



PCARA Update



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May be busy

We have a busy few months ahead! The first event on our club schedule is the PCARA Foxhunt on May 10, 2014 at 3:00 p.m., starting from the Beach Shopping Center in Peekskill, NY. A full set of rules can be found in this month's issue of the *PCARA Update* courtesy of Malcolm, NM9J. The Fox will be played by Mike, N2EAB with a bit of moral and operational support from yours truly. Please consider joining us, and as always **all are welcome!** At the conclusion of the exercise we will meet at a local restaurant of the Fox's choosing for a nice dinner and critique of the event.



Just a heads up that there are a couple of regional hamfests approaching. The first is the Bergen Amateur Radio Association Hamfest on Saturday May 24, 2014 at Westwood High School in the Township of Washington in Bergen County, NJ. Details can be found on the BARA website at: <http://www.bara.org/events/hamfest/>. The second is the returning Mount Beacon Amateur Radio Club (MBARC) Hamfest on Sunday June 8, 2014 at the Downstate Correctional Facility, 65 Red Schoolhouse Rd, Fishkill, NY 12524. Details are listed on the ARRL website at: <http://www.arrl.org/hamfests/mbarc-hamfest-2014>.

As mentioned in last month's edition of the *PCARA Update*, we are planning a road trip to the ARRL

National Centennial Convention 2014 at the Connecticut Convention Center in Hartford, CT on Saturday, July 19, 2014. Anyone interested in helping with planning and logistics, please contact us at mail@pcara.org. For further information on the Convention, please visit <https://www.regonline.com/builder/site/Default.aspx?EventID=1248082>.

Finally, preparations for ARRL Field Day 2014 on June 28-29 have begun. As in years past, we're tentatively planning on setting up at Walter Panas High School at 300 Croton Avenue in Cortlandt Manor, NY. Discussion and planning to be held at the May 2014 meeting.

Our next regularly scheduled meeting is on Sunday May 4, 2014 at 3:00 pm at Hudson Valley Hospital Center in Cortlandt Manor, NY. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE

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Net night

Peekskill/Cortlandt Amateur Radio Association holds a weekly net on the 146.67 MHz W2NYW repeater on Thursdays at 8:00 p.m. Join net control Karl, N2KZ for news and neighborly information.



L to R: Mike N2HTT, NM9J and Joe, WA2MCR man the club table at the Orange County ARC Hamfest, Sun April 27.

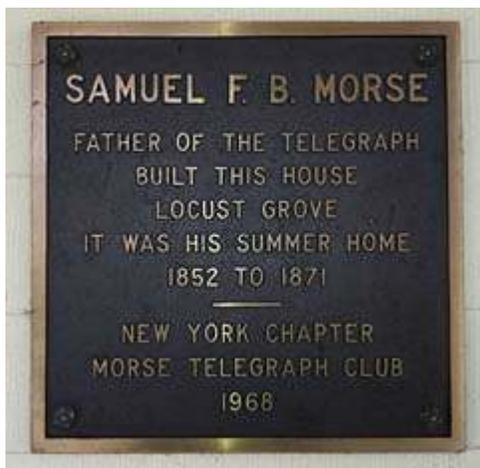
Adventures in DXing

- N2KZ

Morse... of course

At the end of April every year, members of The QSY Society amateur radio club make a pilgrimage. This year, on Saturday, April 26th, we traveled to Poughkeepsie to celebrate the 223rd birthday of a man near and dear to us: Samuel Finley Breeze Morse. Year after year, we gather together and build an amateur radio station right on the old front porch of his estate known as Locust Grove. For anyone who loves CW and sending code, it is like going to church.

It was 8:00 am when we first began setting up antennas and arranging equipment on a picnic table up on the porch. A rainy dawn slowly turned into a pretty nice day with a hint of full sunlight now and then. Two antennas went up on the nearby lawn supported by handy 30 foot collapsible masts. We put up an end-fed wire for 40 meters and a PAR loop for use on 17 meters. Waiting on the picnic table were two Elecraft KX3 rigs capable of ten watts of CW apiece. What a sweet and easy way to get on the air!



Plaque at Locust Grove.



Antenna raising for the Special Event Station W2M.

In attendance were some great friends: Scott,

W2NTV, Henry, KB2VJP, Mark, WA2NYY, John, WK2T, Frank, W2IX, Fred WY2E and Finn, WB2UWU and his wife Lilli. We share one thing we all have in common: CW makes us smile. It may have been a cold and rainy morning, but there was plenty of warmth and excitement to be had.

Our special event station was concise, efficient and effective. Using the callsign W2M, we hit the airwaves on 17 meters briefly, then switched to 40 meters with the end-fed wire. Both John, WK2T and Mark, WA2NYY manned the station early on. John asked me to call up the Reverse Beacon Network (on my Smartphone with Internet access) to see if our callsign was being registered and heard from monitoring stations afar. Boy, was it ever!



Mark WA2NYY and John WK2T manning the W2M Samuel Morse special event station at Locust Grove.

One look at our spotter log and we could rest assured we were getting out. Our first shot at 40 meters reached Quebec, Wisconsin, Michigan, Maryland, Ohio, Pennsylvania and New York. Our first QSO was more amazing. Thomas, KA2KGP in Forestville, New York heard our call and replied right away. He sent nice slow code to us exchanging name, QTH, RST, rig information and casually mentioned that he is deaf and still loves CW. See, this morning is special!

No annual Morse birthday event would be complete without the inclusion of WB2UWU into the log. Finn has figured out a perfect way to work our special event stations - and - still be in attendance on Mr. Morse's porch. Using a Ten Tec R4020 QRP CW transceiver, and old Japanese straight key and an ingenious dummy load combined with a one inch long antenna, Finn can transmit a milliwatt signal only our ears can hear!

W2M went on to work many stations you might expect for 40 meters during the day. We heard from Michigan, Long Island, nearby New Jersey and New York and a few from upstate New York, as well. As time went on, W2M created quite a pile-up line of stations



Finn WB2UWU transmits QRP CW from the Morse porch.

longing to reach us. Our station stayed on the air into the afternoon sending a happy birthday message to all who called. Several groups of tourists came by to visit and enjoyed our show! A grand time was had by all!

Be Quiet!

As amateur radio advances into its second century, it is fascinating to marvel at all that has changed over a dozen decades. In the beginning, two challenges were basic. 1. Get your spark transmitter flying as fast as it could to reach beyond 200 meters into short-waves. 2. Receive *anything!*

The years immediately after the First World War brought miracles to the amateur world. Transmitters found dignity now, enjoying electronic “continuous wave” oscillators to find their frequency. Receivers became viable and reliable with the advent of super regeneration and later superheterodyne designs.

Another World War passed and radio progressed further. Aircraft radios and radar helped win the war.



World War II radar, RAF Ventnor.



“Be vewy, vewy quiet, I’m hunting Dog X-way.”

Important refinements like single sideband and operation into the VHF and UHF spectrum provided more and more incentives towards reli-

ability and excellence in two-way communication. Immediate exchanges of information across thousands of miles was no longer a fluke. Constant contact became the rule. Television also came into view.

