3.3V and yellow +12.0V. I tested several 3.3V, 5V and 12V gadgets including an FM transceiver using the multi-voltage power supply and they operated perfectly at the indicated power levels.

Note: In order to obtain 13.8V output for use

with amateur radio transceivers, the power supply needs adjustment of an internal voltage regulator circuit. Instructions are provided in the referenced QST article, courtesy of Malcolm NM9J. I plan to make this modification as a follow-on project.



*Power supply finished view.*

## References:

1. “The St. Louis Switcher” by Matt Kastigar, NOXEU, May 2002 QST, pp 35-38. Available to ARRL members at:  
<http://www.arrl.org/files/file/protected/Group/Members/Technology/tis/info/pdf/0205035.pdf>
2. “Toolbox Power Supply”:  
<http://www.instructables.com/id/Toolbox-Power-Supply/>
3. “33 DIY Power Supplies”:  
<http://www.instructables.com/id/33-DIY-Power-Supplies/>
4. “How to Build a Power Supply for Electronics Hobby”:  
<http://www.instructables.com/id/How-To-Build-A-Power-Supply-For-Electronics-Hobby/>



# Mother's Day Race

In early May, Jared KD2HXZ had invited PCARA members to take part in radio support for a 5k Mother's Day Race organized by the Taconic Road Runners Club. Details were circulated through PCARA's Yahoo! Group and on the Thursday evening Old Goats' Net. Volunteers were asked to assemble from 7:00 a.m. on May 14 at Parking Lot #1 of FDR State Park.



## Preparations

On the cold but sunny Sunday morning Jared's E-Z Up pop-up-tent was soon erected in the northeast corner of the parking lot. Jared had brought along cooking equipment to prepare a hot breakfast — with fresh bagels provided by Barry K2BLB and coffee by Kevin N2KZE.



L to R: Jared KD2HXZ prepares breakfast for Bob N2CBH, Greg KB2CQE and Kevin N2KZE.

Suitably fortified, PCARA members were then allocated to positions around the 5k course as shown in the table below.

## Course of the run

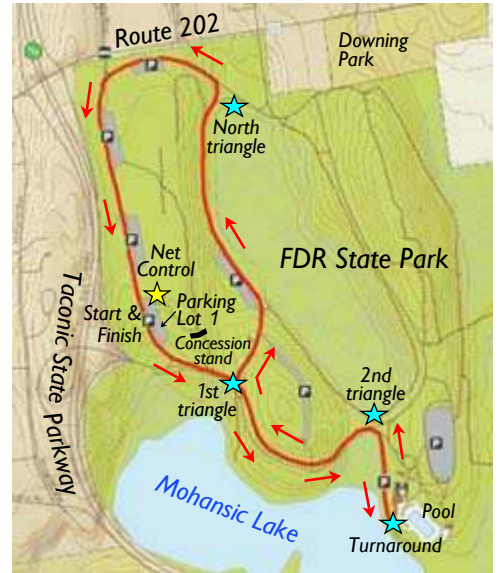
The route for runners begins on FDR State Park Road, alongside Parking Lot #1, then proceeds down the road past the "First Triangle", where three roads meet, on to the "Second Triangle". Before reaching the Park Police building, runners turn south onto the track toward the boat launch, located just below the pool.

At this point, there is a "Turnaround" post from where runners retrace their steps back to the "Second Triangle" and the "First Triangle". They then turn *right* onto the northbound road leading to the "North Triangle", near the Route 202 entrance. The course then circles round, back to Parking Lot 1, where the finish

line is set up. Each post has a TRRC Course Marshal.

A 2 mile walk takes place at the same time as the 5k run. The walk follows a shortened version of the circular course.

PCARA's radio stations were assigned as follows:



Map shows course of the Taconic Road Runners' 5k Mother's Day Race.

