



JT-65 Weak Signal Digital

Rob Hall– KV8P

kv8p@arrl.net

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.



Interface same as with FLDIGI

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.

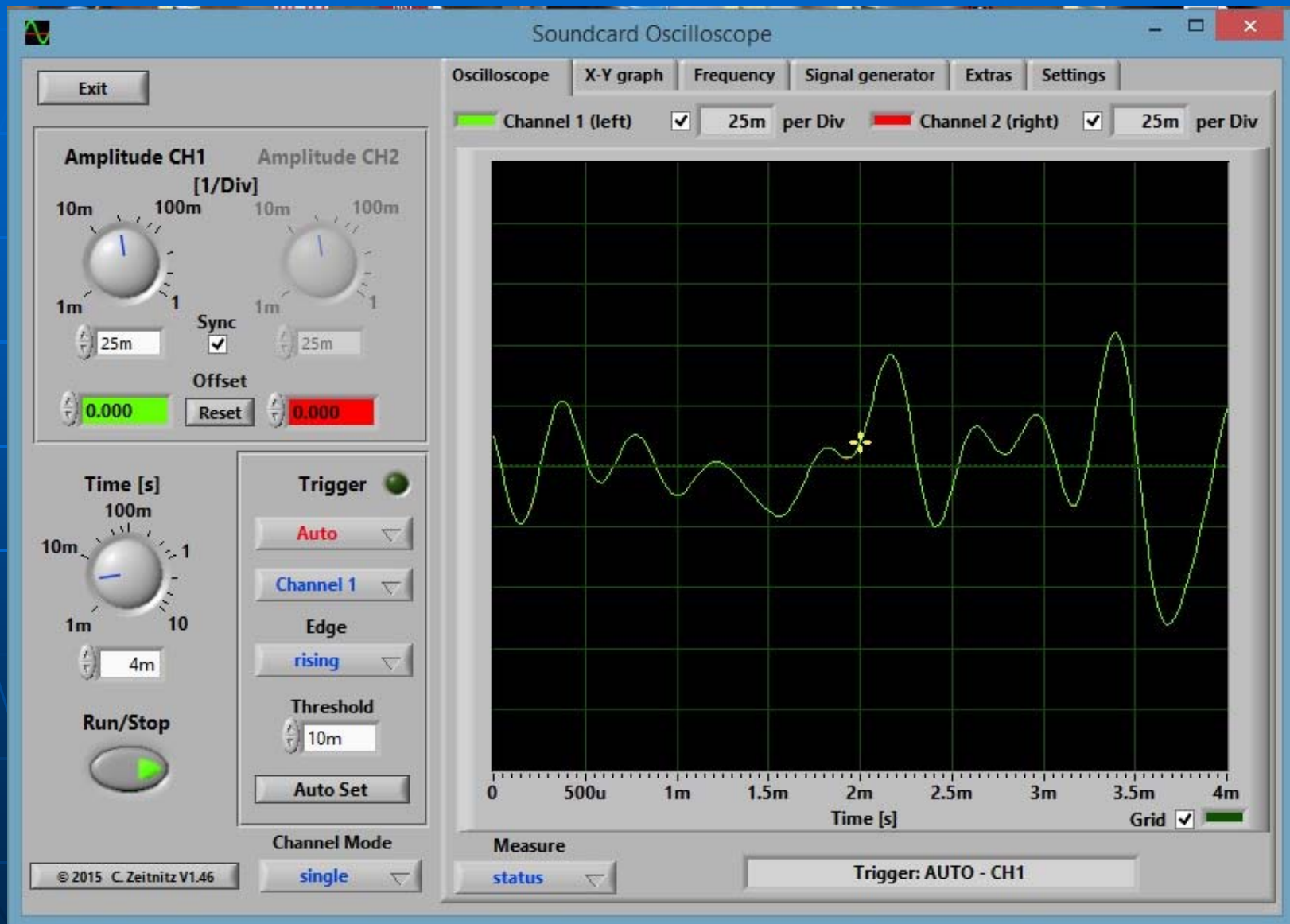


Use a sound-card (separate)

