



# PCARA Update



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## Out of the park

Field Day 2014 was a *home run*! Member attendance was excellent during setup and teardown. Even the overnight coverage was better than years past. We even had a bit of unexpected attendance. At around 1:30 p.m. on Saturday June 28, people began showing up — people in uniforms, people in baseball uniforms. Apparently there had been a Little League championship playoff double header scheduled for the same field where we had just finished setting up, needing the players' "dugout" area — which now contained all three operating positions. Awkward! After discussion with the coaches, we realized that we could peacefully co-exist and both play. We removed any obstructions from the field (i.e., antenna tie-down stakes and low hanging coax cables), rearranged a few things, and the game went on. On Sunday June 29 there was *another* game scheduled for the morning hours.

In all of the years we have been holding Field Day at Walter Panas High School, this is the first time we had unexpected company. Next year when we setup, we'll need to keep this in mind. **Thank you** to all who helped setup, operate, teardown, and make Field Day 2014 such a success! *You knocked it out of the park!*

PCARA is planning a road trip to the ARRL National Centennial Convention 2014 at the Connecti-

cut Convention Center in Hartford, CT on Saturday, July 19, 2014. This leaves us just under two weeks to make travel arrangements for members who wish to attend. We'll need to arrange an *ad hoc* meeting for all interested in attending. Particulars of the meeting will be announced via 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), the PCARA mailing list, and the PCARA Thursday night *Old Goats Net*.

Just a quick reminder to mail in your membership renewals. Your dues support our efforts and help pay our bills! If you have misplaced your renewal notice, you can visit our website (<http://www.pcara.org/>), print out a copy of the membership application, check-off the renewal box, and send it in with your payment. Thanks!

There are no meetings for July and August, and our next meeting is on Sunday September 7, 2014 at 3:00 p.m. at Hudson Valley Hospital Center in Cortlandt Manor, NY. Please bring stories and tales of your Summer Ham Radio adventures with you. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE

## PCARA Officers

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Greg Appleyard, KB2CQE, kb2cq at arrl.net

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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.



Mike N2EAB and Joe WA2MCR enjoying 40 meter CW during PCARA's Field Day. (Report on page 5).

# Adventures in DXing

- N2KZ

## Who are you kids?

I confess, your honor. I was out of band and out of order. I'm hoping that the court will dismiss my offense. You see, your honor, it all happened in 1966. That was 48 years ago. Have I exhausted the statute of limitations yet? In any case, I have come to plead guilty.

When I was a little kid, I really had no money. The entire neighborhood usually owned just one 'Spauldeen' pinky ball to play stoop ball and stick ball with. If someone hit the ball onto an apartment roof, and the ball got stuck in a gutter, it was game over. Take your broomstick bat and go home.

When I was about 12, my friends and I discovered the world of walkie-talkies. What a gift they were! These were simple one-channel super-het AM modulated toys made in the same factory in Japan. All of them operated on the 27 MHz Citizen's Band using 100 milliwatts as an unlicensed 'Part 15' device. Some operated on Channel 14, but most of the ones marketed by Lafayette Electronics used Channel 10. Before long, nearly everyone had Lafayette 'walkie-tees,' and we would all play with them happily after



school, weather permitting (as long as we had a somewhat good 9 volt battery installed!)

As time went by, our two-way radio world became more sophisticated. We tried to see if some of our friends from outside our neighborhood of garden apartments could reach us. We tried all sorts of things to improve our range. Somebody would stand on the top of the hill outside my address to get more height. We would look for scraps of wire and find just the right length to make a longer antenna with some gain in it. We tried everything!

One of my friends even managed to find a discarded quarter-wave 9 foot whip antenna (it was missing a mount and its wobbly shock spring.) He found a block of wood and drilled a hole to make a primitive mount for it. He smashed the antenna rod down into the wood block as best he could. Then, he attached a piece of wire, with an alligator clip at each end, so we could connect our walkie-talkies to it. The

final step was nailing the block of wood to a wide pants belt so it could be worn like a harness! Jump on a bike and you would immediately become the ultimate kid mobile unit attracting a lot of attention wherever you went.

Every day, we were thinking of new ways to improve the system. We had quite a team of designers aboard. The core group consisted of two Mikes: Keller and Goldberg, along with Burt and Fred and there was me. Already, we had really improved our range and brought several more kids into the fold. With only 100 measly milliwatts, our continued growth was stunted. There had to be something more we could do.

Citizen's Band has had one really miserable characteristic since its inception: The endless drone of hundreds, if not thousands, of users all attempting to reach each other on a quite finite waveband of channels. Popular channel 10 was a zoo. The going noise floor would always be at S-9 or even higher. The melee went on and on.

I started to think: 'Wouldn't it be great if there was no one else on *our* channel?' There had to be a way. After a lot of thought and pondering, I came up with a really inventive idea: What would happen if I reversed the crystals? All Citizen's Band transceivers, licensed or unlicensed, had to be crystal controlled. It was mandatory. No variable tuning allowed!

I noticed that all our plug-in transmit crystals were for 27.075 MHz and the receive crystals were 455 kHz lower at 26.620 KHz. Oh, I thought. This is really interesting. No one is on 26.620! Since I had a pair of Lafayette HA-130s, I could experiment. I removed the back covers of both walkie-talkies and reversed the crystals. Now the 26.620 crystal was in the transmit slot. Would it work?



Lafayette 27 MHz walkie-talkies as used by Karl in the 1960s.

Holy moly!

**It did!** I didn't understand how I was getting away with using a 27.075 MHz transmit crystal to receive, but I didn't care. It worked. I had discovered a crystal clear channel (no pun intended!) and it was all ours. Wow.

