

North Fulton Amateur Radio League NFARL eNEWS

April 2022

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Our April Speaker- Warren Merkel KD4Z: Node Red

Our April 19, 2022 club meeting is going to include a great presentation on Node-RED (<https://nodered.org>), which is a browser based programming tool easily used to put event driven programming onto low cost hardware. Node-RED is based on Node.js code and used for IoT and similar applications.

Warren Merkel K4DZ, will present how Node-RED is used and demonstrate this using the programmable logic level relay controller board he showed us during his February 2022 KiCad presentation. Node-RED is an easy to use software program that you will undoubtedly hear more about in future amateur radio control applications.

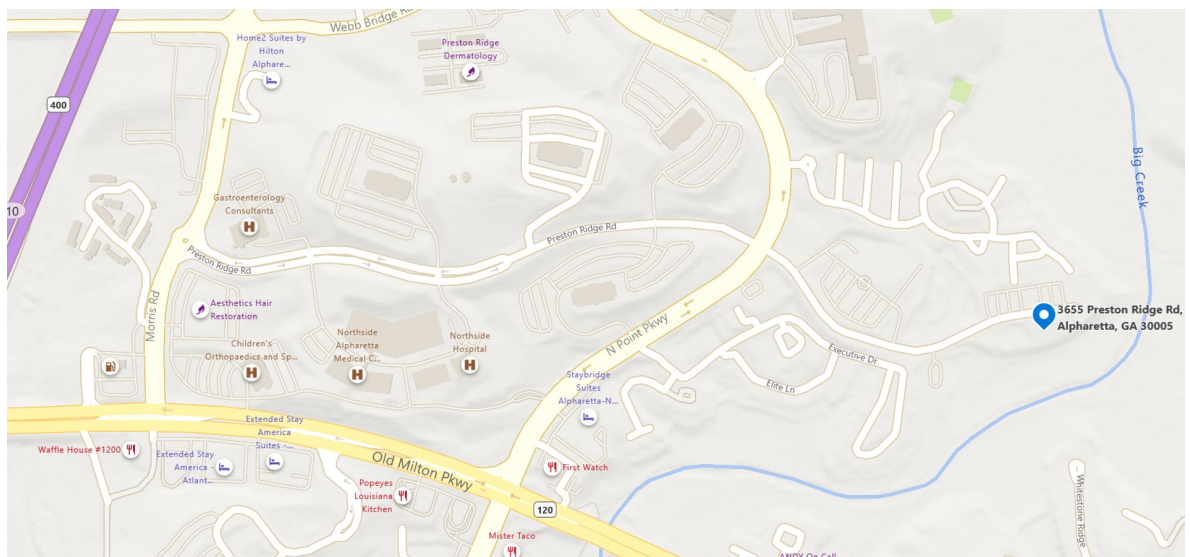
Join us! This type of knowledge and the skills you develop along learning about them will help you stay abreast of the changing technology platforms associated with amateur radio!

Members and guests will begin to gather at 7:00PM and the business meeting will start at 7:30PM. Our meeting location is:

Preston Ridge Community Center, 3655 Preston Ridge Road Suite 100, Alpharetta, GA 30005. The meeting will be broadcast on Zoom; join us on Zoom with the following credentials:

<https://us06web.zoom.us/j/84017976124?pwd=VGxwRk9OaFBPdCtGQitJU0NIMjFEZz09>

(Meeting ID: 840 1797 6124 Passcode: 083888)



President's Corner / John Norris N4IHV

I was reading an article in the April 2022 QST about copper vs aluminum wire. It was interesting to discover that copper starts out more efficient and its atoms are filled with lots of energy like us in our twenties. Unfortunately copper wire sags over time as its atoms get tired just like us as we age. Now that was enlightening and sounds familiar when I look in the mirror!

There is also a good article on how to make a small 40M Loop antenna in the March 2022 issue of QST. This would help someone who lived in a controlled area or had a small lot. It could be an excellent project for one of our members to build and then give a report to the club so we could learn something new. There are many excellent articles in QST that have "make me" written all over them.

By the time you read this, we will have completed the Georgia QSO Party. I hope you had lots of fun and made many contacts. We are preparing for our June 2022 Field Day and you do not want to miss this exciting event. We believe this is going to be one of our best. Steve Randall KO4VW, is the Field Day Manager this year. He only knows one way to approach anything and that is with his best effort, which is always excellent. Please help if Steve calls. You won't regret participating in this event.

Don't forget to join us at Hungry Hams (Slope's) or you could miss some good conversations. Of course during these conversations it is always a matter of trying to determine truth from fiction. I try to stretch it as much as possible.

Warren Merkel KD4Z, is giving a talk on Node-Red at our April 2022 meeting. It is low-code programming for event-driven applications. What this really means is one is able to use basic building blocks that have pre written code to make things happen. You connect these blocks by way of strings and that creates the program flow. You can control just about anything with this program. Don't miss this chance to learn something new.

Hope everyone made it through spring break safely and are having a wonderful April. See you at the NFARL Meeting April 19, 2022.

