FT8 Mode

How, Why
and Tips and tricks
Fox/Hound vs. MSHV

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FT8 (short for **Franke-Taylor 8-FSK modulation**) is a digital mode of radio communication used by amateur radio operators worldwide. It was jointly developed by Joe Taylor, K1JT, and Steve Franke, K9AN, and released back in 2017. The mode is designed to allow for reliable communication over long distances, even in poor conditions.
Here are some key points about FT8:
1.Purpose: FT8 was specifically designed for making **reliable QSOs (contacts)** under **extreme weak-signal conditions**.
2.Transmission Cycles: FT8 uses **short transmission and reception cycles**, with T/R cycles only **7.5 seconds** long.
3.Message Structure: It employs a structured message format that allows for efficient communication.
4.Sensitivity: FT8 is highly sensitive and can detect signals even when they are very weak.
5.Bandwidth: It uses minimal bandwidth, making it suitable for crowded frequency bands.
6.Global Communication: Hams use FT8 to communicate globally using **low-power transmissions**.

In summary, FT8 is a powerful digital mode that enables ham radio operators to establish reliable contacts even when traditional voice or other digital modes might fail due to weak signal conditions. It has revolutionized long-distance communication within the amateur radio community.

Resources

- WSJT-X program and manuals (https://wsjt.sourceforge.io/wsjtx.html)
- Paper on RCARC.ORG by Bob WB2NFL
- ZL Paper on FT8 (https://www.g4ifb.com/FT8_Hinson_tips_for_HF_DXers.pdf)
- JT alert (https://hamapps.com/JTAlert/)
- PSK reporter (https://pskreporter.info/pskmap.html)
- Fox/Hound Manual (https://wsjt.sourceforge.io/wsjtx.html)
- DX Watch.com /VE7CC (http://www.bcdxc.org/ve7cc/)
- QRZ.COM
- Time Sync: https://www.meinberg-usa.com/support/downloads/ntp-software-download.htm

Advantages of FT8

-Pipsqueaks can do serious DX

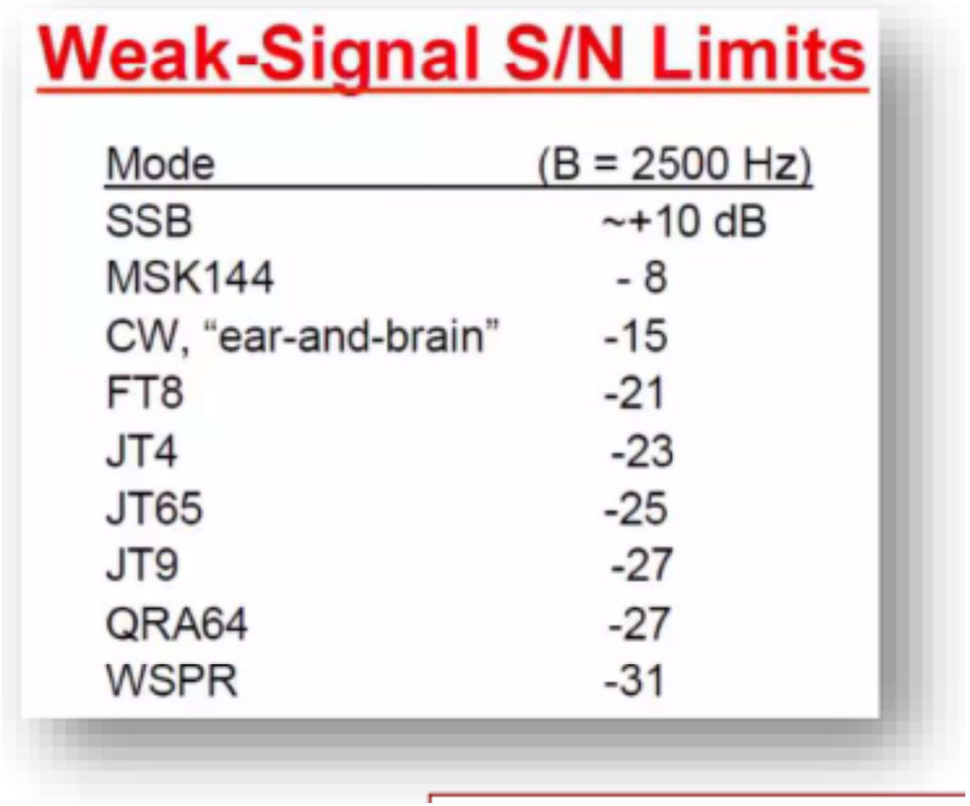
-No need for big antenna systems
 -Wires/Indoor antennas
 -Vertical Antennas/Flagpoles

