# One door closes…

Things have been quiet for January.

Our **PCARA Annual Bring and Buy Auction** for 2024 was postponed due to construction work at the Town of Cortlandt CUE Room in the Cortlandt Town Center. We are hoping to reschedule at a future time. Stay tuned!

The **January PCARA Breakfast** was held on Saturday January 20, 2024 at 9:00 a.m. at Uncle Giuseppe's Marketplace in Yorktown Heights, NY. We had only eight members in attendance, most likely attributable to the frigid temperature of 18°F (Brrr…). Needless to say, we didn't meet outdoors but we were still treated to Arctic blasts every time the store's exit doors opened! Regardless, a good time was had by all.

On Monday January 22, 2024 a **PCARA Laurel VE Test Session** was held at the Putnam | Northern Westchester BOCES Tech Center in Yorktown Heights, NY. The session was attended by Robert KE2CAJ, a frequent flyer. Robert had successfully tested for Technician on October 7, 2023 at the PCARA VE Test Session at the Putnam Valley Free Library, and General at the October 23, 2023 VE Test Session at Putnam | Northern Westchester BOCES. Robert won the *trifecta* and earned his Extra ticket! Congratulations Robert!

Please mark your calendars with the following upcoming events:



*PCARA Volunteer Examiners supervise the Test Session on Monday January 22 at Putnam | Northern Westchester BOCES Tech Center in Yorktown Heights.*

- Sunday February 11, at **1:00 p.m.** PCARA **Membership Meeting**, Town of Cortlandt CUE Room, Cortlandt Town Center.
- Monday February 12, 2024 at 7:00 pm: **PCARA Laurel VE Test Session** at the Putnam | Northern Westchester BOCES Tech Center in Yorktown Heights, NY. Please contact Dave KF2BD if attending.
- Saturday February 24, 2024 at 9:00 am: **PCARA Breakfast** at Uncle Giuseppe's Marketplace in Yorktown Heights, NY.

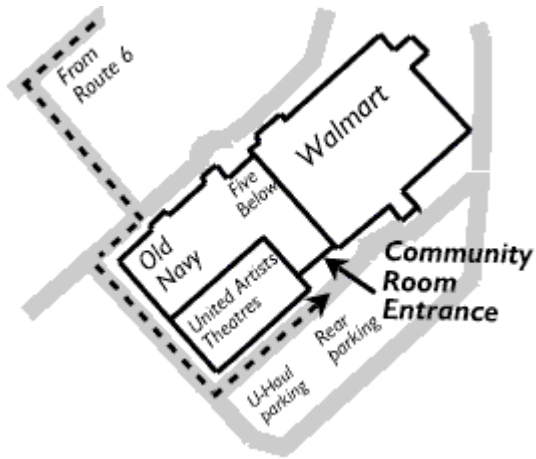*Members were dressed for the cold during PCARA Breakfast on January 20 at Uncle Giuseppe's.*

# Contents

Our next scheduled **PCARA Membership Meeting** is at **1:00 p.m.** on Sunday February 11, 2024 at the Town of Cortlandt CUE Room in the Cortlandt Town Center. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE



*CUE Room location in Cortlandt Town Center.*

# PCARA Board

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 Greg Appleyard, KB2CQE; kb2cqe 'at' arrl.net
Vice President:
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*Vice President Emeritus: Joe Calabrese, WA2MCR.*

# Net night

Peekskill/Cortlandt Amateur Radio Association holds a roundtable net on Tuesday evenings at 8:00 p.m. and a directed 'Old Goats' net on Thursday evenings at 8:00 p.m. Both events take place on the 146.67 MHz W2NYW repeater, offset -0.600, PL 156.7 Hz.

Join the roundtable to find out what members have been doing or join the Old Goats with net control Karl N2KZ for news and neighborly information.

# ARRL membership for students

At the ARRL Board of Directors meeting held on January 19 – 20, 2024, the Board decided that there would be a new option for no-cost Associate membership of ARRL for full-time students age 21 and younger.

This action joins ARRL's existing support for young people to take amateur radio examinations and become licensed radio amateurs. Under ARRL's Youth Licensing Grant program, candidates younger than 18-years old pay a reduced examination session fee of $5.00 to the ARRL VEC VE team at the time of the exam. In addition, ARRL will cover the one-time $35.00 application fee for new license candidates younger than 18 for tests administered under the ARRL VEC program. The $35.00 FCC application fee will be reimbursed after the ARRL VEC receives the completed reimbursement form and the new license has been issued by the FCC.

# V.E Test Session 2/12

PCARA's next V.E. Test Session is scheduled for Monday February 12 at Putnam | Northern Westchester BOCES Tech Center. This will be a Laurel VEC Test Session (no fee). Candidates must contact Dave KF2BD by February 10 using: daveharper'at'vivaldi.net.



*Graphic courtesy of Lou, KD2ITZ.*

# Adventures in DXing

## - N2KZ

### See The Light

The incandescent light bulb was first marketed in 1879. It is dimmable and features a built-in flicker filter. The tungsten filament displays persistence of light. Alternating current pulses do not vary the light it produces in the least. It is simple to manufacture with no active electronics. The resultant light is warm, soothing and predictable. One huge deficit: It is only about two percent energy efficient. Most of the necessary power dissipates in heat. Besides that, the design is brilliant!



