



PCARA Update



Volume 6, Issue 2

Peekskill / Cortlandt Amateur Radio Association Inc.

February 2005

Planning for PCARA

PCARA has a new Secretary/Treasurer for 2005. Jim, W2JJG was nominated and elected at January's meeting. Jim's already been hard at work becoming familiar with the inner workings of PCARA. Congratulations Jim. At this time on behalf of the membership of PCARA, I would like to thank outgoing Secretary/Treasurer Mike, N2HTT for all of his work on organizing and automating the PCARA membership records and renewals. Thanks Mike!

At January's meeting, the membership approved an expenditure of funds to have the PCARA logo digitized by a local merchant, so that the logo can be embroidered on hats, shirts, and jackets. This will allow individual members to walk into the store and have a logo embroidered on whatever they wish, whenever they wish. There is no minimum order. An order for hats is in the works and will be finalized at the February 6th meeting.

Looking forward, we have a few events on the horizon. We have the PCARA 5th Anniversary Special Event Station on May 14, 2005, a Foxhunt on June 4, 2005, and Field Day 2005 on the weekend of June 25-26, 2005.

As you can see, we have some planning for the year ahead that we need to accomplish. Please come out and give us your thoughts and ideas! I hope to see each of you at the February 6th meeting at Hudson Valley Hospital Center.

- 73 de Greg, KB2CQE

Westchester trunking

The *Journal News* for January 30 reports that Westchester County is going ahead with its stalled plans for a new Fire/EMS radio system. The plan ran into difficulties last year when FCC-allocated UHF frequencies for the new trunked system were found to suffer interference in the southern part of the county from New York City. The FCC has now issued new frequencies to Westchester County. In our part of the world, the system will make use of existing radio towers at Mohansic Golf Course in Yorktown and Benefield Boulevard water tower in Peekskill.

Forty meters

Quite a few countries in I.T.U. Region 1 previously restricted to 7.0-7.1 MHz are now permitted to use 7.1-7.2 MHz. Keep an ear open for U.K. (G/M/2E etc.), Republic of Ireland (EI), Croatia (9A), San Marino (T7), Norway (3Y/LA), Iceland (TF), Switzerland (HB/HE) and Denmark (OU-OZ/XP).

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PCARA Officers

President:

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Secretary/Treasurer:

Jim Grefig, W2JJG; w2jjg at arrl.net



A wintry view of the VHF/UHF antennas at W2CH following the blizzard of January 22-23.

Adventures in DXing – AM... FM... XM! - Karl Zuk N2KZ

Bob Edwards was smart. America's leading public radio personality, Edwards decided to migrate from traditional broadcasting to the new world of satellite radio. On October 4, he began a new chapter in his career becoming chairman of the first nationwide public radio station XMPR on channel 133. His foresight of the future of radio is correct. Millions of subscribers are already listening to XM Satellite Radio, with thousands of newcomers joining every month.

I followed in his footsteps two months later. On Christmas Day, I became a believer. I'm a proud new owner of a Delphi MyFi™ handheld XM satellite receiver. Its futuristic technology is amazing. XM's programming is even better. Suddenly, I am in the 21st century of radio. I have 137 crystal-clear channels to enjoy, from African music to trucker's talk and half a dozen places where country music's playing. (Hello, Patty Loveless. I sure have missed you, darlin'.)

One channel was very telling. There are six channels dedicated to distinct decades of popular music. I could name nearly every song and artist from the 40s through the 80s, but I was lost with the 90s. Long ago, FM radio stations stopped announcing the titles of popular music. Songs I have heard thousands of times have no identity. All XM radios display song titles, artists' names, and even stock reports and sports scores. If you really like a song or performer, you can program the radio to prompt you when any of the XM channels play your song. It's a new world!

