PCARA Update

Volume 25, Issue 3 Peekskill/Cortlandt Amateur Radio Association Inc. March 2024

Cue the band

We returned to the Town of Cortlandt CUE Room in the Cortlandt Town Center on Sunday February 11, 2024 for our **PCARA Membership Meeting.** The CUE Room had been undergoing some construction to create new offices for *Nor-West Regional Special Services*, that had been housed previously at the Charles J. Cook Park on Furnace Dock Road in Cortlandt Manor. [There will be a ribbon cutting/Open House on March 5. - *Ed.*] Bob N2CBH brought along some items from the estate of Henry KB2VJP (SK). An *ad hoc* flea market ensued, that brought in $162 for the treasury. Well done!

Some of you may have noticed that the **2-meter repeater** was down on the morning of February 12, 2024. This was discovered through the due diligence of Bob N2CBH, who took a trip up the hill and found that there was no output on 146.670 MHz. True to form, Bob had a standby repeater that he installed and had up and running that same afternoon! **Thank you Bob**! [Further details and a short history of the 2 meter machine begin on page 6. *-Ed.]*

Another PCARA Breakfast took place on Saturday February 24 at 9:00 a.m. at Uncle Giuseppe's Marketplace in Yorktown Heights. As expected, there was a good turnout with 11 members in attendance, around two tables in the market's "café" area. These Breakfasts continue to be very popular.

Bob N2CBH prepares the new 2 meter repeater for installation on the hill, February 12, 2024.

On Saturday February 24, eleven members gathered for another PCARA Breakfast at Uncle Giuseppe's Marketplace in Yorktown.

Please mark your calendars with the following upcoming events:

- Saturday March 16, 2024 at 11:30 a.m.: **PCARA ARRL VE Test Session** at the Putnam Valley Free Library in Putnam Valley, NY. Candidates, please contact Mike W2IG at w2igg'at'yahoo.com to register.
- Saturday March 30, 2024 at 9:00 a.m.: **PCARA Breakfast** at Uncle Giuseppe's Marketplace in Yorktown Heights, NY.

Our next **PCARA Membership Meeting** is scheduled for Sunday March 16, 2024 at 10:15 a.m. at the Putnam Valley Free Library in *Continued on page 2* ⇨

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Putnam Valley, NY. Please join us! I look forward to seeing each of you there.

-73 de Greg, KB2CQE

PCARA Board

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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.

Repair Café

The Town of Cortlandt will hold its first Repair Café on Saturday, March 16, 2024 from 10:00 a.m. to 2:00 p.m. at the Muriel H. Morabito Community Center, 29 Westbrook Drive in Cortlandt Manor. The Repair Café is sponsored by the Town of Cortlandt and the Village of Croton-on-Hudson. Volunteer repair coaches will be available to make all possible repairs free of charge.

Those attending will be limited to two items and will be required to pre-register by March 8th via the following link: https://forms.gle/PC2xHrxRAZjZfKHeA. Further details are available at: https://www.townofcortlandt.com/repaircafe.

[Note: This event partially overlaps the March 16 meeting and V.E. Test Session.]

VE Test Session

The Laurel V.E. Test Session scheduled for Monday February 12 at Putnam | Northern Westchester BOCES had to be postponed. The campus was closing early in preparation for a storm that dropped 11 - 12 inches of snow on the area.

PCARA's next V.E. Test Session takes place on Saturday March 16 at Putnam Valley Library, starting at 11:30 a.m. The session follows PCARA's monthly meeting scheduled for 10:15 a.m. at the Library on March 16.

This will be an ARRL-VEC Test Session. Candidates must contact Mike W2IGG before the session using e-mail: w2igg'at'yahoo.com.

Graphic courtesy of Lou, KD2ITZ.

Adventures in DXing
- N2KZ

Not A Real QSO

How do you record a great moment in your amateur radio history?

My mission was not to honestly contact my good friend sitting on the beach of a resolute and remote island. The recording simply demanded clear and distinct audio from both participants. All I wanted to create was a souvenir of a masterful DXpedition for perpetuity!

Who is this wayfaring adventurer? None other than my good friend **Bob Bower** signing as **VK9N/GM4DLG** near Emily Bay on Norfolk Island. Picture a tiny place poking out of the ocean 1000 miles northeast of Sydney, Australia — 600 miles north of Auckland, New Zealand — on your way to French New Caledonia. It is where the South Pacific Ocean meets the Tasman Sea. See? It really is nowhere!

Map shows location of Norfolk Island in the Pacific Ocean between New Zealand and New Caledonia. [Base map: CIA]

Bob sent me a firm date, time and frequency to sked with him: Very early Friday morning, February 2, 2024 at 0700 UTC — 0200 Eastern Standard Time! Bob would be transmitting USB on 14260 kHz and 'listening up' to calls on 14265 kHz. It was time to dream up the best strategy for (hopefully!) recording both sides of our conversation as very best I could.

My first assessment eliminated my QTH for listening. Within my shack is a Yaesu FTDx1200 connected to a simple 20 meter wire dipole at 25 feet facing east/west. I needed something better. I am a regular user of the vast network of Kiwi SDRs always available and free-to-use. It became a superior solution!

I referenced the Kiwi SDR map (http://rx.linkfanel.net) and zoomed into receivers near Bob's outpost in the South Pacific. I was drawn to one location: The ZL1ROT Kiwi at Rotorua, North Island, New Zealand operated by the Rotorua Amateur Radio Club.

