

Practical Operating with FT8

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Don Sandstrom, W7VXS

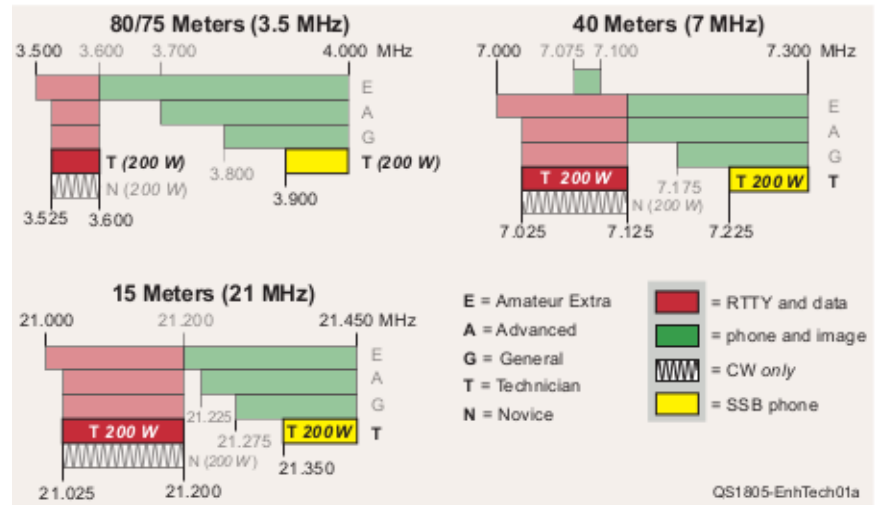


WSJT-X: “Weak Signal Communication by K1JT-Extended”

- Multi-Mode digital software package by Joe Taylor K1JT and collaborators
- Modes: FT8, JT4, JT9, JT65, QRA64, ISCAT, MSK144, and WSPR—today’s focus on FT8
- Short messages compressed, encoded and sent as a unit, not letter-by-letter
- Messages Tx/Rx on 15-second intervals
- Strong sensitivity and error correction—24 dB below noise
- Entire band segment decoded on every interval
- Automation of timing and message sequencing
- Introduced in June, 2017
- Wide adoption on HF and VHF/UHF bands
- Focus on making QSOs, not conversation & not EMCOMM

New Ham and Technician-Class Benefits

- FT8 an option for modest stations to operate on HF
 - Low power and modest antenna will perform well
- ARRL-proposed expansion of Tech privileges on HF
 - Better pathway to HF and General Class
 - Add phone and data band segments on 80/75, 40, 15 m



WSJT-X Resources

- Must read these articles:

Work the World with WSJT-X, Joe Taylor, K1JT, et. al

- *Part 1: Operating Capabilities*, QST, Oct. 2017 p. 30
- *Part 2: Codes, Modes, and Cooperative Software Development*, QST, Nov. 2017 p. 34
- User Guide distributed with software and at:
www.physics.princeton.edu/pulsar/K1JT/wsجتx-doc/wsجتx-main-1.8.0.html
- Discussion group: WSJT-X at groups.io/g/WSJT-X

WSJT-X Resources

Joe Taylor's presentation
at Microsoft Digital
Conference, March 24

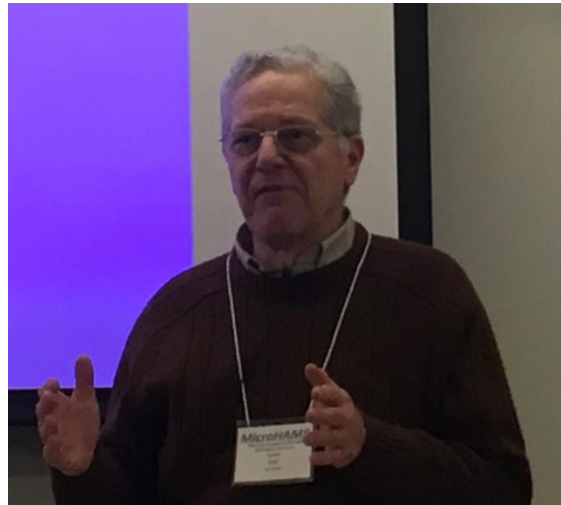


Photo: Steve Stroh, N8GNJ

- Slides:
microhams.blob.core.windows.net/content/2018/03/MHDC2018-K1JT.pdf
- Video: youtu.be/j1sWCtVzzak

WSJT-X—Where to Get It

- Description and downloads at:
<https://www.physics.princeton.edu/pulsar/K1JT/wsjtx.html>
 - Current release is 1.8.0 but... scroll down for beta
 - Get current beta version: 1.9.0-rc4 (as of 5/14/2018)
 - Windows file is: `wsjtx-1.9.0-rc4-win32.exe`
- User Guide distributed with software and at:
<https://www.physics.princeton.edu/pulsar/K1JT/wsjtx-doc/wsjtx-main-1.8.0.html>

Operating WSJT-X

What is a QSO?