XM Satellite Radio is the beginning of a new era of radio programming. I am a child of the broadcast industry. I was born with a two-transistor AM radio in my hands and was devoted to radio as a career by the time I was 16. After 15 years in radio, I've now worked for all three major TV networks and have been a broadcast professional for over 35 years. It broke my heart to see the rapid decline of radio in the 1990s. The Ma and Pa stations were forced out of business by huge conglomerates. Local content became extinct. Song artists and titles became unspeakable. (Why?) Commercial loads and endless drive-time drivel chased us away.



Delphi MyFi portable receiver for XM Satellite Radio - courtesy Delphi Electronics.

Multicasting, computer audio and digital time compression schemes made radio unlistenable. Computer and power line noise, combined with very tight station spacing allocations sealed the deal.

Analog radio = lost at sea. Praise satellite radio! I have not had this much fun listening since I was a teenager!

Dozens of channels of commercial-free music await you. You can choose mixes according to decades (the 40s through the 90s), six channels of Country, gospel, more than two dozen rock and pop streams, classical, jazz, blues, urban, dance, Latin, even African. When was the last time you listened to a radio drama or a full un-edited symphony? The amount of programming is almost endless. A dozen channels are devoted to news. Scroll around to find comedy, talk, sports and traffic/weather. It will take you a couple of weeks just to sample all of them.

A lot of fun can be found listening to XM's special events. Several channels broadcast exclusive concerts and interviews with performers, along with classic concerts from the past. It is such pleasure to listen to a singer/songwriter talk about their craft for as long as they like without interruptions. Uninhibited non-commercial radio is not just a breath or fresh air; it is pure oxygen to the deprived refugees of analog commercial radio. I had an awful experience. One day, my XM receiver's rechargeable battery died while I was walking through Manhattan. I was forced to listen to FM again. Horrors!

XM receivers have a wonderful feature allowing you to scroll through the channels three ways, sorting by channel title, artist playing, or current song title. You can program the receiver to search for favorite songs and titles so you don't miss a beat. Even better, you can record up to 5 hours of programming, using a built-in VCR-like timer, to time shift what you can't catch live. The recordings sound great.

One receiver can serve an entire household. My MyFi includes a built-in robust FM transmitter ready to cover several hundred feet from its location. It includes an intelligent sensor that turns off the built-in transmitter's stereo subcarrier when listening to monophonic programs. A handy full-featured remote allows you to control the MyFi without having to get up from what you are doing. Every aspect of this unit and its accessories was well designed and thoughtful.

Satellite radio's sound is crystal clear. No co-channel or adjacent channel interference. Zero noise. Easy reception. Two geosynchronous satellites broadcast 137 clear channels of programming, serving the entire continent day and night. It takes more effort to DX it than analog radio. You'll have to bring your receiver to far-off places like Bermuda, Alaska, The



Caribbean or Central America to test weak signal pickup. I understand you can actually hear XM at the fringes of “Rock” and “Roll’s” satellite footprints and beyond. Keep in mind that you are really DXing constantly! XM’s satellites orbit high in the sky 22,300 miles above the equator!

XM Radio uses 2.3 GHz S-band microwaves to transmit its program streams. (2332.5 - 2345.0 MHz, in the non-amateur section of our 13cm band -Ed.) XM’s satellites act as a complementary pair for nationwide coverage: “Rock” for the eastern half of the United States and “Roll” for the west. Your receiver automatically chooses which

“bird” is strongest wherever you happen to be. Where tall buildings and urban environments may pose reception problems, terrestrial repeaters fill in the gaps. Visit Manhattan to experience the power of XM’s repeaters. I have listened while walking between skyscrapers and even inside buildings with solid reception using the new handheld XM MyFi. The XM transmission system works very well. It’s pretty difficult to discover the locations of their repeater sites. XM uses panel antennas that look very similar



XM repeater panel antenna - photo courtesy Frank Martin

to the vertical columns you’ll often see stacked on cell towers.

At home, using an S-band antenna that is the size of a postage stamp, I can achieve full signal strength of the XM satellites indoors nearly anywhere. You don’t have to be near a window! During a drive home from Michigan, I experienced some fade when the little antenna that sat upon my dashboard rode through some tall mountain passes in Central Pennsylvania. Huge hills of rock to the southwest were required to stop the XM signal, but the fades were momentary.