RARC's Kiwi is only a few miles north from the quite famous Radio New Zealand International transmitter site in Rangitaiki. RNZ International serves the entire South Pacific with news, weather reports and entertainment programming, often being the only radio station heard on many remote islands. RNZ picked this area to launch their signals to the world. Choosing the Rotorua Kiwi SDR seemed like a perfect place to clearly hear Bob's signal.

My transmission strategy also required thought and planning. I decided to use the facilities of my good friend Noble Harper KC8PGG in Deckerville, Central Michigan. I use his remote daily to reach the Lake Huron Amateur Club's Old Goat's Net on the 2 meter Bad Axe repeater.

Noble KC8PGG in Deckerville, MI has a station capable of remote control. [KC8PGG]

Noble's shack is several steps above my home QTH performance level. Located in Central Michigan in flat and wide open farm country, Noble uses a 50 foot high delta loop fed by ladder line with a linear amplifier and a Palstar tuner. To say his station produces an authoritative signal is an understatement! Noble kindly took time to tune up and maximize the signal I was going to send out on 14265 kHz hours later in the middle of the night. Thanks Noble!

I woke up at about 1:30 a.m. and walked across our house to the mudroom bathroom, way out of earshot of my sound-asleep wife. The only equipment I had was my trusty fourth-hand Dell laptop and my iPhone 13 Pro sitting on the keyboard as a voice recorder. What does any of this gear have to do with amateur radio?

I logged onto 14260 kHz on the Rotorua SDR and verified that the receiver was active and ready. It occurred to me that I had no need to listen to the transceiver in Michigan so I turned the volume all the way down. At about 1:50 a.m., I pressed the record button on my iPhone's 'Voice Memos' app and patiently waited to hear Bob's voice. Magic was about to begin!

Remote access to the KC8PGG IC-746 Pro.

"Hello CQ 20... CQ... Victor Kilo 9 November stroke GM4DLG on Norfolk Island... and listening five up" Bob's voice was loud and clear! I called Bob and he gave me a 5/5 report on my signal from Michigan: *"We actually made a contact! That's very amazing! How about that!" "I'm on the north coast of the island with just a vertical dipole at the moment. I've only got one element up and I'm running 100 watts and I am right at the edge of the sea... but there's no beach here so I am on the edge of a small cliff. It's only about 20 feet high but I am right at the water's edge and the magic of salt water is doing it again, Karl, and I am so pleased to work you this evening. It's absolutely brilliant!"*

Bob GM4DLG with two fiberglass poles as used throughout his DXpedition. [GM4DLG pics].

Needless to say, there were big smiles at both ends of the connection! My recording captured the audio crystal clear and we were all very pleased with the results. The sun was just setting on Bob's island outpost at just 4 minutes before 2:00 a.m. in New York as I signed off. My signal had come up to 5/8 in those few moments. Granted, the Internet certainly helped with the connections but I never had so much fun in my mudroom bathroom!

If you want to try to listen for Bob wherever you are, try the Rotorua Kiwi at: http://zl1rot1.zapto.org:8083. Bob will be touring Lord Howe Island February 27 through March 3 — and — March 5 through March 9 in Tasmania before heading back to his home QTH near Stranraer, Scotland.

I powered down my laptop and quietly tiptoed to my office to see if I could hear Bob directly... and I could. Bob's signals were just above noise level and he was working quite a mêlée of stations piling up to log such a rare island. It was quite a memorable night featuring the most complex combination of resources that brought simply remarkable results. Could it count as a QSO? Hardly! But great fun it was!

DXpeditioner Royale

Bob Bower is a seasoned DXpeditioner with many a tale to tell! He began his DX career back in the 1970s while stationed in the Persian Gulf, serving with the Royal Air Force. In 1998, Bob crewed one of Robin Knox-Johnston's yachts between Iceland and Greenland using their onboard HF gear on the ham bands. In 2004, Bob sailed from Antigua to Panama on a replica of Captain Cook's *Endeavour* tall ship using a Yaesu FT-817 and a 50 watt amplifier. In March and April of 2012, Bob was again maritime mobile on board the Dutch sailing barque *Europa*, voyaging from Ushuaia, Argentina to the Antarctic Peninsula, South Georgia, Tristan da Cunha and Cape Town.

GM4DLG/MM operated from one of Robin Knox-Johnston's yachts sailing from Iceland to Greenland in 1998.

PA/GM4DLG/MM on the South Shetland Isles during a voyage from Argentina to Cape Town in 2012.

In the past ten years, Bob has been off to quite a few other exotic places usually aboard the most magnificent ships: The Falkland Islands, Fonimagoodhoo Island in the Maldives and Saint Helena Island. In January 2019, Bob found himself on board the square-rigged cruise ship *Royal Clipper* in the Caribbean. His Yaesu FT-817 followed him most everywhere!

Bob has a brilliant mind and devises some very interesting methods to make a contact. He would ride his tractor from his home down to a nearby seashore and try to work 40 meter LSB on greyline at sunrise. Bob enjoyed some very interesting contacts and, over time, developed more refinements to the antenna system attached to his tractor frame. He had to be careful not to use too much output power during his sandy experiments. Otherwise, he might glow going home! Bob and I finally met each other for an 'eyeball QSO' this

GM4DLG and tractor on Port Logan Beach. [QSL pictures courtesy GM4DLG].

