

JT65/JT9/WSJT

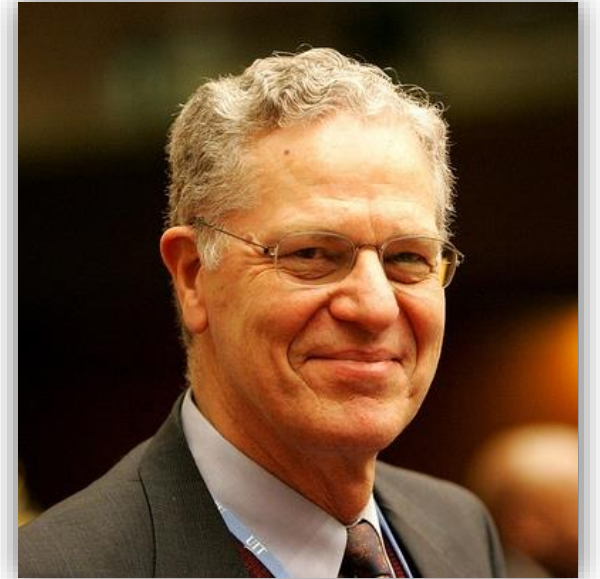
Blair Gillam, KC9BBW

Goals

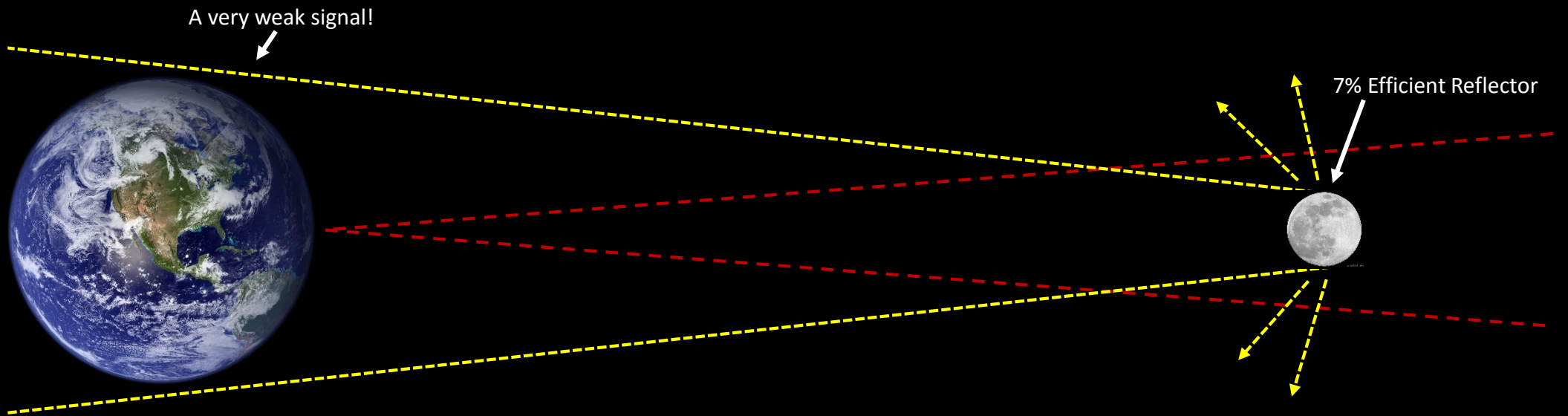
- JT65/JT9/WSJT History
- JT65/JT9/WSJT Protocols
- JT65 Station Equipment
- JT65 Operating Practices

History

- Joe Taylor (K1JT)
 - Nobel Laureate, Astrophysicist, Amateur Radio operator
 - Moon-bounce (EME)
 - Earth -> 240,000 -> Moon -> 240,000 -> Earth
 - Free space path loss
 - Increase output power
 - Use a directional antenna
 - Narrow signal bandwidth to concentrate energy



Simplified EME



Transmitted Signal: - - - - -
Reflected Signal: - - - - -

WSJT Protocols

- **FSK411:** Meteor Scatter on 2m/70cm
- **JT6M:** Meteor Scatter on 4m/6m
- **JT65:** EME at VHF/UHF and QRP operation at MF/HF
- **JT9:** LF, MF, & low HF bands

Let's focus on **JT65 for QRP HF.**

JT65

- “Slow” mode originally developed for Tropospheric and EME
- More efficient coding & modulation schemes
 - Redundant Multiple-Frequency Shift Keying (MFSK)
 - 64 tones + 1 Synchronization tone
 - Data Compression
 - Forward Error Correction (Reed-Solomon coding)
- Uses DSP to decode signals below the noise floor
- Time-synchronized
 - 1 minute transmissions
- Short Structured Messages



Message Types

Category	Type	Examples
Standard	CQ, QRZ, or DE	CQ W9YB EN60 —or— W9YB KC9BBW FM18
Standard	Signal Report	KC9BBW W9YB -19 —or— W9YB KC9BBW R-17
Standard	RRR	KC9BBW W9YB RRR
Standard	73	W9YB KC9BBW 73
Shorthand	RO	RO
Shorthand	RRR	RRR
Shorthand	73	73
Free Text	Freehand Text	TNX ROBERT 73

Why use JT65?

- DX with < 10 watts
- “Small stations” can win HF DX awards (WAS, DXCC)
- **Mostly** stress-free operating mode

