



PCARA Update



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Cooking up a storm

Wow! PCARA's participation in ARRL 2017 Field Day was an unparalleled success. I have difficulty in



[WWW.ARRL.ORG](http://www.arrrl.org)

knowing where to begin. There are so many things that I am in awe of, from the number of members who participated to the level of teamwork and skills, to the generosity of members who brought equipment, supplies, and prepared food.

We demonstrated that we can do our part in providing emergency communications under less than ideal conditions. From difficulty with the wind interfering with placing antenna support lines over light poles, to the catastrophic failure of an antenna mast, we made it work. As a team we pulled it all together! I am very proud, grateful, and honored to be President of an organization that has membership of such caliber and character. We had 22 PCARA members participate, along with 8 family members and Boy Scouts from Troop 36! Please see PCARA's 2017 Field Day entry in this month's edition of the *Update* for specifics. **THANKS TO ALL. WE NAILED IT!** [Report begins on page 7 -Ed.]

We're on our Summer break for July and August so we'll keep in touch via the **Old Goats Net** at 8:00 p.m. on Thursdays (146.670 MHz -, PL 156.7 Hz), the **Informal Evening Chat Net** at 7:30 p.m. on Tuesdays



L to R: Joe WA2MCR logs while Lou KD2ITZ operates 20 meter SSB during PCARA's Field Day 2017.

(448.725 MHz -, PL 107.2 Hz), and the PCARA Yahoo! Groups page. Please feel free to share your vacation adventures with us.

Here are some upcoming events and Hamfests:

- Saturday July 8, 2017: **PCARA Breakfast**, 9:00 a.m. at Turco's in Yorktown Heights, NY.
- Sunday July 16, 2017: **Sussex County ARC Hamfest**, in Augusta, NJ.
- Saturday August 19, 2017: **Ramapo Mountain ARC Hamfest**, Ringwood, NJ.
- Sunday August 27, 2017: **Candlewood ARA Western Connecticut Hamfest**, Newtown, CT.
- Saturday September 9, 2017: **PCARA Special Event Station**, 250th Anniversary of Old Saint Peter's Church, Cortlandt Manor, NY.
- Saturday September 23, 2017: **PCARA Foxhunt**, 2:30 for 3:00 p.m. Beach Shopping Center, Peekskill.

Our next regularly scheduled meeting is **Sunday September 10, 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, fresh from your Summer sabbaticals.

-73 de Greg, KB2CQE

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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.

Adventures in DXing

- N2KZ

To find a fox!

Hidden in a place that defies logic, an amateur radio fox awaits discovery and capture. Hounds are gathering at the start, admiring their equipment and discussing strategies. The next 90 minutes will be anxious, competitive and passionate! Will you be the first to discover the fox? Only time will tell! How can you improve your chances? Read on!

Step One: Preparation

Every good hunter needs good tools. It is nearly essential to use a directional antenna, a reasonable length of quality coaxial cable, a wide-range variable attenuator and a receiver with a metal casing.

I prefer to use a four-element Yagi. The extra fourth element provides a pickup pattern with a tighter 'nose', giving it just a little narrower directionality. This should help you get a more precise bearing on the fox's signal. The extra length of the beam does not prohibit quick setup and storage during the hunt. Use a white PVC pipe handle to insulate your hands from the antenna. Never hold your antenna itself. You will distort the pickup pattern and reduce the match to your receiver! Every little advantage adds to your chances of winning the hunt.



Karl demonstrates his 4-element Yagi antenna with PVC handle during the PCARA Foxhunt of May 2006.

The length and quality of your coaxial cable is equally important. I would not use a length of cable more than 20 feet. You do not want to find yourself with too short a cable making it hard to maneuver your antenna. Too long a cable will have you spending precious time rolling up and storing the cable or even tripping up in it. After some trial and error you will find a length that is right for you.

Another essential item is your attenuator. There are two basic types: passive and offset. Passive attenua-

tors juggle different in-line resistances to diminish strong signals. With more resistance less signal gets through. Passive attenuators are often designed like a 'decade box' with multiple switches to vary a signal in steps. You flip your switches around until you find the right amount allowing you to get some signal but not



Pacific Antenna 41dB step attenuator (<http://www.qrpkits.com>).

an overpowering one. Adjustment is easy to do but it does take time. I use an old-fashioned TV antenna



Karl's adjustable TV/VCR signal overload attenuator in series with 6dB and 10dB fixed attenuators.

attenuator with an adjustment knob that is faster to operate. If necessary, I add attenuator pads designed for the cable TV industry to decrease the signal strength further. Be creative! Less

to adjust = more time saved!

The second type of attenuator requires battery power. Your received signal is mixed with a local oscillator that offsets the fox's signal to another frequency. For example: The fox might be broadcasting on 146.565 MHz but your offset attenuator adds 4 MHz so you are listening on 150.565 MHz. As part of the mixing process, the active offset attenuator signal can be weakened by adjusting a knob on the device. Same results as a passive device but much more complex! Again, your choice is completely bound by personal preference.

Arrow Antenna makes a typical active attenuator:



Offset attenuator by Arrow Antenna.

<http://www.arrowantennas.com/main/4ofha.html>. Many active attenuator kits are available on the Internet, as well. A good example of a passive switchable attenuator is the MFJ-762:

<http://www.mfjenterprises.com/Product.php?productid=MFJ-762>.

The MFJ web site even provides a schematic diagram of the attenuator design for your examination.

Your receiver will most likely be a handheld handi-talkie (HT) transceiver. Find yourself an old-school HT with an all-metal case. HTs with plastic cases allow signals to enter the receive electronics directly, not just from the antenna itself. All-metal HTs shield stray signals from direct entrance and make a nice and clean con-



Find yourself a handi-talkie with a metal case — otherwise strong signals can leak into the case and you will need an offset attenuator.

nection with just the antenna itself. If you use a 'leaky' all plastic HT or scanner as your primary receiver you will add great confusion and frustration as you attempt to take your readings and you won't know why! Also, it

is best to use a HT with a large, multi-step signal meter. Good meter definition results in more useful readings. The more steps the merrier!



Choose an HT with a multi-step signal strength meter.

Finally, I always use a second receiver to act as a 'sniffer.' I put a dual-band (2 meter and 70 cm) mag-mount antenna on my roof, connect it to another HT or scanner and leave it on to constantly monitor the 146.565 MHz signal. This reduces the chances of making a mistake by mis-reading a clock or other distractions. You don't want to miss a transmission! A second receiver adds another reference when measuring the average signal strength of the fox.

Also consider bringing along an easy-to-read time-piece. It is nice to have a large digital readout clock with you for easy countdowns to the next fox broadcast! I use a large stopwatch I bought at Radio Shack decades ago. Watch the clock! Plan ahead!



Bring a clock.