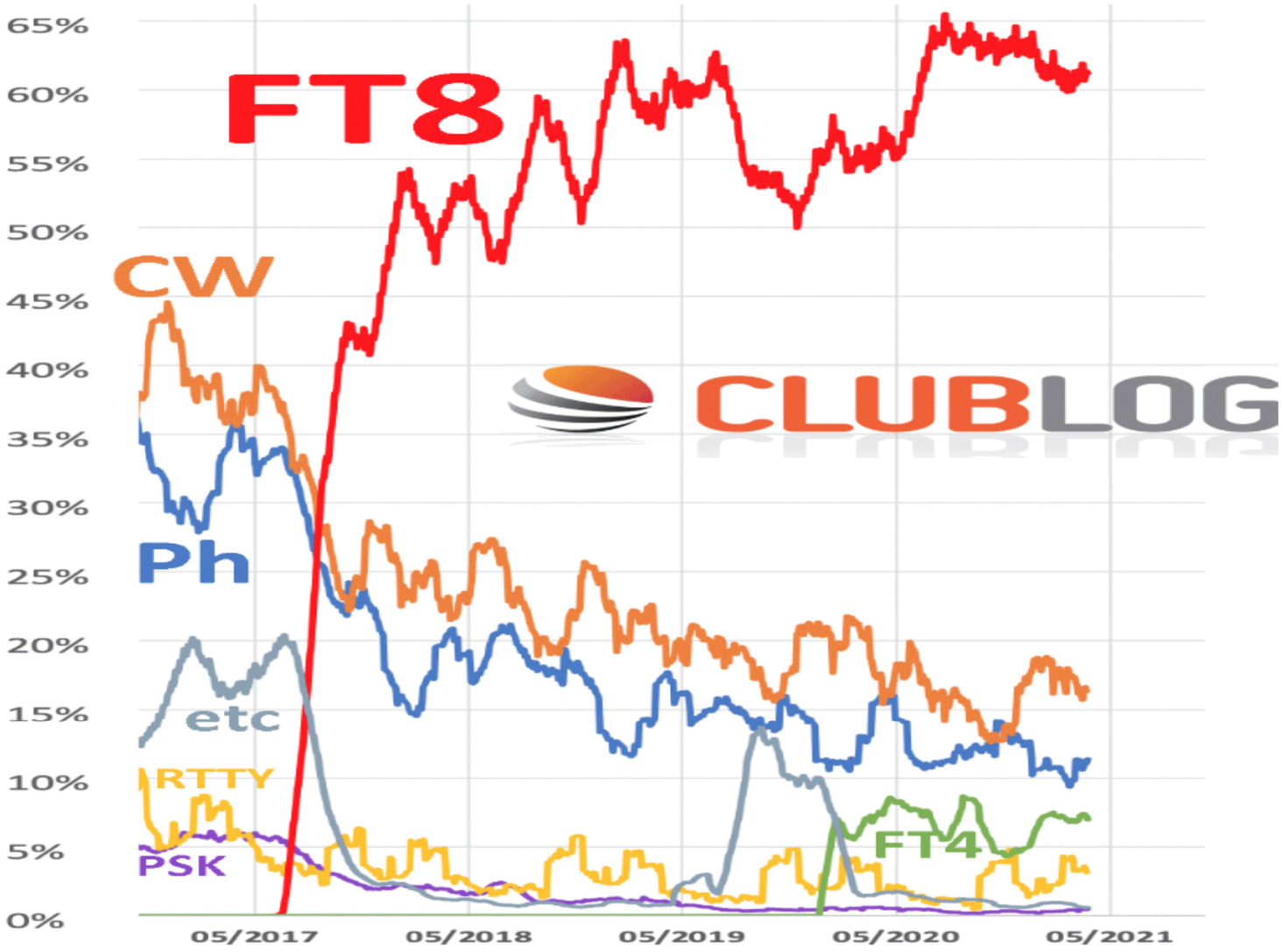
-Everyone gets a free Bandscope

-No need for amplifiers
 -100 Watts or less

-Easy semi-automatic logging for uploading to LOTW

FT8 Weak Signal comparisons

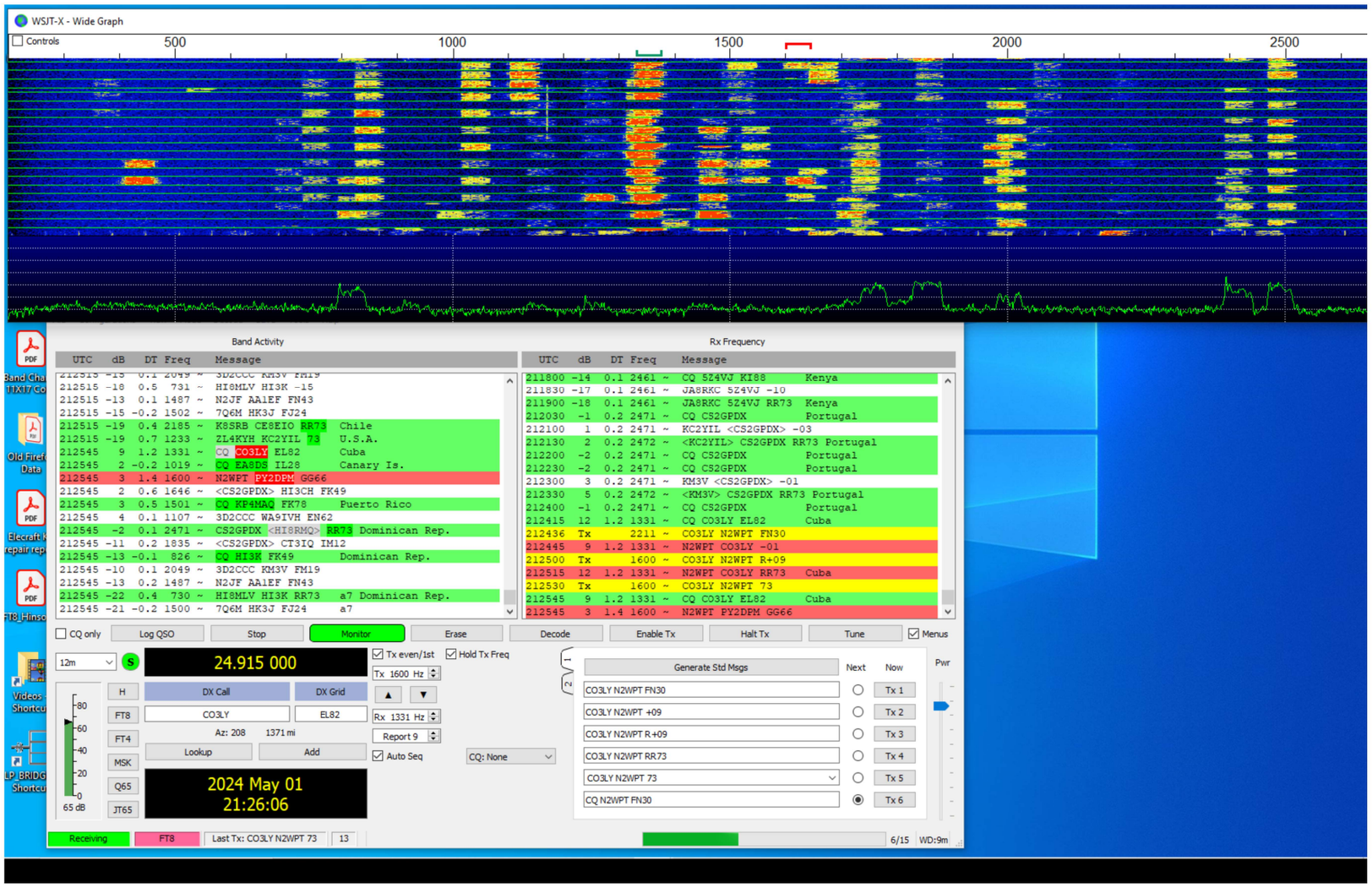



65%
60%
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
FT8
CW
Ph
etc
RTTY
PSK
FT4
CLUBLOG
05/2017
05/2018
05/2019
05/2020
05/2021