KC9BBW



JT65 Station Setup

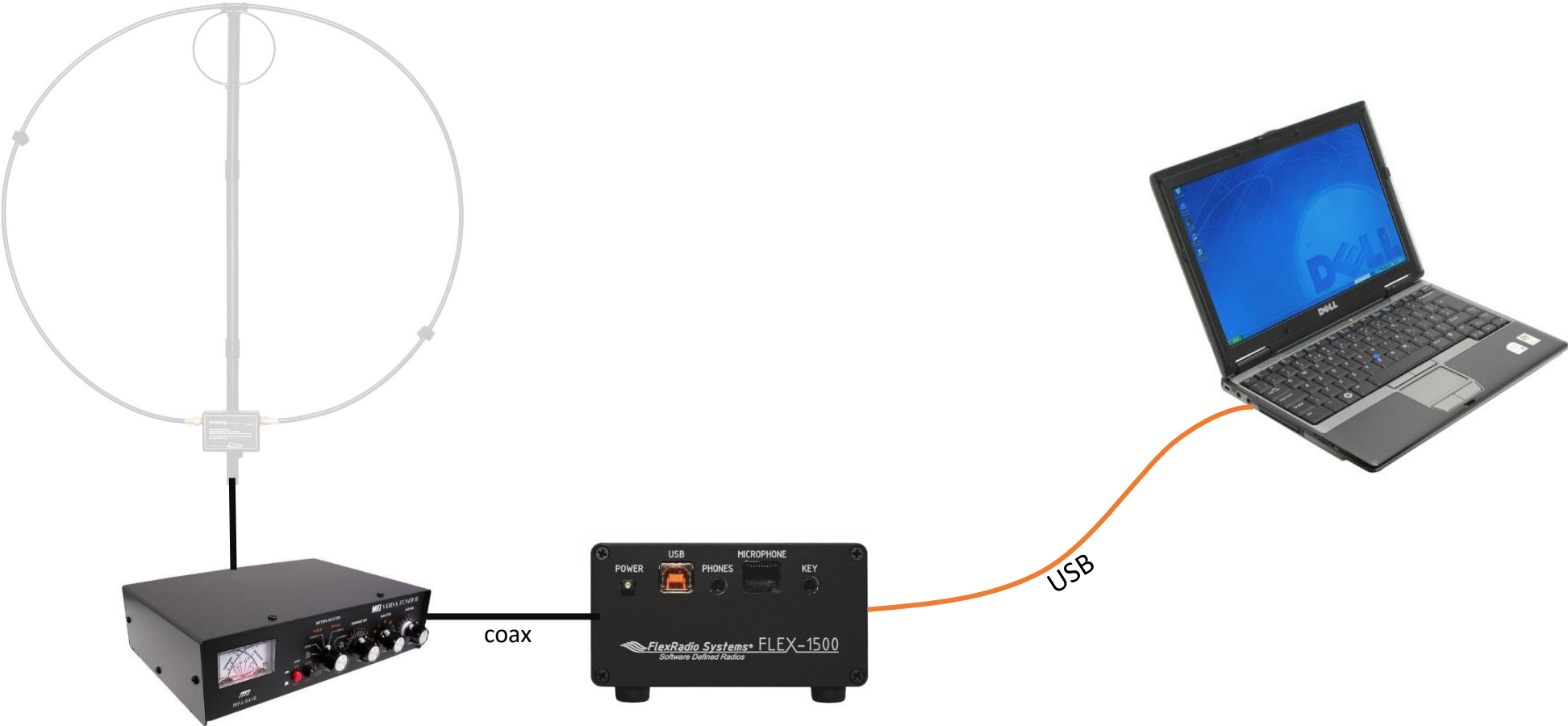
Equipment Needed

- Radio
 - USB or computer interface port preferred
 - Must handle Full Duty Cycle
- Computer
 - 1.5GHz+ CPU
- Interface between radio & computer (PTT & Audio)
- Software
 - JT65
 - Rig Control (HRD, PowerSDR, etc)
 - Time Synchronization (Dimension 4, Meinberg)
 - Optional: JTAlert

