

FT8 Basics

How, Why
Set UP
and Tips and tricks

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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>)
- 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>
- Time Sync without internet: <http://www.dxshell.com/jtsync.html>

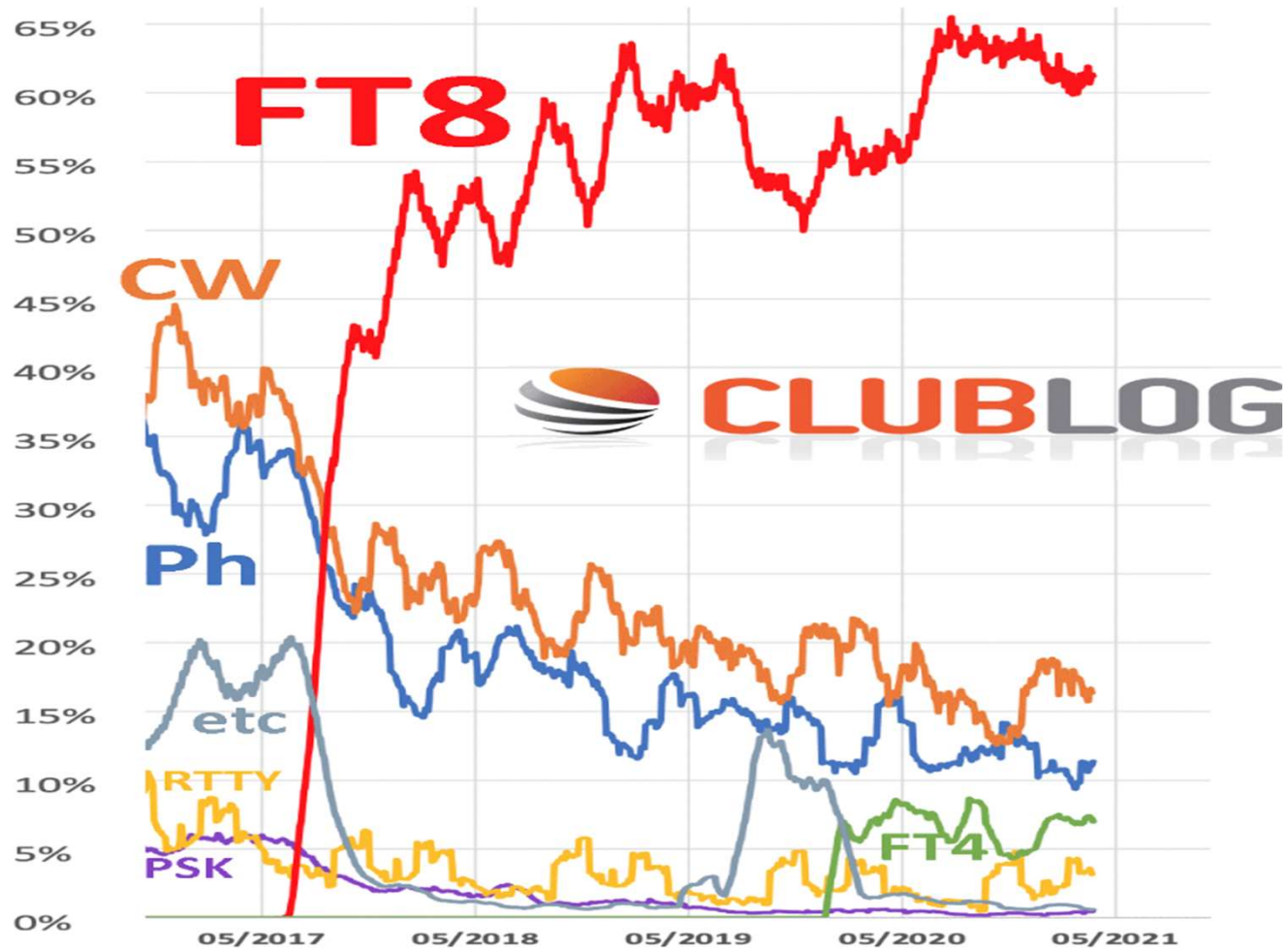
Advantages of FT8

- 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

Weak-Signal S/N Limits

<u>Mode</u>	<u>(B = 2500 Hz)</u>
SSB	~+10 dB
MSK144	- 8
CW, "ear-and-brain"	-15
FT8	-21
JT4	-23
JT65	-25
JT9	-27
QRA64	-27
WSPR	-31



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

Setup Screens

Settings

General | **Radio** | Audio | Tx Macros | Reporting | Frequencies | Colors | Advanced

Station Details

My Call: My Grid: AutoGrid IARU Region: All ▾

Message generation for type 2 compound callsign holders: Full call in Tx3 ▾

Display

Start new period decodes at top Font...

