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Release: WSJT-X Version 1.8.0-rc2
September 2, 2017

Implementation of FT8 and its auto-sequencing feature is now more capable and more polished. The decoder is faster and better: it now includes signal subtraction, multi-pass decoding, and the use of accumulated "a priori" information as a QSO progresses. Sensitivity extends downward as far as -24 dB in some circumstances. Overlapping signals 2 and 3 deep are frequently decoded at essentially the same frequency. On a crowded band we sometimes see more than 30 decodes in a single 15-second interval, over a 2 kHz window. The North American VHF Contesting Mode has been extended to include both FT8 and MSK144 modes.

The "RC2" release also includes many minor bug fixes and an extensively updated WSJT-X User Guide.

Depending on what code revision you upgrade from, it may be necessary to do a one-time reset of the default list of suggested operating frequencies. Go to *File->Settings->Frequencies*, right click on the table and select *Reset*.

Release: WSJT-X Version 1.8.0

NEW FEATURES IN WSJT-X Version 1.8.0

1. New mode called FT8: sensitivity down to -20 dB on the AWGN channel; QSOs 4 times faster than JT65 or JT9; auto-sequencing includes an option to respond automatically to first decoded reply to your CQ.
2. New mode for accurate Frequency Calibration of your radio.
3. Improved performance of decoders for JT65, QRA64, and MSK144. MSK144 includes facilities for amplitude and phase equalization and an "SWL" mode for short-format messages.
4. Options to minimize screen space used by Main and Wide Graph windows.
5. Enhanced management scheme for table of operating frequencies, and a new set of default frequencies specific to the three IARU Regions.
6. Improved CAT control for many rigs, including those controlled through Commander or OmniRig.

7. New keyboard shortcuts to set "Tx even/1st" ON or OFF.
8. A number of (mostly minor) bug fixes and tweaks to the user interface. For example: new behavior for the audio level slider; correctly logged QSO start times in certain situations; correct control of FT-891/991 and some other radios via rigctld.

At the time of the v1.8.0-rc1 release the following tasks are yet to be completed:

1. Updates to WSJT-X User Guide.
2. Sample files for FT8.
3. Enhanced decoding using AP ("a priori") information.
4. Signal subtraction and multi-pass decoding.
5. Option to Auto-respond to the weakest responder to your CQ.

Installation packages for Windows, Linux, OS X, and Raspbian can be downloaded from the WSJT web site:
<http://physics.princeton.edu/pulsar/K1JT/wsجتx.html>

Please send bug reports to either wsجتgroup@yahoo.com or wsجت-devel@lists.sourceforge.net. Such reports should include a full prescription of steps to reproduce the undesired behavior. You must be a subscriber to post to either of these lists.

Brief Description of the FT8 Protocol

WSJT-X Version 1.8.0 includes a new mode called FT8, developed by K9AN and K1JT. The mode name "FT8" stands for "Franke and Taylor, 8-FSK modulation". FT8 uses 15-second T/R sequences and provides 50% or better decoding probability down to -20 dB on an AWGN channel. An auto-sequencing facility includes an option to respond automatically to the first decoded reply to your CQ. FT8 QSOs are 4 times faster than those made with JT65 or JT9. FT8 is an excellent mode for HF DXing and for situations like multi-hop E_s on 6 meters, where deep QSB may make fast and reliable completion of QSOs desirable.

Some important characteristics of FT8:

- T/R sequence length: 15 s
- Message length: 75 bits + 12-bit CRC
- FEC code: LDPC(174,87)
- Modulation: 8-FSK, tone spacing 6.25 Hz
- Constant-envelope waveform
- Occupied bandwidth: 50 Hz
- Synchronization: 7x7 Costas arrays at start, middle, and end
- Transmission duration: $79 \times 1920 / 12000 = 12.64$ s
- Decoding threshold: -20 dB; several dB lower with AP decoding
- Multi-decoder finds and decodes all FT8 signals in passband
- Optional auto-sequencing and auto-reply to a CQ response
- Operational behavior similar to JT9, JT65

We plan to implement signal subtraction, two-pass decoding, and use of a priori (AP) information in the decoder. These features are not yet activated in v1.8.0.

We haven't yet finalized what the three extra bits in the message payload will be used for. Suggestions are welcome!

-- Joe, K1JT, for the WSJT Development Team