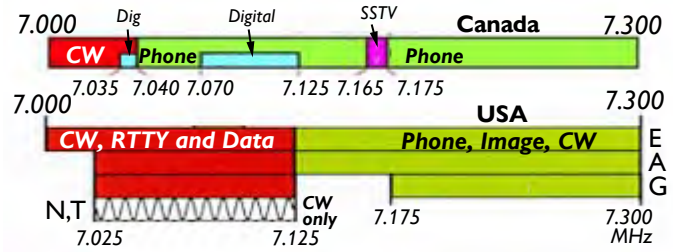
past July 2023 at the Mull of Galloway lighthouse in Scotland as part of an outing of the Wigtownshire Amateur Radio Club to which we both belong.

Bob GM4DLG is on the far left of these Wigtownshire Amateur Radio Club members, with Karl at center. [N2KZ pic.]

Newfound Operating Techniques

You are never too old to learn new things. A case in point: While casually tuning around 40 meters, I came across the Trans Provincial Net on 7100 kHz LSB filled with a cornucopia of Canadian, British and Scottish accents. Please appreciate my opening impression of this quite active gang: "Who are these people who have taken root on what used to be CW-only territory?" I listened along for a while to the seemingly endless traffic from all over Ontario and as far away as England. The net host was Barry, VE3ISX from Hamilton — just southwest of Toronto. The net runs from 0800 to 1700 hours Eastern daily on 7100 kHz LSB.

At 3:30 p.m. Barry read a long TCN introductory statement which included a warning to American amateurs to not join in with voice although they would welcome check-ins in Morse CW. (American hams are not allocated for voice operation way down on 7100 kHz.) I took this as a personal invitation to give a call using CW. It didn't occur to me what error I was about to fall into!

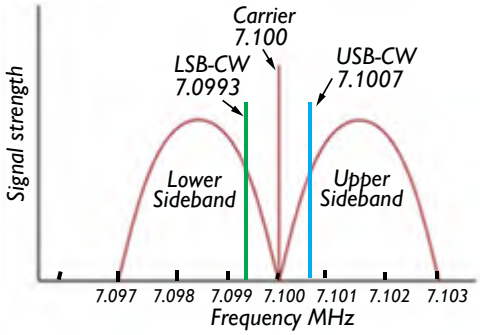


Top: Band Plan recommended by Radio Amateurs of Canada. Below: Band Plan for U.S. radio amateurs showing emissions authorized by FCC Part 97 Rules.

The only other place I had ever tried to gain attention cross-mode has been on 6 meters. Morse operators usually listen to upper sideband on any band as a rule. On six meters, a USB amateur operating on 50.130 MHz would likely hear a CW operator transmitting at 50.130.700 MHz creating a 700 hertz note that should be heard aurally.

Of course, I sent my call this day on 7.100.700 forgetting I was in LSB territory! Another station prompted Barry saying: "I think someone is trying to call you on CW but they are on the wrong sideband!" Barry twiddled around with his RIT and found me immediately. I was completely embarrassed by my basic mistake.

Lesson learned! When on 40 and below, send cross-mode calls in *LSB* CW! Doesn't everybody live in the CW-only world? Sadly, I think not! Do you know Canadians can send voice transmissions as low as 7040 kHz? Is anything sacred? 40 meters used to be an all CW band!



To break in on a LSB phone contact using CW, choose LSB-CW rather than USB-CW.

Today's 40 meters is packed with all sorts of operators using every mode imaginable. 7100 kHz down to about 7060 kHz is long gone to digital modes especially FT8. With other digital modes taking root from 7040 down to 7030 or even 7028 or below, everyone who sends CW (especially slow speed CW) is being smashed further down the band to 7025 to 7028 kHz.

Below 7025 is indeed exclusive Extra Class licensee territory where you must carefully honor DX windows and regular operating spots by very fast CW operators. Indeed, half of the old 40 meter Novice segment from 7100 to 7150 kHz (now 7100 to 7125 kHz) can still suffice as a home for slow-speed CW operators but only if they are willing to dodge 'quacky-duck' sidebanders from outside American borders. A similar allocation mess can be found on 80 meters. When I first became an amateur, I used to be found almost exclusively on 3600 kHz CW. The 80 meter voice allocation now reaches down to exactly 3600 kHz making it very hard to still operate CW on my first watering hole.

I knew things were looking bad when federal regulations completely outlawed spark as a Morse mode back in 1926. I knew trouble was brewing when the new bands — 80, 40, 20 and 5 meters — were allocated in 1924. Using these new allocations demanded spark-free operation only. One hundred years later, continuous wave CW is now slowly being pushed out of existence. I guess times change and you must adapt, you old goat! Until next month, 73 ES dit dit DE N2KZ "The *Old* Goat."

2 meter repeater

Early on Monday morning, February 12, 2024 Bob N2CBH noted that the 2 meter repeater on 146.670 MHz was not transmitting. The problem was confirmed by NM9J. Bob paid a visit to the repeater site and found the receiver still operational but no output power from the transmitter.

Bob returned to home where — fortunately — he had a standby repeater ready for deployment. This was a VHF Motorola MTR3000 unit similar to the UHF repeaters currently deployed to the co-sited KB2CQE/R on 449.925 MHz and to the N2CBH/R repeater on 448.725 MHz. Bob had reported on this newly acquired compact unit in *PCARA Update* for April 2023, pp 9-10 where he described its integrated power supply, receiver with preselector and 100-watt transmitter scaled back to 50 watts output.

New Motorola MTR3000 repeater producing 50 watts output while on-test into dummy load. [N2CBH pic.]