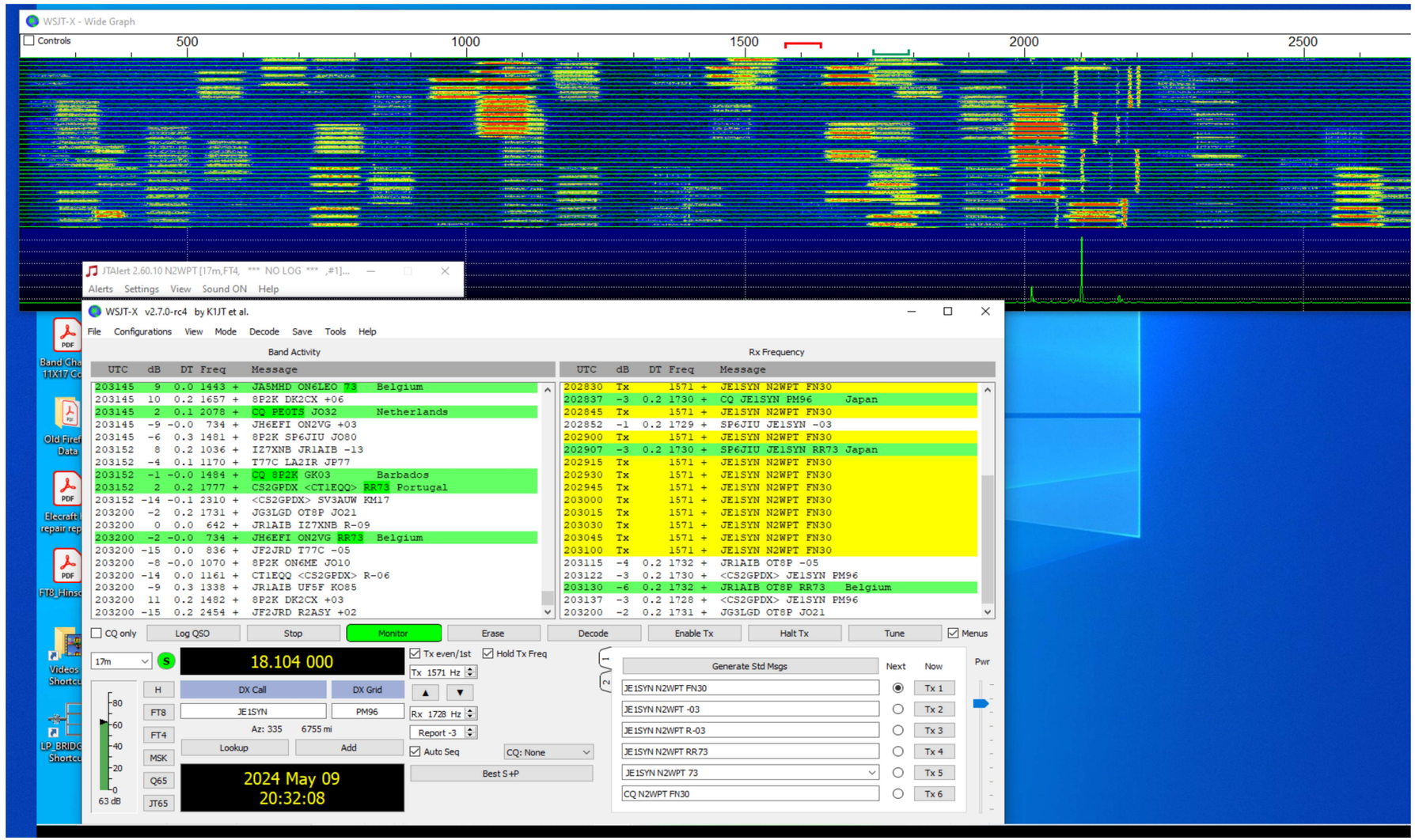
Equipment (in addition to your Transceiver)

- 1) PC running Windows, Linux or Mac
  - Installed WSJT-X (ver 2.6 or above recommended)
  - Time Sync Software (Meinberg or others)
  - Reset audio output for Transceiver interface or Rig with USB input
  - Reset audio input for Transceiver interface or Mic or Rig with USB input
  - Optional: Two Monitors very helpful
- 2) Rig interface or Rig with USB input
- 3) Optional tuner for multiple bands (but be careful about power rating)
- 4) Just about any antenna