73

John Norris, President of NFARL
N4IHV

Stray- / Jim Hanson, W1TRC

This QST Stray is from the June 2006 issue. Jim Hanson, W1TRC, author of "A Home-made Ultrasonic Arc Detector" [Apr 2006, pp 41-46], reports that PC boards for the project are available. FAR Circuits, www.farcircuits.net, is producing the 2 x 3 inch boards based on artwork developed by Tom Hammond, NOSS, and John Brosnahan, W0UN. Jim reports that there has been quite a bit of interest in the detector. He notes that at least one ham, Roger Monroe, K7NTW, already has his detector working. He has been able to use it to pinpoint his first noise source on a pole about 3/4 mile from his home that has been giving him problems on 15 meters.

https://www.arrl.org/files/file/Technology/hanson_update.pdf

2022 K4M GA QSO Party Adventure / Bob Hensey K4VBM

Here is the saga of the 2022 K4M Adventure! Well, our 2nd year as team K4M in the portable GA QSO Party category taught us another lesson on how things can go really wrong, and how poor weather can make operating portable a not-so-fun experience. Again this year, Team K4M was composed of K4VBM - Bob Hensey, KK4E - Don Deal, and KN4APC - Greg Gilbert.

During our 2nd year we used a different radio, but with the same end-fed antenna as last year. We also added a Tarheel 100A mounted on a pole screwed into the ground as a 2nd antenna to try.

Also this year we abandoned generators in favor of LiFePo4 batteries and a Battery Booster to boost the voltage from the battery to a constant 13.8 volts as the battery ran down. We did some limited testing with this set-up, and found that a 100Ah LiPo battery would most likely power the radio and a logging laptop for the full 10 hours each day of the GA QSO Party, with an overnight charge that would complete in time for the next day. That was probably the ONLY thing that went really right this year - the 100Ah SOK brand LiFePo4 battery ran down to 58% on the first, very cold day. Temperature surely affected it a bit (not even half used), and was only about 68% on the second day. We had a spare 50Ah LiPo battery, and (2) 35Ah SLA batteries that we really didn't need to bring.

And once again, the weather on the first day had us really suffering with cold and a strong chilling wind. We wasted quite a bit of time rigging up some tarps as a windbreak. Even though we had a 2-burner heater for a LP gas tank, the eyes wouldn't stay lit in the wind, which chilled you to the bone, so without the windbreak we would have had to give up the first day. And once we got some reasonable comfort, the antenna woes gave us a miserable QSO count for the day of 43 QSOs! We got pretty discouraged after the Saturday fiasco, but with a promising weather report for Sunday, we decided to give another day a try. With not enough sleep in between, as well. Also, the park we chose for the first day was NOT a POTA park: it was the Corps of Engineers Sunny Point Recreation Area near the Alabama border in LaGrange, GA in Troup County. This hurt us a bit because we found out last year that a real POTA activation really helps your QSO count.



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The comfort of the 2nd day's weather had us working hard on 20m to make some QSOs, and although still fighting the antennas on the other bands we achieved some better numbers than day one. However, results were nothing like we had hoped. We had returned to Hard Labor Creek State Park POTA K-2184 near Rutledge, GA in Morgan county, and once again the POTA chasers helped us.



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The spotty cell service at Hard Labor Creek diminished our ability to self-spot also which also hurt us. Thank goodness some of the POTA chasers spotted us on the POTA site, and others spotted us on dxsummit.fi which really helped out. Sunday somewhat redeemed the weekend effort, but it was still a disappointing effort compared to last year.

Now for the painful lessons we learned. A DC power brick purchased for the Dell laptop failed the 2nd day, which we didn't discover until the laptop started to flake out on us. The power brick was intended to enable running the laptop directly off the battery. When the battery on the original laptop finally went dead, we figured out what had happened, and switched to a back-up laptop. This took a bit of time to get working right and cost us valuable contesting time, eventually cutting short our 2nd day a bit when its battery ran down.

Another very serious problem was encountered with the end-fed antenna we used last year. The antenna had worked great on all bands, but only worked on 20m this year (and 40m was our money band last year!) The SWR was fine on 20m but 10, 15, and 40 just wouldn't tune this year. Wasted a lot of time troubleshooting with no joy or solution. We tried the Tarheel on the post driven into the ground, but had limited success on 40m CW, and no real luck on the other bands either. We did not expect our main antenna to stiff us! Without a good antenna, you are NOT going to make a lot of QSOs - so spend the time testing and finding good antennas for portable use.

On the way home Sunday, we detoured a bit in an attempt to find a place to eat. With spotty cell navigation, and in the process driving on some narrow winding roads, we got completely lost in the failing light. We saw some eastern Georgia, a mansion out in the middle of nowhere, and finally eating dinner at a local establishment named Tin Plate in Social Circle, GA. Tin Plate had great burgers to end the weekend on a nice note (no, we were too tired to put that safe in the minivan).

Another nice thing was the email from US county chaser Sam, LY5W, requesting a paper QSL for Morgan county which was a new one for him.

