



# TBARC Programs

## FT8: New WSJT-X Mode

Original Presenter: Israel K7HI

BAARC Presenters: Guy Shipley WB5MXO, Kent Powell K5WTS

&

Dan Woods W5BM

# Overview

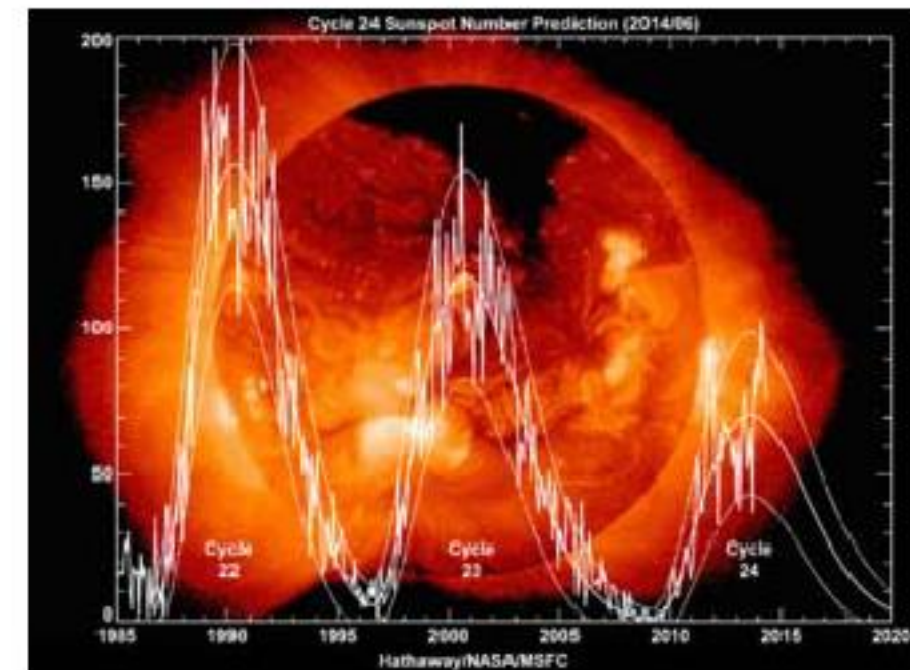


- 1. Introduction to WSJT Modes**
- 2. Downloading & Installing WSJT-X Software**
- 3. Dimensions-D – Time Synchronization**
- 4. Setup, Audio and CAT Configurations**
- 5. Frequencies**
- 6. FT8 Basic Operation**
- 7. Power Level & ALC**
- 8. Monitoring FT8**
- 9. Answering FT8 Calls**
- 10. Calling CQ**
- 11. Logging QSOs**

# Reasons to Operate Digital Modes



- **Reasons to use digital modes include:**
  1. **More punch than (analog) voice**
  2. **Better signal to noise ratio (S/N)**
  3. **Forward Error Correction (FEC)**
  4. **Bandwidth efficiency (better usage of spectrum)**
  5. **Better performance relative to analog SSB/AM**
  6. **QSOs can be recorded (and played back)**
  7. **Solar Cycle Minimum**



# WSJT-X Version 1.8.0 Has FT8



- WSJT-X Version 1.8.0 **includes** a new digital mode named **FT8**
- FT8 was developed by **Steven Franke, K9AN** and **Joe Taylor, K1JT**.
- **FT8** stands for "**Franke** and **Taylor, 8-FSK** modulation".
- FT8 provides 50% or better decoding probability down to **-20 dB** on an AWGN (\*) channel.
- FT8 maintains good performance on Doppler-spread fading channels.
- *"It is an **excellent** mode for **HF DXing** and for situations like multi-hop Es on 6 meters, where deep QSB may make fast and reliable completion of QSOs desirable..."[Joe Taylor] .*

(\*) Note: AWGN = Additive White Gaussian Noise

# FT8 Designers



## **Steven J. Franke, K9AN**

**Professor, Associate Head for Graduate Affairs  
Dep. of Electrical and Computer Engineering  
University of Illinois at Urbana-Champaign**

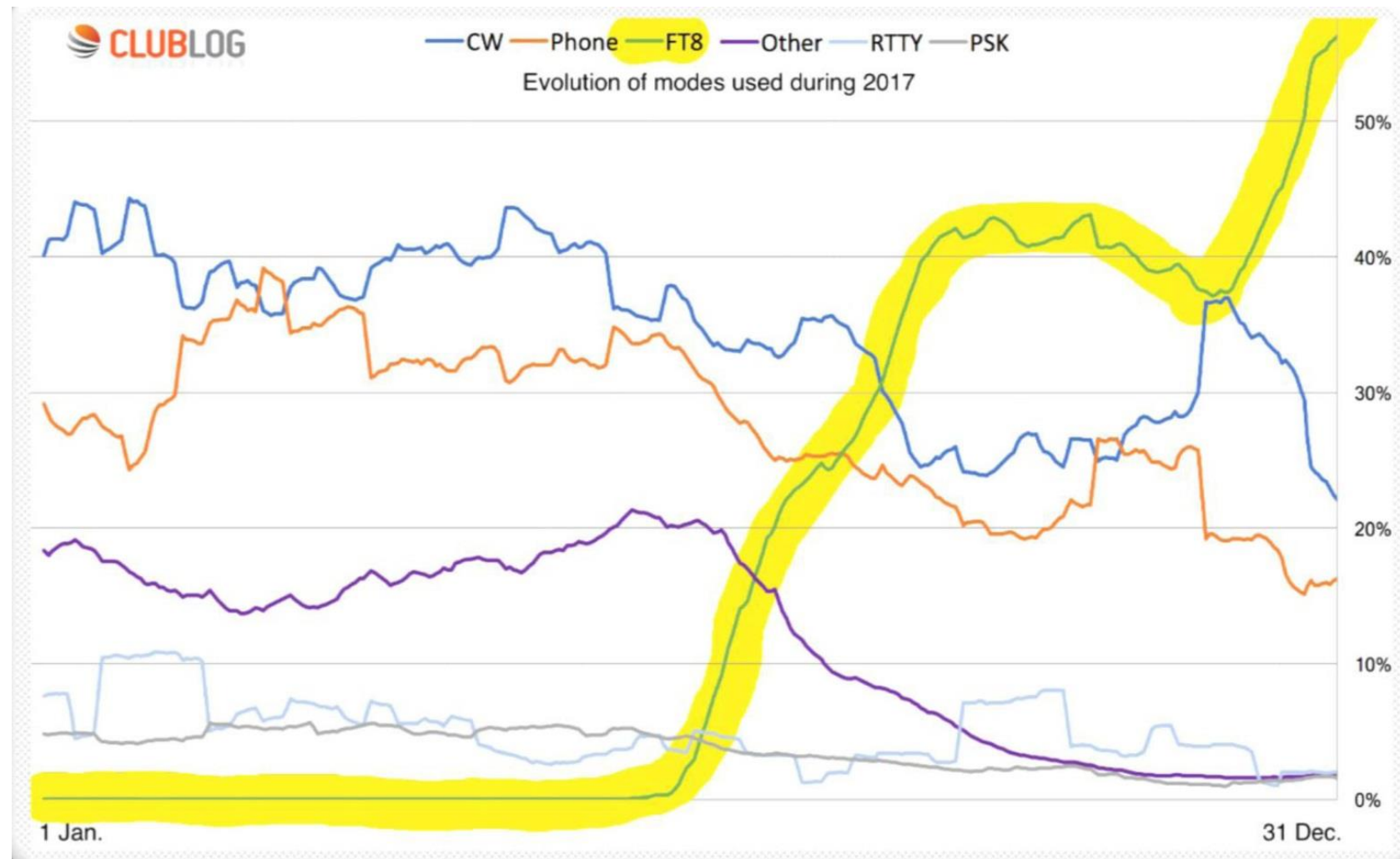
- **Illinois Radar Interferometer System (IRIS) (2012-)**
- **Urbana Meteor Radar (2008-2009)**
- **Maui Meteor Radar (2002-2007)**
- **Ionospheric Tomography**

## **Joe Taylor, K1JT**

**Princeton University  
University of Massachusetts Amherst**

- **Albert Einstein Medal (1991)**
- **Wolf Prize in Physics (1992)**
- **Nobel Prize in Physics (1993)**
- **Karl Schwarzschild Medal (1997)**

# GROWTH OF FT8



| Mode 05/05/2018 | Count last 2 hours 4:43 pm CST |
|-----------------|--------------------------------|
| FT8             | 1010266                        |
| CW              | 14105                          |
| PSK63           | 3804                           |
| RTTY            | 2145                           |
| PSK31           | 1635                           |
| JT65            | 1547                           |

# FT8 Characteristics



- **Some important characteristics of FT8:**
  - T/R sequence length: **15 s (4 times faster than JT65/JT9)**
  - Message length: 75 bits + 12-bit CRC
  - FEC code: LDPC
  - Modulation: **8-FSK**, tone spacing 6.25 Hz
  - Constant-envelope waveform
  - Occupied bandwidth: **50 Hz**
  - Transmission duration: **12.64 s**
  - Decoding threshold: **-20 dB** (several dB lower w/ AP decoding)
  - Multi-decoder finds and decodes all FT8 signals in passband
  - Optional **Auto-Sequencing/Auto-Reply** to a CQ response
  - Operational behavior similar to JT65 and JT9

Source: Joe, K1JT, for the WSJT Development Team  
[http://physics.princeton.edu/pulsar/K1JT/Release\\_Notes\\_1.8.0.txt](http://physics.princeton.edu/pulsar/K1JT/Release_Notes_1.8.0.txt)

# WSJT-X Modes Decoding Threshold



## Relative Sensitivity in a 2500 Hz Bandwidth (\*)

| Mode | SNR Threshold | T/R Period |
|------|---------------|------------|
| WSPR | -30 dB        | 2 min      |
| JT9  | -27 dB        | 2 min      |
| JT65 | -24 dB        | 2 min      |
| FT8  | -20 dB (**)   | 30 sec     |

(\*) Values are approximate

(\*\*) – 23 dB when AP becomes available

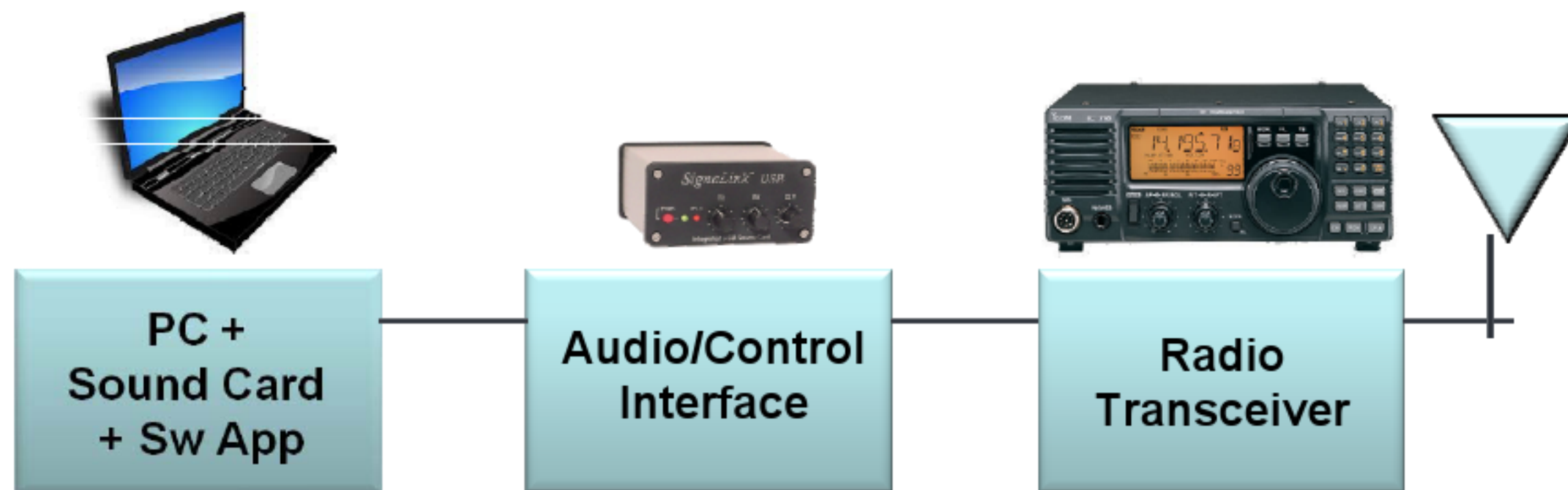
# What is Needed to Get Started?



