

FT8

WE5TR

Agenda

- What is it?
- Characteristics
- How to use it?

WE5TR

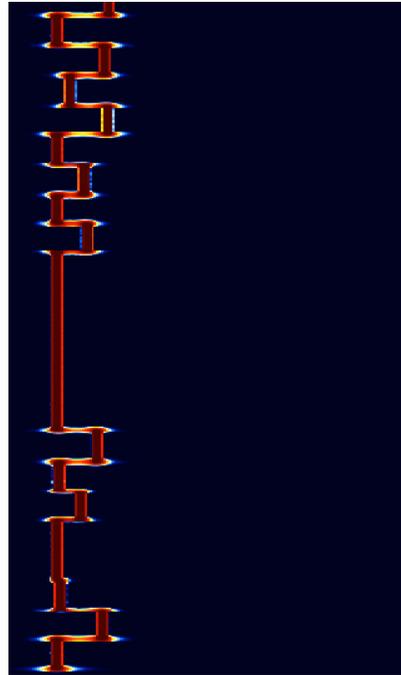
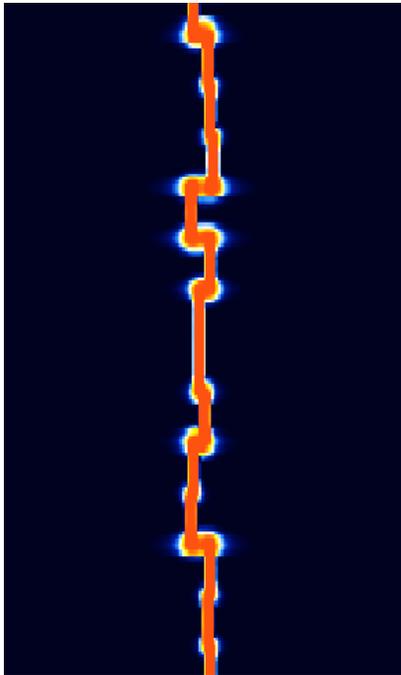
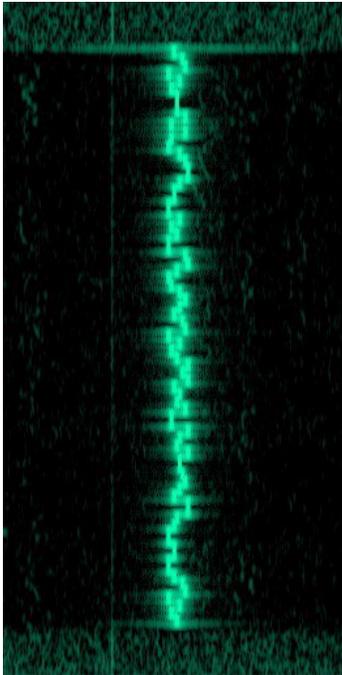
What is it?

- Invented by Steve(K9AN) and Joe(K1JT) - July 2017
- Designed for multi-hop Es where
 - Signals may be weak and fading
 - Openings may be short
 - Want fast completion of reliable, confirmable QSOs
- Comparison with slow modes JT9, JT65, QRA64:
 - FT8 is a few dB less sensitive
 - Allows completion of QSOs four times faster
 - Bandwidth
 - Greater than JT9
 - About 1/4 of JT65A
 - Less than 1/2 QRA64.
- Comparison with fast modes JT9E-H:
 - FT8 is significantly more sensitive
 - Much smaller bandwidth
 - Uses the vertical waterfall
 - Offers multi-decoding over the full displayed passband
- Modes:
 - FT8: 8-FSK BW: 47Hz
 - JT9: 9-FSK BW: 20Hz Tone stops smaller than JT65
 - JT65A: BW: 180Hz

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Derived from Joe Taylor (K1JT) comments

