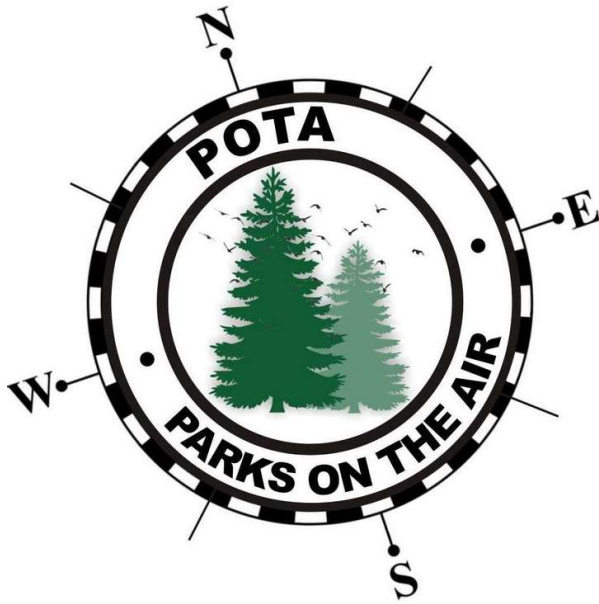


Activating POTA with FT-8 and QDX

1. Activity
2. Radio Mode
3. Configuration

Bill Reed, KD9PUP



Parks On the Air (POTA)