First came some R&D testing. I wrapped a rubber band around and around one walkie-talkie so that it would transmit endlessly. I placed it near an AM tabletop radio that was playing and suddenly I had programming. I took a walk with the other walkie-talkie to see just how far I could hear my newly conceived base station. I walked and walked and walked. I didn't lose the signal. This was so cool!

I couldn't wait to tell my friends so they could try it too. In no time, we had the entire gang really enjoying this new channel that was quiet as a mouse for our exclusive use. What a breakthrough! This bliss lasted for several months. The frequency would light up for two or three hours daily starting weekdays right after school. Lots of new kids joined in. It was simply great... until...

One day, heaven darkened and the skies went black. All of us were fooling around on *our* secret 26.620 channel and a powerful voice came on all of our radios. A mature adult's voice thundered: "This is

The Civil Air Patrol. Who are you kids? Get off this

frequency NOW!" Our reaction was immediate. Not only did we turn off our 'walkie-tees,' we took the batteries out and hid them under our beds or in our closets. Boy, were we scared!



*"Get off this frequency NOW!"*

Needless to say, our sneaky operations out of band were over for good. I looked through my dog-eared shortwave logbook magazines and some books at the public library. Sure enough, The Civil Air Patrol had an allocation for the familiar 26.620 MHz used for search and recovery and other exciting stuff. We had no idea that anyone was on that frequency. Eventually, the heat died down and we relaxed. Was that close or what? Yikes. A lesson well learned, your honor.



A few years later, some of us returned to CB with full-sized

desktop rigs by makes like Courier, Johnson, Cobra and Sonar. By the time I was in college, I was even selling CB radios professionally at Arrow Audio in Mineola, Long Island. Still, whenever I get near that frequency, I remember all my history there. What an adventure!

### **Not Legal, but...**

On-air hijinks were not unique to my group of buddies back in the 1960s. You never know what you might hear on the radio, even to this day! Let me explain...

A reliable and trusty set of headphones finally gave up on me recently. After about 20 years of use and abuse, one of the two elements of my Sennheiser

HD414s went silent. Parts are no longer available, so I had to go elsewhere. I decided on a nice pair of Sony MDR-7506 headphones. They produce a very accurate and detailed presentation that is sharp and crisp. Sounds have a hard time hiding when you listen through these beauties.



*Sony MDR-7506 professional headphones.*

In the next few days, I auditioned them with every kind of music I could imagine. It was a fulfilling experience. I often take a quick listen to shortwave to see what's going on. With my new headphones on, I chanced upon a really full and dynamic rendition of an old 1964 ballad called 'Suspicion' by Terry Stafford. The first thing that came to mind was 'What station sounds this good?' The bottom end was rich and full, the definition was superb and everything was crisp and present. It sounded like good old AM radio, heard on a high fidelity receiver from 1964! I haven't heard any AM that good in a long time.



I looked down at the frequency readout and all I could say was 'Whoops!' The radio was on one of my presets: 3875 kHz, smack dab in the middle of the 75 meter amateur phone band. As the song ended, so did the carrier. Hot-rodders have to exercise their horsepower once in a while, I guess.

It was quite obvious that serious professional gear was being used. Many amateurs who covet a good AM sound use broadcast quality (or better) equipment and this station sounded just excellent. It is a crime and a shame that a ham has to risk fines and losing his license to pull this off. Even so, broadcasting music on amateur radio spectrum is beyond illegal.

Listening in to this frequency again tonight, I heard more music on the air, this time a couple of kilohertz down from the 3875 kHz AM watering hole. The usual rag chew gang on 3875 kHz continued right along but were commenting that 'at least he could play good music!' As good as their fidelity may be, this is not the place for this kind of activity.

It is inappropriate and illegal enough to air a one-off song and be done with it. To broadcast a regular evening long tune session just doesn't belong here. I don't understand why someone would do this. Of

course, no voice or ID is offered. Triangulating and documenting a pirate and then prosecuting them is laborious and expensive — and in this case — necessary. My conclusion: ‘What’s your problem, bud?’

Your license privileges are priceless. Abuse it and lose it.

### Good sounds

The recent ARRL VHF/UHF contest (June 14 and 15) was a bit of a challenge this year.

Missing in action was a magic band enthusiast’s best friend: E-skip. All the stations reaching my QTH were high-powered hams reaching me by ground wave. One contact, early in the contest, made a revealing comment to me. “There are plenty of people out there. You just need a 80 foot tower and a Yagi array like I have!” OK, OK. Rub it in, buddy!



A 3-element Yagi tied to the fence.

I plodded along with just a three element Yagi, tied to a fence with a piece of rope, a full ten feet above my front lawn. I did work a few interesting stations with my best ones being on CW. I met, for the first time, a legendary VHF/UHF DXer: Emil Pocock W3EP. Emil authored ‘The World Above 50 MHz’ column for QST for many years, has written many articles on his high band experiences and has organized and Elmered many, many new hams onto the higher bands. I also touched base with a superpower station, with very interesting and profound warbly echoes, all the way from Maine. It really was a good time after all!

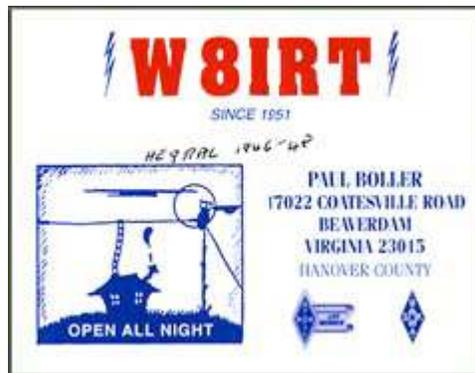


Emil, W3EP

### Good tales

A couple of interesting QSOs came my way on good old 40 meters, too. I listen daily to CW in my bathroom as I am getting ready to face the day. (Doesn’t everyone have a Realistic DX-160 in their bathroom closet?) I had been hearing an interesting callsign regularly for a few days and I finally had a chance to work him and find out what it was all about.