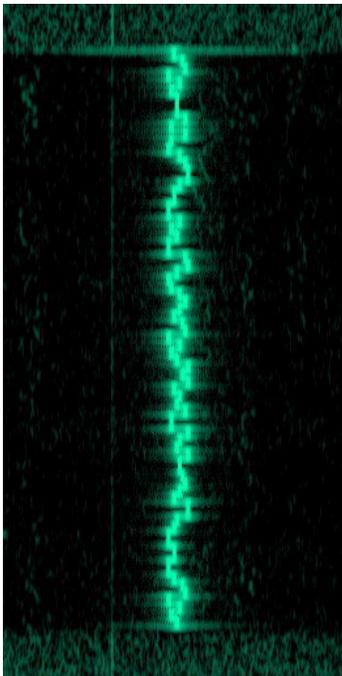
Name the Mode



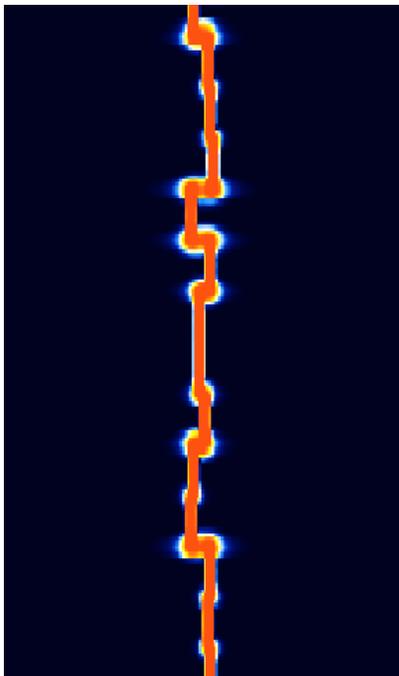
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Name the Mode

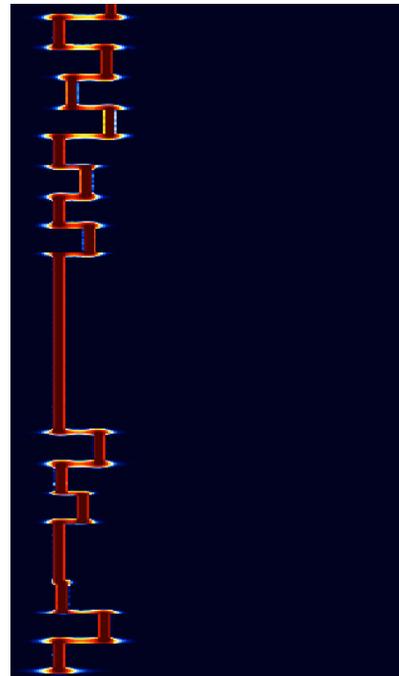
FT8



JT9



JT65



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Characteristics of FT8

- T/R sequence length: 15 s
- Message length: 75 bits + 12-bit CRC
- FEC code: LDPC(174,87)
- Modulation: 8-FSK, keying rate = tone spacing = 5.86 Hz
- Waveform: Continuous phase, constant envelope
- Occupied bandwidth: 47 Hz
- Synchronization: three 7×7 Costas arrays (start, middle, end of Tx)
- Transmission duration: $79 \times 2048 / 12000 = 13.48$ s
- Decoding threshold: -20 dB (perhaps -24 dB with AP decoding, TBD)
 - I had a -25 db decode QSO during Mentorfest
- Operational behavior: similar to HF usage of JT9, JT65
- Multi-decoder: finds and decodes all FT8 signals in passband
- Supports auto-sequencing after manual start of QSO

Uses/Details of FT8

- Propagation research
- High noise tolerant
 - I had a -25db decode during mentorfest
- Low power
 - QRP is common
 - 40w is loud
- Timeslot based (Even 0:15,0:45/ Odd 0:00,0:30)
- Payload per message is small (13 characters)
- Free text is possible but not common

| | | | | | | |
|------------------------|--------|----|------|------|---|------------------|
| Odd | 010845 | 4 | -0.2 | 1515 | ~ | CQ K5GCC EM13 |
| Even (Dropped in late) | 010905 | Tx | | 601 | ~ | K5GCC WE5TR EM12 |
| Odd (still decoded) | 010915 | 5 | -0.2 | 1515 | ~ | WE5TR K5GCC +00 |
| Even | 010930 | Tx | | 601 | ~ | K5GCC WE5TR R+05 |
| Odd | 010945 | 5 | -0.2 | 1515 | ~ | WE5TR K5GCC RRR |
| Even | 011000 | Tx | | 601 | ~ | K5GCC WE5TR 73 |
| Odd | 011015 | 6 | -0.2 | 1515 | ~ | WE5TR K5GCC 73 |

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How to use it?