- **At a minimum:**
  1. **PC running Windows XP/7/8/10 or Linux.**
  2. **SSB HF or VHF transceiver**
  3. **PC to Radio Interface (e.g. Signalink, Rigblaster)**
  4. **Connecting Cables**
  5. **WSJT-X Software version 1.8.0 or better**



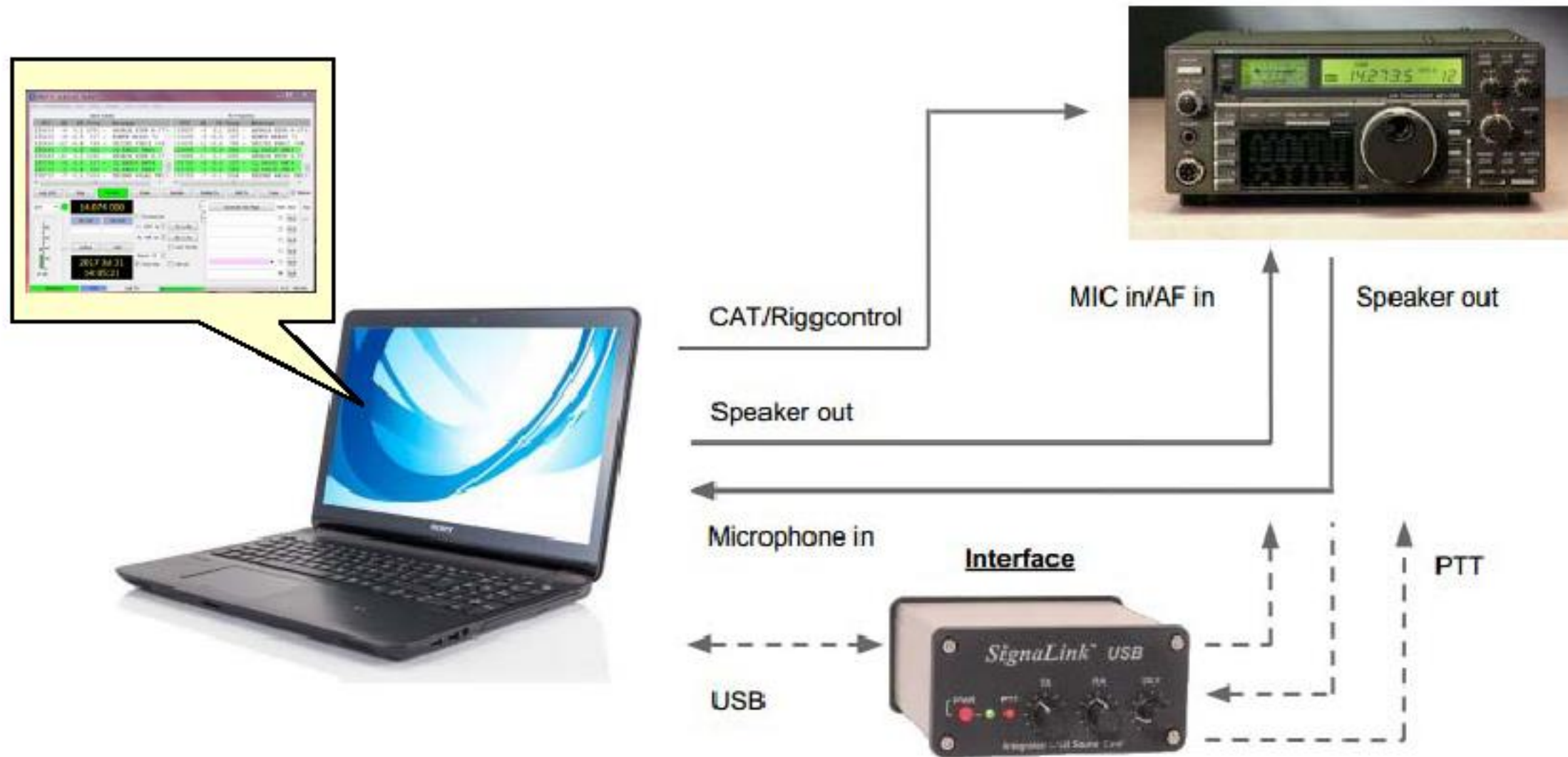
# Digital Modes Typical Setup



- WSJT-X modes have 100% duty cycle
- Operating rig at full power may result in overheating and damage to the rig
- Choose appropriate power level for the capabilities of your rig.

**Audio modulation level and ALC adjustment are very important as transmitter must maintain linear operation to avoid distortion of the digital signal.**

# WSJT-X Basic Setup



**This is the same setup for most digital modes**

*Credit: SM7VRZ page <https://sm7vrz.wordpress.com/jt9-english/>*

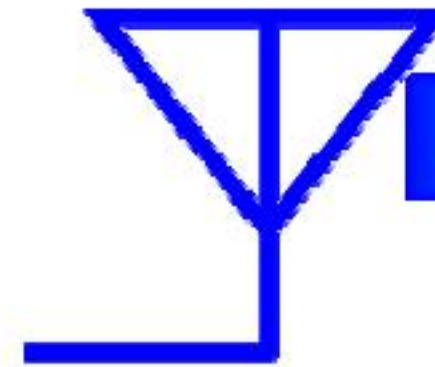
# WSJT-X Basic Setup



Interface



Transceiver



Ant

This setup works for most digital modes



PC+WSJT-X

Radios like TS-590 and IC-7300 do not require an interface



# FT8 Basic Installation Steps



- 1. Download WSJT-X and Dimensions-4**
- 2. Install WSJT-X and Dimensions-4**
- 3. Connect PC, Interface and Radio**
- 4. Configure Audio & CAT**
- 5. Setup Your Station Information**
- 6. Turn Off any speech processor or compression**
- 7. Adjust Signal Levels, ALC, Power, etc.**
- 8. Check signal reception and decoding**
- 9. Transmit into a dummy load for testing**
- 10. Ask another ham to monitor and report your first transmissions**

# WSJT-X Download & Installation



- **Download WSJT-X software and Docs from here:**
  - <http://physics.princeton.edu/pulsar/k1jt/wsjt.html>

**Candidate Release for WSJT-X Version 1.8.0-rc1**

**Release Notes:**

[http://physics.princeton.edu/pulsar/k1jt/Release Notes 1.8.0.txt](http://physics.princeton.edu/pulsar/k1jt/Release%20Notes%201.8.0.txt)

**Installation packages:**

**Windows:**

- Version 1.8.0-rc1: [wsjtx-1.8.0-win32.exe](#). (runs on Win XP, Vista, Win 7, Win 8, Win10, both 32- and 64-bit).

*download  
this one*

- **Install WSJT-X into its own directory, for example [C:\WSJTX](#) or [C:\WSJT\WSJTX](#), rather than the conventional location [C:\Program Files\WSJTX](#)**

# Download Dimension4 & JTAlert



- **Dimension-4**
  - <http://www.thinkman.com/dimension4/>
  - **Dimension4 synchronizes your computer's clock if you're running a Windows-based operating system.**
  
- **JTAlert (Optional)**
  - <http://hamapps.com/>
  - **WSJT-X FT8 requires JTAlert version to **2.10.1** or later.**

# JT ALERT

## Audio and visual alerts for several alert conditions

### CQ & QRZ

Wanted Call sign

Wanted Prefix (by Ban/Mode)

Wanted Grid (by Band/Mode)

Wanted US State (by Band/Mode)

Wanted DXCC (by Band/Mode)

Wanted CQ Zone (by Band/Mode)

Wanted Continent (by Band/Mode)

Wanted CQ Marathon (by Band/Mode)

## Automatic logging to these log types when QSO is logged in JT65-HF or WSJT-X

DXLab DXKeeper

ACLog

Log4OM

HRD Log V5

Standard ADIF 2.2 file

MixW CSV file

# Connecting PC-Interface-Radio



- **There are many types of interfaces, the link below provides step-by-step instructions to connect a Tigertronics Signalink™ USB, which is a popular interface used by many hams operating digital modes:**

**[http://www.tigertronics.com/sl\\_suprt.htm](http://www.tigertronics.com/sl_suprt.htm)**

- **Rigblaster, Unified Microsystems, kits available in the internet and even homebrew can be used**

***Remember... some modern rigs don't need an external interface.  
Check before you buy hardware that you may not need.***

# WSJT-X Settings



Click on File → Settings

WSJT-X v1.8.0-rc1 by K1JT

File Configurations View Mode Decode Save Tools Help

- Open Ctrl+O
- Open next in directory F6
- Decode remaining files in directory Shift+F6
- Deletes all \*.wav & \*.c2 files in SaveDir
- Erase ALL.TXT
- Erase wsjtx\_log.adl
- Open log directory
- Settings... F2**
- Exit

Rx Frequency

| UTC | dB | DT | Freq | Message |
|-----|----|----|------|---------|
|-----|----|----|------|---------|

Log QSO Stop **Monitor** Erase Decode Enable Tx Halt Tx Tune  Menus

17m **18.100 000**

Tx even/1st  
Tx 1200 Hz Tx ← Rx  
Rx 1200 Hz Rx ← Tx  
 Lock Tx=Rx

DX Call DX Grid  
Az: 36 5170 mi  
Lookup Add

Report -15  
 Auto Seq  Call 1st

Generate Std Msgs Next Now Pwr

|  |                                  |      |
|--|----------------------------------|------|
|  | <input type="radio"/>            | Tx 1 |
|  | <input type="radio"/>            | Tx 2 |
|  | <input type="radio"/>            | Tx 3 |
|  | <input type="radio"/>            | Tx 4 |
|  | <input type="radio"/>            | Tx 5 |
|  | <input checked="" type="radio"/> | Tx 6 |

CQ AD7ND DM33

Receiving FT8 6/15 WD:6m

# WSJT-X Settings



Call, Grid and Blank Line should suffice to start

**Settings**

General | Radio | Audio | Tx Macros | Reporting | Frequencies | Colors | Advanced

**Station Details**

My Call: AD7ND My Grid: DM33 IARU Region: Region 2

Message generation for type 2 compound calsign holdings: Full call in Tx3

**Display**

Blank line between decoding periods

Display distance in miles

Tx messages to Rx frequency window

Show DXCC entity and worked before status

**Behavior**

Monitor off at startup

Monitor returns to last used frequency

Double-click on call sets Tx enable

Disable Tx after sending 73

Tx watchdog: 6 minutes

CW ID after 73

Enable VHF/UHF/Microwave features

Allow Tx frequency changes while transmitting

Single decode

Decode after EME delay

Periodic CW ID Interval: 0

Font...  
Decoded Text Font...

