JT-65 Weak Signal Digital

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What does JT-65 stand for?

JT65-HF is so labeled because it sends **65 tones** spread out over 175Hz. The “JT” part comes from the original creator of this type of mode, **Joe Taylor**, K1JT, the 1993 winner of the Nobel Prize in physics. Joe Taylor, K1JT, originally developed the JT series of weak signal communication modes for UHF and VHF moonbounce and meteor scatter transmissions. Others built upon these to develop JT65 and JT9 for HF which makes it a pleasure to work very weak, low power stations thousands of miles away.
As with FLDIGI Modes such as PSK31, you interface your HF rig to a computer, and send out text encoded by your computer over the amateur bands.

Use a sound-card (separate)

Some items I have learned (the hard way):

- Rx: Turn off any auto notch filters and noise filters
  - Turn off your Automatic Gain Control
  - When Transmitting, remove signal until NO ALC.
- Set the levels in windows to 0.0db on the sound input
- Freeware sound card o-scope – Make sure you aren’t clipping/square edging your signal.
Sound card o-scope
Why JT65?

**JT65DX** or **WSJT-X**

This form of modulation is much more efficient than on-off keying, especially when combined with an optimal coding scheme. In addition, it is much more tolerant of frequency instabilities than phase-shift keying.

As much as 80% of the signal can be “lost” and your 13 characters can still be decoded. Low Power mode = perfect for restricted antennas.
JT65 specifics

Sounds like Music

Transmissions last 46.8 seconds to transmit 13 characters.

NOT a ragchew mode – short exchange

Exchange = callsign, signal report and grid square

Stations take turns – odd minutes vs. even minutes

Station clocks must agree with within 2 seconds.
Time sync required

We’re not talking within 30 seconds here. 2 seconds off is barely acceptable. 1 second off is usually OK. In reality, you’ll want it to be less than 0.5 seconds off.

http://dimension-4.en.softonic.com/  D4 time sync
http://www.meinberg.de/english/sw/ntp.htm  Meinberg time sync
http://www.timesynctool.com/  Net time
Software needed

http://jt65-hf.com/downloads/
http://sourceforge.net/projects/jt65-hf/files/
http://physics.princeton.edu/pulsar/k1jt/wsjtx.html
http://jt65-dx.com/

WSJT-X and JTDX are quickly becoming the most popular choices! WSJT-X can also do other modes like JT-9 and WSPR (and some other newer modes), so it is still the most popular.
Exchange - Common

00:01  CQ KV8P EN81
00:02  KV8P JA1JNY PM9S
00:03  JA1JNY KV8P -16
00:04  KV8P JA1JNY R-18
00:05  JA1JNY KV8P RRR
00:06  KV8P JA1JNY 73
00:07  JA1JNY KV8P 73
00:08
00:09  CQ KV8P EN81
Exchange – TX 73 Deleted

(Note – Most used and accepted)

00:01 CQ KV8P EN81
00:02 KV8P JA1JNY PM95
00:03 JA1JNY KV8P -16
00:04 KV8P JA1JNY R-18
00:05 JA1JNY KV8P RRR
00:06 KV8P JA1JNY 73
00:07 CQ KV8P EN81
Exchange – RRR Deleted
(Note – Now less accepted, but still used)

00:01  CQ KV8P EN81
00:02  KV8P JA1JNY PM95
00:03  JA1JNY KV8P -16
00:04  KV8P JA1JNY R-18
00:05  JA1JNY KV8P 73
00:06  KV8P JA1JNY 73
00:07  CQ KV8P EN81
Exchange – short
(Note – used with very weak signal exchanges)

00:01 CQ KV8P EN81
00:02 KV8P JA1JNY -18
00:03 JA1JNY KV8P R-16
00:04 KV8P JA1JNY 73
00:05 CQ KV8P EN81
Exchange – Additional Info.

- 00:01  CQ KV8P EN81
- 00:02  KV8P JA1JNY PM9S
- 00:03  JA1JNY KV8P -16
- 00:04  KV8P JA1JNY R-18
- 00:05  10W DIP LOTW
- 00:06  TNX ROB 73
- 00:07  CQ KV8P EN81
Exchange – Specific need

For CQ VT for Worked All States

CQ KV8P VT

NOT:

CQ VT KV8P

When another station double-clicks, it needs callsign second.
Exchange – Portable / Mobile

00:01 CQ KV8P/WP4 (leave out grid)
00:02 KV8P JA1JNY (leave out grid if needed)
00:03 JA1JNY KV8P -16
00:04 KV8P JA1JNY R-18
00:05 JA1JNY 73
00:06 KV8P/WP4 73
Exchange:

UTC – When the signal was received

Sync – Measure of how well synchronizing tone is received. High is good

dB – Signal strength of the received signal in −dB. -1 is the best you will get, down to about -26dB.

DT – Calculated offset of the received signal from your local clock. Values of .3 to 1.9 are typical.

DF – Offset in Hz from the center point (0).
**Signal Reports**

**Signal reports** are specified as signal-to-noise ratio (S/N) in dB, using a standard reference noise bandwidth of 2500 Hz. Thus, in example message *(G0XYZ KV8P –19)*, I am telling G0XYZ that his signal is **19 dB below the noise power in bandwidth 2500 Hz.**

Signals become visible on the waterfall around $S/N = -26$ dB and **audible (to someone with very good hearing) around –15 dB.** Thresholds for signal decodability are approximately –24 dB for JT65, –26 dB for JT9.

JT65 reports are constrained to lie in the range –30 to –1 dB, while JT9 supports the extended range –50 to +49 dB.
Computer needs

Computer must be 1.5 GHz
Windows Vista +
(13 second decode time)
Exchange specifics

What’s your grid square?

http://www.QRZ.com

http://www.levinecentral.com/ham/grid_square.php
JT65 Frequencies

1838 kHz
3576 kHz
7076 kHz (European = 7039 kHz)
(International = 7036 KHz)
14076 kHz
10139 or 10137.8 kHz
18102 kHz
21076 kHz
24920 kHz
28076 kHz
50276 kHz
Who can hear me?

See who can hear you via reporting network!
PSK Reporter check-box
http://pskreporter.info/pskmap.html
http://wsprnet.org
In use - demo

https://www.youtube.com/watch?v=FnfDgsxnvxg

https://www.youtube.com/watch?v=mUz1H0jClzY
Awards

Valid for most awards!

DXCC
WAS
WAC

Support by ARRL’s Logbook of the World
More Links

Here are those links:

http://www.eham.net/articles/25604

http://sourceforge.net/projects/jt65-hf/files/ download the latest software and .pdf setup/operations doc

http://www.hamclubs.info/JT-Utilities/ JT-Alert add-on software with visual and audio alerts

http://hamspots.net/wsjt/ “cluster”-type spots for JT65-HF and other digital modes

http://groups.google.com/group/jt65-hf JT65-HF group discussions (on Google groups)

http://nw7us.us/jt65a.html More great information about JT-65!