Digital electronics came next in the early 1970s. I remember marveling at the first phased-locked loop crystal-less transceivers followed by a whole bevy of digital modes like packet. Receivers became incredibly sensitive, selective and compact. Transmitters became rock solid, agile and equally concise.

All sorts of miracles like moonbounce, incredibly robust and resilient data and today’s all-digital modes continue our tradition of research and development. Remote control transceivers allow us to communicate from locations all over the world even with handheld phone devices. Want to know what it is like to operate and listen in New Zealand? No problem. Turn on your computer and log in to a rig on the other side of the world and find out!

The great irony in all this progress unfortunately is noise. As receivers have become more and more sensitive and interference resistant, man-made noise has increased nearly proportionately. You can marvel at the sensitivity and selectivity of the most modest QRP transceiver kit and then curse all the noise these miracles need to dodge. What to do?

New-fangled light bulbs and switching power supplies are only the beginning. Nearly everything includes some sort of noisy CPU or full-fledged computer. Of course, the old nuisances have not gone away. Kitchen mixers and blenders can still blow the ears off headphone wearers without warning. Can modern DSP filtering completely remove all the evil noise from your life and hobby? How can you cope with a world filled with interference?

In a word: Experiment. I avoid using new-fangled noise-making light bulbs at my QTH and always disconnect switching power supplies or even ‘wall-warts’ when they are not being used. Beware of even tiny ‘wall-warts!’ These miniature power supplies are often switchers allowing manufacturers to avoid employing costly step-down transformers.

Get yourself grounded — but do it intelligently.

Household grounds, like the ground connections incorporated into house wiring (using the outlet box center screw or third prong of an A/C power cord) may act as a direct connection to every noise gener-

ating device in your house. It is always better to establish a good earth ground right outside your shack. A few copper stakes in the ground and some ground radial wires to match can make significant improve-



Personal grounding kit from Groundology.com...

ments in both your reception and transmission. Using an earth ground raises your ability to capture ground wave signals in a clean environment and protects against static discharges and lightning.

Of course, using the available noise filters designed into your receiver or transceiver always helps. Learn how to use them and which subtle filtering effects each one is capable of. Remember: Less bandwidth means less noise, too.

One great hint for the CW operator: Try listening to the opposite sideband for better reception. As a loose standard, most hams listen to the USB side of transmissions. If noise or adjacent channel interference is blocking your copy, jump to LSB and take a listen. You may find much better copy on the other side of the street.

If you don't have a tower and a directional antenna on a rotor, you can still dodge noise sources if you are clever. One technique I have come to enjoy recently is using more than one antenna for a QSO. If your rig or external accessories allow for operation with separate transmitting and receiving antennas, you may discover a new world of operation. Perfect resonance is not particularly necessary for adequate reception.

Here is an example: My 20 meter dipole favors the east and west and my 40 meter dipole faces north and south. A station from the south of me could very possibly pick me up, but I may be able to increase my reception of their signals by a few dB just by switching to an antenna with a different heading. If you have a rig that can do this automatically (transmit on one antenna — receive on the other) it makes this idea so much easier to realize.

Another technique I admire is using loop antennas to peak signals and null noise. This is especially common on low bands where rotating directional antennas may be impractical. This is the same effect as manipulating a portable AM radio that employs a ferrite bar antenna. Medium wave DXers know loop antennas well. The tuned box loop has been a standard for broadcast radio reception for almost exactly one hundred years.

One of my great heroes in this arena is the gifted Mark Connelly, WA1ION who lives in the Boston area and regularly visits Cape Cod for medium wave DX sessions. Mark has designed and built many miracles that hundreds of DXers have followed. He is the king of

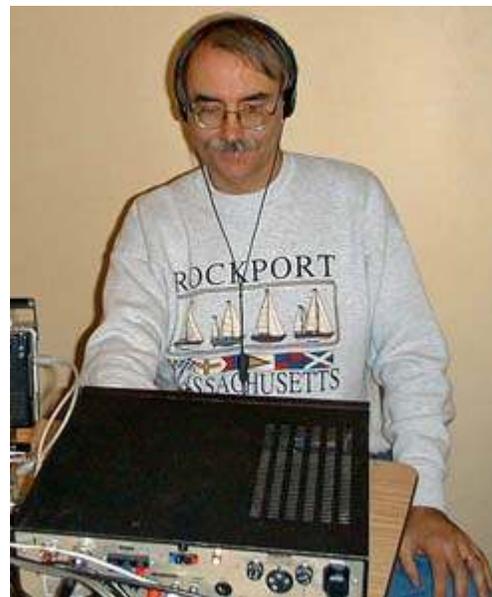


Loop antenna for medium frequency reception.

building task-specific pre-amps and phasing devices as well as some spectacular loops. You have not lived until you have seen the results possible using a bevy of Beverage antennae slewed and sharply tuned toward a target station. You could spend hours with his web site at <http://www.qsl.net/wa1ion/>. The artillery that Mark designs has been used all over the world by some of the best DXers you might ever find.

So the dilemma remains: The more sensitive your receiver, the better it picks up noise, too!

Until next month, 73 and good DX de N2KZ, 'The Old Goat.'



Mark Connelly, WA1ION driving the Drake R8A receiver on a Newfoundland AM broadcast DXpedition.



Orange County Fest



Henry KB2VJP (right) won the first-drawn door prize at the Orange County ARC Hamfest on Sun April 27. The items in the bag included a subscription to CQ Magazine...

Homebrew HDTV antenna – N2CKD

I was recently checking out the myriad available types of OTA (over-the-air) indoor/outdoor digital TV antennas. The product advertisements suggest they are an excellent alternative for those who wish to cut out their cable TV service. Pictured here are some of the different shapes and sizes available on the market.

I reviewed specifications of many different types of antenna and decided to find out if a homebrew DTV antenna installed in my home in Cortlandt Manor could receive Digital TV (DTV) signals transmitted to the Tri-State region from more than 40 miles away. I chose a bow-tie design because it is the simplest homebrew antenna to construct which receives all the UHF channels 14 - 69. However, it does not receive VHF-low band channels 2-6 or VHF high-band channels 7-13, for which you would need to add a VHF antenna.

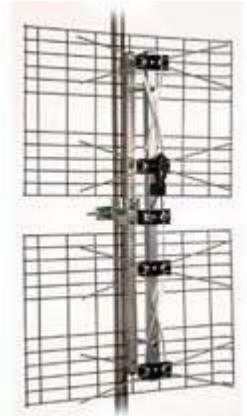
From the many available designs on the Web, I chose 'How to make a homemade TV antenna', complete with design specs, instructions and a YouTube video. The website is at tvantennaplans.com

[Ed — this site is reported to contain malware, so we would suggest the following alternatives: <http://www.diyvantennas.com/bowtie.php>, <http://makezine.com/projects/digital-tv-coat-hanger-antenna/>, <http://current.org/ptv/ptv0821make.pdf>.