- Required:

- WSJT-X / Operating Guide
- Time sync software
 - Dimension4
 - Meinberg NTP
 - (or similar)
- Rig to PC interface
 - Soundcard for audio
 - Typically USB for control
- Carefully set your PC audio levels

- Optional:

- JTAlertX - Call sign, grid square and prior QSO
- QSO Logging software - Give the QSO credit
- HRD Rig Control
- HamSpots.net (web)
- PSKReporter.info (web)
- Time.is (web)
- FT8 group on FaceBook (web)

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WE5TR Typical Operating Setup

- Windows 10 Laptop
 - FT8 is not VM friendly
- IC-7300
- SWR Meter
- Manual tuner
- Homemade 40m dipole
 - HOA Friendly
 - Cause its too low

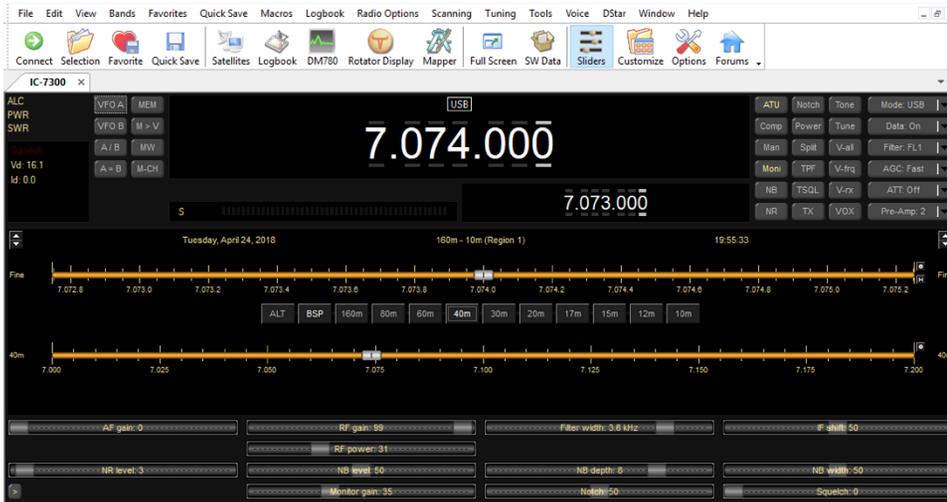
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The screenshot displays a multi-windowed Windows 10 desktop environment for radio operation. The primary window is 'HamSpots (Callsign)', which features a 'CALLSIGN HISTORY' table listing various call signs, their locations, and signal strengths. A map of the United States is overlaid with numerous call sign spots, indicating active stations. Other visible windows include 'PSK Reporter', which shows a similar map with call sign spots, and 'Wide Graph', which displays a signal strength graph over time. A 'Band Activity' window is also present, showing a list of stations and their frequencies. The system tray at the bottom indicates the date and time as 2018 Apr 25 02:13:49.

| S | Age | DX | St | Country | End | Mode | Sig | DT | S | Age | Spot |
|---|-----|--------|----|---------------|-----|------|-----|-----|---|-----|------|
| X | 1m | KK4BZ | VA | United States | 40 | FT8 | -10 | 0.1 | P | 2m | NEQ |
| X | 1m | NA4ME | GA | United States | 40 | FT8 | -17 | 0.1 | P | 2m | VE4 |
| X | 1m | ND4Q | AL | United States | 40 | FT8 | -01 | 0.1 | P | 2m | KC4 |
| X | 1m | K9IG | IN | United States | 40 | FT8 | -04 | 0.1 | P | 2m | N7E |
| X | 1m | KX1X | MA | United States | 40 | FT8 | -11 | 0.2 | P | 3m | AAJ |
| X | 1m | WB5OZA | LA | United States | 40 | FT8 | -07 | | P | 3m | AIR |
| X | 1m | WB2EM | FL | United States | 40 | FT8 | -19 | 0.1 | P | 3m | KJ4 |
| X | 1m | N8XHN | IL | United States | 40 | FT8 | -15 | 0.1 | P | 3m | KC9 |

IC-7300 FT8 Transmit

HRD Rig Control - [IC-7300]



Rig Items:

- Transmit power down
 - I'm typically 30w or less
- Generally:
 - Turn off signal conditioners
 - Widen filters

Remote Operate:

- RF Power Control
- Other rig features

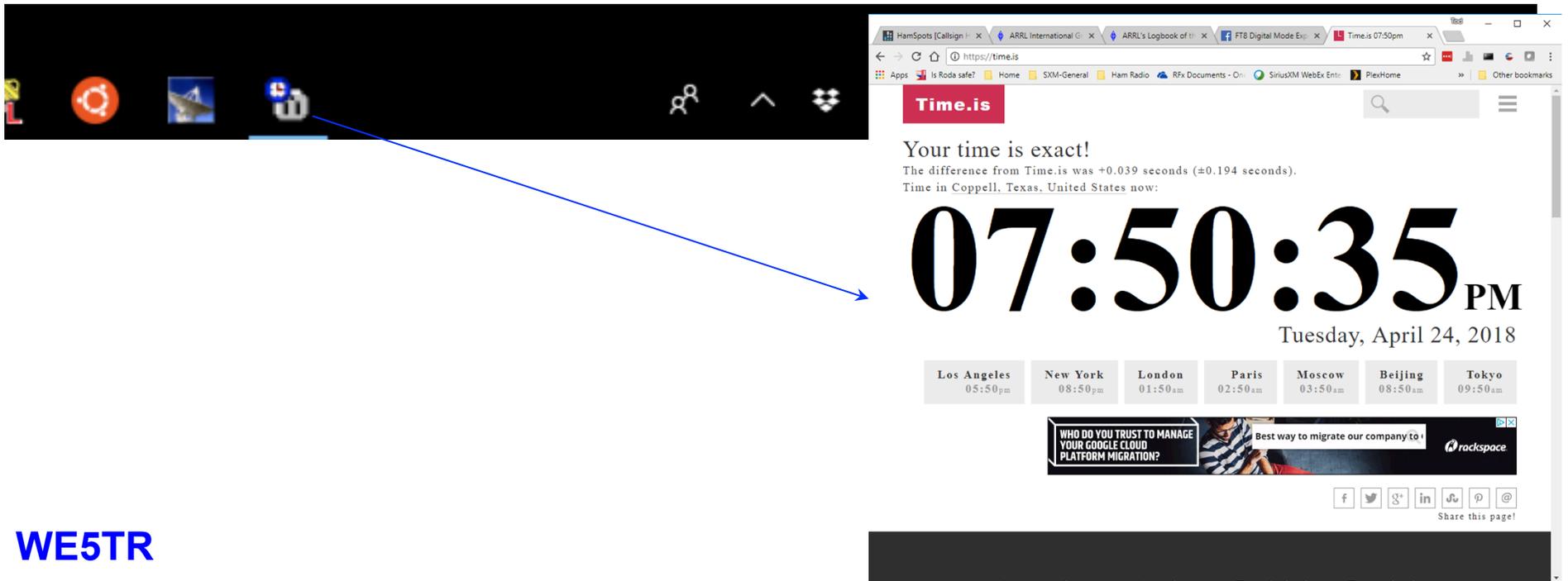
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IC-7300 FT8 Receive



Time Sync

If you fail to decode → Check your time sync



The image shows a mobile device interface on the left and a browser window on the right. A blue arrow points from a social media icon on the mobile device to the Time.is website in the browser. The browser window displays the Time.is website with the following content:

Time.is

Your time is exact!
The difference from Time.is was +0.039 seconds (±0.194 seconds).
Time in Coppel, Texas, United States now:

07:50:35 PM

Tuesday, April 24, 2018

| | | | | | | |
|-------------|----------|----------|----------|----------|----------|----------|
| Los Angeles | New York | London | Paris | Moscow | Beijing | Tokyo |
| 05:50 pm | 08:50 pm | 01:50 am | 02:50 am | 03:50 am | 08:50 am | 09:50 am |

WHO DO YOU TRUST TO MANAGE YOUR GOOGLE CLOUD PLATFORM MIGRATION? Best way to migrate our company to rackspace

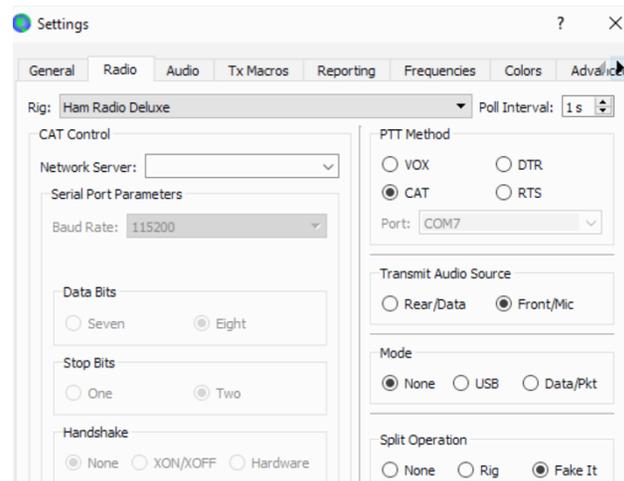
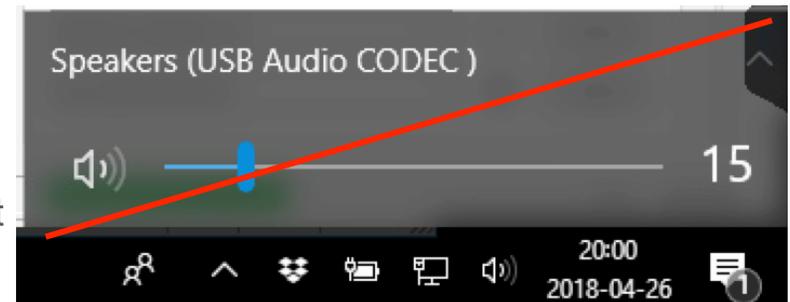
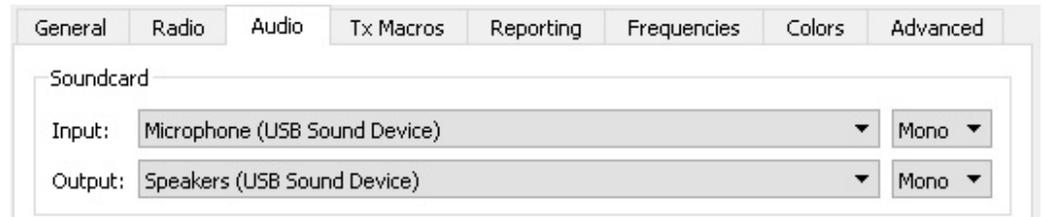
Share this page!