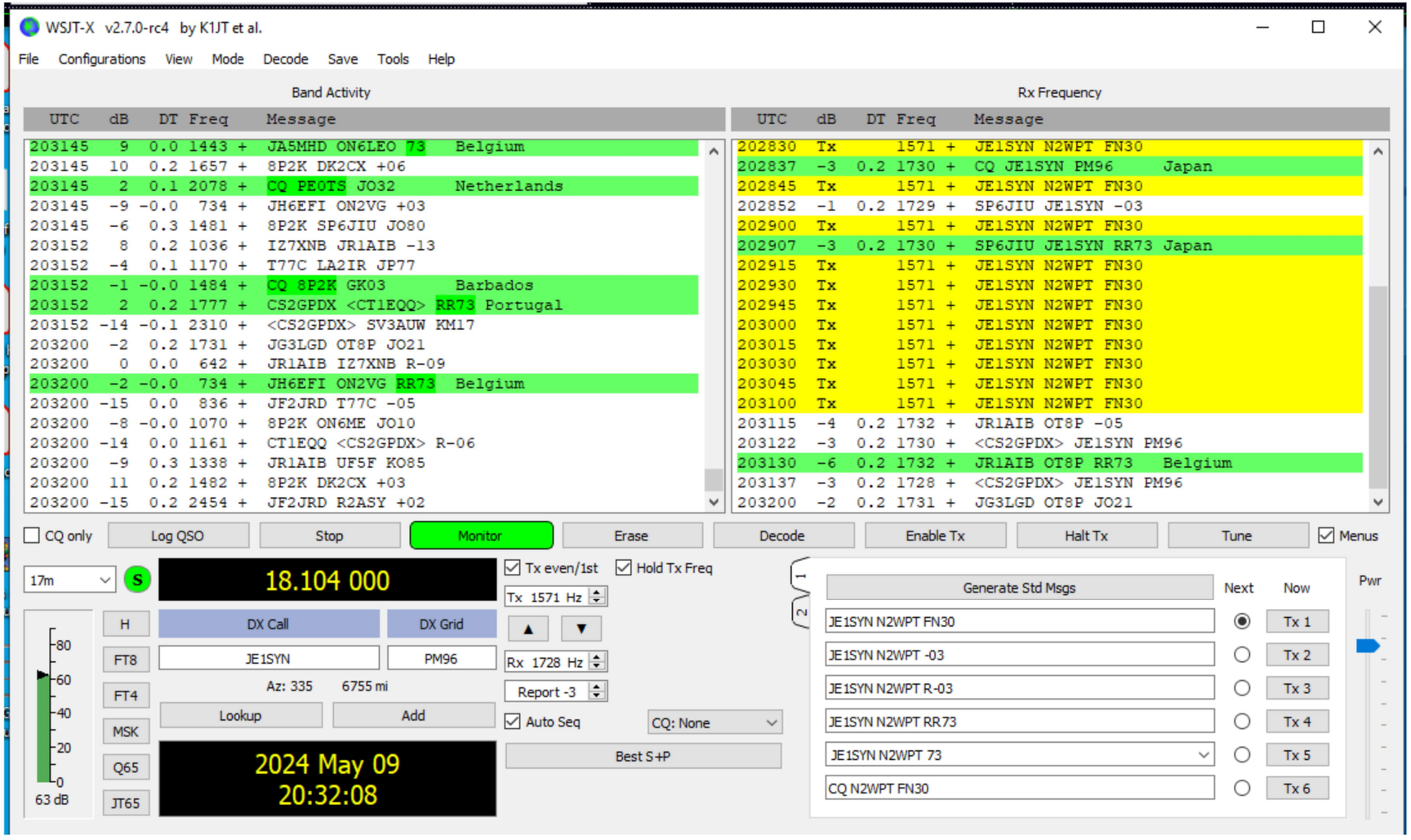
FT8 Screens


WSJT-X - Wide Graph
Controls
500
1000
1500
2000
2500
Band Activity
UTC dB DT Freq Message
212515 -18 0.5 731 ~ HI8MLV HI3K -15
212515 -13 0.1 1487 ~ N2JF AA1EF FN43
212515 -15 -0.2 1502 ~ 7Q6M HK3J FJ24
212515 -19 0.4 2185 ~ K8SRB CE8EIO RR73 Chile
212515 -19 0.7 1233 ~ ZL4KYH KC2YIL 73 U.S.A.
212545 9 1.2 1331 ~ CQ CO3LY EL82 Cuba
212545 2 -0.2 1019 ~ CQ EA8DS IL28 Canary Is.
212545 3 1.4 1600 ~ N2WPT PY2DPM GG66
212545 2 0.6 1646 ~ <CS2GPDX> HI3CH FK49
212545 3 0.5 1501 ~ CQ KP4MAQ FK78 Puerto Rico
212545 4 0.1 1107 ~ 3D2CCC WA9IVH EN62
212545 -2 0.1 2471 ~ CS2GPDX <HI8RMQ> RR73 Dominican Rep.
212545 -11 0.2 1835 ~ <CS2GPDX> CT3IQ IM12
212545 -13 -0.1 826 ~ CQ HI3K FK49 Dominican Rep.
212545 -10 0.1 2049 ~ 3D2CCC KM3V FM19
212545 -13 0.2 1487 ~ N2JF AA1EF FN43
212545 -22 0.4 730 ~ HI8MLV HI3K RR73 a7 Dominican Rep.
212545 -21 -0.2 1500 ~ 7Q6M HK3J FJ24 a7
Rx Frequency
UTC dB DT Freq Message
211800 -14 0.1 2461 ~ CQ 5Z4VJ KI88 Kenya
211830 -17 0.1 2461 ~ JA8RKC 5Z4VJ -10
211900 -18 0.1 2461 ~ JA8RKC 5Z4VJ RR73 Kenya
212030 -1 0.2 2471 ~ CQ CS2GPDX Portugal
212100 1 0.2 2471 ~ KC2YIL <CS2GPDX> -03
212130 2 0.2 2472 ~ <KC2YIL> CS2GPDX RR73 Portugal
212200 -2 0.2 2471 ~ CQ CS2GPDX Portugal
212230 -2 0.2 2471 ~ CQ CS2GPDX Portugal
212300 3 0.2 2471 ~ KM3V <CS2GPDX> -01
212330 5 0.2 2472 ~ <KM3V> CS2GPDX RR73 Portugal
212400 -1 0.2 2471 ~ CQ CS2GPDX Portugal
212415 12 1.2 1331 ~ CQ CO3LY EL82 Cuba
212436 Tx 2211 ~ CO3LY N2WPT FN30
212445 9 1.2 1331 ~ N2WPT CO3LY -01
212500 Tx 1600 ~ CO3LY N2WPT R+09
212515 12 1.2 1331 ~ N2WPT CO3LY RR73 Cuba
212530 Tx 1600 ~ CO3LY N2WPT 73
212545 9 1.2 1331 ~ CQ CO3LY EL82 Cuba
212545 3 1.4 1600 ~ N2WPT PY2DPM GG66
CQ only
Log QSO
Stop
Monitor
Erase
Decode
Enable Tx
Halt Tx
Tune
Menus
12m
24.915 000
Tx even/1st
Hold Tx Freq
Tx 1600 Hz
Rx 1331 Hz
Report 9
Auto Seq
CQ: None
H
FT8
FT4
MSK
Q65
JT65
DX Call
DX Grid
CO3LY
EL82
Az: 208 1371 mi
Lookup
Add
2024 May 01
21:26:06
65 dB
Generate Std Msgs
Next
Now
Pwr
CO3LY N2WPT FN30
CO3LY N2WPT +09
CO3LY N2WPT R+09
CO3LY N2WPT RR73
CO3LY N2WPT 73
CQ N2WPT FN30
Tx 1
Tx 2
Tx 3
Tx 4
Tx 5
Tx 6
Receiving
FT8
Last Tx: CO3LY N2WPT 73
13
6/15
WD:9m