OK Cancel

*your Call here*

*your Grid here*

*if this box is checked, your Tx will also show up on the Rx window*

# WSJT-X Settings – Radio Tab



Select your radio from the list

Your PC Serial Port here

Consult your radio's manual

Settings

General | **Radio** | Audio | Tx Macros | Reporting | Frequencies | Colors | Adv

Rig: Yaesu FT-450 Poll Interval: 1 s

CAT Control

Serial Port: COM4

Serial Port Parameters

Baud Rate: 38400

Data Bits

Seven  Eight

Stop Bits

One  Two

Handshake

None  XON/XOFF  Hardware

Force Control Lines

DTR: RTS:

PTT Method

VOX  DTR

CAT  RTS

Port: COM1

Transmit Audio Source

Rear/Data  Front/Mic

Mode

None  USB  Data/Pkt

Split Operation

None  Rig  Fake It

Test CAT Test PTT

OK Cancel

Some interfaces uses VOX

to test you radio settings green = working

# WSJT-X Settings – Audio Tab



Select  
Soundcard  
Input and  
Output

Settings

General | **Radio** | Audio | Tx Macros | Reporting | Frequencies | Colors | Adv

Soundcard

Input: SignalinkTx1 (USB Audio CODEC) Mono

Output: SignalinkRx1 (USB Audio CODEC) Mono

Save Directory

Location: C:/Users/Administrator/AppData/Local/WSJT-X/save Select

AzEl Directory

Location: C:/Users/Administrator/AppData/Local/WSJT-X Select

Remember power settings by band

Transmit  Tune

**Leave Directories as they are here**

OK Cancel

# WSJT-X Settings – Reporting Tab



Settings

General | Radio | Audio | Tx Macros | Reporting | Frequencies | Colors | Adv

Logging

- Prompt me to log QSO
- Convert mode to RTTY
- dB reports to comments
- Clear DX call and grid after logging

Network Services

- Enable PSK Reporter Spotting

UDP Server

UDP Server: 127.0.0.1  Accept UDP requests

UDP Server port number: 2237  Notify on accepted UDP request

Accepted UDP request restores window

OK Cancel

If PC connected to internet, this enables your Tx/Rx to be seen on PSKReporter

The above settings should work for most installations

# WSJT-X Settings – Frequencies Tab



**Settings** [?] [X]

General | Radio | Audio | Tx Macros | Reporting | **Frequencies** | Colors | Adv

Frequency Calibration

Slope: 0.0000 ppm Intercept: 0.00 Hz

Working Frequencies

| IARU Region | Mode | Frequency            |
|-------------|------|----------------------|
| All         | WSPR | 10.138 700 MHz (30m) |
| All         | JT9  | 10.140 000 MHz (30m) |
| All         | FT8  | 14.074 000 MHz (20m) |
| All         | JT65 | 14.076 000 MHz (20m) |

Station Information

| Band | Offset | Antenna Description |
|------|--------|---------------------|
|------|--------|---------------------|

OK Cancel

**The above table shows frequencies for all modes and bands**

# WSJT-X Link to User Guide



WSJT-X v1.8.0-rc1 by K1JT

File Configurations View Mode Decode Save Tools Help

- Release Notes
- Online User Guide F1
- Local User Guide
- Download Samples ...
- Keyboard shortcuts F3
- Special mouse commands F5
- List of Type 1 prefixes and suffixes
- About WSJT-X Ctrl+F1

**If connected to internet, choose Online User Guide**

Band Activity

| UTC | dB | DT | Freq | Message |
|-----|----|----|------|---------|
|-----|----|----|------|---------|

Rx Frequency  
Message

Log QSO Stop Monitor Erase Decode Enable Tx Halt Tx Tune Menus

40m 7.074 000

DX Call: K7HI DX Grid: DM33

Az: 0 0 mi

Look up Add

Tx even/1st  
Tx 1200 Hz Tx ← Rx  
Rx 1200 Hz Rx ← Tx  
Lock Tx=Rx

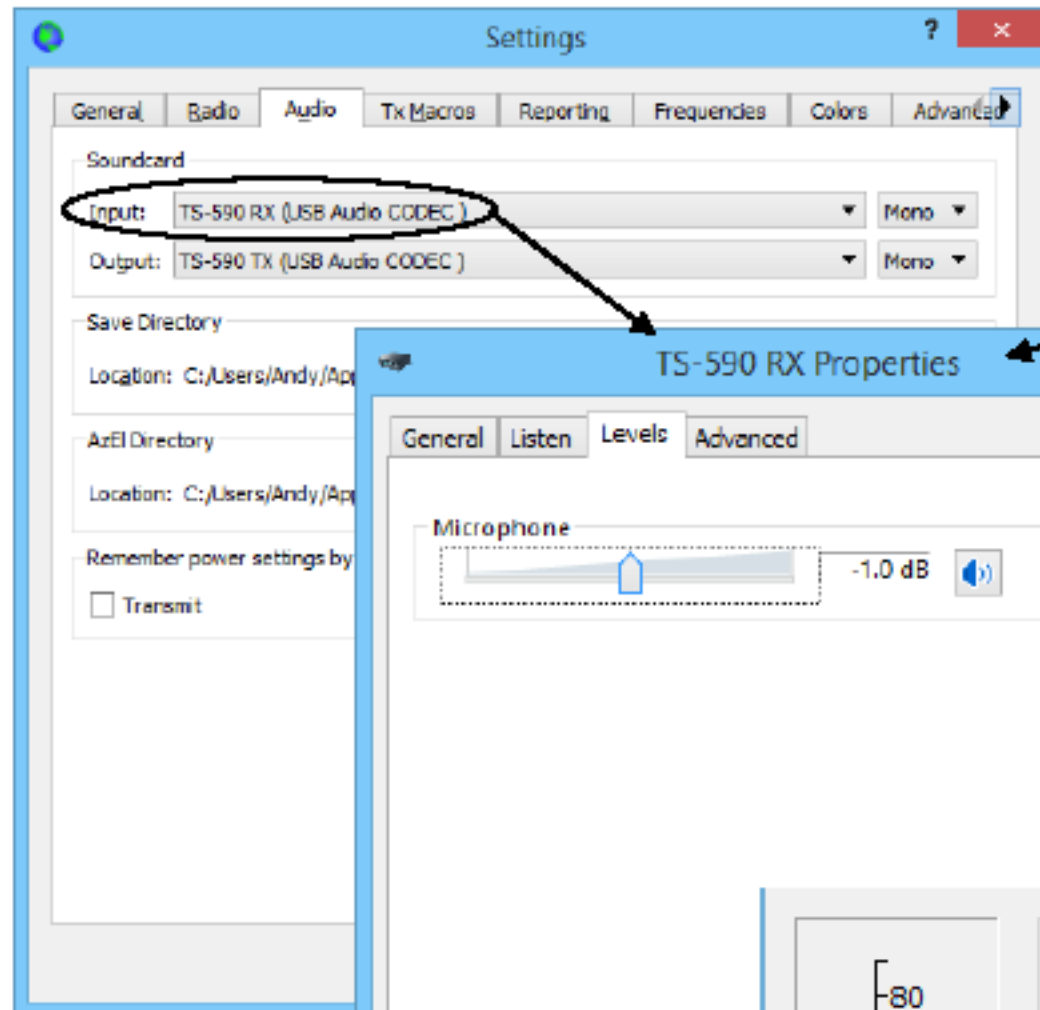
Report -15  
Auto Seq Call 1st

Generate Std Msgs

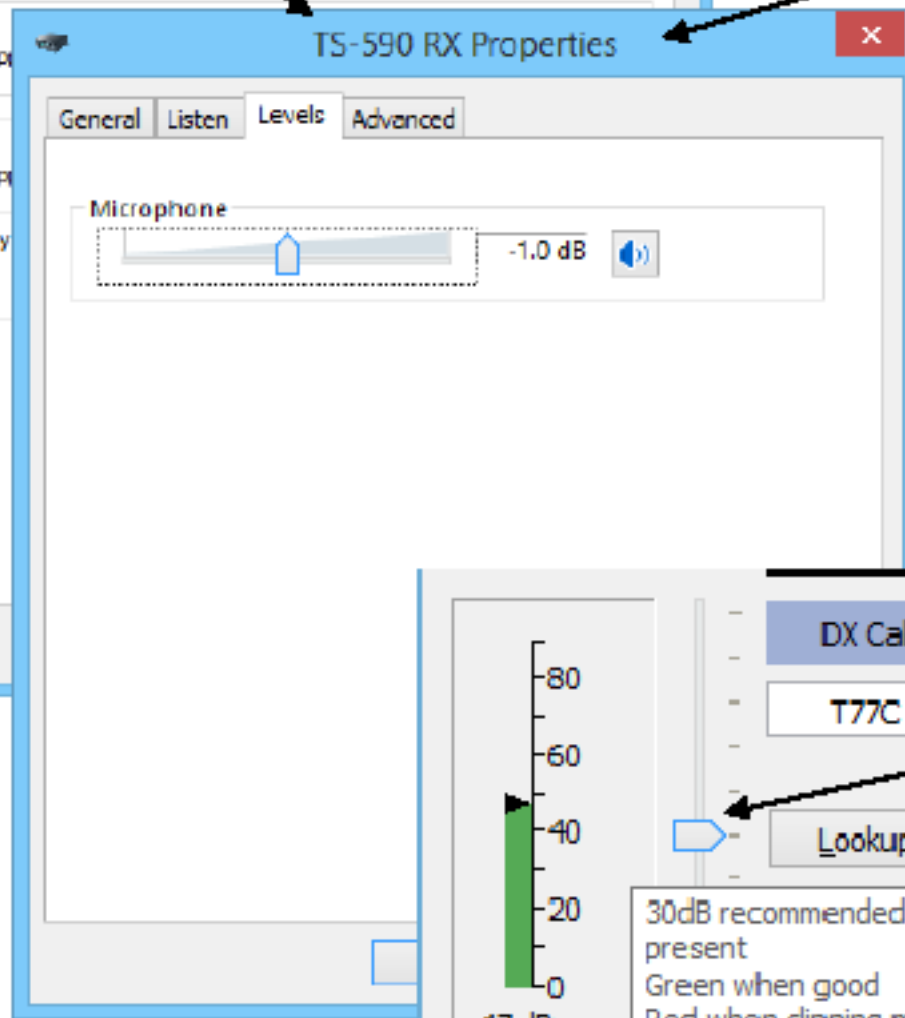
|                 | Next                             | Now                   | Pwr  |
|-----------------|----------------------------------|-----------------------|------|
| K7HI AD7ND DM33 | <input type="radio"/>            | <input type="radio"/> | Tx 1 |
| K7HI AD7ND -15  | <input type="radio"/>            | <input type="radio"/> | Tx 2 |
| K7HI AD7ND R-15 | <input type="radio"/>            | <input type="radio"/> | Tx 3 |
| K7HI AD7ND RRR  | <input type="radio"/>            | <input type="radio"/> | Tx 4 |
| K7HI AD7ND 73   | <input type="radio"/>            | <input type="radio"/> | Tx 5 |
| CQ AD7ND DM33   | <input checked="" type="radio"/> | <input type="radio"/> | Tx 6 |

