



JT65A, Weak Signal HF

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What are we doing today?

- Demo on use of JT65 over HF
 - Antenna is 20m Buddipole, out on the sidewalk
- Software is JT65-HF by W6CQZ
 - If we have time, we may compare w/ WSJT7
- Discussion of best practices for mode
 - If we have time, Q&A
- Hoping for good prop and low noise

What are we *not* doing?

- **Details of rig aka “CAT” interfaces**
 - Ham Radio Deluxe, OmniRig, DX Labs Commander are options
- **Soundcard interfaces**
 - If you’re set up to run PSK31 or other AFSK “soundcard” modes, you’re good to go on JT65A once you get your clock synched and understand the QSO pattern

What is JT65A?

- Developed by Nobel Prize winner Joe Taylor
K1JT
 - Joe also did WSPR, FSK441, JT6M, etc
- Intended for EME, came to HF in 2006
- 13(-ish) chars, 48 seconds, odd/even minute QSO pattern
- Work the world on 50W and simple antennas
- Very popular mode – activity 24/7 worldwide – mostly 14076

What is JT65A?

- **Weak-signal mode, reliable decode down to -24 dB SNR by using forward-error correction and other signal processing techniques**

Shannon-Hartley Theorem (describes the maximum information transfer rate for a given channel bandwidth and signal-to-noise ratio)

$$C = B \log_2 \left(1 + \frac{S}{N} \right)$$

Why JT65A?

- Work QRP
- Work with poor antennas
- Compromised locations
- Find propagation you might not expect



JT65-HF Setup

Configuration

Station Setup | RB/PSK Reporter/Rig Control | Heard List/RB Statistics | Macros | Si570 USB Control | Diagnostics

Call sign: JT65-HF DOES NOT support prefixed or suffixed call signs. If you need this feature please use WSJT. Grid (4 or 6 Characters). Required value to enable transmit.
W6DTW CM97

Sound Input Device: 02-USB Audio CODEC Sound Output Device: 05-USB Audio CODEC

Enter your PTT port into the input box below in the format COM###, for example, COM11

PTT Port: NONE Test PTT Use Alternate PTT Method. Only enable this if you have problems with PTT. Test PTT will Key/Unkey your Transceiver. No audio will be sent during test.

RX Sample Rate: 1.0000 TX Sample Rate: 1.0068 Enter values shown in main screen if need for SR correction is indicated. Automatic adjustment may cause some initial skewing of spectrum display until SR settles. This is harmless.

Enable Automatic RX/TX Sample Rate Correction.

Disable TX after sending same message 15 times. (Runaway TX watchdog)

Disable Multidecoder while in QSO. Suggested unless you have a fast CPU (>1.5GHz).

Enable Multidecoder after 2 minutes of no TX (If disabled by option above).

Restore defaults sets Multidecoder On

Save text of decodes and transmissions to file.

Location of RX/TX history file (JT65hf-log.csv)
C:\Documents and Settings\DTW\Local Settings\Application Data\JT65-HF

Save Settings and Close Window

JT65-HF Setup

Configuration

Station Setup | RB/PSK Reporter/Rig Control | Heard List/RB Statistics | Macros | Si570 USB Control | Diagnostics

[Optional] Call for PSK Reporter or RB. Suffixed/Prefixed is allowed here. Rig Control Reported QRG Hz

Spot Receptions via RB Network Spot Receptions via PSK Reporter Operate RB in Offline Mode

[Optional] Antenna Description for PSK Reporter.

OmniRig Settings Use OmniRig Radio 1 Radio 2

Ham Radio Deluxe Settings Use HRD Instance 1 Instance 2

DX Labs Commander Settings Use Commander

Save Settings and Close Window

JT65-HF Setup

Configuration

Station Setup | RB/PSK Reporter/Rig Control | Heard List/RB Statistics | Macros | Si570 USB Control | Diagnostics