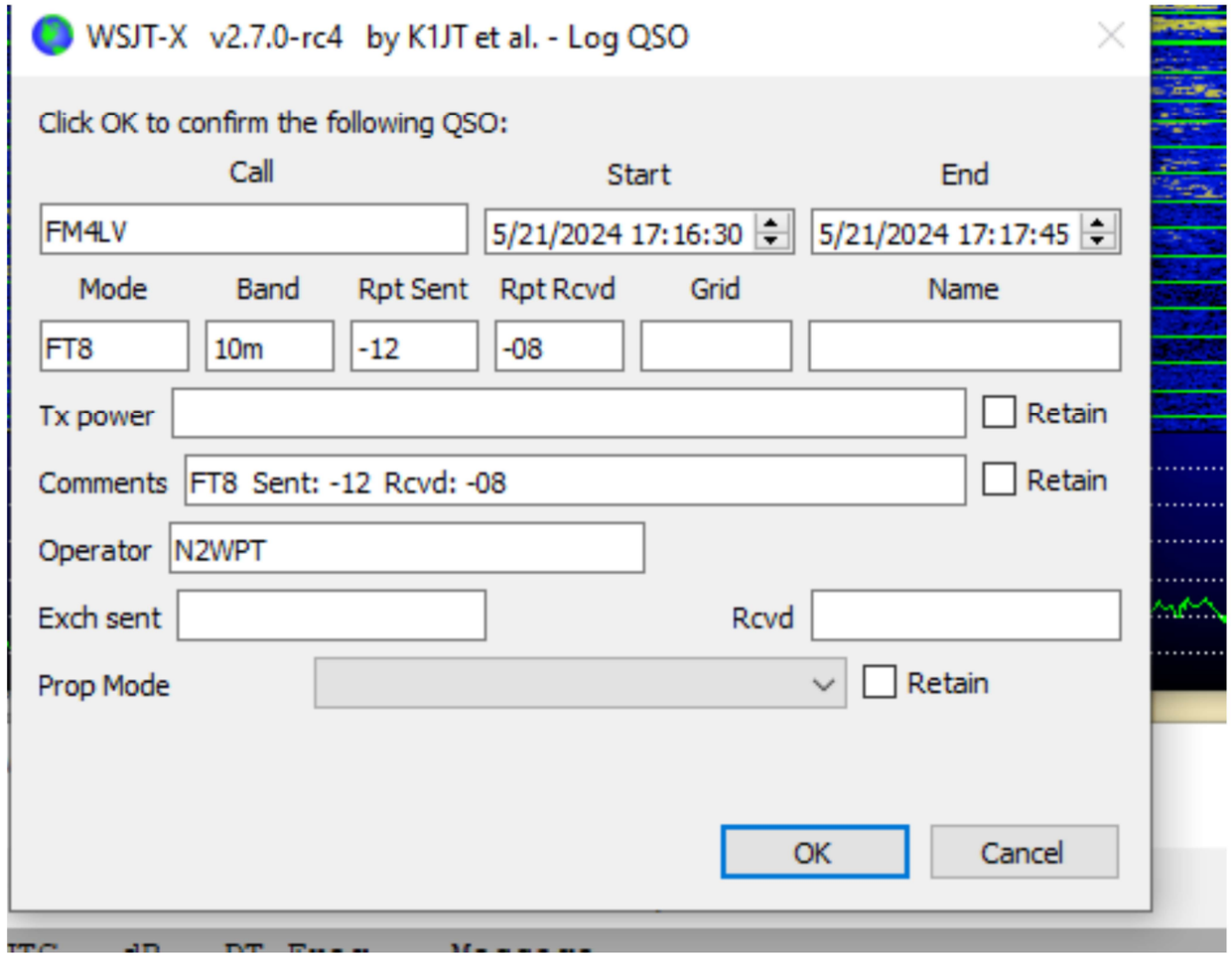
FT4


WSJT-X - Wide Graph
Controls
500
1000
1500
2000
2500
JTAlert 2.60.10 N2WPT [17m,FT4, *** NO LOG *** ,#1]...
Alerts Settings View Sound ON Help
WSJT-X v2.7.0-rc4 by K1JT et al.
File Configurations View Mode Decode Save Tools Help
Band Activity
Rx Frequency
UTC dB DT Freq Message
203145 9 0.0 1443 + JA5MHD ON6LEO 73 Belgium
203145 10 0.2 1657 + 8P2K DK2CX +06
203145 2 0.1 2078 + CQ PE0TS JO32 Netherlands
203145 -9 -0.0 734 + JH6EFI ON2VG +03
203145 -6 0.3 1481 + 8P2K SP6JIU JO80
203152 8 0.2 1036 + IZ7XNB JR1AIB -13
203152 -4 0.1 1170 + T77C LA2IR JP77
203152 -1 -0.0 1484 + CQ 8P2K GK03 Barbados
203152 2 0.2 1777 + CS2GPDX <CT1EQQ> RR73 Portugal
203152 -14 -0.1 2310 + <CS2GPDX> SV3AUW KM17
203200 -2 0.2 1731 + JG3LGD OT8P JO21
203200 0 0.0 642 + JR1AIB IZ7XNB R-09
203200 -2 -0.0 734 + JH6EFI ON2VG RR73 Belgium
203200 -15 0.0 836 + JF2JRD T77C -05
203200 -8 -0.0 1070 + 8P2K ON6ME JO10
203200 -14 0.0 1161 + CT1EQQ <CS2GPDX> R-06
203200 -9 0.3 1338 + JR1AIB UF5F KO85
203200 11 0.2 1482 + 8P2K DK2CX +03
203200 -15 0.2 2454 + JF2JRD R2ASY +02
202830 Tx 1571 + JE1SYN N2WPT FN30
202837 -3 0.2 1730 + CQ JE1SYN PM96 Japan
202845 Tx 1571 + JE1SYN N2WPT FN30
202852 -1 0.2 1729 + SP6JIU JE1SYN -03
202900 Tx 1571 + JE1SYN N2WPT FN30
202907 -3 0.2 1730 + SP6JIU JE1SYN RR73 Japan
202915 Tx 1571 + JE1SYN N2WPT FN30
202930 Tx 1571 + JE1SYN N2WPT FN30
202945 Tx 1571 + JE1SYN N2WPT FN30
203000 Tx 1571 + JE1SYN N2WPT FN30
203015 Tx 1571 + JE1SYN N2WPT FN30
203030 Tx 1571 + JE1SYN N2WPT FN30
203045 Tx 1571 + JE1SYN N2WPT FN30
203100 Tx 1571 + JE1SYN N2WPT FN30
203115 -4 0.2 1732 + JR1AIB OT8P -05
203122 -3 0.2 1730 + <CS2GPDX> JE1SYN PM96
203130 -6 0.2 1732 + JR1AIB OT8P RR73 Belgium
203137 -3 0.2 1728 + <CS2GPDX> JE1SYN PM96
203200 -2 0.2 1731 + JG3LGD OT8P JO21
CQ only
Log QSO
Stop
Monitor
Erase
Decode
Enable Tx
Halt Tx
Tune
Menus
17m
18.104 000
Tx even/1st
Hold Tx Freq
Tx 1571 Hz
Rx 1728 Hz
Report -3
DX Call
DX Grid
JE1SYN
PM96
Az: 335 6755 mi
Lookup
Add
Auto Seq
CQ: None
Best S+P
2024 May 09
20:32:08
H
FT8
FT4
MSK
Q65
JT65
63 dB
Generate Std Msgs
Next
Now
Pwr
JE1SYN N2WPT FN30
JE1SYN N2WPT -03
JE1SYN N2WPT R-03
JE1SYN N2WPT RR73
JE1SYN N2WPT 73
CQ N2WPT FN30
Tx 1
Tx 2
Tx 3
Tx 4
Tx 5
Tx 6