The call sign was W8IRT/HH. This was a new one to me! The operator was a good fisted seasoned ham named Paul down in Virginia. He has used the same callsign since 1951. He began his ham radio career (1946-1949) as HE9RAL in Switzerland. All the things he has seen and heard!



His suffix is equally fascinating. HH stands for a long-established group providing support programs called Handihams, (<http://www.handiham.org>) helping disabled and handicapped people to keep up with current technology and bring goodwill to their day. Paul chairs Handihams’ weekly slow code net on 40 meter CW. Look for him every Friday starting at 0900 Eastern on 7112 kHz. All hams are welcome to check in and read the mail. You’ll enjoy it. I know I do!

I also chewed the rag with Van, N4ERM, enjoying a restful moment on the shores of Jones Lake State Park near Elizabethtown, North Carolina. Van gave me a very descriptive play-by-play as he sat along the beach using a 4 watt QRP rig on 30 meters. Quite talented in his reporting via CW, I felt like I was sitting on the beach along with him! Good times! I was comparatively QRO with a mighty 5 watts up here in Westchester using my trusty Oak Hills Research OHR-100A to a home-built dipole while using a straight key. We had a nice half-hour chat exchanging our thoughts about this new thing called summer!



Van, N4ERM tightening the fasteners on his tower.

### More new radio stations

The big news in the broadcast world is a dramatic programming change on July 4<sup>th</sup>. After decades of being an adult contemporary station, WFAS 103.9 FM White Plains is flipping to an urban format much like the former Kiss 98.7 FM from New York City. Reports suggest they will be moving the transmitter site from the tall tower seen off of the Sprain Brook Parkway in Greenburgh down to The Bronx location currently used

by 90.7 WFUV. Programming on the new station will be anything but local. The well-known syndicated DJ Tom Joyner will be doing morning drive, followed by several other nationwide DJs filling in the rest of the day. I wonder



if any local content will survive? [On July 4 at 1:03 p.m. the station signed on as “**WNBM** Bronxville, New York’s **Best Mix** of R&B - Radio 1039”. Their web address is <http://www.radio1039ny.com/> -Ed.]

Also new on the air is yet another affiliate in the mammoth WAMC Albany chain. If you happen to have a radio that reads RDS data in your car, you may be able to discern the presence of WANR 88.5 FM in Brewster, New York. You can best catch this one driving along I-84 between Home Depot in Carmel and Brookfield, CT. The audio on this facility is really compressed and loud. Hearing content mentioning upstate New York may also clue you into its identity. It often trades places with nearby WEDW-FM Stamford, Connecticut with similar programming on the same frequency.

Finally, a welcomed addition should be in program-test authority starting this month. See if you can pull through 103.7 FM Pawling Public Radio, warming up to go on the air as a low power community station. This admirable and ambitious group can also be heard online at:

<http://www.pawlingpublicradio.org>.

Have a great summer and join us at 8 pm Thursday nights on The Old Goats Net on the PCARA 2 meter repeater - 146.67 MHz.

Happy trails and 73s de N2KZ ‘The Old Goat.’



## Field Day 2014

PCARA’s preparations for ARRL Field Day 2014 started several weeks before the event. Joe WA2MCR acquired a new HF transceiver and obtained permission from Lakeland School District to operate in the grounds of Walter Panas High School. The Field Day team paid a couple of early visits to the site to check distances and plan station layout. With available members back at full strength, a return from 2013’s Class 1A to **Class 2A** was agreed, allowing simultaneous operation of **two** HF stations, plus the ‘free’ VHF station.

Field Day began early on Saturday June 28 at Joe’s location, with the heavy equipment being loaded onto Bob, N2CBH’s truck with assistance from Greg, KB2CQE. A short time later, everything was unloaded at Walter Panas High School, where the weather looked to be warm and sunny for the Field Day week-



end. A good number of members arrived to assist with setup, making the process go very smoothly.

Instead of using push-up tents as in previous years, a new arrangement for housing the stations was tried for 2014. The baseball field adjacent to the High School has two dugout areas with benches for the teams, surrounded by wire-mesh fencing. Bob, N2CBH had acquired two large tarpaulin sheets which were pushed and pulled over the visitor dugout fence, providing a long, wide area protected from sun and rain. Tables for three separate stations were then set up under the tarps, spaced well apart to keep audio levels under control.



*Blue tarps pulled over the dugout fence are secured by Bob, N2CBH with bungee cords. WA2MCR and NT2I on right.*

The next job was to erect Field Day antennas. Once again we made good use of the tall light poles around the ball field plus Joe’s talent with a fishing pole to cast a nylon line over the rungs and pull up supporting ropes. The 102 foot G5RV wire antenna was suspended between two light poles nearest to home plate, while a Carolina Windom was supported from the more distant light pole at the western corner of the field. The Carolina Windom is a 133 ft off-center-fed dipole with a 22 ft vertical section that adds to the radiation. An inverted-L antenna was also erected.



*Yagi antenna plus rotator for 6 meters is pulled up against the wire mesh fence.*

For the VHF station, a 6 meter three-element Yagi antenna, complete with rotator was assembled on an aluminum mast, then pulled up with guy ropes against the tall wire mesh fence, adjacent to home plate.

Installation of transmitting and logging equipment was well

underway when we had an unexpected event — two Little League teams from New York Elite Baseball arrived on-site and explained that they had double header games arranged for that Saturday afternoon. The “NY Swarm” team agreed to share the dugout area with PCARA — we rearranged their benches to face the field again, and the team kept their baseball equipment out of the way at the far end of the dugout. We had to move a guy stake off the ball field and rearrange the G5RV’s feeder so it was clear of the batting area. We were also advised to move all parked vehicles out of the Foul Ball zone, to avoid any windshield damage.