Receiving FT8 5/15 WD:2m

# Configuring RX Audio



Rig audio output menu  
Rig RF gain



Note – Slider does not control input to decoder

# Configuring TX Audio



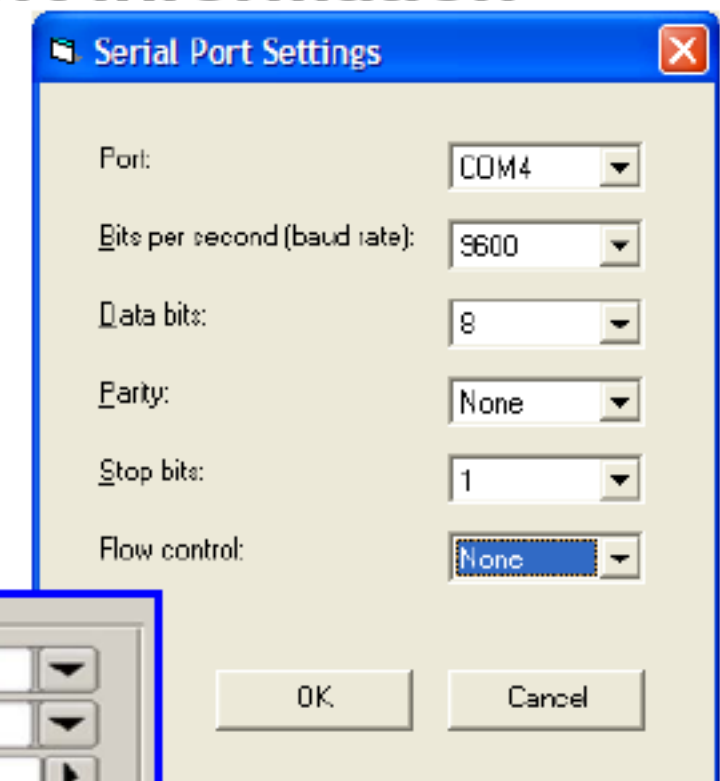
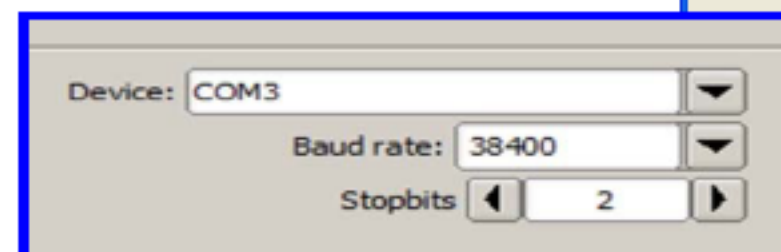
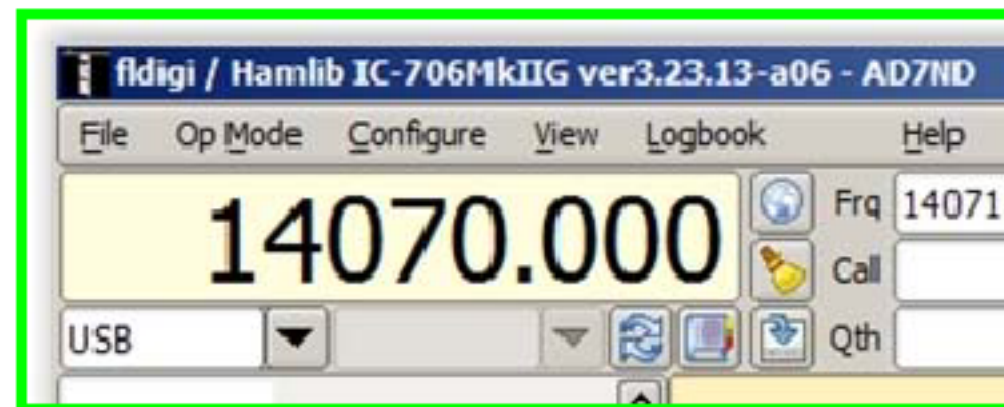
The image illustrates the configuration of TX audio through several software windows and a physical control panel:

- Settings** (Audio tab): Shows the soundcard configuration. The **Output** is set to **TS-590 TX (USB Audio CODEC)**, which is circled in red. An arrow points from this output to the **TS-590 TX Properties** window.
- TS-590 TX Properties** (Levels tab): Shows the speaker level set to **-19.6 dB**. An arrow points from this level to the **Volume Mixer** window.
- Volume Mixer - TS-590 TX (US...)**: Shows the volume levels for the **Device** (TS-590 TX) and the **Applications** (WSJT-X v1.8.0-rc1 by K1J...). Arrows point from the mixer sliders to the **Rig audio input menu** box.
- Rig audio input menu**: A blue-bordered box containing the text "Rig audio input menu".
- Physical Control Panel**: A close-up of a **KENWOOD** antenna tuner control panel. It features a **Pwr** (Power) knob and a **WD:8m** (Worked Distance) display. The power scale is marked with 1, 5, 7, 9, 20, 40, 60dB, 10, 25, 50, and 100W. The **ANT** (Antenna) label is visible at the bottom.

# Configuring CAT



- **Most Radios require a Serial/USB cable interface to connect to the computer**
- **Serial/USB cable adapter usually requires a driver installation**
- **Port, Baud Rate, Stop Bits, Data Bits, Parity and Handshake information is usually required**
- **Radio's baud rate must match the serial port information**



# Adjusting ALC



## **ALC = Automatic Level Control**

- **ALC is a transmitter closed loop control function that is intended to keep the transmitter operating in the linear region, and at set power, when the input signal (drive) varies in amplitude.**
- **ALC will only work correctly within the design range of audio signal drive levels**
- **Below the design operating range ALC will not maintain power**
- **Above the design operating range ALC may introduce significant distortion in the transmitted signal**
- **Know how ALC operates in your transmitter and understand how the acceptable ALC operating region is displayed**

# Adjusting Power



## Two approaches to adjusting power:

- 1. Set required power level on rig and then adjust audio input for correct ALC indication**
- 2. Set rig power setting to maximum and control power by adjusting audio input level (for low power settings ALC will be outside the design range and there will be no ALC meter reading)**

# Adjusting Power



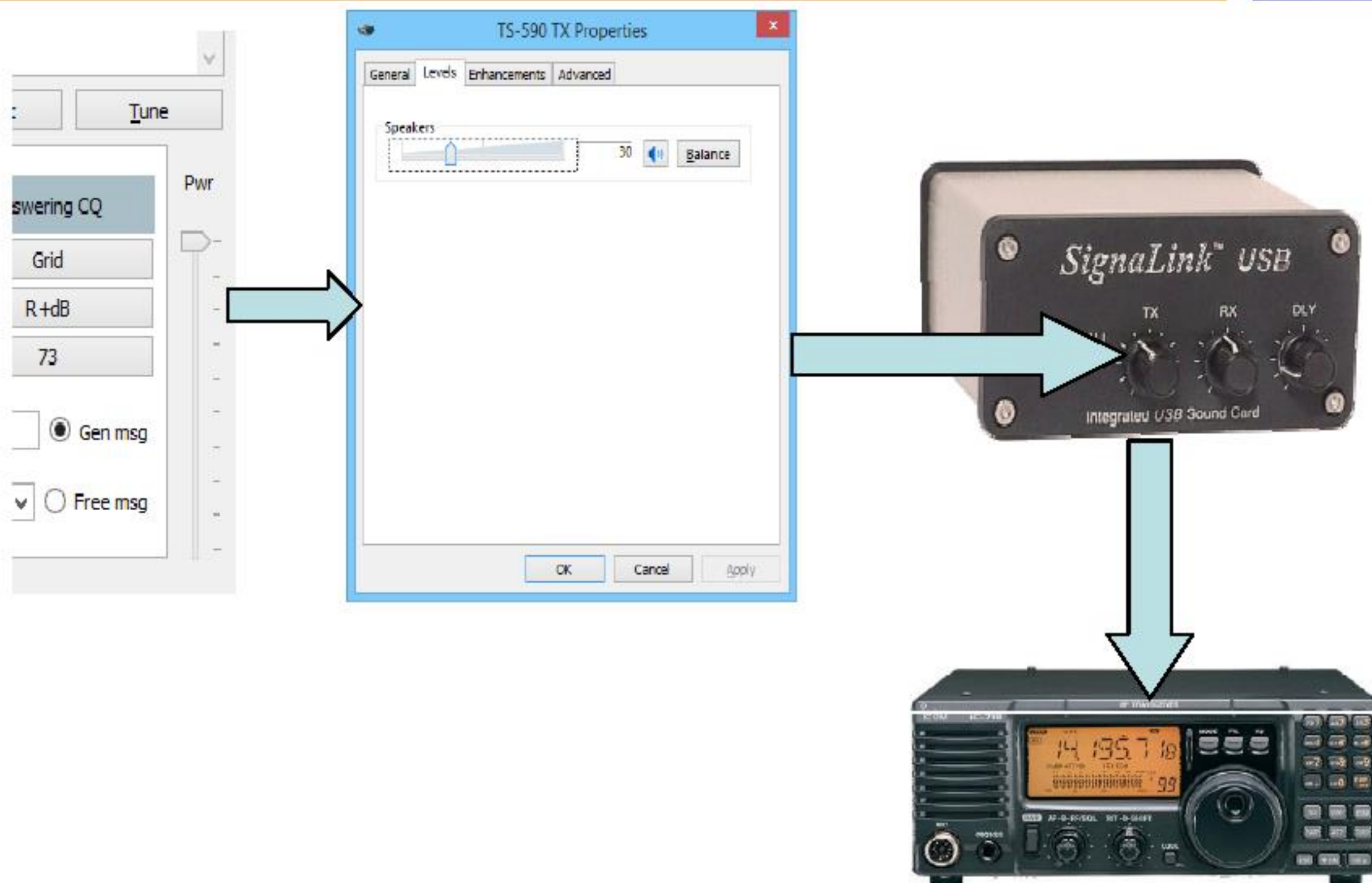
There are typically several places that the **audio drive level** can be adjusted:

- In the digital mode application
- Using the Windows “Playback Device” level slider
- Using a control on the digital mode interface
- Level control internal to the transmitter

Sometimes the digital app controls the Windows slider, sometimes it’s an independent adjustment.

Balance the gain distribution so a high output of one stage does not drive next stage non-linear.