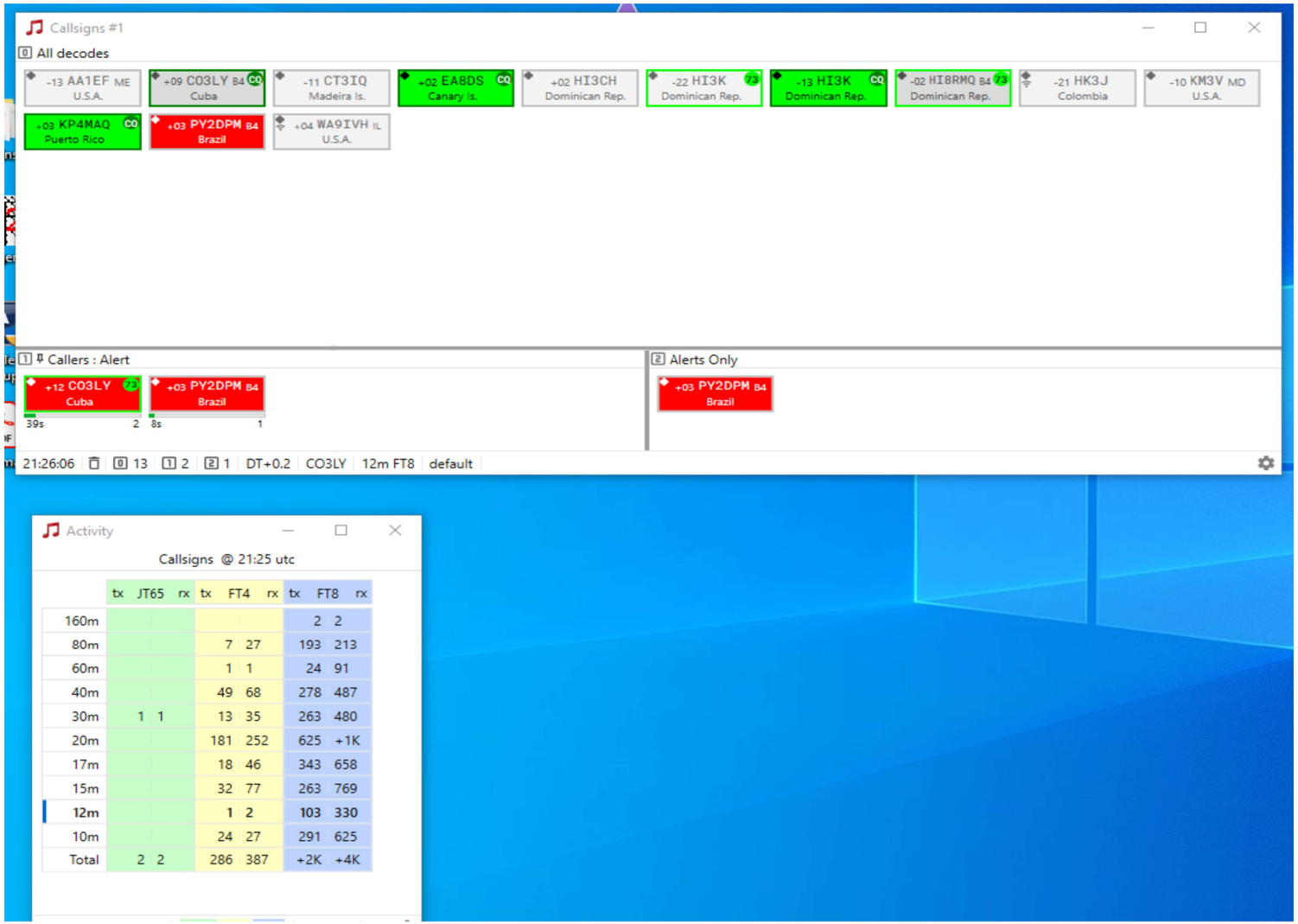
Control Screen



Log Screen

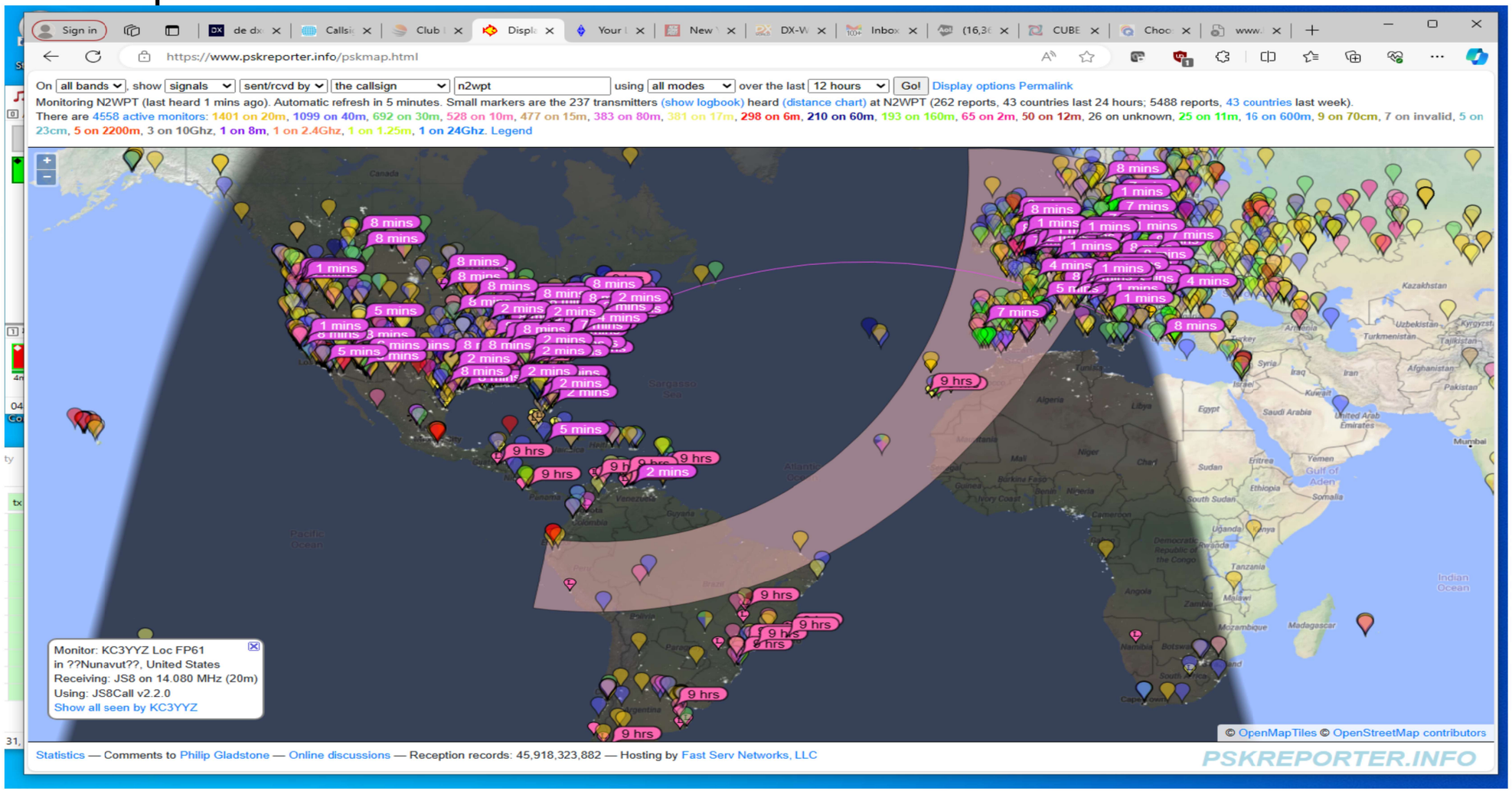

WSJT-X v2.7.0-rc4 by K1JT et al. - Log QSO
Click OK to confirm the following QSO:
Call
Start
End
FM4LV
5/21/2024 17:16:30
5/21/2024 17:17:45
Mode
Band
Rpt Sent
Rpt Rcvd
Grid
Name
FT8
10m
-12
-08
Tx power
Retain
Comments
FT8 Sent: -12 Rcvd: -08
Retain
Operator
N2WPT
Exch sent
Rcvd
Prop Mode
Retain
OK
Cancel

JT Alert



	tx	JT65	rx	tx	FT4	rx	tx	FT8	rx
160m							2	2	
80m				7	27		193	213	
60m				1	1		24	91	
40m				49	68		278	487	
30m	1	1		13	35		263	480	
20m				181	252		625	+1K	
17m				18	46		343	658	
15m				32	77		263	769	
12m				**1**	**2**		**103**	**330**	
10m				24	27		291	625	
Total	2	2		286	387		+2K	+4K	

PSK Reporter



Fox/Hound Mode