Read this carefully: Make sure you test run your

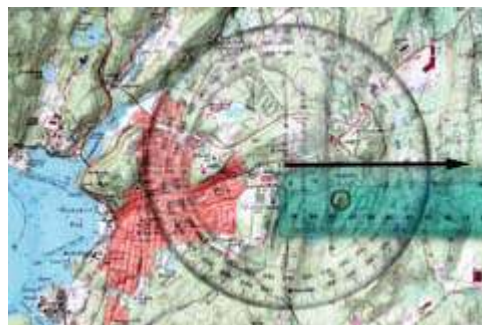
equipment a couple of times before the day of the hunt. You don't want to find yourself with a problem and have to drop out of the race. Make sure all of your antenna, attenuator and HT connections are good and tight. Make sure your receiver and attenuator work well. Are your batteries fresh and charged? Inspect your antenna for good connections without any loose elements.

An essential tip: A fox hunt is a listening-only exercise! Turn off your squelch! Make sure you are hearing lots of static noise as you start. Do not have PL tones or PL squelches on. [Also known as tone squelch – TS or TSQ – or CTCSS decode –Ed.] These things will render you deaf and send you home sad. Don't get caught because you are sloppy! Also please remember: Fox hunting does NOT require an amateur radio license. No transmitting is going on here! Please invite newcomers to our hobby along with you on the hunt. What a fun way to introduce them to the hobby of ham radio!

Step Two: Learning the Skill

Are you ready now? You have all your equipment setup and tested and you are ready to go? Not so fast! There is a lot to learn about being a hound with skill. Understand these tips and you will have a much more satisfying hunt!

The basis of all fox hunting is a direction-finding technique known as *triangulation*. Along with your map, you will need a **compass** and a **ruler**. With all your attenuator switches off... listen to the first fox transmission, move your directional antenna all around in a circle and decide what direction the signal is coming from. Notice where you null! Mark your map with your current position, then take a ruler and draw a line in the direction of your strongest signal.



Draw a line on the map in the direction of the strongest signal.

Get into your car fast and get ready to head in that direction. In

those precious minutes before the fox first stops broadcasting, look over your map and try to decide possible places you can reach in the next five minutes and where the fox might be hiding. Tip: Try to keep your antenna, attenuator and receiver connected in one piece as you travel. Don't waste time with assembly and disassembly at every new location! Everything should slide into your trunk or back deck. When the fox's signal stops... away you go!

Now you arrive at position two. Mark where you

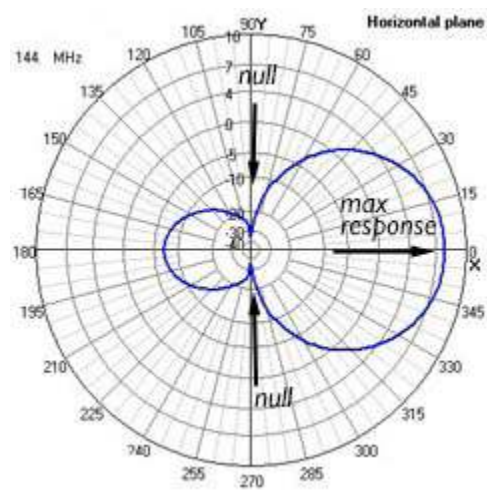
stopped on your map. Get your antenna and radio out of your trunk and prepare to listen. This time you don't have to wait for the transmission to end. Make a new line towards the direction you discover and head toward where the two lines cross. You are getting closer! Get your reading and run! With any luck, as each transmission goes by, you should become closer and closer to the fox.



From position '2', make a new line on the map in the direction of maximum signal then head to where the two lines cross.

If the signal gets too strong, start using your attenuator. Keep adding more loss until the signal appears weaker in the strongest direction. That is where you are headed next! Keep heading for the spot where all your map lines converge and cross! Remember to keep your 'sniffer' radio on 146.565 MHz. If you switch on too much attenuation, you may not hear the fox return to the air and will be waiting forever. The 'sniffer' receiver will remind you what you are *not* hearing and prompt you to adjust your attenuation!

Learn the art of nulling! Your first inclination is to seek the strongest direct signal to the fox. There is more information out there to employ! Make sure you also look for the weakest directions, as well. This is especially important if you are hunting without an attenuator. By nailing down the strongest signal, you have gained one point of reference. By investigating where the nulls are, you gain another two points of reference verifying your strongest signal.



Polar diagram of 4-element Yagi antenna showing two nulls in the horizontal plane.

The technique of using a three-point reference (direct pick-up and two nulls) is incredibly important when you find yourself dazed and confused by the fox

signal arriving to you due to reflections or bending especially in hilly and rocky terrain.

Case in point: Using my 4 element Yagi at home during The Old Goats Net, my strongest signal of the repeater seems to be from about 20 degrees east of north. The PCARA 2 meter repeater is actually west northwest of my QTH. A great big hill near my house obviously reflects signals nicely. When you analyze the nulls of repeater signal, you will see that something is amiss. *The nulls should always appear around 90 degrees offset of your peak.* You have a lot of things to consider if they are not! (Some antennas null somewhat differently. Learn the characteristics of all your gear for best results.) Again, it is essential to learn the topography of the area where you hunt. Being aware and understanding that anything can reflect signals will make you much wiser! Never forget: Nulls and peak!

An analogy that old-timers would understand: Try to remember all the idiosyncrasies of legacy analog TV reception. It was not unusual to see slightly distorted

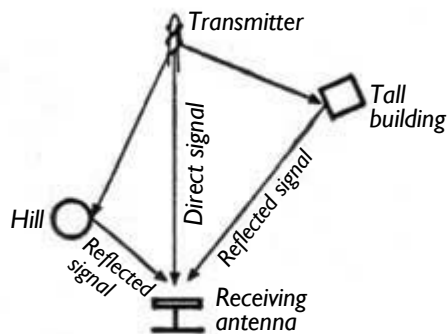


Ghosting on analog TV [FCC pic.]

images due to 'ghosting.' A ghost was created when the TV signal reached you by more than just a direct path. Reflected signals travel a longer distance to your antenna and arrive later than the direct signal. The ghosts you see show you how multiple signal paths look when they combine. If you were only receiving the primary signal, there would be no ghost!

2 meter FM is no different! Our 2 meter band sits between TV channels 6 and 7. It's just like TV! Bouncing TV signals are called 'ghosts.' FM audio signals suffer from 'multipath.' Regardless of the name, it is all the same and it might make you insane! Very important: A reflected signal might be stronger than the signal arriving directly. Beware of bounce!

Another means of assessing your proximity to the fox is by monitoring harmonics. Although the fox is



VHF signals can be reflected by tall buildings and nearby hills.

Beware of bounce!