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Not sure we will do this portable thing again - bad weather and long distance from home equals much less fun playing radio. We did learn a lot again this year, noted more learnings and the re-proven information from the first year. We also took away how important it is to have tried and tested trust-worthy equipment when you go out and operate portable.

Hope everyone had fun in the GA QSO Party this year!

73,

Bob, Don, and Greg

Dayton Hamvention / Wes Lamboley, W3WL

Hamvention is May 20-22 this year, and much can be learned from their website at <https://hamvention.org>. The website is not totally complete for this year, but you can find out where to stay, as there is a listing of all the hotels in the area. Do take a look and see what all is going on even if you cannot go! It is the biggest ham event in the world. Nearby is "Four Days In May" (<http://www.qrparci.org/>) which is a more focused gathering of hams interested in QRP. It is the biggest of its kind also! Just down the road is the USAF museum, another huge highlight in the Dayton area, so plan to go an extra day if you can.

During the days of the events you will find informational forums on all levels and interests in ham radio, a huge flea market, equipment on display and for sale from over a hundred vendors. There are also dinners for DXers, Contesters, Top Band (160 meters) and other special interest groups. In the evening hours of Hamvention there are many hospitality suites in the various hotels that one can visit and be part of this huge fellowship event focused on ham radio.

The fellowship part of Hamvention is one of my favorite aspects. There are few feelings better than seeing old friends and making new ones while involved with the best hobby in the world. I truly enjoy the eight-hour car ride with buddies to and from Dayton; the time goes quickly.

So, if you can possibly make the time, do try to go. Keep an eye on the Hamvention web site; in about two weeks all the forum slots will be populated and you will be hard pressed to select attending the many interesting ones. Everyone needs to go to Dayton at least once!

Sandy Springs Lantern Parade / Mike Cohen, AD4MC

THE SANDY SPRINGS LANTERN PARADE- "TAKE IT TO THE RIVER!" will take place Saturday, April 30th, from 5:15-11 PM.

To: NFARL, NFARES & SSFC Teams

Reginald McClendon, Section Chief of Support Services, Sandy Springs Fire Department, has requested that NFARES again provide amateur radio communications support for this event.

Like we have done for the past, we will be teaming up with the Sandy Springs Fire Corps volunteers. (SSFC Lantern Parade Sign-Up Tab is available). Here's a link from the Sandy Springs Web page; <https://www.visitsandysprings.org/lanternparade/>

Our task is "to report any issues by radio" to the SSPD/SSFD IC (Incident Command) unit "that require Police Department or Fire/Rescue Department response." We will be stationed throughout the Parade route where participants and visitors "will start at the Steel Canyon Golf Club, go as a parade down to Morgan Falls Park and later return to the Golf Club."

Both SSPD and SSFD have told us that by having ham radio operators and SSFC volunteers stationed "along the Parade route to report issues to the Incident Command unit, where our NCS will be stationed, we can help minimize the number of 911 calls."

As many of us have been experienced, amateur radio support for public service events is very much appreciated and is a lot of fun.

The NFARES & SSFC support teams will meet at the Steel Canyon Golf Club (START 8), (460 Morgan Falls Rd, Sandy Springs, GA 30350) at 5:15 PM. More volunteers are required. So, if you are able to participate, please contact Mike Cohen or Andrea Rich.

Please let us know if you can join us.

Mike - AD4MC ad4mc.mike@gmail.com 770-262-5212

Andrea- andrich98@yahoo.com 678-777-1043



Local Ham has Great Year!

Here's how the past year has transpired. I got my first license around 1972, upgraded to General around 1993. However, I never owned any HF equipment until I joined NFARL. Here's a chronical on how the past 12 months have progressed:



- 1 - Joined the ARRL and the NFARL in 2021.
 - 2 - April, 2021:
 - W4QO gave me a tour of his shack and provided 100' of coax.
 - Purchased a center fed multiband dipole from HRO.
 - Purchased my first rig from the club , a Ten-Tech Jupiter 538.
 - Borrowed a antenna analyzer from the club.
 - 3 – May - Finally got on the air by contacting several NETs.
 - 4 - June 2021 – participated in NFARL field day. Racked up over 30 voice contacts with the help of several Elmers. As a bonus, I made my first CW contact! Plus, I provided a carrot cake for desert that evening.
 - 5 - July 2021 – Purchased a USB-64 interface cable for the Ten-Tech rig from RT systems.
 - 6 - August 2021 – installed WSJTX and joined the CW chat group.
 - 7 - October 2021:
 - Purchased a NANOVNA with 4" screen and a Signalink USB soundcard unit.- Started to study for the Extra class exam using the ARRL study book, YouTube instructional videos, HamExam.org, HamStudy.org and QRZ.com Practice Amateur Radio Exams.
 - 8 - March 2022:
 - Purchased a Winkeyer WKmini unit and integrated with N1MM+ logger.
 - Started participating in CW Chat meetings on Wednesday evenings and SST contests on Friday and Sundays.
 - I helped another ham with medical issues service a 50' tower supporting a steppIR antenna.
 - March 12th – passed the Extra class exam.
 - 9 - April 9 and 10 – participated in the Georgia QSO party.
- If I can do it, you can too! That's my story and I'm sticking to it.

