



FT8 - DXing in the Real World

Practical Operating Techniques for DX Success

Presentation to Rowan ARS - Apr. 2026



AI2F, Christopher Krstanovic, PhD - Member ARRL, RARS, CARS

Presentation for all License Classes

Agenda

Presentation Content:

1. FT8 Background and how to use it - AI2F
2. FT8 Setup, Equipment and details - KR4DRH
3. Live Demonstration - 40m



FT8/4 is NOT Killing Amateur Radio

- ✓ Mimic DX or Contest Exchanges
- ✓ RF propagation, technical knowledge, experimentation, and communication
- ✓ Core elements of amateur radio

- What is FT8? Description and Properties
- How FT8 Works and Implementation
- How to use FT8 for DXing
- POWER, AGC, Audio etc.
- Antenna Choices
- Reading the Bands
- Software, Software, Software...
- Situational Awareness in DX Environment
- Bands, Propagation and GrayLine Matters
- Great Expectations
- Questions and Discussion



INTRODUCTION

- Digital communication mode.
- FT8 was designed *specifically* for weak-signal, long-distance communication
- Only the most basic info is exchanged – call, report & grid square
- FT8 is a pure DX animal!
- Most basic setup: Sound card to Rig Mic and Phones

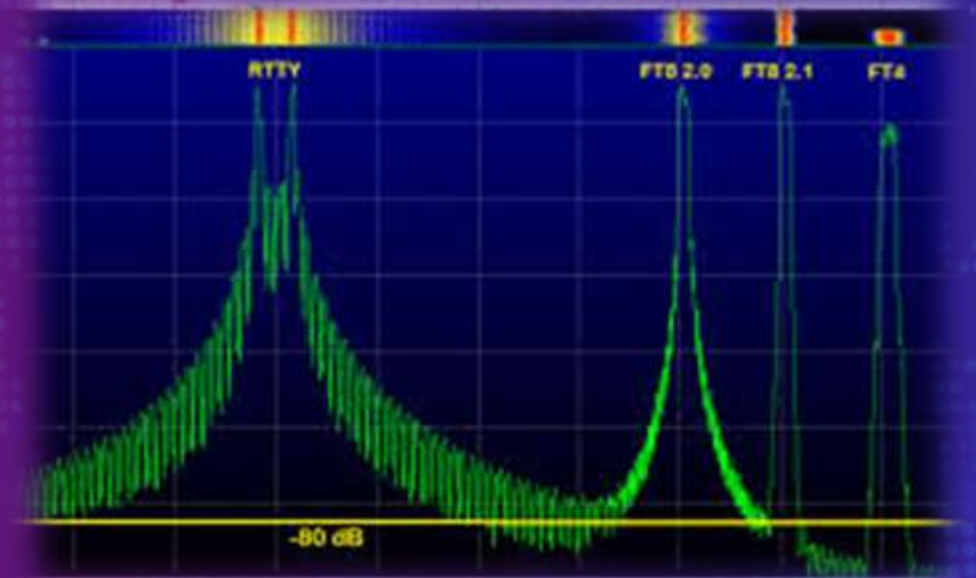
Optimized for:

Very low signal-to-noise ratios
Long-haul ionospheric paths
Marginal and closing band conditions

FT8 is not a general-purpose digital mode

1. Think of FT8 as a *DX instrument*, not a rag-chew mode
2. FT8 enables DX when SSB and often even CW fail
3. It shifts emphasis from voice or fist to precision and discipline

FT8 Is a DX Tool by Design



What FT8 Is (and What It Is Not)

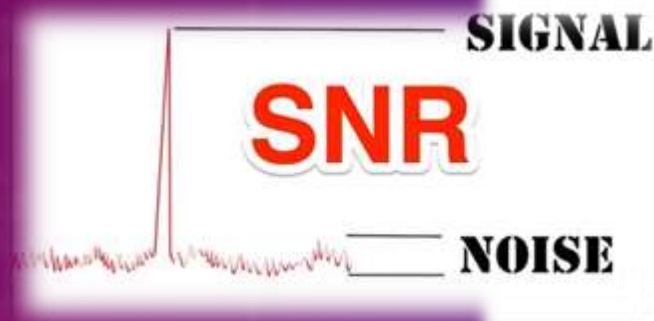
Weak-signal digital mode designed for *reliable decoding*, not conversation

1. Mainstream digital modulation mode
2. Usually completes a QSO in 90 seconds
3. 4 times faster than JT65 or JT9
4. 8-FSK, Constant-envelope waveform

FT8 does *not* replace good operating skills

Optimized for:

- ✓ Low SNR paths
- ✓ Modest antennas
- ✓ Urban noise environments



Weak-Signal Signal/Noise Ratio

| | | |
|------|--------|-------------|
| SSB | +10 dB | |
| CW | -15 dB | ---CW Note* |
| FT8 | -21 dB | |
| JT65 | -25 dB | |
| JT9 | -27 dB | |
| WSPR | -31 dB | |

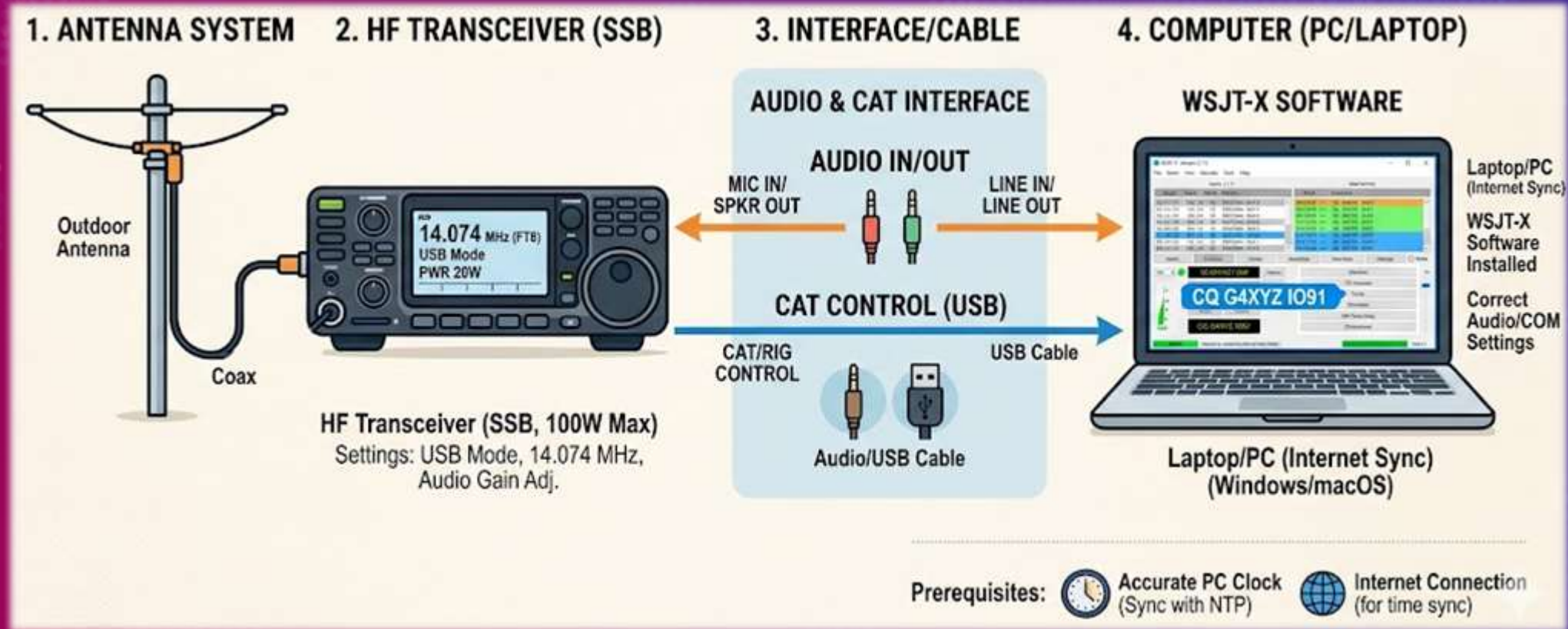
* 2500 Hz bandwidth

Doubling power results in a 3 dB increase in SNR
31dB difference is about $2^{10} = 1,024$
1W FT8 vs 1,024W SSB



MOST BASIC SETUP

You probably already have everything you need:



How and Why FT8 Works

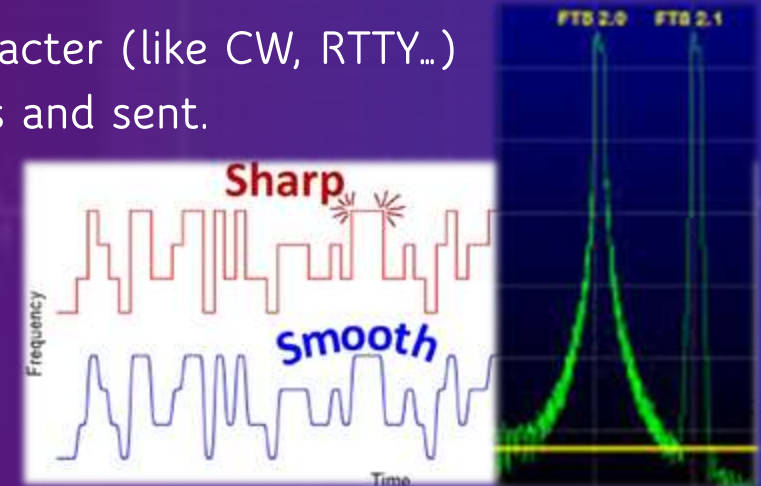
Operating Principles

1. Transmission is only 50Hz wide, in a precisely crafted envelope.
2. FT8 does not simply encode and transmit messages character-by-character (like CW, RTTY...)
3. The entire message is encoded first, *as a block*, compressed to 77 bits and sent.
4. Each message is sent along with error correction and takes 12.6s.
5. 77 bits imposes a constraint how much can be sent in a message.
6. Messages are sent in 15s, precisely timed slots.
7. 4 slots per minute: Odd and Even slots.

What is exchanged:

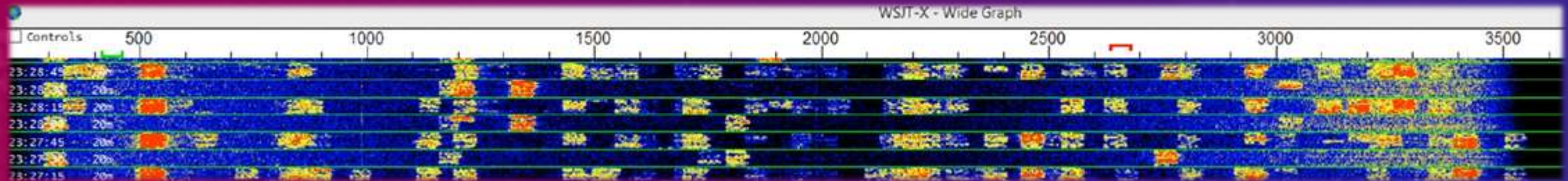
- ✓ Call Signs
- ✓ SNR Reports
- ✓ Grid Square (4 chr)
- ✓ 73s

| | | |
|-------------------|----------------------------------|------|
| W4KZK ZL2IFB RF80 | <input type="radio"/> | Tx 1 |
| W4KZK ZL2IFB -15 | <input type="radio"/> | Tx 2 |
| W4KZK ZL2IFB R-15 | <input type="radio"/> | Tx 3 |
| W4KZK ZL2IFB RRR | <input type="radio"/> | Tx 4 |
| W4KZK ZL2IFB 73 | <input type="radio"/> | Tx 5 |
| CQ ZL2IFB RF80 | <input checked="" type="radio"/> | Tx 6 |



FT8 Implementation

FT8 is transmitted in a single 50Hz slot in ~3500Hz wide designated blocks. Each block has ~2 x 64 slots



- FT8/4 blocks are located at pre-determined frequencies on each band.
- Special events may designate their own frequencies (DXpeditions etc.)
- Always transmitted USB, irrespective of the band!
- Split operation is preferred by most FT8 DXers.
- Even and odd periods are orthogonal and should be considered separately.

| FT8 | FT4 |
|--------|--------|
| 1.84 | None |
| 3.573 | 3.575 |
| 5.357 | None |
| 7.074 | 7.0475 |
| 10.136 | 10.14 |
| 14.074 | 14.08 |
| 18.1 | 18.104 |
| 21.074 | 21.14 |
| 24.915 | 24.919 |
| 28.074 | 28.18 |

Tech License ==>



SNR vs. Signal Strength Explained

We are used to thinking in terms of Signal Strength (S-Units)

- Why? Intuitive: strong signal will have a good SNR
- FT8/4 Reporting is SNR based, not S-units!
- Identical stations can report different SNRs due to differing noise floors.