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

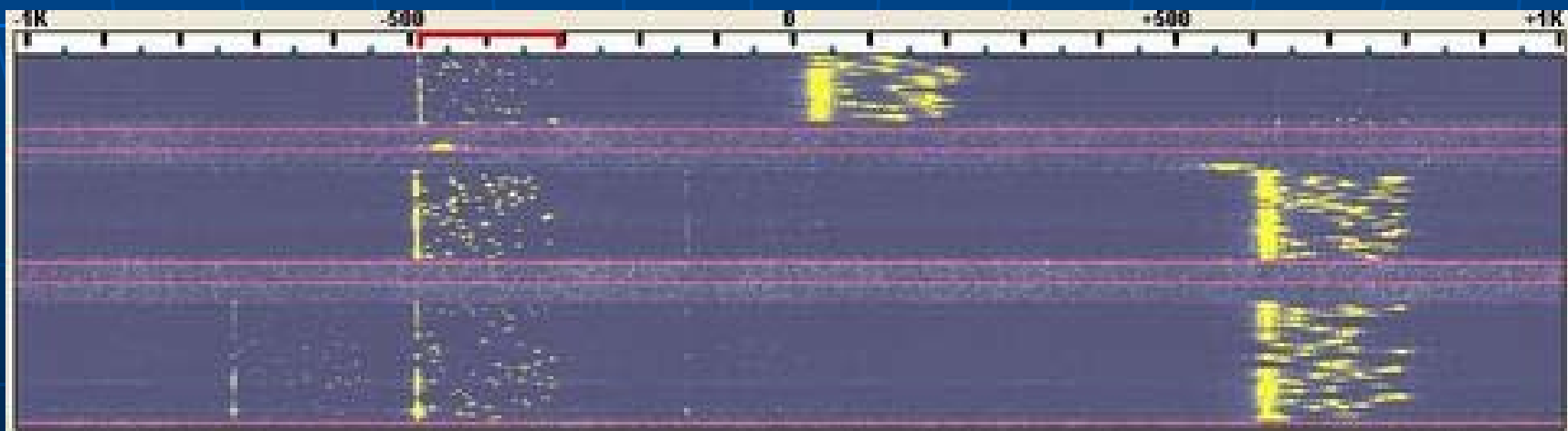


Why JT65?

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/wsجتx.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 PM95

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 PM95

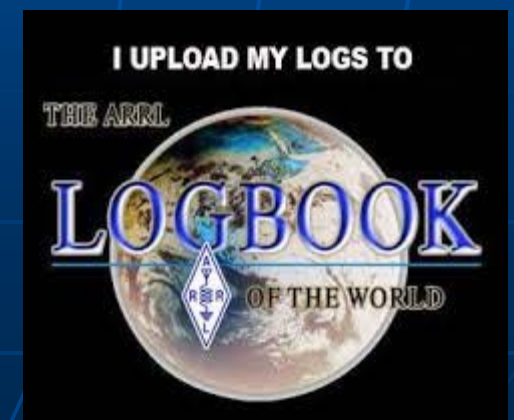
00:03 JA1JNY KV8P -16

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



UTC	Sync	dB	DT	DF	Exchange		
04:07	3	-22	0.4	767	B	JA1PCM	WA6RZR R-17
04:07	8	-4	-0.9	463	B	CQ	NR6M DM42

04:06	4	-8	-1.0	-759	B	KK4TJP	N7PVA R-09

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 (GOXYZ KV8P -19), I am telling GOXYZ 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)