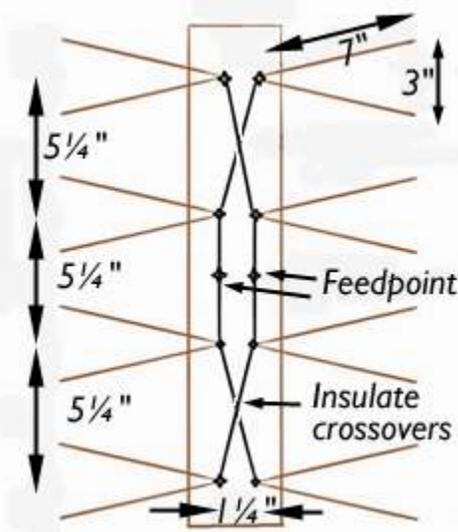
Some of the commercial antennas available for DTV reception.



Antennas Direct DB4 four-bay bow-tie UHF TV antenna.



Antennas Direct DB4 four-bay bow-tie UHF TV antenna.



Bow-tie antenna design for UHF TV reception, using copper wire or coat-hanger wire on a wooden boom.



Lovji's home-built bow-tie UHF TV antenna. [N2CKD pic.]

YouTube videos at:

<http://www.youtube.com/watch?v=MlShMxSCZJ0> .]

You can read details of the antenna's construction on the web so I will not repeat them here. Photos of a commercial DB4 Bow Tie antenna and my homebrew version are shown alongside.

I built this homebrew antenna in about 2 hours using coat hangers, a 2x4 wood stud and parts from the junk box. I then connected the antenna to my Insignia TV set with built-in DTV tuner and pointed it in a southerly direction at approximately 185°-to-202° azimuth using my magnetic compass. I pointed the antenna in slightly different directions till I started receiving signals.

The TV transmitters are quite far away — 37 to 57 air miles — so to boost the weak signals I installed a GE "Multi-media drop amp" 25 dB pre-amplifier. The antenna is directional so it needs to be rotated to receive signals from transmitters in other directions. If you refer to the map, you will notice that the desired stations are scattered mostly to the South in New York City at 40 miles and SSW in New Jersey at 39 miles. There are also stations to the SSE on Long Island (WLIW,WFTY) at 57 miles, to the East at 50 miles in Connecticut and due NNW of Peekskill on Mount Beacon (WRNN, WTBY), only 16 miles away.



GE "Multi-media drop amplifier 54-1000 MHz" preamp.

I hung the antenna outside a bedroom window approximately 17 feet above ground level, facing south toward New York City. After performing a TV channel scan , I am receiving 37 OTA channels from 9 UHF stations, with crystal clear

reception of HDTV (1080i) and standard definition (480i) channels at 100% signal strength with the homebrew antenna.

Callsign	Network	V-Ch	RF-Ch	City of lic.
WCBS	CBS	2.1	33	New York
WNBC	NBC	4.1	28	New York
WNYW	Fox	5.1	44	New York
WWOR	My	9.1	38	Secaucus, NJ
WNYE	ETV	25.1	24	New York
WPXN	Ion	31.1	31	New York
WNJU	Telemundo	47.1	36	Linden, NJ
WTBY	Trinity BN	54.1	27	Poughkeepsie
WFUT	Telefutura	68.1	30	Newark, NJ

Next, I moved the antenna indoors behind the glass window and noticed no change in signal reception—but moving the antenna behind sheetrock, the signal dropped completely. The bow-tie antenna receives horizontally polarized UHF signals and when rotated to the vertical direction, no signals are received, as expected.



Bow-tie antenna hung in the window. [N2CKD pic]

I did not use a reflector so the signal strength is the same in both 180 degree directions. I will be adding an aluminum foil reflector to see if there is any improvement, other than to gain directivity.

Pointing of the antenna is critical to getting good reception. A slight

adjustment of a few degrees changes the number of channels received and you need to perform a new channel scan each time the antenna is moved, clearly a cumbersome process. To avoid repeated TV channel scans a signal strength meter might prove useful.

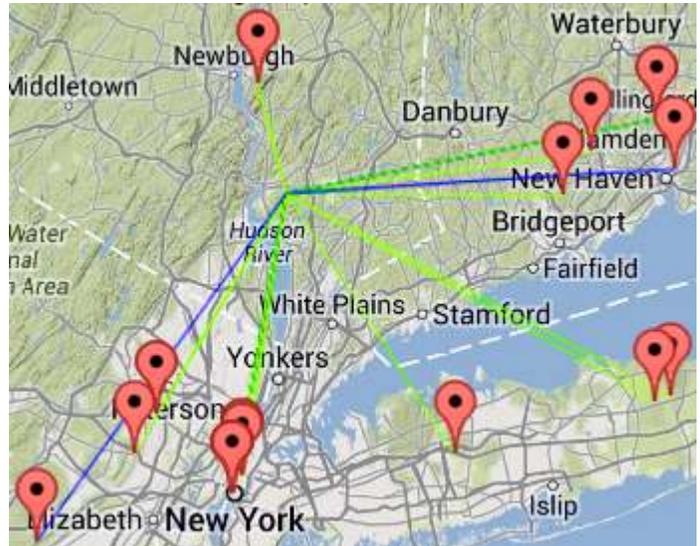
Next I decided to investigate DTV reception maps from sites such as the FCC, AntennaWeb, AntennaPoint and TVFool.com:

- <http://transition.fcc.gov/mb/engineering/dtvmaps/>
- <http://www.antennaweb.org/>
- <http://www.antennapoint.com/>
- <http://tvfool.com/> (Be patient on this site.)

The information in these reports is most useful, since they list items such as: station call, network name, RF channel, virtual channel, output power, distance, heading and UHF or VHF band.

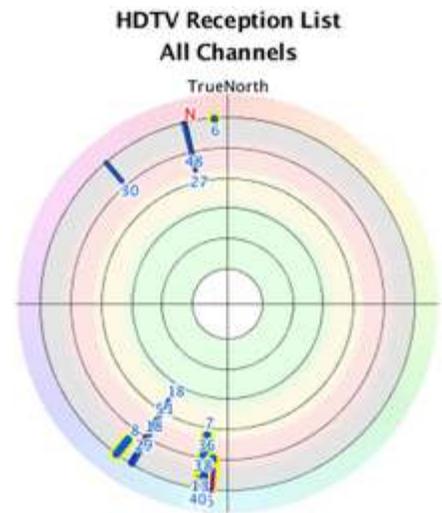
Shown here are some of the reception maps based on my own address that I generated from the above websites. You too can obtain reception maps for your

own address/zip code.



Map generated by the AntennaPoint shows DTV stations within 60 miles of Lovji's location in Cortlandt Manor.

From experimentation at my home site, with its geographical terrain restrictions and the propagation characteristics of UHF/VHF, I concluded that a homebrew bow-tie type antenna does pull in many over-the-air DTV channels at a height of 17 to 20 feet. It should perform even better outdoors at greater height. An antenna rotator might be needed if it is roof or attic-mounted. A long Yagi or stacked



“Radar plot” generated by TV Fool web site shows stations capable of reception by Lovji in Cortlandt Manor, with RF channel number, direction and strength (bar length).