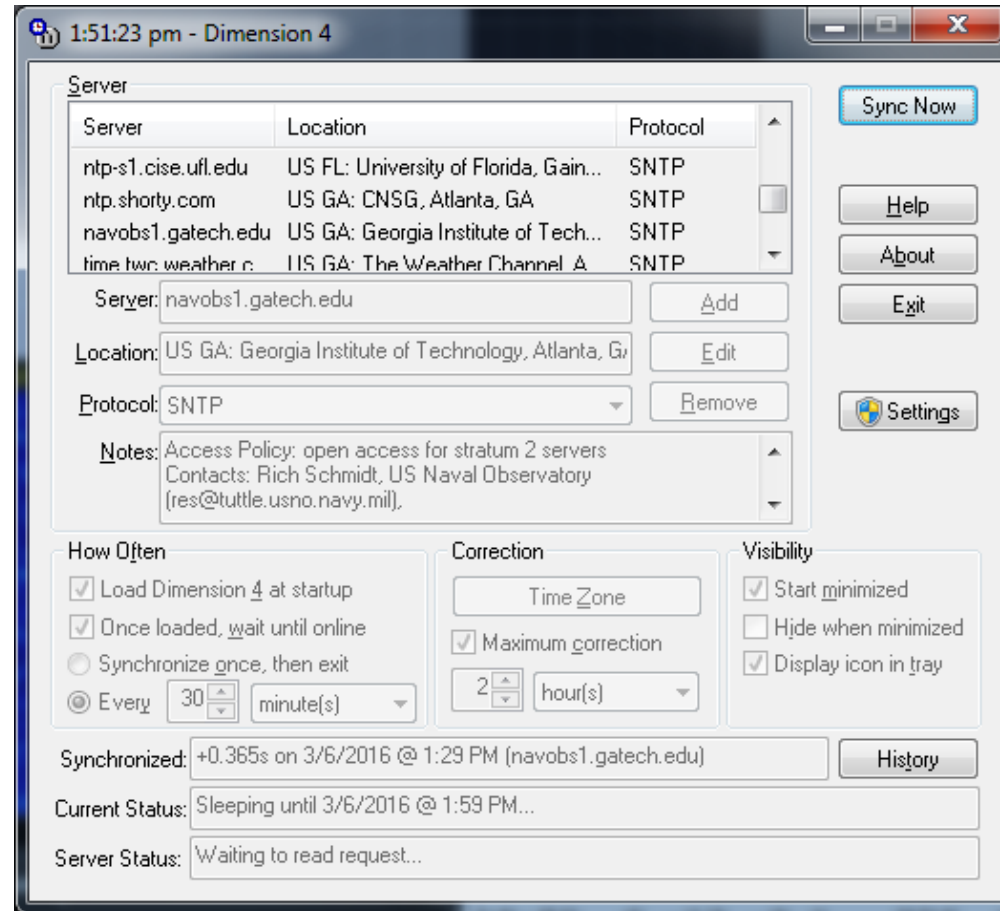
JT65 w/ IC-7000



JT65 w/ FlexRadio 1500

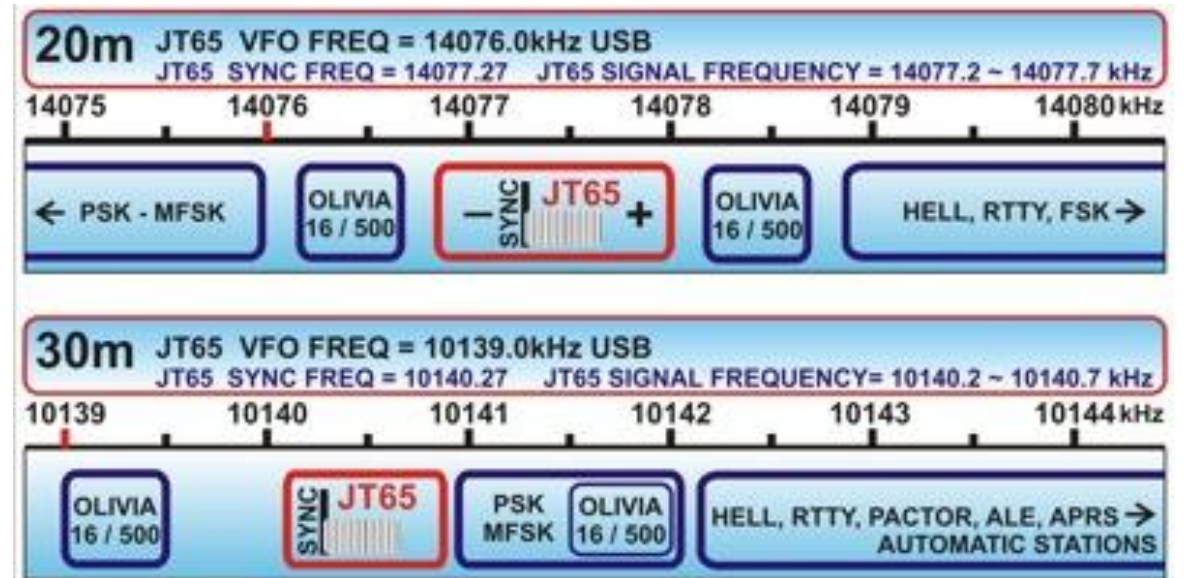


Step 1: Synchronize Your Time



Step 2: Tune to JT65 HF VFO Frequency

- 80m: 3.576 MHz USB
- 40m: 7.076 MHz USB
- 30m: 10.139 MHz USB
- 20m: **14.076 MHz USB**
- 17m: 18.102 MHz USB
- 15m: 21.076 MHz USB
- 10m: 28.076 MHz USB



STOP

VFO A
14.076 000
20M RTTY TX

VFO Sync
VFO Lock
Tune Step: - 50Hz +
7.000000 Save Restore

VFO B
14.076 000
TX 20M RTTY

RX1 Meter TX Meter
Signal Fwd Pwr
-81 dBm
1 3 5 7 9 +20 +40 +60

MON TUN
MOX
MUT
REC PLAY

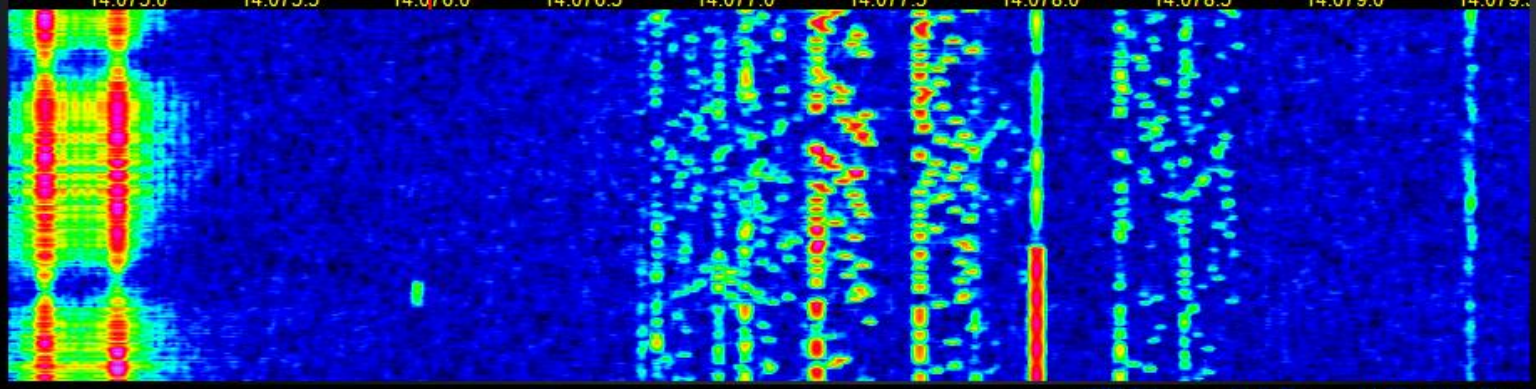
AF: 4
AGC-T: 80

Drive: 100
AGC Preamp
Med 0

SQL: -120

RX: PA
TX: PA

3/6/2016
LOC 16:24:42
CPU %: 15.2



160 80 60
40 30 20
17 15 12
10 6
VHF+ WWV GEN

LSB USB DSB
CWL CWU FM
AM SAM SPEC
DIGL DIGU DRM

Pan: Center Zoom: 0.5x 1x 2x 4x

SPLT A > B NR ANF Panafall
0 Beat A < B NB NB2 AVG Peak
IF->V A <> B SR BIN TNF +TNF
XIT 0 RIT 0
0 0
VACT VACZ
MultiRX
Swap

VAC1 RX Gain: -20
Sample Rate: 48000
VAC1 TX Gain: 0
Mono/Stereo: Stereo
TX Profile: Default Show TX Filter

3.0k 2.5k 2.0k
1.5k 1.0k 800
600 300 150
75 Var 1 Var 2
Low 0 High 2321
Width: Reset
Shift: Reset

Step 3: Configure JT65-HF

Configuration

Station Setup | Rig Control/PTT | RB and PSKR | Macros | Colors | Diagnostics

Callsign
KC9BBW

Prefix
NONE

Suffix
NONE

Note: Suffix/Prefix is suggested to only be used in situations where you have a legal requirement to do so. You may define a suffix OR a prefix but not both. Suffix/prefix support in the JT65 protocol is a (very) complex issue. My suggestion is to avoid its use if at all possible. Suffix/prefix support in JT65-HF is, at best, incomplete.