Bob mounted the VHF MTR3000 in a Motorola half-height cabinet then made up two new N-type to N-type coaxial cables for hooking up to the duplexer. That same afternoon, Bob paid a second visit to the repeater site accompanied by NM9J. There was work already underway at the site with a crew from Mid-State Communications.

Bob prepares to install the MTR3000 at the repeater site.

The previous repeater, based on a Kendecom receiver, Motorola transmitter and separate controller had been returned to the site by Bob on February 27, 2023. After confirming zero power output from the transmitter, it was removed from the outer cabinet then the new Motorola MTR3000 installed in its place. With the duplexer supported on wedges, a test call was made and David KD2EVI provided a weak signal to confirm that operation was satisfactory. Cabinets were closed-up and the site was left just in time as the area was about to receive 11 inches of snow.

Bob tests the new MTR3000 repeater on February 12, 2024.

The new Motorola MTR3000 has significant differences from the previous repeater with its custom-programmed voice controller:

- There is no hourly voice identification.
- During CW identification, PL encode is turned off, so you may not hear the ID if you have tone decode (tone squelch) enabled.
- There is no courtesy tone.
- The repeater time-out is currently set to a short 1 minute. Let the carrier drop to reset.
- The hang-time is set to 5 seconds.

Some of these characteristics can be modified by reprogramming. Meanwhile the repeater has been successfully used for QSOs and nets, with similar power output through the duplexer as before and a receiver sensitivity that seems improved. Bob intends to repair and test the previous equipment, keeping it ready for standby use.

History repeats itself?

PCARA's 2-meter repeater has been on-air for almost **25 years**! Here is a summary of events in its colorful history. Almost all involve Bob N2CBH.

September 5, 1999: 2 meter repeater came on-air as N2CBH/R from 'the hill', 700 ft asl, shortly before arrival of Hurricanes Dennis and Floyd.

April 2000: New controller installed with autopatch.

November 2000: Club call W2NYW acquired.

December 2000: Discussions begin with CARA and CSMA about use of 146.67 MHz. PCARA joins UNYREPCO.

November 2002: 'Micor' repeater with newer controller, new Decibel Products duplexer installed. Antenna changed from tower collinear to Sinclair 2-element folded dipoles.

Greg KB2CQE and Bob N2CBH test the new 2 meter repeater after installation on November 2, 2002. The repeater is in the red-brown metal case, with the duplexer at the top. The old repeater can be seen on the open shelving at right. [From PCUD December 2002.]

January 2005: Circulator and low pass filter added.

March 2006: Antenna work on VHF and UHF. Diamond X500 installed.

April 2006: Antennas split, RX from tower collinear, then reverted to Sinclair.

August 2007: Test repeater installed at Putnam Valley site, 925 ft asl. This became the primary site for five years, with 'the hill' as secondary.

October 2007: Diamond 2-meter antenna installed at Putnam Valley site.

September 2008: Super Stationmaster 2-meter antenna installed at Putnam Valley.

2 meter 'test' repeater installed at Putnam Valley site in 2007. Large cabinet houses a 6-cavity duplexer.

February 2010: Putnam Valley repeater goes off, secondary repeater at the hill reactivated. (Power problems).

October 2011: Putnam Valley loses power again, secondary repeater activated.

July 2012: 2-meter repeater and Super Stationmaster antenna had to be moved out from the Putnam Valley site. 2 meter secondary installation at the hill returns to use as primary.

Bob N2CBH and Joe WA2MCR prepare to remove the 2-meter Super Stationmaster antenna from the Putnam Valley repeater site on July 21, 2012. This antenna had been in use for the 146.67 W2NYW repeater since September 2008. [From PCUD September 2012].

November 2012: 2-meter repeater removed from 'the hill' for troubleshooting. Replaced with older 'test' repeater from Putnam Valley site.

December 2012: Diamond X500 dual-band antenna inspected and repaired. Super Stationmaster installed at the hill. Sinclair folded dipoles removed.

November 2015: Diamond X500 replaced by Super Stationmaster for 440 MHz.

September 2022: 'Older' repeater noisy, replaced with Yaesu DR-1X Fusion repeater on 146.67.

February 2023: Yaesu DR-1X output became very low. Replaced with 'older' repeater after Bob fixed variable capacitors in its Kendecom receiver.

February 2024: Older repeater went to zero RF output. Replaced by Motorola MTR3000.

- NM9J

QRG (Your exact frequency is…)

Last time I described how you can make sure your radio station has accurate time (UTC) for digital modes, whether operating from home or out in the field. This time, I want to make sure your radio is **on frequency**.

Good old days

Fifty years ago, radio amateurs had HF equipment with free-running oscillators and analog frequency dials that were marked every 100 kHz or every 25 kHz across the band. You might have had a crystal marker that allowed calibration to be checked at the 1 MHz and 100 kHz dial marks. But if you arranged a sked on 21.260 MHz, you would need to warm up your drifty VFO, calibrate the dial and even then, you might only be within ±10 kHz of the correct frequency.

Sommerkamp FL-500 transmitter's analog VFO dial.

Around 1980, digital frequency readouts began appearing on amateur radio transceivers. Early displays were provided by a built-in digital counter, measuring the frequency of the analog VFO (FT-102, TS-530S).

Yaesu FT-902DM transceiver from 1981 had a free-running VFO with built-in digital frequency counter.