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WSJT-X Setup

File...Settings

- Be sure to have audio settings match your setup
- Be sure the PC audio remains in the PC
 - Common problem to have PC sounds transmit out
- Set rig control
 - Radio
 - Ham Radio Deluxe



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WSJT-X with QSO

The screenshot shows the WSJT-X software interface. On the left is the 'Wide Graph' showing a waterfall plot of the 40m band. The main window is divided into 'Band Activity' and 'Rx Frequency' sections, both displaying tables of received signals. The 'QSO' control panel is visible at the bottom, showing a frequency of 7.074 000 MHz and a call sign of K5GCC. A list of 'Generate Std Msgs' is also shown.

| UTC | dB | DI | Freq | Message |
|--------|-----|------|------|-------------------------|
| 011100 | -15 | 0.1 | 1515 | ~ K5GCC KJ4LAB EM64 |
| 011100 | -1 | 0.2 | 327 | ~ EA2VE K5JAZ R-17 |
| 011100 | -12 | -0.7 | 651 | ~ AC9HP N8MNI RR73 |
| 011100 | -3 | 0.1 | 771 | ~ CQ K9IG EM69 ~U.S.A. |
| 011100 | -6 | -0.5 | 861 | ~ CQ AG5FP EM51 ~U.S.A. |
| 011100 | -9 | 0.1 | 1404 | ~ N9YBK WOGAS 73 |
| 011100 | -12 | -1.6 | 1628 | ~ VA3CTX AA9HQ 73 |
| 011100 | -7 | 0.1 | 1924 | ~ CQ KE4JD EM66 U.S.A. |
| 011100 | -4 | 0.1 | 2000 | ~ CQ K9GL EN52 U.S.A. |
| 011100 | -14 | 0.2 | 2101 | ~ KE4UW VA3TPS 73 |
| 011100 | -4 | 0.2 | 2276 | ~ CQ K4DAY EM75 U.S.A. |

| UTC | dB | DI | Freq | Message |
|--------|-----|------|------|---------------------|
| 010600 | -10 | 0.0 | 465 | ~ WA3BMX A14FR RRR |
| 010615 | -13 | 0.1 | 1207 | ~ W5AAQ KD9HVT -08 |
| 010845 | 4 | -0.2 | 1515 | ~ CQ K5GCC EM13 |
| 010905 | Tx | | 601 | ~ K5GCC WESTR EM12 |
| 010915 | 5 | -0.2 | 1515 | ~ WESTR K5GCC +00 |
| 010930 | Tx | | 601 | ~ K5GCC WESTR R+05 |
| 010945 | 5 | -0.2 | 1515 | ~ WESTR K5GCC RRR |
| 011000 | Tx | | 601 | ~ K5GCC WESTR 73 |
| 011015 | 6 | -0.2 | 1515 | ~ WESTR K5GCC 73 |
| 011045 | 6 | -0.2 | 1514 | ~ CQ K5GCC EM13 |
| 011100 | -15 | 0.1 | 1515 | ~ K5GCC KJ4LAB EM64 |

1. Shift-click to set TX freq
 2. QSO with CQ double click
- Or-
2. JTAlert double click
 3. Auto Seq can help or you can manually run
 4. I typically work split
 - a. "Hold Tx Freq"
 - b. Avoid QRMing