HD Stacker VHF/UHF/FM antenna from Denny's.

would pull in a better signal than a bow-tie antenna for greater distances.

A good amplifier is required to get the best signal strength. Several in-line DTV UHF/VHF amplifiers with a gain of 15 dB to 25 dB are available from various sources

at a cost of \$15 to \$25. Use of good quality RG-6 type coaxial cable also helps to minimize signal loss.

Try your hand at making a homebrew bow-tie antenna as it is a simple project and it pulls in amazing HDTV reception even at 40-55 mile distance, depending on location and height. It can be an alternate solution for someone who wants to replace and save on monthly cable TV set top boxes — if all you need is free OTA signals.



Preamplifiers from RCA and GE.

- Lovji, N2CKD

PCARA Foxhunt Rules

Saturday May 10, 2014, from 2:30 p.m.

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



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

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

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

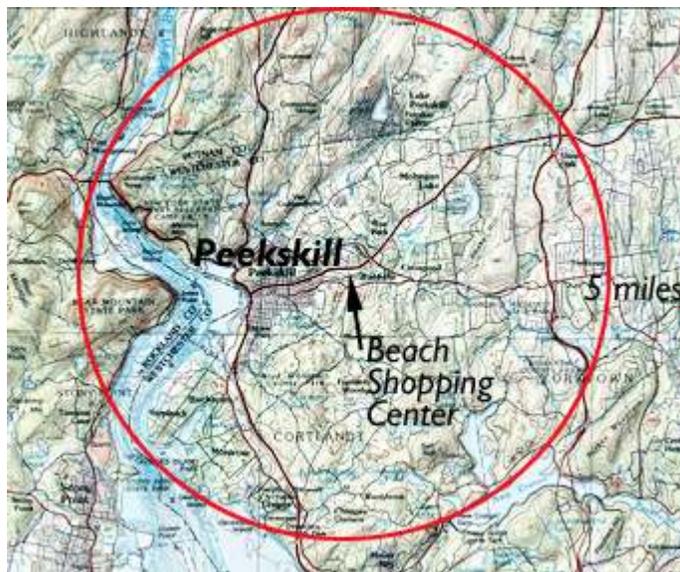
* on west side, near CVS and Radio Shack.

5. No contestant is allowed to move his/her car until the end of the first transmission, so take your time with the first bearing and make it a good one. The transmission will be audible from the start without a super-sensitive receiver.

6. Radio silence will be maintained by all contestants on all frequencies from the first to the last transmission.

7. No excess mileage penalty will be incurred but all contestants are reminded at all times to stay within the law and observe speed limits, parking restrictions etc.

8. The fox will be hidden not more than 5 miles from the start. The location of the fox will not be on property which is inaccessible by car.



Map shows where the fox might be hiding, within a 5-mile radius circle around the Beach Shopping Center, Peekskill.

9. Upon a contestant finding the fox, please do not shout or in any way give the location away to other contestants. Report your name/callsign to the fox and retire to the place of refreshment immediately. This will ensure that other contestants do not discover the fox because a group of people is hanging around nearby. It is requested that you maintain radio silence even though the fox has been found and the fact that you have found the fox should not be revealed to anyone until the place of refreshment has been reached.

10. The first competitor to locate the fox and positively identify him/her will be presented with a certificate. This competitor will be invited to assume the role of fox for the next foxhunt event.

11. Competitors should convene from 4:30 p.m. at the place of refreshment, which will be announced on-air by the fox.

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

Blue screen of night

In years gone by, the only electrical items on the nightstand were likely to be a bedside lamp and an **alarm clock**. I remember Westclox models made in Scotland that plugged into the UK's 240 volt AC mains supply, illuminated by an internal neon lamp. They woke you with a gentle buzz at the same time every morning.



Seven segment snooze

In the late 1970s, electronic alarm clocks came along. I built one from a kit – it had six red LEDs to tell the time down to the second. Those early designs led on to the 1980s clock-radio — where the alarm sound triggered by the digital clock came from an



analog radio built into the same case.

Bedside devices of the past had one thing in common — they had a warm, orange-red light that was just sufficient to see in the dark, but not so bright as to keep you awake.

Blinking lights

Jumping forward several decades to the present — warm red displays are mostly a memory now. Items on tonight's nightstand are likely to have liquid crystal displays (LCD) with a bright-white LED backlight, or a seven-segment display with bright blue LEDs.

I have owned several clock-radios from Emerson's "SmartSet" range, which set themselves when first plugged in—without requiring reception of WWVB on 60 kHz. Instead there is a crystal-controlled clock powered by a lithium battery, which also retains the initial programming. When connected to 120 volts AC, they keep excellent long-term time because the crystal-controlled clock is synchronized to the 60 Hz AC supply. If power fails, the lithium battery retains data and keeps the crystal-controlled clock running. These clocks are programmed for automatic changeover to daylight saving time in spring and back to standard time in the fall. (See U.S. Patent 6567344.)

The only problem with modern SmartSet clocks is

the time display, which uses four large, very bright, very blue seven-segment LEDs. Even on the "dim" setting, the SmartSet clocks I have owned are far too bright and light up the entire room at night.



Emerson SmartSet® clock radio is very **bright**.

Shiny screens

Bright screens of computers and TV sets should be avoided in the bedroom as they are not conducive to a good night's sleep. Instead, bedrooms should be kept as dark as possible to prevent interference with the body's natural sleep mechanisms. See <http://www.webmd.com/sleep-disorders/features/power-down-better-sleep>. Parents have been warned to remove electronic technology from children's bedrooms to make sure they get enough sleep — <http://www.telegraph.co.uk/education/educationnews/10448123/Computers-and-phones-in-childrens-bedrooms-can-cause-anxiety-and-sleep-loss.html>

In early April, Professor Richard Wiseman of the University of Hertfordshire (UK) published results of an Internet poll on YouGov. Participants were asked whether they used a computer, tablet or smartphone during the two hours before they went to bed. 78 per cent of the 2,149 adults who took part said they used electronic devices before going to bed, while the figure rose to 91 per cent for 18 to 24-year-olds.

The survey also showed that 59 per cent of participants were sleeping seven hours or less a night. This showed a deterioration in adequate sleep time compared with a separate poll conducted a year ago.

Professor Wiseman stated that blue light from the brightly-backlit devices suppresses the production of sleep-inducing melatonin, "so it's important to avoid them before bed time." For more details see: <http://richardwiseman.wordpress.com/2014/04/03/10-amazing-tips-to-improve-your-sleep/>.

Dark nights

I resolved to reduce the amount of bright blue light coming from my own nightstand. There was the Emerson SmartSet clock radio, a stereo with a green fluorescent display and a separate tuner with a brightly-lit blue/white LCD.

Starting with the Emerson clock-radio, I already had the dimmer switch set to "low", so I looked for other ways to reduce the light output. Perhaps some semi-transparent material might help? The first solution I tried was heavily-pigmented plastic cut from a "Hefty" refuse liner. This produced a dramatic drop in light output, but unfortunately, it also blurred the clock numbers, making them difficult to read.