Grid (4 or 6 Characters). Required value.
FM18

Sound Input Device
02-Line 2 (Virtual Audio Cable)

Sound Output Device
07-Line 1 (Virtual Audio Cable)

RX Sample Rate
0.9999

TX Sample Rate
0.9999

Enable Automatic RX/TX Sample Rate Correction.

Automatic adjustment may cause some initial skewing of spectrum display until SR settles. This is harmless. In most cases it is suggested that Automatic sample rate correction be enabled.

Disable TX after sending same message excessively. (Runaway TX watchdog) 15 Repeat TX Count for disable TX

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). Enable Multidecoder after Halt TX Button press

Restore defaults sets Multidecoder On

Send CW ID With 73 or Free Text Message Send CW ID ONLY with Free Text Message

Draw divider line between text decode periods (if screen height sufficient). Use compressed divider line

Save text of decodes and transmissions to file.

Location of RX/TX history file (JT65hf-log.csv)
C:\Users\kc9bbw\AppData\Local\JT65-HF\

Save Settings and Close Window

Configuration

Station Setup **Rig Control/PTT** RB and PSKR Macros Colors Diagnostics

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

PTT Port

COM22

Test PTT will Key/Unkey your Transceiver. No audio will be sent during test.

Test PTT

Use Alternate PTT Method. Only enable this if you have problems with PTT.

Ham Radio Deluxe

Enable

Version 4

Version 5

OmniRig

Enable

Radio 1

Radio 2

Commander

Enable

Waiting for data from HRD

	At UTC Time	QSY to QRG	Tune Antenna
<input checked="" type="checkbox"/>	0 0	14076000	<input type="checkbox"/>
<input type="checkbox"/>	0 0	14076000	<input type="checkbox"/>
<input type="checkbox"/>	0 0	14076000	<input type="checkbox"/>
<input type="checkbox"/>	0 0	14076000	<input type="checkbox"/>
<input type="checkbox"/>	0 0	14076000	<input type="checkbox"/>

Rig QRG Hz 14076000

Set QRG

Use HRD for PTT

Test HRD PTT

Shift QRG to match DF if TxDF matching enabled

HRD Server Address localhost

Port 7809

Save Settings and Close Window

JT65-HF Version 1.0.9.3 [KC9BBW QRV]

Setup Rig Control Raw Decoder Transmit Log About JT65-HF

Audio Input Levels

L-2
 R-2

Optimum input level is 0 with only background noise present.

Digital Audio Gain

L: 0

R: 0

2016-Mar-03
18:32:20

Dial QRG KHz

0

Clear Decodes Decode Again 0 DT Offset Restore Defaults

Current Operation: Receiving

Color-map Brightness Contrast Speed Gain

Blue 5 0 Smooth

RX/TX Progress

Message To TX: No message entered.

TX Text (13 Characters) **TX OFF**

TX Generated

TX Even TX Odd

Double click an entry in list to begin a QSO. Right click copies to clipboard.

UTC	Sync	dB	DT	DF	Exchange
18:31	10	-15	0.1	829	B W9IFW RRR 73
18:31	4	-15	0.0	635	K KC9MBL DJ3BO R-16
18:31	4	-7	-0.4	213	B NL7ER OE3UKW -07
18:31	6	-4	-1.0	-83	B CQ W4NQP EM80
18:31	8	-4	0.6	-552	B PD7DX K4EAY R-14

18:30	5	-18	-0.1	401	B EA3XQ A61BK 73
18:30	5	-12	-0.7	272	B W4NQP SP3JHZ JO71
18:30	14	-10	0.1	75	B RV3DBK DB5SU 73
18:30	9	-17	-0.3	-269	B CQ9DX PD4RD JO21
18:30	11	-6	-0.2	-552	B K4EAY PD7DX -16
18:29	6	-14	0.1	829	B W9IFW PA5VL -12
18:29	7	-7	-1.0	275	B CQ W4NQP EM80

Call CQ and answer callers

Answering CQ

TX DF RX DF TX DF = RX DF TX to Call Sign Rpt (-#)

AFC

Single BW Multi BW Enable Multi Enable RB Enable PSKR

RB/PSKR Counts

Sound In:
02-Line 2 (Virtual Audio Cable)

Sound Out:
07-Line 1 (Virtual Audio Cable)



PD7RF	WA0BC - MN	YE6YE	IZ8GUU	DJ6JZ	DK2CH	DL1DBR
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FlexRadio Systems™ PowerSDR™ v2.7.2 FLEX-1500: 2510-0270

STOP

VFO A: 14.076 000
20M RTTY TX

VFO B: 14.076
TX 20M RTTY

MON TUN
MOX
MUT
REC PLAY

AF: 55
AGC-T: 60
Drive: 100
AGC Preamp
Med 0

SQL: -144

RX: PA
TX: PA

Pan: Center Zoom: 0.5x

SPLIT A > B A < B
0 Beat IF->V A <> B
XIT 0 RIT 0
0 0
VAC1 VAC2

NR ANF Panafall
NB NB2 AVG Peak
SR BIN TNF +TNF

VAC1 RX Gain: 0 Sample Rate: 48000
VAC1 TX Gain: 0 Mono/Stereo: Stereo
TX Profile: Default Show TX Filter

600 300 150
75 Var 1 Var 2
Low 0 High 2509
Width: Shift: Reset

3/3/2016
LOC 12.36.56
CPU %: 15.4

JT65-HF Version 1.0.9.3 [KC9BBW QRV]

Setup Rig Control Raw Decoder Transmit Log About JT65-HF

Audio Input Levels L-5 R-5
Optimum input level is 0 with only background noise present.
Digital Audio Gain L: 0 R: 0

2016-Mar-03
17:36:56
Dial QRG KHz: 0

Current Operation: Idle
Color-map Brightness Contrast Speed Gain
Blue 5 0 Smooth

Message To TX: No message entered.
TX Text (13 Characters) TX OFF
Enable TX Halt TX
TX Generated TX Even TX Odd

Call CQ and answer callers
Call CQ Answer Caller Send RRR
Answering CQ Answer CQ Send Report Send 73