Newer models were equipped with a **digital frequency synthesizer** that generated all necessary RF signals from a single **reference oscillator**. The reference was based on a quartz crystal, possibly held at constant temperature in a thermostatic oven. Suddenly radio amateurs knew their exact frequencies to better than 1 kHz, directly from a digital read-out on the front panel. Now, you could arrange a sked on 21.260 MHz and *know* that your correspondent would be right there, on-frequency!

Kenwood TS-870 HF transceiver from 1995 had a digital frequency synthesizer.

Modern times

With the widespread availability of synthesized HF transceivers, modern radio amateurs tend to have SSB QSOs on an *exact* number of kilohertz. Even if you are unfamiliar with someone's natural voice, you can be fairly sure you have them tuned in correctly if you set the frequency to (for example) 21.260.000 MHz. Use of an exact number of kilohertz also makes for efficient use of RF spectrum as stations tend to settle on carrier frequencies in a crowded band that are just 3.0 kHz apart. Modern transceivers can often be tuned in 1 kHz steps for quick band scanning and finding of QSOs.

(I have not noticed a similar consistency in choice for CW frequencies, though some operators seem to choose the nearest 1 kHz, 0.5 kHz or 0.33 kHz 'channel'.)

Digital modes

Just as with accurate time setting of the computer to UTC, digital modes such as FT8 are setting higher standards for frequency accuracy. According to the WSJT-X User Guide: "Many WSJT-X capabilities depend on signal-detection bandwidths of no more than a few Hz. Frequency accuracy and stability are therefore unusually important."

WSJT-X has a *built-in* mode for frequency calibration of the computer/transceiver combination, but before you get that far, it is worthwhile carrying out a separate adjustment of the transceiver's reference oscillator. Not only will WSJT-X require little or no software adjustment, but operation on other modes will also be accurately 'on-frequency'.

Reference oscillator adjustment

There are several different ways to adjust the reference oscillator in synthesized transceivers, new and old — so the first thing to do is consult the User Manual or Service Manual for the model you have. If you do not own a *printed* manual, check the manufacturer's web site for a downloadable PDF — or search the Internet for model number and manual name.


YAESU
FT-991A
OPERATING MANUAL
Operating Manual for Yaesu FT-991A HF/VHF/UHF transceiver.

Look in the manual's Index, Table of Contents or Menu Settings for phrases such as "Frequency Calibration", "Reference Oscillator" or "Reference Frequency". If you cannot find anything in the manual, try an online search — for example: "FT-897D frequency adjustment".

New, old and older

Assuming your transceiver has a frequency synthesizer, you may find yourself in one of these three situations.

1. The reference oscillator can be adjusted using a transceiver menu selection and a front panel control.
2. The reference oscillator can be aligned by adjustment of an internal trimmer capacitor or inductor.
3. There is **no** information on adjustment of the reference oscillator.

Situation #1 is the easiest to deal with and applies to most modern transceivers. If you know your way around the built-in menus and follow the manufacturer's instructions you can probably have the reference oscillator adjusted in a few minutes.

Adjustment of Reference Frequency through menu item 039 of the FT-991A.

Situation #2 is more difficult. You may need to remove a cover from the radio then take the lid off a shielded enclosure for access to the adjustment point. If you have not taken the covers off before, diagrams, photographs and online videos can all be helpful. You will probably need various screwdriver sizes, followed by a small, insulated trimming tool to adjust the capacitor or coil that controls the crystal oscillator.

Adjustment point (arrowed) for the reference oscillator in the SO-2 TCXO unit of a Kenwood TS-870 HF transceiver.

Situation #3 is the most difficult to deal with. Some manufacturers do not like having their equipment adjusted by amateurs, even if they are just as skilled as the company's own technicians. A couple of suggestions — first carry out a deep Internet search, perhaps using a more generic model name. There might be information on an earlier or later version of the model you have. A second suggestion — find a schematic diagram for the radio and locate the reference oscillator stage. It might be within a special module or just part of the circuitry surrounding an integrated circuit. Look for the symbol of a trimmer capacitor or inductor and note the component reference number ("TC102"). Refer to the service manual for disassembly instructions and component layout. If you feel out of your depth, ask for advice from club members.

Prepare to adjust

Before making an adjustment, there are a couple of preliminary actions. First, turn the radio on long enough for the internal temperature to stabilize — 30 to 60 minutes is a good place to start. With an antenna attached, check propagation to find out which standard frequency transmissions can be received at good strength. WWV transmits on 2.5, 5.0, 10.0, 15.0, 20.0 and 25.0 MHz. (The 25.0 MHz transmission is experimental at the time of writing.) Canada's CHU transmits on 3.330, 7.850 and 14.670 MHz. Look for the highest frequency that provides a good, steady signal at your location, allowing for time of day and seasonal propagation.

Next, make a note of the radio's *existing* reference frequency setting. This might be in the form of a value stored in a menu item or the physical position of a trimmer capacitor. Take a photo before going any further!

Can't be beat

With one of the standard frequency transmissions selected on your radio's frequency read-out, change mode from AM to SSB. This can be upper or lower sideband. Tuning across the WWV or CHU carrier frequency (e.g. 20.000 MHz), you should observe "**zero beat**" with your BFO at or very close to the published frequency.

If you are not familiar with acoustic "**beats**" — they occur when two signals with frequencies very close together are combined, resulting in a slow change in amplitude at the difference frequency. This is caused by the amplitudes adding or subtracting according to their phase difference. "Zero beat" is the point where the two frequencies coincide and the slow beat frequency changes to zero cycles per second. However, listening for zero-beat with the WWV carrier can be tricky on a narrow-band SSB transceiver with a restricted audio passband of only 300 - 3000 Hz.

