

Overview of FT8 and JS8Call for the HF DXer and Rag Chewer

FT8 and JS8CALL are digital weak-signal modes that allow hams to enjoy traditional activities on the HF bands under the current miserable propagation conditions. FT8 can operate at signal-to-noise ratios as low as -24 . JS8Call communications are possible at SNR -28 .

FT8 is designed for DX contacts following the format of exchanging call sign, QTH and signal reports. The QSO structure is rigid and with very limited free-text capability.

JS8Call is based on the FT8 platform, but is designed for free-text QSOs. Hams familiar with operating PSK-31 will feel very much at home. It also has a number of innovative features such as the automatic relay of messages, a feature potentially very useful for traffic handling and emergency communications.

Detailed procedures for downloading, configuring, and using these modes are in the documentation and only a very brief overview will be presented here. The requisite links are at the end.

FT8 achieves its low-signal strength capability by following an automated 15-second standard message cycle. For example:

CQ KL7RF EN90	(KL7RF sends CQ and his grid)
KL7RF KB8VIP EN90	(KB8VIP responds and gives his grid)
KB8VIP KL7RF +13	(KL7RF gives his signal report)
KL7RF KB8VIP R+10	(KB8VIP gives his roger and signal report)
KB8VIP KL7RF RR73	(KL7RF acknowledges and says 73)
KB8VIP KL7RF 73	(KB8VIP says 73)

Note: “de” is not used and only the last line is free-text capable. For instance you can say “hpy dx”, “auf wiederseh’n”, “mry xmas and hny.” FT8 generates an automatic ADIF file of the QSO and uploading to LOTW and eQSL is easy.

FT8 uses a 1-kHz bandwidth, which can accommodate 12 or more simultaneous transmissions. This is a narrow-band mode! All transmissions are decoded and printed on a portion of the main screen. To respond to one you would simply double click on it. For example in the above exchange, KB8VIP double clicked on the KL7RF CQ and the cycle was initiated. A waterfall is provided which greatly facilitates split operation.

JS8Call is a more recent mode. The first public version of the software was released on April 1, 2019.

JS8Call is similar to FT8, but rather than alternating the 15-second cycle between transmit and receive, the transmitting station uses every cycle until its free-text message is completed. As with PSK-31, all messages are decoded and short segments appear in a

field on the left side of the main screen. Double clicking on a message moves it to the receive field.

Transmission speeds can be varied from slow for very poor SNR conditions to turbo for relatively good conditions:

	wpm
slow	8
normal	16
fast	24
turbo	40

Heartbeat (HB) transmissions are an innovative feature of JS8Call. Use of the HB feature is optional and has interesting capabilities:

If a station clicks on the HB button, it will send a signal which will activate the transmitters of all receiving stations that have HB activated to send an acknowledgement and signal report. No human intervention needed! The acknowledging stations will also return a list of the stations they are hearing. To avoid QRM the acknowledgements will not be on the same frequency.

This provides automatic relay capability. Assume that KB8VIP (sending the HB signal) wishes to send a message to distant station VY0ERC that it cannot reach. If however, acknowledging station KL7RF has indicated that it can hear VY0ERC, KB8VIP can send an automatic relay message to KL7RF that will copy the message and automatically relay it to VY0ERC.

In a net, if net control sends a HB message, the returning acknowledgments will constitute automatic checkins.

JS8Call provides a group feature, for example #CCARA, #SKYWARN, so that the HB transmissions are restricted to members of the group.

Both modes, and especially FT8, require very accurate time synchronization. The 15-second cycles for transmitting and receiving stations must align closely. In particular, the synchronization provided by Windows 10 is not adequate. An external synchronization program will be needed. Dimension4 is simple to install and use.

Links:

FT8 download and documentation

<https://physics.princeton.edu/pulsar/K1JT/wsjsx.html>

JS8Call download and documentation:

<http://files.js8call.com/latest.html>

Dimension4

<http://www.thinkman.com/dimension4/>

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