# **INTRODUCTION TO FT8**

PART 2

#### TOPICS FOR PART 2

- FT4
- Frequencies
- Fox and Hound
- Logging
- Setting up colors within WSJT-X
- JT Alert
- Best S+P feature

### WHAT IS FT4?

- Designed in 2019, originally intended for contesting.
- Like FT8 it uses:
  - Fixed-length transmissions (77 bits)
  - Structured messages
  - Strong forward error correction
- T/R sequences are 6 seconds long (FT8's are 15 seconds)
- Transmissions last for 4.48 seconds (FT8's are 12.64 seconds)
- Uses 4-tone frequency-shift keying (FSK); FT8 uses 8-tone FSK.
- FT4 is 3.5 dB less sensitive than FT8 and requires twice the bandwidth.

### FREQUENCIES FOR FT4 AND FT8

• Specific frequencies on each band are used by agreement for FT8 and FT4. You don't have to tune up and down the band to find stations to work.

<u>FT8</u>	<u>FT4</u>
1.840	
3.573	3.575
7.074	7.047.5
10.136	10.140
14.074	14.080
18.100	18.104
21.074	21.140
24.915	24.919
28.074	28.180
50.313	50.318
50.323	
70.154	
144.174	144.170

### EXAMPLE OF A CONTACT WITH FT4 SAME AS WITH FT8 BUT IN HALF THE TIME

- CQ K2DM EL88
- K2DM NOSMX EL98
- NOSMX K2DM -03
- K2DM NOSMX R+02
- NOSMX K2DM RR73
- K2DM N0SMX 73

K2DM sends CQ during the first 7.5-sec period
 N0SMX answers during the next period
 K2DM sends a signal report to N0SMX
 N0SMX rogers and sends a report back
 K2DM rogers and says 73
 N0SMX sends 73

• The entire sequence took 45 seconds!

# FOX AND HOUND MODE IN FT8 AKA "DXPEDITION MODE"

## FOX AND HOUND MODE

- Is intended for use by rare-entity DXpeditions and other circumstances where rates well over 100/hour are expected.
- Enables DXpeditions to make FT8 QSOs at very high rates.
  - Does not work in FT4.
- The DXpedition station is the FOX, and the calling stations are the HOUNDS.
- QSOs can be completed with as little as one FOX transmission per QSO.
- Authorized FOX stations can transmit up to five signals simultaneously!

#### FOX AND HOUND MODE RESTRICTIONS AND PREREQUISITES

- The multi-signal capability should only be used if sustained QSO rates are expected to be well above 100 per hour.
- Do NOT use DXpedition mode on the conventional FT8 frequencies.
  - Find a suitable dial frequency and publicize it for the Hounds.
- WSJT-X release 1.9.0 or later is required, but release 2.6.0 makes HOUND mode easier to use.
  - Release 2.6.0 added a button to select the HOUND mode.



Selecting the HOUND button puts WSJT-X into the HOUND special operating activity on the **Settings | Advanced** tab.

General Radio Audio	Tx Macros	Reporti	ng Frequencies	Colors	Advanced	
JT65 VHF/UHF/Microwave de	coding paramet	ers	Miscellaneous			
Random erasure patterns:	6	-	Degrade S/N of .way	v file: 0.0 dt	B	•
Aggressive decoding level:	0	-	Receiver bandwidth:	2500	Hz	•
Two-pass decoding			Tx delay:	0.2 s	;	•
			Tone spacing			
			🗌 x 2	🗌 x 4	ł	
			-Waterfall spectra			
			O Low sidelobes		st sensitive	
Special operating activity						
⊖ Fox	Hound					
		eld Day		FD Exc	th:	
O EU VHF Contest	O FT Roun	dup		FT RU Exc	th:	
O WW Digi Contest		gi Contest				
	CQ with	individual o	contest name	Contest nam	ne: PACC	
				OK	Cano	cel