<https://parksontheair.com/>

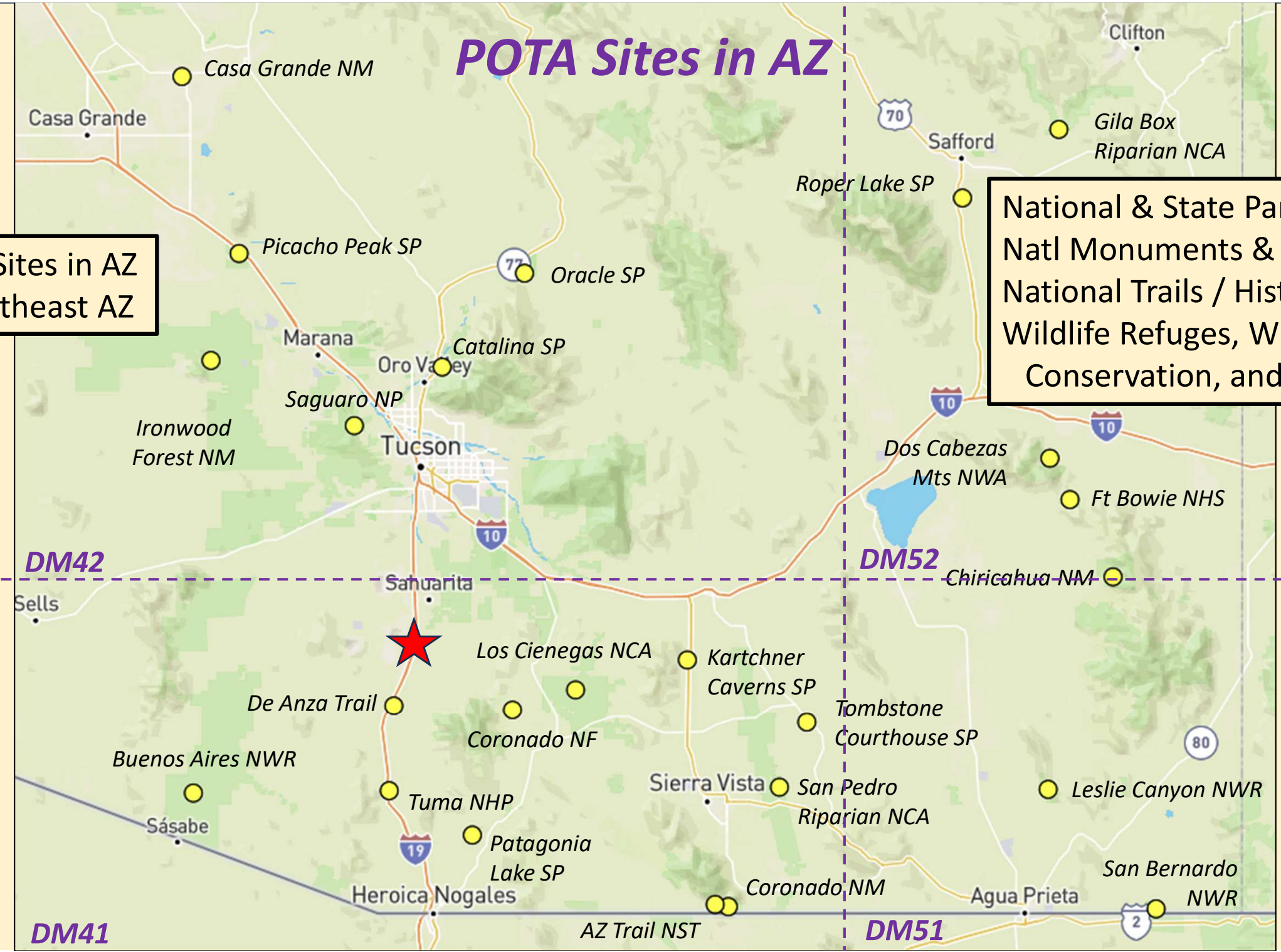
<https://pota.app/#/>

- Popular International RadioSport Award Program
- Encourages licensed amateur radio operators to **visit, enjoy, and operate** portable equipment in [select] parks & public lands.
- Always respecting other park users and local regulations.
- **ACTIVATORS** (in the park) **spot** themselves and call CQ POTA
- HUNTERS (in their shack) often pile up, competing for contact.

POTA Sites in AZ

89 POTA Sites in AZ
24 in Southeast AZ

National & State Parks
Natl Monuments & Forests
National Trails / Historical Sites
Wildlife Refuges, Wilderness,
Conservation, and Rec Areas