So — with baseball players and coaches coming and going around us, PCARA’s Field Day operations commenced at 2:00 p.m. on Saturday afternoon. Joe had brought along his recently-acquired Yaesu



*‘NY Swarm’ baseball players move from dugout to ballfield, just behind PCARA’s Field Day operations. Ed KF2RT is operating 40 meters with Joe WA2MCR logging.*

FT-1000MP transceiver for the first HF station — this was connected to the Carolina Windom antenna, where it gave a good account of itself on 40 and 80 meters. For the second HF station, NM9J had brought the Icom IC-706MkIIIG, a veteran performer from many previous Field Days. This was connected to the G5RV antenna and performed well on 40 plus 20 meters and above.

The VHF station started out with Joe’s Icom IC-7000 transceiver connected to the 3-element



beam and was soon working neighboring Field Day stations on six meters. However, the station was causing broadband noise on transmit and power output was down due to a high standing wave ratio of 3:1 for the 50 MHz antenna. Mike N2EAB and Warren K2WD investigated and brought their own 6 meter antennas for comparison, but these also had high SWRs (and lower heights). Warren contributed his Icom IC-551D 6 meter transceiver, which was used for several additional VHF contacts.

In order to qualify for the “100% Emergency Power” bonus, electrical power for the transmitting equipment was provided once again by Bob, N2CBH’s Honda EU2000i portable generator. This little wonder ran throughout Field Day, sipping gasoline and providing clean 120 volt AC without any problems.

The logging software was once more N3FJP’s “ARRL Field Day Contest Log”, upgraded this year to version 4.2. With three stations on the air, a return was made to networked operations using a Netgear wireless router to connect Joe’s desktop to the two notebook computers and share the log file database. Electric fans and the blue tarps kept equipment cool and shaded, contributing to reliability.

As sunset approached, the baseball game ended, players departed and we were left alone on the grounds of Walter Panas High School. It was time to prepare night-time illumination and to move down from the higher frequencies. Around 11:00 p.m., the FT-1000MP was transferred to 80 meters and continued through the night making many SSB contacts on

the Carolina Windom and Inverted-L antennas. Meanwhile, the IC-706 stayed on 40 meters working phone and CW on the G5RV antenna.

Your editor returned to the High School grounds early on Sunday morning to find Joe WA2MCR plus Greg KB2CQE still keeping vigil over the Field Day stations. The IC-706 was put back into use on 20 meters while Joe continued making contacts on 40 meter CW.

A short time later we were surprised to learn that *another* double-header game had been scheduled by Elite Baseball for Sunday morning, this time between Saturday's "Gators" team and "Thunder Blue". Once again we cleared the visiting team benches and moved vehicles out of the Foul Ball zone. We also explained our activities to any youngsters who expressed an interest. The ball game continued past 12 noon, but fortunately play was completed and teams departed before our Field Day operation wound down.



Youth participation – Elliot KC2ZAB operates 15 meters with Mike N2EAB logging and 'Thunder Blue' team behind.

There was more activity on Sunday at Walter Panas High School as Westchester County Police were preparing for a large "Active Shooter" drill, which began with a **bang** and was intended to simulate an armed employee who had taken hostages. The school car park was full of specialist police vehicles and the woods were surrounded with yellow hazard tape. According to reports, County Executive Robert Astorino would be on hand to observe the drill — unfortunately, he did not make his way over to PCARA's Field Day activities, or we might have scored some more bonus points for a visit from an elected official.

HF operation continued on Sunday afternoon, with band conditions allowing a move up in frequency to the 15 meter and 10 meter bands. Conditions were not wonderful, but some good long distance contacts were made, including several stations in Hawaii. In the past, we have used W3NQN bandpass filters to allow the two HF stations to operate simultaneously, side-by-

side. The filters were in circuit this year, but it was also the first time that our new bandpass filters for 10 and 15 meters were put to use.

As 2:00 p.m. approached, it was time to stop transmissions and prepare to dismantle the stations. Once again we had a large number of members helping with tear-down — making the whole operation run very efficiently. Antennas were taken down, radios and computer equipment were packed away, the tarps were folded up and everything was stowed on the vehicles by 2:30 p.m.

*Mea culpa!* Subsequent examination of the RG-213U coaxial cable for the 6 meter beam showed there was



PL-259 on 6m antenna feeder.

a *break* in the outer conductor at the antenna end. This explained the high SWR. If we could have lowered the antenna on Saturday, we might have discovered the problem earlier, but baseball play prevented access.

## Results

Here is a summary of PCARA Field Day results from previous years along with the score submitted to ARRL for *this* year, 2014. We claimed bonus points for: 100% Emergency Power, Public Location, Public Information Table, W1AW Bulletin, Educational Activity, Field Day Youth Participation and Web submission.

### 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)								
Partcpt:	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 (Class 2A)
QSOs:	775	722
Power:	2 (<150W)	
Participants:	14	16
Total score:	2040	2460

The score was somewhat lower than for previous years in Class 2A and there was some disappointment with the number of contacts at this peak of the sunspot cycle. More QSOs might have been possible if the six meter antenna had been working correctly. The contact-rate was slow at the start, but that could have been due to distraction from the nearby baseball games.

Despite these setbacks, it was a worthwhile effort, with many members participating. Analysis shows that the most contacts were made on 80 meters, followed by 40 and 20 meters. Smaller numbers were contributed by the 15, 10 and 6 meter bands. Many more CW contacts were made compared with 2013, reflecting the availability of more CW ops this time around. Thanks to everyone who operated and contributed to another successful PCARA Field Day!