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Settings

#### Settings

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eneral Radio Audio Tx Macros Re	porting	Frequencies	Colors	Advanced
g: Elecraft K4			~	Poll Interval: 1s 🖨
CAT Control		TT Method		
Serial Port: COM4 ~	-     C	⊃ vox	0	DTR
Serial Port Parameters		CAT	0	RTS
Baud Rate: 38400 V	P	ort: COM4		~
	Т	ransmit Audio So	ource	
Data Bits		Rear/Data	۲	Front/Mic
🔿 Default 🔿 Seven 💿 Eight	M	lode		
Stop Bits		) None		Data/Pkt
◯ Default ◯ One	S	plit Operation		
Handshake	0	) None	Rig	○ Fake It
O Default   None				
○ XON/XOFF ○ Hardware				
Force Control Lines		Test CAT		Test PTT
DTR: V RTS: V				

#### FOX AND HOUND MODE MORE RESTRICTIONS AND PREREQUISITES

Everyone should use **CAT** control with **Split Operation** (either **Rig** or **Fake It**) on the **Settings Radio** tab.

#### FOX AND HOUND MODE MORE RESTRICTIONS AND PREREQUISITES

Everyone should check **Monitor returns to last used frequency** on the **Settings | General** tab.

	os Reporting Frequencies Colors Advanced
Station Details	
My Call: K2DM My Grid:	EL88 AutoGrid IARU Region: All ~
Message generation for type 2 compound	d callsign holders: Full call in Tx3 ~
Display	
Start new period decodes at top	Font
Blank line between decoding periods	Deceded Text Feet
Display distance in miles	Decoded Text Font
Tx messages to Rx frequency window	N
Show DXCC, grid, and worked-before	e 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 off at startup     Monitor returns to last used frequence	Enable VHF and submode features  Allow Tx frequency changes while transmitting
Monitor off at startup Monitor returns to last used frequenc Double-click on call sets Tx enable	Enable VHF and submode features  Allow Tx frequency changes while transmitting  Single decode
Monitor off at startup Monitor returns to last used frequenc Double-click on call sets Tx enable Disable Tx after sending 73	<ul> <li>Enable VHF and submode features</li> <li>Allow Tx frequency changes while transmitting</li> <li>Single decode</li> <li>Decode after EME delay</li> </ul>
Monitor off at startup Monitor returns to last used frequenc Double-click on call sets Tx enable Disable Tx after sending 73 Calling CQ forces Call 1st	Enable VHF and submode features  Allow Tx frequency changes while transmitting  Single decode  Decode after EME delay
<ul> <li>Monitor off at startup</li> <li>Monitor returns to last used frequence</li> <li>Double-click on call sets Tx enable</li> <li>Disable Tx after sending 73</li> <li>Calling CQ forces Call 1st</li> <li>Alternate F1-F6 bindings</li> </ul>	<ul> <li>Enable VHF and submode features</li> <li>Allow Tx frequency changes while transmitting</li> <li>Single decode</li> <li>Decode after EME delay</li> <li>Tx watchdog: 6 minutes \$\overline\$</li> </ul>

Settings

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Cancel

#### FOX AND HOUND MODE BASIC OPERATION

- The FOX transmits at audio frequencies between 300 and 900 Hz.
  - If the FOX is transmitting multiple simultaneous signals, the signals are spaced at 60 Hz intervals.
  - Each of these signals is called a stream.
- HOUNDS make initial calls anywhere between 1000 4000 Hz.
  - FOX will NOT respond to HOUNDS who make their initial calls below 1000 Hz.
- When the FOX (finally!) calls you (the HOUND) and gives you a report, your report back to the FOX is automatically sent at the same frequency that the FOX called you on (his stream frequency)!!!
  - This moves your signal out of all the QRM above 1000 Hz and down to the clear area where only the FOX is supposed to transmit.
- If your waterfall display does not show ANY other HOUND stations calling the FOX, click the Rx All Freqs box on the main WSJT-X screen.
  - This allows you to find a clear spot to use for calling the FOX.