Blank line between decoding periods Decoded Text Font...

Display distance in miles

Tx messages to Rx frequency window

Show DXCC, grid, and worked-before status Show principal prefix instead of country name

Highlight DX Call in message Highlight DX Grid in message

Behavior

Monitor off at startup Enable VHF and submode features

Monitor returns to last used frequency Allow Tx frequency changes while transmitting

Double-click on call sets Tx enable Single decode

Disable Tx after sending 73 Decode after EME delay

Calling CQ forces Call 1st Disable Tune watchdog

Alternate F1-F6 bindings Tx watchdog: 6 minutes ▾

CW ID after 73 Periodic CW ID Interval: 0 ▾

OK Cancel

Settings

General Radio Audio Tx Macros Reporting Frequencies Colours Advanced

Rig: Icom IC-7300 Poll Interval: 1 s

CAT Control

Serial Port: COM5

Serial Port Parameters

Baud Rate: 115200

Data Bits

Default Seven Eight

Stop Bits

Default One Two

Handshake

Default None

XON/XOFF Hardware

Force Control Lines

DTR: RTS:

PTT Method

VOX DTR

CAT RTS

Port: COM5

Transmit Audio Source

Rear/Data Front/Mic

Mode

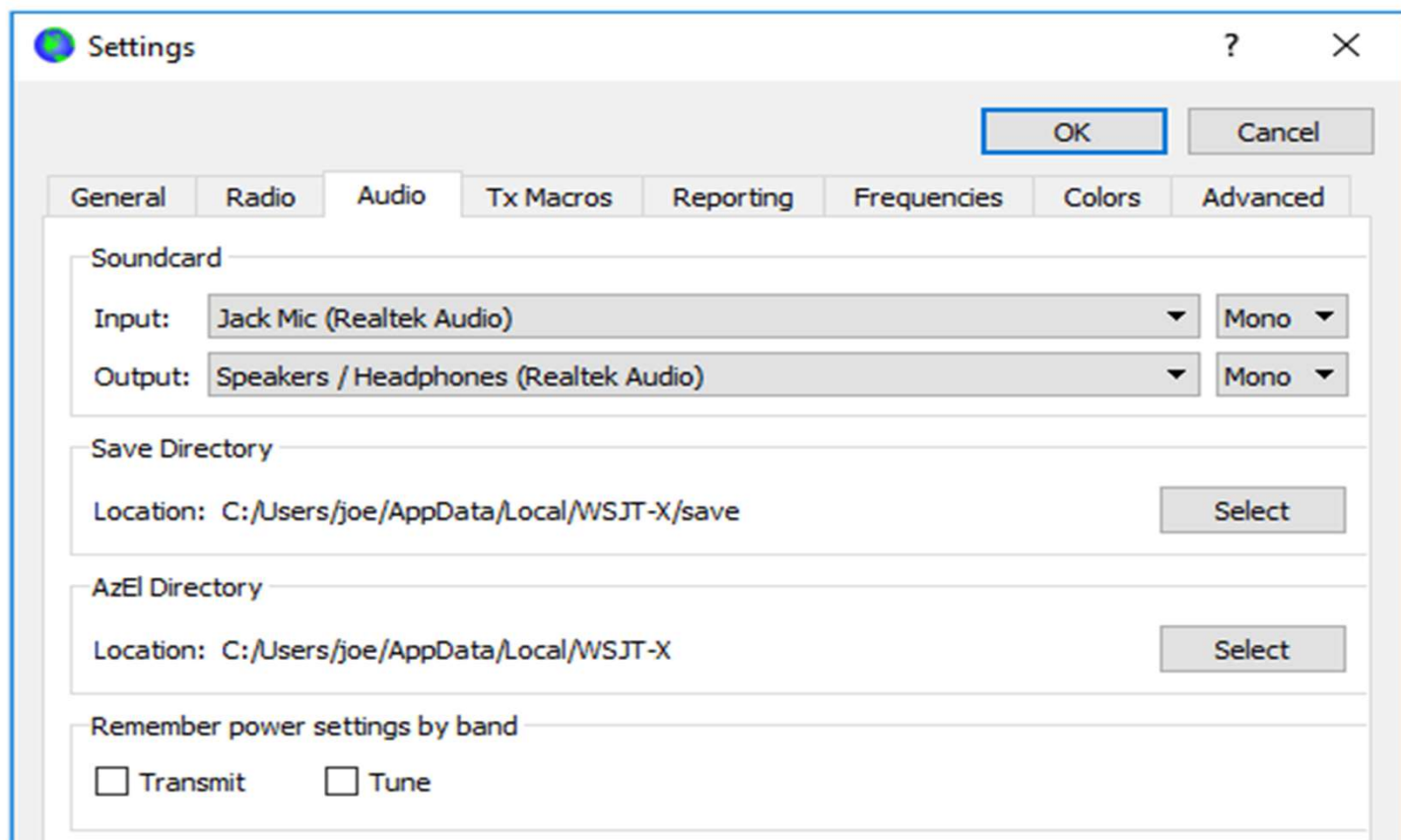
None USB Data/Pkt

Split Operation

None Rig Fake It

Test CAT Test PTT

OK Cancel



Control Screen

WSJT-X v2.7.0-rc4 by K1JT et al.

File Configurations View Mode Decode Save Tools Help

Band Activity

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	+ CS2GPD <CT1EQQ> RR73 Portugal
203152	-14	-0.1	2310	+ <CS2GPD> 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 <CS2GPD> 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

Rx Frequency

UTC	dB	DT	Freq	Message
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	+ <CS2GPD> JE1SYN PM96
203130	-6	0.2	1732	+ JR1AIB OT8P RR73 Belgium
203137	-3	0.2	1728	+ <CS2GPD> JE1SYN PM96
203200	-2	0.2	1731	+ JG3LGD OT8P JO21

CQ only

 Menus

17m S 18.104 000
 Tx even/1st Hold Tx Freq

Tx 1571 Hz

DX Call: JE1SYN DX Grid: PM96 Rx 1728 Hz