*GE 'Crystal Clear' 60 watt incandescent light bulb with filament clearly visible.*

For over 100 years, many other designs have been offered to replace inefficient incandescents with varying amounts of success. Carbon-arc lamps were brilliant but harsh to view and dangerous to operate. Neon is brash in appearance and banished to advertising and promotional use only. Fluorescents and CFLs are red-deficient and environmentally undesirable. Halogen types require heavy hard glass, ultraviolet filtering and run very, very hot. Brilliant white light, indeed, but too intense for offices.

A quick note about lighting nomenclature: Everyone knows what a '**light bulb**' is... but, quite formally (especially in professional lighting design,) it is always referred to as a '**lamp**.' We all think of a 'lamp' to be the whole *enchilada*: a light bulb, an on/off switch, a decorative stand and a plug-in cord. In this modern age of newfangled lighting, anything more than a single very simple LED bulb itself is now called a '*luminaire*.'

To confuse things further, nearly all LED devices include a '**driver**' which often includes a switching DC power supply. Unlike incandescents, *LEDs depend on direct current* only. Drivers accomplish three things: They convert AC to DC, convert 120 volts to much lower DC voltages and even cure light flicker.

Inexpensive, simple DC conversion that suffers from poor AC filtering will tend to make LEDs flicker. In North America, where alternating current runs at 60 cycles per second — the LED flicker would be twice that at 120 cycles per second — seen by most humans as an annoying light. During the process of DC conversion, the drivers will often convert the AC artifacts to a much higher rate to avoid light flicker. Alternation above 200 cycles per second is usually not discernible by consumer users. The faster you make the flicker — the less it fatigues your eyes... or does it?

### The Future of Lighting is Here

Advance to the year 2024. Welcome to the era of SSL — Solid State Lighting — a variety of different approaches using LEDs — Light Emitting Diodes. The choices are mesmerizing! These new designs have completely changed what consumers expect of household light. The old-fashioned correlation between wattage and brightness no longer has meaning. A '60 watt' LED equivalent can vary from 600 to 800 lumens, still shy of the 830 lumens provided by a real incandescent 60 watt lamp. Look only to lumen ratings to establish true brightness.

Color of light should also be considered. You need to learn at least these two basic descriptions: **Soft White** and **Daylight**. Soft White refers to warm golden light at 2700° Kelvin, close to the look of legacy light bulbs. Daylight emulates natural sunlight at high noon with a light blue tint at 5000° Kelvin.

What is Kelvin? Lighting designers refer to degrees of Kelvin to accurately measure the light's color temperature. When an old-fashioned incandescent tungsten lamp provides light its filament heats to a temperature around 2700° Kelvin (about 4400° degrees Fahrenheit.) Tungsten filaments are not capable of reaching more than about 3300° Kelvin (about 5500° Fahrenheit) before the filament melts! Regular light bulbs are filled with helium, argon or similar inert gas to hinder filament failure at these enormous temperatures. Tungsten filaments will always provide warm orange-yellow light.

Light blue tints originally were created by coating the inside of tungsten lamps' glass bulbs with a light-filtering coating. This decreases the amount of lumens presented but delivers new varieties of color for different purposes like comfortable reading. Colored 'party lights' used coatings of transparent colored plastic or glass to achieve dramatic effects. Creative theater lighting came to life using a rainbow of colored gels or colored hard glass filters for decades before a new generation of lamps became available.

In the 1980s, professional High Intensity Discharge (HID) lighting was adopted by entertainment venues. HIDs are more efficient and relatively inexpensive. You've never seen light so white and bright! Theatrical encores became almost blinding in appearance bringing a completely new palette of possibilities to lighting designers. Smaller halogen types entered the consumer market with similar dramatic results.

Today's solid state LED lighting is very efficient but

presents some quizzical new challenges. With very clever combinations of LED colors and passive filtering you can certainly create quite a variety of colors. Unfortunately, we are still limited to a finite number of colors that various LED phosphors or doping can provide. Often several colored LEDs are used to achieve a specific overall color. Some advanced designs are 'tunable' using variable driving of LED elements to vary the resultant look.

Single color — one 'wattage' LED lamps are incredibly simple and clever in design. Just what is inside? I curiously dissected a basic Sylvania 60 watt soft white lamp. The translucent top bulb shape was made of an easily pierced pliable plastic. I revealed a small circular PC board inside — complete with eight surface-mount yellow LEDs doped with an orange tint, hopefully tuning the color to about 2700° Kelvin. The little system is managed by a single miracle chip – a Bright Power Semiconductor BP5133HC. Only two additional parts were needed to complete the entire lamp: A typical 10μF / 200V electrolytic capacitor and a 4.7 ohm current limiting resistor. All of this for 99¢ on sale! Amazing!

*Sylvania Soft White 60W LED bulb.*

*Karl's teardown of a 60 watt Sylvania soft white LED bulb revealed this PC board.* [N2KZ pics.]

The latest multicolored lamps host a complex array of assorted LEDs to produce a rainbow of instantly changing color or can vary with music for parties or performance. Still, today's man-made technologies can not completely emulate the fantastic complexity and dynamics of the rainbow of colors that Mother Nature can create on her own! Today's LED available colors? Visualize an artist limited to very few specific paint colors. Look for further refinements in this arena in the future.