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Set band

"Auto" QSO

"Manual" QSO

JTAlertX

- Helper app
- Shows worked before (gray)
- Allows blocked call signs (black)
- Alerts for various reasons (yellow)
- CQs (green)
- Launch after WSJT

JTAlertX 2.10.15 WE5TR [~,40m,ADIF,#1] (Updates!) | Alerts | Settings | View | Sound ON | ? | 60

| | | | | | | |
|---|-------------|------------|-------------|-------------|------------|-------------|
| ▲ | KN4DXD - FL | NO3K - GA | WW1I - NH | WY4I - FL | K0KRK - NC | KA9ENO - IN |
| | * K7ACW | K7VIC - MT | KD9HVT - B4 | KC9LFD - WI | * CO8LY | |
| | | | | | | |
| | | | | | | |

WB5K [] [] EM13 low hanging dipole [v] 0128 United States

QSO B4 Name QTH Grid Comments PWR Time Country Name

WE5TR

- Halt WSJT-X TX Alt+H
- Out of Shack Alt+S
- Own Call
- CQ and QRZ
- Wanted Callsign
- Wanted US State
- Wanted DXCC
- Wanted Continent
- Wanted CQ Zone
- Wanted Grid
- Wanted Prefix
- Wanted CQ Marathon (2018)
- Decode Keywords
- End of TX/RX period
- Start of WSJT-X TX period
- Rx Frequency
- TX Watchdog
- User Defined Alert
- Filters >
- Show LoTW flags
- Show eQSL flags
- Decoded Callsign Data Tooltip >
- Exit JTAlert

Check Your Propagation

Display Reception Report

Secure | <https://pskreporter.info/pskmap?callsign=we5tr&search=Find>

On 40m show signals sent/rcvd by the callsign we5tr using FT8 over the last 15 minutes

Monitoring WE5TR (last heard 2 mins ago). Automatic refresh in 3 minutes. Small markers are the 69 transmitters (show logbook) heard (distance chart) at W reports, 5 countries last 24 hours; 7048 reports, 20 countries last week. There are 529 active FT8 monitors on 40m. Show all FT8 on all bands. Legend

Monitor: LA6DP Loc JP99gb in Troms, Norway
Receiving: FT8 on 7.076 MHz (40m)
Using: WSJT-X v1.8.0-rc2 r8069
[Show all seen by LA6DP](#)

System statistics. Comments, problems etc to [Philip Gladstone](#). Online discussion of problems/issues. Reception records: [3700, 31, 670](#)

WE5TR

HamSpots [Callsign Hist: x]

Secure | <https://hamspots.net/history/>

Information Settings Searches Digital Modes LOTW & eQSL BANDS My Spots Online? Call: Search

SF1 73, A 5, K 2 Online: 72:21:25 ** CALLSIGN HISTORY ** 407 Online 01:07:10 : UTC