# Adjusting Power



# Monitoring FT8 Transmissions



- It is very **easy to transmit a bad signal** with most, if not all, modes (not just digital)
- The Choices
  - Don't monitor because you know your signal is perfect  
Congratulations...
  - Ask someone else to check your signal quality  
Can be a good choice for those new to a mode
  - Check your signal yourself

# Typical Problems

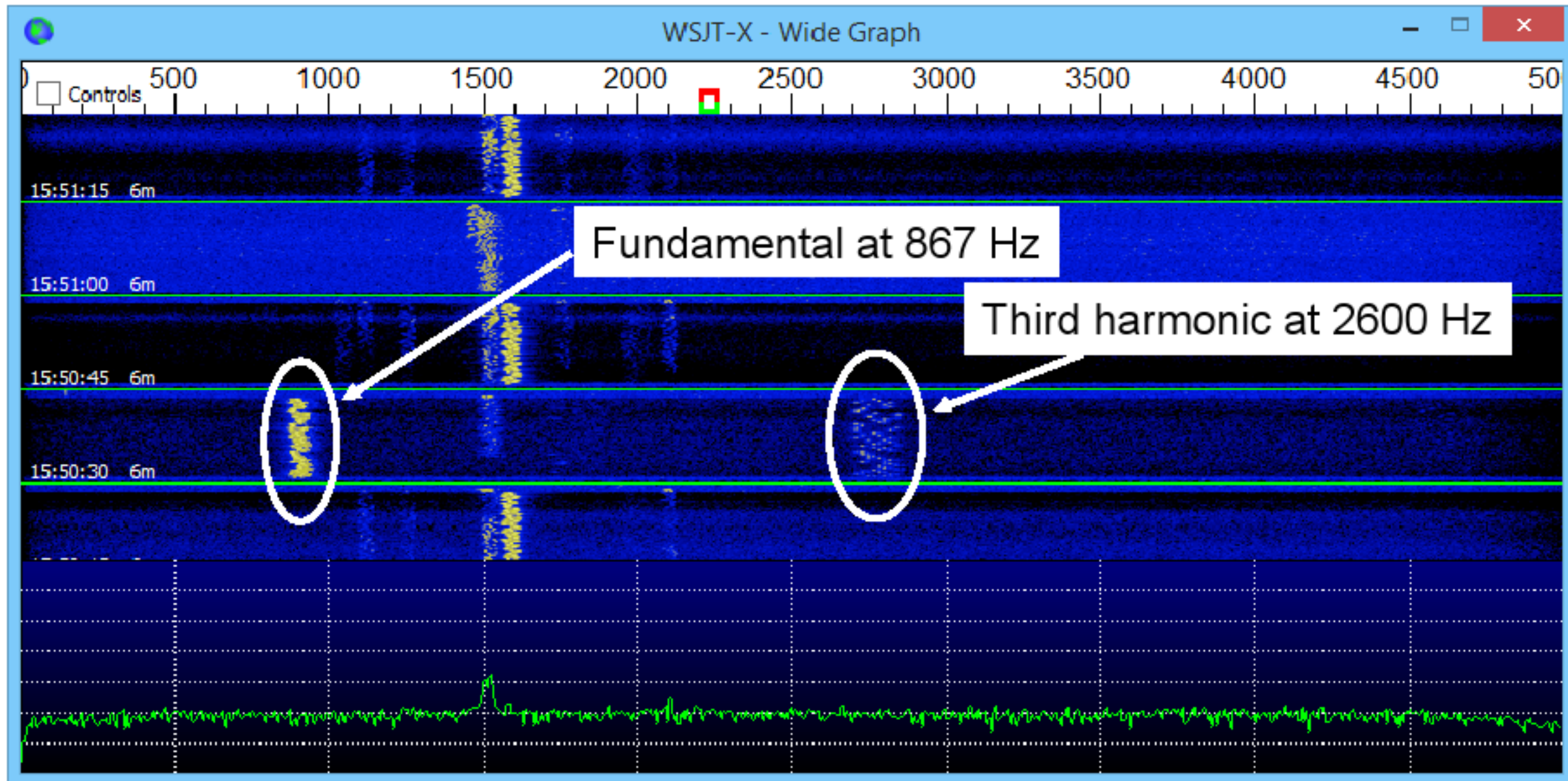


- **Over modulation**
- **Audio harmonics**
- **Spurious modulation by 60 Hz and its harmonics**
- **Spurious modulation by unintended PC audio**
- **Spurious modulation from microphone pickup**

# Examples



- FT8 third harmonic



Note that third harmonic is 3 times width of fundamental

# Avoiding Transmitting Audio Harmonics



- **Avoid over driving any part of the audio signal path**
- **Avoid driving rig finals into non linear operation**
- **Use Audio frequencies for which the third harmonic is outside the transmitter pass band (typical max frequency for SSB rig is 2.7 kHz so don't select TX audio frequency less than  $2.7/3 = 900$  Hz)**
- **WSJT-X supports a special “split” mode**
- **TX audio always in the range 1500 – 2000 Hz**
- **Audio harmonics are outside rig TX passband for most rigs**
- **Allows use of full TX frequency window by shifting the rig TX VFO frequency**

# Selecting FT8 Mode in WSJT-X



Click on Mode → Select FT8

The screenshot shows the WSJT-X v1.8.0-rc1 interface. The 'Mode' menu is open, and 'FT8' is selected. The interface includes a menu bar (File, Configurations, View, Mode, Decode, Save, Tools, Help), two data tables for received signals, a control panel with buttons like 'Monitor', 'Erase', 'Decode', 'Enable Tx', 'Halt Tx', and 'Tune', a frequency display showing 18.100 000, and a message list on the right containing 'CQ AD7ND DM33'. The status bar at the bottom indicates 'Receiving' and 'FT8' mode.

# WSJT-X Main Window



WSJT-X v1.8.0-rc1 by K1JT

File Configurations View Mode Decode Save Tools Help

Band Activity

| UTC | dB | DT | Freq | Message |
|-----|----|----|------|---------|
|-----|----|----|------|---------|

Rx Frequency

| UTC | dB | DT | Freq | Message |
|-----|----|----|------|---------|
|-----|----|----|------|---------|

Band Activity

Frequency in MHz

Rx Signal Level

7.074 000

Rx Signal Level

UTC Date & Time

2017 Aug 16 06:07:13

Auto Sequence

Mode

Halts Tx

Generate Std Msgs

| Next            | Now                   | Pwr  |                          |
|-----------------|-----------------------|------|--------------------------|
| K7HI AD7ND DM33 | <input type="radio"/> | Tx 1 | <input type="checkbox"/> |
| K7HI AD7ND -15  | <input type="radio"/> | Tx 2 | <input type="checkbox"/> |
| K7HI AD7ND R-15 | <input type="radio"/> | Tx 3 | <input type="checkbox"/> |
| K7HI AD7ND RRR  | <input type="radio"/> | Tx 4 | <input type="checkbox"/> |
| K7HI AD7ND 73   | <input type="radio"/> | Tx 5 | <input type="checkbox"/> |
|                 | <input type="radio"/> | Tx 6 | <input type="checkbox"/> |

13/15 WD:6m

# WSJT-X Main Window



← Time 0-15 Seconds →

# FT8 Auto-Sequencing Feature



- **FT8 15-sec T/R cycles allow only ~ 2 secs for you to inspect decoded messages and decide how to reply, which is not enough time for most operators**
- **“Auto-Seq” will automatically complete the QSO for you**
- **You still need to pick the calling station one time**

The screenshot shows the FT8 software interface. At the top, there's a log window with two entries: "175845 -13 0.6 575 ~ AD7ND K3NT 73" and "175845 8 0.0 1509 ~ CQ W6PQL CM97 !U.S.A.". Below the log are buttons for "Log QSO", "Stop", "Monitor", "Erase", and "Decode". The main display shows the frequency "14.074 000" and a signal strength indicator at "71 dB". There are fields for "DX Call" (K3NT) and "DX Grid" (EM13), along with "Az: 86" and "923 mi". A "Report -13" dropdown is visible. The "Auto Seq" checkbox is checked, and a yellow callout bubble points to it with the text "Auto-Seq enabled". Other checkboxes include "Tx even/1st", "Tx 575 Hz", "Rx 575 Hz", "Tx ← Rx", "Rx ← Tx", and "Lock Tx=Rx". The "Call 1st" checkbox is also checked. At the bottom, there's a "Receiving" indicator, "FT8" mode, and "Last Tx: K3NT A".

# FT8 Call 1<sup>st</sup> Feature



- When calling CQ you can also choose to check the box “**Call 1<sup>st</sup>**” so WSJT-X can respond automatically to the first decoded responder to your CQ

The screenshot displays the WSJT-X software interface. At the top, a log window shows two entries: "175845 -13 0.6 575 ~ AD7ND K3NT 73" and "175845 8 0.0 1509 ~ CQ W6PQL CM97 !U.S.A.". Below the log, a row of buttons includes "Log QSO", "Stop", "Monitor" (highlighted in green), "Erase", and "Decode". The main interface shows a frequency display of "14.074 000" and a signal strength meter on the left showing "71 dB". The "DX Call" field contains "K3NT" and the "DX Grid" field contains "EM13". The "Report" field is set to "-13". The "Call 1st" checkbox is checked, and a yellow callout bubble points to it with the text "Call 1st enabled". The status bar at the bottom indicates "Receiving", "FT8", and "Last Tx: K3NT AD7ND 73".

# WSJT-X FT8 QSO



WSJT-X v1.8.0-rc1 by K1JT

File Configurations View Mode Decode Save Tools Help

**Band Activity**

| UTC             | dB  | DT   | Freq | Message                 |
|-----------------|-----|------|------|-------------------------|
| 030630          | -15 | -0.0 | 1640 | ~ KK7KEN KF7GMV 73      |
| 030630          | -13 | -0.4 | 1721 | ~ LU5VV W5MT EM13       |
| 030630          | -8  | 0.3  | 1823 | ~ VE6UX W6AER 73        |
| 030630          | -7  | 0.5  | 2290 | ~ KO6LU NORRO RRR       |
| 030630          | -4  | 0.6  | 2392 | ~ CQ W0QL DM79 ~U.S.A.  |
| ----- 30m ----- |     |      |      |                         |
| 030700          | -3  | 0.6  | 2393 | ~ K7HI W0QL +02         |
| 030700          | -14 | 1.8  | 1005 | ~ CQ K4SE EM86 ~U.S.A.  |
| 030700          | -12 | 0.5  | 1470 | ~ LU5VV VE6UX DO24      |
| 030700          | -15 | -0.4 | 1721 | ~ LU5VV W5MT EM13       |
| 030700          | -4  | 0.3  | 1823 | ~ CQ W6AER CM87 ~U.S.A. |
| 030700          | -9  | 0.0  | 2289 | ~ KO6LU NORRO RRR       |

**Rx Frequency**

| UTC    | dB | DT  | Freq | Message                |
|--------|----|-----|------|------------------------|
| 030630 | -4 | 0.6 | 2392 | ~ CQ W0QL DM79 ~U.S.A. |
| 030700 | -3 | 0.6 | 2393 | ~ K7HI W0QL +02        |