Keep in mind you have entered the world of microwaves. I live in a wood frame house with cedar shingles. If you have aluminum siding, or metal screens on your windows, any chance of receiving S-band will be found outdoors. Remove the screens and, voila! Instant major signal strength.

Experiment with reception to locate your best antenna location. S-band is high enough in frequency to exhibit some of the same properties as visual light. The signals may be found in unusual and illogical places and directions. I found XM’s signal strongest through a window of a second story bedroom facing southwest where I could “see” the satellites with an unobstructed view. On the north side of my house, I found a few isolated, and useful, places where the signal was reflecting nicely. If your entertainment center is away from the southwest, there is still hope! Sometimes XM’s signals penetrate into the wildest places.

Stuck in a steel or brick building or another hostile S-band environment? Delphi Electronics, the manufacturer of the MyFi and several other models of XM radios, has just announced another breakthrough: a satellite signal repeater for your home. Install just one XM S-band antenna where good reception is available. Connect the antenna to the home repeater. The XM programming stream now becomes available to your entire house. The homebound signal will require small receiver modules to capture the repeater’s output and deliver it to your XM receiver. No longer will you need to install an antenna for each and every receiver in your house. The XM signal will be everywhere!

My MyFi came with four satellite antennas. One is built into the unit and is adequate for unobstructed areas and urban use where terrestrial repeaters are active. The “home use” antenna is about the size of a brownie and is the performance leader. Another antenna, about the size of a postage stamp, is provided for car use. It is a close second. A fourth antenna, which looks like a small cigar, is meant to wear on your clothes as you walk around. It’s pretty anemic in pickup. You also get two docking stations that your MyFi slides into, allowing you to connect external power supplies and adapt to car or home stereos



The MyFi display at CES 2005, Las Vegas - photo courtesy Frank Martin.



XM repeater at Mt. Harvard near Los Angeles - photo courtesy Frank Martin

scroll wheel). The unit will turn on. Press the display button three or four times and the first diagnostic screen will appear. Adjust your antenna until you see a very low digital bit error rate (BER) down to 0.0 and high carrier to noise ratio (C/N) of at least 7.0 or above. I've seen it go as high as 15 or beyond. The little arrays built into the XM antennas are broad enough to resolve both satellites, simultaneously, with excellent strength if you find a sweet spot. I have yet to experience any indication of rain fade or sun outages. If you are aligned correctly, you will be receiving two satellites, so if one is blocked by a rare alignment with the sun, no program loss should occur.

At my QTH, just north of New York City, the XM satellites can be found at approximately 209 degrees (east coast bird) and 244 degrees (west coast bird) to the southwest. It's roughly just to the right of where you would point a TV antenna towards the city (remember those?) The dual satellites act as a redundant pair. While in the car, watching the diagnostics, you can watch your receiver trade-off from one satellite to another for best signal. The result is seamless. You'll never know you are switching back and forth.

XM receivers do include some technical comedy. Digital signals are either resolved or not heard at all. The receiver designers felt these transitions were too abrupt. They cured this "problem" using a very subtle hiss generator to emulate an analog fade out. When the BER gets sufficiently high and tentative, the hiss generator fades on to ease your ride to silence. Sometimes this works.

Another defense against signal errors incorporates a store, delay, and decode to analog scheme. The digital stream is received, stored, processed and resolved. When the signal is broken, an amount of delayed material is used to cover the gaps. When you have too long an interruption, like riding under a large steel bridge, the audio may echo before it dies.

I experience this effect frequently trying to resolve a satellite signal on my commuter train. I've also seen dropouts a second or two after the break in signal. If you are driving at a fast speed, and pass by a large obstruction, the reception will break several seconds after you pass under the bridge when the signal died to your receiver. Delayed reality!

directly. A lot of gadgets come in the box. Delphi thought of everything!