QRG Definitions.	Message Definitions	
1 - 1838 KHz	1 - Short Hand RO	<p>QRG Definition is used when entering QRG manually. When Rig Control is off the input box for QRG becomes editable. You may enter QRG directly (in Hz, KHz or MHz) or by right clicking up the values in the QRG definitions.</p> <p>Message definitions is used for entering free text messages. You may define up to ten of these each limited to 13 characters and may only contain the 43 characters of the JT65 character set, which is;</p> <p>0123456789ABCDEFGHIJKLMNQRSTU VWXYZ +-.!/?</p> <p>Right clicking in the Free Text entry box will present a dialog of these message definitions. Note. The first 3 fixed entries send the JT65 shorthand sequences and should only be used when absolutely necessary.</p>
2 - 3576 KHz	2 - Short Hand RRR	
3 - 7039 KHz	3 - Short Hand 73	
4 - 7076 KHz	4 - <input type="text" value="TU73 W6DTW"/>	
5 - 10139 KHz	5 - <input type="text" value="CHECK CLOCK"/>	
6 - 10147 KHz	6 - <input type="text" value="SRY 2 WEAK"/>	
7 - 14076 KHz	7 - <input type="text" value="SRY NO DECODE"/>	
8 - 18102 KHz	8 - <input type="text" value="25W VERT TU73"/>	
9 - 18106 KHz	9 - <input type="text" value="25W DBLT TU73"/>	
10 - 21076 KHz	10 - <input type="text"/>	
11 - 24920 KHz	11 - <input type="text"/>	
12 - 28076 KHz	12 - <input type="text"/>	
13 - <input type="text" value="0"/>	13 - <input type="text"/>	
14 - <input type="text" value="0"/>		
15 - <input type="text" value="0"/>		
16 - <input type="text" value="0"/>		

Save Settings and Close Window

JT65-HF Key Concepts

- “DF” refers to the +/- frequency *relative to* 1270.5 Hz above dial frequency
- Unlike in WSJT, PSK, etc you don’t click on the waterfall – instead you double-click on the decodes
 - This sets DF to match decode, sets odd/even period, fills in the TOCALL and sig report

Audio Level Meter

JT65-HF Interface

Waterfall DF = 0

The screenshot displays the JT65-HF software interface. At the top left, there are audio level meters for L (15) and R (-20). The central waterfall plot shows a signal at 14076 KHz. Below the plot is a QSO list with columns for UTC, Sync, dB, DT, DF, and Exchange. The entry for 06:23 with a DF of -396 is highlighted in green. To the right of the QSO list are various control buttons and settings, including 'TX Generated', 'TX Even', 'TX Odd', 'Call CQ', 'Answer Caller', 'Send RRR', 'Send 73', 'Answer CQ', 'Send Report', 'Log QSO', 'Restore Defaults', and 'Dial QRG KHz' (14076). At the bottom, there are buttons for 'Clear Decodes', 'Raw Decoder', and 'Station Setup', along with 'RB Reports: 3' and 'PSKR Reports: 3'.

UTC	Sync	dB	DT	DF	Exchange
06:24	9	-2	-0.3	-5	B 50W DPL TU 73
06:23	9	-5	0.2	-5	B W7IXZ KG6NUB 73
06:23	7	-7	-0.1	-396	B CQ KA1GMN EM12
06:14	2	-7	-1.9	11	B CQ KE1AF FN41

Decode Window

QSO Buttons

Best practices for JT65A

- **Keep power down – 50W ERP max**
- **Keep your clock synched (< 1 second error helps with decode sensitivity)**
- **Use the standard QSO patterns (helps with decode sensitivity and allows reverse beacon systems to gather prop data)**
- **Don't use "shorthand" unless you NEED to**
- **Help the community – Maintain accurate QRG and allow reporting of decodes to PSKR/RB**
- **NO ALC – NO ALC – NO ALC!!**

Best practices for JT65A

- Drawback to sensitivity of decoder is that the RX dynamic range is very narrow (about 10 dB)
 - Important to keep the “Audio Input Level” between -5 to +5
 - Tip: Zero the level during the 12-second “quiet period” after :48 and before :00
 - I prefer the Tigertronics Signalink for JT65A because it has front-panel knobs

Standard JT65 QSO (6:00 min)

- **CQ K1JT FN20**
 - (First station calls CQ - note that grid square is included in CQ)
- **K1JT W6DTW CM97**
 - (A second station answers CQ w/ grid square)
- **W6DTW K1JT -18**
 - (CQ station sends signal report)
- **K1JT W6DTW R-16**
 - (Answering station sends "R" + sig report)
- **W6DTW K1JT RRR**
 - (RRR indicates that the R+signal was received OK)
- **K1JT W6DTW 73**
 - (OPTIONAL – RRR was received OK - end of QSO)

“Contest” JT65 QSO (4:00 min)

- **CQ K1JT FN20**
 - (First station calls CQ - note that grid square is included in CQ)
- **K1JT W6DTW –16**
 - (Answering station sends signal report, no grid)
- **W6DTW K1JT R–18**
 - (CQ station sends R + signal report)
- **K1JT W6DTW RRR**
 - (RRR was received OK - end of QSO)

JT65A Tools

- PSKreporter.info (maps)
- Hamspots.net (spots)
- jt65.w6cqz.com (spots & chatroom)
- JT65-HF Google group (support)
- JT65 Facebook group (community support and narcissism)

PSKReporter.info

Display Reception Reports - Mozilla Firefox

http://pskreporter.info/pskmap.html?preset&ca deodorant use me

Most Visited Calendars Google Grammar News Radio WCA Weather Yahoo Groups Drudge Facebook Twitter LinkedIn

Google W deodorant use me dtwitk...