Consider the following example:

- The signal strengths are equal at both ends
- The noise background is not!
- Thus the SNR will be different at two ends



Easy Decode (SNR=-12db)

No Decode (SNR<-24db)

| SNR (db) | Type | QSO Probability | Comment |
|----------------|-------------|-----------------|--|
| > -5db | Very Strong | 100% | Certain QSO |
| -5db to -10db | Strong | 100% | Certain QSO |
| -10db to -15db | Moderate | 80% | Good chance for QSO |
| -15db to -18db | Weak | 50% | Decent chance of a QSO |
| < -18db | Very Weak | 25% | Possible, but iffy - depends on his conditions |

Weak Signal Does *Not* Mean Low Power

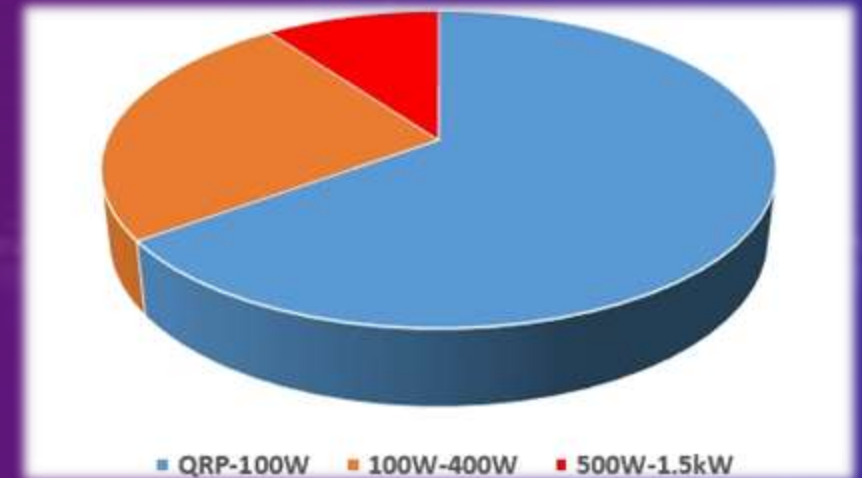
"Weak signal" refers to received signal at the DX station, not transmitter output

FT8 does *not* mean QRP or Low Power!!!

Many successful DX stations run:

High Power

High-gain antennas



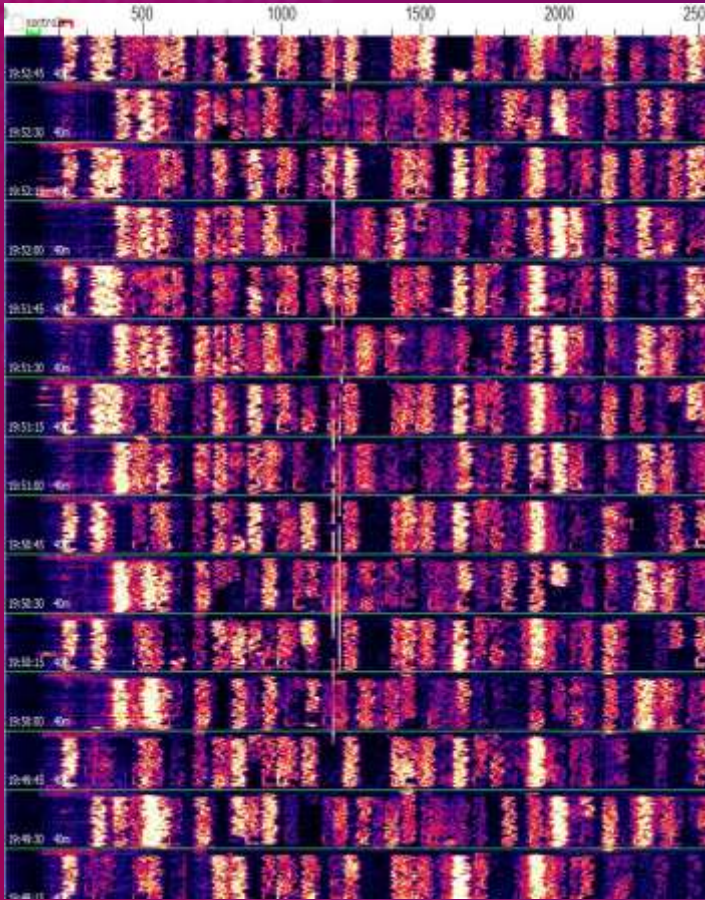
FT8 simply allows *decoding of signals that would otherwise be unusable*

Key point:

Power (ERP) helps – *after* signal quality, timing, and frequency discipline



DX Reality Check



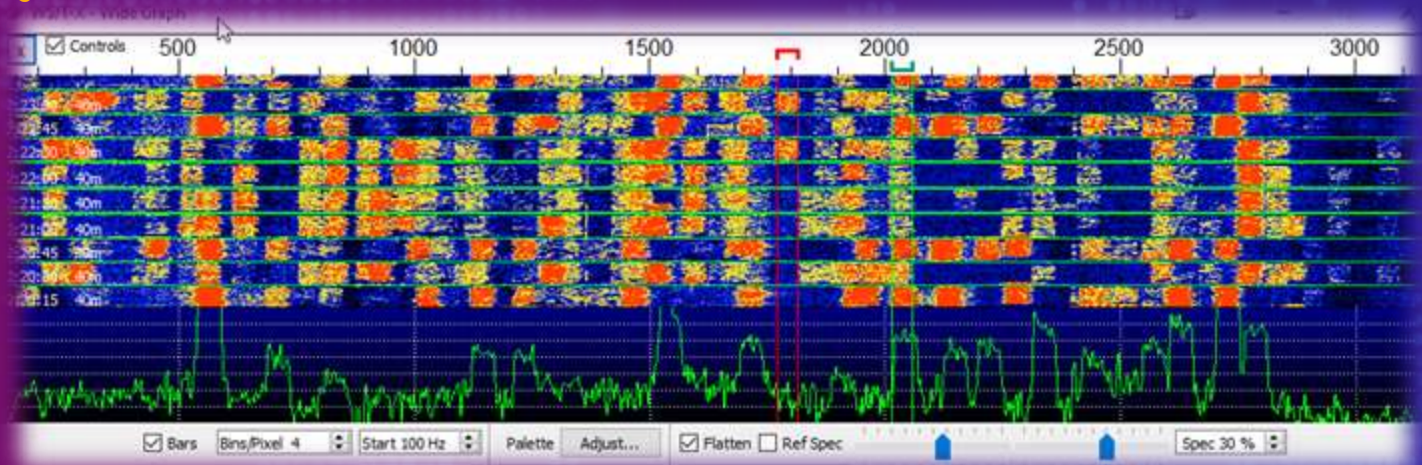
FT8 doesn't make DX "easy"

It makes it possible when otherwise impossible

- DX stations hear many callers!
- Decoding does *not* mean being heard
- Smart slot selection beats calling on the "loud pile"
- Watching the DX operator's pattern improves success (his noise situation)
- Skillful calling beats brute force... but force and antenna does help!

Listen First - Finding Your Transmit Slot

- Successful FT8 DX starts with *listening*, not transmitting
 - Watch the waterfall to identify open transmit slots
 - Make sure slot is open for your transmission!
 - Last resort: squeeze between two adjacent slots – look for biggest gap
 - In pileup, observe other station's TX frequencies
 - Those slots will likely be available when they are done
 - Avoid calling on top of ongoing QSOs
 - Free slots can:
 - Appear and disappear quickly
 - Change as pileups shift
 - If they don't respond – change the slot
- Re-check slot availability often!



Operating reality:

The best FT8 operators spend more time *observing* than transmitting



How to Answer DX Correctly

Band Activity

| UTC | dB | DT | Freq | Message |
|--------|-----|------|------|--|
| 222230 | -6 | 0.2 | 882 | ~ W4EDL N41UA 73 U.S.A. [IN] |
| 222230 | -12 | 0.1 | 2317 | ~ CQ II2WOG JN45 Italy [4508mi] |
| 222230 | -13 | 0.3 | 1853 | ~ ZS1WC LA0FA R-22 Norway |
| 222230 | -8 | -0.2 | 2253 | ~ ZS1WC IU8HAO JM88 Italy [5105mi] |
| 222230 | -20 | 0.2 | 1213 | ~ W4EDL S56UVB JN76 Slovenia [4731mi] |
| 222230 | -5 | 0.3 | 2571 | ~ CQ E78W JN94 Bosnia-Herzegovina |
| 222230 | -10 | 0.1 | 1267 | ~ PI4DX AC9HP EM69 U.S.A. [IN] [444mi] |
| 222230 | 9 | 0.4 | 1495 | ~ CQ K4BTR EM57 U.S.A. [AL] [489mi] |
| 222230 | -19 | 0.6 | 2412 | ~ VA2WM G4RWD IO92 England [3908mi] |
| 222230 | -18 | 0.2 | 3050 | ~ JP7AWQ SV1EMY 73 Greece |
| 222230 | -20 | 0.3 | 1363 | ~ HL5BMX E71DK JN94 Bosnia-Herzegovina |
| 222230 | -8 | -0.5 | 2814 | ~ JA6VQA OK1TNM -09 Czech Rep. |
| 222230 | -2 | 0.1 | 215 | ~ BH1LKO IV3DXW R-11 Italy |
| 222230 | -14 | 0.1 | 2570 | ~ PA3ADE IT9HJQ -13 Italy |
| 222230 | -6 | 0.5 | 1005 | ~ <G6LTT> 4U13FEB RR73 Italy |
| 222230 | -17 | 0.5 | 2617 | ~ JAS5AUC PY2IQ GG66 CQ Zone 11 [4622mi] |
| 222230 | -7 | 0.2 | 760 | ~ CX2CC EA1IOK IN62 Spain [3854mi] |
| 222230 | -21 | 0.2 | 582 | ~ JE4JPQ SP9AU 73 Poland |
| 222230 | -7 | 0.2 | 815 | ~ 6M0MM F1PBZ R-18 France |
| 222230 | -11 | 0.5 | 1309 | ~ CQ JA IK4PLW JN64 Italy [4714mi] |
| 222230 | -2 | 0.2 | 1461 | ~ AI2F F5RRS JN36 France [4392mi] |
| 222230 | -18 | 0.2 | 876 | ~ Z35YL F1HSY JN25 France [4333mi] |
| 222230 | -10 | -0.1 | 759 | ~ KE8X F5NNN IN94 France [4089mi] |
| 222230 | -5 | 0.1 | 1446 | ~ CQ EA5KB IM99 Spain [4222mi] |
| 222230 | -19 | 0.3 | 908 | ~ SP6FME G6ORT -09 England |

Rx Frequency

| UTC | dB | DT | Freq | Message |
|--------|-----|-----|------|--------------------------------|
| 222000 | -9 | 0.2 | 1654 | ~ <...> HG8UEME |
| 222030 | -9 | 0.1 | 2010 | ~ CQ ZA/IW2JOP Albe |
| 222100 | -7 | 0.1 | 2010 | ~ KD9TAW <ZA/IW2JOP> -15 |
| 222115 | Tx | | 1770 | ~ <ZA/IW2JOP> AI2F EM95 |
| 222130 | -9 | 0.1 | 2010 | ~ AI2F <ZA/IW2JOP> -16 |
| 222145 | Tx | | 1770 | ~ <ZA/IW2JOP> AI2F R-09 |
| 222200 | -10 | 0.1 | 2012 | ~ AI2F RR73; K4SXT <ZA/IW2JOP> |
| 222215 | Tx | | 1770 | ~ CQ AI2F EM95 |
| 222230 | -10 | 0.1 | 2012 | ~ <KD9TAW> ZA/IW2JOP RR73 |
| 222230 | -3 | 0.2 | 1769 | ~ AI2F IK2XDE JN45 |
| 222230 | -2 | 0.2 | 1461 | ~ AI2F F5RRS JN36 |

1 2 3 Filtering Prefixes States Ignore Alerts Done

Gen Msgs Tx 1

Rep -9 Tx 2

Tx 3

Tx 4

Lookup ZA/IW2JOP <AI2F> 73 Tx 5

Add CQ AI2F EM95 Tx 6

- Observe first – find TX slot!
- Call and listen
- Know when to stop calling

..... CQ DX CQ DX



How Not to Answer DX



- Don't reply immediately without checking for TX slot
Yeah, I know it is hard...
- On his TX frequency (same slot).
- Pileup: Failing to watch before transmitting
The best DXers will watch a pileup for a few minutes before clicking anything
- Ignoring DX instructions
If the DX calls "CQ AF", "CQ NONA" or "CQ NOUS" DON'T answer it. It is considered rude!
- Calling when DX is answering someone else

How to Call CQ (DX)

- Observe first least a couple of cycles – find a clear TX slot!
- If you are having trouble from a station, it helps to synchronize to his TX
- Call and listen
- Know when to stop calling... and change your slot!
- Be specific:

CQ AI2F EQ95

CQ DX AI2F EQ95

CQ ASIA AI2F EQ95 or CQ ASAF AI2F EQ95

CQ IOTA/SOTA/POTA AI2F EQ95 – Indicating your condition

CQ VKZL AI2F EQ95 – Specific Inclusions

CQ **NONA/NOUS/NOEU** AI2F EQ95 – Specific Exclusion – **Very Effective!**

- Look at the answering stations and decide who to answer.
- Getting “73” at the end is a nice confirmation, but not strictly necessary.



POWER – is good, but...

FT8 favors linearity; overdrive reduces decode probability!