If you want to align your antenna using the scientific method, there is a very useful diagnostic system built into XM units. With the unit off, press 2 - 0 - 7 and then the XM button (push in on the

Audio quality on XM sounds like a typical FM radio station. There is a decent amount of compression and occasional raspy digital artifacts. Music channel dynamics average about

20 db or more peak-to-peak. The channels used for sports play-by-play and local traffic reports have a much lower sampling rate. You will be convinced that computers have captured the planet when you listen to traffic! XM's local traffic reports are much better than traditional radio, mentioning average rates of speed on highways, weather conditions and very thorough coverage of every major artery.

Three web sites can provide you with everything you might ever want to know about XM Radio. Their home site, <http://www.xmradio.com>, is a multi-paged library describing every channel, all the available radios and accessories, and XM's subscription plans. You could spend hours surfing through two independent user sites: <http://www.xmfan.com> and <http://www.xm411.com>. Both are sophisticated, professional and authoritative sites regarding listener preferences, technical advice, installation ideas and much, much more. Also check out <http://www.delphi.com> for the latest news from XM's primary receiver manufacturer. Several other major manufacturers offer XM ready radios: Audiovox, Polk, Crestron, Pioneer, Alpine and Sony. XM Radio is also available by subscription via the Internet.

It's easy to spot someone who has not experienced satellite radio. Their comments are predictable: "I can't imagine paying for radio" or "It can't be that much better than FM."

After you try XM, you'll wonder how you lived without it. Satellite radio is simply the most important technological advance for radio listeners in decades. XM's diverse programming and well-engineered delivery system adds up to one word: **fun**.



Delphi SKYFi2 receiver for XM Radio.



- Karl, N2KZ

Turks and Caicos —W2CH

If January's snow and sub-zero temperatures have got you down, read how Ray W2CH and Marylyn KC2NKU enjoyed their recent visit to the Turks & Caicos Islands at the southeast tip of the Bahamas. You might not want to repeat their travel experience though! - Ed.



As far as the trip down, our direct non-stop flight on American Airlines to the Turks and Caicos from JFK, for 8:00

A.M. on Thursday, January 6, 2005, was canceled the night before because of fear of ice next day. However, we did not find out about the cancellation until we called American Airlines just before 4:00 A.M. on Thursday morning. They told us we were rescheduled on a 2:00 P.M. flight from JFK, through a connecting flight in Miami on to our destination. Some people told us that they did receive a call from the airline around 11 P.M. or midnight, the evening before the flight. So we went back to sleep and left around 10 A.M. for JFK. With the limo service using an SUV, we arrived at JFK just after 11 A.M. After checking in, we went to the gate, waited until after 1:00 P.M., and didn't see any notices about the flight or boarding time. Marylyn walked around and found that our flight was at another gate, which now showed a departure time of 3:00 P.M. We began to worry that we might miss our connection to the Turks and Caicos, which was scheduled to leave Miami around 6:15 P.M. Other passengers, who were also going to our island were complaining about the delay. As it turned out we did not take off until about 4:10 P.M. and arrived in Miami in time to miss our connecting flight. There were some other passengers from our flight to Miami who missed a connecting flight to Quito, Ecuador — they were told there wasn't another flight for 24 hours.



Beaches Turks and Caicos is on Providenciales, a former British colony in the Turks and Caicos island chain, halfway between Florida and Puerto Rico. "Beaches" is the family brand of the Sandals all-inclusive resorts.



Beaches Turks and Caicos includes a beautiful white-sand beach (12-mile beach) and a crystal-clear turquoise sea. Photos by W2CH.

The airline gave us vouchers for our stay overnight at the nearby Holiday Inn Crowne Plaza, plus dinner and breakfast. After checking in at the Miami hotel, we took the shuttle back to the airport, but were unable to obtain our luggage. The airport staff said it would take up to four hours.

So we shuttled back to the Holiday Inn and spent the night there. While we were having dinner at the hotel, we spoke to two people who were also delayed from their flight. One man told us he was the Finance Minister for Mexico and the other was a Doctor. He said they were going by way of Germany to do something about medical work in Laos! The minister said he had graduated from Harvard and had lived in the U.S. for a time. I thought that was an interesting story.