Az: 335 6755 mi Auto Seq CQ: None

2024 May 09 20:32:08

Generate Std Msgs

Next	Now	Pwr
JE1SYN N2WPT FN30	<input checked="" type="radio"/> Tx 1	<input type="text" value=""/>
JE1SYN N2WPT -03	<input type="radio"/> Tx 2	<input type="text" value=""/>
JE1SYN N2WPT R-03	<input type="radio"/> Tx 3	<input type="text" value=""/>
JE1SYN N2WPT RR73	<input type="radio"/> Tx 4	<input type="text" value=""/>
JE1SYN N2WPT 73	<input type="radio"/> Tx 5	<input type="text" value=""/>
CQ N2WPT FN30	<input type="radio"/> Tx 6	<input type="text" value=""/>

FT8 Screens

Band Activity

UIC	dB	DT	Freq	Message
212515	-18	0.1	2049	3D2CCC WA9IVH FM19
212515	-18	0.5	731	HI8MLV HI3K -15
212515	-13	0.1	1487	N2JF AA1EF FN43
212515	-15	-0.2	1502	7Q6M HK3J FU24
212515	-19	0.4	2185	K8SRB CE8EIO RR73 Chile
212515	-19	0.7	1233	Z14KYH KC2YIL 73 U.S.A.
212545	9	1.2	1331	CQ CO3LY EL82 Cuba
212545	2	-0.2	1019	CQ EA9AB IL28 Canary Is.
212545	3	1.4	1600	N2WPT FY2DPH GG66
212545	2	0.6	1646	<CS2GPD> HI3CH FK49
212545	3	0.5	1501	CQ KF8MAQ FK78 Puerto Rico
212545	4	0.1	1107	3D2CCC WA9IVH EN62
212545	-2	0.1	2471	CS2GPD<HI8RMO> RR73 Dominican Rep.
212545	-11	0.2	1835	<CS2GPD> CT3IQ IM12
212545	-13	-0.1	926	CQ HI8RMO FK49 Dominican Rep.
212545	-10	0.1	2049	3D2CCC WM3V 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 FU24 a7

Rx Frequency

UIC	dB	DT	Freq	Message
211800	-14	0.1	2461	CQ 5Z4VJ KI88 Kenya
211830	-17	0.1	2461	J48RKC 5Z4VJ -10
211900	-18	0.1	2461	J48RKC 5Z4VJ RR73 Kenya
212030	-1	0.2	2471	CQ CS2GPD Portugal
212100	1	0.2	2471	KC2YIL <CS2GPD> -03
212130	2	0.2	2472	<KC2YIL> CS2GPD RR73 Portugal
212200	-2	0.2	2471	CQ CS2GPD Portugal
212230	-2	0.2	2471	CQ CS2GPD Portugal
212300	3	0.2	2471	KM3V <CS2GPD> -01
212330	5	0.2	2472	<KM3V> CS2GPD RR73 Portugal
212400	-1	0.2	2471	CQ CS2GPD Portugal
212415	12	1.2	1331	CQ CO3LY EL82 Cuba
212436	Tx		2211	CO3LY N2WPT FN30 Cuba
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 FY2DPH GG66