A better technique is to wait for a period when the AM modulation on WWV includes an audio tone. This occurs during most minutes of the hour apart from 43-52 minutes. (The broadcast format is available at: https://www.nist.gov/pml/time-and-frequency-division/time-distribution/radio-station-wwv/wwv-and-wwvh-digital-time-code.)

While the tone is being transmitted, change from AM to SSB reception then switch back and forth between upper sideband and lower sideband. If the carrier is tuned in accurately, there should be no change in

pitch between the audio tone received on upper sideband and the tone on lower sideband. (This assumes that your transceiver does not change carrier frequency between USB and LSB.) If the pitch *does* change, then the reference oscillator needs adjustment.

A refinement is possible if you have a second radio that can also receive WWV. Set the second receiver to **AM** mode while WWV is transmitting a steady tone then compare it with the USB or LSB reception of the same tone on the main transceiver. If you adjust the audio gain and listen closely to both tones together, you should be able to hear audio 'beats' when the two audio tones are very close in frequency to each other.

Some transceivers can introduce a calibration marker derived from the reference oscillator. One example is the Icom IC-7410, which can turn on a 100 kHz harmonic marker from the Set-mode Menu for beating with the carrier from WWV. See the Instruction Manual for details.

Icom IC-7410 can turn on a calibration marker with Set Menu item #47 (top). Adjustment of reference oscillator is available with Set Menu item #48 (below).

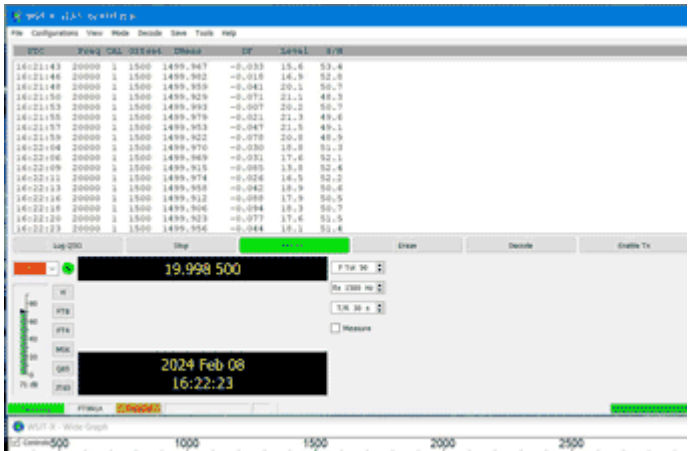
Using WSJT-X

If you already have WSJT-X installed on a computer and interfaced to your HF transceiver, there is a more accurate way of adjusting the radio's reference oscillator. WSJT-X has a "Frequency Calibration" mode that sets the receiver to a frequency offset from one of WWV's transmissions, then measures the audio beat note between WWV's carrier and the receiver BFO.

In WSJT-X, select menu choice: Mode → FreqCal. You should see the transceiver's frequency jump to 0.6585 MHz ready for reception of the carrier of WFAN Sports Radio on 660 kHz. You can select various WWV and CHU standard frequencies from the red drop-down list labeled "OOB" (Out of Band). If reception is good, I would suggest starting with WWV on 20.000 MHz. The transceiver should jump to 19.9985 MHz.

When using WSJT-X in FreqCal mode, tcvr frequency jumps from 20.000 to 19.9985 MHz

Every few seconds, the program measures the audio beat frequency generated between WWV's carrier on 20 MHz and the transceiver tuned to 19.9985 MHz. This should be exactly 1500 Hz — the actual value in hertz is reported onscreen in WSJT-X's column "fMeas". Alongside is the column "DF" (difference frequency), displaying the positive or negative offset from 1500 Hz in hertz (cycles per second). Now you can make adjustments to the reference oscillator, aiming for the smallest possible value of "DF". If you can reduce the value of "DF" to less than 1.000 Hz, then you are doing well.



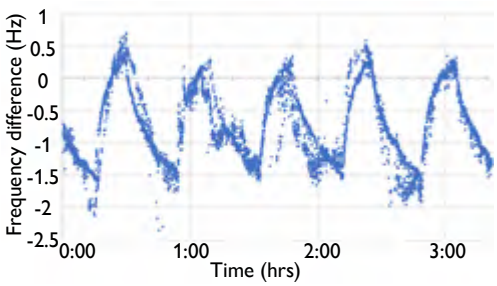
WSJT-X in FreqCal mode. Waterfall shows WWV on 20 MHz with 100 Hz subcarrier and 500/600 Hz tones.

UTC	Freq	CAL	Offset	fMeas	DF	Level	S/N
16:21:43	20000	1	1500	1499.967	-0.033	15.6	53.4
16:21:46	20000	1	1500	1499.982	-0.018	16.9	52.8
16:21:48	20000	1	1500	1499.959	-0.041	20.1	50.7
16:21:50	20000	1	1500	1499.929	-0.071	21.1	48.3
16:21:53	20000	1	1500	1499.993	-0.007	20.2	50.7
16:21:55	20000	1	1500	1499.979	-0.021	21.3	49.6
16:21:57	20000	1	1500	1499.953	-0.047	21.5	49.1
16:21:59	20000	1	1500	1499.922	-0.078	20.8	48.9
16:22:04	20000	1	1500	1499.970	-0.030	18.8	51.3
16:22:06	20000	1	1500	1499.969	-0.031	17.6	52.1
16:22:09	20000	1	1500	1499.915	-0.085	13.8	52.4
16:22:11	20000	1	1500	1499.974	-0.026	16.5	52.2
16:22:13	20000	1	1500	1499.958	-0.042	18.9	50.6
16:22:16	20000	1	1500	1499.912	-0.088	17.9	50.5
16:22:18	20000	1	1500	1499.906	-0.094	18.3	50.7
16:22:20	20000	1	1500	1499.923	-0.077	17.6	51.5
16:22:23	20000	1	1500	1499.956	-0.044	18.1	51.4

WSJT-X in FreqCal mode displays the offset from an audio frequency of 1500 Hz in the "DF" column (arrowed). Also note the red "OOB" drop-down frequency list bottom left.