I continued looking for material to darken the dis-



Bright-lights in the bedroom.

plays. The next candidate was a roll of colored “Cello Wrap” cellophane gift wrapping. The figures were clear enough, but unfortunately, this product had so little effect on brightness that it was not worth using.



Black Magic Tint Film.

My third attempt was with a roll of “Black Magic” Tint Film, purchased from the Auto Parts store on Route 6. This product is intended for application to the rear windows of automobiles, to block daylight, ultraviolet light and infrared radiation. The roll I purchased was rated at “20% VLT” (visible light transmission). It includes a metalized layer to reflect heat.

I cut a rectangle of tint film to fit the clock radio then applied it to the display. I found that — for a temporary application — there was no need to follow the instructions for separating the clear liner from the adhesive side of the darker tint film. After smoothing out air bubbles, the composite film adhered well enough to the clock and was practically invisible on the dark display surface. It also provides just the right amount of darkening to allow the clock’s digits to be seen, both day and night.

I repeated the procedure on the stereo receiver and the external tuner with similar success. The tint film adhered well, did not detract from the appearance and reduced the light output from the display to the right level for nighttime use. I am not sure whether the tint film has improved sleep-time, but at least the displays do not illuminate the entire room anymore.



Effect of tint film (left) on the brightly-lit display of the radio tuner.

Wider application

There could be more places where tint-film might be appropriate. For example, there are some mobile VHF/UHF transceivers such as the Icom IC-2800 and the JT2200M where the backlighting is far too bright for use in a vehicle at night. The problem in the IC-2800 is the cold cathode fluorescent backlight which cannot be dimmed



Icom IC-2800 FM transceiver has a very bright backlit display.

below a certain minimum level. Just apply some tint film to the display, and your night driving will be undisturbed by dancing digits.

Another example could be the always-on displays of some Hi-Fi equipment — for example the Sangean HDT-1 Radio Tuner. This display is too bright for use in a darkened home theater set up. Apply some tint film and the light level will come down.

Perhaps we should adopt the same approach at Field Day to prevent neighborhood bugs from invading the operating tent and getting too close to the bright lights of our HF transceivers.

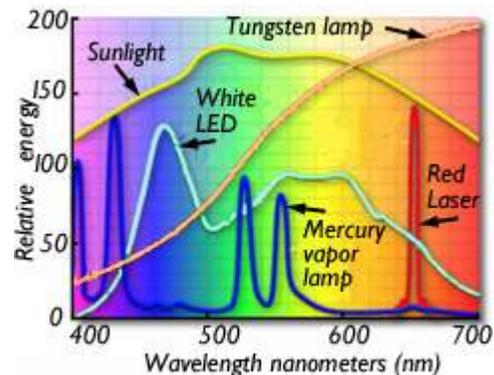
Regulation

If you do purchase a roll of tint film and are tempted to use the remainder to darken your car windows, bear in mind that there are state regulations governing this activity. The aim is to ensure sufficient light for night driving and to allow law enforcement to clearly see the vehicle occupants. In New York State, tinting of the front windshield is only allowed for the top 6 inches of the glass. Tinting of side windows is allowed, but at least 70% of the incoming light must still be transmitted. Mirrored or metallic appearance is not allowed. (See: <http://www.tinting-laws.com>)



Warm glow

In the April issue of *PCARA Update*, Karl N2KZ criticized the color of modern CFL and LED lamps, compared with good old, rapidly disappearing incandescent bulbs. Perhaps the modern high-efficiency lamps are playing a role in our sleep loss as well. Over the centuries, mankind has become accustomed to night-time illumination from fires, oil lamps and candles that was predominantly yellow in color. Old-style tungsten lamps were mostly yellow too. Maybe it’s time to dim the light on our modern, blue-rich bulbs — at least before bedtime.



Spectral energy of different light sources (after Olympus). Note the peak in blue light for the white LED... and the blue-green spikes from the mercury vapor lamp—which also appear in CFL bulbs.

- NM9J

Two tube transmitter

- N2HTT

Since January of this year I have been a bit obsessed with the idea of home-brewing a tube QRP transmitter.

This all started with the fortuitous (or not) acquisition of a really beautiful Hickock 6000A tube tester, for a ridiculously low price, at the club's annual Bring and Buy Auction. If you have a tube tester, you must have to play with tubes, right? In fact, the tester came with a bunch of new-old-stock (NOS), really nice tubes. My fate was sealed.



Mike N2HTT (left) checks out the Hickock 6000A tube tester that he bought at PCARA's January Auction.

Although I actually did find a circuit using one of the tubes (a 6SN7) that came with my tester, I decided that I didn't have enough expertise to make it my first foray into tube building. The circuit didn't have an integrated power supply, and it came with annotations like "this connection is wrong, it will put high voltage on the antenna line..." That one was best left for someone who knows what they are doing...

Instead, I gravitated back to an old friend: the W1TS "Simple Transmitter" article presented in October 1968 *QST* by Don Mix, W1TS. This project was later featured in an ARRL introductory volume entitled "How to Become a Radio Amateur". This two tube transmitter was presented as an ideal, first project for the budding ham. It featured:

- a low parts count,
- a built-in, relatively low voltage (but still potentially lethal) power supply,
- low output power (perfect QRP level of about 5 watts)
- –and construction technique was not too critical.

You could build it on a metal chassis, or even a wooden slat frame (as long as you carefully avoided the HV lines while operating.)

This time around, I came across a wonderful resource for this transmitter — an article by Ralph Taggart, WB8DQT, describing his modernization of this venerable circuit. In the form of a downloadable PDF,

Ralph provides an updated schematic, a complete bill of materials (you can get all the parts online from two or three suppliers. I had my complete parts kit in about a week), and helpful assembly hints and safety tips. A thorough, beautiful package!

In addition to providing a modern parts list, Ralph incorporates several important circuit changes, born out of his research using modern crystals instead of the massive FT-243s, and out of safety concerns. I won't detail them here, go download the article if you are interested. Even if you aren't going to build the rig, it is a worthwhile read. (See: http://taggart.glg.msu.edu/wb8dqt/w1ts_project.pdf)

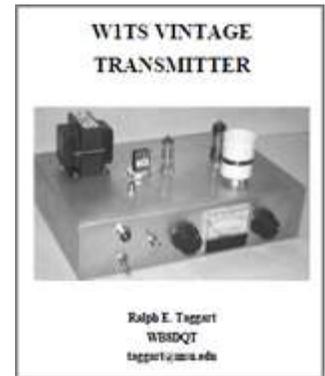
The first step was to acquire the parts. This was easy given the bill-of-materials Ralph provides in the article. With only one or two easy substitutions I had my parts together from Mouser, Antique Electronic Supply, and National RF. A visit to a well-timed hamfest in the area provided a better, cheaper meter than any I could find online.

Then came the metal work. This proved to be quite challenging, on several levels. All of my home-brew efforts to date have been using "Manhattan style" construction. This is a technique where you glue down little bits of copper clad board to a big piece of board, and string your components between the little "islands" you create. It's great, very free-form, not a lot of commitment. If you run out of space in one direction, just turn 90 degrees and keep going. I really like it, and generally lay out my projects to look like the schematic.