- Both sides know callsign of other station
- Both sides receive some expected information
- HF DX or contest QSO, usually...
 1. CQ K5D Running the frequency
 2. K7NWS Calling K5D obvious
 3. K7NWS 599 ID this caller; pass info
 4. R 599 TU Ack info;pass info
 5. 73 K5D QRZ Ack info reply; continue run
- Info can be signal report, grid square or any information defined by contest rules (e.g. name, CQ zone, serial number, etc)

WSJT-X Message Exchange

- WSJT-X modes QSO similar, uses Standard Messages
 1. CQ K1JT FN20
 2. K1JT K7NWS CN87
 3. K7NWS K1JT -13
 4. K1JT K7NWS R-9
 5. K7NWS K1JT RRR
 6. K1JT K7NWS 73
- Four-character Maidenhead grid locators exchanged
- SNR signal reports dB relative to 2,500 Hz BW noise power
- Each transmission carries payload packed and sent as single unit

FT8 QSO Examples

Answering CQ

- Basic QSO with extra 73 (common)
 - Split frequency (common)

UTC	dB	DT	Freq	Message
053530	-6	0.1	1677 ~	CQ K7FYI DM26
053546	Tx		1044 ~	K7FYI W7VXS CN87
053600	-2	0.1	1677 ~	W7VXS K7FYI -08
053615	Tx		1044 ~	K7FYI W7VXS R-02
053630	-11	0.1	1677 ~	W7VXS K7FYI RRR
053645	Tx		1044 ~	K7FYI W7VXS 73
053700	-13	0.1	1677 ~	W7VXS K7FYI 73

- QSO with RR73 (shorter)

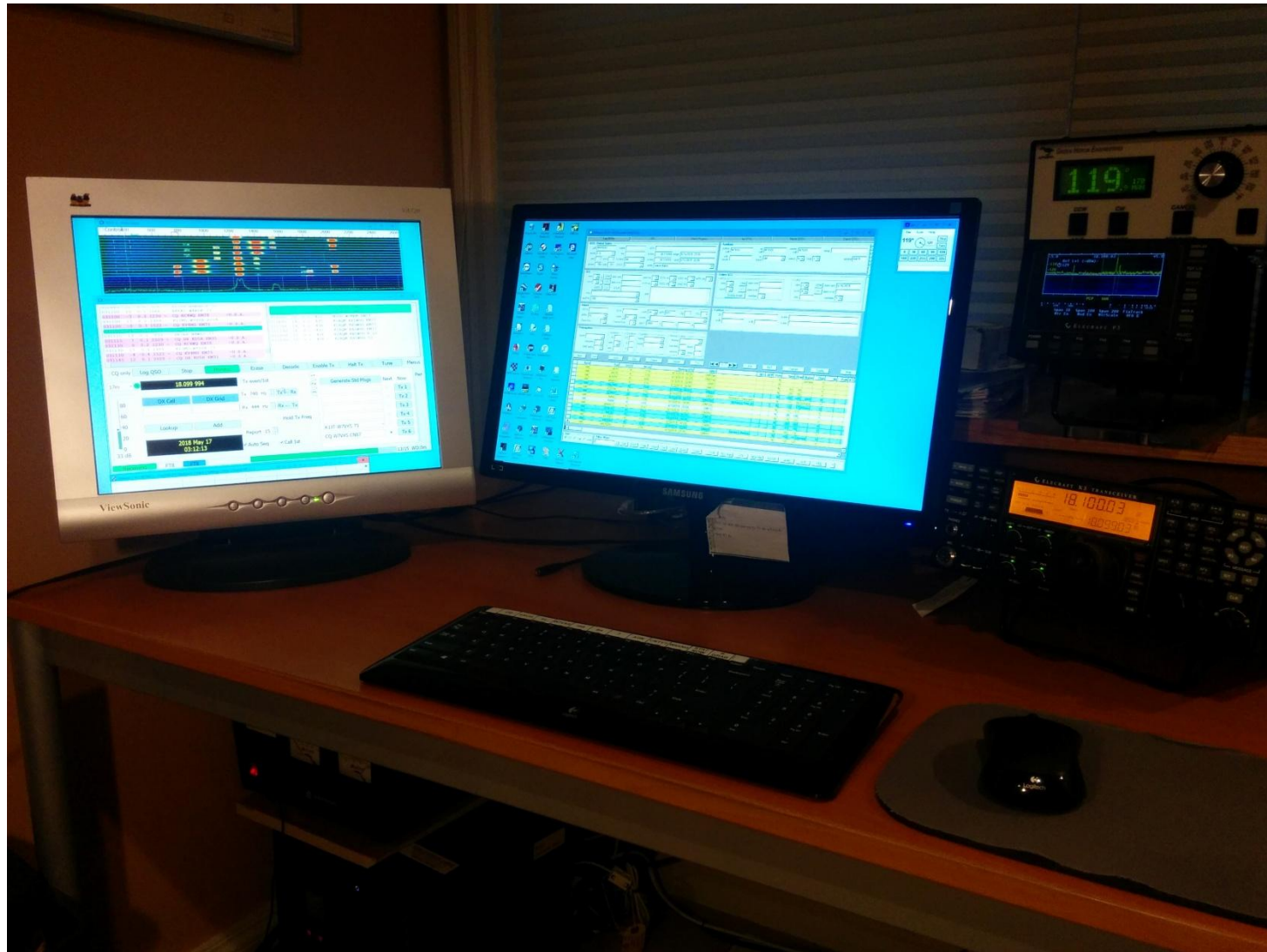
- Running station jumped to my frequency (unusual)

