



PCARA Update



Volume 3, Issue 3/4

Peekskill / Cortlandt Amateur Radio Association Inc.

April 2002

Our Family is Growing! Technician Class

At our VE Session on March 26th, we welcomed 11 new hams into the world of Amateur Radio! I wish I had stock in the *Big Three!* In addition, there were a few at the session who just missed or came really close to passing. **Try it again!** There are many hams that didn't make it on their first, second, or even third try. You came a very long way in *only* 8 weeks and should be proud of what you've accomplished with all of your hard work! We are planning to have additional review sessions, as well as another VE session soon! Keep studying!

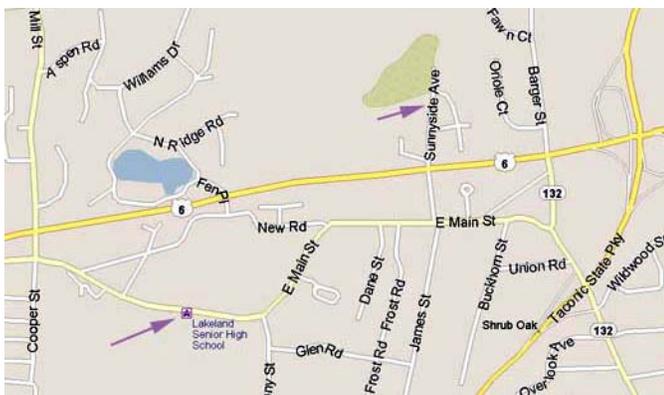
Kudos to all of the instructors and those who volunteered their time and talents to make the course possible. You've demonstrated what this hobby is all about - caring and sharing.

Looking ahead, we have quite a number of events coming up over the next few months (public service events, Special Event Station, Foxhunting, Kids' Day, Field Day, UHF/VHF Contest, and JOTA). Please sign up and have fun! Hope to see you there!

- 73 de Greg, KB2CQE

Public Service Event

On Sunday, April 14th, 9:30 AM to 1:00 PM, PCARA will be providing communications at the Shrub Oak Athletic Club's spring parade, from Lakeland High School to Sunnyside, across Rt. 6. Close to 3,000 participants are expected, and we'll need 10-12 members to assist with communications. Please contact Joe (kr2v@arrl.net) if you are able to assist with this important club event. — KR2V



PCARA's 2002 Technician Class has been very well attended with over 20 students from all age groups. The final night of the course on Tuesday March 26 took the form of a Volunteer Examiner Test Session. We had a very substantial attendance — in addition to students from the class, we had several walk-ins, including two PCARA members taking ARRL/VEC tests.

Final analysis of the VE Test session showed:

Total candidates: **23** (including 2 resits).
New license class earned: **12** — *made up of 11 new Technicians and one upgrade from General to Extra.*
Element-only credit: **1** for Element 3.



Mike, N2HTT explains electrical safety to students at the PCARA Technician Class.

A big thank-you to the Volunteer Examiners who participated — Joe, KR2V, Mike N2HTT, Karl N2KZ, Armen, N2PLZ — plus NM9J.

Thanks also to the PCARA members who helped in teaching the Technician classes at Hudson Valley Hospital Center, and to those who came along to support and share their experiences. That would include Joe, KR2V; Bob, N2CBH; Mike, N2HTT; Karl N2KZ; Greg KB2CQE; John KA2TMU; Will KC2FYY and NM9J. Finally, a special word for Karl, N2KZ who pounded out 5 wpm morse code practice over the W2NYW repeater, three nights a week throughout the eight weeks of the class. — Malcolm, NM9J

PCARA 2nd Anniversary Special Event Station

The PCARA 2nd Anniversary Special Event Station (W2Q) will operate from Perkins Memorial Drive on Bear Mountain, Saturday, May 4th, 8:00 AM to 5:00 PM.



This is a **QRP** event (5 watts or less) and we'll be using the 1x1 callsign — **W2Q**. This event has been listed with *QST* and *CQ* magazines (see below) and will be a great time for all. Please join us with or without radio gear — everyone will have a chance to operate regardless of license/license class. Please contact Joe, kr2v@arrl.net, for further information.