This transmitter was different. There is a metal chassis involved, and it is one of the most expensive parts. As I unwrapped it and gazed at its pristine surface, I clenched at the idea that I was going to have to make holes in it, and at the right spots, and that I couldn't move the holes once they were made if I later discovered that they were in un-advantageous places. This was paralyzing.

So I took several deep breaths, and devised a strategy that allowed me to continue. I got some graph paper, and made a slightly smaller (80% reduction) sketch of the chassis area, and started laying out the parts on paper. I measured the approximate amount of space the switches, connectors, meter and variable caps would take, the footprint of the transformer and the tube sockets, and tried to draw the layout. It was not high art, and went through many iterations, but very confidence-building.

Then there was the matter of making holes. I have a few chassis punches, either purchased for earlier proj-



ects, or acquired in a brilliant deal made at a yard sale in southern New Jersey two years ago, but as it turned out I did not have quite the right assortment to make the hole sizes I needed. Ralph's article suggests the use of step drills, those conical-shaped drill bits that have



Step-drill as used by Mike for making holes in the metal chassis.

graduated sizes in a stack. Back to eBay and Amazon, and within a few days I had the necessary hole-making implements. It turns out these drills work surprisingly well in soft aluminum, I definitely recommend them as a cheaper alternative to a collection of chassis punches. The article also mentions a nibbling tool for making the rectangular hole needed for the AC receptacle. I happened to have one of those, and it did come in very handy indeed.

After a long afternoon of sheet metal work, and populated with all the hardware, my chassis looked like the picture below.



Aluminum chassis with holes drilled and hardware mounted, prior to component wiring.

I was quite pleased with how this stage of the project had turned out, then went bravely on to the point-to-point wiring.

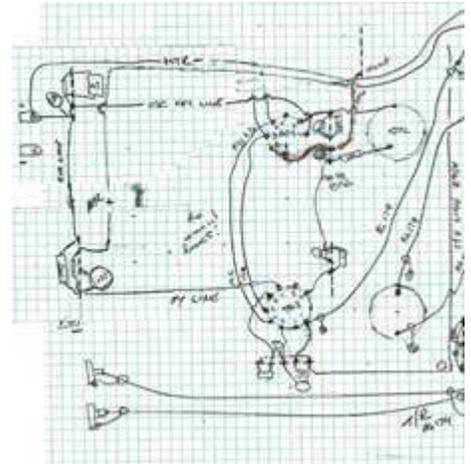
Point-to-point wiring.

I spent a surprisingly large amount of time trying to figure out the physical layout for point-to-point wiring of my tube transmitter. Deciding where the holes went was only the first step — then I had to figure out placement for the terminal strips that would hold internal components, and the wiring runs between them. I decided that I was going to try to lay-out the circuits in sections, and build and test them one section at a time. This is a time-honored technique used in many ham radio kits, and one I have adopted for my scratch-building activities. It even resonates with the

modular approach one takes to building software.

I also knew that I wanted to color-code the wiring to some degree, and save a copy of the schematic highlighted with the color coding, so that when I look at the guts of this thing down the road I have a better chance of remembering what I did. This approach of precise documentation is probably not as imperative for a simple transmitter than it would be for a complex receiver (or a Perl script to make the software analogy) but it seemed to enhance the build experience for me.

Starting with pencil and graph paper, I tried to lay out the physical circuits and the interconnecting wires, making liberal use of terminal strips. I went through many sheets of paper, and several iterations until finally coming up with a layout for each section of the circuit. At one point I even cut out bits from one page and taped them to another, when I realized that a terminal strip was located in the wrong spot on the original drawing. Alongside is an example of what I worked from.



Mike's sketch of the chassis wiring, on squared graph paper (reduced size).

With the paper layouts in hand, I started to build. This part was more fluid, more like what I was used to working with Manhattan style.

For each block of components, I would mount them on the terminal strip before installing it into the chassis. Then locating where the strip should be mounted, I'd drill a hole, mount the strip, and then run the wiring from the new components to their already-installed mates. This approach allowed the production of very dense component wiring on the terminal strips, more so than if I had installed the strips first, then tried to maneuver the soldering gun within the confines of the chassis.

Soldering gun... that was another difference with this project. I have done most of my building before this project using a Weller thermostatically controlled pencil iron, with a very fine tip. This project caused me to pull out the old Weller soldering guns. The 125 watt gun was okay, but actually I got the best results with the 250 watt behemoth that I for-



Weller soldering gun.

merly used only for attaching PL-259 connectors to large diameter coax.

Finally, after many iterations and rework along the way, the interior wound up looking as in the photo.



View of the chassis underside, after component wiring.

The smoke test

The most exciting, and anxiety provoking moment in a homebrew project is the “smoke test.” That moment when the construction work is done, the new device is sitting on the bench, hooked up to power, antenna and key, ready to demonstrate that all that planning and effort were worth it. It can be a moment of triumph, or despair.

I already knew that most of my sub-assemblies worked, as I had been testing them all along. The oscillator was putting out a nice clean signal, and all of the high voltage lines measured where they should be — I was pretty sure we were headed for a successful launch. Hooked up to a dummy load through a QRP watt meter, 40 meter crystal in the socket, and the home made tank circuit coil in place, I keyed the rig for the first time. Some good news, and some bad...

Output! Nice note, keying sounded good in a nearby receiver... but not a lot of output. I was expecting about 4 – 5 watts, a healthy QRP signal, but at the max I was seeing about 1 watt, maybe 1½ watts. Now admittedly at low power the difference between 1½ and 4 watts is not a big deal, but I had the sense that something was not as it should be.

I was pretty sure my home-made coil was okay. I had measured the inductance using my LC meter, and it was spot-on for the coil specifications. Further, I had tested the coil mounted on the transmitter with a grid-dip meter, a device that measures resonance, and it showed the coil resonant on the 40 meter band. So it wasn't the coil.

Well, okay, according to the project manual I should be prepared to add capacitors to the output

variable capacitor in the tank circuit, if the maximum output was obtained with the plates of the cap fully meshed. That certainly described what I was seeing, so I then embarked on the aerobic exercise portion of the project.

Down two flights of stairs to my basement workbench, add a cap to the output variable, back up two flights of stairs to my operating position to try again. Lather, rinse, repeat. I was adding a huge amount of capacitance to the output variable cap, with not much beneficial effect. Without any effect, in fact. Something was really wrong here, time to return to the Internet.

I read everything I could find about tank circuits. The tank circuit is what connects the output of the final amplifier tube to the antenna, and it turns out that it is a relatively recent invention in the history of the radio arts. Tank cir-

cuits became commonplace in transmitter and amplifier designs with the rising popularity of the use of coaxial

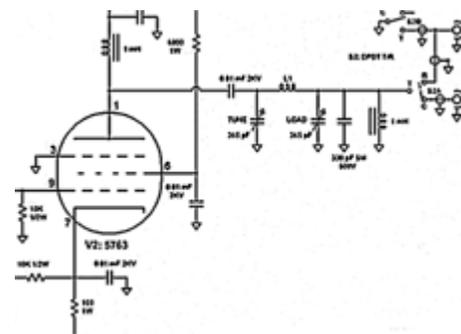
cable to connect antennas to radios. The purpose of the tank circuit is to

match the high-impedance output of the tube, to the low impedance of the coaxial cable. When the impedances are matched, the maximum amount of power is transferred from the tube to the antenna. When they are not matched, you get anemic output, and the tube glows in funny, self-destructive ways.