053100	-5	0.1	2330 ~	CQ VE9DX FN75
053116	Tx		1044 ~	VE9DX W7VXS CN87
053130	-8	0.1	1045 ~	W7VXS VE9DX -10
053145	Tx		1044 ~	VE9DX W7VXS R-08
053200	-7	0.1	1045 ~	W7VXS VE9DX RR73
053215	Tx		1044 ~	VE9DX W7VXS 73

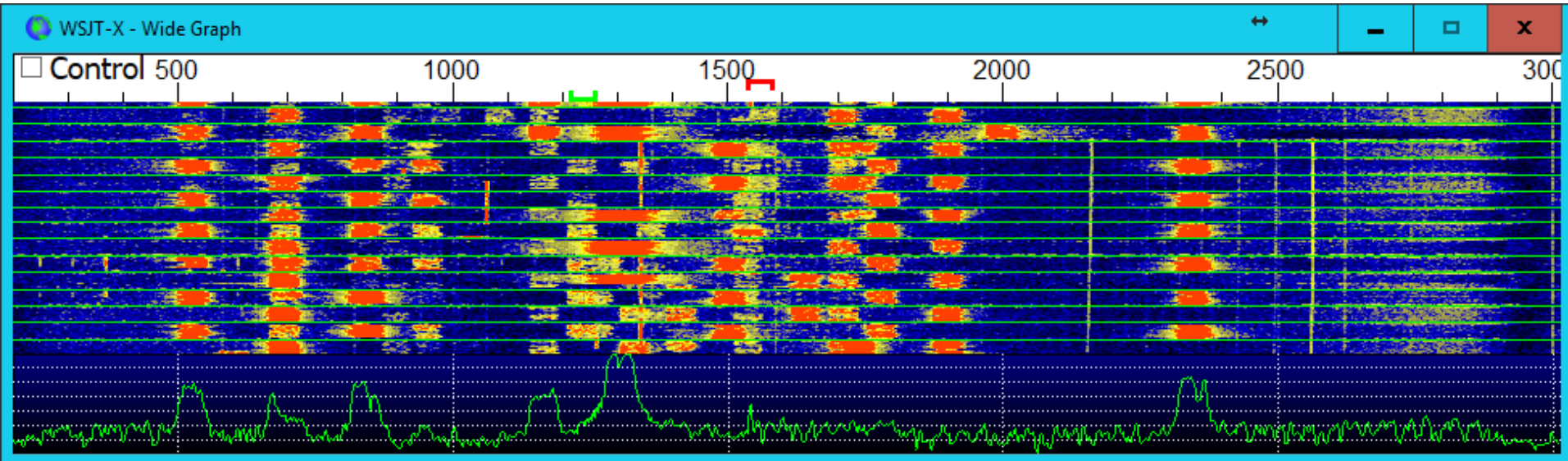
- QSO with weak signals/QRM—repeats
 - Split frequency