Power: More is not always better



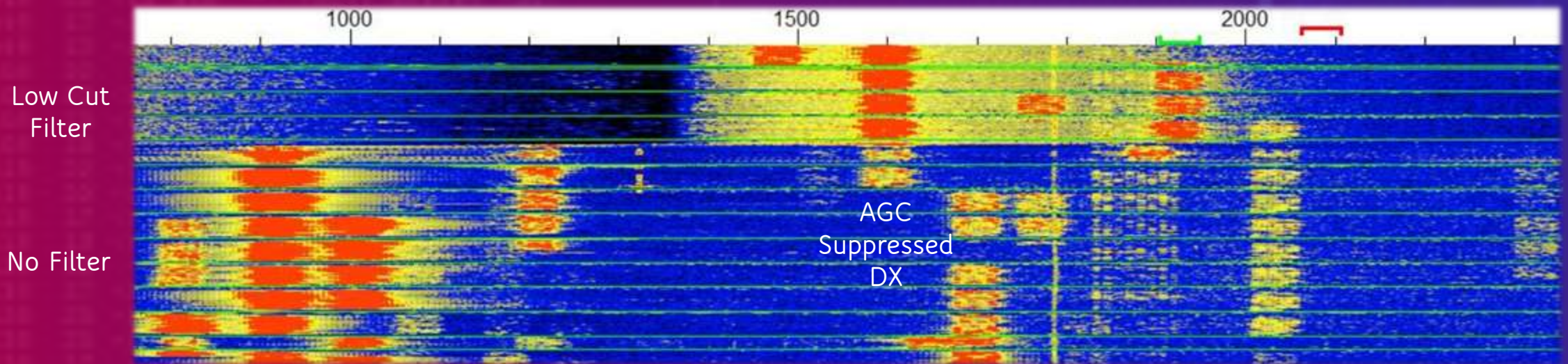
- Overdriven signals reduce decode probability!
- Power helps (a lot)–but only after:
 - ✓ Clean Audio
 - ✓ Proper ALC Behavior
- However, the fact is - ERP helps. Example:
600W/Yagi vs. 30W/EFHW = ~18db delta!
SNR Difference: -8db vs. -25db

FT8's high duty cycle puts sustained stress on transmitter finals, so reduce power for long runs (1/3rd Rule):

- Limit a 100W Rig to about 30-40W on prolonged FT8 and monitor finals temperature.
- Limit a 1500W Amp to about 400-600W on prolonged FT8 and increase blower speed if possible.

AGC and Filtering

- ✓ AGC ideally OFF, but in reality best to use Fast or Medium unless your RX Dynamic range is really, really good. Why?
- ✓ AGC Settings: Rig dependent, but for most use AGC, unless the band is very quiet.
- ✓ Filtering can help remove strong stations. Notch is very useful.

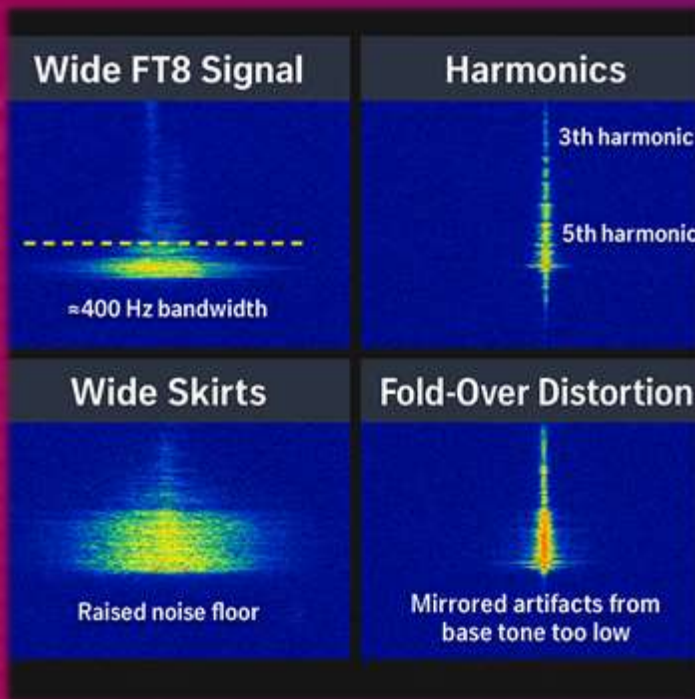


Strong Local
Stations

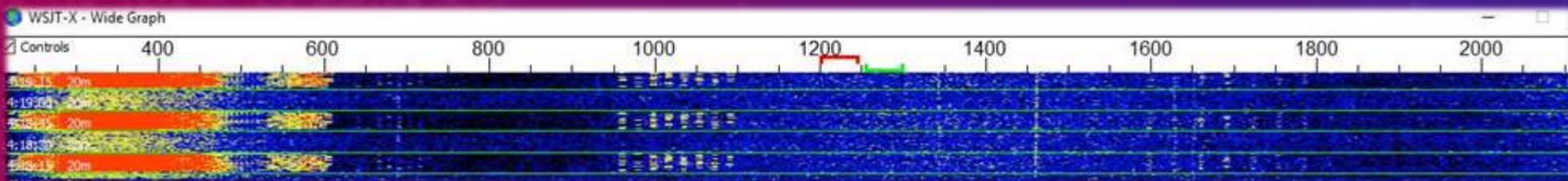
Audio Chain Discipline

Set levels once, then leave them alone!

- ✓ TX: No compression, audio processing or DSP
- ✓ RX: Turn off Noise Blanker and NR



- On some rigs, the ALC meter is, in effect, a distortion meter
- Watch ALC like a hawk
- Some OMs do report good results with the rig's DSP NR



Wide and Raised
Noise Floor

3rd Harmonic

5th Harmonic



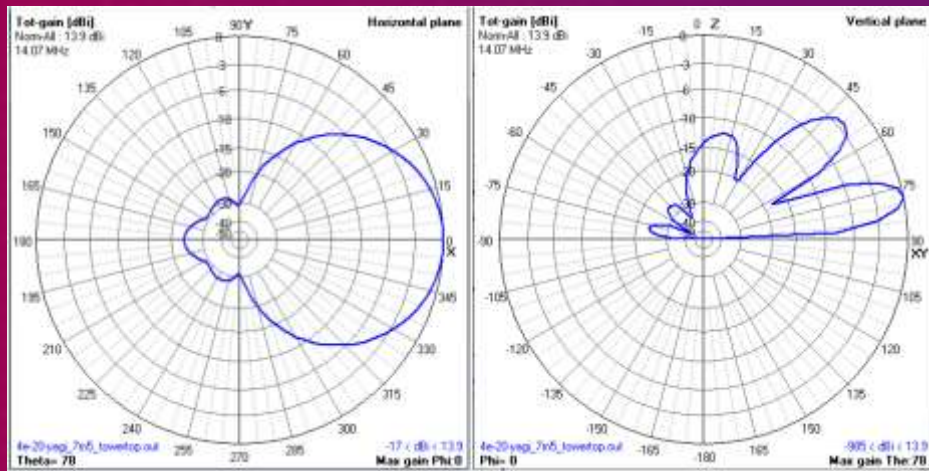
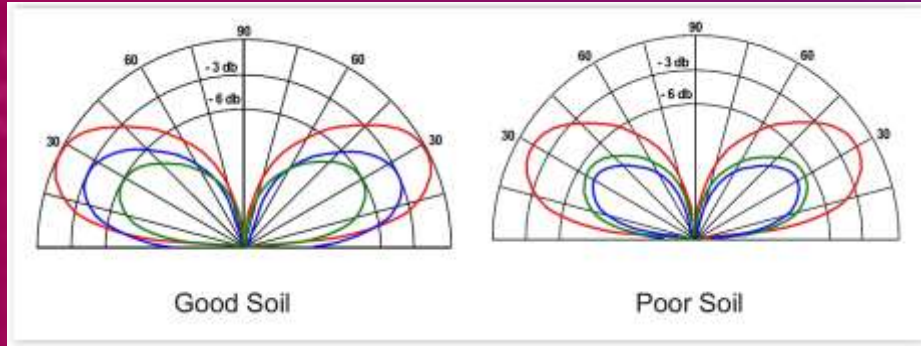
Things to Watch Out For:



- ✓ Microphone! The Cough Gauge...
- ✓ Computer Audio – don't TX: PC mic, announcements, Youtube, PC dongs etc.
- ✓ Monitor your TX if possible to hear what is going out.
- ✓ Make sure your clock is synced to UTC – 0.5s or better.
- ✓ Transmitting at 100% duty cycle for 15 seconds may cook your finals. Check TRX manual.



Antenna Choices



❖ Dipoles (and Derivatives):

- Need Height for best DX (>0.5 wave)!
- Excellent DX when propagation cooperates
- Weak at 90 degrees – orientation matters

❖ Verticals:

- Strong low-angle radiation – DX
- Omnidirectional & low gain
- Susceptible to noise

❖ Beams:

- Directionality & Gain help a lot



Height and location ALWAYS matter!

Software Stack

❖ Base Software (and Derivatives):

- WSJT-X, WSJT-Z, WSJT-Improved
- JTDX: Variant with helpful UI tweaks + GridTracker Features
- MSHV: Make several QSOs in parallel (DXpeditions)

❖ Helper Applications:

- GridTracker2
- JTAlert
- PSK Reporter (web browser)
- MacLoggerDX / RUMlogNG

❖ Loggers:

- Too many to list: Log4OM, N1MM, DX Lab Suite, *Ham Radio Deluxe*, N3FJP



Situational Awareness in DX Environment

| Callsign | dB ▼ | Calling | DXCC | State | Freq | Grid | LoTW | eQSL | OQRS | Age | Life | CQz | Cont | ITUz | Dist (mi) | DT |
|-----------|------|---------|--------------------|-------|------|------|------|------|------|--------|--------|-----|------|------|-----------|-------|
| EA1DR | -1 | CQ | Spain | | 1974 | IN82 | ✓ | ✓ | | 56s | 3m 52s | 14 | EU | 37 | 4034 | 0.10 |
| F1PBZ | -1 | JE4JPQ | France | | 807 | | | | | 26s | 26s | 14 | EU | 27 | | 0.20 |
| M0ILT | -1 | CQ | England | | 1570 | IO80 | ✓ | ✓ | | 1m 56s | 3m 56s | 14 | EU | 27 | 3854 | 0.10 |
| EA5KB | -2 | CQ | Spain | | 1441 | IM99 | ✓ | ✓ | | 26s | 3m 53s | 14 | EU | 37 | 4211 | 0.10 |
| F6HRP | -3 | CQ | France | | 1907 | IN88 | ✓ | ✓ | | 26s | 1m 55s | 14 | EU | 27 | 3895 | 0.40 |
| F5RRS | -4 | BI6PWL | France | | 1455 | JN36 | ✓ | ✓ | | 24s | 3m 40s | 14 | EU | 27 | 4380 | 0.20 |
| ZA/W2JOP | -5 | RR73 | Albania | | 2007 | | ✓ | ✓ | | 55s | 3m 51s | 15 | EU | 28 | | 0.10 |
| F5NNN | -5 | M9NED | France | | 753 | IN94 | ✓ | ✓ | | 23s | 3m 53s | 14 | EU | 27 | 4077 | -0.10 |
| IU8HAO | -5 | ZS1WC | Italy | | 2799 | JM88 | ✓ | ✓ | ✓ | 26s | 1m 23s | 15 | EU | 28 | 5092 | 0.00 |
| G8TJQ | -6 | CQ | England | | 1826 | IO90 | ✓ | ✓ | | 56s | 3m 56s | 14 | EU | 27 | 3938 | -0.20 |
| E78W | -7 | CQ | Bosnia-Herzegovina | | 2594 | JN94 | ✓ | ✓ | | 25s | 1m 56s | 15 | EU | 28 | 4955 | 0.30 |
| OK1TNM | -7 | CQ | Czech Republic | | 2810 | JO70 | ✓ | ✓ | | 24s | 3m 52s | 15 | EU | 28 | 4585 | -0.50 |
| SP5AA | -8 | K5EK | Poland | | 1887 | JO92 | ✓ | ✓ | | 24s | 1m 25s | 15 | EU | 28 | 4669 | 0.10 |
| HA1BF | -8 | JH2XJV | Hungary | | 1419 | JN86 | | | | 23s | 2m 22s | 15 | EU | 28 | 4800 | 0.20 |
| I1ZWOG | -9 | LY5J | Italy | | 2312 | | | | | 56s | 3m 53s | 15 | EU | 28 | | 0.10 |
| F5RAV | -9 | HL5BMX | France | | 1083 | JN09 | ✓ | ✓ | | 1m 55s | 3m 53s | 14 | EU | 27 | 4045 | 0.00 |
| ZV8PI | -10 | CQ | Brazil | | 1002 | GI84 | | | | 56s | 2m 56s | 11 | SA | 13 | 3741 | 0.20 |
| G6PWY | -10 | N2XK | England | | 2602 | IO94 | ✓ | ✓ | | 24s | 3m 53s | 14 | EU | 27 | 3860 | 0.20 |
| IU1UIC | -11 | RR73 | Italy | | 401 | | ✓ | | | 56s | 1m 23s | 15 | EU | 28 | | 0.10 |
| DL9KM | -12 | JE4JPQ | Germany | | 1358 | JN68 | ✓ | ✓ | | 24s | 24s | 14 | EU | 28 | 4570 | 0.10 |
| LA0FA | -13 | ZS1WC | Norway | | 2225 | JO59 | ✓ | ✓ | | 25s | 1m 55s | 14 | EU | 18 | 4181 | 0.30 |
| IK4PLW | -13 | CQ JA | Italy | | 1304 | JN64 | ✓ | | ✓ | 1m 24s | 3m 55s | 15 | EU | 28 | 4701 | 0.40 |
| OM3LU | -14 | CQ | Slovak Republic | | 2761 | JN88 | ✓ | | | 24s | 3m 52s | 15 | EU | 28 | 4731 | 0.30 |
| F5MXH | -15 | BI6PWL | France | | 2217 | JN07 | ✓ | ✓ | ✓ | 24s | 3m 52s | 14 | EU | 27 | 4092 | 0.20 |
| DB8WK | -18 | CQ | Germany | | 568 | JO33 | ✓ | ✓ | | 55s | 3m 52s | 14 | EU | 28 | 4190 | 0.70 |
| I20CKM | -19 | SP9PLK | Italy | | 978 | | | ✓ | | 25s | 25s | 15 | EU | 28 | | 0.10 |
| PD4SN | -19 | A12F | Netherlands | | 928 | | | | | 56s | 56s | 14 | EU | 27 | | 0.20 |
| EK/RX3DPK | -20 | RR73 | Armenia | | 1102 | | ✓ | | ✓ | 23s | 23s | 21 | AS | 29 | | 0.10 |
| HB9FAP | -20 | EA9ABC | Switzerland | | 2056 | | ✓ | ✓ | | 26s | 26s | 14 | EU | 28 | | 0.20 |
| HG2DX | -20 | JE4JPQ | Hungary | | 2938 | | ✓ | ✓ | ✓ | 26s | 26s | 15 | EU | 28 | | 0.20 |
| PA3KUS | -20 | JA6VOA | Netherlands | | 879 | JO21 | ✓ | | | 55s | 55s | 14 | EU | 27 | 4161 | 0.50 |
| OE9GWW | -21 | EA8J | Austria | | 2664 | | ✓ | ✓ | | 25s | 25s | 15 | EU | 28 | | 0.10 |
| S56UVB | -21 | I1APQ | Slovenia | | 1834 | JN76 | ✓ | ✓ | ✓ | 1m 22s | 3m 52s | 15 | EU | 28 | 4718 | 0.20 |
| M0IEP | -21 | IK4LZH | England | | 759 | IO91 | ✓ | ✓ | | 1m 25s | 3m 52s | 14 | EU | 27 | 3917 | 0.10 |
| IT9HJQ | -24 | JL3OUW | Italy | | 2563 | | | | | 1m 24s | 1m 24s | 15 | EU | 28 | | 0.10 |
| LZ4VR | -24 | JP7AWQ | Bulgaria | | 1051 | KN13 | ✓ | | | 1m 24s | 1m 24s | 20 | EU | 28 | 5159 | 0.10 |