- NM9J

# Build a 4 MHz offset active attenuator - N2CKD

After participating in two Foxhunts hosted by Peekskill/Cortlandt Amateur Radio Association, I realized that I needed an attenuator to reduce the received Fox transmitter signal strength. I investigated the traditional 'Passive' versus an 'Active' attenuator circuit and decided to build a popular 'Active 4 MHz Offset attenuator' circuit by Joe Moell - KOOV as featured in his



Lovji, N2CKD demonstrates his offset attenuator, which is connected between the tape-measure Yagi antenna and the handi-talkie.

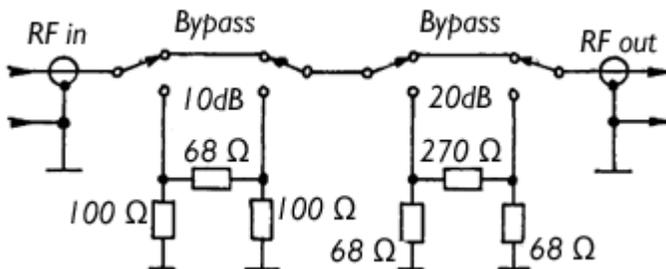
*Homing In* column of *73 Magazine* for May 1998. The circuit and article is available at: [http://www.homingin.com/joe\\_k0ov/offatten.html](http://www.homingin.com/joe_k0ov/offatten.html).

[The original article from *73 Magazine* is available via the Internet Archive: <http://www.archive.org>, see

[https://archive.org/stream/73-magazine-1998-05/05\\_May\\_1998#page/n77/mode/2up](https://archive.org/stream/73-magazine-1998-05/05_May_1998#page/n77/mode/2up) -Ed.]

The RF attenuator connects between a directional antenna and a 2 meter FM handi-talkie (HT), to reduce the signal strength to a range that the receiver S-meter can handle. The amount of attenuation is adjusted by rotating the potentiometer knob and noticing a change in the S-meter deflection. Maximum attenuation is achieved by turning the potentiometer counter-clockwise from the starting minimum position.

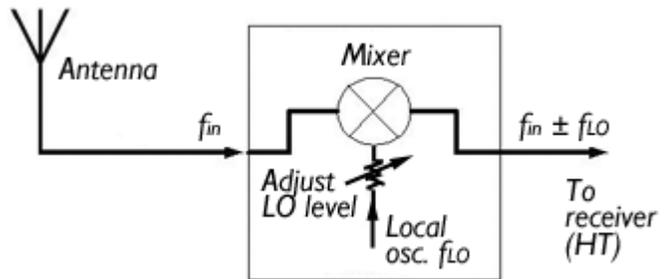
A 'passive' attenuator consists of a resistor network with more resistors switched in to increase attenuation. Passive attenuators work well by reducing the RF



Circuit diagram of a passive attenuator, suitable for fox-hunting. Two DPDT switches bring the 50Ω resistive pads into and out of circuit, providing 0, 10, 20 or 30dB of attenuation.

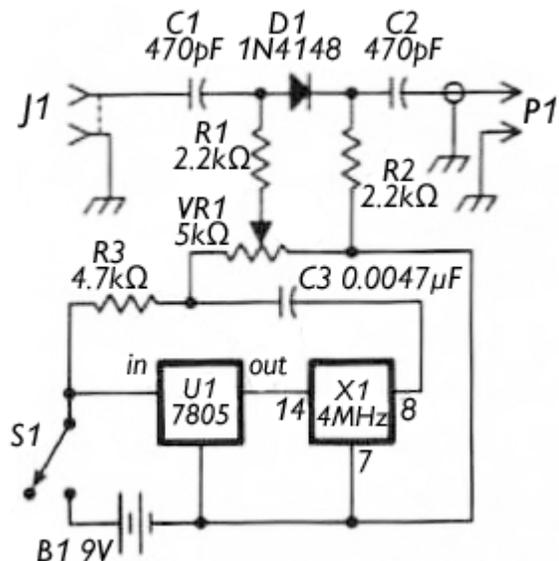
voltage at the antenna input, but strong signals can still get through the HT case, into the receiver front-end and affect the S-meter.

The active attenuator described here works differently by converting the strong *on-frequency* signal into a weaker *off-frequency* signal — for example offset +4 MHz or +2 MHz from the original frequency. The HT's receiver is tuned to the offset frequency and this signal is then measured for signal strength and direction. For example, if the fox was transmitting on 146.565 MHz, the receiver would be tuned to an offset frequency of 150.565. [Many handi-talkies have an extended receive range that can cover these out-of-band frequencies, but you should check -Ed.]



Block diagram of an offset attenuator. Typical local oscillator frequency is 4 MHz or 2 MHz.

The offset attenuator consists of a local oscillator (4 MHz or 2 MHz crystal) connected to a diode mixer via a linear or audio taper-resistor (potentiometer). The higher the local oscillator level, the higher is the amplitude of the offset signal. To increase attenuation, the local oscillator signal into the mixer diode is decreased



Original circuit diagram of the offset attenuator, as published by Joe Moell, KOOV. X1 is a crystal-controlled oscillator mounted in a metal can.

with the potentiometer.

The offset attenuator is easy and inexpensive to build. I had most of the parts in my junk box except the 4 MHz quartz crystal which I ordered from Jameco Electronics, costing \$1.95. I first bread-boarded the circuit to test and made sure the crystal worked by listening for the 4 MHz signal on my HF Transceiver and on a SW radio. The crystal oscillator puts out a strong signal at quite a distance. I then quickly put together a prototype on a small perforated circuit board. The prototype lacked any enclosure and the BNC sockets for antenna and HT were too close to each other, so it was necessary to place them slightly apart.

The prototype worked well so I decided to rewire the circuit and placed it into a blue plastic electrical outlet box that I had lying around. In order to provide shielding in the plastic box, I cut up a 12 ounce aluminum soda can and stuck it inside with crazy glue. (In hindsight it would have been better to mount the circuit board in a metal box.)