Auto refresh every 60 secs - Next refresh in 25 secs - Refresh Now

| WE5TR : Calls You Spotted | | | | | | | | | | WE5TR : Your Call Spotted | | | | | | | | | |
|---------------------------|-----|--------|----|---------------|-----|------|-----|-----|--|---------------------------|-----|---------|----|---------------|-----|------|-----|------|--|
| S | Age | DX | St | Country | Bnd | Mode | Sig | DT | | S | Age | Spotter | St | Country | Bnd | Mode | Sig | DT | |
| X | 1m | WV2NY | NY | United States | 40 | FT8 | -17 | 0.1 | | X | 1m | AE8S | OH | United States | 40 | FT8 | -20 | 0.0 | |
| X | 1m | VE3KKQ | | Canada | 40 | FT8 | -15 | 2 | | T | 1m | S51CP | | Slovenia | 40 | FT8 | -15 | -0.2 | |
| X | 1m | N4JAH | GA | United States | 40 | FT8 | -14 | 0.3 | | X | 1m | K4DAY | TN | United States | 40 | FT8 | 00 | 0.0 | |
| X | 1m | A14FR | FL | United States | 40 | FT8 | -09 | 0.0 | | X | 1m | W3IH | NM | United States | 40 | FT8 | -07 | 0.1 | |
| X | 1m | KE4JD | KY | United States | 40 | FT8 | -05 | 0.1 | | X | 1m | N4CLY | NC | United States | 40 | FT8 | -12 | 0.5 | |
| X | 1m | N00C | NE | United States | 40 | FT8 | -13 | 0.1 | | T | 1m | N1CNG | MA | United States | 40 | FT8 | -09 | 0.0 | |
| X | 1m | VA3MJR | | Canada | 40 | FT8 | -16 | 0.1 | | X | 1m | AB4BC | NC | United States | 40 | FT8 | -12 | 0.1 | |
| X | 1m | K9GL | WI | United States | 40 | FT8 | -03 | 0.1 | | X | 1m | N4JAH | GA | United States | 40 | FT8 | -15 | 0.1 | |
| X | 1m | AE4TI | NC | United States | 40 | FT8 | -09 | 0.0 | | X | 1m | WA7CZ | AZ | United States | 40 | FT8 | -03 | 0.0 | |
| X | 1m | W9YK | IL | United States | 40 | FT8 | -06 | 0.1 | | T | 1m | TG9AJR | | Guatemala | 40 | FT8 | -08 | 0.4 | |
| X | 1m | K4DAY | TN | United States | 40 | FT8 | -04 | 0.2 | | X | 1m | W0PD | TX | United States | 40 | FT8 | -11 | 0.1 | |
| X | 1m | KC5ZZX | OK | United States | 40 | FT8 | +3 | 0.1 | | X | 1m | K3DFL | PA | United States | 40 | FT8 | -16 | 0.1 | |
| X | 2m | N00C | NE | United States | 40 | FT8 | -12 | 0.1 | | X | 1m | KE5TD | AR | United States | 40 | FT8 | -06 | 0.3 | |
| X | 2m | NF3R | PA | United States | 40 | FT8 | -10 | 0.2 | | X | 1m | KF2E | NJ | United States | 40 | FT8 | -23 | 0.3 | |
| X | 2m | KO4O | AL | United States | 40 | FT8 | -08 | 0.1 | | X | 1m | N7ETI | OR | United States | 40 | FT8 | -17 | 0.1 | |
| X | 2m | KJ4LAB | AL | United States | 40 | FT8 | -13 | 0.1 | | X | 1m | KJ3L | PA | United States | 40 | FT8 | -15 | 0.1 | |
| X | 2m | TG9NSJ | | Guatemala | 40 | FT8 | -16 | 0.1 | | X | 1m | K6GB | CA | United States | 40 | FT8 | -11 | 0.1 | |

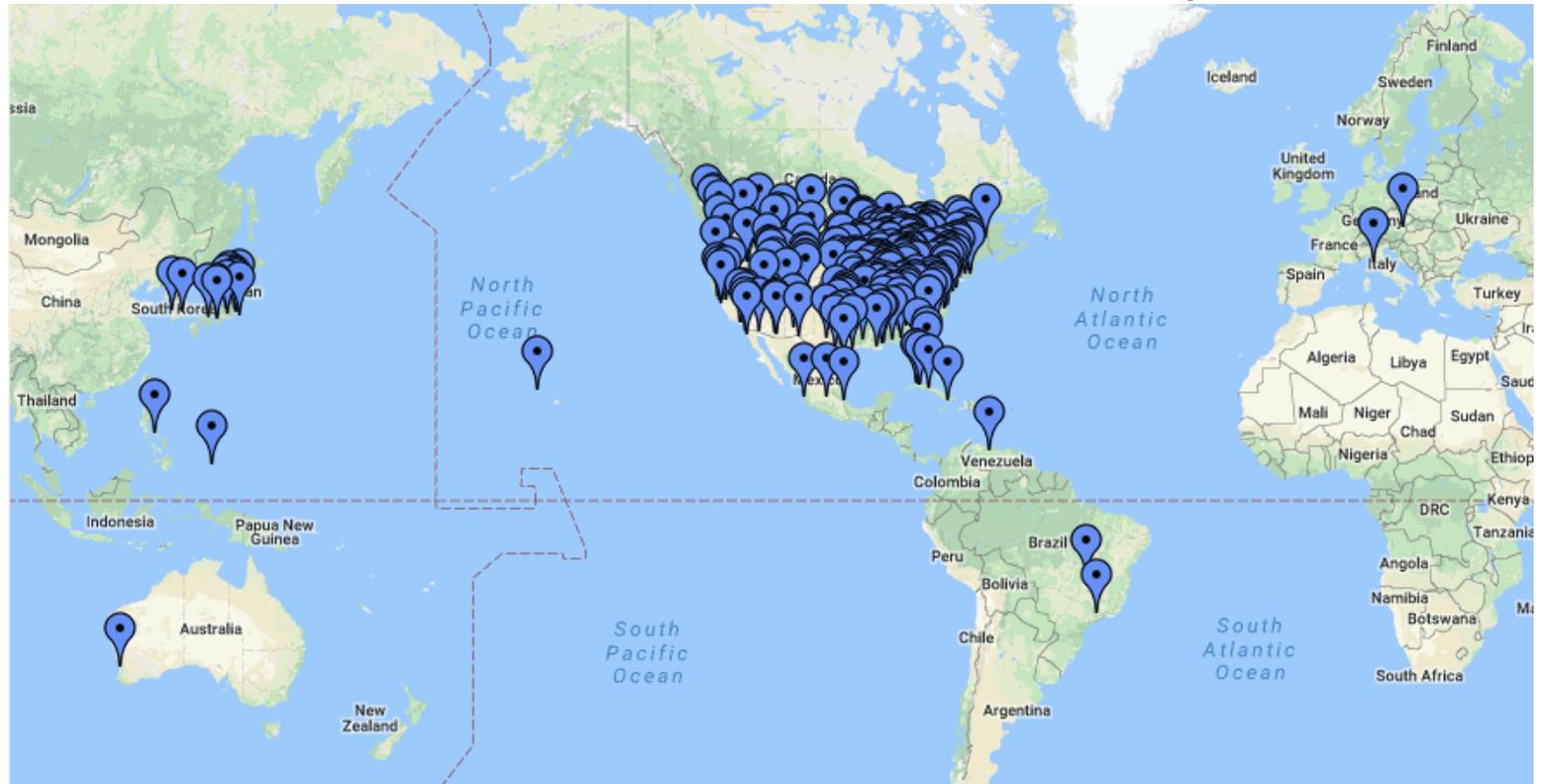
WE5TR Log Out Search Callsign spot history
Your Spot History Settings Callsign: Search