Log QSO Stop **Monitor** Erase Decode **Enable Tx** Halt Tx Tune  Menus

30m ●

29 dB

**10.136 000**

DX Call: W0QL DX Grid: DM79

Az: 45 607 mi

Lookup Add

**2017 Aug 16**  
**03:07:29**

Tx even/1st

Tx 2393 Hz Tx ← Rx

Rx 2393 Hz Rx ← Tx

Lock Tx=Rx

Report -3

Auto Seq  Call 1st

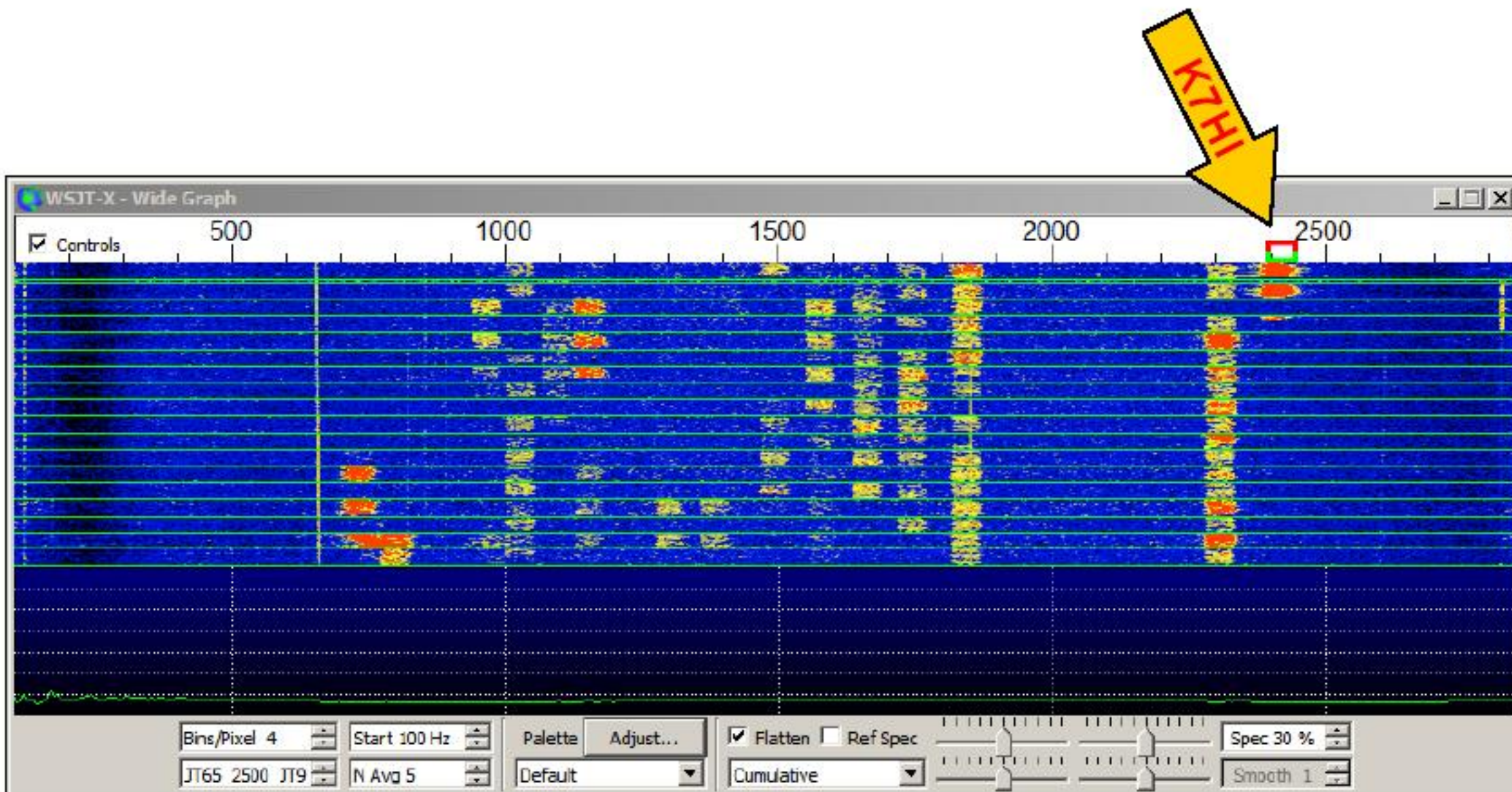
Generate Std Msgs

|                | Next                  | Now                              | Pwr  |
|----------------|-----------------------|----------------------------------|------|
| W0QL K7HI DM33 | <input type="radio"/> | <input type="radio"/>            | Tx 1 |
| W0QL K7HI -03  | <input type="radio"/> | <input type="radio"/>            | Tx 2 |
| W0QL K7HI R-03 | <input type="radio"/> | <input checked="" type="radio"/> | Tx 3 |
| W0QL K7HI RRR  | <input type="radio"/> | <input type="radio"/>            | Tx 4 |
| W0QL K7HI 73   | <input type="radio"/> | <input type="radio"/>            | Tx 5 |
| CQ K7HI DM33   | <input type="radio"/> | <input type="radio"/>            | Tx 6 |

**Receiving** FT8 Last Tx: W0QL K7HI R-03 14/15 WD:6m

**K7HI Working W0QL in FT8 Mode 30m Band**

# WSJT-X FT8 Mode Waterfall



**K7HI Working W0QL Using FT8 in 30m**

# WSJT-X FT8 QSO



**Band Activity**

| UTC             | dB  | DT   | Freq | Message                |
|-----------------|-----|------|------|------------------------|
| 222615          | -19 | -0.9 | 335  | IS0DCR KR4PI 73        |
| 222615          | -17 | 0.5  | 816  | CQ KM4OJA FM15 ~U.S.A. |
| 222615          | -10 | -0.9 | 1036 | F4GMM CO3LT R-16       |
| 222615          | -12 | 0.0  | 1172 | AB6OJ VE6UX DO24       |
| 222615          | -14 | 0.3  | 1538 | CQ K6VNG EM12 ~U.S.A.  |
| 222615          | -18 | 0.8  | 1714 | TF2MSN KF4BI R-06      |
| 222615          | -15 | 0.6  | 2167 | 9A5N K4ZGV EM96        |
| ----- 20m ----- |     |      |      |                        |
| 222645          | -15 | 0.5  | 1243 | AD7ND NJ8G 73          |
| 222645          | -19 | 0.3  | 1538 | CQ K6VNG EM12 ~U.S.A.  |
| 222645          | -16 | 0.6  | 1713 | TF2MSN KF4BI R-06      |
| 222645          | -15 | 0.2  | 1932 | KF5SEJ WBOFTY R-05     |

**Rx Frequency**

| UTC    | dB  | DT  | Freq | Message              |
|--------|-----|-----|------|----------------------|
| 222515 | -15 | 0.5 | 1240 | CQ NJ8G DM33 ~U.S.A. |
| 222545 | -14 | 0.5 | 1241 | AD7ND NJ8G -17       |
| 222615 | -14 | 0.5 | 1242 | AD7ND NJ8G RRR       |
| 222645 | -15 | 0.5 | 1243 | AD7ND NJ8G 73        |

**Control Panel:** 20m, 14.074 000, 69 dB, 2017 Aug 05 22:27:01, FT8, Last Tx: NJ8G AD7ND 73

**Message List:** Generate Std Msgs, NJ8G AD7ND DM33, NJ8G AD7ND -14, NJ8G AD7ND R-14, NJ8G AD7ND RRR, NJ8G AD7ND 73, CQ AD7ND DM33

Only the Rx signals are showing here; slide #17 shows how to add your Tx

AD7ND Working NJ8G (Walt) in 20m

# WSJT-X FT8 QSO



WSJT-X v1.8.0-rc1 by K1JT

File Configurations View Mode Decode Save Tools Help

| Band Activity |    |      |      |                          | Rx Frequency |    |     |      |                         |
|---------------|----|------|------|--------------------------|--------------|----|-----|------|-------------------------|
| UTC           | dB | DI   | Freq | Message                  | UTC          | dB | DI  | Freq | Message                 |
| 185600        | 0  | -0.2 | 875  | ~ W7DRW KF7GMV 73        | 185200       | 4  | 0.6 | 1208 | ~ CQ K7PDW DN31 ~U.S.A. |
| 185600        | 2  | 0.4  | 1214 | ~ WM6Q K7PDW RRR         | 185230       | 1  | 0.6 | 1210 | ~ NE6I K7PDW -09        |
| 185600        | -9 | 0.3  | 1348 | ~ N7WGH W0SPA RRR        | 185300       | 1  | 0.6 | 1213 | ~ NE6I K7PDW RRR        |
| 185600        | -2 | -0.2 | 1529 | ~ CQ KW2E DN13 U.S.A.    | 185300       | 6  | 0.3 | 1139 | ~ CQ K7ULS DN41 ~U.S.A. |
| 185600        | 4  | 0.1  | 1615 | ~ KY7M K7ULS 73          | 185330       | 3  | 0.3 | 1139 | ~ CQ K7ULS DN41         |
| 185600        | 4  | 0.1  | 1817 | ~ CQ KD0GYG DN70 ~U.S.A. | 185400       | 4  | 0.4 | 1140 | ~ CQ K7ULS DN41         |
| ----- 6m      |    |      |      |                          | 185415       | -7 | 0.0 | 1140 | ~ K7ULS KY7M DM33       |
| 185630        | 2  | 0.6  | 1715 | ~ AD7ND K7DD 73          | 185430       | 5  | 0.6 | 1716 | ~ CQ K7DD DM33 ~U.S.A.  |
| 185630        | -3 | -0.0 | 873  | ~ CQ KF7GMV DN23 ~U.S.A. | 185500       | 4  | 0.6 | 1718 | ~ CQ K7DD DM33          |
| 185630        | 4  | 0.6  | 1214 | ~ WM6Q K7PDW RRR         | 185530       | 3  | 0.6 | 1716 | ~ AD7ND K7DD -10        |
| 185630        | 3  | 0.3  | 1612 | ~ CQ K7ULS DN41 ~U.S.A.  | 185600       | 3  | 0.4 | 1715 | ~ AD7ND K7DD RRR        |
| 185630        | 0  | 0.4  | 1816 | ~ K6CWB KD0GYG -05       | 185630       | 2  | 0.6 | 1715 | ~ AD7ND K7DD 73         |

Log QSO Stop Monitor Erase Decode Enable Tx Halt Tx Tune

6m **50.313 000**

**distance zero (same grid)**

DX Call: K7DD DX Grid: DM33

0 mi

**2017 Jul 30 18:56:47**

Report 3

Auto Seq Call 1st

Generate Std Msgs

- K7DD AD7ND DM33
- K7DD AD7ND +03
- K7DD AD7ND R+03
- K7DD AD7ND RRR
- K7DD AD7ND 73
- CQ AD7ND DM33

**K7DD signal report**

07-30-17 11:56:47

Receiving FT8 Last Tx: K7DD AD7ND 73 2/15 WD:6m

**AD7ND Working K7DD (Mike) in 6m**

# WSJT-X FT8 QSO



WSJT-X v1.8.0-rc1 by K1JT

File Configurations View Mode Decode Save Tools Help

**Band Activity**

| UTC       | dB  | DT   | Freq | Message                 |
|-----------|-----|------|------|-------------------------|
| 030630    | -8  | 0.3  | 1823 | ~ VE6UX W6AER 73        |
| 030630    | -7  | 0.5  | 2290 | ~ KO6LU NORRO RRR       |
| 030630    | -4  | 0.6  | 2392 | ~ CQ W0QL DM79 ~U.S.A.  |
| ----- 30m |     |      |      |                         |
| 030700    | -3  | 0.6  | 2393 | ~ K7HI W0QL +02         |
| 030700    | -14 | 1.8  | 1005 | ~ CQ K4SE EM86 ~U.S.A.  |
| 030700    | -12 | 0.5  | 1470 | ~ LU5VV VE6UX D024      |
| 030700    | -15 | -0.4 | 1721 | ~ LU5VV W5MT EM13       |
| 030700    | -4  | 0.3  | 1823 | ~ CQ W6AER CM87 ~U.S.A. |
| 030700    | -9  | 0.0  | 2289 | ~ KO6LU NORRO RRR       |
| ----- 30m |     |      |      |                         |
| 030730    | -12 | 0.3  | 2394 | ~ K7HI W0QL RRR         |

**Rx Frequency**

| UTC    | dB  | DT  | Freq | Message                |
|--------|-----|-----|------|------------------------|
| 030630 | -4  | 0.6 | 2392 | ~ CQ W0QL DM79 ~U.S.A. |
| 030700 | -3  | 0.6 | 2393 | ~ K7HI W0QL +02        |
| 030730 | -12 | 0.3 | 2394 | ~ K7HI W0QL RRR        |