73s...

Tony, WA3TRA

APRIL VE LICENSE TESTING / Wes Lamboley, W3WL

Slope's Barbeque, as usual, allowed us to use their dining room for the tests, and all who tried were successful in getting what they came for.

David Altman, KO4YLZ, passed his Technician license last month and returned for the General license. He was featured in the March 2022 eNews. As a reminder, he was in the Army and performed 5 letter code groups at 25 WPM. David is looking forward to Field Day and getting back into CW!



David Altman



Matt Hunnemeder

Matt Hunnemeder, KO4EAH upgraded to Extra (with a perfect score, I might add!). He is interested in building gear, and recently restored a Heathkit HW101 that has 20 tubes in it. Matt got started in ham radio during the Covid lockdown and has not been on the air yet, but he soon will be, as he has promised to take part in Field Day from helping set up on Friday to tear down on Sunday and everything in between. Matt is a Chemical Engineer and works for Hoshizaki.

John Samuels passed his Technician license exam. John is employed as an Information Security engineer and got interested in ham radio listening to some of his co-workers. John is 22 years old and recently graduated from college in the UK. John's dad worked for Chevron and John lived in several countries whilst growing up. John enjoys building quad copters and wants to get into Fox hunting. Field Day is on his "must do" list as well.

Help us congratulate these gentlemen by taking a minute to say hello and offer them assistance the next time you see them!



John Samuels

NFARL 45TH Anniversary Celebration / Steve Randall, KO4VW

Now that the Georgia QSO Party is behind us, our next event on May 14 will be our 45th Birthday Celebration and US Islands One Day Getaway event. This will be at West Bank Park at Lake Lanier. This is a special operating event, listed in QST magazine. We will be operating under the club call sign, NF4GA. This will be a great opportunity to show off your portable gear and operating techniques and share information as well as operate and compare equipment. We'd love to see all our SOTA/POTA ops.

This is not just an operating event. This is more importantly an opportunity for all of us to get together and put faces with names and just have a good time. Hopefully many will show up with their significant other. Also feel free to invite others and use this as a way to introduce your friends to Ham Radio, and the people involved. There will be Hot Dogs and Hamburgers and other treats for lunch. Our Chefs will be Dave, KO4USA and Edith, KN4NDV. Feel free to bring anything you'd like to share. We'd all like to try your specialty. Final plans are still underway but the date is certain. The Pavilion number is SL08203.



It would be nice to get a head count as close as possible so we know how much food to bring so we've created a sign up sheet to get an idea of attendance. You can use this link to sign up. <https://docs.google.com/spreadsheets/d/1f9gRWqyonf6Cn2ezz9hku0uhhvk4vKIC22Y148LmJF0/edit?usp=sharing>

We will have a couple radios and antennas set up, but we encourage people to bring their portable equipment to show off, share information and set up and use. There will not be a ridged operation schedule, it's more about fun.

Setup will begin at around 7:00 AM with lunch around Noon or whenever we get hungry. Come when you want as stay as long as you like. We'll try to be out of there by dark.

If you have any questions or suggestions email me at KO4HVW@Gmail.com

Steve
KO4VW

FT8 Signal Reports

I started into FT8 as I do many things. I ignored the manual, set all the knobs to 10 and turned it on. Downloading and running WSJT-X for the first time I was startled to see the computer immediately decode signals – without being connected to the radio! WSJT-X had turned on my computer's microphone and was picking up enough audio from the rig's speaker to decode signals with 100% accuracy. That was encouraging!

After connecting the radio to the computer I noticed the minimum signal report from FT8 was -24 dB and my ears could hear FT8 signals down to about -15 dB *as reported by* the program. Well, okay, obviously the -15 dB signals were not 15 dB below the noise floor as I perceived it; I could hear them after all. If -15 dB wasn't 15 dB below the noise floor, then -24 dB wasn't 24 dB below the noise floor either. That's when I realized I had no idea what FT8 signal reports were. *A persistent misunderstanding about FT8 is it can decode signals 24 dB below the noise floor (as you hear it). It can't.* So, what do the numbers mean?

Unfortunately, a complete answer to that question leads one into the complexities of digital signal processing. Most of us don't understand forward error correction, symbol rate, sync energy fraction, or 7 x 7 Costas arrays. The good news is, understanding FT8 at that level isn't necessary to run the program and appreciate what the signal reports mean.

If proceeding without a complete understanding of FT8 bothers you, it's worth noting that FT8 was invented by Joe Taylor, K1JT. Joe was awarded the Nobel Prize in physics. A lot of the signal processing he used in his ground-breaking astrophysics work is in his ham radio software. No wonder I only half-understand it.

Author's note: This is, by far, the wonkiest *Around the Shack* column to date. Also, it was by far the most difficult to write. It took four days of study before I felt I understood FT8 well enough to explain it in terms a non-technical ham might understand. I may have fallen short. If you stop reading a paragraph or two from now, I understand.