*View inside Lovji's offset attenuator, built inside a blue plastic electrical box.*

Finally, I mounted clamps under the plastic box so it easily clamps on to the ½ inch PVC pipe handle of my Yagi antenna. The clamps can be found in the closet/brooms section of the local hardware store.

To operate the attenuator it needs 5 volts, provided from a 9V battery via a 7805 voltage regulator. The circuit recommends an audio-taper potentiometer but I used a linear pot with no audible difference. The crystal oscillator module is mounted on a regular 14 pin dual-inline IC socket. I removed all but 4 pins of the socket and soldered the wire leads to the socket. The crystal oscillator is plugged into the socket for easy replacement with a different frequency such as a 2 MHz crystal.

This attenuator is for receiving signals only and transmitting through it should be avoided — otherwise it will damage the diode. I am thinking of adding a bypass switch to allow transmitting.

To test the unit, I listened to several on-the-air 2 meter QSO's (including the Thursday night PCARA net) and adjusted their frequencies by adding 4 MHz to obtain the offset frequency for my HT. I then rotated my homebrew 3-element tape-measure Yagi antenna in the direction of the signal and adjusted the potentiometer knob, moving it counter-clockwise to obtain maximum attenuation. The knob is adjusted to just the right point where the signal almost fades away. At this point the radio picks up a weak signal and it becomes easy to find the null point of the signal. This attenuator works well at 10 dB, 20 dB to 100 dB. You can tell the attenuator kicks in when the signal strength drops and the signal becomes noisy and distorted.



*Offset attenuator mounted on the boom of Lovji's tape-measure Yagi antenna, using steel clips.*

To further test the circuit I requested Malcolm, NM9J to transmit a simplex signal from his QTH. I was able to receive and locate the direction of his signal, after which I went over to Malcolm's QTH to further test the circuit and received valuable suggestions from him to fine-tune the completed project. Thanks, Malcolm.

I had fun building this circuit and am looking forward to using it in the next Foxhunt. Anyone looking to purchase or build a passive attenuator should consider this active attenuator as it is much lighter in weight, inexpensive and provides very effective attenuation beyond 20 dB.

- Lovji, N2CKD

# Another scanner for the Manor

There is always something worth picking up at the BARA Hamfest. This past May, I came home with a Radio Shack PRO-197 desktop/mobile scanner, purchased from Joel, KB2SFO. Here are some of my experiences with this modern marvel.

## Scanning the past

Let me quickly update you on my previous scanning history. In the UK, during the early 1980s, I had a Bearcat 220FB 20 channel scanner, which covered VHF/UHF including the European 66-88 MHz low-band. After moving to Illinois in 1986, I picked up a Bearcat 175xl 16-channel scanner, which was still doing duty until recently, monitoring business-band radios at my old works-QTH. In the mid-1990s, I upgraded to a Radio Shack PRO-2035 1000-channel scanner for the shack. This model covers up to



*Bearcat 220FB*



*Bearcat 175xl*

1300 MHz and has a wide-band FM mode, which allowed monitoring of the Armstrong memorial broadcasts from WA2XMN, Alpine, NJ on 42.8 MHz.



*PRO-2035*

In 2008, I picked up a PRO-433 trunking scanner which was on close-out from Radio Shack. As reported in the Sept 2008 *PCARA Update* article “Scanner for the Manor”, this model has



*PRO-433 scanner.*

a 1000 channel memory that can be programmed remotely using a PC with suitable software. The PRO-433 can follow conversations on a “trunked” radio system where a limited number of frequencies are shared between many different users. By monitoring digital signaling on the control channel, trunking mobile radios can respond to transmissions for just their own “talkgroup” on the appropriate frequency.

On all these scanners, the display was restricted to displaying just channel number and frequency — which can be confusing when you have hundreds of frequencies stored in memory. I was on the look-out for a

more modern scanner that could display “alpha-tags” to identify the transmissions — and that is how I came across the PRO-197, in very good condition, at BARA’s Hamfest.

## Banner scanner

The PRO-197 was manufactured for Radio Shack by GRE (General Research of Electronics Inc. of Japan) and is very similar to GRE’s own model PSR-600 digital trunking scanner, introduced in 2007-2008. Some of the features include — storage of up to 1800 frequencies; coverage from 25 to 1300 MHz (with significant gaps); tracking of multiple trunking systems; reception of AM, FM, NFM (narrow FM) and P25 digital voice; decoding of CTCSS (‘PL’) tones, DCS (digital coded squelch) and P25 NAC (network access code).



*RadioShack PRO-197 digital trunking scanner.*

GRE has manufactured many Radio Shack scanners over the years, including the famous PRO-2006. GRE America also supports Alinco amateur radio products. In October 2012, GRE America announced that GRE’s manufacturing site in China had closed and was unlikely to reopen at the same location. Sales Director Raj Grounder wrote at the time: “GRE America continues to market, support and service the GRECOM branded scanners and is contractually committed to keep the Library Database updated and current. GRE America will continue to market, service and support Alinco’s radio products without any interruption.” See <http://www.greamerica.com>.

## Object lesson

The scanner came with a 128 page paper manual which opens with a chapter on “Understanding Object Oriented Scanning”. The PRO-197 does not store frequencies in separate “channel banks” like previous scanners did. Instead, conventional frequency channels are stored as “objects” in a single list. The talk-groups for trunked systems are also stored as objects in a similar list.

Each of these “objects” can appear in a “Scan List”, defining which channels should be scanned — and there are twenty different Scan Lists available. Each Scan List can be switched on and off from the front

panel of the PRO-197 just like the channel banks of an old-time scanner. As well as the twenty “Scan Lists” there is also a “Favorite” list which can be quickly chosen by pressing just one button on the front panel, plus a similar “SkyWarn” list.