Location	Operator
Net Control, Parking Lot 1	Jared, KD2HXZ
Race Director Shadow	David, KD2EVI
First Triangle	Kevin, N2KZE
Second Triangle	Bob, N2CBH and Barry, K2BLB
Turnaround	Al, K2DMV
North Triangle	Greg, KB2CQE

Using his recently acquired "Go-box" and a mag-mount antenna suspended from the tent, Jared established communication with each of the remote stations on 2 meters. Despite the rolling terrain, simplex operation on 146.565 MHz proved entirely adequate to cover the area of the course.



Net control - KD2HXZ.

## At the start line

Runners and walkers checked in at the nearby concession stand then made their way over to the starting line alongside Parking Lot 1. David KD2EVI was staying close to Race Director Melissa Cole, so he could relay messages about



David KD2EVI (right) stays close to Race Director Melissa Cole at the start line.



course conditions, which were then communicated to runners by loud-hailer. The race started shortly after 9:00 am with more than 200 runners and some 50 walkers departing southward toward Mohansic Lake.



Some 250 runners and walkers leave the starting line in the Mother's Day event. KD2EVI and Melissa are visible at left.

Your editor was able to walk over to the concession stand to visit David KD2EVI then on to the First Triangle where Kevin N2KZE was established in his vehicle. This is an important point on the course as runners and walkers have to be guided differently depending on destination.



Kevin N2KZE was assigned to the first Course Marshal position, located at "First Triangle".

There was insufficient time to visit all the other stations on foot — so at this point, I'll hand over to Al, K2DMV to pick up the story with his own account as seen from the race Turnaround post.

## Race report - Al, K2DMV

On Mother's Day 2017, members of PCARA led by Jared KD2HXZ supplied communication assistance to the Taconic Road Runners Club for their Annual Mother's Day 5k Run. The run had a companion walk of shorter distance and the 5k Race was the main event.

Jared came early and treated all the communication volunteers to a wonderful homemade breakfast. Barry K2BLB supplied us with superb warm bagels. (Whoever gets warm bagels anymore? See Barry.)



Jared prepares breakfast for the PCARA volunteers under the pop-up tent in Parking Lot 1. [KD2EVI pic]

The event was operated simplex on 146.565 MHz and we were able to communicate all across the course with a combination of handi-talkies and mobile units.

On hand were Jared KD2HXZ (Net Control), Al K2DMV, Kevin N2KZE, Bob N2CBH, Greg KB2CQE, Barry K2BLB, David KD2EVI, and Malcolm NM9J on camera and auxiliary — whatever needed to be done.

I know appreciation was expressed by the Course Marshals. When we called in for information while they were using cell-phones, we obtained the requested information first. It's good to see how much more direct and immediate radio communication can be compared to a cell phone — where the Marshals had to find a contact, dial the contact, then wait for a response.



A Mother's Day runner approaches the Course Marshal at Al's Turnaround post in FDR State Park. [K2DMV pic]

When I was at the Turnaround post, I asked about routing for the walkers. At that moment Mike the Course Marshal called in via cell phone requesting the same information. He looked surprised about how quickly I received the answer and seemed more convinced about the usefulness of radio communication.

May 14 was a very nice day spent with some very



good people. Great job Jared as Net Control and breakfast Chef.

Thanks to all for volunteering and making radio look useful to the cell-phone generation.

- Al, K2DMV

### At the finish line

Progress of runners and walkers around the course was being reported by our four out-stations. It was not too long before Greg, KB2CQE reported that first runners had reached the last Course Marshal at the North Triangle.

Taconic Road Runners Club had set up their finish line within Parking Lot 1. This included chip-based timing equipment and a large digital clock to display finishing times to participants.



Finishing line equipment in Parking Lot 1.

The first runner turned into the lot and crossed the finishing line around 9:23 a.m., a course time of 20 minutes 18 seconds. She was followed by many more runners over the next 40 minutes. The very last runner crossed the line around 10:00 a.m.



First in the race was #705, Kaitlyn Dibello, seen here turning into Parking Lot 1.

As the parking lot began to empty, PCARA members were able to return to the starting point and assist Jared with dismantling the net control tent and stowing away equipment.