A "Basic Description" of FT8

Understanding enough about FT8 to appreciate what the signal reports mean requires an understanding of several concepts. Here they are:

The first is signal to noise ratio (SNR). Decoding the information content in a signal, whether by your ear (SSB and CW) or by computer (FT8), requires processing the signal that resides within the noise. More signal level for a given amount of noise improves SNR and decoding accuracy. Decreasing noise does the same thing. Only the ratio matters – one divided by the other. In all communications systems, not just ham radio, we strive for the best signal strength we can get, but also for the lowest noise level we can get, to improve SNR. SNR is all that matters.

Next comes a rudimentary understanding of dB. The ratio of two numbers (read: SNR) can be expressed simply as the result of dividing one number by the other, or, using a mathematic conversion (logarithmic), as dB. The denominator in the ratio can be another signal, but FT8 decoding probability is based on the "other signal" being the noise level over an assumed bandwidth. That noise level is the "N" in SNR. Working in dB allows us to calculate and assess SNR in a meaningful way using only addition and subtraction. That might not seem particularly helpful, but an example will illustrate that it is.

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Using dB, signals that are 1000 times stronger or 1000 times weaker than the noise are calculated to have SNRs of +30 dB (stronger) or -30 dB (weaker). How about a signal that is 100,000 times stronger or weaker (0.00001) than the noise? The numbers start to lose meaning as the zeros increase and our eyes strain to count them. How much *is* "100,000 times stronger" and what exactly does that mean? I don't know. In dB, a signal strength 100,000 times the noise is +50 dB. The difference in SNR between two signals 100,000 and 1,000 times the noise is 20 dB (+50 minus +30) which is a factor of 100. I know what that means.

Because of the way logarithmic math works, every signal increase by a factor of 10 adds 10 dB. Every signal increase by a factor of two adds three dB. If FT8 reports two signals, one at -24 dB and the other at -21 dB, that 3 dB difference is a factor of two in signal strength, or more correctly, signal to noise ratio. One signal is twice as strong as the other.

The last concept is frequency shift keying (FSK). Most of us first encounter FSK when starting into RTTY. A RTTY signal is a CW carrier that is shifted back and forth between two frequencies (sometimes called tones). The shifting superimposes information onto the carrier. Early RTTY used 850 Hz shift. Modern RTTY uses 170 Hz shift. Note that the noise within 850 Hz of bandwidth is five times the noise within 170 Hz of bandwidth (850/170). That's a SNR improvement of 7 dB.

Now, finally, on to FT8.

In FT8 we set our radios to USB and send roughly 2.5 KHz of audio to our computer. That's the bandwidth of one SSB signal, give or take. Every 15 second cycle the FT8 algorithm searches the entire 2.5 KHz for every signal it can find and lists them together with a signal report. That report is the SNR of the signal compared to the total noise detected, across what is assumed to be 2,500 Hz of bandwidth.

The FT8 signal is FSK, just like RTTY. Unlike RTTY, FT8 shifts between 8 tones, not two. The modulation scheme is called 8-FSK. In FT8 the frequency shift (tone spacing) is 6.25 Hz. Figure 1 shows the spectrum of an FT8 signal. Eight tones spaced 6.25 Hz apart occupy 50 Hz of total bandwidth (8 X 6.25 Hz = 50 Hz).

Fifty 50 Hz wide signals will fit into 2,500 Hz of bandwidth (2500/50 = 50), hence 50 decodes per cycle is the most we should see. The most decodes I have seen is 55. What's happening? Ah, the magic of advanced signal processing is happening. The FT8 decoding algorithm can cor-

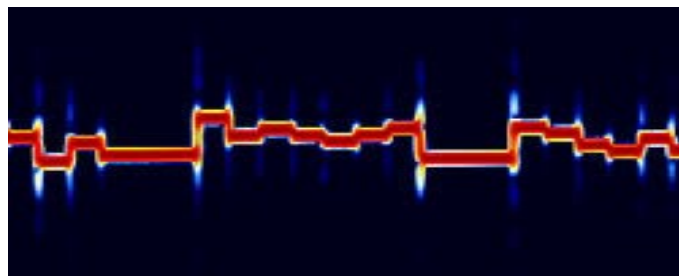


Figure 1. The FT8 waveform. FSK steps are 6.25 Hz.

rectly decode stations that are on top of each other. Its ability to do this greatly exceeds that of a human. Fifty-five or more FT8 QSOs can fit in the bandwidth of one SSB QSO. If nothing else, FT8 is spectrum efficient.

Thank you for your patience - we are near the end. If we assume the noise from our receivers is flat, then to consider how much narrow filtering reduces noise simply requires comparing bandwidths. FT8 uses an assumed bandwidth of 2,500 Hz (typical of SSB). By comparison, the noise in 6.25 Hz (the FT8 computer-based decoding filter) is 6.25/2,500 or .0025 (-26 dB). 26 dB is the theoretical SNR improvement FT8 can achieve by filtering alone. This does not include improvement from advanced signal processing.