In the past, if your traditional channel banks contained duplicated frequencies, the details had to be entered multiple times, using up memories in each channel bank. With the Object Oriented approach, frequency details are entered just once, and the objects can then appear in multiple Scan Lists.

The printed User’s Guide from Radio Shack is a lot better than a PDF file on a CD-ROM, but I found more friendly information for the PRO-197 on “Mark’s Scanners” site at: <http://marksscanners.com> .

## Getting started

The first thing I did was check which frequencies had been entered into the PRO-197 by its previous owner. It turned out to be mostly Police, Fire and EMS Departments around Paramus, NJ. There was also one 800 MHz trunked system for NJ State Police. Some of the conventional frequency objects had been



*The LED above the five-way ‘SEL’ pad can be programmed to light in different colors when specific channels are active.*

color-coded — there is a multi-color LED on the front panel which can be programmed to light in different colors when a particular signal is received. Fire departments

had been color-coded red, police frequencies were colored cyan while the EMS channels lit up green.

## A river runs through it

In our part of the world, we have a river, railroads, highways, camps, parks and prisons all using FM radio. I started assembling my own list of Peekskill/Cortlandt frequencies, based on information from the old “Police Call” guides and from local scanning expert Greg KB2CQE. But it took only a few milliseconds to realize that entering all this information from the radio’s front panel would take a very long time.

## Computer connection

The solution was the same as with our modern amateur radio transceivers — connect the radio to a computer with a programming cable, then use dedicated software to enter the frequency information into a table and upload the data to radio memory.

Good news! From my previous experience with the PRO-433, I already had a USB programming cable for the PRO-197, RS part number 20-047 (current version is # 20-546). And my notebook computer already had the correct drivers installed.

## Which software?

There is a choice of programming software for the PRO-197 scanner from at least four different suppliers. Details are in the list below along with their web sites.

ARC500 from Butel Software: <http://www.butelsoftware.com>  
Win500 from Starrsoft: <http://www.starrsoft.com>  
PSREdit500 from PSREdit: <http://www.psredit.com>  
ScanControl from Scannersoft: <http://www.scannersoft.com>

On the grounds of already owning one Butel product, I decided on Butel’s ARC500 software and installed it alongside the software for my PRO-433 scanner. Installation of ARC500 took place without any problems and after selecting the COM port for the USB adapter it was able to communicate rapidly with the PRO-197. ARC500 software is also available in a “Pro” version that logs all scanner activity on the computer — but I did not take that more-expensive option.

## Easy entry

I was about to start entering details of my Peekskill/Cortlandt frequencies when I noticed that Butel’s software can import data — including alpha-tags — directly from the RadioReference Internet site, <http://www.radioreference.com>. This capability can save even more time — though it does require a subscription. (Radio Shack’s USB cable kit includes a free 7 day trial.)

The Import process works as follows. From the ARC500 menu, choose “Internet” → “RadioReference Import”. This brings up a window where account details can be entered. You can then choose your country and state (for example USA – New York), followed by county (Westchester), and Municipality, for example ‘Peekskill’. Available frequencies are then listed and can be selected for import by checking the



*Butel ARC500 importing data from RadioReference.*

box alongside each item. Chosen frequencies are added to the current list of conventional frequency objects along with their corresponding alpha tags. By default all new objects are also added to Scan List 1.

Uploading these newly found frequencies to the scanner takes only a few seconds. But beware! You might be in danger of overwriting existing data in the scanner's memory. My advice is to save a record of the scanner's current memory contents in a file on the computer hard drive. Always read this latest file into the Butel software at start-up, then make your changes and upload to the scanner. Before exiting, save the updated configuration to the computer hard drive in a new file.

### Performance

With some local frequencies loaded into the PRO-197, it was possible to check performance compared to my earlier scanners. Scanning speed and sensitivity proved to be excellent. The 16-character alpha-tags allowed much easier identification of different services when the scanner was stopped on a signal. The LCD display also showed signal strength on the 5-segment S-meter. Specifying a PL tone or DCS code for conventional frequency objects made sure that only desired services were received.

Audio quality from the built-in speaker was very good, and became even better when an external speaker was plugged in.

### In the trunk

Using the Butel software and RadioReference, I added details of Westchester County's trunked system to the scanner. As explained in the September 2008 PCUD article, the county-wide system provides a trunked radio service for fire, ambulance and hospitals on UHF-FM from several sites. The system is also shared with county buses. I downloaded information from RadioReference.com to set up the trunked system and all its talkgroups. I then selected just the talkgroups for "60 Control", "Fire 10", "EMS



*Westchester County's trunked transmissions plus other services for the Peekskill/Cortlandt area come from this water tank on Benefield Blvd.*

10", "Fire 17", "EMS 17" plus the local hospital to add to my "Favorites" list. (Fire Battalions 10 and 17 cover the area around Peekskill/Cortlandt.)

Scanning performance on the trunked system was similar to the PRO-433. Only the talkgroups that I added to the active Scan List would stop the scanner — which is fortunate as the county buses are really boring most of the time. The alpha-tags also helped explain what I was listening to.

### Antennas

I tried several antennas with the PRO-197. The first trial was with my old Radio Shack 20-032 mag-mount scanner antenna, which covers 25-1300 MHz according to the specification. This antenna sits on a high shelf in the radio room and looks like a trapped vertical for 6 meters, 2 meters and 440 MHz.