Peekskill, NY: Peekskill/Cortlandt Amateur Radio Assn. - W2NYW, W2Q, 1300 **05/04/02** to 2100 **05/04/02**, PCARA Second Anniversary QRP Special Event Station, 28.350 21.350 14.280 7.240. Certificate. PCARA, PO Box 32, Crompond, NY 10517. — Joe, KR2V

Slow Code - KC2IFG

"It's 8:45. Get your pencil and papers ready. It's time for S L O W code practice on the PCARA repeater."

It was a cold and rainy night. I was on my way to the Tech class to take my first code test. When I arrived there, the room was filled with VEs and future hams. I looked around, (I know there's a novel in here somewhere). I sat at the table, filled out the form for an upgrade, paid my dues and proceeded to take the test. Karl N2KZ, the VE, came over to the table and asked: Are you ready? You have one minute of practice, then the test will begin.

I got ready, put the headphones on and listened to the tape. If you can remember back to the **Jackie Gleason show**, when **Ralph Kramden** would get in

trouble he would say **Hamada, Hamada, Hamada**. Well that's the way I felt. Then every thing went downhill from there. This didn't sound anything like the on-air code practice lessons that Karl N2KZ gave so gallantly for 7 weeks, 3 days a week. Well I blew it. I wasn't ready. I should have been ready. It's only a hobby. But I am determined to pass next time. As I headed back to my car, I met a father and son who asked me how I did. I said I failed the test, how about you? He answered that he passed and so did his son. I congratulated both of them.

Well thanks to Karl N2KZ, I am hooked on CW. I will also miss Karl N2KZ's on the air classic saying: "It's 8:45. Get your pencil and papers ready. It's time for S L O W Code practice on the PCARA repeater."

— Ray, KC2IFG



Operator of the Year

PCARA inaugurated a new award last year for "Amateur Radio Operator of the Year". In recognition of his work with the Red Cross following the September 11 disaster, and for his efforts during PCARA youth events, **William, KC2FYF** was presented with one of the two awards, at PCARA's February meeting.



William (Wires) being presented with Amateur Radio Operator of the Year award at the February meeting by Joe, KR2V. The award takes the form of an engraved plaque.



Will and family members with award.

The new ham experience — KC2JDL

This is the first in a series of articles for the new ham, from the perspective of a new ham. I received my Technician's ticket in February and since then have been trying to answer that most burning of questions – *what do I do now?*

What I've done is a lot of researching and discovery. In this wired age, information is more readily available than ever before and the Internet is a great resource. In this first installment, I'd like to share some of the Internet resources I've found with you. Even if you've been hamming for a while, you might find something new here. And I welcome feedback (and feed forward) from old and new hams for inclusion in subsequent articles. Please feel free to shoot e-mail to kc2jdl@arrl.net.

The Mother Lode

The greatest Internet resource for hams is the web site maintained by the American Radio Relay League (ARRL) at <http://www.arrl.org>. Membership in ARRL includes the benefit of unrestricted access to the on-line technical library at the web site. This includes literally thousands of pages on all aspects of the art and science of amateur radio. And unlike many other sites, the information is **easy** to find.

On the main page (and every other page) is a box that lets you enter a search term. This will search the site and list all the resources available, ranking them with one to four stars — more stars indicate a better match. Recently I was looking for information on dipole antennas. I entered "dipole" as the search term and found that there are upward of 500 hits. Since they are shown in "decreasing star" order, the best pages come up first.

Another on-line resource available only to ARRL members is free access to *QST* reviews going back a number of years. If you're looking to buy a new or used rig, antenna, or accessory, access to ARRL's detailed reviews (including results of extended lab tests that don't appear in the magazine) can help make an informed purchase decision.

Many of the entries are Adobe Acrobat* (pdf) versions of articles or product reviews that originally appeared in *QST* or other ARRL journals. Since new hams generally don't have easy access to back issues (and few of our local libraries receive *QST*), this is an

*Note: Adobe Acrobat Reader is free software needed to view "pdf" files. It can be downloaded from — <http://www.adobe.com>

extremely valuable resource. But again, many of the articles require ARRL membership to view or download.