TX DF RX DF TX DF = RX DF TX to Call Sign Rpt (-#)
245 245 AFC
Zero Zero Noise Blank
Single BW Multi BW Enable Multi Log QSO
100 100 Enable RB Enable PSKR

RB/PSKR Counts: 0
Sound In: 02-Line 2 (Virtual Audio Cable)
Sound Out: 07-Line 1 (Virtual Audio Cable)

UTC	Sync	dB	DT	DF	Exchange
17:36	7	-8	-0.3	450	B AC9HP DK2CH JO52
17:36	3	-13	-0.9	231	B AK3J PD7RF -20
17:36	3	-21	2.3	5	K M0LTA YE6YE -20
17:36	7	-14	-0.1	-275	B CQ IZ8GUU JN70
17:36	5	-18	0.1	-476	B F5NAA DJ6JZ JO31
17:36	11	-7	-0.1	-606	B G0IXE WA0BC EN36
17:36	4	-13	0.2	-762	B HB9ELE DL1DBR JO41

17:35	4	-17	0.2	727	B CQ PA7ZZ JO22
17:35	4	-13	1.1	560	B 73 RRR TU
17:35	6	-21	-0.3	458	K SRI NO DECODE
17:35	1	-16	-0.4	234	K PD7RF G4SDL IO83
17:35	5	-11	-0.2	-283	B 8Q7WK DJ7BP JO41

WSJT-X

WSJT-X v1.6.0 by K1JT

File View Mode Decode Save Help

Band Activity

UTC	dB	DT	Freq	Message
0107	-11	0.6	1372	# K4KSW73LOTW
0107	-14	0.5	1490	# AD1E WX7SJ 73
0107	-1	0.9	1968	# NP4AM N5SLY R-07
----- 20m				
0108	-12	0.7	586	# CQ RW0SR OO22
0108	-10	1.3	1491	# CQ DX AD1E DM43
0108	-11	2.1	1969	# N5SLY NP4AM 73
----- 20m				
0110	-19	1.0	800	# KC9BBW K6KNS CM98
0110	-13	0.9	586	# CQ RW0SR OO22
0110	-9	1.3	1490	# JF8EVE AD1E -22
0110	-15	2.1	1968	# W5VCZ NP4AM -06

Rx Frequency

UTC	dB	DT	Freq	Message
0053	-15	0.7	1199	# CQ KC7J CN86
0054	Tx		1199	# KC7J KC9BBW FM18
0055	-14	4.4	1769	# CQ WD8LJP DM65
0056	Tx		1769	# WD8LJP KC9BBW FM18
0057	-15	4.6	1768	# KE1AF WD8LJP -11
0059	Tx		1000	# CQ KC9BBW FM18
0101	Tx		1000	# CQ KC9BBW FM18
0103	-20	0.5	297	# CQ KJ4TX CN85
0104	Tx		297	# KJ4TX KC9BBW FM18
0109	Tx		800	# CQ KC9BBW FM18
0110	-19	1.0	800	# KC9BBW K6KNS CM98
0111	Tx		800	# K6KNS KC9BBW -19

Log QSO
Stop
Monitor
Erase
Decode
Enable Tx
Halt Tx
Tune

20m 14.076 000

DX Call: K6KNS Az: 284

DX Grid: CM98 3799 km

Lookup Add

Tx JT65 #

Tx 800 Hz

Rx 800 Hz

Tx even Tx<Rx Rx<Tx Lock Tx=Rx

Calling CQ: CQ

Answering CQ: Grid

dB: RRR

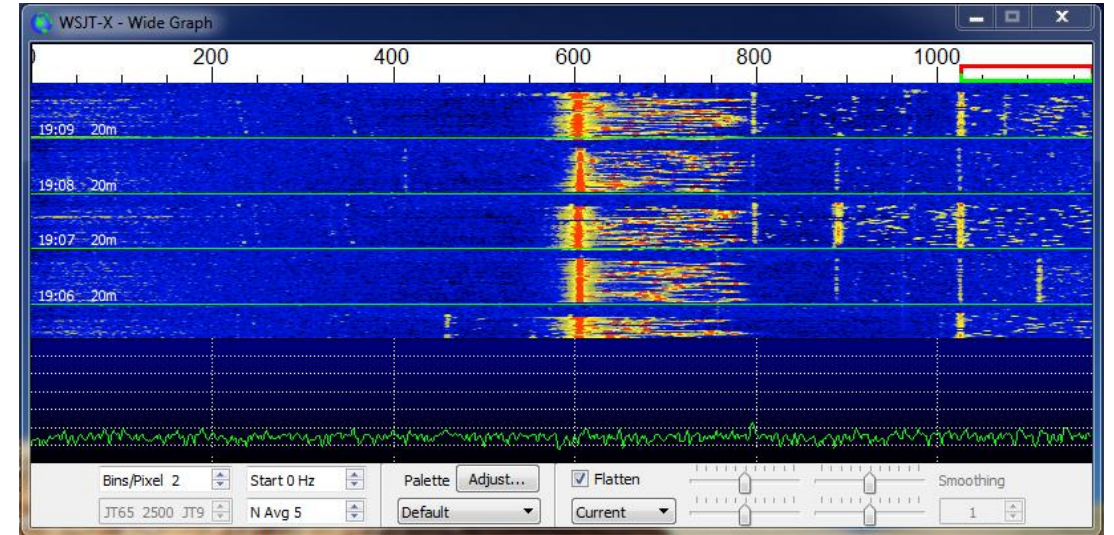
73

K6KNS KC9BBW -19 Gen msg

TNX 73 GL Free msg

2016 Mar 10 01:11:34

Tx: K6KNS KC9BBW -19
JT65 A
Last Tx: K6KNS KC9BBW -19
Tx-Enable Armed 71%



JT65 Exchanges

JT65 Color Codes

UTC	Sync	dB	DT	DF	Exchange
22:38	10	-11	-0.1	-307	B KC9BBW KD5PQG R-19
22:36	5	-7	-0.3	754	B CQ PY7RL HI21
22:36	6	-18	-0.2	447	B W9ZED K2WH -01
22:36	4	-12	-0.4	202	B GM0NBM LW2EIIY -14
22:36	6	-10	-0.2	-94	B W4DRK EI6KD RRR
22:36	3	-13	-0.1	-304	B KC9BBW KD5PQG EL29
22:36	2	-22	0.1	-528	K VE3DQ K4EAY R-06

Green: Someone Calling CQ

Gray: QSO In Progress

Red: Someone Replying to You

Header	Meaning
UTC	Time of the Exchange (In JT65-HF, most recent is at the top)
Sync	The # of synchronizing tones received (Higher is better)
dB	Received strength after decoding (Strong signals are closer to 0.)
DT	Time differential (Ideally between 0.3 to 0.1)
DF	Decoding frequency (corresponds to where in the pass-band the signal was heard)
Exchange	The actual data payload (i.e. the conversation)

The “Perfect” Exchange

CQ KC9BBW FM18

I call CQ with my grid.