The next morning we caught our flight from Miami to the Turks and Caicos and arrived there on time. Once we processed through the airport, we had a little problem, in that the Beaches Resort did not have us on their list for arriving a day late. This surprised us because Marylyn had repeatedly called the Beaches office in Miami to tell them about our delay. However, the Manager from the Beaches Resort was at the airport and he saw to it that we had our shuttle to Beaches. Then, when we arrived at the resort around 2 P.M., we were told that our room wasn't ready yet following departure of the previous occupants. So we had lunch and then checked into our room around 3 P.M., as the person at the front desk pointed to the elevator and said, "take that elevator up and go left to the room". We were surprised because previously at Sandals we were greeted with a glass of champagne and a towel for your face... they then take you to your room at the resort. We did get the towel as we entered Beaches, but did not receive the greeting, champagne or guide to the room. We talked to the staff later about this and about the day we missed due to the airline problem. We received a bottle of Champagne to take home, a \$100

gift certificate for the spa, and a letter from the Beaches Manager for an extra day's stay for our next trip to Beaches/Sandals.

We had mostly good weather during our stay and met some nice guests there. It must be pointed out that while Sandals is for couples, Beaches is for couples and families. Most guests at Beaches were with children and there were some couples like us there. We knew this would be so when we booked to stay at Beaches, having previously only vacationed at Sandals Resorts. However, we did want to see what the Turks and Caicos Islands were like. It could get quite noisy and busy with all the children there – from babies to teenagers. There were some weddings during our stay at Beaches, as we had previously experienced at Sandals Resorts.

Radiowise, I had my Radio Shack DX-398/Sangean ATS-909 with us and listened to hams from the U.S., Caribbean and South America. I was also able to listen to WCBS-AM, 880 kHz at certain times, but there was a lot of QRM from other broadcast stations, especially from South America. The only other thing that I can add about radio is that there are about eight FM radio stations receiveable at the resort. They had a variety of programming, such as rock, caribbean music and a religious station. There is a government station too, which carries varied programming. An article in the local paper recommended establishing a MW station for better coverage of the islands in case a hurricane strikes again. The Beaches Resort was closed for five weeks after Hurricane Frances passed nearby last fall.

Fortunately, the trip back was ok, especially when we made sure that our luggage went back with us. In spite of what happened, it was still pleasant to be in the warm weather and sunshine.

–Your travellers Ray, W2CH and Marylyn, KC2NKU

Changing times

Good technology can be very persistent. Techniques invented decades ago have served us well, and are still in good shape today. Some examples include the telephone, AM radio and NTSC color television. But the times they are a changing for all three.

Plain old telephone: The telephone was invented in 1876 by Alexander Graham Bell, and improved with a carbon microphone by Edison in 1878. The earliest telephone exchanges were manual, with human operators making the circuit connections — *number please?* The first automatic switch dates from 1892, based on the designs of Almon Strowger. Strowger's technology of electromagnetic relays and selectors gradually took over from the human operators, staying in use until the 1980s. Strowger exchanges

were succeeded by crossbar switches, introduced during the 1950s, and by fully electronic switches, introduced during the 1970s.

Meanwhile the "plain old telephone" connected by a pair of copper wires to the central office still works the same way it did eighty years ago. Attempts to improve on its analog connection have had limited success. A move to digital, ISDN phones in the 1980s penetrated only a few, niche markets.

But the writing may now be on the wall for the plain old analog phone. Quite a few people nowadays do not have a landline phone, relying instead on wireless cell phones. Others use their broadband Internet connection to make phone calls. And as the FCC loads all kinds of strange charges onto the standard landline bill, there are fewer and fewer incentives to stay with the plain old analog phone.