Despite the cool weather, everyone left in a good mood, with the feeling that PCARA's support for the race was a job well done. Full results and additional photos can be found at the Taconic Road Runners Club web

site, <http://www.runner.org/>.

- Malcolm NM9J and Al, K2DMV

## Test equipment for the radio shack

Whether you are a beginner or an experienced radio amateur, no radio shack is complete without **test equipment**. We'll cover the bare essentials here, then move on to 'nice to have' items in a later article.

### Voltage and current

The first item in any radio amateur's electronic tool kit should be a **multimeter**, capable of measuring electrical voltage, current and resistance. Nowadays there are many choices, ranging from a basic meter from Harbor Freight (where they give them away) to more expensive models with better construction, greater accuracy and additional capability for measuring other properties.



Harbor Freight gives away this Centech 90899 multimeter from time to time.



*This Fluke 77 series digital multimeter is more accurate — and safer on high voltages — than the Harbor Freight model. Voltage of an alkaline cell is being measured.*

In the radio room, the most likely item to be measured with a multimeter is **DC voltage** — whether supplied by a lead-acid battery, an alkaline battery, a rechargeable lithium or nickel metal hydride cell (NiMH), or the output from a DC power supply. Voltage measurement of electronic circuitry is an important part of RF alignment and troubleshooting of faulty equipment.

Another popular use for a multimeter is to check an electrical cable — for example to see whether a length of coaxial cable has continuity from end to end for both inner and outer conductors, as well as no short circuit between them. This check is easily carried out with a multimeter set to its **resistance** range.

Some meters also have a "Continuity Test" range which sounds a beeper whenever resistance is below a few hundred ohms.

Most multimeters can measure **AC voltage**, while some models also measure AC current. Please be *very careful* if you are trying to measure the household

supply of 120 or 240 volts AC. High voltages can be deadly if you come into contact with them, and it's easy to do this when you insert test probes into an AC outlet, or into the exposed wiring of mains-powered equipment.

There are better approaches! In order to safely measure AC voltage and current delivered to an item of electrical equipment, you can use a "Kill A Watt" electricity usage monitor by P3 International.



"Kill A Watt" electricity usage monitor can indicate AC voltage and current.

If you only need to check for presence of high AC voltage at an electrical outlet or within an insulated cable, use a **non-contact voltage detector** such as the Fluke VoltAlert™.



Fluke VoltAlert (top) and Klein Tools NCVT-1 non-contact voltage tester.

**AC circuit tester** for checking 3-pin grounded outlets.

If the outlet is wired correctly, two of the three colored lights will illuminate according to a pattern marked on the tester. If the outlet is wired incorrectly, a different pattern illuminates showing, for example, an open ground or hot and neutral wires reversed. Some models include a GFCI test button which adds a temporary leakage path to ground — tripping the ground fault breaker if all is well.



Circuit tester

Most multimeters sold nowadays are **digital**, with a liquid crystal display and internal battery. More expensive models may include features such as capacitor measurement, true-RMS reading of AC voltage and current, frequency measurement and temperature indication using a thermocouple.



Exttech EX400 true-RMS multimeter.

A few decades ago, multimeters were all of the analog variety — with a sensitive d'Arsonval moving coil meter

at the heart of the instrument. There is still a place in the radio shack for an **analog multimeter**, especially if you need to adjust tuned circuits for maximum reading or monitor DC voltages for short-term fluctuation under load.

Analog multimeters are still manufactured by Simpson Electric and Triplet Corporation — though their new prices may come as a shock. Keep an eye open for used models in good condition at the next hamfest.



Simpson 260 series 6 analog VOM multimeter. The 260-8 is still manufactured today.

Purchasing previously-used multimeters raises the question of **accuracy**. A few decades ago, you might have checked your meter against a "Weston Standard Cell", a wet electrochemical cell with a precisely-known voltage. Nowadays you can find inexpensive voltage standards based on the Analog Devices AD584. These are ideal for checking a multimeter's accuracy on its voltage range. Carry out a search for "voltage reference" at your favorite Internet vendor.