The lighting industry should consider producing more precise and standardized colors instead of confusing the public with endlessly random results. Every LED light bulb seems to have a slightly different tone than the one you tried before. The colors can also vary from one manufactured lot to another of the same marketed product. Organize and regulate your products! 'Never twice the same color' should be replaced with 'never again confused!'

Manufacturers of light bulbs also have to be very cognizant to provide adequate filtering of "blue light." Studies have shown that raw LED light includes specific blue and green light that can affect your sleep patterns, your skin, your eyes and your circadian rhythms. Many current LED light bulbs already include some blue filtering. Block Blue Light is a company that embraces these concerns and takes them to the next level. Their product catalog offers many alternative light sources. Are these harbingers of the future for widely marketed bulbs? See: https://www.blockbluelight.com/ for a whole new world of ideas!

Today's developers of advanced LED formulations yearn to constantly concoct more accurate true-to-life light that conforms with the *Color Rendering Index* (CRI). Any artificial light we create needs to have little or no effect on how objects look to the human eye. Red apples need to look authentically red, not brown or bluish-grey. Bananas need to look bright yellow not grey, green or blue. Whites especially need to look white! Look for GE's *Reveal®* and Sylvania's *TruWave Technology™* product lines for finer-quality LED bulbs that meet the highest standards on the color rendering index.

GE offers LumenChoice™ and SpectraChoice™ features on some of their LED light devices. Using built-in slide switches you can vary overall brightness and color temperature from warmish 2700°/3500° to 4000° to brash white 5000° Kelvin looks. Some competitors market similar quick switch products to allow easy configuration for end users.

Tech-savvy retail merchants demand lighting with a near-perfect color rendering index and stunning brilliant light. Nothing sells like product that 'pops' authentically under today's sophisticated lighting. Tight spotlights immediately direct consumer interest to heavily-promoted product displays. Carefully chosen splashes of LED lighting can add to the excitement.

Something else I can reveal: GE, Philips and Sylvania no longer directly make light bulbs. GE's trademark and logo is now licensed to Savant Systems doing business as GE Lighting. However, their domestic operations are still based in the legendary center of American light bulb production: Nela Park, near Cleveland, Ohio. The Philips name is now licensed to and managed by Signify N.V. — a multinational lighting corporation in the Netherlands. Sylvania's trademark and logos are licensed to Ledvance GmbH, domestically based in Wilmington, MA. *Read the packaging of every light bulb you can find. Nearly all standard household LED light bulbs marketed in America are now made in **China**.*

The lifetime of LED lamps generally goes into three categories: 3 years of life, 10 years of life or 13+ years of life, based on the material quality and complexity of the design of each lamp offered for sale. More fuzzy logic is seen here. Nearly every producer has a different idea of how to measure a 'year' of use. Sylvania light bulb packaging defines their 'year' in their very fine print as: "Based on 3 hrs/day. LED lamp lifetime is defined as the number of hours when 50% of a large group of identical lamps reaches 70% of the initial lumens." Got it? Many other manufacturers follow similar calculations.

No doubt, when LED lamps age they can lose brilliance considerably. A "100 watt" LED lamp initially provides about 1500 lumens. When it decays to 70% of its original brightness, you would be down to 1050 lumens, roughly the same as a "75 watt" LED lamp. LED lamps also shift their output color as time passes by. Depending on the design they will lean more red or blue as they age out.

## If you build it... will they come?

The retail angle of the burst of lighting creativity requires quizzical analysis. I visited many stores now offering aisle-long displays with hundreds of choices of new-age lighting devices. It was entertaining and sometimes comical. My favorite packaging was from GE Lighting: A four-pack 'LED+' bundle comes complete with two remote controls to program and manage your new light bulbs.


*GE 'LED+' box contains four bulbs and two remotes.*

GE's LED+ line offers all sorts of features. Advanced special-purpose LED light bulbs now incorporate programmable timers, battery backup, tunable color displays, Bluetooth® audio speakers, automatic dusk-to-dawn illumination, color shifting, linkable motion to create groups of lights that respond to your commands — or the music you are playing, and the list goes on.


*GE 'LED+' lamp with Bluetooth speaker and remote. [N2KZ pics]*

Most major light bulb manufacturers now offer similar feature-filled designs that are programmable via remote controls and/or smart phone apps. If you like a wide variety of settings... you will love these lamps!

From a practical point-of-view, the most useful application found amongst all of this technology is **EyeComfort**, a trademark of Philips' photobiological safety program. The wizards at Philips reached a new and exciting level of product maturity. You can now gracefully fill your home or office environment using their sophisticated illumination system capable of emulating all-day natural lighting. Program your environment with a minute-by-minute schedule of personally customized light! During dawn, dusk and evening hours you'll see gently displayed and appropriate warm light. Observe carefully and you'll see the light progress from warm to a pleasant bluish brilliance following the tone of light you would see outside or out a window. The day-long cycle returns to warmth at dusk. Several manufacturers have marketed similar systems but Philips currently leads the pack.

## It's Not Easy!

During my store-to-store comparative shopping tour, I met a woman who was looking for just a simple regular light bulb. I watched her as she carefully studied every box and read every detail completely confused by the myriad of complicated offerings surrounding her. Together we found her holy grail: A simple '60 watt' LED replacement bulb in soft white manufactured by 'ecosmart™.' They were squirreled way down in the display at foot level. There is a message here! No longer can you just pick up any light bulb and expect direct replacement results. Read carefully!