American Home Mortga... WunderMap Interactive... World's most expensive... Profile Stats | LinkedIn Display Reception R...

On all bands, show signals sent/rcvd by anyone using JT65 over the last 30 minutes. [Go!](#) [Display options](#)

Automatic refresh in 3 minutes. Large markers are monitors. [Display all reports](#).

There are **199 active monitors**: **74 on 20m**, **50 on 40m**, **25 on 30m**, **18 on 15m**, **16 on 80m**, 11 on unknown, **3 on 160m**, **1 on 2m**, **1 on 17m**.

[Legend](#)



The map displays signal paths (arcs) connecting various regions: Europe, Asia, Africa, Australia, and South America. Active monitors are indicated by colored pins (green, yellow, orange, purple) on the map. The map includes a scale bar (5000 mi / 5000 km) and a copyright notice: © 2009 Philip Gladstone - Terms of Use.

Map Satellite Terrain

POWERED BY Google

System statistics. Comments, problems etc. to: Philip Gladstone. Online discussion of problems/issues. Last modified: Sunday, October 03, 2010

Done SF:82 A:4 K:2 SSN:51 reQall US Pacific -- 23:54:35 -- Fri 15-Oct GMT/UTC -- 06:54:35 -- Sat 16-Oct

Hamspots.net

HamSpots - Ham Radio Digital Mode Spots [WSJT Modes] - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://hamspots.net/wsjt/ deodorant use me

Most Visited Calendars Google Grammar News Radio WCA Weather Yahoo Groups Drudge Facebook Twitter LinkedIn My Yahoo!

Google W Share Sidewiki Bookmarks deodorant use me dtwitk...

American Home Mortgage S... WunderMap Interactive Rad... World's most expensive mob... Profile Stats | LinkedIn HamSpots - Ham Radio ...

Information Settings Searches Digital Clubs **Digital Modes** Special LOTW & eQSL BANDS Online? Call: Search

SFI 82, A 4, K 2 **** WSJT MODES **** 20 Online
 Online : 00:00:38 06:55:26 : UTC

Auto refresh every 120 secs - Last refresh: 06:54:49 utc - Refresh Now

Local Spots / Chat / Skeds			Cluster Spots							
KG6NUB de KA1GMN	3576.00 kHz	JT65A	Age	DX	ST	Country	Freq	Sig	Mode	Spotter
-13			3m	HB9MGS		Switzerland	14076.18	-9	JT65A	LY2BCE
[age 12m] Oct-16 06:42utc			4m	SP7FFY		Poland	10138.48		JT65A	F1LFT
W7IXZ de KA1GMN	3576.00 kHz	JT65A	4m	MH9OEJ		Jersey	7075.56		JT65A	SA7AGE
-5			5m	ZL2DOG		New Zealand	14076.28	-10	JT65A	JH1BBS
[age 23m] Oct-16 06:31utc			5m	AF6SA	CA	United States	3575.09	-6	JT65A	KG6NUB
de F1SMV			5m	RZ3AAO		European Russia	14076.25	-22	JT65A	PY8ELO
z13in thank QSO paul 73			6m	SM0MEM		Sweden	10138.65	-5	JT65A	F1SMV
[age 24m] Oct-16 06:30utc			6m	RA1OGP		European Russia	10138.00	-4	JT65A	HB9ARI
KB3X de VA7HZ	1838.00 kHz	JT65A	6m	ZL1ATB		New Zealand	10137.99	-2	JT65A	HB9ARI
I heard you but didn't have enough power to get back to you			6m	SP2IPU		Poland	10137.99	-2	JT65A	GI8HXY
[age +2h] Oct-16 04:46utc			7m	KC2VKD	NY	United States	3575.01	-9	JT65A	W7LAB
			8m	KA1GMN	TX	United States	3575.10	-9	JT65A	KG6NUB

Callsign:

Name:

Welcome Guest.

To post local spots or chat, please sign in.
 Access is **FREE**, just enter your callsign & first name.

Spotters | Links | Colors?

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Done SF:82 A:4 K:2 SSN:51 reQall US Pacific -- 23:55:26 -- Fri 15-Oct GMT/UTC -- 06:55:26 -- Sat 16-Oct