Log QSO Stop **Monitor** Erase Decode Enable Tx Halt Tx Tune  Menus

30m ●

69 dB

**10.136 000**

DX Call: W0QL DX Grid: DM79

Az: 45 607mi

**2017 Aug 16**  
**03:08:06**

Tx even/1st

Tx 2394 Hz Tx ← Rx

Rx 2394 Hz Rx ← Tx

Lock Tx→Rx

Report -12

Auto Seq  Call 1st

Generate Std Msgs

|                | Next                             | Now                   | Pwr  |
|----------------|----------------------------------|-----------------------|------|
| W0QL K7HI DM33 | <input type="radio"/>            | <input type="radio"/> | Tx 1 |
| W0QL K7HI -12  | <input type="radio"/>            | <input type="radio"/> | Tx 2 |
| W0QL K7HI R-12 | <input type="radio"/>            | <input type="radio"/> | Tx 3 |
| W0QL K7HI RRR  | <input type="radio"/>            | <input type="radio"/> | Tx 4 |
| W0QL K7HI 73   | <input type="radio"/>            | <input type="radio"/> | Tx 5 |
| CQ K7HI DM33   | <input checked="" type="radio"/> | <input type="radio"/> | Tx 6 |

Receiving

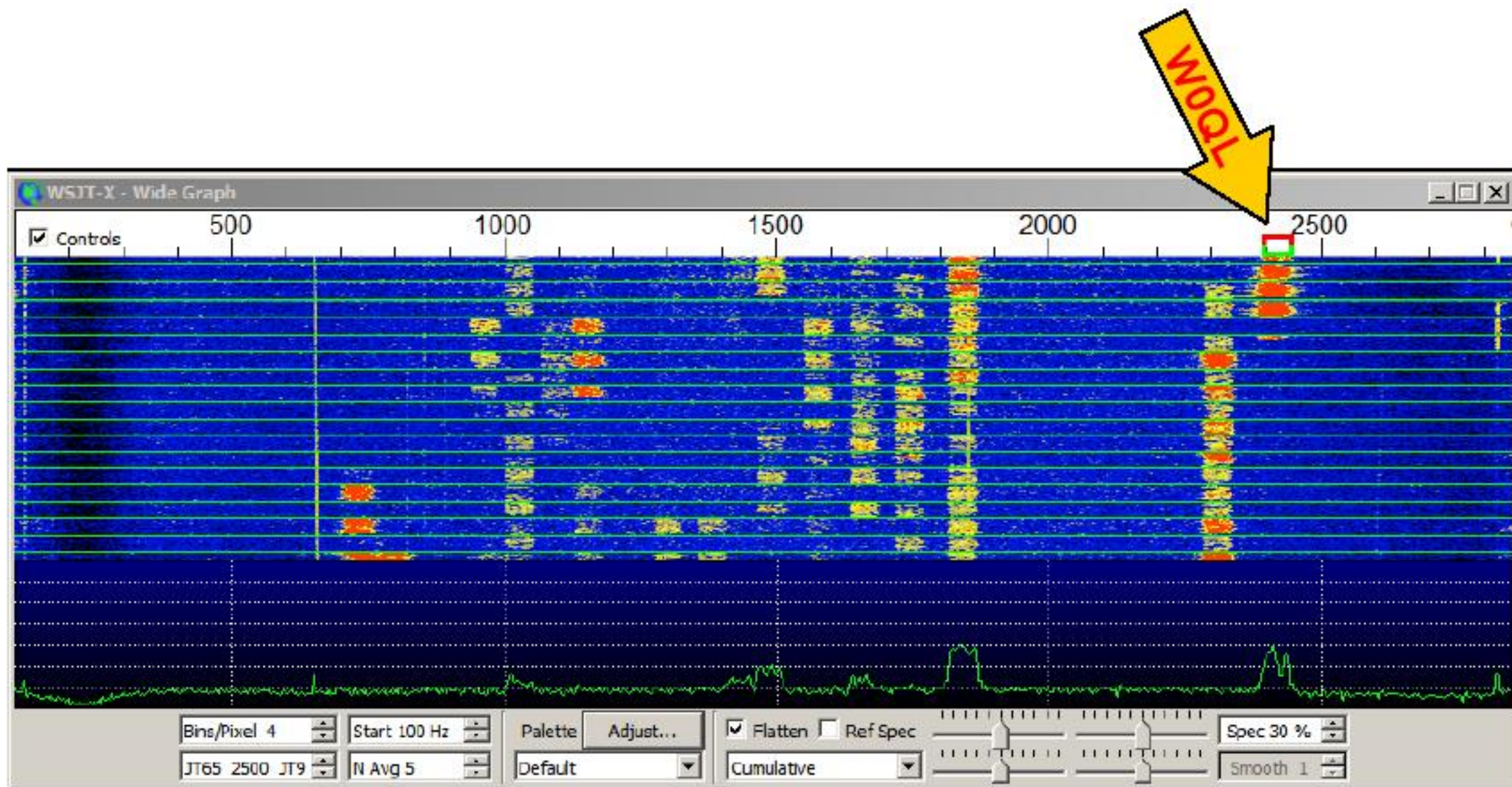
FT8

Last Tx: W0QL K7HI 73

6/15 WD:5m

**K7HI Working W0QL in FT8 Mode 30m Band**

# WSJT-X FT8 Waterfall



**K7HI Working W0QL Using FT8 in 30m**

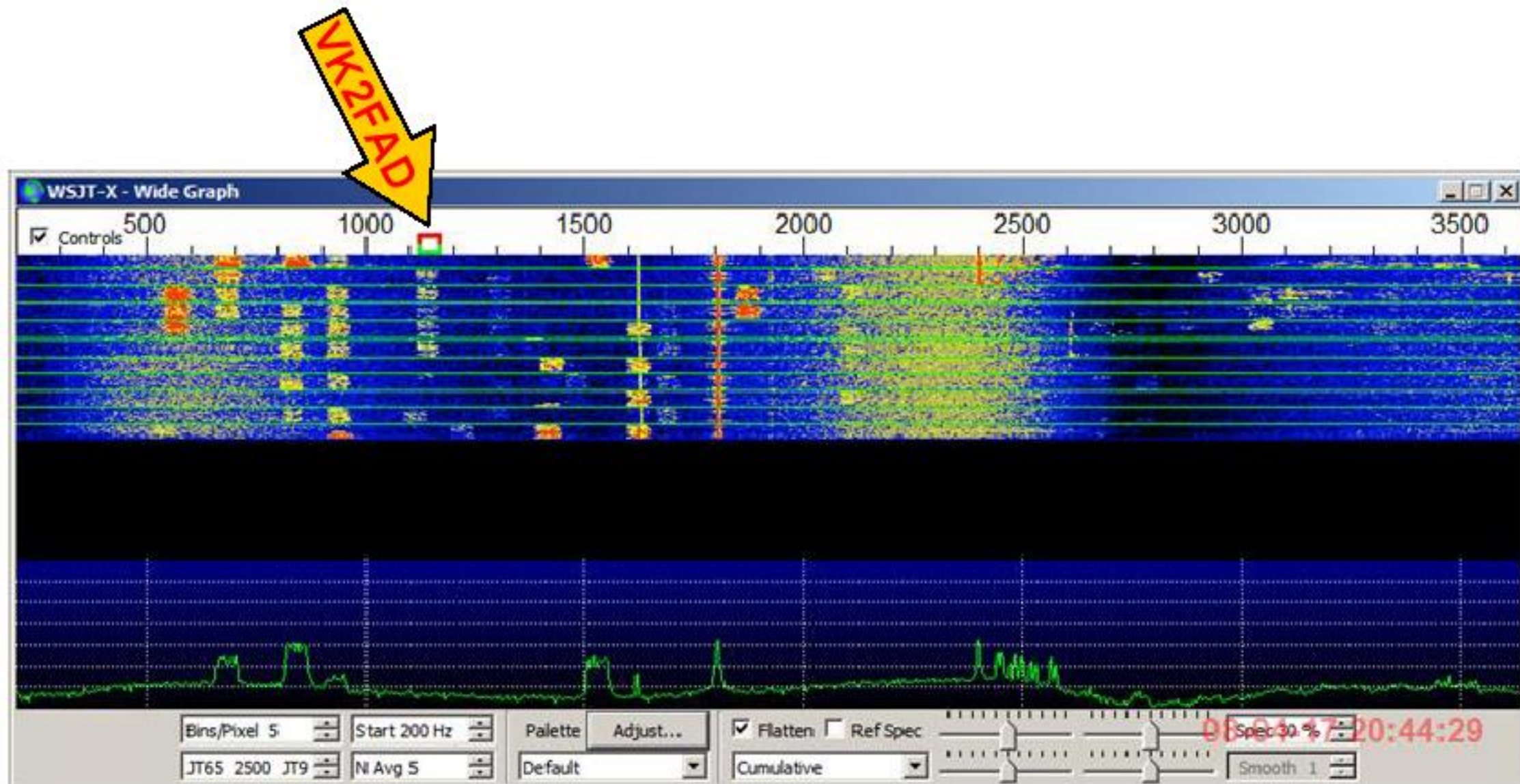
# WSJT-X FT8 QSO



The screenshot shows the WSJT-X v1.8.0-rc1 by K1JT interface. The main window is divided into two panes: 'Band Activity' on the left and 'Rx Frequency' on the right. Both panes display a table of received signals with columns for UTC, dB, DT, Freq, and Message. The 'Band Activity' pane shows a list of signals, with the most prominent one being '034400 -12 0.7 1117 ~ AD7ND VK2FAD 73'. The 'Rx Frequency' pane shows a similar list, with the most prominent one being '034200 -11 0.8 1120 ~ CQ VK2FAD QF56 !Australia'. Below the panes is a control panel with buttons for 'Log QSO', 'Stop', 'Monitor', 'Erase', 'Decode', 'Enable Tx', 'Halt Tx', and 'Tune'. The 'Monitor' button is highlighted in green. To the left of the control panel is a vertical scale from 0 to 80 dB. In the center, there is a large display showing '14.074 000' and '2017 Aug 05 03:44:20'. To the right of this display is a call sign field showing 'VK2FAD' and 'QF56', and a distance field showing '7745 mi'. A red speech bubble points to the distance field with the text 'Distance 7745 mi'. Below the call sign field is a 'Generate Std Msgs' section with a list of messages: 'VK2FAD AD7ND DM33', 'VK2FAD AD7ND -11', 'VK2FAD AD7ND R-11', 'VK2FAD AD7ND RRR', 'VK2FAD AD7ND 73', and 'CQ AD7ND DM33'. At the bottom of the interface, there is a status bar showing 'Receiving', 'FT8', 'Last Tx: CQ AD7ND DM33', and a progress indicator.