KKMoon voltage reference.

Just remember that with *any* multimeter, attempting to read a power supply voltage while the test leads are still in the current-measurement position will probably result in a blown fuse or a damaged meter!

### RF power

One of the more important things that radio amateurs need to know is — how much power is coming out of the transmitter and how much is being reflected back from the antenna? Output power might be less than you expect because of a sagging power supply, misalignment of the tuned circuits, or an equipment fault. Modern transceivers often have a built-in power indicator, but it is unlikely to be very accurate.

Some radio amateurs employ nothing less than a 43 series **RF wattmeter** from Bird Technologies. These instruments offer full-scale accuracy of  $\pm 5\%$  over a wide range of frequencies



Bird ThruLine® Model 43 wattmeter.



(500 kHz – 2.5 GHz) and power levels (100 mW to 10 kW). Unfortunately, Bird wattmeters are expensive and the bundle becomes even pricier when plug-in elements are included to cover all the amateur frequencies and power levels of interest.

Most power and standing wave ratio (SWR) measurements around the radio shack can be covered with one or two **RF power meters** for the HF or VHF/UHF bands. My own collection includes three such meters from Daiwa and Welz. Specified accuracy for these amateur radio products is typically  $\pm 10\%$  of full scale, not as good as a Bird 43, but adequate for most of our needs.



*Daiwa CN-465M is a cross-needle power meter for the 144 and 440 MHz bands.*



*Welz CT-20A 50 ohm load.*

I also have several shielded “dummy loads” from Welz, Diamond and Heath so that power output can be measured while the transmitter is feeding a purely resistive 52 ohm load.

Most RF power meters are capable of indicating the standing wave ratio on a coaxial line connected to the antenna. Solid-state transmitters work best with a low SWR, typically less than 1.5:1. The radio’s built-in protection circuitry may reduce output power if SWR rises any higher. A very high SWR ( $>5:1$ ) might indicate a faulty cable or antenna. A very low SWR (1.00:1) could mean that the coaxial cable has excessive loss — perhaps because the air-spaced insulation has become contaminated with moisture.

### Antenna measurements

Long ago, the only indication we had of correct antenna operation was with a **thermocouple RF ammeter** inserted into the antenna line. The more ampères of antenna current, the better the signal! This was followed by use of a standing wave ratio meter or **reflectometer**, which indicates presence or absence of reflected power in the coaxial feeder. Both methods require use of an external transmitter to produce the RF signal for measurement and they can only indicate antenna char-



*Radio-frequency ammeter with thermocouple movement from 1944. Note the non-linear scale.*

acteristics at that single operating frequency.

For a short time in the 1970s-1980s, the **antenna noise bridge** became popular. It contains a broadband noise source and an RF impedance bridge – but it also required a suitable receiver for detection of the signal null when the bridge was balanced.

Antenna measurement took a leap forward in 1991 when MFJ introduced their \$200.00 MFJ-249 HF/VHF SWR Analyzer. Within the metal box was a switched-range signal source covering 1.8 – 170 MHz, a digital frequency counter with LCD display for accurate measurement of frequency, and a 50 ohm RF bridge with single analog meter to indicate standing wave ratio. Power requirements could be satisfied with an external 12 volt power supply or by filling the internal battery holder with eight AA cells.



*MFJ-249 SWR Analyzer (as seen at BARA Spring Hamfest).*

This fully self-contained approach, with built-in power supply, made the unit highly suitable for amateur radio field work. A newly-erected antenna could be ‘swept’ across a range of frequencies to find out where the antenna’s standing wave ratio was at a minimum.



*The MFJ-259C is one of MFJ’s current range of SWR analyzers.*

MFJ made significant changes to the original MFJ-249 — the MFJ-249B and MFJ-249C moved the SWR reading from the analog meter to the LCD panel (possibly *not* an improvement). The MFJ-259 added a second analog meter alongside the MFJ-249’s single SWR meter to indicate RF resistance. The current model MFJ-259C has two analog meters for SWR and resistance, while the liquid crystal display can show the oscillator frequency plus numeric display of SWR and complex impedance ( $R + jX$ ).