Although the fox is

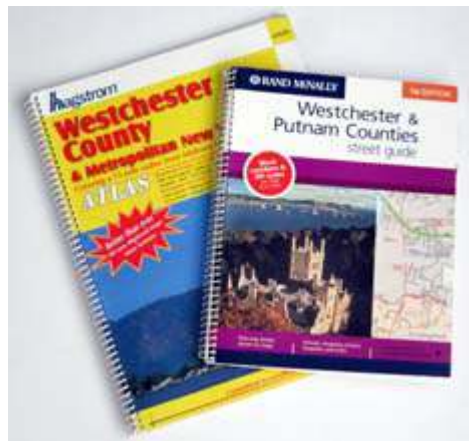
broadcasting on 146.565 MHz, small amounts of RF energy will also be emitted at multiples of that frequency. Think of this phenomenon as a method of natural attenuation by offset! Before the hunt, enter the harmonic frequencies for 146.565 MHz in adjacent presets on your HT: The easiest harmonic to hear is at **439.695 MHz** right in the middle of our amateur radio 70 centimeter band. Some HTs offer wideband receivers and can even pick up another harmonic at 293.130 MHz. Try it!

My Yaesu FT-60R can grab the 293 MHz frequency. Maybe you can, too! Harmonics are very, very weak compared to the main transmission frequency. If you can hear the fox's harmonic, you are really, really close!



If you can hear the fox's harmonic frequency, you are really, really close.

Know your territory! Start with a print out of the five mile radius map defining the fox's lair. You can find this in the May and June 2017 editions of *PCARA Update*. The fox will never be found beyond the big red circle! If you



Spiral-bound street maps by Hagstrom and Rand McNally are out-of-print.

can find a copy, purchase an old-school street map of Northern Westchester. These spiral-bound map books used to be published by Hagstrom and Rand McNally but are now sadly out-of-print. Consult local libraries. They may still have a copy in their collection. A modern-day alternative could be Google Maps. If you are creative, you may be able to piece together a similar map-set by printing overlapping segments using Google Maps' 500 foot resolution and a lot of patience.

Having full street-by-street detail at your fingertips is so much easier to use than fumbling around with a small screen GPS in your car. Unfortunately, you can't enter 'FOX' into a GPS to find one or ask 'Siri' for help. You need a good map.

Step Three: Practicing

Besides maps, it also helps to drive around the areas nearby The Beach Shopping Center just so you won't be driving through neighborhoods you know nothing about. Discover where all the schools and parks are. Learn about the locations of large parking lots, steep and rocky hills and unpopulated areas. Think like a fox! Where would be a good place to hide and not draw attention?

Another great way to expand your skills is by experimenting and experiencing casual triangulation. Get a friend to play fox and try to find where they are. Even more challenging, try to track down someone while they are in conversation by listening to the *input* of our 2 meter repeater at 146.070 MHz. (If you try to track down the repeater's more powerful output on 146.670 MHz, you'll find yourself at the repeater site!)

Get to know just how far you can go during the seven minutes of silence before the next fox transmission. You should really assume about a five or six minute drive allowing for a little bit of time to pull out your gear before the fox reappears on the air. Knowing how much distance you can cover will give you a confident sense of what your next destination should be. Think like you are playing chess. What would be my most effective next move?



Get a friend to play fox.

Step Four: The Secrets of Expert Hounds

Bring along a timetable. No, we are not putting you on Metro-North to catch the fox! We can provide you with a copy of our transmission timetable good for all PCARA fox hunts. Our table provides a quick and easy reference to exactly when all ten transmissions will be broadcast during the hunt. No more guesswork or in-your-head mathematics necessary. A very handy tool!

PCARA Foxhunt Times	
3:00 - 3:05	Transmission #1
3:10 - 3:13	Transmission #2
3:20 - 3:23	Transmission #3
3:30 - 3:33	Transmission #4
3:40 - 3:43	Transmission #5
3:50 - 3:53	Transmission #6
4:00 - 4:03	Transmission #7
4:10 - 4:13	Transmission #8
4:20 - 4:23	Transmission #9
4:30	Final Transmission
Frequency: 146.565 MHz FM Simplex	
Harmonics: 293.130 and 439.695 MHz	

How fast can you go?

Try this challenge: Park at your next stop about 30 seconds before the next transmission and get ready. The fox goes on the air! Get a reading fast... jump into your car... and

take a quick spin to another location and stop at about 2 minutes into the 3 minute transmission. With one minute to go, get another bearing! Yes, it IS insane, but I have used this in the past when I had a lot of passion for the competition of the hunt! By all means, DON'T SPEED and BE SAFE! Two readings are always better than one!

If you want to catch a fox, think like a fox! As you proceed during your 90-minute hunt, think to yourself all the places a fox might be hiding. High on the list are school and business parking lots, streets with no residential houses, baseball fields and even train stations.

Foxes can be very, very sneaky! Be wary of hidden antennas! Please remember that fox hunt transmitters must use *horizontal* polarization instead of the familiar up-and-down vertical polarization used commonly on the 2 meter and 70 cm amateur radio bands. You might spy an easy-to-find horizontal dipole sitting on a tripod near the fox's car – but – the fox could also be using a horizontally polarized mag-mount antenna sticking to a trunk or car's side door out of sight. Heaven help you... the antenna might even be inside the car!



The fox could be using a horizontally polarized mag-mount antenna on the side of a vehicle. [May 2015.]

I have seen foxes put down their car seats and broadcast lying down to be out of plain sight. I once broadcast as the fox from the back of a minivan with tinted windows as hounds were only feet away! A fox can be nearly invisible!

Nothing prevents a fox from hiding outside of a car. They could be sitting behind a tree, on a park bench or up on bleacher seats at a baseball field. Think out of the box! Don't make barriers for yourself! When you are really stuck, try the other side of the road or go across to the other side of a highway. Find a totally different perspective, around a hill or obstruction, to gain a firmer understanding of where the fox might be. If you are completely stuck, try a wacky perspective from a completely different direction. You have nothing to lose! Don't ever give up!

Step Five: Resources and Encouragement

You'll find much more about fox hunting techniques in past issues of the *PCARA Update*. Lovji, N2CKD, documented his experiences building attenuators in our July 2014 and April 2017 editions. Enjoy reading about his fine work! Malcolm, NM9J, authored an excellent article about compass use in the May 2016 edition and gave a useful overlook of fox hunting in the April 2014 issue. All are available on-line at: <http://home.lanline.com/~pcara/newslett.htm>.

Never give up! You might find a fox without any equipment at all! On May 4th, 2013, my daughter Sarah and I were setting up a fox den along the Goat Trail to the Bear Mountain Bridge at the scenic overlook. Just as we were getting our antenna in place, another PCARA member, Richard, N1GIL, stopped by, approached us and said: 'Hey! Is that a two-meter antenna?' Richard knew the fox hunt was that day and just happened to be passing by with a keen eye! Can you imagine



Richard N1GIL found the fox at the Goat Trail Scenic Overlook before the hunt had begun. [May 2013.]

being caught *before* your first transmission! It can happen... and did!

Above all, ENJOY fox hunting. It is crazy, fun, competitive but most of all entertaining. The get-togethers after the hunts are always memorable. A very good time will be had by all! I always look forward to the next hunt. Mark your calendars for Saturday, September 23, 2017. I'll see you at The Beach Shopping Center around 2:30 pm! Tally-ho!