Frequency asked questions?

1. If you track the value of "fMeas" and "DF" over a period of time, you may notice trends. When the frequency steadily drifts in one direction, this is a sign that the transceiver is still warming up. Be patient. If the frequency slowly cycles up and down in a periodic fashion, the heating element in the transceiver's temperature-compensated crystal oscillator (TCXO) is

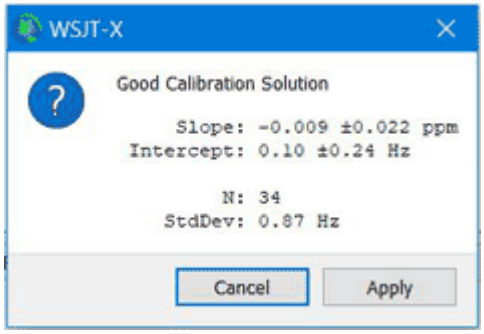


*Frequency difference (**DF**) measured by WSJT-X in FreqCal mode, plotted against **time** using Microsoft Excel. Periodic rise and fall in frequency suggests a thermostat is cycling on and off.*

probably cycling on and off to maintain a steady temperature.

2. You can modify the list of standard frequencies used by WSJT-X for Frequency Calibration. I added the 25.000 MHz WWV transmission to the list using menu choice: File → Settings… → Frequencies tab, then adding an entry after: All | WSPR | 24.924600 MHz (12m) with the values: All | FreqCal | 25.000000 MHz (OOB).

3. Once you have your transceiver's reference oscillator accurately set, you can carry out a *further* refinement to your digital modes setup in WSJT-X by starting a frequency calibration. This is available using menu choice: "Tools → Execute frequency calibration cycle". WSJT-X will cycle through the standard frequencies in its list, then you can ask it to fit a straight-line graph to your radio's frequency offsets, plotted against frequency — WSJT-X will calculate the line's slope and intercept. Full details are in the 'WSJT-X User Guide" under "Measurement Tools – Frequency Calibration".



WSJT-X fits a straight line to the 'DF' values plotted against transceiver frequency.

Final thoughts

If the quartz crystal in your HF transceiver's reference oscillator has drifted in frequency since the radio was brand new, then it is probably still moving! Check the reference oscillator again in a year or two. And say a thank you to NIST's Time and Frequency Division for keeping WWV on-frequency and on the air.

VHF/UHF transceivers can also suffer from drift of the reference oscillator. This can result in even larger frequency errors than for HF transceivers, with FM transmissions sounding "rough" because the carrier is no longer centered in the receiver passband. Check the radio's User Manual or Service Manual to see if there is an adjustment available through the service menu or a trimmer capacitor. - NM9J

Paul Maytan - AC2T (SK)

From Peter Johnson N2TFC:

Sadly, Paul M. Maytan / AC2T became an SK this past weekend on February 4, 2024. He was born on 12/31/1934 and was 89 years old. He got his money's worth! He was an ARRL Volunteer Examiner (VE) since 1984 for 748 exams.

I have known Paul since December 1993 when I took my Tech license exam with him at the Yonkers Police Department on Grassy Sprain Road along with his wife Emily and other VEs who have since passed on. For many years Paul was the former Technical Engineering Director for WECA. He was also a Technical Director for the Yonkers Amateur Radio Club (YARC) for many years. Until recently, Paul would operate on HF and he would also join the CBS Retirees net at 9 a.m. on Tuesday & Thursday mornings on the 147.06 WECA repeater. One of his replies on the net was "Fine Business!" Paul is predeceased by his wife Emily (AC2V) who was also a WECA member and a VE.

Regards and 73,
Peter Johnson / N2TFC
2024 WECA Membership Director / CIO
Membership'at'Weca.Org

From Karl Zuk N2KZ:

Paul Maytan, AC2T, passed away on Sunday, February 4, 2024 at 89 years old. Paul was an institution in Westchester County amateur radio and known worldwide for his lifetime of DXing. Paul was originally licensed as WA2DVS in 1976 and was an active ham for almost 50 years. Hundreds of people became friends with Paul and his wife Emily through regular amateur radio exam sessions they used to host on behalf of the Yonkers Radio Club at the Yonkers Police Department facility on Grassy Sprain Road overlooking the Sprain Brook Parkway. Paul also served as the Technical Engineering Director for the Westchester Emergency Communications Association (WECA) for many years. Paul signed all of my CSCEs and always gave me a big smile as an extra bonus — especially when I became an Extra!

Paul Maytan AC2T.