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The noise floor is, by definition, a SNR of 1, which is 0 dB. If the narrow decoding filter in FT8 (6.25 Hz) contains 26 dB less noise than the wide bandwidth FT8 uses as a reference (2,500 Hz), FT8 should report signals down to -26 dB and it doesn't. FT8 quits at -24 dB. We have left 2 dB on the table somewhere.

Okay, here's the last question. Why is that? We exult advanced signal processing for its ability to see (hear?) into the noise, only to discover FT8 doesn't work lower than 2 dB above the noise at its decoder. You might have believed FT8 could see 24 dB below the noise before you read this.

The 2 dB discrepancy is caused by many things unrelated to the advantage of narrow FSK. For example, the filters in our radios do not have steep skirts. Also, the noise from our receivers is not constant across 2,500 Hz of bandwidth. FT8 assumes it is, but to a dB or two it isn't. Then there is the as-yet unmentioned elephant in the room – the probability of correct decoding. Correct decoding requires more SNR than detection. "I can hear the voice but can't make out the words." A full understanding of the effects of factors other than bandwidth requires a dive into the deep end of the information theory pool. Let's not go there. Suffice it to say K1JT and company designed FT8 to produce a very high probability of correct decoding and put a hard lower limit on reporting at -24 dB. FT8 messages virtually never contain errors.

Having no message errors comes at a price. There are other programs that decode FT8 and work with weaker signals than WSJT-X. If you use them you will notice they sometimes produce decoding errors. You can have a few extra dB if you are will to accept mistakes. There is no free lunch.

What can you hear?

It's important to realize that the signal reports from WSJT-X (SNR in dB referenced to an *assumed* bandwidth of 2,500 Hz); S-meter readings (an S-number up to S9 then dB above S9) and what you can hear are three different things. As I mentioned, I can hear FT8 signals down to around -15 dB as reported by WSJT-X. Many factors determine what I can hear. For example, my hearing is poor and partially corrected by hearing aids. On the plus side I have been operating CW for over 60 years. The rule-of-thumb for good CW operators is they have a bandwidth of around 50 Hz due to "ear-to-brain" filtering. If you are not a CW op, your internal filtering may not be that good. Or, it might be as good or better if you have music as a profession or avocation. We are all different and our hearing perception varies considerably.

What do the signal reports mean?

The preceding paragraphs only take us so far. They describe what the WSJT-X signal reports are, but not what they mean.

In my view, WSJT-X signal reports do not have meaning in an absolute sense. Yes, the SNR of a given signal is 26 dB better in a noise-bandwidth of 6.25 Hz compared to a noise-bandwidth of 2,500 Hz, but do we care?

The value I see in assessing WSJT-X signal reports is in a relative sense, on both an immediate basis and over time. A -24 dB signal is half the strength of one that is -21 dB. A -14 dB signal is 10 times the strength of one that is -24 dB. That's useful to know. With a better antenna I can improve those reports, independent of the absolute values.

If the band is full of signals between -24 dB and -15 dB, the band may be opening or closing. If signals are around -24 dB from Asia and 10 dB better from Europe, the band may be about to swing

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from Europe to Asia. That thought is confirmed if the Europe reports are going down as the Asia reports are coming up on a relative basis. This is actionable information. Maybe it's time to point the beam toward Asia.

If a signal report that has been consistent on a day-to-day basis changes, there may be a solar storm, something may have raised your local noise floor, or your coax or antenna may be deteriorating. Once again, the WSJT-X signal reports are informative and actionable when viewed on a relative basis.

Summary

I hope you made it to the end. In summary:

SNR is what counts. As we narrow bandwidth the signal remains constant but the noise is decreasing, hence the SNR is going up.

FT8 reports SNR in dB in an assumed bandwidth of 2,500 Hz but decodes in 6.25 Hz of bandwidth. Our ear-brains hear CW in about 50 Hz of bandwidth. There is 26 dB less noise in 6.25 Hz of bandwidth than there is in 2,500 Hz of bandwidth.

To yield error-free decoding (and for many other reasons), the WSJT-X FT8 decoding algorithm operates above its noise floor. *Not 24 dB below the noise floor!*

Programs other than WSJT-X will decode weaker signals at the expense of accuracy.

FT8 is spectrum efficient. More than 50 QSOs will fit in the space of one SSB QSO.

Last but not least, FT8 signal reports have useful meaning on a relative basis, but, in my opinion, little utility on an absolute basis.

Further Reading

The WSJT-X help files are a good place to learn about FT8, its modulation characteristics and signal reporting.

Joe Taylor, K1JT; Steve Franke, K9AN; and Bill Somerville, G4WJS published a valuable two part article in QST in 2017:

Work the World with WSJT-X, Part 1: Operating Capabilities. QST October, 2017.

Work the Word with WSJT-X, Part 2: Codes, Modes, and Cooperative Software Development. QST November, 2017.

The above articles are in the QST on-line archive.

There is an excellent slide presentation explaining FT8 signal reports - authored by Jim Frazier, KC5RUO. It can be found on-line at:

<https://tapr.org/pdf/DCC2018-KC5RUO-TheReal-FT8-JT65-JT9=SNR.pdf>

Warning: Jim's slides and Part 2 of the QST article are a level deeper than this column.