I found an Internet article by a ham who had built a tube transmitter in two cases, the tubes in one and the tank circuit in another. He observed that when he used coax to connect the two, the output was terribly attenuated, but using plain wire to make the connection worked fine. My mistake suddenly became obvious – I had used coax to connect the tube to the tank circuit, and even to wire the tank components together! With my new found understanding of tank circuits, I ripped out all of the offending coax and replaced it with good old #14 gauge wire.

Instantly, things were better: the power jumped to about 2 watts and the output variable cap now started to have an effect. I was able to find the right amount of capacitance to add to get it to peak at the midpoint of the adjustment.

Good stuff, but I still wasn't satisfied. 2 watts isn't 4 – 5, I still thought there were issues. I went back to reviewing the wiring discovered that I had omitted a connection of the amplifier tube socket! The amplifier tube is a pentode, a 5763, and the suppressor grid pin



Tank circuit of QRP transmitter.

was supposed to be grounded. I had left this connection out. Adding this connection made a big difference! I was now getting about 3½ watts from my vintage FT-243 style 40 meter crystal.

At this point I figured I was finished, and would have been, but for a chance experiment. I have a few modern, HC-49 style crystals hanging about, and just for fun I decided to take one and jam the leads into the crystal socket to see how it would work. Wow! 5 plus watts out, a veritable QRP powerhouse!



HC-49U crystal.

Then it dawned on me. Ralph's design, with the reduced plate voltage to the oscillator, was intended to optimize the operation with modern crystals. The modern crystals have much less mass than the old, FT-243 style crystals. I bet the reduced plate voltage was not driving enough current through the old crystals to produce full output.

I then embarked on the final modification to my transmitter. I added another regulation circuit for 200 volts to the oscillator plate, and a switch to select between 100 volts and 200 volts on the oscillator plate. Voilà, a "vintage" – "modern" crystal switch. This modification worked beautifully. I am now getting 4-to-5 watts out with vintage crystals running at 200 volts, and can use modern crystals (fitted into empty FT-243 holders) with the 100 volt setting. This transmitter is ready for anything.



N2HTT's **HF Two Tube** transmitter in final form.

Night, and all those SKCC sprints.

Of course, I can't help but think that a nice homebrew tube receiver to go along with it would be ideal...

- Mike, N2HTT



Mike and the finished TX.



FT-243 crystal

New York QSO Party

Results from the 2013 New York State QSO Party were published in January. PCARA's multi-op effort from the home station of Joe WA2MCR used club call W2NYW, from Westchester County (code WES).

Peekskill/Cortlandt Amateur Radio Association was 39th out of a total of 243 entries, 8th out of 13 multi-op entries and **first** out of four entries from Westchester County.

Joe, WA2MCR has now received a very attractive mounted certificate for PCARA's first place in Westchester. The award was sponsored by Westchester Amateur Radio Club, WE2OEM.

Further details of all entries in the 2013 event are available at the Rochester DX Association's web site, <http://www.rdxa.com>. The date for this year's New York QSO Party is expected to be October 18-19, 2014.



Participants in PCARA's 2013 entry for the New York QSO Party with the mounted certificate for "First in Westchester". L to R: KB2CQE, NM9J and WA2MCR.

Windows wait update

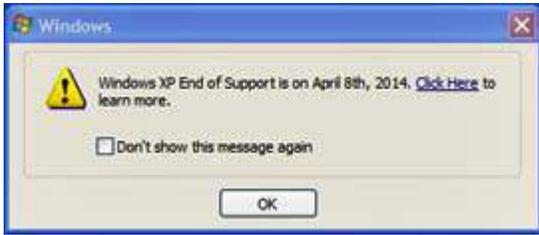
In the February 2014 issue of *PCARA Update*, upcoming changes to Microsoft's Windows operating system were reported, along with possible consequences for radio room computers. Some of the changes have now taken place, so it's worth revisiting the topic to see what actually happened.

Start me up or shut me down?

As predicted, the very last set of patches for **Windows XP** were released on April "Patch Tuesday" by Microsoft—that was Tuesday April 8, 2014. On my own Windows XP system, there was a cumulative security update for Internet Explorer 8, a Security Update for Windows XP and an update for the Windows Malicious Software Removal Tool.

Apart from a Microsoft reminder that "Windows XP End of Support is on April 8th 2014", no other dreadful

things happened. My old Windows XP system is only used



occasional-ly—I am just keeping it around for applications that might need a genuine serial port,

an old version of software such as Acrobat Reader 5 or ye olde Microsoft Office 2003 — which also went out of support on April 8.

Pull the plug?

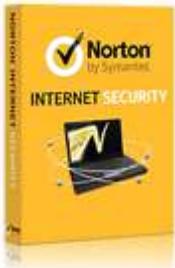
If you have an old Windows XP computer, you can make it quite safe by keeping it disconnected from the Internet. But if you intend to continue normal use, including Internet connectivity, I would suggest a few precautions. Make sure the PC is always on the protected side of your router's fire-wall, that it uses an alternative default browser to Microsoft Internet Explorer 8 (for example Mozilla *Firefox* or Google *Chrome*) and that it has reliable, **paid-for** Internet Security software that updates itself automati-



Firefox



chrome



cally. Keep all your other software up-to-date as well, including Adobe *Flash Player* and Oracle *Java*.

If the old XP computer is home to any important data files, then make a backup copy on a removable drive and keep it secure, away from the computer. Always follow rules for safe computing—don't open unexpected e-mail, and never click on links or attachments in any such

messages. Stay away from dubious web sites that are notorious sources of malware, including those offering pirated software, gambling and porn. And if you see an unexpected pop-up message while browsing the Internet, close the pop-up without clicking on any acceptance button that might offer to fix a problem or update your software.

Microsoft's support for Windows XP is not going away completely. Estimates suggest that somewhere between 17% and 28% of all PCs are still running Windows XP. Some of those computers are still fulfilling important roles in government, in bank ATMs and in retail point-of-sale terminals and cash registers. Microsoft has offered a year of extended support to high volume users, but the price is high—the UK government has reportedly paid \$5.5 million.

At my former place of work, plans were well underway this time last year to upgrade from Windows XP. I am told that the changeover to Windows 7 took place on schedule. As usual, there were scientific instruments and

other devices with long lifetimes that outlasted their attached computer hardware. If updating the computer was impractical, the only fix was to isolate these devices completely from the network.

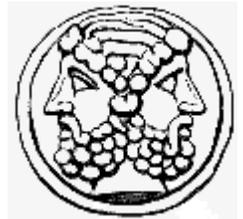
Where next?