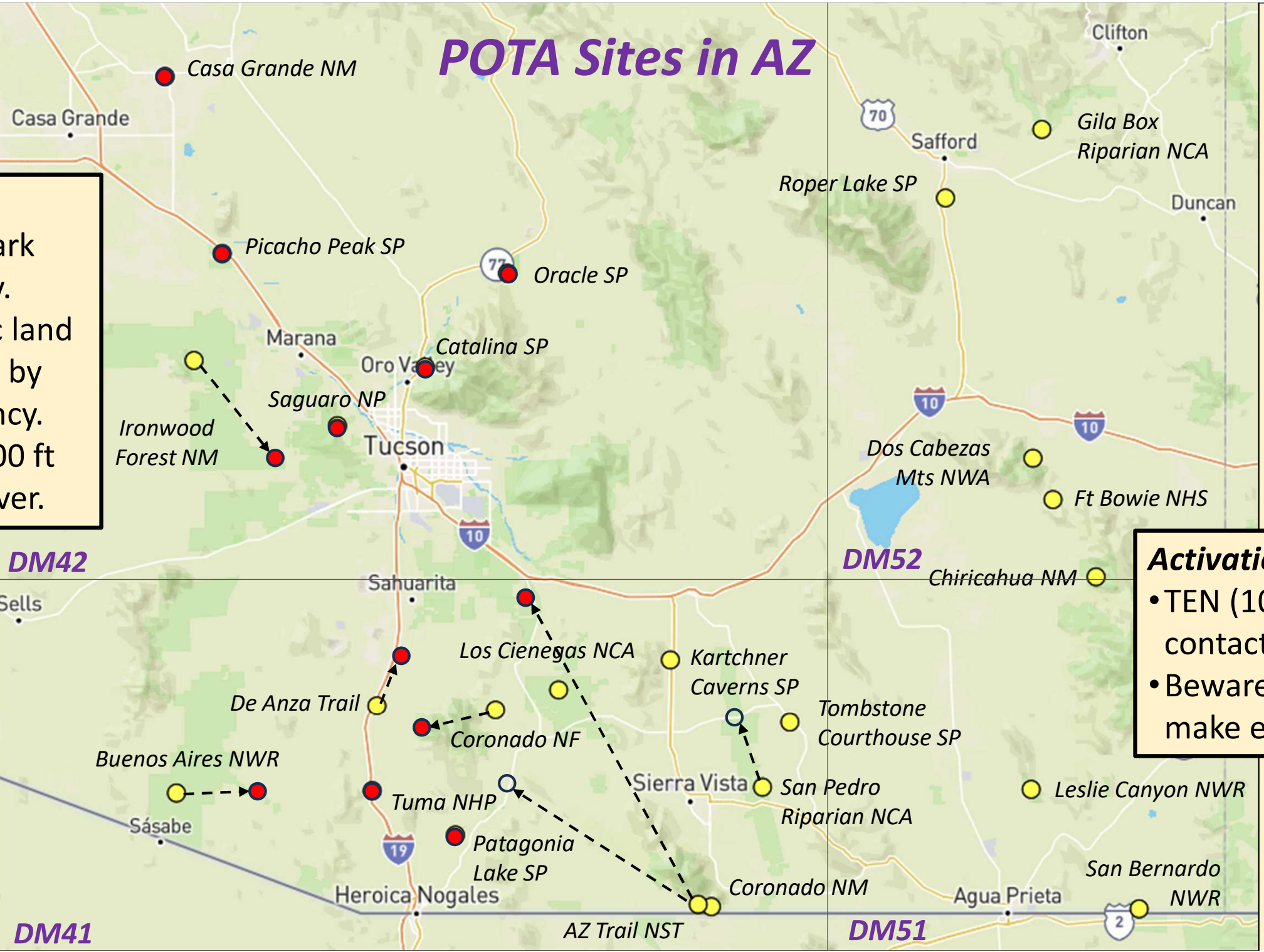


Maidenhead
Grid Lines

POTA Sites in AZ

Activate

- Within park boundary.
- On Public land managed by govt agency.
- Within 100 ft of trail/river.



Activation

- TEN (10) valid contacts required
- Beware of dupe; make extras

<https://pota.app/#/map>

https://pota.app/#/

Spotting (Voice & CW) Activators

The screenshot shows the POTA website interface. At the top, there's a navigation bar with the POTA logo, a search bar, and buttons for 'SPOTS', 'ACTIVATIONS', and a user profile 'KD9PUP'. Below the navigation bar, there's a section for 'Active Spots' with a refresh indicator and a 'Spot Filters' section. The filters are: Band: 20M (40), Mode: FT8 (15), Program: All (81), QRT: Show (81), Hunted: Show (81), and Sort: Time. A red box highlights the Band, Mode, and Program filters. To the right of the filters, there's a button 'At a park now?' and an 'ADD SPOT' button, with a red arrow pointing to the 'ADD SPOT' button and the text 'Self Spot'. Below the filters, there's a grid of spot cards. Each card shows a call sign, a location, and details like frequency and mode. A red arrow points to the frequency '14074.0 kHz (FT8)' in the second card, with the text 'Freq'. At the bottom of the page, there's a copyright notice: '© W H Reed 3/31/2024'.

Active Spots Data will refresh in 42 seconds. **Spot Filters**

Band: 20M (40) Mode: FT8 (15) Program: All (81) QRT: Show (81) Hunted: Show (81) Sort: Time

At a park now? **ADD SPOT**

Self Spot

Freq

| Call Sign | Location | Frequency | Mode | Last Heard |
|-----------------|--|-------------------|------|------------------------------------|
| KD8IAK @ K-1847 | K-1847 Collier-Seminole State Park | 14074.0 kHz (FT8) | FT8 | Last heard 54 sec ago at 21:42 UTC |
| WA9TT @ K-9807 | K-9807 Newton Blackmour State Trail | 14074.0 kHz (FT8) | FT8 | Last heard 1 min ago at 21:42 UTC |
| N4JKD @ K-7565 | K-7565 AEDC and Woods Reservoir Wildlife Management Area | 14075 kHz (FT8) | FT8 | Last heard 1 min ago at 21:42 UTC |
| KJ7WLL @ K-0824 | K-0824 Fort Vancouver National Historic Site | | | |
| KC1RLS @ K-2643 | K-2643 Bear Brook State Park | | | |
| K3WHD @ K-TEST | K-TEST Test Park | | | |

Activator



10351 Hams activated a park in 2023
About 85% used voice mode

Activator files contact log with POTA.

Hunter



36210 Hams hunted a park in 2023
Top hunters made 16x contacts of top activators

Hunter gets credit only from Activator's log.