UTC	dB	DT	Freq	Message
051700	Tx		1513 ~	K0JV W7VXS CN87
051715	-18	0.1	1441 ~	CQ K0JV DN84
051730	Tx		1513 ~	K0JV W7VXS CN87
051800	-8	0.2	1441 ~	K0JV KJ0I R-03
051800	-4	0.2	1064 ~	CQ AI6MQ DM07
051828	Tx		1513 ~	AI6MQ W7VXS CN87
051830	-15	0.2	1064 ~	CQ AI6MQ DM07
051845	Tx		1513 ~	AI6MQ W7VXS CN87
051900	-16	0.2	1064 ~	W7VXS AI6MQ -03
051915	Tx		1513 ~	AI6MQ W7VXS R-16
051945	Tx		1513 ~	AI6MQ W7VXS R-16
052000	-7	0.2	1064 ~	W7VXS AI6MQ RRR
052015	Tx		1513 ~	AI6MQ W7VXS 73
052030	-10	0.2	1064 ~	W7VXS AI6MQ 73

W7VXS Hamshack



FT8 Wide Graph



FT8 Main Window Layout

WSJT-X v1.8.0 by K1JT

File Configurations View Mode Decode Save Tools Help

Band Activity

UTC	dB	DT	Freq	Message
214500	-15	0.7	1081	~ CQ KI8L EN80 ~U.S.A.
214500	-22	0.5	1400	~ CQ MT KI4JM FM03 ~U.S.A.
214500	-3	0.1	1517	~ CQ K4AFE EM55 ~U.S.A.
214500	6	0.1	1567	~ VE2NCG AI5P -16
214500	6	-0.1	1611	~ VE7AS K9BR EM49
214500	7	0.2	1758	~ CQ AD5XD EM12 U.S.A.

Rx Frequency

UTC	dB	DT	Freq	Message
214045	-19	0.0	1216	~ AE7CD KE7UIU RRR
214115	-23	0.0	1216	~ CQ KE7UIU CN88
214130	-20	-0.1	1217	~ KE7UIU KF4WQH EN61
214145	-21	-0.0	1216	~ CQ KE7UIU CN88
214200	-14	-0.1	1217	~ KE7UIU KF4WQH EN61
214230	-20	-0.0	1217	~ KE7UIU KF4WQH EN61

Log QSO Stop **Monitor** Erase Decode Enable Tx Halt Tx Tune Menus

17m s 18.100 000

Tx even/1st

DX Call KA1AF DX Grid EL98 Tx 1536 Hz Tx ← Rx
 Rx 1213 Hz Rx ← Tx

Az: 106 4123 km Hold Tx Freq

Lookup Add Report -13

Auto Seq Call 1st

NA VHF Contest

2018 Jan 04
21:45:17

Generate Std Msgs Next Now Pwr

KA1AF W7VXS CN87	<input checked="" type="radio"/>	Tx 1
KA1AF W7VXS -13	<input type="radio"/>	Tx 2
KA1AF W7VXS R-13	<input type="radio"/>	Tx 3
KA1AF W7VXS RRR	<input type="radio"/>	Tx 4
KA1AF W7VXS 73	<input type="radio"/>	Tx 5
CQ W7VXS CN87	<input type="radio"/>	Tx 6

Receiving FT8 FT8 Last Tx: KA1AF W7VXS CN87 2/15 WD:0m

Remote FT8 demonstration follows...

Operating Tips

- See User Guide section 6.6 for FT8 suggestions
- Download ZL2IFB tip sheet:
http://www.physics.princeton.edu/pulsar/K1JT/FT8_Operating_Tips.pdf
- Check “Hold TX Freq” box
- Operate split most/all of the time
 - Shift-click waterfall to set TX freq in clear space (red goalpost)—watch for QRM on your TX freq—keep an eye on both even and odd time slots
 - You can change frequency during QSO to avoid QRM (but not during transmit cycle)
- Don’t worry about the RX frequency (green goalpost)—software manages it for you.
- Make sure your radio sound card output is not the Windows default—prevent Windows sounds transmit.

Getting on the Air Requirements

- HF SSB transceiver and antenna (or 6 meters)
- Computer: Windows (\geq XP), Linux, or OS X
 - CPU \geq 1.5 GHz; \geq 200 MB memory
 - Monitor $>$ 1024 x 768 resolution
 - SWSJT-X software installation per users' guide
- Sound card interface to radio
- Rig control interface to radio
 - At least T/R switching (PTT, CAT, or VOX)
 - PTT can be via separate COM port from CAT
 - Full CAT control desirable but not mandatory
- Computer clock sync to UTC within ± 1 second
- If already operating digital you are probably good to go

Accessory Software

JTAlert; Loggers

- WSJT-X creates `wsjtx_log.adi` (ADIF format)
 - “worked before” status is read from this file
- JTAlert interfaces with WSJT-X to display band activity alerts and provides interface to logger software
 - Download at: <http://hamapps.com/>
- JTAlert logger interfaces
 - DXLab-DXKeeper
 - Ham Radio Deluxe V5/V6
 - Log4OM
 - ACLog
 - Last QSO API works with N1MM Logger+