Need more help? We have tentatively scheduled our first 'Fox Hunt University' event on Saturday, September 16th, 2017. We will demonstrate fox hunting set-ups, direction finding techniques and even a small practice hunt. Details about the exact time and place will appear in future editions of *PCARA Update* and on the PCARA Facebook site.

If you have questions that can't wait, join us on The Old Goats Net, Thursday nights at 8 pm on the PCARA 2 meter repeater at 146.670 MHz -600 offset 156.7 PL. We now have a new 'coffee house' casual net on Tuesday nights at 7:30 pm on our 70 cm repeater at 448.725 MHz -5 MHz offset 107.2 PL. Fellow hounds... have a great summer and get on the air! 73 de N2KZ 'The Old Goat'



Field Day 2017

Discussions about PCARA's Field Day began several months before the June event. Joe, WA2MCR had proposed that the club should rent *two* cargo vans instead of the single panel truck that was used in 2016. That would allow the two HF stations to be housed separately — so audio interference should no longer be a problem. Once again, Joe had successfully obtained permission from Lakeland Central School District to operate from the grounds of Walter Panas High School.

Henry KB2VJP had volunteered for the publicity role, sending press releases to publications and organizations before the event. Details of PCARA's upcoming activity appeared in the Croton-on-Hudson *Gazette* for June 22-28 and in the Calendar pages of the *Journal News* for Friday June 23. Well done Henry!

24-hour amateur radio Field Day at Walter Panas

Members of Peekskill/Cortlandt Amateur Radio Association (PCARA) will be participating in the national Amateur Radio Field Day exercise at the rear of Walter Panas High School, 300 Croton Avenue, Cortlandt Manor, from 2 p.m. Saturday, June 24 through 2 p.m. Sunday, June 25.

The event is open to the public, which is encouraged to attend anytime during the 24-hour event.

Since 1933, amateur radio operators have established temporary amateur radio stations in public locations during Field Day to showcase

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Amateur radio

from page 5

the science and skill of amateur radio. Last year 36,729 amateurs participated in Field Day, making 1,105,315 contacts in 24 hours.

For over 100 years amateur radio has helped people from all walks of life to experiment with electronics and communications techniques and to provide a free public service to their communities during disasters. Amateurs can literally throw a wire in a tree for an antenna, connect it to a battery-powered transmitter and communicate halfway around the world.

For additional information, contact PCARA Club President Greg Appleyard--KB2CQE--at 914-646-4616, or e-mail him at KB2CQE@ar1.net.

Croton Gazette Jun 22 article.

“deluxe feather flag” from HalfPriceBanners.com. This arrived just in time for inspection at the June 21 meeting.

Getting ready

On Friday evening, June 23 Joe WA2MCR and Malcolm NM9J visited U-Haul in Cortlandt Town Center to collect the two Dodge Ram vans that Joe had ordered. Unfortunately, the Dodge models were unavailable and Joe had to settle for two Ford Transit 250 vans — which have 10 inches less cargo headroom. Beggars cannot be choosers, so Joe drove the two trucks to his home location, with NM9J acting as shuttle pilot.

Damp start

Friday night had been wet, with rain continuing up to 8:30 a.m. on Saturday June 24. The morning was hot and humid as the first cargo van was loaded up in Joe's driveway at 9:00 a.m. The two vans were then driven to Walter Panas High School ready for equipment set up.

Joe parked the cargo vans at the school baseball field. They were arranged with side-doors pointing inward across the space for the club's push-up tent which would shelter the “free” VHF station. The two vans would become home to the two HF stations allowed by Class 2A.



The two cargo vans were parked with side-doors opening inward, separated by a space for the VHF station.

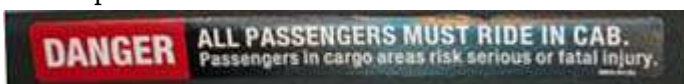
Joe commenced setting up stations on folding tables inside the two vehicles. The Ford vans had a high step-up and insufficient room to stand, so the process was more difficult than last year.

Launch party

Mike N2HTT had once again brought his pneumatic antenna launcher, along with son David who acted as initial aimer. Charles N2SO had his CSV19 antenna launcher by Alan Biocca Engineering (<http://www.akbeng.com>), so there was no shortage of fire-power. Mike and David launched nylon lines across the two lighting poles nearest to home plate, then pulled up sturdier



David aims N2HTT's antenna launcher over the top of a light pole.





L to R: Lovji N2CKD watches while Charles N2SO prepares his antenna launcher and Mike N2HTT fires a line over the right-field light pole.

ropes which would support the HF antennas. The multi-band dipole covering 40, 20, 15 and 10 meters was then hauled up above the baseball field.

Our antenna launching crew moved to the light pole at right field, which now had a new fence erected around its area. Rising ground and the prevailing wind made the site distinctly breezy. The nylon line was repeatedly blown away from the top of the lighting pole, despite accurate aiming of 'projectile' and tennis balls by Mike and Charles.

Eventually a line was raised and used to hoist the far end of the G5RV wire antenna. Height was not quite what it should have been as the supporting rope was wrapped around one of the climbing rungs.

Bull pull

Support for the VHF antennas was once again provided by **bull float handles** from Home Depot. These six-foot aluminum tubes are threaded and tapped at opposite ends so they can be screwed together. The tubes are normally used with a 'bull float' for smoothing large areas of poured concrete.

A 3 element Yagi for 6 meters from Joe and a combined 5 element Yagi for 2 meters/70 cm from Bob, N2CBH were mounted above Joe's rotator at the top of the assembled mast. A team of helpers was then orga-



Raising of VHF antennas on the bull float handle mast.

nized to simultaneously push the mast up against the outer side of the backstop while another team was pulling the mast up using ropes over the backstop fence.

At this point disaster struck! The 30 foot mast broke in the middle, fortunately without harming anyone or damaging the antennas.



Disaster strikes while raising the VHF antennas. L to R: Mike N2EAB, Fred KD2GJJ, Mike N2HTT & Karl KD2HRW.

When the rubber joint cover was removed, it revealed the threaded coupling attached to one of the alloy tubes, which had sheared off. Those same bull



The threaded coupling which projected from the end of this aluminum tube had sheared off.

float handles have been in use since 2005, so there might have been some corrosion in storage.

The setup crew rapidly reassembled the mast, with the damaged pole now in top position, above the rotator. The whole structure was pulled up against the back

stop — more carefully this time — then fastened in place against the chain-link fence using nylon ties.

Lunch is served

Meanwhile, Jared KD2HXZ had been busy preparing a meal in his Dutch oven, located alongside the seated area near the school building. The main course for Field Day 2017 was Shepherd's Pie — this dish went down very well with the team of hot and weary PCARA members who had been exposed to a great deal of sun and humidity that Saturday morning. A great morale booster!



Jared KD2HXZ prepares the hot meal. [K2DMV pic.]

Ready, set, launch!

Delays with antenna installation had left very little time for final station setup, ahead of the 2:00 p.m. start time. Computer logging was put into place using the latest version 5.4 of N3FJP's ARRL Field Day Logging software. The 'PCARA' network used a combination of wired and wireless Ethernet so that three notebook computers could share data and record their contacts in a single database.