Rig Manufacturer Sites

The new ham wants to get on the air. Duh! So the first biggest decision is: *which rig to buy?* The choice of rig is a subjective decision and outside the scope of this article. However, the big three amateur radio manufacturers (Icom, Kenwood, and Yaesu) provide a wealth of on-line information to help you decide.



All three companies provide basic information and specifications for their product lines. Icom and Kenwood go beyond, providing downloadable product brochures and operating manuals. Being able to review an operating manual is, to me, an important part of the decision-making process. And since my shack/office seems to collect entropy, it is good to know that if the original manual goes missing, I can print a spare to throw into the briefcase along with the HT when on travel.

The web site addresses are:

Icom	http://www.icomamerica.com
Kenwood	http://www.kenwood.net
Yaesu	http://www.yaesu.com

Other rig manufacturers may provide similar support on their web sites. If you're interested in Alinco, Ten-Tec, or other rigs, locate their web sites using a Google or Yahoo search, and explore.

Next time, more for the new ham. And hopefully a better photo!



-73 de KC2JDL, Bruce

Call Sign Badges

The badges ordered at the last two PCARA meetings have arrived and will be available at the April meeting at a cost of \$12.00 each. Please contact Joe (kr2v@arrl.net) if you will not be at the meeting or if you would like to place an order.

— Joe, KR2V



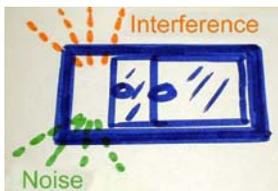
Receiver specs

and why they are so important to understand

Part II – N2CBH

Last month we began our discussion of receiver specifications talking about sensitivity and its interrelationship to system and ambient noise. This month we will take a look at another important measure of a receiver's mettle, selectivity.

Selectivity simply stated is a receiver's ability to receive desired signals and at the same time reject undesired signals on adjacent channels. To get an idea of how this works, imagine an opaque sliding door. If you stand so many feet away and look through the opening there are a certain number of things you can see in your field of view as you look through the opening. Think of the opening as bandwidth. Next, someone starts to close the door while you are still trying to look through the opening. As the door slides closed you can see less and less until you can no longer see anything. This is bandwidth reduction by use of the

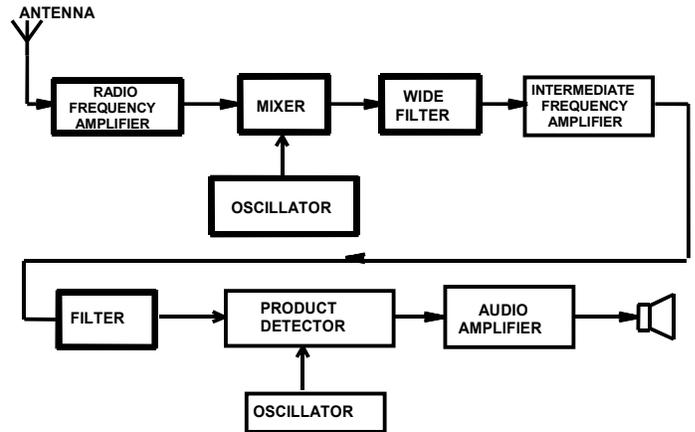


The more the sliding door is closed, the more "distractions" (noise and interference) are blocked from view.

door as a filter. If the door is partly closed some of what you want to see is still there while other distractions are blocked. The larger the object you want to view, the more of the door needs to remain open.

This works the same in your receiver. The wider bandwidth the signal is that you are trying to receive, the wider the bandwidth needs to

be. Good selectivity in a receiver is achieved through filtering of the incoming signal at the radio frequency (RF), intermediate frequency (IF), and audio stages. In recent years you may have noticed quite a bit of talk about transceivers that utilize DSP filtering. DSP stands for digital signal processing and is a powerful and important development in receiver design. I will talk more about DSP in a while. Taking a longer view of system selectivity requires us to talk about what a receiver is connected to in order to get signals to your speaker. System selectivity really starts at the antenna. Antennas can be designed for broad or narrow band characteristics. Dipoles typically have an SWR of 2.0:1 or less over a significant portion of the band of interest. Remember that the flatter the antenna is in terms of SWR the more bandwidth it has and consequently the more signals it presents to the receiver. You might have a tuner in line with your transceiver. Many tuner designs offer a low pass filter characteristic. This has always been considered good design practice as a tuner



Block diagram of a typical SSB/CW receiver

of this type offers matching and harmonic suppression comes at no extra cost. The low pass filter effect removes signals above the frequency the tuner is adjusted for. This can be significant in some situations.