Reading the Bands

- Who and where is DX?
- Where is your signal decoded?
- Do I need it?

Use companion tools to visualize activity



GridTracker Companion Software:

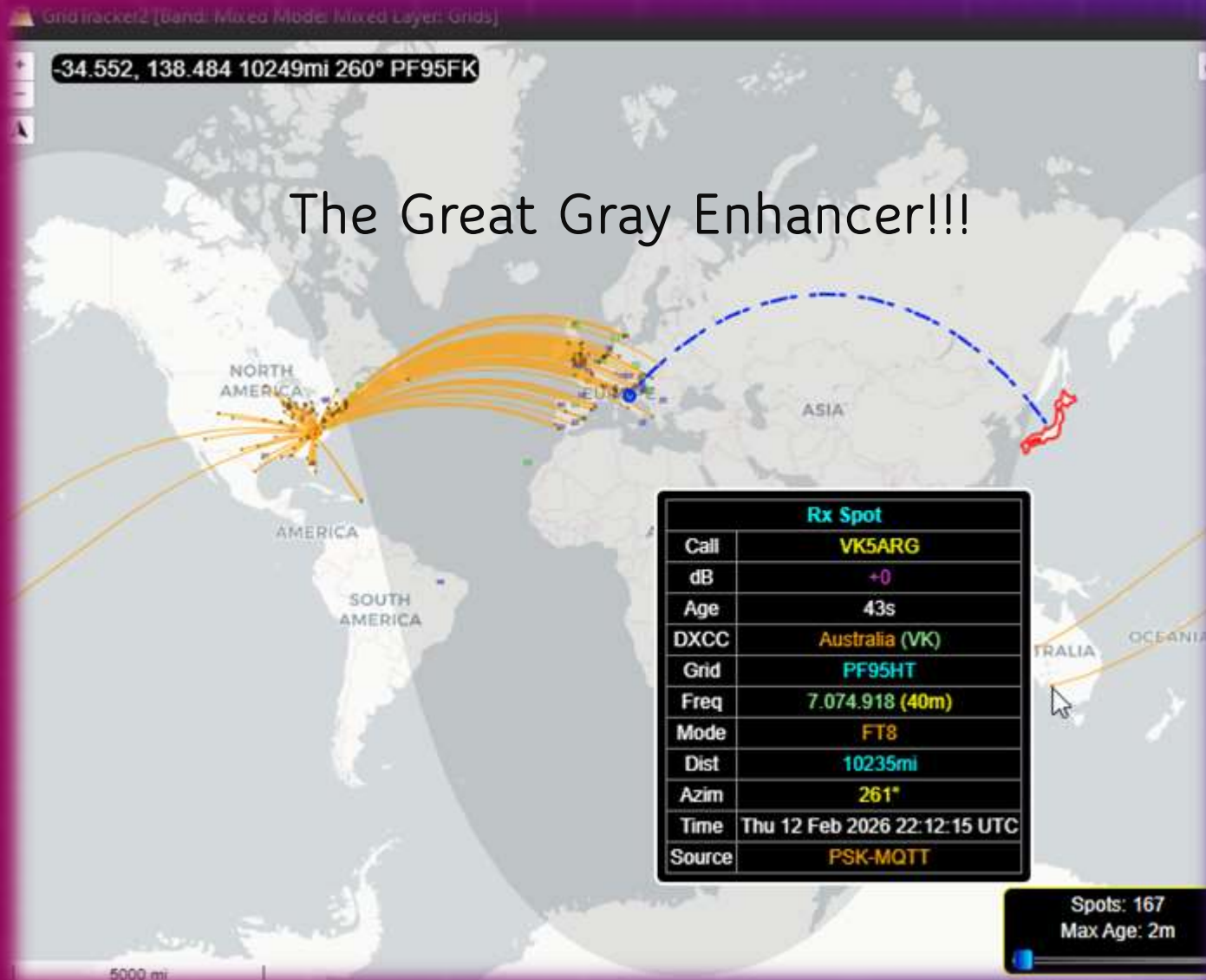
- Real-time map of stations you are working and hearing, **and how they may hear you!**
- Highlights DX entities, grids, and band activity
- Keeps track of stations, countries, continents worked/confirmed for awards.
- Excellent situational awareness during pileups
- Helps confirm propagation direction and timing
- Understanding FT8 DX pileups

• Key point:

Successful FT8 DX operators watch the band as much as they transmit



Propagation and GrayLine Matter



Great Expectations

- FT8 delivers real DX results without exotic stations
- FT8 rewards *smart operating*, not big spending or endless hours on the radio



What Is Achievable (Real Example):

- Using 25W of power, and 40m EFHW at 35ft
- Ops as a Technician (One month, 10m Experiment)
 - ✓ DXCC credits completed in under one month
 - ✓ Worked All States (WAS) credits

QRZ awards:

- ✓ Continents of the World
- ✓ Master of Europe
- ✓ Master of NA
- ✓ US Counties
- ✓ Grids²



NEXT: FT8 Setup and Demonstration - KR4DrH



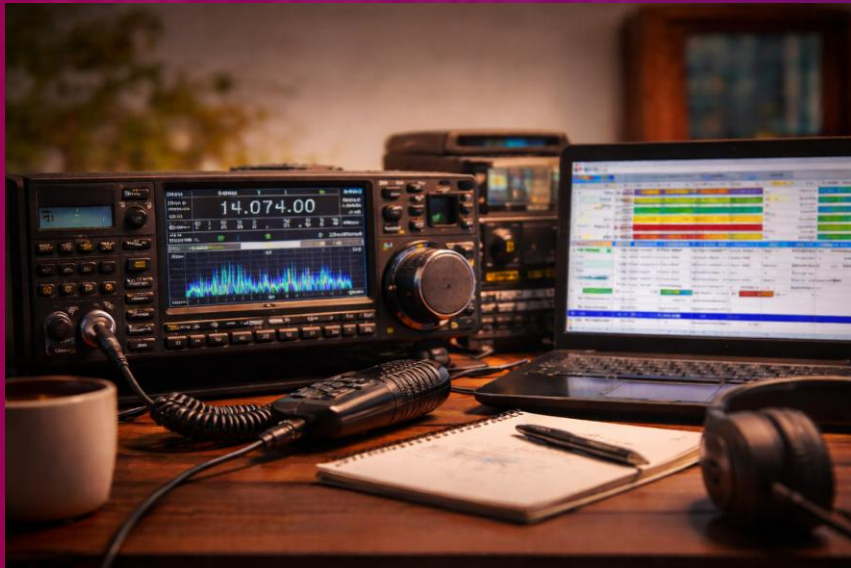


FT8

Hardware and Software Setup

William Breinich - KR4DRH

Before we begin...



- Generally, setups will be similar in function, but hardware may vary. Use this as a guide, not as an absolute.
- Don't get frustrated! Help is available! YouTube, forums, and fellow hams! It may not work right at first, this is common. You will get there!
- The specific screenshots in this presentation will be Windows based, though setup should be similar in other operating systems.
- Other digital modes possible once you have the hardware set up properly (Winlink, VarAC, JS8Call, etc)

Radio and Computer Connection

To make it all work, your computer and radio need to communicate

This communication is handled in two parts

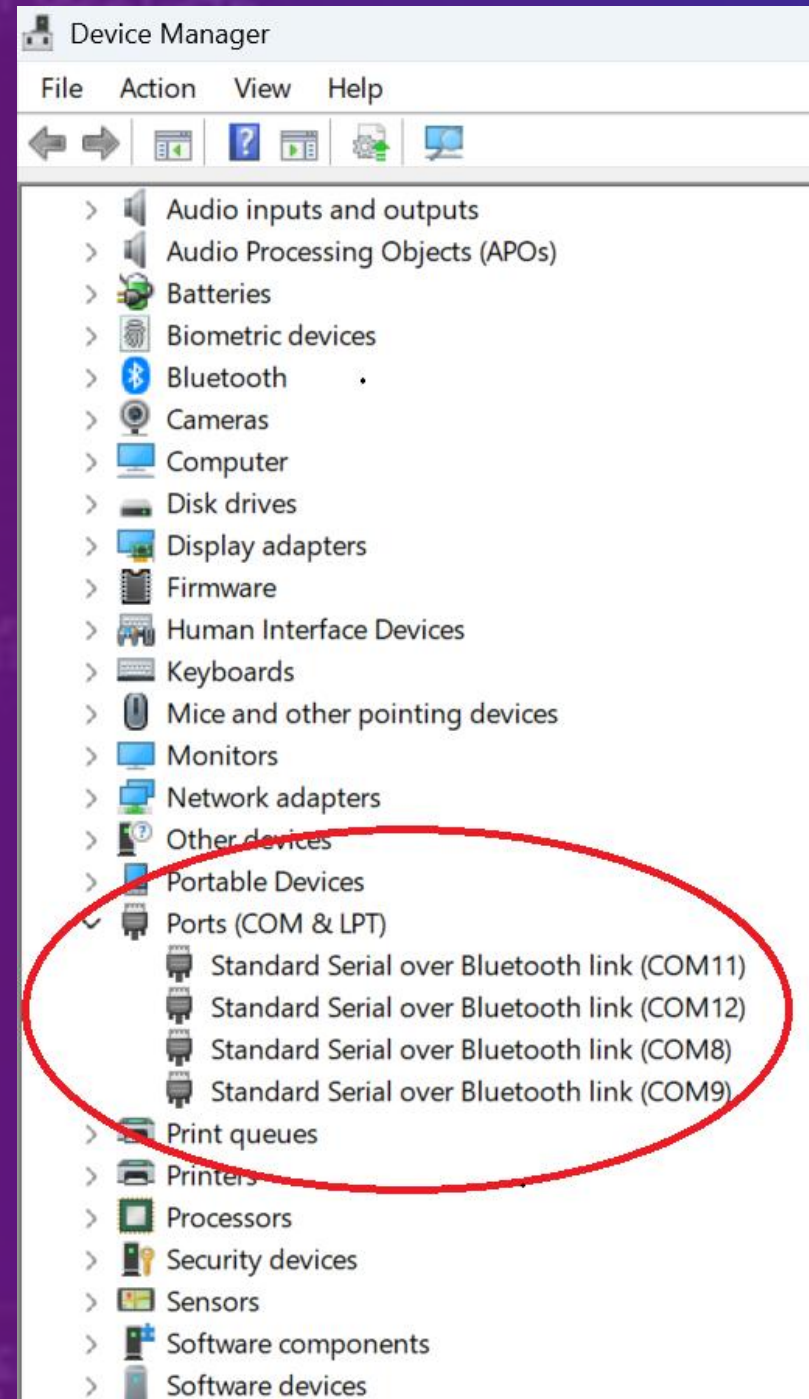
- *Audio passed back and forth between the radio and computer*
- *Computer Aided Transceiver (CAT control) allows the computer to control the radio.*



Find your COM Ports

Do this first!

- You will need to know what port your radio uses
- Search for Device Manager – open the ports section
- Note the ones present before you connect the radio – setup in WSJT-X is easier this way.
- Notice the ones that appear after you connect, these are the ones that you will need to know for setup
- Try to use the same USB port(s) each time. Else the COM port numbers may change.
- You may need to download some radio specific software. This is dependent on the radio and connection method – consult the manual.