For comparison, I connected the new scanner to a VHF/UHF mobile gain antenna. This arrangement revealed a deficiency

of the PRO-197's wideband circuitry, as I began to experience significant inter-modulation from the powerful broadcast signal of WHUD on 100.7 MHz. My final trial was with a Revco discone antenna,



brought over from England and re-assembled in the loft. The discone was the best

*Revco Discone antenna assembled and suspended in the loft.*

performer, with reduced inter-mod and a better signal from NOAA Weather Radio KWO35 on 162.55 MHz. However, there was still some cross-modulation from WHUD, so I now have an FM-trap in the coaxial cable between antenna and scanner.

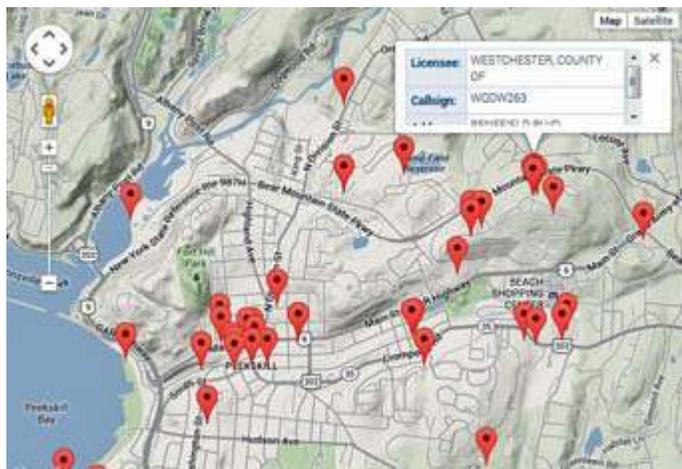
### Firmware

I found several firmware upgrades for the PRO-197 still available on Radio Shack's support site. They installed from the notebook PC via the USB adapter without a problem. According to the accompanying notes, they fix bugs and correct some search frequency ranges.

### Mapping the sites

I have only touched on capabilities of the new scanner. It also has excellent features for seeking out strong, local signals and for searching across specific service bands — for example 'Marine' only or 'Amateur Radio' only. Combining these capabilities with RadioReference to identify transmissions means that

little should escape your notice. You can also ask RadioReference to list transmitters within four miles of a specific point and plot them on a map. Give it a try! Look under “FCC License Proximity Search” on the “Frequency Database” page.



Map showing “FCC Callsigns within 4 miles” of Peekskill/Cortlandt was produced by RadioReference.com. Each red map icon contains details of a transmitter site, linked through the callsign to a web page with further details.

To-date, I have not found any P25 signals in our area to check digital voice reception.

### Future scan

So far, I’m quite happy with my newly-acquired PRO-197 scanner. But what does the future hold for the “Object Oriented” approach to scanners pioneered by GRE? With their factory in China closed, will the GRE designs just become a memory?

Recent reports suggest that radar-detector company **Whistler** has acquired rights to GRE’s scanner designs and Whistler’s web site shows several models “coming soon” which look remarkably like GRE radios. For example, the “WS1065” is similar to my PRO-197 / GRE PSR-600. There is also a WS1040 handheld, similar to GRE’s PSR-500. See: [http://www.whistlergroup.com/default\\_us.aspx](http://www.whistlergroup.com/default_us.aspx).

Similar models to Whistler’s appeared recently for online ordering from RadioShack’s web-site. They are designated as the **PRO-651** Handheld Radio Scanner and the **PRO-652** Desktop Radio Scanner. See:

<http://www.radioshack.com/product/index.jsp?productId=42283596>.

So — let’s hope that this type of object-oriented scanner has just received a new lease of life.

- NM9J



RadioShack PRO-652 digital trunking scanner.

## Field Day pictures

Here are more pictures from PCARA’s Field Day 2014, June 28-29, taken by Ray W2CH.



Erection of wire antennas on Saturday morning, adjacent to the dugout with its blue tarpaulin cover.



Joe WA2MCR and Dan NT2I operating the 6 meter VHF station.



Saturday evening — sunset over the Field Day site.

# Peekskill / Cortlandt Amateur Radio Association

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

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

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*Newsletter contributions are always very welcome!*

Archive: <http://home.computer.net/~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 the Hudson Valley Hospital Center, Route 202, Cortlandt Manor, NY 10567. Drive round behind the main hospital building and enter from the rear (look for the oxygen tanks). Talk-in is available on the 146.67 repeater. \*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 Jul 19:** PCARA visit to ARRL National Centennial Convention, Hartford, CT.

**Sun Sept 7:** PCARA meeting, Hudson Valley Hospital Center, 3:00 p.m.

## Hamfests

**Sun Jul 13:** Sussex County ARC Hamfest, Sussex Co F&H Show Fairgrounds, 37 Plains Rd, Augusta NJ. 8:00 am.

**Thu Jul 17 - Sat Jul 19:** ARRL National Centennial Convention, Connecticut Convention Center, 100 Columbus Boulevard, Hartford, CT. 9:00 a.m.

**Sat Aug 23:** Ramapo Mountain ARC Hamfest, Camp Veritans, 225 Pompton Road, Haledon, NJ.

**Sun Sept 14:** Candlewood ARA Western CT Hamfest, Edmond Town Hall, 45 Main Street, Newtown, CT.

## VE Test Sessions

**Jul 5:** Yonkers PAL Ham Radio Club, 127 N Broadway, Yonkers. 2:00 p.m. Michael Rapp (914) 907-6482.

**Jul 6:** Yonkers ARC, Yonkers PD, Grassy Sprain Rd., Yonkers. 8:30 am Contact John Costa, (914) 969-6548.

**Jul 10:** WECA, Westchester Co Fire Trg Cen, 4 Dana Rd., Valhalla, NY. 7:00 pm. S. Rothman, 914 831-3258.

**Jul 21:** Columbia Univ VE Team ARC, 531 Studebaker Bldg, 622 West 132nd Street, New York, NY. 6:30 pm. Alan Crosswell, 212 854-3754.



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