KC9BBW KD5PQG EL29

KD5PQG answers with his call sign and grid.

KD5PQG KC9BBW -13

I answer KD5PQG with a report (-13).

KC9BBW KD5PQG R-19

KD5PQG acknowledges my report (R) and sends his (-19).

KD5PQG KC9BBW RRR

I acknowledge KD5PQG’s report (RRR).

KC9BBW KD5PQG 73

KD5PQG ends the QSO with a 73.

KD5PQG KC9BBW 73

I end the QSO with a 73.

Non-Standard Exchanges

- Running station may combine the RRR & 73 (i.e. **KD5PQG RR73**)
- Stations may skip the 73 message
- Stations may send free-hand text (up to 13 characters):
 - 10W IN V 73
 - 5W LOOP 73
 - 2W DIP TUGL
 - QSL LOTW 73
 - UR ANTENNA?

Non-Standard Exchanges (cont'd)

CQ KC9BBW FM18

I call CQ with my grid.

KC9BBW KD5PQG EL29

KD5PQG answers with his call sign and grid.

KD5PQG KC9BBW -13

I answer KD5PQG with a report (-13).

KC9BBW KD5PQG R-19

KD5PQG acknowledges my report (R) and sends his (-19).

KD5PQG KC9BBW RRR

I acknowledge KD5PQG's report (RRR).

10W DIP 73

KD5PQG sends his antenna info and ends the QSO.

5W LOOP 73

I send my antenna info and end the QSO.

Free-Hand Text Messages

30W DIP 73GL	Sender is running 30 watts through a dipole; ending the QSO and wishing us Good luck!
15W LOOP TU73	Sender is running 15 watts through a loop; Thank you and 73.
UR ANTENNA?	Sender wants to know your antenna configuration.
KC9BBW UR QRM	Is KC9BBW is being interfered with or is KC9BBW causing the interference?
QSL LOTW 73	Please QSL through Logbook of the World.
LOTWQRZBURO73	Please QSL through LOTW, QRZ.com, or the QSL Bureau.
UR IN LOG 73	Sender already worked you...?
QSL BURO 73	Please QSL through the Bureau.
READ UR DISPL	...?
CHK CLOCK	Sender is telling someone to check their time sync.
SRI NO DECODE	JT65 Software could not decode the exchange.

These are actual free-hand text messages I have seen. Call signs changed to protect the innocent.

Running vs. Search & Pounce

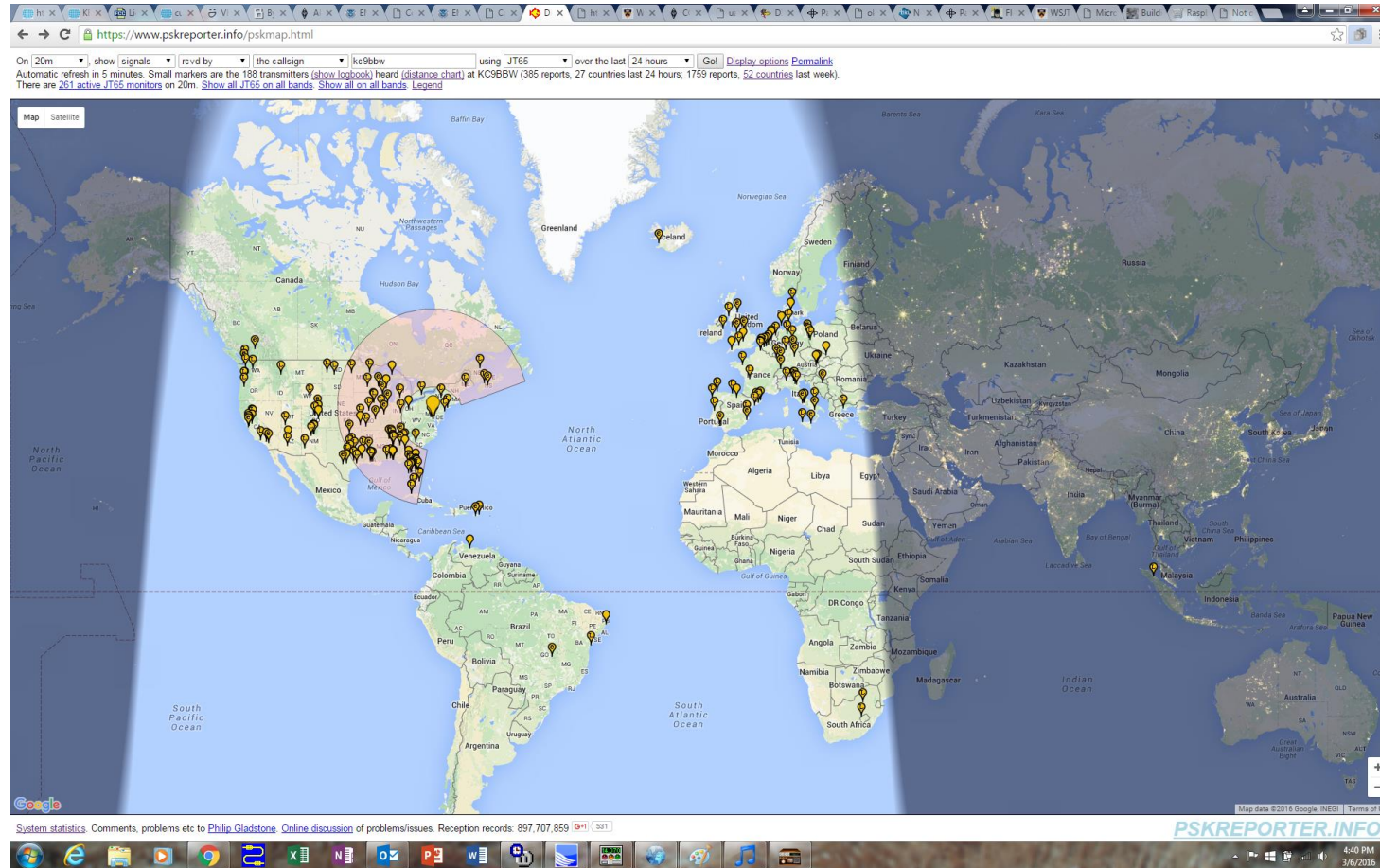
UTC	Sync	dB	DT	DF	Exchange
20:07	15	-11	-0.2	509	B KC9BBW KC8NN EN66