#### FOX AND HOUND MODE EXAMPLE OF A F/H CONTACT OR TWO

- 1. FOX, transmitting on 540 Hz: CQ VP2MDM
- 2. Multiple HOUNDS, transmitting at various frequencies above 1000 Hz: VP2MDM K4ZDM EL88, VP2MDM NOSMX EL 92, VP2MDM W4MRJ EL88
- 3. FOX, transmitting on 540 Hz: K4ZDM VP2MDM -13
- 4. HOUND, transmitting on 540 Hz: VP2MDM K4ZDM R-11
- 5. FOX, transmitting on 540 Hz: K4ZDM RR73; N0SMX <VP2MDM> -11
- 6. HOUND, transmitting on 540 Hz: VP2MDM NOSMX R-16
- 7. FOX, transmitting on 540 Hz: NOSMX RR73; W4MRJ <VP2MDM> -09
- 8. NOTE: When the FOX sends RR73 to one station, he can also send a signal report to ONE additional station, which will pull THAT station down to the FOX's stream frequency.
  - The result of all this is that only one station at a time can be talking to the FOX on the FOX's stream frequency.
  - The station to whom the FOX sent RR73 is returned to their original frequency above 1000 Hz!

# WHEN DOES A FOX ABORT A QSO?

- WSJT-X maintains several queues in a manner that allows difficult QSOs to be completed while keeping the overall QSO rate high.
- We use a "3 strikes and you're out" rule.
- Fox will call a specific Hound up to 3 times, waiting for an "R+rpt" response. If no response is received – abort.
- If a Hound repeatedly sends an "R+rpt" message, Fox will send RR73 up to 3 times, then abort.
- Finally, the total timespan of an attempted QSO is limited to 3 minutes, the QSO is aborted.

#### FOX AND HOUND MODE HOW TO TELL IF A STATION IS A FOX

- The FOX announces their operation ahead of time.
- The FOX is operating on a dial frequency that is not a standard FT8 frequency.
- The FOX station is transmitting below 900 Hz.
- The station transmits messages to more than one other station at a time, e.g.: K4ZDM RR73; N0SMX <VP2MDM> -11
- The FOX station only transmits during the EVEN transmit/receive periods.

#### MSHV

### Let's Take a Side Trip to Bulgaria

- WSJT-X has a competitor called MSHV, which was developed by LZ2HV.
- I am not going to say much about MSHV now except as it pertains to FOX/HOUND operation.
- Some FOXes use MSHV. If you call them using WSJT-X in HOUND mode, you may not be able to work them.

#### MSHV IN MULTISTREAM MODE ADVANTAGES RE: FOX/HOUND

- Callers do not have to make any configuration changes or have any knowledge beyond knowing how to use the standard FT8 mode.
- It can be used not only for true DX expeditions, but also for other smaller events, such as special events, activations, etc.
- Callers can use any frequency to call the DX, so more bandwidth is allowed.

#### MSHV IN MULTISTREAM MODE DISADVANTAGES RE: FOX/HOUND

- The program can be configured for a maximum of 5 simultaneous frames, but since each frame will only contain one message, the maximum number of simultaneous QSO is only 5.
- The DX operator can choose whether to transmit in odd or even periods, which can lead to confusion for the most inexperienced callers who sometimes end up transmitting in the same period of the DX.
- Callers can use any frequency to call the DX, even frequencies already being used for the ongoing contacts of the DX, causing him trouble to complete the contacts.

**IMPORTANT:** In no case, under any circumstances, should the FT8 standard frequencies be used, neither for Fox/Hound, nor for multistream.

## LOGGING OPTIONS WITH WSJT-X

- 1. Log contacts directly to an adi file on your computer.
- 2. Send contact information to your logging program on your computer.