© 2016, HamSpots by VK3AMA

- JTAlert updates HamSpots
- WSJT-X updates PSKReporter

Enjoy

WE5TR QSOs as of 25 April 2018



Plotted from ADIF by "<http://www.qsomap.org/index.php>"

WE5TR

References

- WSJT-X
 - <https://physics.princeton.edu/pulsar/k1jt/wsjt.html>
 - User Guide
 - <http://physics.princeton.edu/pulsar/k1jt/wsjt-doc/wsjt-main-1.8.0.html>
- Dimension4
 - <http://www.thinkman.com/dimension4/download.htm>
- JTAlertX
 - <http://hamapps.com/>
- Ham Radio Deluxe (commercial)
 - <https://www.ham-radio-deluxe.com/downloads/>
- Facebook FT8 group
 - <https://www.facebook.com/groups/FT8.Digital.Mode/>
 - FAQ
 - <https://www.facebook.com/photo.php?fbid=10212531008502454&set=pcb.245955499264084&type=3&theater&ifg=1>
- FT8 Manual (new to me)
 - http://www.g4ifb.com/FT8_Hinson_tips_for_HF_DXers.pdf

WE5TR

Just Interesting

- I try to make sure other station has a clean end
- I'll try ~3 times then wait

| | | | | | | |
|--------|-----|-----|------|---|------------------|---------|
| 173015 | -12 | 0.2 | 1288 | ~ | CQ AB5ZR DM77 | ~U.S.A. |
| 173036 | Tx | | 932 | ~ | AB5ZR WESTR EM12 | |
| 173100 | Tx | | 932 | ~ | AB5ZR WESTR EM12 | |
| 173130 | Tx | | 932 | ~ | AB5ZR WESTR EM12 | |
| 173345 | -9 | 0.2 | 1151 | ~ | WESTR AB5ZR +06 | |
| 173407 | Tx | | 932 | ~ | AB5ZR WESTR R-09 | |
| 173415 | -10 | 0.2 | 1151 | ~ | WESTR AB5ZR +06 | |
| 173430 | Tx | | 932 | ~ | AB5ZR WESTR R-10 | |
| 173500 | Tx | | 932 | ~ | AB5ZR WESTR R-10 | |
| 173515 | -10 | 0.2 | 1151 | ~ | WESTR AB5ZR RRR | |
| 173536 | Tx | | 932 | ~ | AB5ZR WESTR 73 | |
| 173545 | -14 | 0.2 | 1151 | ~ | WESTR AB5ZR RRR | |
| 173607 | Tx | | 932 | ~ | AB5ZR WESTR 73 | |
| 173615 | -7 | 0.2 | 1151 | ~ | WESTR AB5ZR RRR | |
| 173630 | Tx | | 932 | ~ | AB5ZR WESTR 73 | |
| 173645 | -5 | 0.2 | 1151 | ~ | WESTR AB5ZR 73 | |
| 173745 | -8 | 0.2 | 1151 | ~ | CQ AB5ZR DM77 | |

WE5TR

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