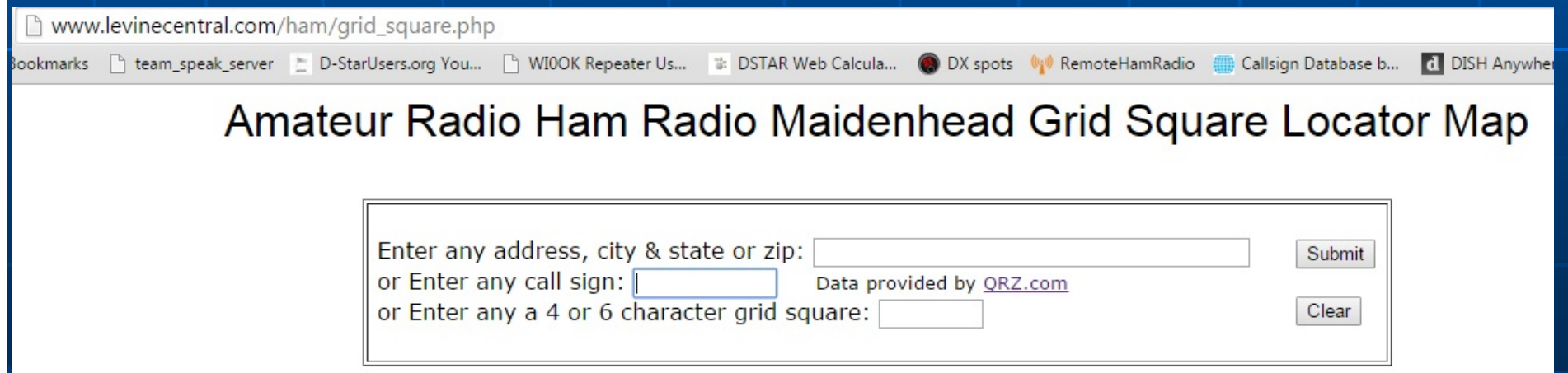


Exchange specifics

What's your grid square?

<http://www.QRZ.com>

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



The screenshot shows a web browser window with the address bar displaying `www.levinecentral.com/ham/grid_square.php`. The browser's bookmark bar includes several items: `team_speak_server`, `D-StarUsers.org You...`, `WI00K Repeater Us...`, `DSTAR Web Calcula...`, `DX spots`, `RemoteHamRadio`, `Callsign Database b...`, and `DISH Anywher`. The main content area of the browser displays the title **Amateur Radio Ham Radio Maidenhead Grid Square Locator Map**. Below the title is a form with three input fields and two buttons. The first input field is labeled "Enter any address, city & state or zip:". The second input field is labeled "or Enter any call sign:" and is followed by the text "Data provided by [QRZ.com](http://www.QRZ.com)". The third input field is labeled "or Enter any a 4 or 6 character grid square:". To the right of the first input field is a "Submit" button, and to the right of the third input field is a "Clear" button.

www.levinecentral.com/ham/grid_square.php

Bookmarks team_speak_server D-StarUsers.org You... WI00K Repeater Us... DSTAR Web Calcula... DX spots RemoteHamRadio Callsign Database b... DISH Anywher

Amateur Radio Ham Radio Maidenhead Grid Square Locator Map

Enter any address, city & state or zip:

or Enter any call sign: Data provided by [QRZ.com](http://www.QRZ.com)

or Enter any a 4 or 6 character grid square:

JT65 Frequencies

1838 kHz

3576 kHz

7076 kHz (European=7039 kHz)

(International = 7036 KHz)