20:03	6	-7	-0.2	509	B KC9BBW EA3HUF 73
20:01	5	-8	-0.5	511	B KC9BBW EA3HUF R-18
19:59	11	-4	-0.5	511	B KC9BBW EA3HUF JN11
19:53	8	-10	0.1	544	B KC9BBW EA5ZN IM98
19:49	5	-9	0.0	568	B KC9BBW ON6SAT RR73
19:47	6	-11	0.0	565	B KC9BBW ON6SAT R-15
19:45	3	-12	-0.0	563	B KC9BBW ON6SAT JO20
19:41	4	-14	0.5	563	B KC9BBW EA4GST 73
19:39	7	-16	0.5	565	B KC9BBW EA4GST R-22
19:35	3	-13	-0.1	751	B SV6COH EA3HUF R-01
19:35	4	-12	0.5	563	B KC9BBW EA4GST IN80

UTC	Sync	dB	DT	DF	Exchange
21:38	10	-2	-0.2	503	B F4HMI AI4RJ EM74
21:38	9	-7	-0.3	213	B TU G 73
21:38	10	-1	0.3	-8	B WA9TTY W1TLK 73
21:38	1	-10	0.5	-533	B RR 73 MD AI1W
21:38	3	-17	0.0	-845	B KC9BBW IZ1SBX -18

21:36	17	-1	-0.2	1028	K WA4UT KM4RTG R-06
21:36	14	-10	-0.3	215	B IZ5VUT K4JRU -19
21:36	13	-6	0.3	-8	B WA9TTY W1TLK RRR
21:36	8	-6	-0.8	-242	B KK4MA IT9SUQ R-10
21:36	5	-9	0.6	-530	B AD0BM AI1W -09
21:36	3	-16	0.0	-842	B CQ IZ1SBX JN45
21:35	10	-6	-0.3	756	B KM4RTG WA4UT EM66

pskreporter.info



hamspots.net

Information | Settings | Searches | Digital Clubs | **Digital Modes** | Special | LOTW & eQSL | BANDS | Online?

SFI 94, A 23, K 4
Online : 32:46:24

**** 2 BAND - JT9 & JT65 MODES ****

295 Online
22:42:18 : UTC

Auto refresh every 90 secs - Next refresh in 78 secs - Refresh Now

S	Age	DX	Freq	Sig	Mode	St	Country	Spotter
X	2m	W6MSU	14078.53	-13	JT9	CA	United States	W6VY
A	2m	W4DRK	14078.45	-05	JT65A	FL	United States	W8OTR
A	2m	K4EAY	14078.01	-17	JT65A	AL	United States	W8OTR
A	2m	W5VMA	14079.23	-08	JT65A	MS	United States	W8OTR
A	2m	K05PQG	14078.24	-07	JT65A	TX	United States	W8OTR
A	2m	N7MMO	14079.53	-16	JT65A	WA	United States	W8OTR
X	3m	W9ZED	14077.69	-24	JT65A	IL	United States	VK3VT
X	3m	K4SOC	14077.09	-01	JT65A	GA	United States	VK3VT
X	3m	JA2HMD	14078.00	-16	JT65A	Japan	VK3VT	
X	3m	CT1FBK	14076.95	-21	JT65A	Portugal	K2RH	
A	3m	JA2HMD	14078.03	-19	JT65A	Japan	LU8DQS	
A	3m	K4SOC	14077.13	-13	JT65A	GA	United States	LU8DQS
X	3m	JA3GAK	14078.26	-23	JT65A	Japan	DU2K8SQ	
A	3m	W6YDG	14077.45	-17	JT65A	CA	United States	JA7FYU
A	3m	CT1FBK	14076.96	-21	JT65A	Portugal	LU8DQS	
X	3m	JA2HMD	14078.03	-24	JT65A	Japan	NS0FQ	
X	3m	JA2HMD	14077.85	-11	JT65A	Japan	JK1JOJ	
X	3m	KC9BBW	14076.96	-09	JT65A	VA	United States	W6VY
X	3m	W9ZED	14076.91	-01	JT65A	IL	United States	K9OHI
A	3m	K17WL	14077.82	-13	JT65A	WA	United States	JA7FYU
A	3m	GMONBM	14077.49	-15	JT65A	Scotland	LU8DQS	
X	3m	VE3DQ	14076.77	-13	JT65A	Canada	KG7LKI	
A	3m	K4SOC	14077.11	-05	JT65A	GA	United States	JR1AQN
X	3m	N9ID	14078.76	-19	JT9	IN	United States	W9MDB
A	3m	W9ZED	14077.71	-05	JT65A	IL	United States	JR1AQN
A	3m	JA3GAK	14078.25	-13	JT65A	Japan	JA8QVO	
X	3m	JA3GAK	14078.25	-15	JT65A	Japan	K7JFC	
P	3m	KB7N	14079.20	-21	JT9	WA	United States	AC2QY
A	3m	G8ZSG	14077.70	-17	JT65A	England	W8OTR	
P	3m	AA8EN	14079.11	-7	JT9	OH	United States	N9SEO
A	3m	N7IY	14078.76	-18	JT65A	OR	United States	W8OTR
P	3m	WB2QAV	14077.17	-14	JT65A	FL	United States	KC3EIZ
A	3m	W6YDG	14078.72	-06	JT65A	CA	United States	W8OTR
A	3m	K4SOC	14078.39	-18	JT65A	GA	United States	W8OTR
A	3m	K17WL	14079.09	-06	JT65A	WA	United States	W8OTR
P	4m	JA1VGV	14076.41	-8	JT65A	Japan	W8OU	