**AD7ND Working VK2FAD (Australia) in 20m**

# WSJT-X FT8 Waterfall



**AD7ND Working VK2FAD in 20m**

# WSJT-X FT8 QSO



WSJT-X v1.8.0-rc1 by K1JT

File Configurations View Mode Decode Save Tools Help

**Band Activity**

| UTC      | dB  | DI  | Freq | Message                  |
|----------|-----|-----|------|--------------------------|
| 193900   | 3   | 0.1 | 2158 | ~ K7CW W7OUU RRR         |
| ----- 6m |     |     |      |                          |
| 193930   | 2   | 0.5 | 837  | ~ W7WSV W7AMI RRR        |
| 193930   | -17 | 0.3 | 1033 | ~ CQ WA7IIR DN07 ~U.S.A. |
| 193930   | -17 | 0.0 | 1267 | ~ CQ K5VWW EL29 ~U.S.A.  |
| 193930   | -8  | 0.0 | 1639 | ~ CQ K5GZR EL29 ~U.S.A.  |
| 193930   | 2   | 0.1 | 2158 | ~ TNX PAUL               |
| 193930   | 2   | 0.5 | 837  | ~ W7WSV W7AMI RRR        |
| 193930   | -17 | 0.3 | 1033 | ~ CQ WA7IIR DN07 ~U.S.A. |
| 193930   | -17 | 0.0 | 1267 | ~ CQ K5VWW EL29 ~U.S.A.  |
| 193930   | -8  | 0.0 | 1639 | ~ CQ K5GZR EL29 ~U.S.A.  |
| 193930   | 2   | 0.1 | 2158 | ~ TNX PAUL               |

**Rx Frequency**

| UTC    | dB  | DI  | Freq | Message                 |
|--------|-----|-----|------|-------------------------|
| 193830 | -14 | 0.4 | 968  | ~ WA6SXU KD0GYG -10     |
| 193830 | -10 | 0.5 | 679  | ~ CQ KF7PG CN88 ~U.S.A. |
| 193900 | -12 | 0.5 | 680  | ~ AD7ND KF7PG -14       |

Log QSO Stop Monitor Erase Decode Enable Tx Halt Tx Tune  Menus

6m 50.313 000

Tx even/1st

Dx Call: KF7PG    Dx Grid: CN88    Tx 680 Hz    Tx ← Rx

Az: 336    1157 mi    Rx 680 Hz    Rx ← Tx

Lock Tx=Rx

Auto Seq     Call 1st

Report -12

2017 Jul 30 19:40:14

Receiving FT8 Last Tx: KF7PG AD7ND R-12 07-30-17 12:40:14 14/15 WD:6m

**AD7ND Working KF7PG (WA) in 6m**

# WSJT-X FT8 Calling CQ



WSJT-X v1.8.0-rc1 by K1JT

File Configurations View Mode Decode Save Tools Help

**Band Activity**

| UTC             | dB  | DT   | Freq | Message                        |
|-----------------|-----|------|------|--------------------------------|
| 034815          | -12 | -0.0 | 909  | ~ VK2MBK VE3M2D -1             |
| 034815          | 2   | 0.1  | 984  | ~ ZL1MVL AK9S 73               |
| 034815          | -3  | 0.1  | 1508 | ~ KH6SAT N2LEE R 17            |
| 034815          | -3  | 0.1  | 1753 | ~ CQ KX5SP DM80 ~U.S.A.        |
| ----- 20m ----- |     |      |      |                                |
| 034830          | 0   | 0.5  | 1004 | ~ KK7PW AD0WG DM79             |
| 034830          | -8  | 0.4  | 1195 | ~ CQ FK8GX RG28 !New Caledonia |
| 034830          | -14 | -0.8 | 1655 | ~ KM6JD N8OQ FM07              |
| ----- 20m ----- |     |      |      |                                |
| 034900          | 0   | 0.5  | 1004 | ~ KK7PW AD0WG DM79             |
| 034900          | -6  | 0.4  | 1334 | ~ JA4EVN FK8GX +01             |
| 034900          | -16 | -0.9 | 1654 | ~ KM6JD N8OQ FM07              |

**Rx Frequency**

| UTC    | dB  | DT  | Freq | Message                        |
|--------|-----|-----|------|--------------------------------|
| 034200 | -11 | 0.8 | 1120 | ~ CQ VK2FAD QF56 !Australia    |
| 034230 | -13 | 0.8 | 1120 | ~ CQ VK2FAD QF56               |
| 034300 | -15 | 0.8 | 1118 | ~ AD7ND VK2FAD -14             |
| 034330 | -11 | 0.6 | 1118 | ~ AD7ND VK2FAD RRR             |
| 034400 | -12 | 0.7 | 1117 | ~ AD7ND VK2FAD 73              |
| 034830 | -8  | 0.4 | 1195 | ~ CQ FK8GX RG28 !New Caledonia |

Log QSO Stop **Monitor** Erase Enable Tx Halt Tx Tune  Menus

20m ● **14.074 000**  Tx even/1st

**DX Call** **DX Grid** Tx 1195 Hz Tx ← Rx

**FK8GX** **RG28** Rx 1195 Hz Rx ← Tx

Az: 248 6588 mi  Lock Tx=Rx

Report -8  Auto Seq  Call 1st

**2017 Aug 05**  
**03:49:30**

● Receiving ■ FT8 Last Tx: FK8GX AD7ND DM33 08-04-17 20:49:31 0/15 WD:6m

Generate Std Msgs Next: Now Pwr

1 FK8GX AD7ND DM33  Tx 1

2 FK8GX AD7ND -08  Tx 2

3 FK8GX AD7ND R-08  Tx 3

4 FK8GX AD7ND RRR  Tx 4

5 FK8GX AD7ND 73  Tx 5

6 CQ AD7ND DM33  Tx 6

**FK8GX (New Caledonia) and KX5SP Calling CQ in 20m**

# Logging a QSO



WSJT-X v1.8.0-rc1 by K1JT - Log QSO

Click OK to confirm the following QSO:

|          |  |                     |
|----------|--|---------------------|
| Call     | Start                                      | End                 |
| WOQL     | 16/08/2017 03:06:45                        | 16/08/2017 03:07:45 |
| Mode     | Band                                       | Rpt Sent            |
| FT8      | 30m  | -03                 |
| Rpt Rcvd | Grid                                       | Name                |
| +02      | DM79                                       |                     |
| Tx power | <input checked="" type="checkbox"/> Retain |                     |
| 30       | <input type="checkbox"/> Retain            |                     |
| Comments |  |                     |

OK Cancel

Log QSO Stop Monitor Erase Decode Enable Tx Halt Tx Tune  Menus

30m 10.136 000

DX Call: WOQL DX Grid: DM79

Azi: 45 607 mi

Report: -12

Auto Seq  Call 1st

Generate Std Msgs

| Next                             | Now                   | Pwr  |
|----------------------------------|-----------------------|------|
| <input type="radio"/>            | <input type="radio"/> | Tx 1 |
| <input type="radio"/>            | <input type="radio"/> | Tx 2 |
| <input type="radio"/>            | <input type="radio"/> | Tx 3 |
| <input type="radio"/>            | <input type="radio"/> | Tx 4 |
| <input type="radio"/>            | <input type="radio"/> | Tx 5 |
| <input checked="" type="radio"/> | <input type="radio"/> | Tx 6 |

Receiving FT8 Last Tx: WOQL K7HI 73 4/15 WD:5m

Click here or automatic, if selected

# Log Folder



Click here to  
navigate to  
log folder

WSJT-X v1.8.0-rc1 by K1JT

File Configurations View Mode Decode Save Tools Help

- Open Ctrl+O
- Open next in directory F6
- Decode remaining files in directory Shift+F6
- Delete all \*.wav & \*.c2 files in SaveDir
- Erase ALL.TXT
- Erase wsjtx\_log.adf
- Open log directory**
- Settings... F2
- Exit

Log QSO Stop Monitor Erase Deco

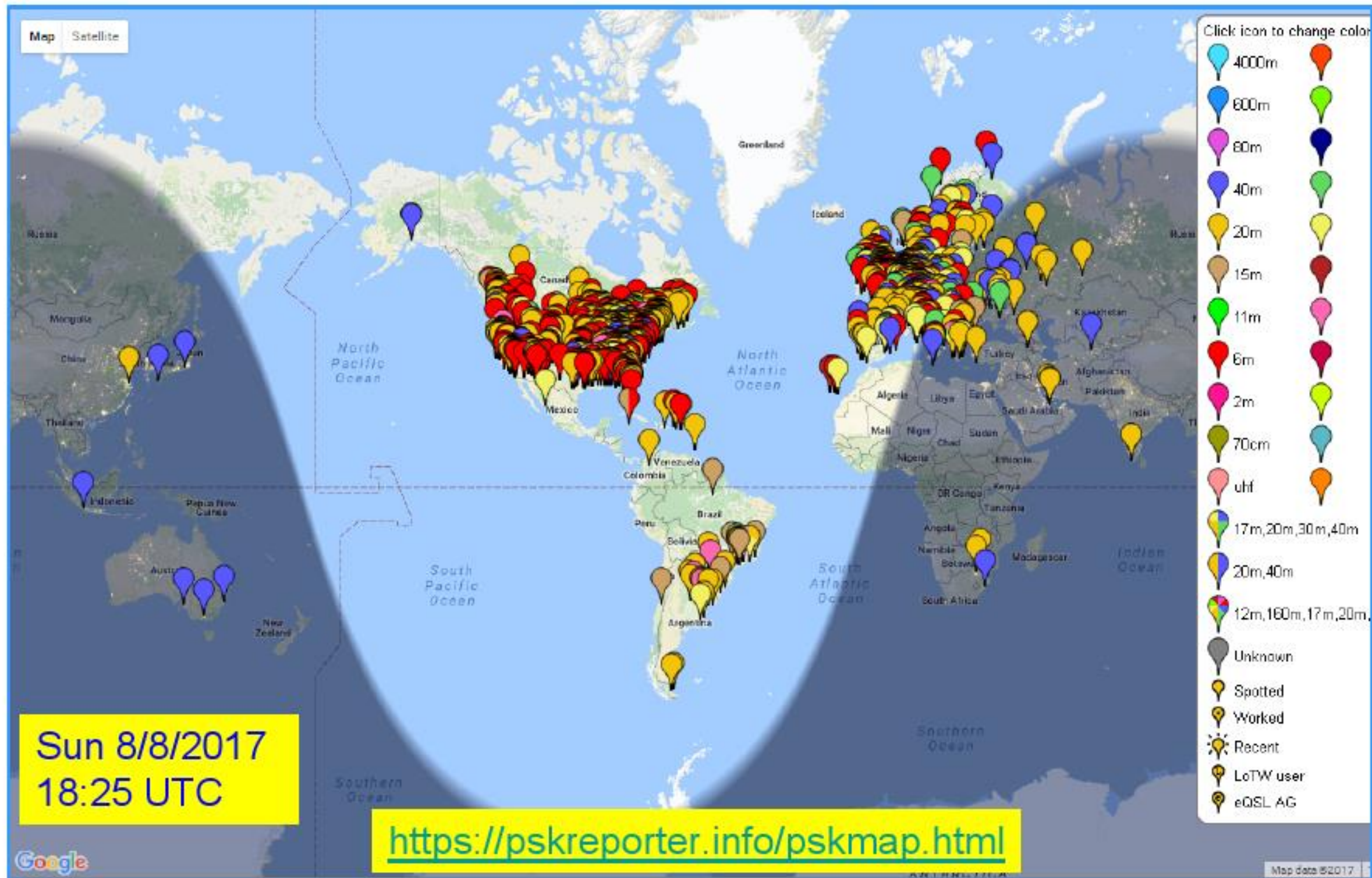
40m 7.074 000

Dx Call Dx Grid  
K7HI DM33  
Az: 0 0 mi  
Lookup Add

2017 Aug 17  
06:16:33

Receiving FT8

# FT8 on PSK-Reporter



# Link References



- **WSJT-X Download:**  
<http://physics.princeton.edu/pulsar/k1jt/wsjtx.html>
- **Dimensions-4:**  
<http://www.thinkman.com/dimension4/>
- **JTAlert:**  
<http://hamapps.com/>
- **ARRL Digital Mode Page:**  
<http://www.arrl.org/digital-modes>
- **WM2U Soundcard Interfacing:**  
<http://www.qsl.net/wm2u/interface.html>

THANK YOU!



Q&A