At last, we are at the receiver-input terminals! Most receiver inputs, also known as "front ends", begin the process of limiting the bandwidth of signals. Most amateur receivers have a series of parallel resonant networks that are cascaded together to form a bandpass filter between the antenna input and the first active stage which is either an RF amplifier or a mixer. These filters help prevent the RF amplifier from amplifying signals that are just above and just below the desired frequency. Believe it or not, these filters also help with last month's topic, sensitivity. Here's how.

A receiver has an automatic gain control built in to attenuate signals that are really strong. Without AGC action, these signals might sound distorted. If a really strong signal—just above or just below the desired frequency—appears at the front end, the AGC will reduce the receiver's gain. This has the effect of attenuating the desired signal too. Thus, sensitivity to the desired signal is reduced and in severe cases can render communications impossible. To combat this problem, receiver designers build filters that have just enough bandwidth to allow the desired signal through and attenuate undesired adjacent signals. This way, the AGC can act normally on the desired signal without any influence on usable sensitivity.

If your receiver has a preselector knob on it you have already operated your receiver's front-end filters! The preselector allows you to tune the front end of your receiver for the particular part of the band that you want to listen to while attenuating signal further away.



Yaesu preselector control

After the signal is shaped and passed through the

RF amp and mixer, the resultant intermediate frequency is passed to a series of amplifiers before it is passed to the detector. The IF amplifiers of the receiver further filter the signal. Each IF stage has an input and output transformer. These transformers are really band pass filters that further optimize bandwidth.

Does your receiver have an IF shift control? If it does, you may have already operated the filter in the IF stage of your receiver. This control allows you to skew the passband in one direction or another in order to minimize interfering signals.



Kenwood IF Shift control

Once the signal passes through the IF stages it is on to the detector where more filtering occurs. In an HF receiver SSB and CW signals are detected using a technique known as product detection. Product detection multiplies the incoming signal from the IF with that of a carrier from your receiver's variable frequency oscillator or VFO. What comes out of this multiplication is the original audio signal if it is an SSB signal or a tone if it is a CW signal.

Receivers incorporate audio filters to further restrict bandwidth. Remember I talked briefly about DSP filtering at the start of this article? In recent years receiver designers have incorporated this type of filter into the audio filters used in receivers. More recently, some makers are even using DSP techniques in the IF stages. So, what is DSP? A DSP filter is comprised of an analog to digital converter, a multiplying accumulator, memory and a digital to analog converter. What?! The analog signal is passed to an A to D where it is turned into a series of ones and zeros or binary data that can be processed by the MAC. The MAC is a device that takes the incoming digital signal and performs filtering on it according to a set of instructions known as an algorithm. The algorithm is stored in the memory portion of the DSP. Once the DSP is done filtering it is then converted back into an analog signal to be reproduced by a speaker. See that wasn't so hard!

OK, we've talked a lot about how modern receivers work but not really about selectivity specs. This will be helpful when you go transceiver shopping. Receivers will generally be specified for selectivity in terms of adjacent channel rejection. Or perhaps +/- so many kilohertz away from the signal of interest, an offending signal of identical carrier strength will be reduced by so many dB. A check of an Icom data sheet for the IC-775DSP HF transceiver shows for SSB mode that 2.4 kHz away from the tuned frequency an offending signal is down 6 decibels, written as 2.4kHz/-6 dB. The number to the left of the slash is the usable bandwidth and the one to the right is the rejection just outside the usable bandwidth. At 4.0 kHz away it is 60