*Ecosmart LED.*

This experience opened my eyes to today's lighting marketing ploys. All the elaborate and feature-filled lighting devices *with big price tags* are universally clustered at eye-level, often with explanatory animated displays to pique your interest.


*Expensive LED light bulbs clustered at eye-level. [N2KZ pics.]*

You'll see light bulbs constantly panning through their color displays and other mesmerizing effects. It is a snowstorm of option variants.

I could almost hear the marketing managers hawking: 'We designed all of these new and wonderful features! Won't you please buy them?' Also be aware that all retail chain brick-and-mortar stores are not alike. I visited one store in Fairfield, Connecticut that shelved mostly very high priced light bulbs. The same chain's store in Brewster, New York predominantly hawked much cheaper basic bulbs. Your best bet is to buy online where nationwide offerings give you more choices at all price levels.

*A most important tip: When venturing into the world of solid-state LED lighting,* **buy only one light bulb to test the results at home.** *If you enjoy what you see you can buy as many as you like. Is the light ugly or harsh to your eyes? Return the one light bulb and try again.*

Be creative: Don't be afraid to experiment with combining different color temperatures and looks within your home. Do you have four eye-level lamps with warm light but it looks just a little too warm together? Try switching a light bulb or two to daylight types to bring up the overall temperature — or — add a couple of more lamps fitted with daylight color bulbs. You can also experiment with how brilliant the lights are. You can certainly mix '40 watt', '60 watt' and '100 watt' lamps to further fine tune your visual end product.

Be patient and find a bulb you like! I have seen some 'brilliant white' light bulbs in action that will make your eyes weep and cry for mercy! Hand me those Ray-Bans®! Some 'soft white' LED lamps produce a color that looks like a blend of mustard and deep orange tones. Hopefully, you will discover a color and intensity that is *just right!*



*Soft-white and daylight color temperatures stand out in this store lighting display.* [N2KZ pic]

**A Color Carnival**

My award for most elaborate and wildly distinctive LED design goes to Shenzhen Intellirocks Technology Company Limited using the trademark 'Govee.' Wait until you experience their RGBIC (Red-Green-Blue Integrated Circuit) Technology. You'll enjoy seeing their color display system project a background light show behind your video entertainment flat screen produced by brilliant full-colored LED strip lights. Of course, the system is linked to the screen's audio and video completely controlled by Alexa or Google Assistant or with their multi-featured fantastic smartphone application.

A small camera points at the flat



*Govee's LED 'TV Backlight 3 Lite' illuminates the wall behind the TV set.* [Govee]

screen to allow the background display to sample and mimic the visual content you are watching and interpolates the colors and action to the LED light strips presenting the most intelligent and mesmerizing experience you have ever seen. Suddenly every inch of your surroundings becomes a synchronous total viewing experience. Gamers go to heaven with this clever add-on. Looking for a way to get anyone's attention? This is it! Go Govee! See it for yourself: https://www.youtube.com/watch?v=Ej_nb5IU-Is.

At best, we are only in the intermediate stages of solid state lighting refinement and development. Things have improved wildly since the early days of just red LEDs. Remember when green came out and then <gasp> even yellow. Eventually blue and bright white arrived. Tiny complex LEDs became the basis of some flat screen displays. Time marches on! Who knows what they will think of next? Thanks for reading! Now you can see the light *and know how it all happens!* See you next month! 73s and dit dit de N2KZ 'The Old Goat."

# A leap in time

### Second by second

Not so long ago, our unit of **time** was derived from 'solar time' — as measured by the Earth's rotation relative to the Sun. Early observations of the annual average length of a day were made as the sun passed overhead. More accurate measurements at the Royal Greenwich Observatory were made of stars whose positions in the sky were accurately known.



*The Royal Observatory, Greenwich stands on a hill overlooking the River Thames in southeast London. Lowering of the red time ball on the tower at exactly 1:00 p.m. indicated Greenwich Mean Time to nearby ships.* [G3VNQ 2000 pic.]

The transit times of those stars could be calculated and compared with the actual time observed. Astronomers could then check accuracy of their standard clock, and set it to the correct time. These observations were used to set Greenwich Mean Time.

The 1884 International Meridian Conference in Washington DC agreed that the Transit Circle in Greenwich should be the location for zero degrees Longitude and start of the Universal Day.

As time went on (sorry) more accurate clocks became available. Mechanical pendulum types were superseded by quartz-crystal clocks around 1927, and atomic clocks based on absorption of microwave energy by cesium atoms were developed from 1955 onwards. Nowadays the second is defined as **9,192,631,770** cycles of the hyperfine structure transition frequency of cesium-133 atoms.



*Airy's transit circle telescope at Greenwich allowed observation of time and angle above the horizon as stars cross the meridian.* [Credit: CCA 2.0]

With more accurate clocks available, it became clear that earth's rotation was far from being a reliable standard, even when averaged out over a year. As a result, **Coordinated Universal Time** was established in 1970, based on International Atomic Time. The abbreviation "UTC" was chosen by the International Telecommunication Union (ITU) so as not to favor any one particular language.

Earth's rotation has been slowing down by roughly 2 milliseconds per day during the last century due to movement of the oceans and Earth's molten core. The International Earth Rotation and Reference Systems Service (IERS) was authorized to add a "**Leap Second**" to UTC (analogous to a leap year) to ensure that the difference between UTC and solar time would never exceed 0.9 second. The first adjustment was made in 1972 and a total of 27 leap seconds have been added to UTC up to Dec 31, 2016.