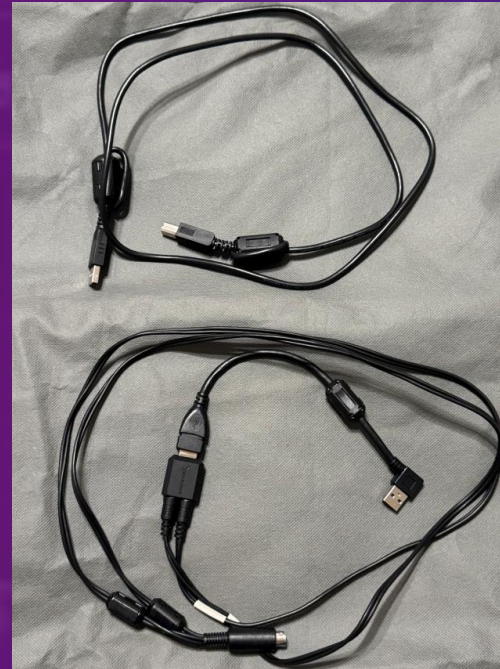


Connection Options

Multiple Options

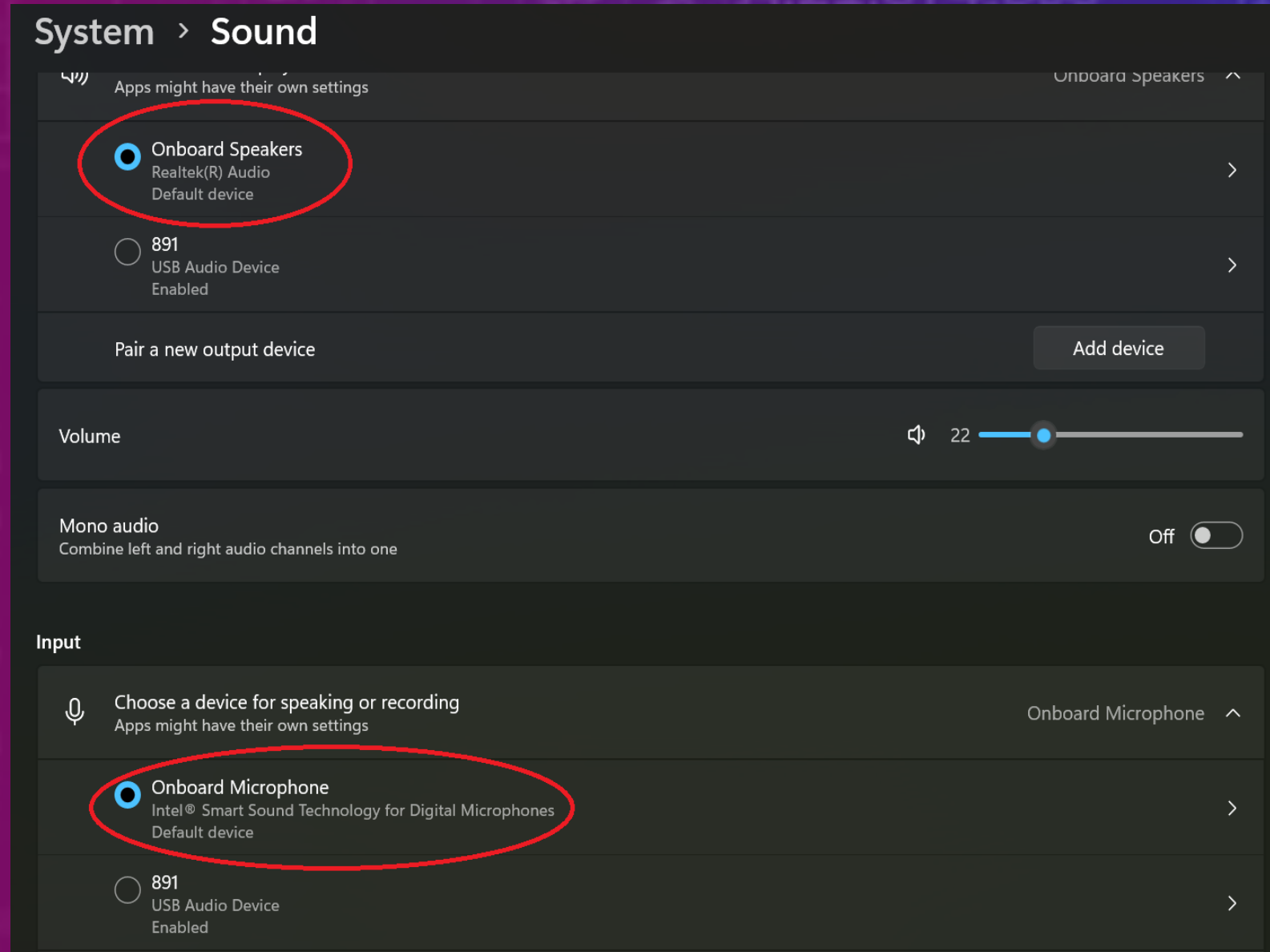
- Cable(s) – some radios just need a single USB cable (FT-991, IC-7300). Some can use two cables, one for CAT control, one for audio.
- Digirig/Signalink – CAT control and audio with one connection – for radios that don't have an internal sound card (FT-891 or IC-718)
- Wireless (such as IC-705)

Rigs can often use multiple ways to connect. Find what works best for you and the rig you have.



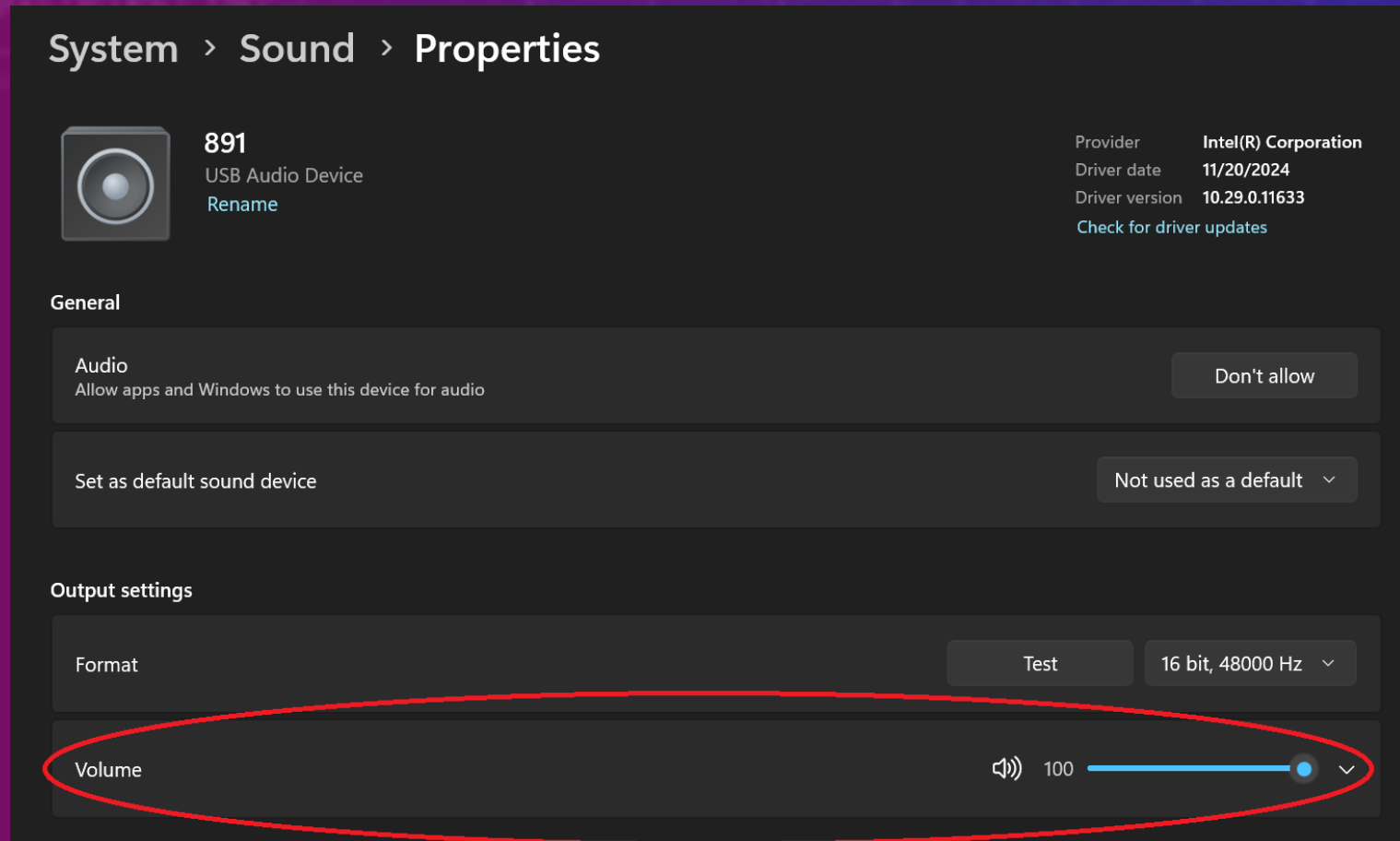
Sound Settings – Default Device

- Audio devices not hooked to radio should be set as the default
 - otherwise system sounds can play over the air
- Right click speaker in system tray on bottom right, click Sound settings
- Here you can see the onboard speaker and microphone are the default devices – correct
- If the device hooked to the radio is the default, click on the circle beside it – it will be made default. Do for both output an input.



Sound Settings - Volume Levels

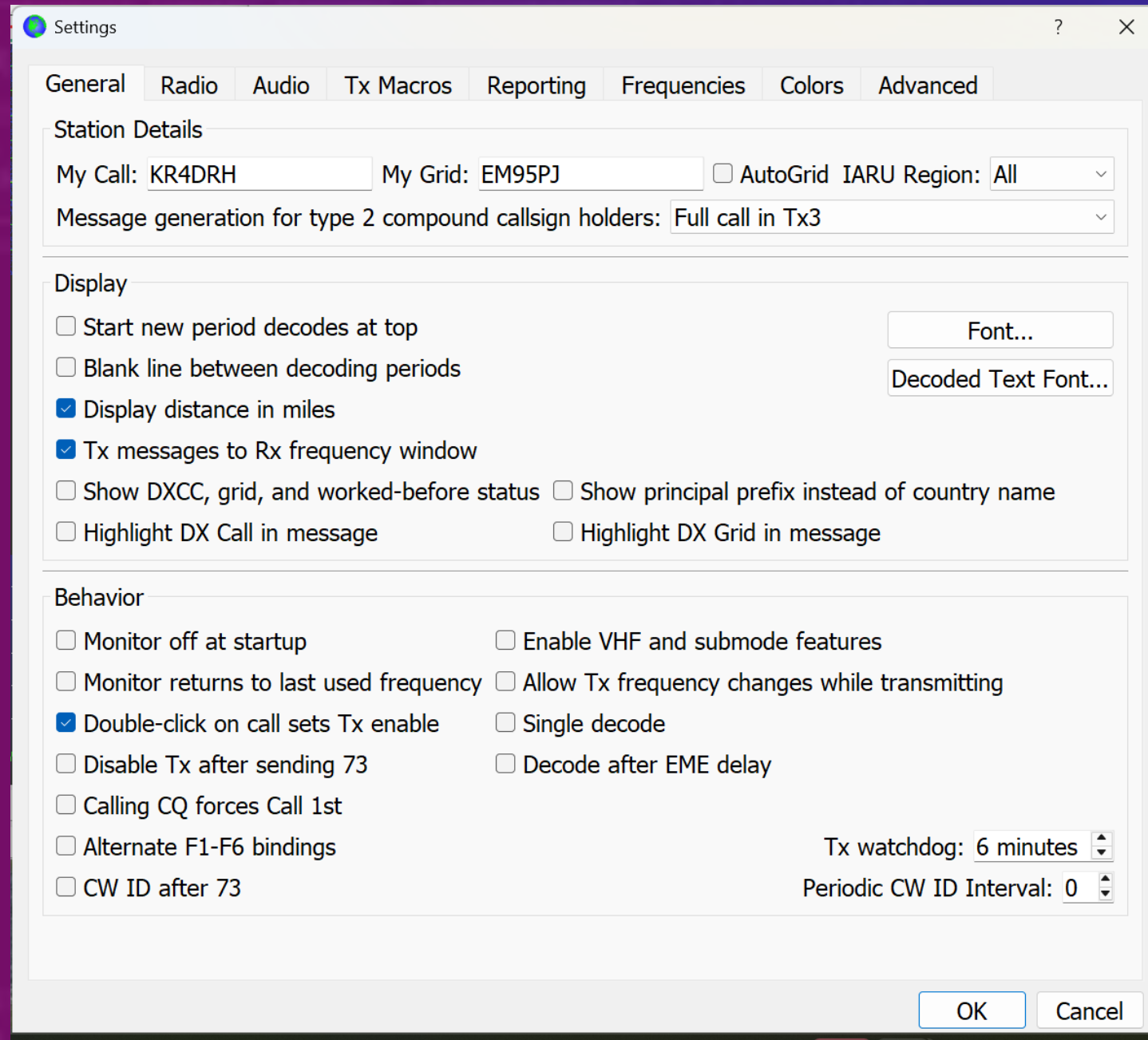
- Check the volume settings on both the speakers and microphone
- 80-100 for Speakers – provided ALC can be controlled
- Adjust input volume so WSJT-X receive meter stays in the green (will also depend on certain radio settings)
- Also make sure any enhancements for speakers and microphones are turned off