Paul's signature phrases were "have a great day — and a better one tomorrow" and "the bands are open!" Paul was a warm and wonderful friend. Oh, to visit his basement and to see his fine transceiver! Look around and chat with Paul about everything he stored down there! There was a story to behold for every item you could find. It was quite a museum including decades of

memories and files and records once authored by his dedicated and wonderful wife Emily – AC2V. I will miss Paul so much.

Paul participated in VE sessions for decades and decades and brought hundreds of new amateurs into our hobby. Most recently, Paul would host VE sessions at his home in Yonkers every Saturday morning. He was a constant light for all who desired a test. His signature on a CSCE was like a warm handshake of welcome into our fold. Paul also appeared from time to time at PCARA VE sessions. I remember one session when Paul and our friend Stan Rothman WA2NRV (SK), were all together serving as VEs. I never had a prouder moment with such fine company. Thank you OM!

Paul was a grand old ham in every respect. He loved telling us about his DX loggings and we loved to hear them! Always welcoming and reassuring, his selflessness and dedication to our hobby, for almost 50 years, serves as an inspiration to all. I host the bi-weekly CBS Retirees Net on the WECA repeater where Paul was a regular voice. You should have heard his joy and enthusiasm every time he keyed his microphone. He was a such a warm and giving soul. I was honored to have him as a good friend.

- Karl Zuk N2KZ

ARRL Library Book Set

ARRL Affiliated Clubs and members who wish to gift or donate books to a local library, school, or classroom, can do so with ease via **ARRL's Library Book Set**. For a special price of $250.00 (including U.S. ground shipping), the set includes the most popular ARRL publications, such as ARRL license manuals, The ARRL Handbook, and The ARRL Antenna Book for Radio Communications, among others.

These publications and resources will encourage potential new amateur radio operators from among students, youth, and the wider community, while also providing support to current licensees who are library users.

A complete description of the program, including the books and details for ordering, is available at: https://www.arrl.org/library-book-set.

Be sure to read the "Club Station" column in the April 2024 issue of *QST* (coming soon), in which a Florida club shares how they donated books to their local library.

The ARRL Library Book Set contains the following volumes (subject to availability when ordering):

- The ARRL Handbook for Radio Communications (softcover)
- The ARRL Antenna Book for Radio Communications (softcover)
- The ARRL Operating Manual for Radio Amateurs
- The ARRL Ham Radio License Manual
- The ARRL General Class License Manual
- The ARRL Extra Class License Manual
- Understanding Basic Electronics
- Basic Antennas – Understanding Practical Antennas and Designs
- Get On the Air with HF Digital
- Your First Amateur Radio HF Station
- FCC Rules & Regulations for the Amateur Radio Service

[Article credit: *ARRL Club News* for February 20, 2024.]

Spring forward

Daylight Saving Time in the USA begins on the second Sunday in March, Sunday March 10, 2024. At 2:00 a.m. Eastern Standard Time, clocks should be moved forward to 3:00 p.m. Eastern Daylight Time.

As a result, our local time zone moves 1 hour closer to UTC (GMT). The United Kingdom does not change from Greenwich Mean Time to British Summer Time until the last Sunday in March — Sunday March 31 in 2024.

The end of DST?

On March 15 2022, the U.S. Senate passed the 'Sunshine Protection Act', first introduced in 2018 by Senator Marco Rubio. The Bill would have made daylight saving time permanent for the full 12 months of the year. Although passage in the Senate was 'unanimous', some senators were unaware of the bill and would have opposed it if they had known about its content. It made little progress in the House. Similar bills were introduced into House and Senate in March 2023.

Peekskill / Cortlandt Amateur Radio Association

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PCARA on Facebook: https://www.facebook.com/pcararadio
YouTube Channel: https://www.youtube.com/@peekskillcortlandtamateurr7670

***PCARA Update* Editor:** Malcolm Pritchard, NM9J
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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.
Sat Mar 16: PCARA Meeting, 10:15 a.m., Putnam Valley Library, 30 Oscawana Lake Rd, Putnam Valley, NY.
Sat Mar 16: PCARA V.E. Test Session, 11:30 a.m. Putnam Valley Library. See below.
Sat Mar 30: PCARA Breakfast, 9:00 a.m., Uncle Giuseppe's, 327 Downing Dr. Yorktown Heights, NY.

Hamfests

Check with organizers before leaving.
Sat Mar 16: NJ Antique Radio Club Swapmeet, Parsippany PAL, 33 Baldwin Rd., Parsippany, NY. 8:00 a.m.
Sun Apr 7: Southington ARA Flea Market, Southington High School, 720 Pleasant St., Southington, CT. 8:30 a.m.
Sun May 5: Orange County ARC Hamfest, Black Rock Fish & Game Club, 5 Pleasant Hill Rd., Mountainville, NY. 8:00 a.m.

VE Test Sessions

Check with the contact before leaving.
Mar 2, 9, 16, 23, 30: NYC-Westchester ARC, 43 Hart Ave, Yonkers NY. 12:00 noon. Must contact VE, k2ltm'at'aol.com.
Mar 14: WECA, Westch Cnty Fire Trg Center, 4 Dana Rd Valhalla NY. 7:00 p.m. Contact VE, N2gdy'at'weca.org.
Mar 15: Orange County ARC, Munger Cottage, 40 Munger Dr., Cornwall, NY. 6:00 p.m. Contact w2bcc'at'arrl.net.
Mar 16: PCARA, Putnam Valley Library, 30 Oscawana Lake Rd Putnam Valley NY, 11:30 a.m. ARRL/VEC. Must contact V.E. Mike W2IG, w2igg'at'yahoo.com.

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