S	Age	DX	Freq	Sig	Mode	St	Country	Spotter
X	4m	KD9EOT	28077.78	-20	JT65A	IL	United States	WD6OOD
X	4m	N7NEV	28078.75	-04	JT9	AZ	United States	K9AAN
X	4m	C3NYTP9	28077.06	-17	JT65A	France	KC7UBS	
X	4m	KE4QVB	28077.08	-01	JT65A	FL	United States	W2PKY
X	4m	KD9EOT	28077.79	-21	JT65A	IL	United States	K6AVP
X	6m	N7NEV	28078.78	-19	JT9	AZ	United States	AA3AE
X	6m	KE4QVB	28077.07	-13	JT65A	FL	United States	N4RP
X	6m	KF8YO	28078.06	-02	JT65A	OH	United States	AA3AE
P	8m	KE4QVB	28077.09	-7	JT65A	FL	United States	CX8AF
X	8m	N7NEV	28078.75	-01	JT9	AZ	United States	K9AAN
X	8m	KE4QVB	28077.06	-01	JT65A	FL	United States	NOKM
X	8m	KF8YO	28078.06	-04	JT65A	OH	United States	AA3AE
X	9m	PP5AMP	28077.06	-17	JT65A	Brazil	N4RP	
X	9m	NP4AM	28077.48	-03	JT65A	Puerto Rico	K0VM	
P	10m	NP4AM	28077.51	-12	JT65A	Puerto Rico	CX8AF	
P	10m	KC7TCH	28076.71	00	JT65A	UT	United States	W4GAA
X	10m	B25XQS	28077.05	-23	JT65A	China	KC7UBS	
X	10m	KE4QVB	28077.06	-18	JT65A	FL	United States	K0VM
X	10m	NP4AM	28077.54	-06	JT65A	Puerto Rico	WB5TKA	
X	10m	KF8YO	28078.02	-24	JT65A	OH	United States	W2PKY
X	11m	AA8EN	28079.21	-22	JT9	OH	United States	KK7MF
X	11m	PP5AMP	28077.06	-17	JT65A	Brazil	N4RP	
X	11m	KB7N	28079.34	-20	JT9	WA	United States	KK7MF
X	12m	W4DQ	28078.74	-24	JT9	FL	United States	KK7MF
X	12m	K8SIA	28078.97	-02	JT9	MI	United States	KK7MF
X	12m	CO2RVA	28079.34	-14	JT9	Cuba	KK7MF	
X	12m	KE4QVB	28077.11	-20	JT65A	FL	United States	WB5TKA
X	13m	PP5AMP	28077.08	-02	JT65A	Brazil	W2PKY	
P	14m	KE4QVB	28077.25	00	JT65A	FL	United States	PUSCIT
X	14m	KE4QVB	28077.06	-01	JT65A	FL	United States	KC7UBS
P	16m	KE4QVB	28078.38	00	JT65A	FL	United States	LU2EXS
X	16m	B25XQS	28077.08	-13	JT65A	China	W2PKY	
X	16m	KF2T	28077.46	-10	JT65A	NV	United States	KM4OYP
X	16m	KE4QVB	28077.15	-21	JT65A	FL	United States	K6UVR
X	18m	CO2RVA	28079.34	-16	JT9	Cuba	KK7MF	
X	18m	KF2T	28077.46	-01	JT65A	NV	United States	W4RVH

Call sign:
Password: [Register](#)
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5:42 PM
3/11/2016

JT65 Logging

JT65-HF can log all received & transmitted exchanges to a CSV file.

- C:\Users\\AppData\Local\JT65-HF\JT65hf-log.csv

```
"Date","Time","QRG","Sync","DB","DT","DF","Decoder","Exchange"  
"2014-05-21","23:59","14076","2","-7","-0.5","-657","B","IZ1RHY K0ECN -15","65A"  
"2014-05-21","23:59","14076","5","-10","-0.3","-466","B","RC9U HB9BVB JN37","65A"  
"2014-05-21","23:59","14076","9","-2","-0.5","81","B","CQ N9BC EN54","65A"  
"2014-05-21","23:59","14076","1","-11","-0.9","589","B","CQ G4DZE IO92","65A"  
"2014-05-21","23:59","14076","3","-8","-0.5","746","B","LU1EEG WY1C 73","65A"  
"2014-05-22","00:00","-","-","-","-","T","CQ KC9BBW FM18"
```

Resources

- WSJT Home Page: <http://physics.princeton.edu/pulsar/k1jt/>
- JT65 Protocol: <http://www.arrl.org/files/file/18JT65.pdf>
- VE3BUX JT65 Operator Guide: http://ve3bux.com/files/JT65_Operator_Guide.pdf
- Work The World With JT65 and JT9 (ARRL)
- HFLINK JT65: <http://hflink.com/jt65a/>
- PSK Reporter: <https://pskreporter.info/>
- Reverse Beacon Network: <http://www.reversebeacon.net/>
- HAM Spots: <http://hamspots.net/>
- Maidenhead Grid Square Locator: http://www.levinecentral.com/ham/grid_square.php

Software Resources

- JT65

- WSJT/WSJT-X: <http://physics.princeton.edu/pulsar/k1jt/index.html>
- JT65-HF: <https://sourceforge.net/projects/jt65-hf/>
- JT65-HF-Comfort: http://www.funkamateure-dresden-ov-s06.de/index.php?article_id=315&clang=1
- JT65-HF-HB9HQX-Edition: <https://sourceforge.net/projects/jt65hfhb9hqxedi/>
- JAlert: <http://hamapps.com/>

- Rig Control

- Ham Radio Deluxe: <http://ham-radio-deluxe.com/>
- PowerSDR (Flex Radios): <http://www.flexradio.com/amateur-products/flex-series/powersdr/>

- Time Synchronization

- Meinberg: <https://www.meinbergglobal.com/english/sw/ntp.htm>
- Dimension 4: <http://www.thinkman.com/dimension4/>

Questions?

UTC	Sync	dB	DT	DF	Exchange
20:22	16	-6	0.6	164	B KC9BBW RPT?

20:20	3	-17	-0.5	778	B SQ6RKY RRR 73
20:20	11	-7	0.5	164	B KC9BBW W1EHQ -05