WSJT-X

General Tab

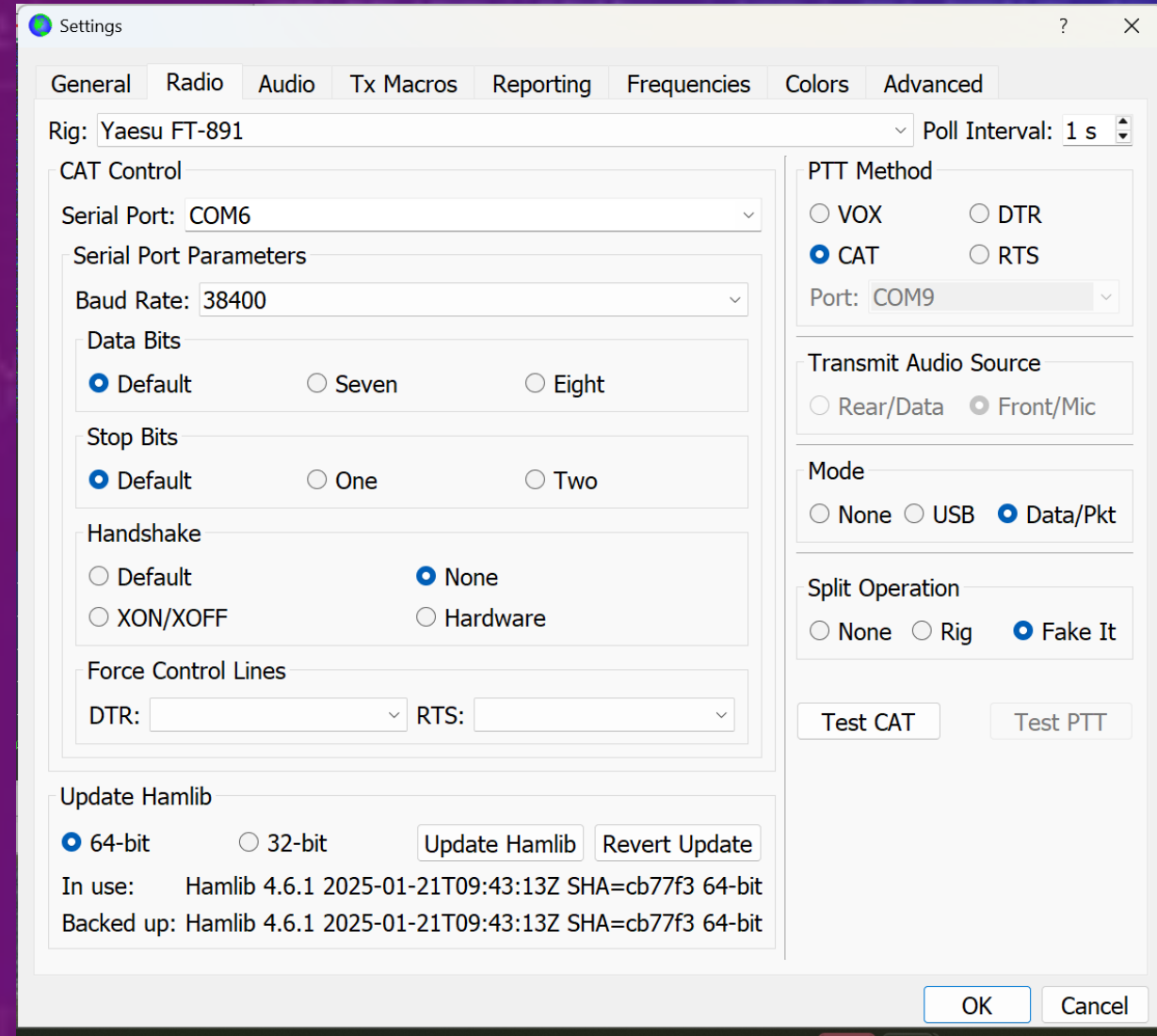
- Enter Call
- Enter Grid
- Most here are preference



WSJT-X

Radio Tab

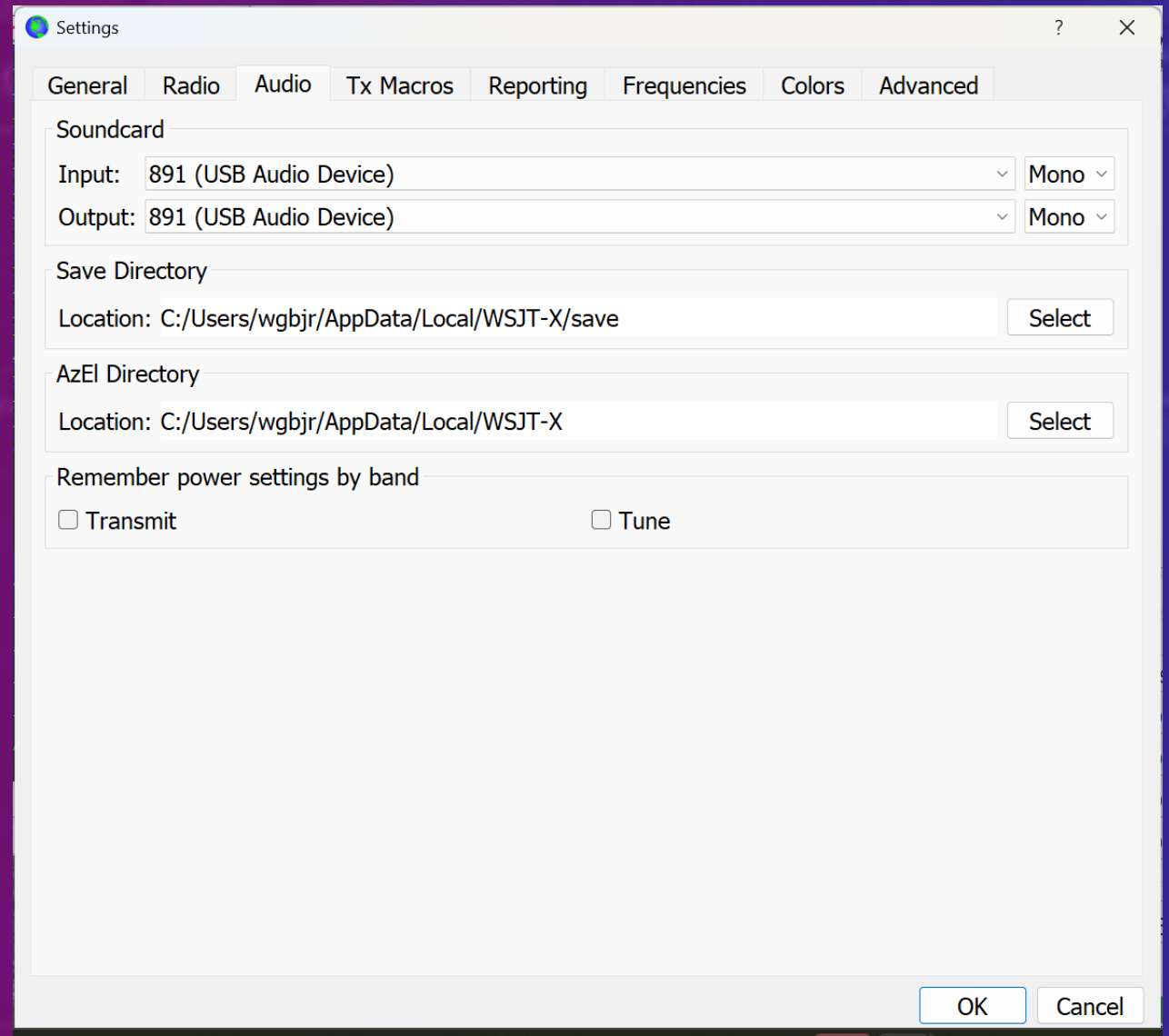
- These options vary based on the radio you choose
- This is where you enter the COM port(s)
- Baud rate must match your radio's setting
- PTT – will depend on setup
 - Signalink can use VOX
- Mode will be rig specific – many radios have a Data/Pkt mode, but not all
- Split operation – If your radio has two VFOs, use Rig, otherwise use Fake It. This results in a cleaner transmitted signal – strongly recommended
- Test CAT and Test PTT



WSJT-X

Audio Tab

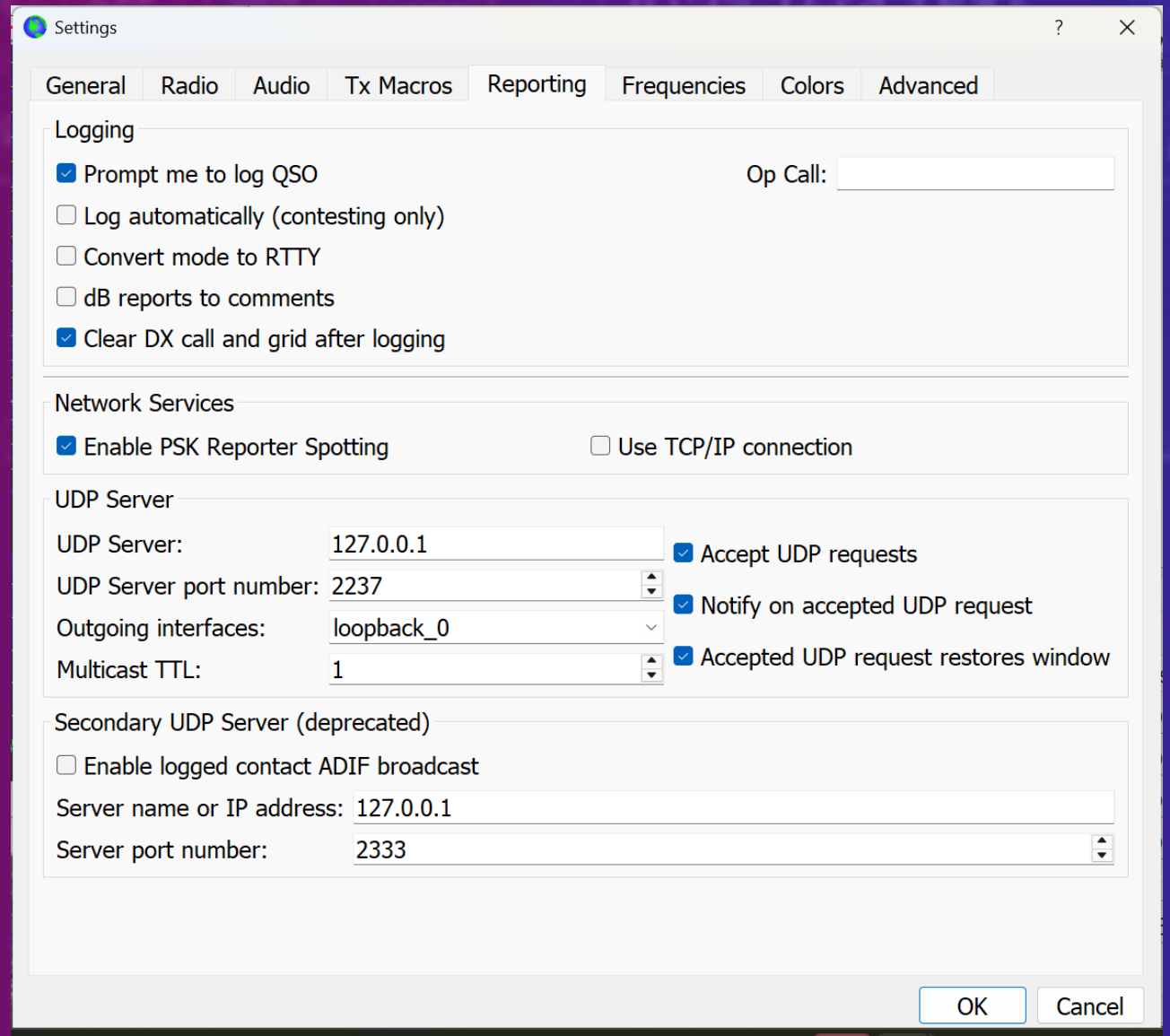
- Select the soundcard you have added for digital modes
- Remember that a second soundcard is best so system sounds aren't broadcasted by the radio