Suppose you decide to leave Windows XP behind, then you have a few decisions to make. Do you want to upgrade your old hardware to a newer operating system? In that case, the best choice is probably an upgrade to Windows 7 — but first make sure your old hardware is up to the task. Microsoft's *minimum* requirements for Windows 7 are a 1 GHz or faster 32-bit (x86) or 64-bit (x64) processor with 1 GB of RAM for 32-bit or 2 GB of RAM for 64-bit, plus 16-20 GB available hard disk space. As usual, more is better, and a multi-core processor would be a very good idea.

New start

If your old XP system's hardware is not suitable for an upgrade, you may be looking at a *new* computer. Now you have a lot of choices—and that might include a Linux machine, Macintosh computer, a tablet or Chromebook that does not even run Microsoft Windows. But for compatibility with most amateur radio software, you will probably want a shack PC that still runs Windows.

Although Microsoft announced in February that computers with consumer versions of Windows 7 pre-installed could still be sold until October 31, 2014, most models in retail stores are nowadays supplied with either Windows 8 or (better) 8.1. As explained in the February *PCUD* article, you might find Windows 8 a confusing operating system with a split-personality—one face for the brave, new world of touch-screens and another for the traditional desktop environment. It is still possible to purchase a computer with Windows 7 (or Windows 8 Professional with down-grade rights to Windows 7) but you



may have to visit an Internet site such as Tiger Direct or NewEgg to find these offerings. Hint — 64-bit processors are practically standard nowadays as they can address more than 4GB of memory (RAM) and run the 64-bit version of Windows 7/8. Bear this in mind if you are considering a “new-old-stock” or refurbished PC.

Updates to update

In addition to the end of support for Windows XP, there was another significant event on April 8. The original version of Windows 8, released in October 2012, alienated a lot of users for its emphasis on the touch screen over the traditional keyboard-and-mouse driven desktop. In October 2013, version 8 was given a “point” upgrade to version 8.1 which—unusually—was released through the “Windows Store”. Version 8.1 fixed some problems in the initial release, though it added some new problems as well.

On April 8, 2014—only six months after 8.1 first appeared—Microsoft issued a free **Update** to Windows 8.1. This was released through the normal “Windows Update” process, rather than through the Windows Store.

Windows 8.1 Update 1 is quite a significant improvement. On the Start Screen, there is now a Power Button and a Search Button—previously, these items had to be called up by swiping or typing. Start Screen tiles and Modern UI apps can now be manipulated with a mouse in a similar way to desktop applications. And Modern apps can now be pinned to and displayed on the desktop taskbar. Just to show this off, a green “Windows Store” app is



Windows 8.1 Update 1 now has a “Power Button” and “Search Button”, top right on the Start Screen.

minimal hardware configurations, reducing the install size from 32GB to 16GB on solid state drives, running faster on slower hardware and reducing minimum memory requirements from 2GB to 1GB of RAM. This appears to be Microsoft’s answer to low-cost Chromebooks and Android-powered tablets that have been nibbling away at the bottom end of the market.

Microsoft went on to announce that the Windows 8.1 Update... “also becomes the new servicing baseline for Windows 8.1, so next month’s security updates (on May 13th, the next “Update Tuesday”) will be dependent on Windows 8.1 Update 1.” This gave the IT community very little time to verify compatibility of the new Update, especially as some new problems came to light almost immediately. Microsoft subsequently relented and allowed enterprise customers 120 days to install the Update—but for everyone else using Windows 8.1, there will be no more patches until the new Update 1 is installed.

In practice

On April 8, I watched my convertible notebook as “Windows Update” applied several patches including “Windows 8.1 Update 1” (KB2919355 887 MB). There was a *very* long wait while the system shut down and had to be restarted. After a reboot, the “Store” icon was pinned to the desktop task bar, and two more updates became available and had to be installed. A further fix for KB2919355 was offered on April 16.

I noted the new power button on the Windows Start Screen—in fact, this seems to be the only indication that

Update 1 has been installed. I also noted new controls for adjusting tiles and Modern UI apps with a mouse. This certainly makes it a lot easier for traditional Windows users without a touch-screen to manipulate Modern UI apps and controls.

Apart from that, I did not see a *huge* change with the new Update. Perhaps that’s because I had already applied items that became optional with 8.1 and I don’t make much use of Modern apps.

Everything else is working much as before. Sadly, there is still no traditional “Start Menu” for access to desktop applications, so you are forced back to the Modern UI Start Screen.

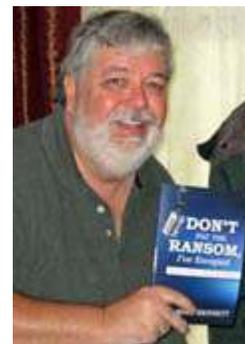


Windows 8.1 Update 1 desktop taskbar now has a green “Windows Store” icon pinned to it and shows Modern Apps such as “Weather” with a preview.

Microsoft now has a new CEO — Satya Nadella, in place of Steve Ballmer — and just about the whole of the original Windows 8 Design Team has been replaced. Microsoft says that future improvements to Windows 8 will include a Start Menu and the ability to run “Modern UI” apps in their own desktop windows. But whether this will be in a subsequent “Update 2” or a new release of Windows is not yet clear. Rumors suggest something could happen as soon as August or September. - NM9J

Radio ransom

If you would like to read some fun stories about broadcast radio in the Hudson Valley, pick up a copy of “Don’t Pay the Ransom, I’ve Escaped”, by Mike Bennett. This humorous autobiography describes Mike Bennett’s career in broadcasting, up to his present position as joint morning host on WHUD. The book is available through Amazon, and is well worth reading.



Mike Bennett

Sony gone

If you were looking forward to visiting the Sony Store at Woodbury Common Premium Outlets in Central Valley, NY then look no further. It was recently closed as part of Sony’s plan to shutter 20 of its 31 U.S. retail stores.



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. *Apart from holidays.

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 May 4: PCARA meeting, Hudson Valley Hospital Center, 3:00 p.m.

Sat May 10: PCARA Foxhunt. Gather at the Beach Shopping Center, Peekskill from 2:30 p.m. for a 3:00 p.m. start.

Hamfests

Sat May 24: Bergen ARA Hamfest, Westwood Reg HS, 701 Ridgewood Rd, Twnshp of Washington, NJ. 8:00 am

Sat May 31: Southern Berkshire ARC Hamfest, Goshen, CT Fairgrounds. 8:00 a.m.

Sun Jun 8: Mt Beacon ARC Hamfest, Downstate Correctional Facility, QWL Hall, 121 Red Schoolhouse Rd, Fishkill, NY.

VE Test Sessions

May 3: Yonkers PAL Ham Radio Club, 127 N Broadway, Yonkers. 2:00 p.m. Michael Rapp (914) 907-6482.

May 4: Yonkers ARC, Yonkers PD, Grassy Sprain Rd., Yonkers. 8:30 am Contact John Costa, (914) 969-6548.

May 8: WECA, Westchester Co Fire Trg Cen, 4 Dana Rd., Valhalla, NY. 7:00 pm. S. Rothman, 914 831-3258.

May 19: 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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