

JT65 an introduction and basic information

Introduced to me in March 2009 by Tim Stein N9FTC

		28.436	SSB	100	21 ²⁰ / ₂	CA4SS	59	59	21 ⁴⁰ / ₂	1K	YER
		28.438	SSB	100	21 ²⁴ / ₂	LU1HF	59	59	21 ²⁴ / ₂	1K	ARC
		28.465	SSB	100	21 ²⁷ / ₂	LT0D	59	59	21 ²⁷ / ₂	100	ARC
		28.468	SSB	100	21 ²⁸ / ₂	LQ0F	59	59	21 ²⁸ / ₂	100	AR
3/8/09		28.444	SSB	100	21 ³⁴ / ₂	CA6BMF	59	59	21 ³⁴ / ₂	100	C
3/8/09		21.290	SSB	500	22 ¹³ / ₂	PV2EX	59	59	22 ¹³ / ₂	1K	
		21.323	SSB	500	22 ¹⁷ / ₂	CE3PG	59	59	22 ¹⁷ / ₂	1K	
		21.340	SSB	500	22 ²⁰ / ₂	KH6RC	59	59	22 ²⁰ / ₂	1K	
3/8/09		7.285	SSB	500	22 ⁴⁰ / ₂	TM6M	59	59	22 ⁴⁰ / ₂	1K	
3/8/09		7.282	SSB	500	22 ⁵⁶ / ₂	KP4KE	59	59	22 ⁵⁶ / ₂	100	
3/8/09		7.2835	SSB	500	22 ⁵⁹ / ₂	CS2C	59	59	22 ⁵⁹ / ₂	1K	
3/8/09		7.278	SSB	500	23 ⁰⁴ / ₂	S53F	59	59	23 ⁰⁴ / ₂	1K	
3/8/09		7.288	SSB	500	23 ²⁸ / ₂	GW7X	59	59	23 ²⁸ / ₂	400	
60TW	3/14/09	14.076	JT 65A	40W	11 ²⁵ / ₂	VA3WLD	-000	-06	11 ³⁰ / ₂	JEHN	FN03 HE IS 5W
0TW	3/14/09	14.076	JT 65A	40W	21 ⁴⁶ / ₂	VE3ODZ	-000	R-06	21 ⁵⁰ / ₂	TAMAS	FN03
0TW	3/14/09	14.076	JT 65A	40W	23 ²⁰ / ₂	N9FTC	-06	-06	23 ²⁷ / ₂	TIM	EL79EQ
0TW	3/15/09	14.076	JT 65A	30W	15 ¹³ / ₂	KC2QII	-8	-18	15 ¹⁷ / ₂	JAVIER	FN20
0TW	3/15/09	14.076.5	JT 65A	30W	15 ⁵¹ / ₂	DB1DT	-12	R-13	15 ⁵⁹ / ₂	TOM	JN40

So how long has it been since you tried a new MODE in Ham Radio? For me, I suppose it was 2009 when I was introduced to JT65. But first a little history. I was Licensed in Colorado in 1992, (no code Technician) I have been thru several interest changes. My first was repeaters, like many newbies. I quickly got bored with that, although it served a purpose during the commute to and from work. I then ventured into packet radio, probably with influence from my Dad KB9CDM, and my Elmer Karl Graf K0ELE and several local ham friends as well. It was a lot of

fun, it helped develop my computer interest, and formed a path to computers in my shack from then on. Using 2m packet to HF gateways broke the ice for looking for DX stations, and beginning to learn more how propagation works. The next step got me into seriously chasing DX via satellites. Still having a Tech license, I could work the world and didn't need a huge tower and antenna stack, although equipment expenses went UP considerably. Then I started reading and learning about the Dxpeditions, how to chase them and the exotic countries all over the planet. I then buckled down got my General license and the DX bug bit me HARD. I tried a vertical in our back yard, but it didn't work the greatest, and I created "NEIGHBOR RFI".... Well we finally moved to some property, a tower went up, BIG antennas grew and I earned my DXCC, got into contesting etc. I then kept thinking about all the spectrum I couldn't use as a General. I got into RTTY and I LOVED IT !!! I could contest, chase DX, DXpeditions used it a lot.... WHAT on earth does all this have to do with JT65 ????? Well for the first time to an extent, I was into digital modes. (although packet was digital) it wasn't the same feeling. Well sometime later (2008 or so) I must have read in a magazine article, or some website, or something about PSK, JT65 using a computer sound card instead of a TNC. I downloaded the software, most likely an early WSJT version. After trials and tribulations with the com port settings, IRQ issues, and no clue about digging into that can of worms, I somehow got on the air. I made two contacts, shown in the logbook picture above. I didn't really understand how the signal report exchange was supposed to be. I was then contacted by Tim Stein N9FTC in Florida and he walked me thru the procedure. He made the statement I maybe one of very few hams if not the only one in Colorado on JT65 at that time. Now its HUGE all over the world. I have used it from 160m to 2m. I can't remember going any higher but guys certainly do now...

Software downloads:

<https://sourceforge.net/directory/os:windows/?q=wsjt-x>

<http://physics.princeton.edu/pulsar/K1JT/>

WSJT-x:

FT8, JT4, JT9, JT65, MSK144, WSPR

WSPR-x 15min, 2m T/R sequences (prop reporter)

Compiled for Windows (pretty well all versions), Unbuntu, Linux, Macintosh,
Source codes to build for any (supported) platform.