*Racks of cesium beam atomic clocks at the U.S. Naval Observatory in Washington DC help provide standard time for the Department of Defense and the entire U.S.* [Credit: USNO]

Since 1972 more and more computer and satellite systems around the world have become reliant on highly accurate time, based on UTC. But implementation of the leap second can prove troublesome as there are different ways of making the transition and problematic equipment. For example, addition of the leap second in 2012 was blamed by Australian airline Qantas for stranding thousands of passengers around Australia on July 1, 2012. Up to 50 Qantas flights were delayed by a problem in the global reservation software Amadeus, which left the airline unable to check in passengers.

In view of all these problems, the General Conference on Weights and Measures (CGPM) meeting in Versailles, France in November 2022 resolved to **eliminate** leap seconds by or before 2035. There would then be no more leap seconds added to UTC for at least 100 years. UTC would continue its steady atomic tick without reference to solar time or "the stars in their courses".

How does such precise timing affect amateur radio? See the next article for details.

- NM9J

# An amateur radio leap?

You might think that amateur radio would have little concern with highly accurate time or leap seconds. We rely on UTC (also known as Greenwich Mean Time or 'Zulu') for our international schedules, contest entries, logging and filling out QSL cards. But most contests only require QSO times to be accurate to the nearest minute. We seldom enter times in the log to better accuracy than ±1 minute.

## Digital modes

Modern digital modes such as **FT8** and **FT4** have changed the picture. FT8, released in June 2017, has a 15 second cycle time with transmissions beginning at 0, 15, 30 and 45 seconds past each **UTC** minute. Transmissions last 12.6 seconds followed by a 2.4 second pause for your computer to decode messages. FT4 has an even shorter cycle time of 7.5 seconds for its faster transmit/receive sequences.
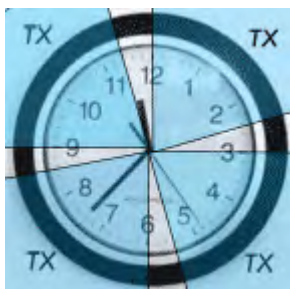


*FT8 transmissions should begin at 0, 15, 30 and 45 seconds past each exact UTC minute.*

The computers controlling transmission and reception times must have their clocks synchronized. The WSJT-X *User Guide* recommends that computer clocks must be synchronized to UTC **within ±1 second**. If additional leap seconds were ever added to or subtracted from UTC, digital modes would also be affected.

In WSJT-X, the on-screen 'DT' column indicates the time offset in seconds between each decoded signal and your local computer clock, presumably set to UTC. If your clock is correctly synchronized, you should see offsets in the DT column that are zero or very close (±0.1 sec).



*In WSJT-X software, the **DT** column (red arrow) shows the difference in seconds between the start of transmission and the local computer clock.*
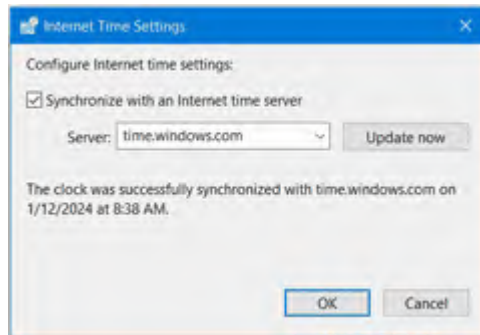
The waterfall display in WSJT-X should show or-ange/yellow transmissions falling *exactly* between the green horizontal lines.
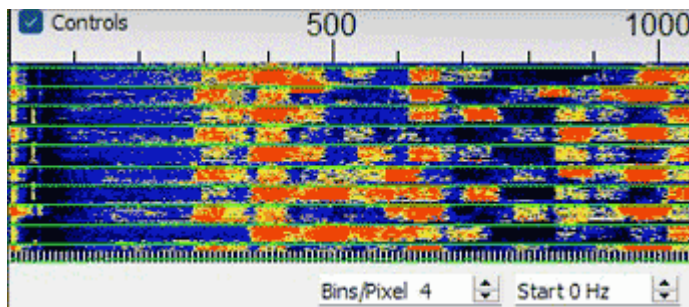


*FT8 waterfall display in WSJT-X should show transmissions falling exactly between the green horizontal lines that mark the 15 second intervals.*

If you are hearing FT8 transmissions but **no** decoding is taking place, your computer's clock could be out of synch with UTC. The 'real-time' quartz clock in a PC can gain or lose several seconds each day. Home computers usually have a connection to the Internet and can be synchronized to a time server. This can be checked in Windows 10 and 11 using Settings → Time & Language → Date & Time. You can also use: Control Panel → Date and Time then click on the "Internet Time" tab and the "Change settings" button. By default, the Windows computer clock should try to resynchronize with an Internet time server every 32,768 sec-



*Synchronizing the computer clock with an Internet time server in Windows.*

onds (9.1 hours) — but changing this period requires a registry edit. There are applications such as Meinberg and BktTimeSync which can synchronize more often.