WSJT-X

Reporting Tab

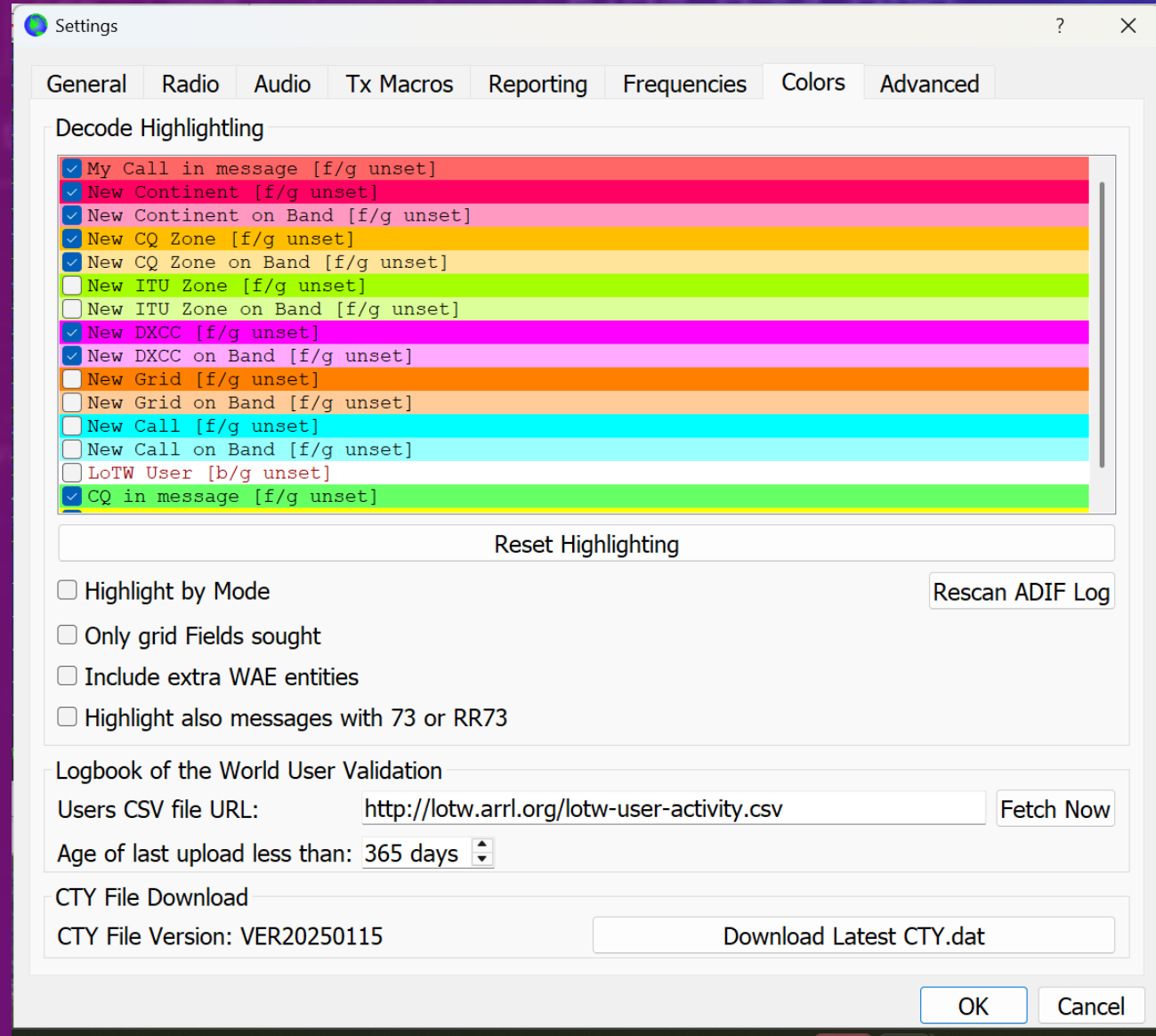
- Prompt for QSO log, Clear DX – required for GridTracker
- PSK Spotting is useful to everyone
- UDP Server is how GridTracker is linked to WSJT-X – this port number must match the one used in GridTracker



WSJT-X

Frequencies, Colors, Advanced

- Mostly personal preference
- All other options explained in the user manual
- <https://wsjt.sourceforge.io/wsjt-x-doc/wsjt-x-main-2.7.0.html>



Audio Levels

- Audio levels are important
- Incoming audio (receive level) on the left. Keep in the green.
- Audio output level adjusted on the right
- Check radio's ALC during a tune to make sure the signal is clean, Too much ALC means a distorted signal.

The screenshot displays a radio software interface with various controls and status indicators. Two red circles highlight specific areas:

- Left Circle:** A vertical audio level meter on the left side, showing a green bar at approximately 50 dB. The scale ranges from 0 to 80 dB. Below the meter, the text "54 dB" is visible.
- Right Circle:** A vertical slider control on the right side, labeled "Pwr", used for adjusting the audio output level. The slider is currently positioned at approximately 50%.

Other visible elements include:

- Buttons: "CQ only", "Log QSO", "Stop", "Monitor", "Erase", "Decode", "Enable Tx", "Halt Tx", "Tune", "Menus".
- Frequency: "20m" band, "14.074 000" MHz.
- Mode: "FT8".
- Call Sign: "DD0AM JO41".
- Distance: "Az: 44 4356 mi".
- Report: "Report -15".
- Auto Seq: "Auto Seq" checked.
- QSO List: A table with columns "nerate Std Ms", "Next", and "Now".
- Bottom Status: "Receiving", "DR-891", "FT8", "1", "9/15", "WD:6m".

GridTracker

- Companion app for WSJT-X
- Not required, but very useful
- Shows contacts, past and present, on a map
- Ability to filter contacts so only desired stations or locations show
- Very useful when you're seeking certain contacts or DX entities
- <https://gridtracker.org/>

Call Roster: 116 heard • 21 in roster

DECODE Halt TX Settings Fewer Controls

Logbook Live Band & Mode

Hunting Mixed

Wanted

Callsign Grid DXCC Marathon WPX POTA OAMS CQz ITUz State County Continent Watcher

Exceptions

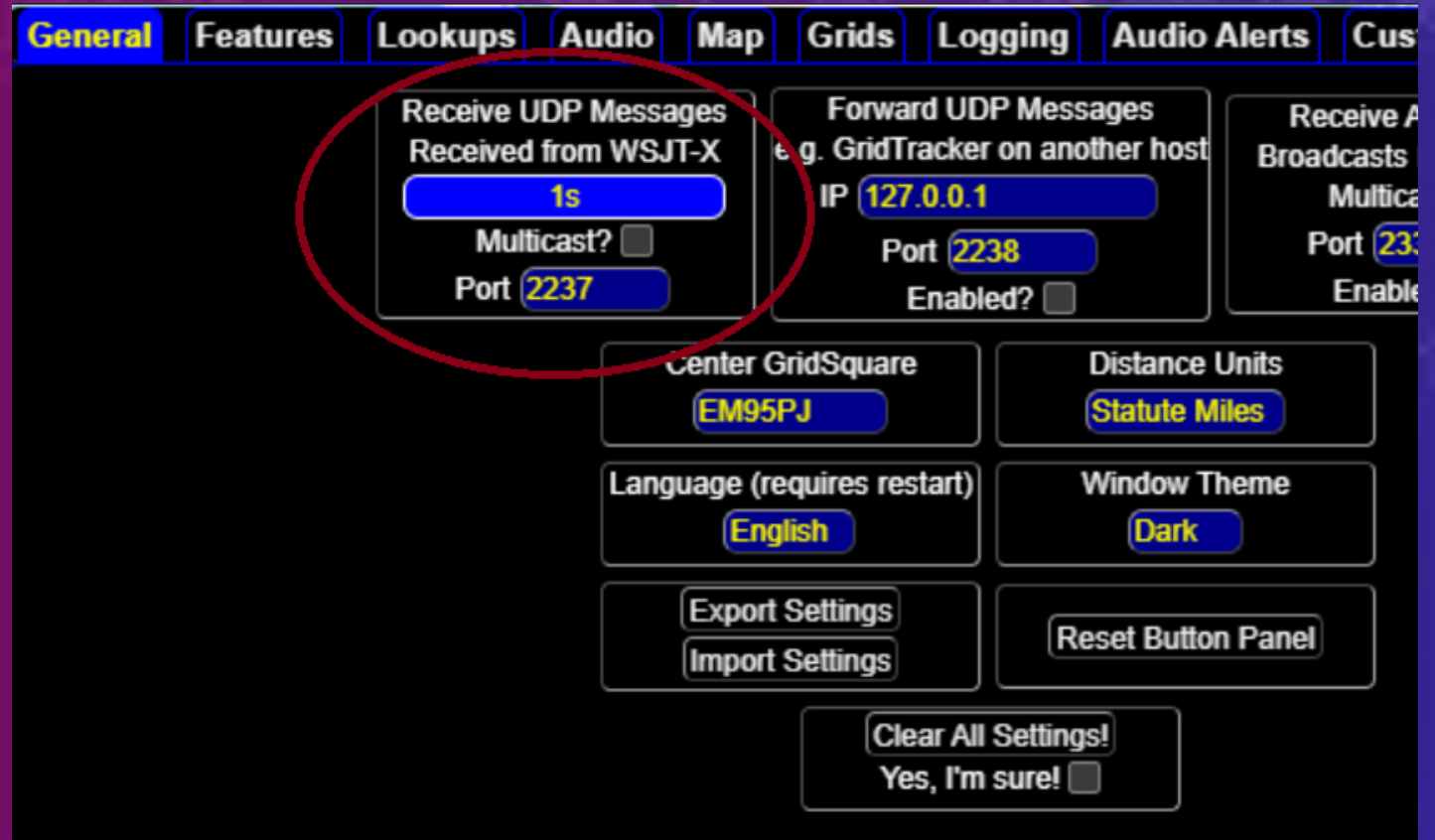
Only Wanted CQ Only RR73 as CQ New Calls Has Grid Not My DXCC Only My DXCC Uses eQSL

| Callsign | Calling | Grid | POTA | DXCC | Flag | State | dB | OAMS | Age ▼ |
|----------|---------|------|----------|--------------------|------|-------|-----|------|-------|
| WA6NFJ | RR73 | CN85 | | United States | 🇺🇸 | WA | -10 | | 14s |
| VE2UC | RR73 | | | Canada | 🇨🇦 | QC | -16 | | 15s |
| WT1C | RR73 | FN34 | | United States | 🇺🇸 | VT | -10 | | 15s |
| KF5TJO | CQ | EM50 | | United States | 🇺🇸 | MS | -4 | | 15s |
| N8XCO | CQ POTA | EN74 | US-10519 | United States | 🇺🇸 | MI | -11 | | 15s |
| VE3GBN | RR73 | FN03 | CA-1368 | Canada | 🇨🇦 | ON | -13 | | 15s |
| NO9D | CQ | EM54 | | United States | 🇺🇸 | MS | -7 | | 15s |
| KB5GA | CQ | EL49 | | United States | 🇺🇸 | LA | -19 | | 26s |
| KDØWPF | CQ DX | EM18 | | United States | 🇺🇸 | KS | -12 | | 30s |
| WA4CB | CQ | EM54 | | United States | 🇺🇸 | MS | 2 | | 30s |
| K7DM | RR73 | EM13 | | United States | 🇺🇸 | NC | -13 | | 30s |
| NØA | RR73 | EM36 | | United States | 🇺🇸 | | 3 | | 30s |
| AEØZC | RR73 | | | United States | 🇺🇸 | CO | -17 | | 41s |
| N3AZ | CQ | EL09 | | United States | 🇺🇸 | TX | -19 | | 42s |
| CO2ER | CQ | EL83 | | Cuba | 🇨🇺 | | -13 | | 45s |
| KN4LJP | CQ | EL98 | | United States | 🇺🇸 | FL | 4 | | 46s |
| N1NRL | CQ | FN41 | | United States | 🇺🇸 | MA | -14 | | 56s |
| HI5MAH | RR73 | | | Dominican Republic | 🇩🇲 | | -14 | | 56s |
| KE8ZKN | CQ | EN73 | | United States | 🇺🇸 | MI | -2 | | 59s |
| KC1FNM | CQ POTA | FN31 | US-0882 | United States | 🇺🇸 | CT | -16 | | 1m |
| F5NBQ | RR73 | JN05 | | France | 🇫🇷 | | -20 | | 1m 1s |

GridTracker

General Tab

- Set port number to match same one from WSJT-X options
- Also set your grid just below it



GridTracker

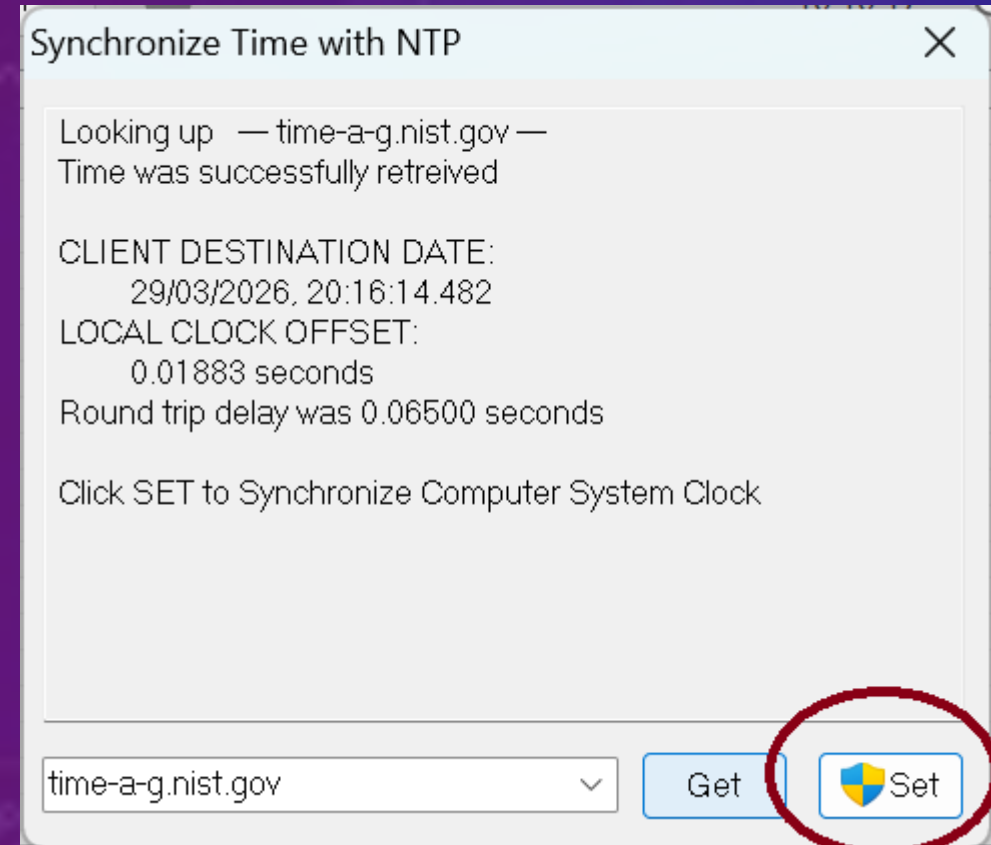
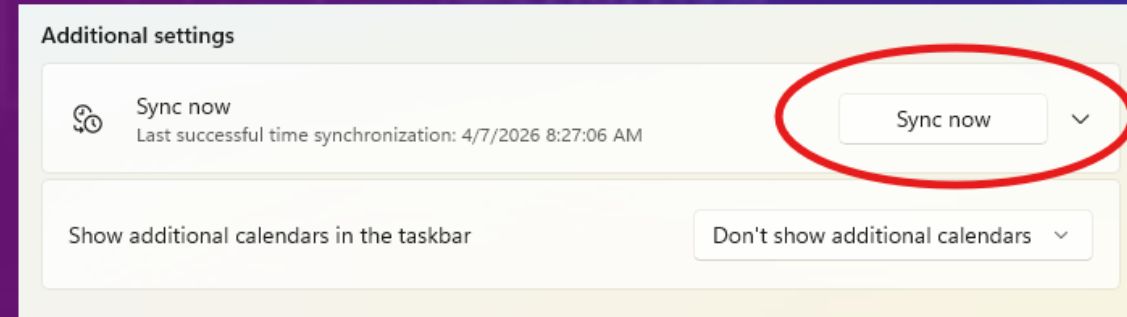
Logging Tab