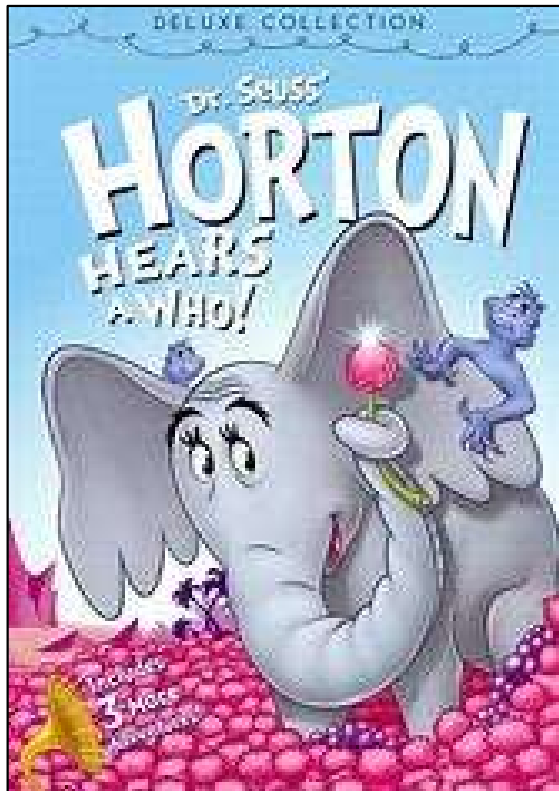
Some Hams Bring their Shack to the Park



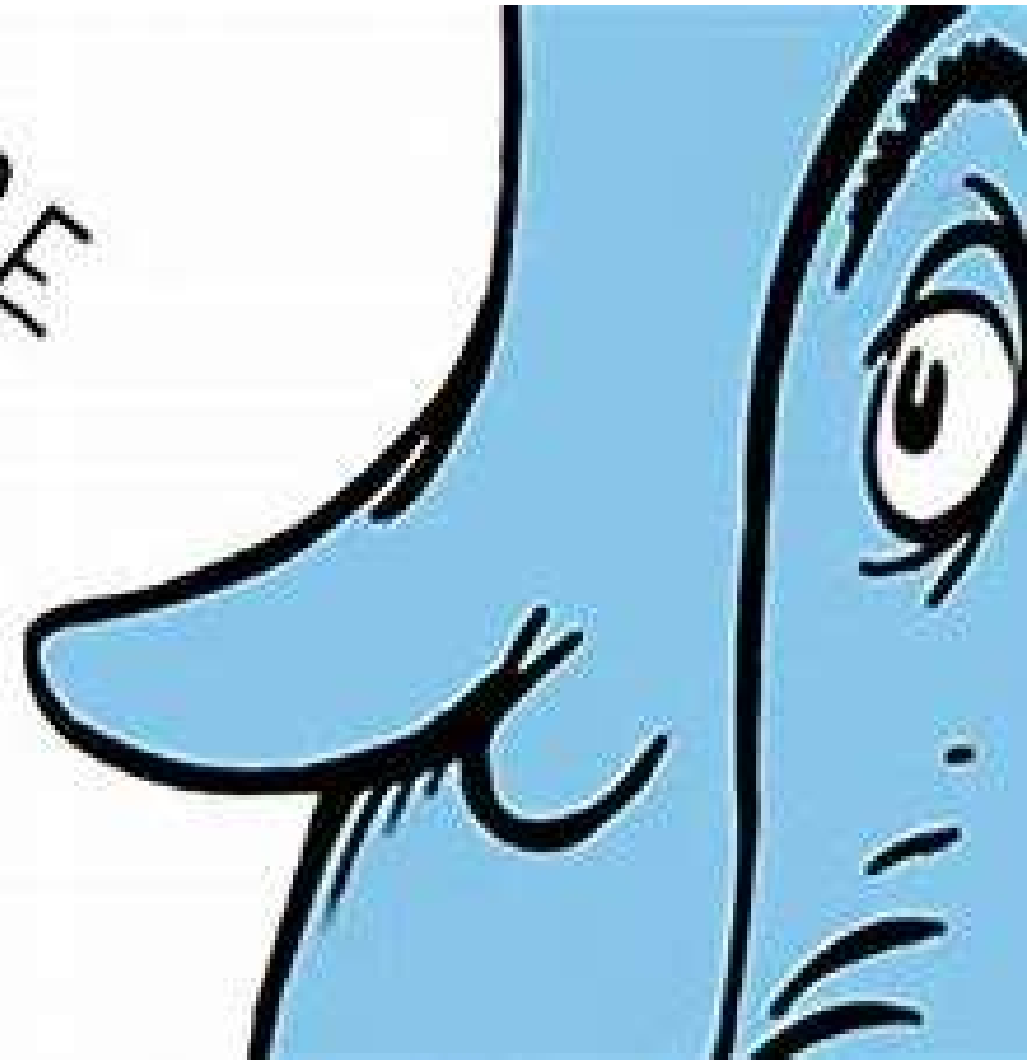
Other Hams have Specialty Gear



Weak Signal Contacts ***(from far away and/or low power)***



WE ARE HERE
WE ARE HERE
WE ARE HERE
WE ARE HERE





Weak Signal Communication by K1JT (Joe Taylor*)

**Some modes are designed for Communication;
Other modes like FT8 are Optimized for Contacts**



| |
|--------|
| FST4 |
| FT4 |
| • FT8 |
| JT4 |
| JT9 |
| JT65 |
| Q65 |
| MSK144 |
| FST4W |
| WSPR |
| Echo |

WSJT-X is a **computer program** used for weak-signal radio communication between amateur radio operators. The program was initially written by Joe Taylor, K1JT, but is now **open source** and is developed by a small team.

The **digital signal processing** techniques in WSJT-X make it substantially easier for amateur radio operators to employ esoteric propagation modes, such as high-speed meteor scatter [MSK] and moonbounce [JT65, Echo].

Additionally WSJT is able to send signal **reports** to spotting networks such as PSK Reporter.

FT8 stands for "Franke-Taylor design, 8-FSK modulation*" and was created in 2017 by Joe Taylor, K1JT and Steve Franke, K9AN. **FT8 is a digital mode in the WSJT-X software.**

* FSK = frequency shift keying (binary).

It is described as being designed for "multi-hop Es where signals may be weak and fading, openings may be short, and you want **fast completion of reliable, confirmable QSO's**".

Important characteristics of FT8 are:

- T/R sequence length: 15 s [recent time synch required]
- Occupied bandwidth: 50 Hz
- Multi-decoder: finds and decodes all FT8 signals in passband
- Decoding threshold: -24 dB (with a priori decoding)
- Auto-sequencing after manual start of QSO [CQ includes Maidenhead grid location]