The radio equipment may be familiar from previous Field Days. In the 'north' transit van, Joe's Yaesu FT-1000MP was connected to the multi-band dipole. This station began operating at 2:10 p.m. on 20 meters SSB. Inside the 'south' Transit van, Joe had connected his Icom IC-7410 transceiver to the sloping G5RV antenna. This station commenced operation on 40 meters SSB at 2:30 p.m. Both HF stations were using individual W3NQN bandpass filters for 80-10 meters to prevent any interference that might occur when operating close together.



L to R: Joe WA2MCR logs while Karl N2KZ makes a phone contact using Joe's Icom IC-7410 HF transceiver.

The VHF station employed Joe's Icom IC-7000 transceiver. This tiny radio covers 160 meters – 70 centimeters — though the 'free' VHF station was mostly active on 6 meters with only a few 2 meter contacts.



Mike N2EAB commences operation at the 'free' VHF station using the IC-7000.

Greg KB2CQE had brought his new "Go-box" with Yaesu FT-90R 2m/440 FM transceiver for local liaison.

For additional shade, a tarpaulin was stretched across the west side of

the VHF tent and a second push-up shelter from Charles, N2SO was erected alongside.

Electrical power and cabling to the radio equipment were once again provided by Bob N2CBH with his Honda EU2000i generator. This small wonder purred away throughout Field Day, sipping gasoline and supplying 120 volt AC power to all three radio stations. Use of a generator qualifies PCARA for the "100% Emergency Power" bonus.



Power was provided by Bob, N2CBH's Honda generator.

With the aim of taking Field Day photos from a highly unusual angle, Al K2DMV had brought along his economy drone.

After careful adjustment the little four-bladed aircraft soared into the evening sky — then vanished into nearby woods. Al suspected a radio communication problem between his remote control and the tiny drone.



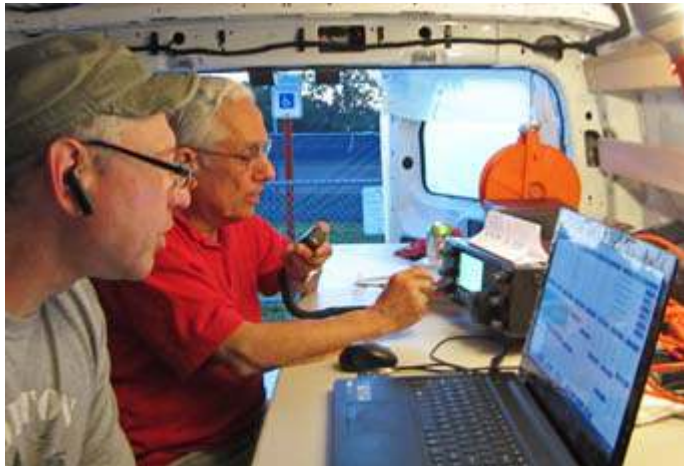
Al K2DMV prepares mini-drone for launch.

Rating the propagating

Despite being close to sunspot minimum, conditions seemed rather better than in 2016. The bulk of activity was on 40, 20 and 80 meters but there were also some good contacts on 15 meters, including Puerto Rico and the U.S. Virgin Islands — plus a few QSOs on 10 meters.

The West Coast was worked on 20 meters on Saturday evening including Orange County - California,

Western Washington and British Columbia in Canada. Southern states came in on 20 meters on Sunday with Arkansas and Arizona. 40 meters reached out to Utah, Texas, Eastern Washington and Alberta, Canada on Saturday evening.



Jared KD2HXZ and Lovji N2CKD operating 80 meters SSB on Saturday evening.

Six meters provided openings on Saturday afternoon with propagation to Illinois and Indiana — and on Sunday with contacts to North/South Carolina, Tennessee, Alabama, Missouri, Iowa, Kansas, Georgia, North Florida and Nebraska. The main operator on VHF was Ray, W2CH.

A majority of contacts were made using single sideband phone, but there were also 99 CW contacts logged by Joe WA2MCR, Charles N2SO and NM9J.



Joe WA2MCR and Bob N2CBH use the Yaesu FT-1000MP transceiver on 15 meter SSB, Sunday morning.

Earning a bonus

Points were claimed for copying the **W1AW Field Day Bulletin**, for **100% Emergency Power** and for **Media Publicity**. Walter Panas High School qualifies as a **Public Location** — especially with all the people who passed our signs on the way to the lower athletic field.

We had a **Public Information Table** with club



Operation from a public location, with new feather flag sign.

information. For the **Educational activity** bonus, Greg KB2CQE contributed to training a group of Boy Scouts from Troop 36 in Montrose, NY for their Radio Merit Badges. Two Scouts and Charles, N2SO's grandson Ethan completed QSOs under supervision, qualifying for the **Youth Participation** bonus.



Charles N2SO's grandson Ethan makes a contact on 80 meter SSB under the supervision of Lovji N2CKD.

Karl N2KZ had posted details of our upcoming Field Day activities on PCARA's Facebook Page, for the **Social Media** bonus. Field Day results were submitted to ARRL using the **web applet** for more points.

As a result of these activities, our total bonus points claim for 2017 is **910**.



This Field Day announcement appeared on PCARA's Facebook page, courtesy of N2KZ.

Torrential tear-down

On Sunday afternoon, as 2:00 p.m. approached, the scoring rate was declining. Looking out toward the northwest, the sky began to darken, then became quite threatening. A decision was taken to cease operations at 1:20 p.m., forty minutes before the official end of Field Day. One of the cargo vans was completely emptied so it could be returned to U-Haul at Cortlandt Town Center. Station equipment and logging computers were removed from the vans to hasten tear-down.

Work had started on dismantling the antennas when it began raining. This came as something of a surprise as very few people had brought waterproof clothing. At 1:55 p.m. the gentle rain turned into a torrential downpour, drenching members and the antennas they were working on. Equipment was temporarily stored under the push-up tent until Joe and Lovji returned from dropping off the first van at Cortlandt Town Center.



Equipment was temporarily stored under the push-up tent to protect it from the rain until Joe and Lovji returned.

By 3:00 p.m. the field had been cleared and the second cargo van driven to Joe WA2MCR's location for unloading. The second van was safely returned to U-Haul by 3:55 p.m. on Sunday afternoon.

Growing support

The sign-in sheet for PCARA's 2017 Field Day effort shows a total of 22 licensed members and friends who came along for set-up, tear-down and operating. Eight family members and other visitors came by to share the experience. The overnight period was well attended, with multiple operators pressing operations on into the small hours. This was a notable improvement on the 19 members who assisted in 2016. Thanks to all!

Here is a summary of the claimed points for PCARA Field Day 2017 (bold column) along with a comparison of scores from previous years and a breakdown of 2017 contact numbers by band.