AM: Broadcasting began in the early 1920s using amplitude modulation on medium frequencies. Famous call signs such as WOR, WCBS and WGN went on air in 1922. NBC set up a coast-to-coast network in 1928. Early reception was with "crystal sets" but tube receivers followed and superheterodyne receivers arrived in the 1930s. Antenna techniques established in the 1930s for laying down a powerful AM signal are still in use today. Transmitter design has changed, mainly to improve energy efficiency, but the signals radiated are just like the ones from 80 years ago. A 1930's receiver will still receive AM if switched on today.

Other services, including amateur radio, made good use of AM from the 1920s onward. On our HF bands, AM and CW reigned until SSB began to take over in the 50's and 60's. AM was also popular on VHF/UHF until the arrival of FM and repeaters. One service still making extensive use of VHF-AM today is aeronautical mobile.

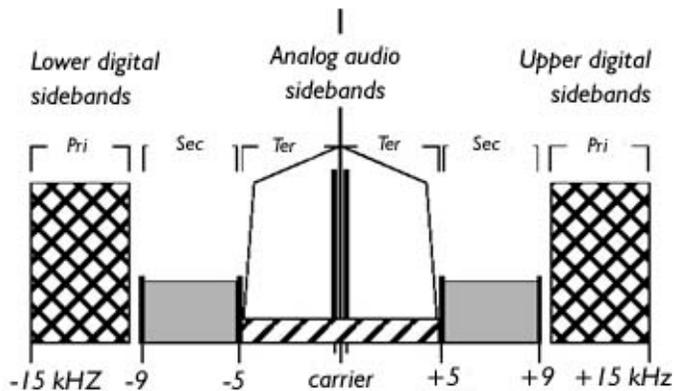
The writing may also be on the wall for AM broadcasting. Many countries around the world are testing "DRM" or "Digital Radio Mondiale" as a replacement for AM on long wave, medium wave and short wave. DRM is being developed by an international consortium of broadcast-



Kansas City undertaker Almon Strowger believed that a manual telephone exchange operator was sending calls to his competitor rather than to his own funeral business. So he developed an automatic telephone exchange that needed no operators.



iboc/worhd.htm. There are very few available radios capable of receiving IBOC at present and they are not cheap — Ray W2CH points out that the Kenwood mobile receiver for HD Radio costs a total of \$590!



Spectrum of “HD Radio” – IBOC AM signal carrying simultaneous analog audio (5 kHz) and digital modulation.

ers and manufacturers — see <http://www.drm.org> for details. The DRM signal is designed to fit in existing AM broadcast band plans, based on signals of 9 kHz or 10 kHz bandwidth. The change to all-digital transmission provides near-FM quality audio, with the capacity to integrate text and data.

Unfortunately (in your editor’s view) the U.S.A. has adopted a completely different standard called IBOC (In-Band On-Channel), a proprietary format developed by iBiquity Digital Corporation for AM and FM digital broadcasting. In “HD Radio” IBOC provides a digital signal simultaneously with the existing analog broadcast. On AM, the new digital signals are broadcast as “sideband” transmissions bracketing the top and bottom of the existing analog signal, for a total bandwidth of 30 kHz. This is a lot wider than DRM! See <http://www.ibiquity.com/technology/iboc.htm> and March 2003 *QST* p28 for details. Several stations are already using IBOC technology, including WOR in Lyndhurst NJ on 710 kHz. Try tuning with a narrow bandwidth receiver to the adjacent channels on 700 and 720 kHz to experience digital QRM — you will need to do this in daytime while the IBOC signal is on. Then check <http://www.wor710.com/Engineering/>