- A sub mode within FT8 for use by DX expeditions(which is the fox) you are the hound. Watch for spots to see who is using it.
- It is done outside of usual FT8 bands, watch for spots to see where they are.
- Enter by clicking the H box on main screen
- It has its own protocols
  - Fox transmits below 1000Hz on band screen
  - Fox can transmit on *multiple frequencies simultaneously*
  - Hounds must transmit above 1000Hz on band screen
  - Your transmissions limited to 2 minutes on each click

Fox/Hound 2

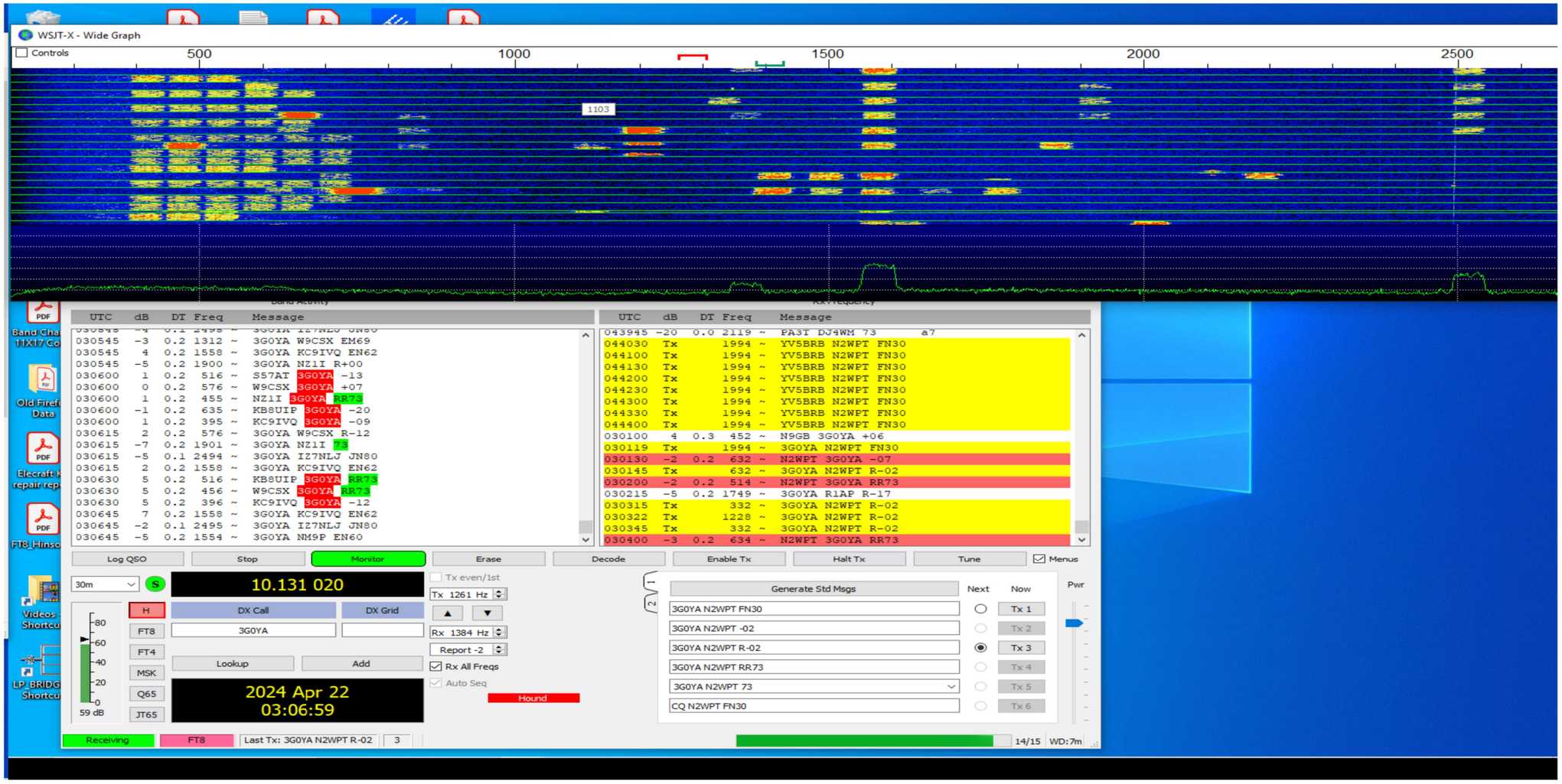
- Spooky action at a distance (per A. Einstein):

-after Fox acknowledges you, you will be magically (automatically) moved to one of the transmit frequencies to complete the QSO, logging screen will popup.