Peekskill/Cortlandt ARA, W2NYW, Class 2A

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

	2013 (Class 1A)		2014	2016	2017
QSOs:	775		722	816	813
Power:	2 (<150W)				
Participants:	14		16	19	22
Total score:	2040		2460	3018	2734

2017 breakdown by band, in order of number of QSOs:

40 meters - 323 QSOs;	20 meters - 212 QSOs
80 meters - 147 QSOs;	6 meters - 96 QSOs
15 meters - 24 QSOs;	10 meters - 9 QSOs
2 meters - 2 QSOs	

A few suggestions for next time... larger vehicle(s) with more headroom would be welcome. Moving the stations a little

further apart would avoid the audio distractions noted in 2017. A stronger mast for the VHF antenna would be worthwhile along with a 6 meter bandpass filter to prevent broadband noise from the VHF transmitter reaching the HF stations. Remember your hat and sun-block as the weather could be equally sunny next time. Finally, we need to spread out responsibilities, allowing more time to set up all three stations for computer and CW operation — each CW/digital contact scores twice as many points as a phone contact.



Evening view of the VHF antennas and nearby multi-band dipole.

Sign-off

In conclusion, here is a hearty **thank you** to everyone who participated in Field Day 2017 including: Verle W2VJ; Ray W2CH; Marylyn KC2NKU; Bob N2CBH; Joe WA2MCR; Greg KB2CQE; Fred KD2GJJ; Lou KD2ITZ; Mike N2EAB; Mike N2HTT; Larry AC2QH; Karl KD2HRW; Jared KD2HXZ; Al K2DMV; Dan NT2I; Karl N2KZ; Richard N1GIL; Henry KB2VJP; Lovji N2CKD; Mike KC2GSP; Steve WA2FKE and Jon N2NBR. - NM9J

Foxhunt report

PCARA's 2017 Foxhunt had been scheduled for Saturday May 13, during the *CQ Magazine* twentieth annual Foxhunting Weekend. But there was heavy rain on May 13 and PCARA's event had to be postponed until June 3.



Fortunately the weather on Saturday June 3rd was much better. The temperature was around 70°F, with bright sunshine and a gentle breeze. The only downside to the revised date was the wealth of outdoor activities taking place at that time of year — including graduations, weddings, barbecues and student transport. As a result, some of our more experienced fox-hunters were unavailable.

Overture and beginners

Act I of PCARA's foxhunt always starts at the Beach Shopping Center in Peekskill where participants lined up on the west side of the parking lot. Those taking part included Charles N2SO, Lovji N2CKD, Fred KD2GJJ, NM9J and the combined team of Karl KD2HRW with Matt KD2FME. Henry KB2VJP also dropped by, but he had another appointment.

After registering for the event, our hunters had time to compare their antennas and associated direction finding equipment.



Hunters prepare their tape measure Yagi antennas at the Beach Shopping Center. L to R: Matt KD2FME, Charles N2SO, Karl KD2HRW, Fred KD2GJJ and Lovji N2CKD.

We salute those members who took part in a foxhunt for the first time — this can be a great learning experience! A preponderance of WB2HOL tape-measure Yagi antennas was noted, thanks to the efforts of Lou KD2ITZ and the 'FYCAT' workshop held in April at Lake Mohegan Fire Department, courtesy of Barry K2BLB.

Lovji N2CKD was using his home-brew passive attenuator housed in an Altoids container as described in the April 2017 *PCARA Update*. Charles N2SO had an offset attenuator built into a plastic container and incorporated into the boom of his tape-measure Yagi. (See the web site of KE6HTS for details: <http://www.west.net/~marvin/complete.htm>.)

At 3:00 p.m. the first transmission was heard on 146.565 MHz from PCARA's 2015 foxhunt winner, Mike N2EAB. All antennas swung around to find the direction. The signal was reasonably strong with some reflections evident — and a major response roughly east-north-east from the Beach Shopping Center. As soon as the first five minute transmission was over, hunters were free to leave the parking lot.



Active attenuator incorporated into boom of a tape-measure Yagi.

Decision time

PCARA's Foxhunt rules call for a strict tempo of subsequent transmissions, each of which lasts for 3 minutes *on* followed by 7 minutes *off*. This pattern should allow just enough time to take a bearing, followed by a short drive to the next location ready for another transmission. Hunters have to make rapid decisions about their route and choose a location where it will be safe to park for the next bearing. Saturday shoppers and a surfeit of traffic along the roads of Peekskill and Cortlandt added to their problems.

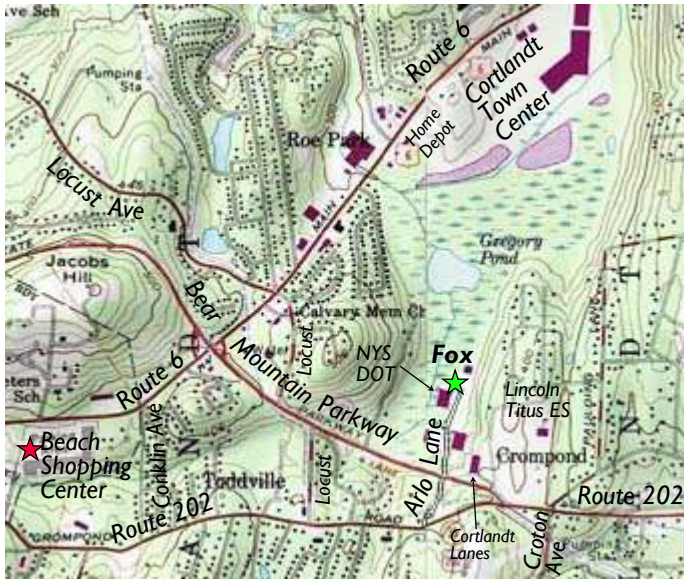
Charles N2SO headed east on Route 6 then stopped at the Home Depot parking lot in Cortlandt Town Center. There he confirmed a receiver problem, and also ran into difficulties with his smartphone foxhunt app so headed home to fix it. (For more details about foxhunt mapping software, see Joe K0OV's thoughts at: <http://www.homingin.com/apps.html>.)

Fred KD2GJJ took Route 202 to the Toddville Plaza shopping center then visited Walter Panas High School, followed by the Field Home (echoes of 2016). He crossed Lexington Avenue then headed west and ended up at St Columbanus Church. Fred was hindered by a lack of paper maps currently on sale for the local Peekskill/Cortlandt area.

Karl KD2HRW and Matt KD2FME headed east from the Beach Shopping Center then stopped at Kohl's on Route 6 for a bearing. They crossed Route 6 and took their next bearing from the back of the Cortlandt Town Center. This led them to BJ's on Route 202 then to the 202 Diner parking lot where they had an interesting encounter (see later) followed by a visit to the Cortlandt Lanes bowling center, off Route 202. At this

point the fox signal was becoming very strong and they were hampered by the lack of an attenuator.