Control Panel

Frequency: 24.915 000
 TX: 1600 Hz
 RX: 1331 Hz
 Date/Time: 2024 May 01 21:26:06
 Status: Receiving FT8
 Last Tx: CO3LY N2WPT 73

Generated Std Msgs

Message	Next	Now	Pwr
CO3LY N2WPT FN30	<input type="radio"/>	<input type="radio"/>	Tx 1
CO3LY N2WPT +09	<input type="radio"/>	<input type="radio"/>	Tx 2
CO3LY N2WPT R+09	<input type="radio"/>	<input type="radio"/>	Tx 3
CO3LY N2WPT RR73	<input type="radio"/>	<input type="radio"/>	Tx 4
CO3LY N2WPT 73	<input type="radio"/>	<input type="radio"/>	Tx 5
CQ N2WPT FN30	<input checked="" type="radio"/>	<input type="radio"/>	Tx 6

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

FT4

The screenshot shows the WSJT-X v2.7.0-rc4 interface. At the top, a wide graph displays a spectrum of signals with various call signs and frequencies. Below the graph, a control panel is visible, showing the current frequency (18.104 000) and mode (FT4). The control panel includes fields for DX Call, DX Grid, and a list of messages. The messages list shows various call signs and their corresponding frequencies and messages.

UTC	dB	DT	Freq	Message
203145	9	0.0	1443 +	JASMHD ON6LEO 73 Belgium
203145	10	0.2	1657 +	8P2K DK2CX +06
203145	2	0.1	2078 +	CQ PE0TX JO32 Netherlands
203145	-9	-0.0	734 +	JH6EFI ON2VG +03
203145	-6	0.3	1481 +	8P2K SP6JUI JO80
203152	8	0.2	1036 +	I27XNB JRI1B -13
203152	-4	0.1	1170 +	T77C LA2IR JF77
203152	-1	-0.0	1484 +	CQ 8P2K GK03 Barbados
203152	2	0.2	1777 +	CS2GPD <CT1EQQ> RR73 Portugal
203152	-14	-0.1	2310 +	<CS2GPD> SV3AW RM17
203200	-2	0.2	1731 +	JG3LGD OT8P JO21
203200	0	0.0	642 +	JRI1B I27XNB 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 <CS2GPD> R-06
203200	-9	0.3	1938 +	JRI1B UF5F KO85
203200	11	0.2	1482 +	8P2K DK2CX +03
203200	-15	0.2	2454 +	JF2JRD R2ASY +02

The control panel shows the following information:

- Frequency: 18.104 000
- Mode: FT4
- DX Call: JE1SYN
- DX Grid: PM96
- Az: 335, 6755 mi
- Report: -3
- Auto Seq:
- CQ: None
- Best 5+P

The messages list on the right side of the control panel includes:

- JE1SYN N2WPT FN30
- JE1SYN N2WPT -03
- JE1SYN N2WPT R-03
- JE1SYN N2WPT RR73
- JE1SYN N2WPT 73
- CQ N2WPT FN30

JT Alert

The screenshot displays a software interface with two main windows. The top window, titled "Callsigns #1", shows a list of call signs with their respective countries and status indicators. The bottom window, titled "Activity", shows a table of activity statistics for various call signs over time.

Callsigns #1 - All decodes

-13 AA1EF ME U.S.A.	+09 CO3LY B4 CQ Cuba	-11 CT3IQ Madeira Is.	+02 EA8DS CQ Canary Is.	+02 HI3CH Dominican Rep.	-22 HI3K Dominican Rep.	-13 HI3K CQ Dominican Rep.	-02 HI8RMQ B4 Dominican Rep.	-21 HK3J Colombia	-10 KM3V MD U.S.A.
+03 KP4MAQ CQ Puerto Rico	+03 PY2DPM B4 Brazil	+04 WA9IVH IL U.S.A.							

Callers : Alert

+12 CO3LY CQ Cuba	+03 PY2DPM B4 Brazil
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Alerts Only

+03 PY2DPM B4 Brazil

Activity - Callsigns @ 21:25 utc

	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

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!