- These are all optional, your choice
- Remember, WSJT-X keeps a log too
- This one shows Log4OM being used
- You can see it uses the log in WSJT-X

| Source/Sync | Connect? | Menu? | Startup? | Log? | Details | Test | Result |
|------------------|--------------------------|--------------------------|-------------------------------------|-------------------------------------|--|---------------|--------|
| WSJT-X Log | | | <input checked="" type="checkbox"/> | | wsjtx_log.adi | | |
| GridTracker2 | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Backup Logs | | |
| Local File(s) | | <input type="checkbox"/> | <input type="checkbox"/> | | | | |
| PSK-Reporter | | <input type="checkbox"/> | <input type="checkbox"/> | | 24 Hour History | | |
| QRZ.com | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | API Key <input type="text"/> | Test | |
| ClubLog | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Callsign <input type="text" value="KR4DRH"/> Password <input type="text"/> Email <input type="text"/> | Test | |
| HRDLOG.net | | | | <input type="checkbox"/> | Callsign <input type="text"/> Upload Code <input type="text"/> *** How to get upload code *** | Test | |
| Cloudlog/Wavelog | | | | <input type="checkbox"/> | URL <input type="text" value="http://127.0.0.1"/> API Key <input type="text"/> Station Profile <input type="button" value="Press Test"/> | Test | |
| eQSL.cc | | | | <input type="checkbox"/> | User <input type="text"/> Password <input type="text"/> QTH Nickname <input type="checkbox"/> | Test | |
| LoTW | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Login <input type="text"/> Password <input type="text"/> | Test Download | |
| HamCQ.cn | | | | <input type="checkbox"/> | API Key <input type="text"/> | Test | |
| N1MM Logger+ | | | | <input type="checkbox"/> | IP <input type="text" value="127.0.0.1"/> Port <input type="text" value="2333"/> | | |
| Log4OM | | | | <input checked="" type="checkbox"/> | IP <input type="text" value="127.0.0.1"/> Port <input type="text" value="2236"/> | | |
| N3FJP Loggers | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | IP <input type="text" value="127.0.0.1"/> Port <input type="text" value="1100"/> | | |
| DXKeeper | | | | <input type="checkbox"/> | IP <input type="text" value="127.0.0.1"/> Port <input type="text" value="52000"/> | | |
| HRD Logbook | | | | <input type="checkbox"/> | IP <input type="text" value="127.0.0.1"/> Port <input type="text" value="7826"/> | | |

Time Synchronization

- For FT8 to function, your computer time must be synchronized to UTC time (within half a second ideal)
- Mismatched times = mismatched cycles and bad/no decodes. You can see the time offset in WSJT-X. (DT)
- Windows has a built-in sync function you can use.
- Other options if Windows' sync doesn't work well
- JTSync is free, and easily allows you to synchronize your computer clock
- There are other fine programs
- <https://www.dxshell.com/jtsync.html>



Logging

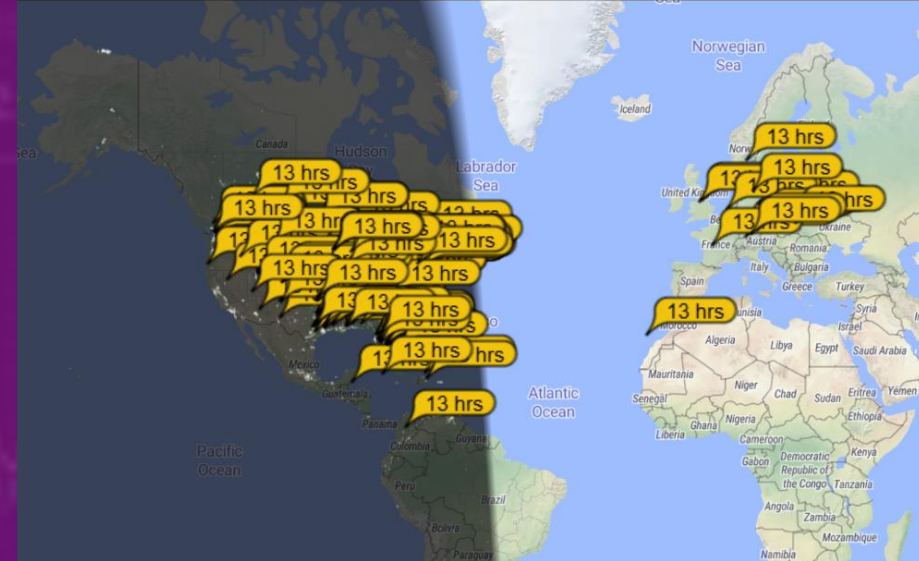
- Many different options
- Many can sync with WSJT-X or Gridtracker
- Choose one that works for you
- Not necessarily needed – WSJT-X keeps a log



PSKReporter

- Web based signal reports
- WSJT-X reports who you hear, others report when they hear you
- Useful to see how well you're getting out
- Can be loosely used to see if you'll reach a particular DX entity you're seeking

sent by using over the last (hrs ago). Automatic refresh in 4 minutes. 291 reception reports for KR4DRH are shown as times ([show logbook](#)).
: 2145 on 20m, 481 on 40m, 409 on 30m, 382 on 15m, 355 on 10m, 347 on 17m, 244 on 12m, 243 on 80m, 134 on 23cm, 1 on 10Ghz, 1 on 8m, 1 on 70cm. Show all on all bands. Legend

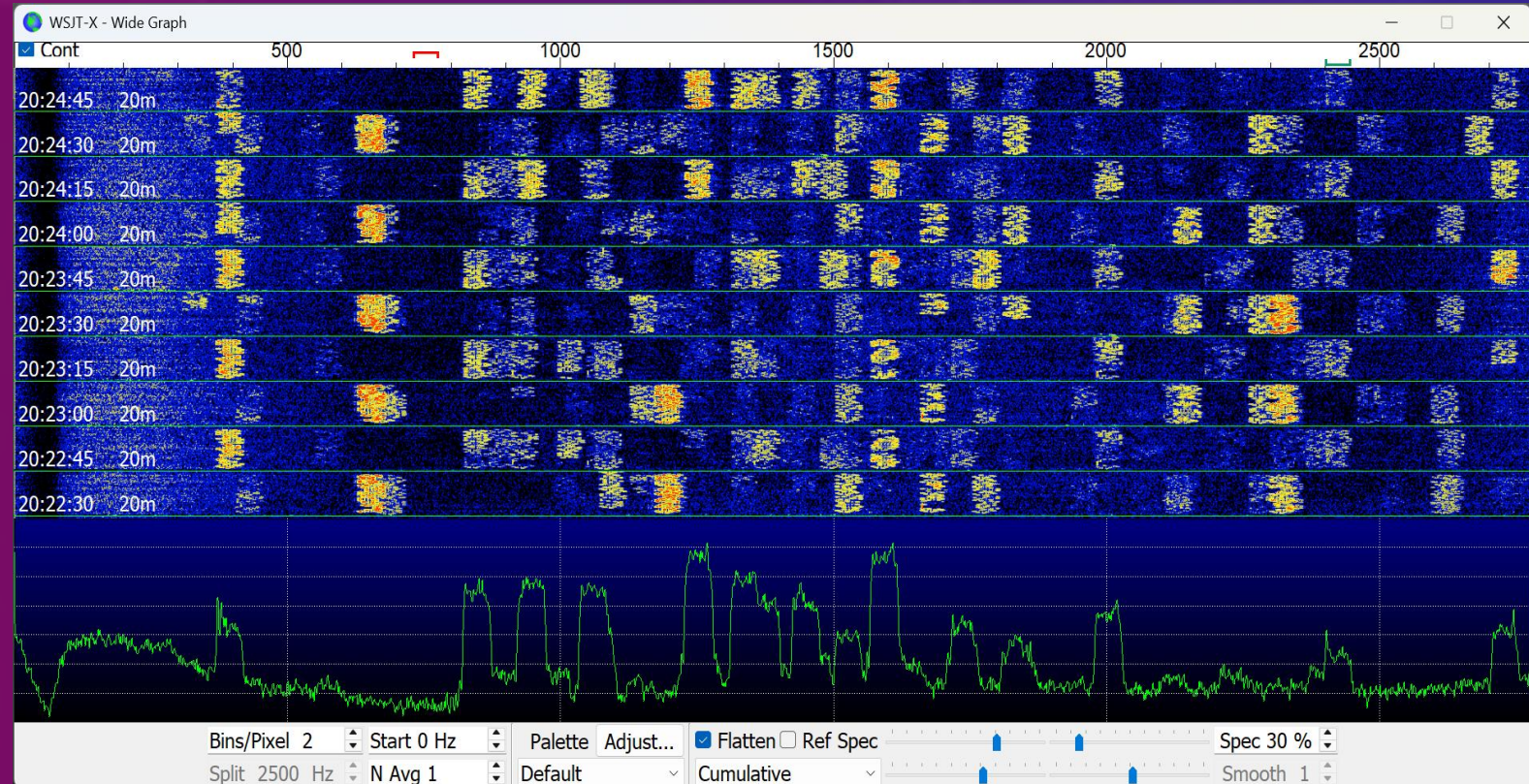


adstone — [Online discussions](#) — [Reception records](#)

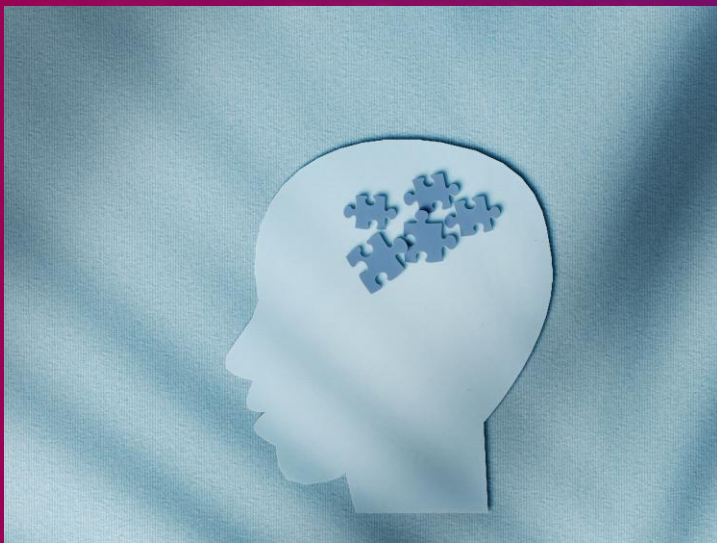
Rx at Sun, 29 Mar 2026 20:38:45 GMT
From **KR4DRH** by **DL8LAS** in Fed. Rep. of Germany Loc JO54EF
Frequency: 14.074.720 MHz (20m), FT8, -9dB
Distance: 6952 km bearing 41°
Using: STEMLab SDR FT8 TRX 1.0
Antenna: Vertical Active Loop
Rig: Icom IC-7850/7851

Success!

- CAT/PTT tests in WSJT-X work
- Seeing signals in the waterfall
- Seeing decodes in WSJT-X and/or GridTracker
- Tune results in clean signal – minimal ALC movement
- Stations respond to your CQ and/or you appear on PSK Reporter



Final thoughts...



Remember there are multiple hardware options available for connecting the radio to the computer

Other rig control software packages not even discussed (OmniRig, DXLab Commander for example)

Don't forget time syncing – you will not be able to send and receive properly if your system time is off

If the setup worked last time and doesn't this time, check sound settings in the operating system first! Windows can change the default sound device, especially if you use two devices (Digirig for HT's, cables for HF rigs), or you often disconnect the radio from the computer

Setup Questions



Next up - Demonstration!