14076 kHz

10139 or 10137.8 kHz

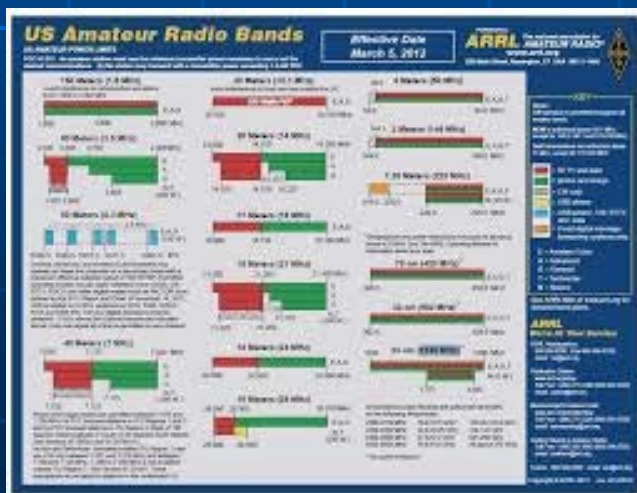
18102 kHz

21076 kHz

24920 kHz

28076 kHz

50276 kHz



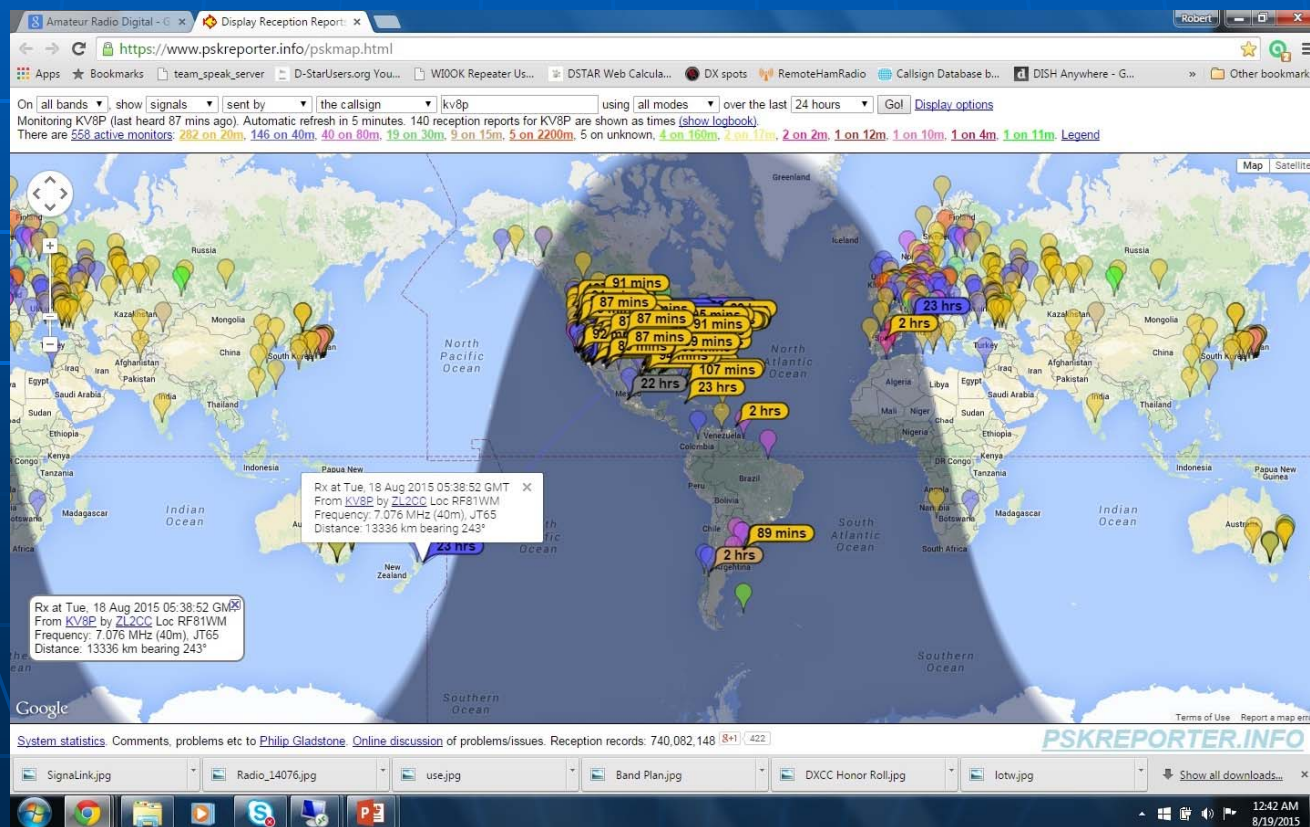
Who can hear me?

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>

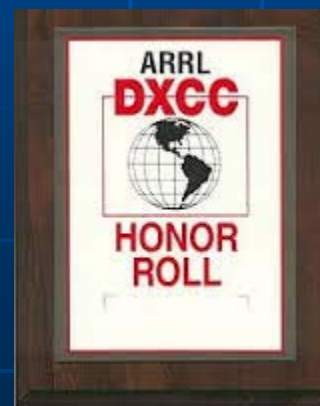
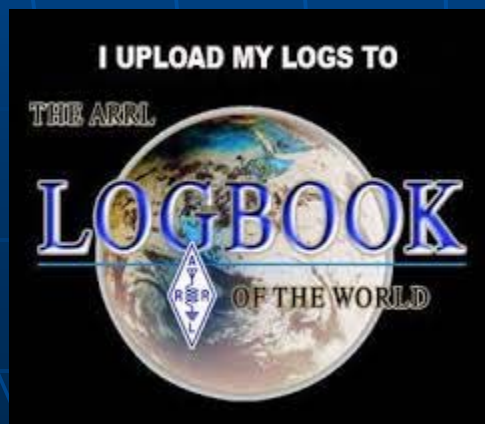
<https://www.youtube.com/watch?v=mUz1H0jClzY>

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!