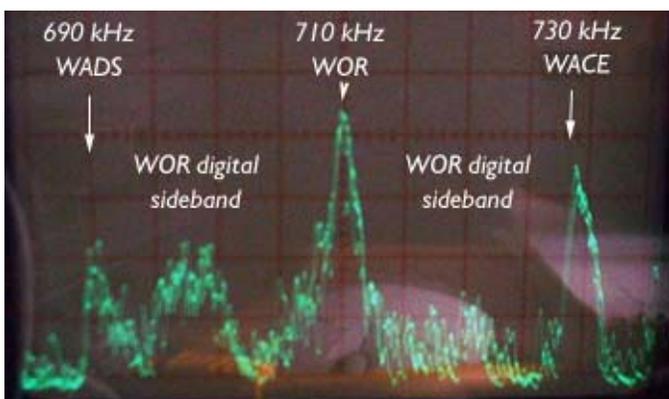
Color TV: Color television in the U.S.A. grew out of competing systems developed by CBS, RCA, GE, Hazeltine and Philco in the late 1940s and early 1950s. The National Television System Committee (NTSC) submitted a technical standard, which was approved by the FCC at the end of 1953. This standard assured compatibility with existing black and white receivers and was all electronic – there were to be no spinning color wheels. Color broadcasting began in 1954, but it would be the 1960s before sales of color TV receivers took off.

The 525 line NTSC standard for color television has proved to be robust and very long lived. It was adopted by many countries in North and South America, plus Japan and S. Korea.

Europe took longer than the U.S.A. to develop its system of color television – West Germany developed the PAL (Phase Alternate Line) system in the early 1960s, with the first PAL color broadcasts taking place on BBC2 during summer 1967. PAL improves on NTSC by reversing the phase of the color components from line to line, with a corresponding reversal at the receiver. This reduces color changes caused by multipath distortion and other types of interference. France developed a competing system of color television named SECAM, which was also supported by the Soviet Union and Eastern Europe. The rest of the world mostly adopted 625 line PAL.

More than fifty years after the standard was approved, NTSC color television receivers are still readily available in North America and new transmitters are being installed in New York City to continue broadcasting analog color TV signals to millions of existing sets — with some assistance from our own N2CBH! However, the writing is on the wall for analog TV. Many people now watch digital television – through the satellite services of DirecTV and Dish Network – or through digital cable. The broadcasters have begun transmitting various formats of over-the-air digital television, of which HDTV offers the maximum resolution. In our part of the world, digital UHF signals from New York City have a hard time penetrating the hills, and it may be some time before a majority of over-the-air viewers can switch from analog.

– NM9J



SM-230 station monitor view of daytime RF spectrum around 710 kHz. Note how WOR’s digital sidebands fill up 30 kHz of spectrum from 695 to 725 kHz.

Peekskill / Cortlandt Amateur Radio Association

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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.

PCARA Repeaters

W2NYW: 146.67 MHz -0.6, PL 156.7Hz

KB2CQE: 449.925MHz -5.0, PL 179.9Hz

(IRLP node: **4214**)

N2CBH: 448.725MHz -5.0, PL 107.2Hz

PCARA Calendar

Sun Feb 6: February meeting, HVHC, 3:00 p.m.

Hamfests

Sun Feb 27: LIMARC Long Island Winter Hamfair & Electronics Show, Levittown Hall, 201 Levittown Parkway, Hicksville, NY 11801. 8:00/9:00 a.m.

Sun Mar 5: Splitrock ARA North Jersey Hamfest, Parsippany PAL Building, Smith Field, Route 46 and Baldwin Road, Parsippany NJ. 8:00 a.m.

Sun Apr 10: Mt Beacon ARC Hamfest, Tymor Park, County Route 21, Unionvale, NY.

VE Test Sessions

Feb 6: Yonkers ARC, Yonkers Police Dept., 1st Precinct, E Grassy Sprain Rd, 8:30 A.M. Contact: D. Calabrese, (914) 667-0587.

Feb 14: Split Rock ARA, Hopatcong High School, Rm C-1, Hopatcong NJ. 7:00 p.m. Contact Sid Markowitz, 973 724-2378.

Feb 18: Bergen ARA, Westwood Reg HS, 701 Ridgewood Rd., Washington Twnshp NJ. 7:00 p.m. Contact Donald Younger 201 265-6583.

Feb 28: Columbia Univ ARC, Watson Labs, 612 W 115th St. New York, NY, 6:30 p.m. Contact Alan Crosswell, 212 854-3754.



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