If you wish to gain a complete understanding of FT8, I recommend: *The FT8 and FT4 Communications Protocols*, by Joe Taylor, K1JT; Steve Franke, K9AN; and Bill Somerville, G4WJS. *QEX Magazine*, July/August, 2020.

QEX is available in the ARRL's on-line archives. Bring your best math.

73,

Hal N4GG/4

Extra Extra! / From the Extra Class Question Pool

New info for Technicians and Generals and a refresher for Extra Class Licensees!



E1A06 — Where must the carrier frequency of a CW signal be set to comply with FCC rules for 60 meter operation?

- A.) At the lowest frequency of the channel
- B.) At the center frequency of the channel
- C.) At the highest frequency of the channel
- D.) On any frequency where the signal's sidebands are within the channel

See answer on the last page!

The new Amateur Extra-class license examination question pool, effective from July 1, 2020, through June 30, 2024, has been released and is available at the National Conference of Volunteer Coordinators (NCVEC) [website](#). Note the new Technician class license examination question pool will be effective July 1, 2022.

Ian NV4C and his team hold license test sessions on the second Saturday of each month. For more information including upcoming test dates, [click here](#).

Wanted: NFARL eNEWS Editor

Want to be involved in producing the NFARL eNEWS? We would like to have more members involved in the publication each month. We're interested in someone who is willing to become the editor / compiler / producer / reporter / or whatever help you can provide supporter! There are several regular contributors to the monthly NFARL eNEWS publications. However, we want more input and articles so we can provide a broad base of information associated with the club and ham radio. Please consider what you might be able to provide. You don't need to be a professional writer (we aren't!) and you don't need to contribute every month. Just send us your information / articles when you can and we'll work with you to get them published.

Thanks for your consideration in this matter! If you've any questions, please feel free to contact us at enews@nfarl.org

Contest Corner

These are some contests and events including the "routine K1USN, and other organizational events" scheduled to occur the near future.

Go to [WA7BNM Contest Calendar: 5-Week Calendar at https://contestcalendar.com/fivewkcal.html](https://contestcalendar.com/fivewkcal.html)

Contest Name	Time & Date
+ K1USN Slow Speed Test	0000Z-0100Z, Monday (Apr 18)
+ CWops Test	1300Z-1400Z, Wednesday (Apr 20)
+ CWops Test	1900Z-2000Z, Wednesday (Apr 20)
+ CWops Test	0300Z-0400Z, Thursday (Apr 21)
+ CWops Test	0700Z-0800Z, Thursday (Apr 21)
+ Walk for the Bacon QRP Contest	0000Z-0100Z, Apr 21 & 0200Z-0300Z, Apr 22
+ 10-10 Int. Spring Contest, Digital	0001Z, Apr 23 to 2359Z, Apr 24
+ North American SSB Sprint Contest	0000Z-0400Z, Apr 24
+ QCX Challenge	1300Z-1400Z, Apr 25
+ QCX Challenge	1900Z-2000Z, Apr 25
+ QCX Challenge	0300Z-0400Z, Apr 26
+ SKCC Sprint	0000Z-0200Z, Apr 27
+ CWops Test	1300Z-1400Z, Wednesday (Apr 27)
+ CWops Test	1900Z-2000Z, Wednesday (Apr 27)
+ CWops Test	0300Z-0400Z, Thursday (Apr 28)
+ CWops Test	0700Z-0800Z, Thursday (Apr 28)
+ Florida QSO Party	1600Z, Apr 30 to 0159Z, May 1 & 1200Z-2159Z, May 1
+ CWops Test	1300Z-1400Z, May 4, 2022
+ CWops Test	1900Z-2000Z, May 4, 2022
+ Walk for the Bacon QRP Contest	0000Z-0100Z, May 5 & 0200Z-0300Z, May 6
+ CWops Test	0300Z-0400Z, May 5, 2022
+ CWops Test	0700Z-0800Z, May 5, 2022
+ SKCC Weekend Sprintathon	1200Z, May 7 to 2400Z, May 8
+ 7th Call Area QSO Party	1300Z, May 7 to 0700Z, May 8
+ Indiana QSO Party	1500Z, May 7 to 0300Z, May 8
+ Delaware QSO Party	1700Z, May 7 to 2359Z, May 8
+ New England QSO Party	2000Z, May 7 to 0500Z, May 8 & 1300Z-2400Z, May 8
+ CWops Test	1300Z-1400Z, May 11, 2022
+ CWops Test	1900Z-2000Z, May 11, 2022
+ CWops Test	0300Z-0400Z, May 12, 2022
+ CWops Test	0700Z-0800Z, May 12, 2022
+ Canadian Prairies QSO Party	1700Z, May 14 to 0300Z, May 15
+ 50 MHz Spring Sprint	2300Z, May 14 to 0300Z, May 15
+ Run for the Bacon QRP Contest	2300Z, May 15 to 0100Z, May 16
+ CWops Test	1300Z-1400Z, May 18, 2022
+ CWops Test	1900Z-2000Z, May 18, 2022
+ Walk for the Bacon QRP Contest	0000Z-0100Z, May 19 & 0200Z-0300Z, May 20
+ CWops Test	0300Z-0400Z, May 19, 2022
+ CWops Test	0700Z-0800Z, May 19, 2022
+ Arkansas QSO Party	1400Z, May 21 to 0200Z, May 22