-If your 2 minutes transmission has timed out, the fox can re- enable your transmitter if you are in his receive queue (but you won't know if you are in the queue, so you may want to manually re-enable transmit).

-Note well- If you can't hear (decode) them, you can't work them!!

F/H Screenshot



MSHV

- MSHV is similar to F/H (but different)-
  - Usually on non standard frequencies
  - Multiple streams
  - You should transmit above1000Hz on band screen (but not required), the target transmits below
  - No 2 minute timeout
  - No Moving to one of the transmit frequencies
  - When in doubt use F/H mode

Coming soon to a transceiver near you:

Joe Taylor’s team will soon offer a “SuperFox” mode of WSJT-X for making rapid FT8 QSOs. Hounds chasing the SuperFox DX station will transmit normal FT8 signals, as in the already familiar Fox/Hound mode.

But rather than sending concurrent streams of up to five FT8 signals, the SuperFox station will transmit a single constant envelope, using a 1.5 KHz-wide waveform, that conveys signal reports or “RR73” acknowledgments to as many as ***nine different Hounds simultaneously***. Most importantly, there will be no signal-strength penalty for simultaneously transmitting to all those Hounds.

Another very significant improvement will be a digital signature contained in the SuperFox message that will allow the receiving software to verify the legitimate origin of the signal from a validated DXpedition.

The SuperFox development team will be beta testing the software in coming weeks with the goal to have it rolled out in time to debut during the N5J Jarvis Island DXpedition a few months from now (August 2024).

You may need an upcoming version of FT8 to use all the features of this mode.

Summing up

- If can't hear (decode) them, you can't work them
- Hit them where they ain’t/ Go for the gaps

- JT Alert is a great add on

- Don't forget FT4

- A wire antenna and a good tuner will allow you to work more bands, but watch out for full power rating

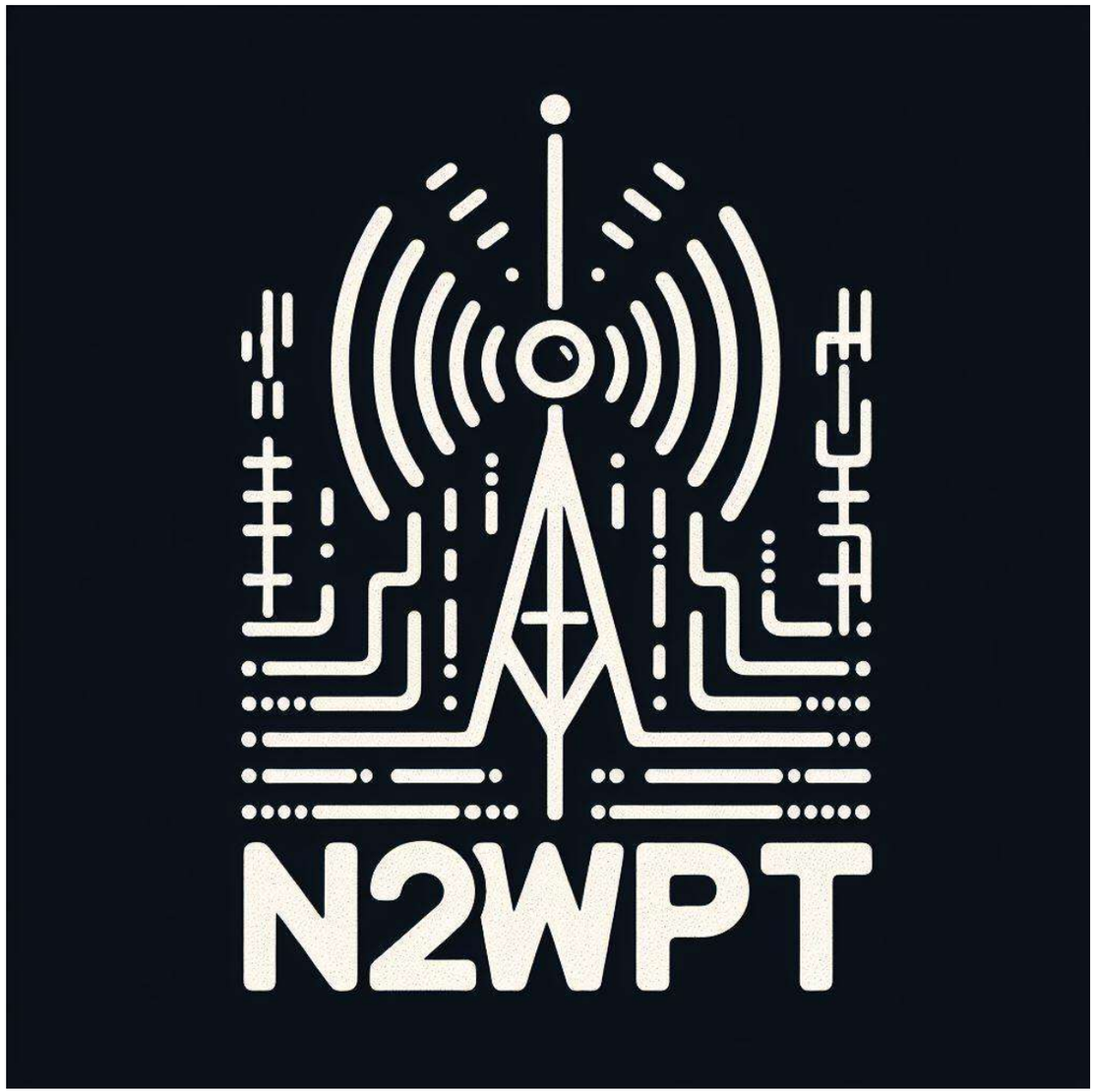
- Two monitors are helpful

- The WARC bands are perfect for FT8

- Use at least the 2.6 version of WSJT-X

- F/H is a very powerful DX tool

- Thank you for listening!


N2WPT