There are several alternatives to the original MFJ SWR analyzers, for example the Comet CAA-500. A recent development is the growing range of VNA (vector network analyzer) models, including **graphic analyzers** such as the RigExpert AA-170 and MFJ’s MFJ-223 and MFJ-225. These units employ micropro-

processor-controlled frequency synthesizers to automate oscillator tuning. They can then plot SWR against frequency and other useful data on the built-in display.

Whichever model of analyzer you decide on, you can be sure it will provide insight into the operation of antennas you build or buy. Antenna analyzers can also be used for other investigations including generation of an RF test signal, frequency measurement, coaxial cable velocity factor, and analysis of filter characteristics.



*RigExpert AA-170 graphic analyzer can plot SWR or R and X against frequency.*

### Second receiver

Fifty years ago, a typical amateur radio setup would have included a transmitter and a *separate* HF receiver, with an antenna changeover relay to switch from receive to transmit. This arrangement allowed the on-air transmitted signal to be heard in the



*Yaesu/Sommerkamp separates: FLDX-500 HF transmitter and FRDX-500 receiver, in use at the G3VNQ radio shack of 1977.*

receiver — provided there was a ‘monitor’ control to cut back receiver gain during periods of transmission, reducing any RF overload and audio feedback.

Separate transmitters and receivers are mostly a thing of the past, with self-contained transceivers standard in most shacks today. As a result, it is not so easy to monitor one’s outgoing RF signal. But there is one item in your shack that may allow you to check the outgoing signal. That item is a **second receiver** or transceiver for the band of interest.

Let’s suppose you have a 2 meter FM handi-talkie that is misbehaving on transmit. Do you have another radio capable of 2 meter reception? Perhaps it’s a mobile radio, a multimode HF/VHF transceiver, or even a VHF scanner. Just set the frequency of the second radio to your transmit frequency, turn the volume down and listen carefully to your own modulation. Remember that for repeater operation, your HT will be transmitting on the repeater’s *input* frequency, so that’s where you need to listen.

You can extend this approach to monitoring CW and SSB transmissions on HF or VHF/UHF — though

you may need to remove the antenna from the second receiver to prevent signal overload. Frequency measurement is also possible with a well-calibrated second receiver, switched to SSB.

### Component tester

If you are a constructor of electronic kits or you like to assemble circuits using items from your own junk box, then you probably need a **component tester**.

You can always check the value of resistors using a multimeter set to its ‘ohms’ range. But it is not so easy to measure the value of capacitors and inductors. I have a Heathkit solid-state **RLC bridge** that can make these measurements using AC excitation frequencies of 1 kHz, 10 kHz and 100 kHz.



*Heathkit IB-5281 RLC bridge can check the value of resistors, inductors and capacitors.*

Nowadays it is much easier to use an **electronic component tester** such as the Peak Electronic Design LCR40 or LCR45 “LCR and impedance meter”. These compact instruments can identify the type of component connected to the test leads, then measure its value and display full results on the built-in LCD screen.



*UK company Peak Electronic Design manufactures two models of automatic LCR and impedance meter including the LCR45.*

For more details see: <http://www.peakelec.co.uk/>. USA distributors for Peak Electronic Designs’ range

of test equipment include MCM Electronics, <http://www.mcmelectronics.com/> and Alltronics, <http://www.alltronics.com/> .

- Malcolm, NM9J



# PCARA Gallery

Here are pictures taken during the past month of PCARA people and their activities.

## Orange County ARC Hamfest



Greg KB2CQE takes his place behind the PCARA club table at the OCARC Hamfest in Middletown, NY on April 30<sup>th</sup>. Many members and friends came by the table and several member items were sold.

## May meeting

At the May 7 meeting, Jared KD2HXZ provided a 'Show and Tell' with his latest acquisition — a Hammo-



Jared KD2HXZ demonstrates his go-box based on a Hammo-Can Pro 18 and Yaesu FTM-100D transceiver.

