

# WSJT User's Guide

## Supplement for Version 4.9

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This document describes features new to WSJT since Version 4.7.0. Read it after reading the *WSJT 4.7 User's Guide*, [http://pulsar.princeton.edu/~joe/K1JT/WSJT\\_User\\_470.pdf](http://pulsar.princeton.edu/~joe/K1JT/WSJT_User_470.pdf), which should have been copied to your computer when you installed or upgraded WSJT.

**CW Mode.** WSJT now offers a transmit-only CW mode. Select it from the **Mode** menu or with the keyboard shortcut **Shift+Ctrl+F8**. The program sends EME-style messages at 15 WPM by keying an 800 Hz audio tone, and it takes care of the timing and T/R switching. Receiving is left up to you, the operator. You can select the T/R sequence duration. Present conventions typically use 2.5 minute sequences on 432 MHz, either 1 or 2 minutes on 144 MHz, and 1 minute on 50 MHz. Enter the desired sequence length in seconds in the box labeled **T/R Period**.

**Callsign Double-Click.** Double-clicking on a callsign in either one of the decoded text windows will cause that callsign to be copied into the **To Radio** box. The corresponding grid locator will be looked up in the database and the callsign inserted appropriately into transmit message boxes **Tx1** and **Tx2**. If the decoded text line includes "CQ" before the selected callsign, message **Tx1** will be selected for your next transmission. Otherwise, **Tx2** will be selected.

**Deep Search Decoder.** The JT65 decoder is now a multi-layered procedure. A full description of how it works is available at <http://pulsar.princeton.edu/~joe/K1JT/JT65.pdf>. If the soft-decision Reed Solomon decoder fails, a deeper search is made using a matched filter approach. The decoder constructs a list of hypothetical messages by pairing each entry in the callsign database with "CQ" and with the home callsign of the user. Each trial message is encoded as it would be done at the transmitter, including all of the Reed Solomon error-control symbols. The resulting patterns are then tested for good match with the received wave file. You can define the list of likely callsigns in any way you choose. An example file is provided with WSJT, containing the calls of nearly 5000 worldwide stations known to have been active in weak-signal work on the VHF/UHF bands.

All decoders can make mistakes, and this one is no exception. Just like a human copying CW, the JT65 decoder has a "grey area" in which it finds a solution but may have only moderate confidence in it. In such cases the decoder appends a "?" to the decoded text, and the operator must make the final decision as to whether the decoding is believable. Be aware that because of the mathematical message structure, incorrect decodings will not differ from the correct one in only a few characters; more likely, they will exhibit a whole incorrect callsign. As you gain experience in recognizing the graphical and numerical indications of proper message synchronization (Sync, dB, DT, DF, W, and the green, red, and blue curves), as well as the effects of "birdies" and other interference, you will become adept at recognizing and rejecting bogus decodes. If it appears that an unexpected (and perhaps exotic) station is calling you, wait until you decode the message again. Random decoding errors will seldom repeat themselves.

## Decode Menu.

Several options are available for adjusting the decoding procedure to your liking. If you check **Decode | JT65 | Only EME calls**, a subset of callsigns in the database that include an “EME” flag will be used in the deep search. Check **Aggressive** on the same submenu to see everything produced by the deep search, even if the decoder has low confidence in the result. In that case you will also see two numbers at the end of each line of decoded text. The first number tells whether the soft-decision Reed Solomon decoder succeeded (1) or failed (0). The second number gives a relative confidence level on a 0 to 10 scale for results produced by the deep search decoder.

Check **No Shorthands if Tx 1** if you wish to suppress shorthand decodings when you are still transmitting the first Tx message. Check **Sked** on the main screen if you are running a schedule with a known station and do not wish to see any results from the deep search decoder that are not relevant to your QSO. Check **Decode | FSK441 | No shorthands** to instruct the FSK441 decoder not to look for shorthand messages.

**Expanded Signal Reports.** Since version 4.7, JT65 has supported the transmission of numerical signal reports in dB. The reference bandwidth for noise power is 2500 Hz, the same as used in all other WSJT modes. Messages with numerical signal reports take the following form:

G3LTF DL9KR -24  
JM1GSH OK1DFC R-27

Starting with WSJT version 4.9.5, it is also possible to send messages like

VK7MO K0AWU RO  
K1RQG SM2CEW RRR  
K5JL W7GJ 73

In some circumstances with very high activity, these messages might be preferred to sending shorthand messages without callsigns. They will require about 2 dB higher S/N in order to be copied, however.