Lovji N2CKD and Malcolm NM9J also set off eastward on Route 6, arriving almost simultaneously at the Hummingbird Caribbean restaurant near the Bear Mountain Parkway. From this location, the bearing to the fox was still ENE. Lovji turned right onto Locust Avenue — from where there is no left turn onto the Bear Mountain Parkway. He returned to Route 6 and the Home Depot parking lot then became tied up in traffic. From Route 6, he headed up Conklin Avenue toward Hudson Valley Hospital. Lovji concluded that his homebrew passive attenuator was working well and he is becoming more skilled at using it for foxhunting.



Map shows locations featured in the June 3 PCARA foxhunt.

Following behind Lovji on Route 6, your editor [NM9J] took his next bearing from the Cortlandt Town Center, then turned south onto Lexington Avenue and into the ‘Mohegan Colony’. The next stop was outside Calvary Chapel on Baron De Hirsch Road — by now the bearing had swung around to WNW, with the pencil lines on the map converging in an area south of Gregory Pond. I checked at Lincoln Titus Elementary School — location of Karl, N2KZ on a previous hunt — but the direction was still westward.

Finding a fox

I drove out of “The Colony” at the intersection with Croton Avenue, joined Route 202 then turned right onto the Bear Mountain Parkway. The first road crossing the Parkway is **Arlo Lane** and I had a feeling that foxes



might be found down there. The entrance is marked by an old plow painted with “Town of Cortlandt DES / NYS DOT”. I drove past the auto dealer lot, past the Verizon depot and past the New York State Department of Transportation. Just before the entrance to the Town of Cortlandt Environmental Services, I spotted a Ford SUV hiding under the shade of a tree — with a tall antenna on the roof. It was Mike, N2EAB and the time was 3:48 p.m. Mike advised me that the ‘Place of Refreshment’ would be the **202 Diner** so I returned to Route 202, and waited in the diner’s parking lot.



Our fox, Mike N2EAB was hiding under a tree in Arlo Lane. His antenna was a horizontal dipole above a fiberglass pole.

A few minutes later, Karl KD2HRW and Matt KD2FME drove into the same parking lot. I thought they might have found the fox, but in fact they were still taking part in the hunt — so I kept quiet about my own adventures and they set out again after the next transmission.

All over

With the final fox transmission at 4:30 p.m., Mike N2EAB announced the ‘place of refreshment’ to all listening on 146.565 MHz and 146.670 MHz. I was soon joined at the 202 Diner by our other hunters, who spent some time in the parking lot comparing notes and describing their own experiences. When everyone had arrived, we headed into the diner and settled down for a meal and presentation of the certificates... just one certificate this time as only one hunter found the fox.



Presentation of the foxhunt certificate.

The 202 Diner has only been open since the end of last year as successor to the New City Diner. Food and service seem to be greatly improved and everyone left with a pleasantly full feeling. Hunters also expressed a

desire to practice hunting and improve their skills before the next PCARA event.

Being a fox

Toward the end of the hunt, Mike N2EAB was giving more and more explicit clues as to where he might be. I asked Mike to describe his foxhunt transmitting equipment. Here is Mike's own description.

"The antenna is a kluge of parts as follows:

"The Quad-Pod



Close-up of the fox vehicle and antenna. Horizontal transmit dipole for 146 MHz is just visible on top of the fiberglass pole.

folding base is from a discarded free standing oscillating fan, with a short piece of PVC pipe fitted into it. The white mast is indeed fiberglass which was once a 60" Kastle ski pole that fits nicely into the PVC. Atop is a generic set of telescoping TV rabbit ears positioned horizontally and carefully measured to be a 38.4" half-wave dipole for 146.565 MHz."

"The coaxial cable is approximately 15 ft of Antenna Network Lab Inc RG58-A/U. Transceiver is an Icom IC-2GAT with speaker/microphone. Battery is the vehicle battery supplying 12V DC via a cigarette power adapter. Two meter amplifier: KLM PA 2-25B."

Power levels from N2EAB were either 12 watts output or 4 watts output for the middle transmissions.



IC-2GAT

Next time

At the June PCARA meeting a desire was expressed for more than one foxhunt per year. After consultations during the Old Goats Net, a date of Saturday September 23rd has been chosen for the second hunt of 2017. Start time and location will be the same as before, 2:30 for 3:00 p.m. at the Beach Shopping Center in Peekskill.

- Malcolm, NM9J

Test equipment for the radio shack, part II

Previously on test

A previous article in the June 2017 *PCARA Update* covered *essential* test equipment for the average amateur radio station. This included multimeters, AC test probes, RF power meters, antenna analyzers and component testers.

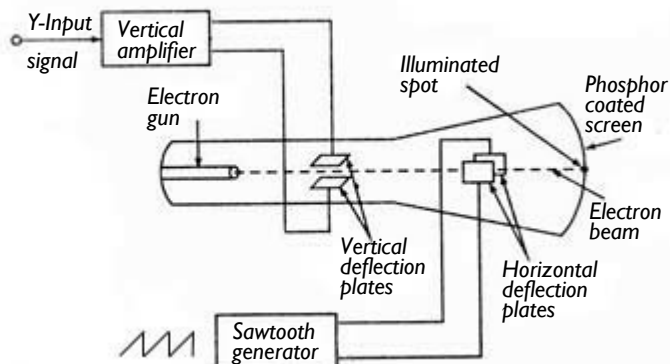
In this episode we'll cover one of the items that might not be *quite* so essential, but could be worth acquiring for the well-equipped radio test bench. (We'll also mention why you might **not** need this item.)



A useful item of test equipment.

'Scope for investigation

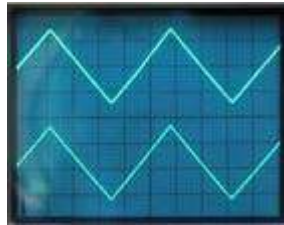
The **oscilloscope** is a versatile piece of test equipment. Basic models display the magnitude of an input voltage as it varies with time using either a cathode ray tube (CRT) or a liquid crystal display (LCD). In a traditional analog cathode ray oscilloscope (CRO), the input signal is applied to the Y-plates, deflecting the electron beam vertically. Meanwhile a sawtooth wave is applied to the X-plates, deflecting the electron beam horizontally. With the sawtooth wave driving the electron spot across the tube face, horizontal displacement is linear with time. As a result, the waveform from the Y-input is plotted from left-to-right on the oscilloscope screen.



Block diagram of a simple cathode ray tube oscilloscope.

In amateur radio we are often interested in viewing audio frequency signals and radio frequency signals with a repetitive waveform. By adjustment of the sawtooth generator, known as the **timebase**, successive cycles can be made to appear in the same place on the oscilloscope screen, so it looks like a static image.

More advanced models of oscilloscope can display two or more waveforms simultaneously (dual-beam or dual-trace display) — this capability can be useful for comparing two signals, for example before and after amplification.



Analog oscilloscopes have a vertical amplifier with a high impedance input, so as not to load the circuit under test. The input feeds a variable attenuator and wideband amplifier. This arrangement usually allows monitoring of signals from a few millivolts to tens of volts in amplitude. Bandwidth of the amplifier is important as it sets a limit to the oscilloscope's high frequency response.



Oscilloscope timebase controls.