dB down, written as 4.0 kHz/-60 dB. 6 dB is a power ratio of 4:1, or a voltage ratio of 2:1, so the offending signal is cut in half by the receiver's IF filters. 60 dB down is a reduction of the offending signal by a factor of 1 million (power) or 1 thousand (voltage)! In the CW mode the numbers are even more impressive, 500 Hz/-6 dB and 1.0 kHz/-60 dB. This is one of the key factors as to why CW is the preferred mode for weak signal work and DX. You might notice a difference in the numbers for SSB and CW. SSB requires about 2.4 kHz for good quality — CW uses much less spectrum and requires only about one fifth the receiver bandwidth at 500 Hz. Just to be complete, the selectivity numbers for AM operation for this receiver are 6.0 kHz/-6db, 20 kHz/-40 db. For FM operation 15 kHz/-6dB, 30 kHz/-60 dB. These figures tell us something about these modes and why they are less popular on the HF bands. AM and FM requires higher bandwidth and the rejection of interference isn't as good. FM is certainly easier to copy than SSB or CW but the price paid is extra bandwidth.

To sum up — selectivity is very much like last month's installment on sensitivity, less is more. Well, most of the time. When comparing selectivity specs compare both the usable bandwidth and the number of dB of rejection. For a given usable bandwidth, the larger the rejection numbers the better the receiver. Next month I will conclude this series with a discussion of modulation modes and how to use them.



- 73, de N2CBH Bob

Where's March?

Alert readers will have noted that this issue of the *PCARA Update* is for the month of **April**, while the previous issue was for February. With the newsletter appearing one week before the PCARA meeting on April 7, a "March" issue would only have been current for one day, so we skipped ahead to April.

Special thanks to all this month's contributors who increased the newsletter size from 4 to 6 pages.

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Newsletter contributions are always very welcome!

PCARA Information

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

PCARA Repeaters

W2NYW: 146.67 MHz -0.6, PL 156.7Hz

KB2CQE: 449.925MHz -5.0, PL 179.9Hz

N2CBH: 448.725MHz -5.0, PL 107.2Hz

PCARA Calendar

Sun Apr 7: April meeting, 3:00 P.M. HVHC.

Sun Apr 14: Shrub Oak A.C. Little League Parade.

Sat May 4: PCARA 2nd Anniversary QRP Special Event Station and Contest.

June 22-23: Field Day

Hamfests

Sat Apr 13: Roseland ARC, West Orange NJ.

Sun Apr 14: Southington ARA, Southington CT.

Sun Apr 21: Mt Beacon ARC, **CANCELLED**.

Sat Jun 1: Bergen ARA, Washington Township NJ.

Sun Jun 2: WECA Hamfest, Saxon Woods Park, Mamaroneck Ave., White Plains, NY.

Sun Jun 9: LIMARC, Bethpage NY.

VE Test Sessions

Apr 7: Yonkers ARC, Yonkers Police Dept., 1st Precinct, East Grassy Sprain Rd, 9:00 A.M. Contact: Daniel Calabrese, 914 667-0587.

Apr 9: Crystal RC, Rockland Co. Fire Trg Ctr., Firemans Memorial Dr., Pomona NY. 7:00 P.M. Contact: Robert Chamberlain 845 354-7340.

Apr 11: WECA, Fire Training Center, Dana Rd., Valhalla, 7:00 P.M. Pre-registration required, contact: Sanford Fried 914 273-2741.

Apr 13: IRAC Hamfest, West Orange H.S., 600 Pleasant Valley Way, West Orange NJ.

Apr 15: Columbia Univ ARC, Watson Labs, 612 W 115th St. New York, NY 10025, 6:30 P.M. Contact Alan Croswell, 212 854-3754.

Apr 19: Bergen ARA, Fair Lawn Cultural Center, 12-56 River Rd., Fairlawn NJ., 6:30 PM, Contact Donald C. Younger, (201) 265-6583.

Apr 27: PE.A.R.L., EOC, County Office Bldg., 40 Gleneida Dr., Carmel, NY. 9:00 a.m. Contact NM9J, 736-0368.

May 5: Yonkers ARC, Yonkers Police Dept., 1st Precinct, East Grassy Sprain Rd, 9:00 A.M. Contact: Daniel Calabrese, 914 667-0587.



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