## Out in the field

Once you are outside the shack, synchronizing the computer clock becomes more difficult. This was a problem during ARRL Field Day 2023 when PCARA made an effort to employ FT8 and FT4 digital modes from outside George Washington Elementary School in Mohegan Lake. My own ap-



*PCARA's entry in Field Day 2023 from George Washington Elementary School.*

proach was to place a shortcut to the Control Panel "Date and Time" applet on the notebook computer's desktop, then set time *manually* before starting digital operations. Accurate time setting was based on my Casio wrist watch which synchronizes with WWVB on 60 kHz every night. An alternative would be to tune the HF transceiver to WWV on 2.5, 5, 10, 15, 20 or 25 MHz — or to Canada's CHU on 3.330, 7.850 or 14.670 MHz.
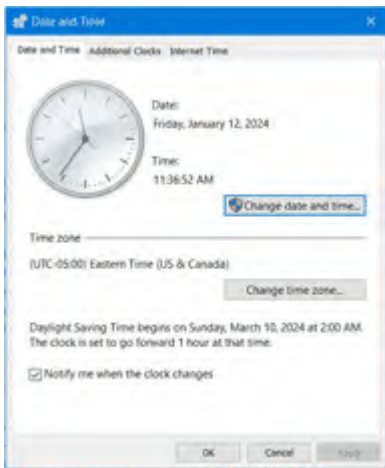
*Date and Time applet from Windows Control Panel.*

Manual time setting was tricky as Microsoft Windows takes a second or two to correct the clock after you enter a time from the keyboard then press the "OK" button. It was not really practical for other operators to carry this out if I was not present.

Another approach might have been to allow Internet time setting using a smartphone as a Personal Hotspot, connected by Wi-Fi to the computer. But I was not prepared to leave my phone behind overnight!

### Advice from Scotland

I followed advice from Chris GM3WOJ in a series of contesting articles in RSGB's *RadCom*. (*RadCom,* November 2023 pp 68-69). Chris recommends using a separate "**uBlox7**" Global Positioning System (GPS) receiving device on each PC along with the free software **GPS2Time** available from Chris VK4ADC. (See new locn: http://vk4adc.com/web/index.php/vk4adc-utilities/gps2time)

The uBlox7 is a module manufactured for Swiss company u-blox AG that supports global navigation satellite systems including USA's GPS, Russian GLONASS, European Galileo and China's BeiDou. I checked Amazon and found two low-cost units incorporating the uBlox7 — the self-contained HiLetgo VK172 USB GPS receiver ($11.99) and the VFAN® USB GPS receiver ($19.99) — which has a separate magnetic "puck" on the end of a wire for external mounting.

### Leggo my HiLetgo

My first evaluation was with the HiLetgo "VK172 G-MOUSE USB GPS". This unit had arrived with minimal packaging and no instructions whatsoever. I plugged it into an empty USB port on my Windows 10 notebook computer. The USB device's internal LED lit with a steady red light and it showed up in Windows Device Manager as "USB Serial Device (COM8)", below the serial device ports for my USB-connected FT-991A.
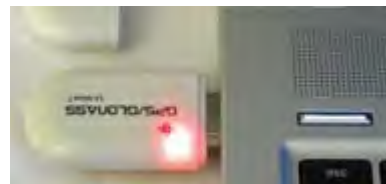
*HiLetGo VK172 USB GPS receiver plugged into notebook computer.*

*Windows Device Manager "Ports" section shows two COM ports assigned to FT-991A followed by COM8 (arrowed) assigned to HiLetGo satellite receiver.*

After a few minutes, the steady red light on the VK172 began blinking bright green once a second. I had set up a shortcut on the desktop for the "GPS2Time.exe" program and started it with a double-click. The first thing to do at every start-up is select the COM port (COM 8 in my case), check the baud rate (9600 bps) then click the "Run GPS" button.

The GPS2Time program displays a NMEA (National Marine Electronics Association) 0183 "sentence". This is a data string from the GPS receiver indicating UTC, latitude, longitude, height etc.
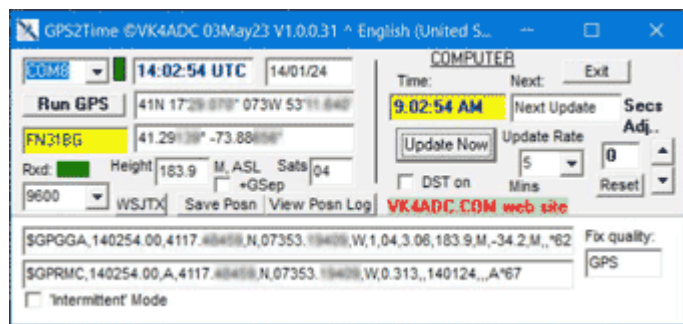
*GPS2Time software displaying data sentences received from USB satellite receiver, plus resulting UTC time, latitude, longitude, height ASL and Maidenhead locator.*

I also saw a pop-up message reminding me to start the GPS2Time software *as Administrator* in order to synchronize the PC clock. I changed properties of the program's shortcut by right-clicking, then selecting Properties → 'Shortcut' tab → 'Advanced…' button, then checking the box "Run as administrator".

### Big problems

At first, everything was looking good. With the computer clock synchronized, I could start WSJT-X, select FT8 mode and see most decodes with a "DT" (time offset) of only 0.1 or 0 seconds. But after a computer

restart I began to experience problems. With the USB device plugged into my notebook in the radio room, it was limping along receiving only 3 satellites, then sometimes losing synchronization. The GPS2Time program would stop responding and had to be forced to close. Windows suggested setting the shortcut's compatibility mode to Windows 8, but this did not help. The USB device was taking longer and longer to pick up satellites. At the end, the device was **preventing** the notebook computer from shutting down properly so I "let go" of the HiLetgo by unplugging it. Some Amazon reviews mention hardware problems with this particular GPS device.