Runners Mother's Day race in FDR State Park where KD2HXZ was net control.

## New York QSO Party

As reported in the April newsletter, PCARA took first place in the "Multi-One Low Mixed" class of the 2016 New York QSO Party from the location of Joe, WA2MCR. The "Multi-One Low Mixed" classification means: Multiple operators with only a single transmitted signal, running 5-100 watts.

PCARA's plaque for this achievement has now arrived. It records that W2NYW took first place in 'New York Multi One' Low Power class, scoring 35,690 points. Operators were Joe, WA2MCR, Charles N2SO, Lou KD2ITZ and NM9J.



Joe WA2MCR shows off the plaque recently awarded for PCARA's entry in the 2016 New York QSO Party.

## BARA Hamfest

Bergen ARA's Spring Hamfest on May 27 was well-attended with fine weather. Here is a picture of two of the visitors from PCARA.



L to R: Malcolm NM9J and Mike N2EAB enjoy the fine weather at BARA's Spring Hamfest in Township of Washington, NJ on Saturday May 27.

# 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 Update Editor:** Malcolm Pritchard, NM9J

E-mail: NM9J 'at' arrl.net

*Newsletter contributions are always very welcome!*

Archive: <http://home.lanline.com/~pcara/newslett.htm>

## 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 NewYork-Presbyterian/Hudson Valley Hospital, Rt. 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. \*Apart from holidays and July/August break.

## 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

**Sat June 3:** PCARA Foxhunt, 2:30 for 3:00 p.m. start from Beach Shopping Center, Peekskill. (Postponed from May 13.)

**Sun June 4:** PCARA Meeting, New York Presbyterian - Hudson Valley Hospital, 3:00 p.m.

**Sat Jun 10:** PCARA Breakfast, Turco's Yorktown, 9:00 a.m.

**Sat-Sun Jun 24-25:** PCARA Field Day, Walter Panas High School, Cortlandt Manor.

## Hamfests

**Sun June 4:** Mt Beacon ARC Spring Hamfest, Employee Rec Cntr, 83 Red Schoolhouse Rd., Fishkill NY. 8:00 a.m.

**Sun June 4:** LIMARC Hamfest, Briarcliffe College, 1055 Stewart Ave, Bethpage NY. 9:00 a.m.

**Sun June 11:** Hall of Science ARC Hamfest, NY Hall of Science, Flushing Meadows, Queens. 9:00 a.m.

**Sat June 17:** Raritan Valley Radio Club, W2QW Hamfest, Piscataway High School, Piscataway NJ. 8:00 a.m.

**Sun July 16:** Sussex County ARC Hamfest, Sussex Co Show-grounds, 37 Plains Rd Augusta NJ. 8:00 a.m.

## VE Test Sessions

**Jun 3, 10, 17, 24:** Westchester ARC Radio Barn, 4 Ledgewood Pl, Armonk, NY. 12:00. Pre-reg M. Rapp, (914) 907-6482.

**Jun 4:** Mt Beacon ARC Hamfest, 9:00 a.m. J. DeLorenzo (845) 534-3146  
**Jun 8:** WECA, Westchester Co Fire Trg Center, 4 Dana Rd., Valhalla, NY. 7:00 p.m. S. Rothman, (914) 949-1463.

**Jun 11:** Yonkers ARC, Will Library, 1500 Central Pk Ave, Yonkers NY. 1:00 p.m. Pre-reg. John Costa (914) 969-6548.

**Jun 16:** Orange County ARC, Munger Cottage, 183 Main Street, Cornwall NY, 6:00 p.m., J. DeLorenzo (845) 534-3146.

**Jun 19:** Columbia Univ ARC, 531 Studebaker Bldg, 622 W 132nd St, New York. 6:30 pm, Alan Crosswell (212) 854-3754.



Peekskill / Cortlandt Amateur Radio Association Inc.  
PO Box 146  
Crompond, NY 10517