To log a QSO within WSJT-X, click **Log QSO** on the main screen. This will bring up a confirmation window on which you can click **OK** to confirm the QSO.

You can also administer WSJT-X so that the confirmation window pops up automatically at the end of a QSO.



On the **Reporting** tab in **Settings**, check the box next to **Prompt me to log QSO**. The confirmation window will then come up automatically at the end of each QSO.

General Radio Audi	o Tx Macros	Reporting	Frequencies	Colors	Advanced					
Logging										
Prompt me to log QSO			Op Ca	all:						
Log automatically (con	testing only)									
Convert mode to RTTY										
dB reports to comments										
Clear DX call and grid after logging										
Network Services										
Enable PSK Reporter S	potting	🗌 U	se TCP/IP conne	ection						
UDP Server										
UDP Server:	127.0.0.1			JDP request	s					
UDP Server port number:	2237				IDD request					
Outgoing interfaces:	loopback_0			n accepted t	DDP request					
Multicast TTL:	1		Accepte	d UDP reque	est restores w	vindow				
Secondary UDP Server (de	precated)									
Enable logged contact	ADIF broadcast									
Server name or IP address	s: 127.0.0.1									
Server port number:	2333					-				

Settings

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Cancel

#### To see your WSJT-X log, first go to **File | Open log directory**. This will bring up a list of available WSJT-X logs, including performance logs.

File	Configu	urations	View	Mode	Decode	Save	Tools	Help								
	Open				Ctrl+	ю							Rx Frequency			
	Open ne	ext in direc	tory			- 1				UTC	dB	DT Freq	Message			
	Decode	remaining	files in (	directory	Shift	+F6			~							~
I	Delete a Erase Al Erase W Erase W Reset C Export ( Open log Settings	II *.wav 8 LL.TXT sjtx_log.a /SPR hash abrillo log Cabrillo log g directory	di table	es in Sav	eDir											
-	Exit															
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20r	n	- <b>-</b>		14.	074 0	00		Tx even/1 Tx 1500 Hz	st		5	Gene	rate Std Msgs	Next	Now	Pwr
	г	Н		DX Cal	I	DX	Grid	<b>A V</b>	7		2	<w4mrj></w4mrj>		۲	Tx 1	
	-80	FT8		W4MR.	]			Rx 983 Hz	÷.			W4MRJ <> -15		0	Tx 2	_
	-60	FT4						Report -15	ŧ			W4MRJ <> R-1	5	0	Tx 3	-
	-40	MCK	L	ookup		Add		Rx All Free	ls			<w4mrj> RR</w4mrj>	73	0	Tx 4	-
	-20	MDK		202	D A	. 10		🗹 Auto Seq				<w4mrj> 73</w4mrj>		<b>v</b> 0	Tx 5	-
0	Е <sub>о</sub> db	Q65 JT65		202.	2:34:5	50 50			Hound					0	Tx 6	-
F	Receiving		FT8												5/15	WD:6m

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Double-click on **wsjt-x\_log.adi** to open your log in adi format. Or double-click on **wsjt-x.log** to open your log in text format.

10	☐   ☑ ☐ 〒   WSJT-X File Home Share View					- □ × ^ ()
đ	Pin to Quick Copy access Copy	Move Copy to v to v	New item ▼ L L L L L L L L L L L L L L L L L L L	Properties ♥ Den ♥ ♥ Den ♥ ♥ Edit ₩ History	Select all Select none Invert selection	
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	← → · · ↑ 🔒 > George > AppData	> Local > WSJT-X			ب 5	Search WSJT-X
	Name	Date modified Typ	pe Size			
	logs	5/10/2023 11:34 AM File	e folder			
1	save	5/10/2023 11:34 AM File	e folder			
r	db.sqlite	5/10/2023 11:34 AM SQL	LITE File 0 K	В		
	jt9_wisdom.dat	8/9/2023 5:52 PM DAT	AT File 1 K	В		
5	timer.out	8/9/2023 5:52 PM OU	JT File 1 K	В		
ł	WSJT-X.ini	8/10/2023 8:33 AM Cor	onfiguration sett 26 K	В		
	wsjtx.log	8/10/2023 8:33 AM Text	xt Document 1 K	В		
	/////////wsjtx_log.adi	8/10/2023 8:33 AM ADI	)l File 1 K	В		
	wsjtx_syslog.log	8/9/2023 5:52 PM Text	xt Document 4 K	В		
	wsity wisdom dat	8/9/2023 5:52 PM DA7	AT File 1 K	R		