### Fan of VFAN

I had anticipated that a GPS receiver plugged directly into a notebook computer's USB port might have difficulty receiving the weak, 1575 MHz GPS transmissions from satellites 12,500+ miles away. For that reason, I had ordered a second USB GPS receiver, the VFAN model UG-353. This has the receiver housed in a separate magnetic "puck", connected to the USB-A plug through a 6-foot cable. The long cable would allow the puck to be located close to a window, seeing more sky.

*VFAN USB GPS receiver includes the USB device, instruction sheet and mini CD-ROM.*

The VFAN receiver was nicely boxed, complete with instruction sheet and mini CD-ROM. The instructions recommended installing "U-Center" software from U-Blox at https://www.u-blox.com/en/product/u-center. I installed the software — which can display data received by the USB device from the satellite constellation.

Plugging in the VFAN's USB-A connector was a similar experience to the HiLetgo unit. Windows Device Manager reported that it was "USB Serial Device (COM8)". A small red LED was lit inside the puck. After a short time, it began blinking off once per second.

Starting the GPS2Time software, selecting COM8 and clicking "Run GPS" resulted in an immediate connection and

*VFAN magnetic puck has a small red LED that blinks during satellite reception.*

display of UTC. I was able to synchronize the computer clock then start WSJT-X. Once again, the decodes were showing "DT" (time offset) values of only 0.1 second.

With the magnetic puck on top of my FT-991A. a few feet from a window, the number of satellites being received was 8 to 9. This is significantly higher than the 3 satellites (at most) received by the HiLetgo unit.
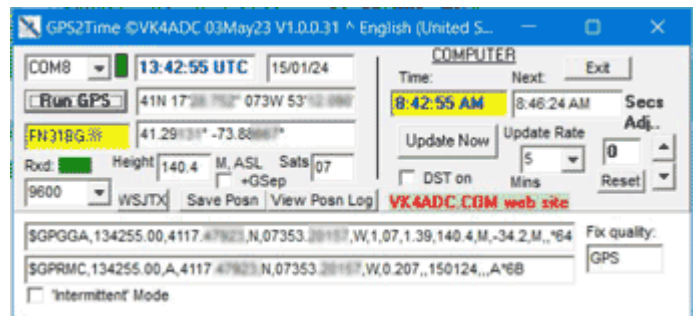
*GPS2Time software indicates reception of '07' satellites.*

I carried out another test by manually setting the computer clock to be about 1 minute slow. After a restart and allowing the VFAN receiver to synchronize, I started GPS2Time and observed the computer clock being synchronized shortly afterward.

GPS2Time displays the receiver's current location in terms of latitude and longitude – and also displays a 6-character or 8-character Maidenhead locator. This could be of value for field operation as WSJT-X (and some contests) need to know your grid square.

### "Field Day" test

To see whether the VFAN GPS receiver would have worked with PCARA's 2023 Field Day setup, I cleared a space on the workbench and set up the Yaesu FT-897D (ex-Henry KB2VJP) along with the Yaesu SCU-17 USB Interface Unit and Windows 11 HP Laptop 14-fq as used at Field Day.

*Equipment as used at PCARA's 2023 Field Day VHF station. L to R: HP notebook, Yaesu FT-897D, SCU-17 interface, Daiwa CN-801 output meter and DC power supply.*

An initial check showed the notebook computer's clock was running *7 seconds* ahead of UTC and WSJT-X was *not* decoding any FT8 on 15 meters. Green lines on the waterfall display were running straight through the middle of transmissions.

I installed a copy of the GPS2time software from VK4ADC's web site and plugged the VFAN USB GPS receiver into the notebook's USB port, where it appeared
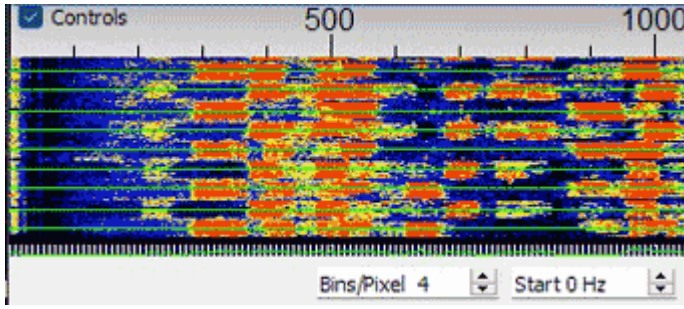
*With the computer clock 7 seconds ahead of UTC, transmissions were not being decoded and green horizontal lines on the waterfall were running through transmissions.*

as COM3. I started 'GPS2Time.exe' as administrator and saw the computer clock synchronize with UTC. After restarting WSJT-X, transmissions were now decoding correctly with low DT values. I was able to work KI0E (Kim in Namp, Idaho) on 15 meters. Success!

### GPS2time problem

I ran into an occasional problem on the Windows 11 computer with GPS2Time unable to continuously update the computer clock reliably after a specified time period. A temporary solution was to change the Update Rate from the default 5 minutes to its highest value, 300 minutes.