Horizontal movement of the spot on the CRT display is governed by the oscilloscope's timebase. If you are monitoring a repetitive waveform — for example a continuous sine wave — then a triggered timebase allows you to

stabilize the display so that successive cycles appear in the same place.

You might also need to examine a non-repetitive waveform — for example a voltage pulse that occurs when a circuit is first switched on or a change of state occurring in a logic circuit. A digital storage oscilloscope will allow a one-off waveform to be captured, then replayed for careful examination after the event.

Analog oscilloscopes are still available but modern instruments are mostly **digital**, with the input signal applied to an analog-to-digital converter. Subsequent



The Rigol DS1054Z is a popular digital oscilloscope from China with 50 MHz bandwidth and four input channels.

processing, storage and display all take place in the digital domain. Earlier generations of oscilloscope were very much analog, with discrete tubes and transistors making up much of the circuitry and a long cathode ray tube acting as the output device. Physical dimensions of analog oscilloscopes always have substantial **depth** to fit in the cathode ray tube.

Previous cycles

The first oscilloscope that I acquired was a result of the UK Amateur Radio Licence conditions of the 1960s. One requirement was the ability to measure power output of a single sideband transmitter to ensure that legal limit was not exceeded. On 160 meters, the UK power limit was 26⅓ watts PEP output, which my pair of 6146Bs could certainly exceed.

I came across a vintage oscilloscope manufactured by Allen B. Dumont Laboratories Inc. of Passaic, NJ. The model 241 was manufactured around 1948, so it was approaching twenty years old when it came into my Southport shack. It was full of octal-based vacuum tubes and had a shiny silver front panel.



Dumont Model 241 Cathode Ray Oscilloscope.

For radio-frequency measurements the Dumont 'scope had the capability of switching its vertical deflection plates from the built-in Y-amplifier direct to input terminals at the top of the front panel. This was just what I needed for SSB power measurement — the direct connection allowed me to monitor outgoing RF waveforms from 1.8 MHz all the way up to 144 MHz.



Dumont 241 vertical deflection plate terminals.

The built-in Y-amplifier only had a bandwidth of 2 MHz, but that was sufficient to monitor the final intermediate frequency stage (465 kHz) in my B28/CR100 receiver. This allowed monitoring of the waveforms of incoming AM, CW and SSB signals.

That original Dumont oscilloscope stayed behind in Southport, but it left a lasting mark on my amateur radio station. The shelving in my radio room crossed the Atlantic with me and is based on Dexion slotted angle. It still has a first shelf clearance of 13½" in order to fit the tall Dumont 'scope underneath.

I had to wait another 30 years before I had similar RF monitoring capabilities with commercial equipment — that was when I acquired a used Kenwood SM-230 station monitor which could monitor a transmitter's RF output as well as act as a band scope with an appropriate Kenwood transceiver — it requires an IF output from the receiver centered on 8.830 MHz.



Kenwood SM-230 station monitor displays waveform of an outgoing 14 MHz SSB transmission from the adjacent Kenwood transceiver.

Tele-'scope

After the Dumont 241, my next oscilloscope was acquired from the NARSA Amateur Radio Convention, held at Belle Vue, Manchester in the late 1970s. One of the vendors had a table full of used Telequipment S51B oscilloscopes at a good price, so one came home with me. I was familiar with this particular model as we had a similar oscilloscope in the Physics Lab at Grammar School. The S51B has solid-state rectifiers, B9A glass-based vacuum tubes and a single transistor in the cathode of the X-amplifier. I last used it during PCARA's Technician License class for demonstrating AC waveforms.



Telequipment S51B oscilloscope.

Current scope

The oscilloscope currently installed in my radio room is a Heath IO-4225 25 MHz Dual Trace Oscilloscope. I built this unit from a kit, purchased in 1986 from the Heath Store in Downers Grove, IL. The kit came in a large cardboard box — it's the most complex Heathkit that I ever assembled, and took a couple of weeks to put together.

Apart from the cathode ray tube, the IO-4225 is all solid state — and is still working today. The last time it was used was to investigate audio output from the PCARA TRACCS workshop code practice oscillator.



Heath IO-4225 25 MHz dual-trace oscilloscope.

Do you need one?

I seem to have grown up surrounded by oscilloscopes in laboratories and workshops. My first memory is of an old Cossor double-beam oscilloscope used to demonstrate Lissajous figures at grammar school.

In the days when much amateur radio equipment was home-built or home-maintained, an oscilloscope was a valuable tool for investigating waveforms, adjusting peak deviation on FM, making sure SSB signals were not "flat-topping" and searching for distortion in audio circuits. It could also be a great educational tool for investigating all sorts of electrical signals.

Nowadays, with commercial equipment predominant in amateur radio, the need for an oscilloscope is not so clear. But if you enjoy home-construction, modifying commercial transceivers for the amateur bands or repairing vintage equipment, then an oscilloscope can be a valuable addition to the shack.

You might find a vintage CRT oscilloscope on sale at a hamfest at a reasonable price. Try to arrange a demonstration before parting with any cash! The cathode ray tube requires a high voltage supply and electrolytic capacitors might have deteriorated to the point where they fail when high voltage is applied. Older tube equipment that has not been used in a while should be connected to a reduced AC voltage using a Variac® variable transformer in order to re-form the insulating layer of electrolytic capacitors. - NM9J

Peekskill / Cortlandt Amateur Radio Association

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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

(**Summer break** — no formal meetings in July, August.)

Sat July 8: PCARA Breakfast, Turco's Yorktown, 9:00 a.m.

Sat Sept 9: Special Event Station, 250th anniversary of Old St. Peter's Church, Locust Ave/Oregon Rd, Cortlandt Manor.

Sun Sept 10: PCARA Meeting, New York Presbyterian - Hudson Valley Hospital, 3:00 p.m.

Sat Sept 16: Foxhunt University.

Sat Sept 23: Foxhunt #2, 2:30 for 3:00 p.m. Beach Shopping Center.

Hamfests

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

Sat Aug 19: Ramapo Mountain ARC Hamfest, St. Catherine RC Church, 112 Erskine Rd, Ringwood, NJ. 8:00 a.m.

Sun Aug 27: Candlewood ARA Western CT Hamfest, Edmond Town Hall, 45 Main St., Newtown CT. 8:00 a.m.

VE Test Sessions

Jul 1, 8, 15, 22, 29: Westchester ARC Radio Barn, 4 Ledgewood Pl, Armonk, NY. 12:00. Pre-reg M. Rapp, (914) 907-6482.

Jul 13: WECA, Westchester Co Fire Trg Center, 4 Dana Rd., Valhalla, NY. 7:00 p.m. S. Rothman, (914) 949-1463.

Jul 17: Columbia Univ ARC, 531 Studebaker Bldg, 622 W 132nd St, New York. 6:30 pm, Alan Crosswell (212) 854-3754.

Jul 21: Orange County ARC, Munger Cottage, 183 Main Street, Cornwall NY, 6:00 p.m., J. DeLorenzo (845) 534-3146.



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