## LOGGING TO AN EXTERNAL PROGRAM

#### • Two steps:

- 1. Enable UDP in WSJT-X
  - User Datagram Protocol is just a data communication protocol for time sensitive information.
- 2. Tell your logging program about WSJT-X

#### STEP 1.

Remember the **Reporting** tab on the **Settings** screen in WSJT-X? This is where you activate the link to send your QSOs to your logging program. Check the three boxes in the **UDP Server** section.

Settings					?
General Radio Audio	Tx Macros	Reporting	Frequencies C	olors Advan	ced
Logging					
Prompt me to log QSO			Op Call:		
Log automatically (conte	sting only)		L		
Convert mode to RTTY					
dB reports to comments					
Clear DX call and grid af	ter logging				
Network Services					
Enable PSK Reporter Spo	otting	🗌 U	se TCP/IP connectior	ı	
UDP Server					
UDP Server:	127.0.0.1		Accept UDP r	equests	
UDP Server port number:	2237		🔹 🗹 Notify on acc	epted UDP requ	iest
			Accepted UD	P request restor	res window
Secondary UDP Server (dep	recated)				
Enable logged contact A	DIF broadcast				
Server name or IP address:	127.0.0.1				
Server port number:	2333				<b>*</b>
				OK	Cancel

#### STEP 2.

#### In your N3FJP logging program, go to Settings | Application Program Interface (API) Check the box for TCP API Enabled (Server), and check the box for Listen for WSJT-X.

7 11 01 00	ozogo recou		1	
		N3FJP API 2.1		
Bnd	Mode	Server API - Allow any properly coded program to connect	ST	County
20	FT8	API Server Functionality - Use this section to enable other programs.		
20	FT8	including other N3FJP Software programs, to connect to this one.	PA	
20	FT8	Laften receive requests from folke who would like to interface their	KS	
20	FT8	digital or logging programs with my logging software. To	GA	
10	FT8	accommodate those requests, I have added easily implemented		
10	FT8	Application Program Interface (API) functionality, to enable any other		
10	FT8	program to do just mate	VT	
10	FT8	If you have a program that you would like to see interfaced with my	PA	
10	FT8	software, please contact the developer(s) and refer them to this page:	IL	
10	FT8	http://www.n3fip.com/help/api.html	ТХ	
10	FT8			
10	FT8	Please click here for the detailed API specifications.	KS	
10	FT8		FL	
10	FT8	TCP API Enabled (Server) Port 1100	PA	
10	FT8	Server Running = True Port = 1100	FL	
10	FT8		MI	
10	FT8	WSJT-X Interface Sec Flansed: 7	PA	
10	FT8	Sec Liapsed. 7	NJ	
10	FT8	Listen for WSJT-X Configure	NY	
10	FT8	To migr WS IT, in WS IT, did: Settings > Reporting > Check Ament LIDP Requests		
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		Client - Only used from N3E IP contest software to AC Log		
		onent - only used non-nor of contest software to ho bog		
Band		API Client Functionality - Use this section to enable N3FJP Contest	S	ent
	~ FT8	working in the contest software is confirmed in AC Log.		
		-		
County	Er	To use this function:		
County		······································	π	Spot I
	~	Host DESKTOP-T05CQA Port 1100	rd 📃	
		Enable Entity Confirmation Check via API		
		Disconnected		
		Disconnected		
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