I found another application for synchronizing the computer clock on the Algarve Astronomy website, see: https://www.coaa.co.uk/gpstime.htm. Their 'gpstime' program provides a lot less information than GPS2time. But when run as administrator it not only set the clock on a Windows 11 computer, but could update the PC time at specified intervals as well.
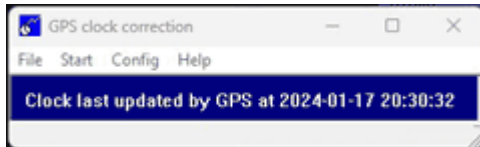


*Algarve Astronomy 'gpstime' program has a limited display of GPS information.*

One suggestion — if you start the computer and the VFAN USB GPS receiver from cold, you may have to wait 8-9 minutes before the receiver has locked in to sufficient satellites for an accurate position, and an accurate readout of UTC. Don't be in too much of a hurry — take your time!

### Conclusion

Advice from GM3WOJ to employ a uBlox7 GPS receiving device along with GPS2Time software for accurate timing when no Internet is available seems appropriate. Don't skimp on the uBlox7 device — spend enough for a reliable unit, and perhaps carry a spare, they are not too expensive. GPS2time software from VK4ADC works well on Windows 10, but if you experience problems with Windows 11, give Algarve Astronomy's 'gpstime' a try.

- NM9J

# VE Test Session 1/22

On Monday evening, January 22, 2024 PCARA held a Volunteer Examiner Test Session at Putnam|Northern Westchester BOCES Tech Center in Yorktown Heights.

There was one candidate — Robert Kerbstat of Paterson NY — who had previously passed the Element 2 Technician exam with PCARA at Putnam Valley Library on October 7, 2023, earning the call sign KE2CAJ. He subsequently upgraded to General Class at PCARA's October 23 session at BOCES.

On January 22, 2024 Robert KE2CAJ was successful in Element 4 and upgraded to Amateur Extra Class. Congratulations! At the same time, Robert applied for a new systematic call sign. At the time of writing, the new call was still awaited.

Thanks to the volunteer examiners who assisted at this V.E. Test Session including Laurel VEC Team Leader Dave KF2BD plus Lou KD2ITZ, Rob AD2CT, Ken W1YJ and NM9J.



*Dave KF2BD presents Robert KE2CAJ with his CSCE for passing Element 4, the Amateur Extra Class examination at PNW BOCES Tech Center. Ken W1YJ is looking on.*

PCARA's next V.E. Test Session is scheduled for Monday February 12 at Putnam | Northern Westchester BOCES Tech Center. This will also be a Laurel VEC Test Session (no fee). Candidates must contact Dave KF2BD by February 10 using: daveharper'at'vivaldi.net.

- NM9J

# Peekskill / Cortlandt Amateur Radio Association

**Mail:** PCARA, PO Box 146, Crompond, NY 10517
**E-Mail:** mail 'at' pcara.org
**Web site:** http://www.pcara.org
**PCARA on Facebook:** https://www.facebook.com/pcararadio
**YouTube Channel:** https://www.youtube.com/
@peekskillcortlandtamateurr7670

*PCARA Update* **Editor:** Malcolm Pritchard, NM9J
E-mail: NM9J 'at' arrl.net
*Newsletter contributions are always very welcome!*
Archive: http://nm9j.com/pcara/newslett.htm

## PCARA Information

PCARA is a **Non-Profit Community Service Organization**. PCARA meetings take place every month (apart from July/August break). See http://www.pcara.org for current details.

## 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

Masks and Social Distancing may be required.
**Sun Feb 11:** PCARA Monthly Meeting. **1:00 p.m.**, Cortlandt Town Center CUE Room, Rt 6., Cortlandt Manor.
**Mon Feb 12:** PCARA V.E. Test Session, 7:00 p.m., BOCES Tech Center, room 235, see below.
**Sat Feb 24:** PCARA Breakfast, 9:00 a.m., Uncle Giuseppe's, 327 Downing Dr. Yorktown Heights, NY.

## Hamfests

Check with organizers before leaving.
**Sat Feb 25:** LIMARC Hamfest, Levittown Hall, 201 Levittown Parkway, Hicksville, NY.

## VE Test Sessions

Check with the contact before leaving.
**Feb 3, 10, 17, 24:** Westchester ARC, 19 Hunts Bridge Rd, Yonkers NY. 11:00 a.m. Must contact VE, ac2t'at'arrl.net.
**Feb 3, 10, 17, 24:** NYC-Westchester ARC, 43 Hart Ave, Yonkers NY. 12:00 noon. Must contact VE, k2ltm'at'aol.com.
**Feb 8:** WECA, Westch Cnty Fire Trg Center, 4 Dana Rd Valhalla NY. 7:00 p.m. Must contact VE, N2gdy'at'weca.org.
**Feb 12:** PCARA, 7:00 p.m., Putnam | Northern Westchester BOCES, Tech Center, 200 BOCES Drive, Yorktown Heights, Room 235. 7:00 p.m. Must contact V.E. Dave KF2BD daveharper'at'vivaldi.net
**Feb 16:** Orange County ARC, Munger Cottage, 40 Munger Dr, Cornwall NY. 6:00 p.m. VE: w2bcc'at'arrl.net.

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Peekskill / Cortlandt Amateur Radio Association Inc.
PO Box 146
Crompond, NY 10517