WSJT

1. **WSJT** is a computer program used for weak-signal radio

communication between amateur radio operators. The program was initially written by Joe Taylor, K1JT, but is now open source and is developed by a small team. WSJT-X has several additional modes besides JT65 such as, FT8, JT4, JT9, MSK144, WSPR.

Each mode has its place and reason for use. These modes aren't designed or capable of "ragchew" type QSO's. They are for basic contact exchange. I.e. callsign, grid locator, signal report.

Time Sync software:

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

<https://www.meinbergglobal.com>

Sounds:

<http://www.arrl.org/hf-digital>

Information and spotting websites:

www.dxsummit.fi

www.dxmaps.com

www.hamspots.net

<https://www.pskreporter.info/>

<http://www.physics.princeton.edu/pulsar/K1JT/wshtx-doc/wshtx-main-1.7.1-devel.html>

Basic Equipment required. RIG, ANTENNA, COMPUTER, INTERFACE.

Rigs I have personally used: Icom IC-7600, Icom IC-7000, Yaesu FT-920, Yaesu FT-817nd, Kenwood TS-440sat

Rigs I know are being used: Elecraft K3, Icom IC-726, Icom IC-7300, Yaesu FT-857D, Flexradio 1500, Flexradio 6300

Commercially manufactured interfaces: West Mountain Radio (rigblaster), Tigertronics (signallink), Buxcomm (rascal) G4ZLP Digimaster (mini pro), MicroHam digi keyer.. Just to name a few.

Some newer rigs don't require an external interface since the built in USB connector allows connection to a computer

directly.

Older rigs need the interface to communicate with the computer sound card via the audio, and microphone in and outs on the soundcard.

2. System Requirements

SSB transceiver and antenna

Computer running Windows (XP or later), Linux, or OS X

1.5 GHz or faster CPU and 200 MB of available memory

Monitor with at least 1024 x 780 resolution

Computer to radio

interface using a serial port or equivalent USB device for T/R switching, or CAT control, or VOX, as required for your radio to computer

connections

Audio input and output devices supported by the operating system and configured for sample rate 48000 Hz.

Audio or equivalent USB connections between transceiver and computer

A means for synchronizing the computer clock to UTC within ± 1 second

Other software besides WSJT-X

<http://jt65-hf.com/downloads/>

<http://hflink.com/jt65/>

<http://nw7us.us/jt65a.html>

http://www.hfradio.org.uk/html/digital_modes.html

(G4UCJ)

http://f6cte.free.fr/index_anglais.htm

FT8 Info

<http://www.physics.princeton.edu/pulsar/K1JT/wsjsx-doc/wsjsx-main-1.7.1-devel.html>

<https://sourceforge.net/directory/os:windows/?q=wsjt-x>

<http://physics.princeton.edu/pulsar/K1JT/>

Steve(K9AN) and Joe(K1JT) have developed a potential new mode for WSJT-X. They are calling the mode “FT8” (Franke-Taylor design, 8-FSK modulation)

1. FT8 is designed for situations like multi-hop Es where signals may be weak and fading, openings may be short, and you want fast completion of reliable, confirmable QSOs.

Important characteristics of FT8:

1. – *T/R sequence length: 15 s*
- *Message length: 75 bits + 12-bit CRC*
- *FEC code: LDPC(174,87)*
- *Modulation: 8-FSK, keying rate = tone spacing = 5.86 Hz*
- *Waveform: Continuous phase, constant envelope*
- *Occupied bandwidth: 47 Hz*
- *Synchronization: three 7×7 Costas arrays (start, middle, end of Tx)*
- *Transmission duration: $79 \times 2048 / 12000 = 13.48$ s*
- *Decoding threshold: -20 dB (perhaps -24 dB with AP decoding, TBD)*
- *Operational behavior: similar to HF usage of JT9, JT65*
- *Multi-decoder: finds and decodes all FT8 signals in passband*
- *Auto-sequencing after manual start of QSO*

**Comparison with slow modes JT9, JT65, QRA64: * FT8 is a few dB less sensitive but allows completion of QSOs four times faster. Bandwidth is greater than JT9, but about 1/4 of JT65A and less than 1/2 QRA64.*

**Comparison with fast modes JT9E-H: * FT8 is significantly more sensitive, has much smaller bandwidth, uses the vertical waterfall, and offers multi-decoding over the full displayed passband.*

**Still to come, not yet implemented: * We plan to implement signal subtraction, two-pass decoding, and use of “a priori” (already known) information as it accumulates during a QSO.*

Three extra bits are available in the message payload, with uses yet to be defined. We have in mind special message formats that might be used in contests, and the like. Your considered suggestions for use of these bits are very welcome!

K1JT, K9AN, and G4WJS have conducted on-the-air tests of FT8 with excellent results. We’re now at a stage where tests under a wider range of conditions are desirable. If you can build WSJT-X from source code revision r7750 or later, and would like to help, please do so and report your results to us! Pre-built installation packages will be made available after further testing is completed.

Suggestions for FT8 setup and examples of use can be found in a screen

shot posted here: <http://physics.princeton.edu/pulsar/k1jt/ft8.png>

We look forward to receiving your feedback.

— 73, Joe, K1JT “

JT65 177.6 hz occupied bandwidth

JT9 15.6 hz

FT8 47 hz

PSK31 31 hz

CW

RTTY

SSB

AM

FM