**Long Callsigns.** JT65 now provides full support for long callsigns like ZA/PA2CHR and G8BCG/P. When using such a callsign prefix or suffix, *do not* include a grid locator in your transmitted message. Note that WSJT versions 4.9.2 and earlier handled callsign prefixes in a different way. To get the expanded capabilities, both transmitting and receiving stations must use WSJT version 4.9.5 or later. The following messages illustrate the correct format:

PA0JMV V5/ZS5Y  
G8BCG/P W7GJ  
ZA/PA2CHR K1JT OOO

Supported suffixes include /P and /0 through /9; the full prefix list is appended below. Note that the last prefix in the list, KC4, was added in WSJT version 4.9.7.

1A	1S	3A	3B6	3B8	3B9	3C	3C0	3D2	3D2C	3D2R	3DA	3V	3W	3X
3Y	3YB	3YP	4J	4L	4S	4U1I	4U1U	4W	4X	5A	5B	5H	5N	5R
5T	5U	5V	5W	5X	5Z	6W	6Y	7O	7P	7Q	7X	8P	8Q	8R
9A	9G	9H	9J	9K	9L	9M2	9M6	9N	9Q	9U	9V	9X	9Y	A2
A3	A4	A5	A6	A7	A9	AP	BS7	BV	BV9	BY	C2	C3	C5	C6
C9	CE	CE0X	CE0Y	CE0Z	CE9	CM	CN	CP	CT	CT3	CU	CX	CY0	CY9
D2	D4	D6	DL	DU	E3	E4	EA	EA6	EA8	EA9	EI	EK	EL	EP
ER	ES	ET	EU	EX	EY	EZ	F	FG	FH	FJ	FK	FKC	FM	FO

FOA	FOC	FOM	FP	FR	FRG	FRJ	FRT	FT5W	FT5X	FT5Z	FW	FY	M	MD
MI	MJ	MM	MU	MW	H4	H40	HA	HB	HB0	HC	HC8	HH	HI	HK
HK0A	HK0M	HL	HM	HP	HR	HS	HV	HZ	I	IS	IS0	J2	J3	J5
J6	J7	J8	JA	JDM	JDO	JT	JW	JX	JY	K	KG4	KH0	KH1	KH2
KH3	KH4	KH5	KH5K	KH6	KH7	KH8	KH9	KL	KP1	KP2	KP4	KP5	LA	LU
LX	LY	LZ	OA	OD	OE	OH	OH0	OJ0	OK	OM	ON	OX	OY	OZ
P2	P4	PA	PJ2	PJ7	PY	PY0F	PT0S	PY0T	PZ	R1F	R1M	S0	S2	S5
S7	S9	SM	SP	ST	SU	SV	SVA	SV5	SV9	T2	T30	T31	T32	T33
T5	T7	T8	T9	TA	TF	TG	TI	TI9	TJ	TK	TL	TN	TR	TT
TU	TY	TZ	UA	UA2	UA9	UK	UN	UR	V2	V3	V4	V5	V6	V7
V8	VE	VK	VK0H	VK0M	VK9C	VK9L	VK9M	VK9N	VK9W	VK9X	VP2E	VP2M	VP2V	VP5
VP6	VP6D	VP8	VP8G	VP8H	VP8O	VP8S	VP9	VQ9	VR	VU	VU4	VU7	XE	XF4
XT	XU	XW	XX9	XZ	YA	YB	YI	YJ	YK	YL	YN	YO	YS	YU
YV	YV0	Z2	Z3	ZA	ZB	ZC4	ZD7	ZD8	ZD9	ZF	ZK1N	ZK1S	ZK2	ZK3
ZL	ZL7	ZL8	ZL9	ZP	ZS	ZS8	KC4							

**New Format for Callsign Database.**

The callsign database used by WSJT is named CALL3.TXT and now has the same format as those used by the programs MoonSked (by GM4JJJ), Tracker (by W7GJ), and other VHF/UHF-related software. The file is comma-delimited and contains callsign, grid locator, and possibly other information for each station. A description of the format is included at the top of the distributed file. WSJT pays attention only to the first three fields; the third one contains EME if the station is known to be active on EME.