NFARL Upcoming Events and Dates

- **Every Sunday — NFARES net** - 8:30 PM - 147.06 MHz (+) PL 100
All licensed hams are welcome, you do not need to be an ARES member!
Check [NFARES.org](https://www.nfares.org) for more information.
- **Every Monday — Tech Talk** - 8:30 PM - 145.47 MHz (-) PL 100
NFARL's flagship technical based "non check-in" net. The net is always better when using the web based chat room (Discord) but Internet is not required to join the net.
Check [NFARL Nets](#) for more information and "how to". Here's the link to the NFARL server on Discord web app <https://discord.gg/spr2a9D>
- **Every Wednesday — Hungry Hams Lunch Bunch** - 11:15 AM
Location: Slope's BBQ, 34 East Crossville Road, Roswell, GA 30075
(770) 518-7000
Dining Room is OPEN. Get Take Out if you can't stay!
- **Every Thursday — YL Net** – 8:00 PM - 9:30 PM - 145.47 MHz (-) PL 100
Check NFARL Nets [website](#) for "how to." This is a great opportunity for YL's to get on the radio with other YL's! OM's (guys) are welcome to listen in to this YL net.
- **Every Wednesday — CW CHAT** – 8:00 PM on ZOOM.
New meeting link and credentials:
<https://us06web.zoom.us/j/84722087419?wd=VIN2d0xvQVhKcDIUL0R4N1hQMTQ2UT09>
Meeting ID: 847 2208 7419; Passcode: CW-CHAT
- **Every Saturday — Royal Order of the Olde Geezers "Breakfast"** -
This informal breakfast group on Saturday mornings is **NOT MEETING IN PERSON** during the COVID issue. A notice will be made when in-person meetings commence again.
- **Second Tuesday — NFARES Meeting - May 10, 2022 Presently- Online meetings only.** Check [NFARES.org](https://www.nfares.org) for more information.
- **Second Saturday – VE Testing - NFARL May 14, 2022 session:**
By reservation only. See the "[Test Sessions](#)" web page for details & registration process. Contact Ian at nv4c.ian@gmail.com for questions / concerns / reservations.
- **Third Tuesday— NFARL Club Meeting** - April 19, 2022, 7:30 PM
Live meeting! Preston Ridge Community Center - Zoom Included!
—April 2022 Meeting: "Node Red" (see Page 1)
Door opens at 7 PM for Social Networking. Meeting begins at 7:30 PM
- **Fourth Tuesday – NFARL Executive Team Meeting** - April 26, 2022, 7:00 PM.
Online meeting only — monitor website and NFARL Groups.io reflector for updates.
- **NFARL 45TH Anniversary Celebration / US Islands 1DG** — May 14, 2022, 8AM-7PM
West Bank Park, Lake Lanier, GA. Park pavilion SL08203 (See Page 10)

Contact Us

President	John Norris N4IHV	President@nfarl.org
Vice President	Mike Riley KN4OAK	VicePresident@nfarl.org
Secretary	Martha Muir W4MSA	Secretary@nfarl.org
Treasurer	John Tramontanis N4TOL	Treasurer@nfarl.org
Activities Chair	Steve Randall K04VW	Activities@nfarl.org
Membership Chair	Wes Lamboley W3WL	Membership@nfarl.org
Past President	Daryl Young K4RGK	PastPresident@nfarl.org
Mentors / Elmers	John Hathcock WE4AUB	Elmers@nfarl.org
Field Day Chair	Mike Riley KN4OAK	FieldDay@nfarl.org
Scout Coordinator	Jon Wittlin K4WIT	k4wit@nfarl.org
ARES Liaison and Community Relations	Jim Paine N4SEC	n4sec@nfarl.org
Repeater Operations	Mike Roden K5JR	Repeaters@nfarl.org
Web Master	Bill Cobb K4YJJ	Webmaster@nfarl.org
eNews Team	Help Wanted!!	enews@nfarl.org

North Fulton Amateur Radio League

P.O. Box 1741
Roswell, GA 30077

nfarl.org

eNEWS can be located online at:
<https://nfarl.org/enews-index>

Club Repeaters

Frequency—Description	P.L. Tone	Location
145.470 (-) EchoLink Node 560686 NF4GA-R	100 Hz	Morgan Falls
147.060 (+) Primary ARES Repeater	100 Hz	Roswell Water Tower
* 224.620 (-) Joint Venture with MATPARC	100 Hz	TBD
443.150 (+)	100 Hz	Roswell Water Tower
444.475 (+)	100 Hz	Morgan Falls
* 927.0125 (-)	146.2 Hz	TBD

* Currently off the air

Club Call signs: NF4GA and K4JJ

Extra Extra answer: B (question E1A06)

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