FT8

Digital Mode

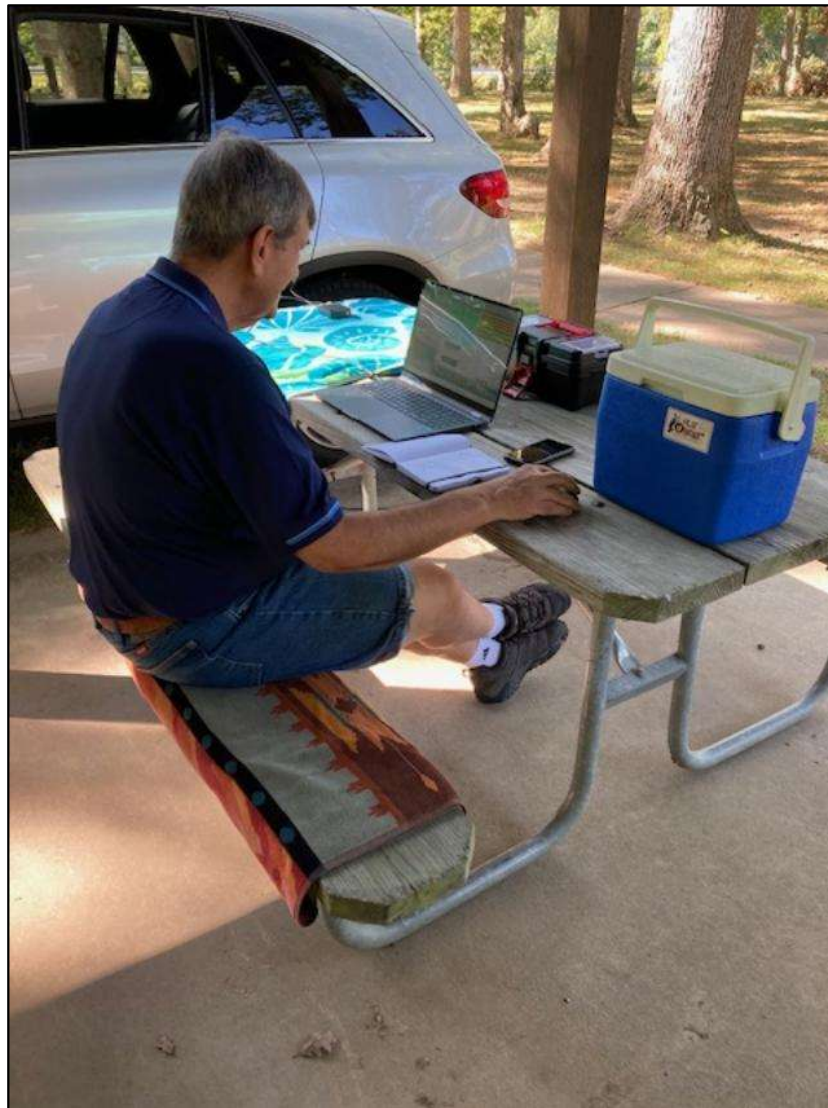
Example FT8 Exchange

CQ POTA KD9PUP DM41
KD9PUP KJ4A EM77
KJ4A KD9PUP +3
KD9PUP KJ4A R-6
KJ4A KD9PUP RR73

Note: a 73 from Hunter is expected but not required for a POTA contact.

Note: a contact can be completed in 75-90 seconds.

Note: KJ4A is my Elmer, John Z of Lexington, KY



K-1028, Walnut Point SP (IL)
Activated 1 Oct 2023
Mag mount hamstick antenna

WSJT-x FT8 Display

| Band Activity | | | | | | | Rx Frequency | | | | | | |
|-----------------|-----|------|------|----------------------|--------|--|--------------|-----|------|------|--------------------------|--------|--|
| UTC | dB | DT | Freq | Message | | | UTC | dB | DT | Freq | Message | | |
| 215045 | -9 | 0.4 | 443 | ~ CQ KE0FDX DN26 | U.S.A. | | 214700 | -10 | 0.1 | 2010 | ~ EA00 KD2JCR RR73 | | |
| 215045 | -12 | 0.2 | 2410 | ~ CQ KD9ROR EN53 | U.S.A. | | 214715 | 29 | 0.1 | 1007 | ~ CQ WS1W DM41 | U.S.A. | |
| ----- 20m ----- | | | | | | | | | | | | | |
| 215100 | -3 | -0.2 | 1177 | ~ CQ KB2OBF FN02 | U.S.A. | | 214733 | Tx | | 1007 | ~ WS1W KD9PUP DM41 | | |
| 215100 | -8 | -0.1 | 593 | ~ CQ W4GKM EM75 | U.S.A. | | 214745 | 29 | 0.1 | 1007 | ~ KD9PUP WS1W +23 | | |
| 215100 | -11 | 0.1 | 1950 | ~ CQ VA6DRU DO31 | Canada | | 214745 | 1 | 0.1 | 1015 | ~ I11WWA K7MOE R-01 | | |
| 215100 | -14 | 0.5 | 2327 | ~ CQ KO4ANX EM87 | U.S.A. | | 214800 | Tx | | 1007 | ~ WS1W KD9PUP R+29 | | |
| 215100 | -6 | 0.1 | 1558 | ~ CQ KE8WIG EN82 | U.S.A. | | 214815 | 29 | 0.1 | 1007 | ~ KD9PUP WS1W RR73 | | |
| 215100 | -14 | 0.6 | 490 | ~ CQ KE8WIG EN82 | U.S.A. | | 214815 | 0 | 0.3 | 1015 | ~ I11WWA K7MOE 73 | | |
| ----- 20m ----- | | | | | | | | | | | | | |
| 215115 | 12 | 0.1 | 395 | ~ CQ KE8WIG EN82 | U.S.A. | | 214830 | Tx | | 1007 | ~ WS1W KD9PUP 73 | | |
| 215115 | 2 | 0.1 | 571 | ~ CQ KE8WIG EN82 | U.S.A. | | 214845 | 19 | 0.6 | 1094 | ~ CQ W6/UT5UF | U.S.A. | |
| 215115 | -8 | 0.1 | 1531 | ~ CQ WM1G FN42 | U.S.A. | | 214900 | Tx | | 1094 | ~ <W6/UT5UF> KD9PUP DM41 | | |
| 215115 | -9 | 0.1 | 2341 | ~ CQ VA2FCS FN35 | Canada | | 214915 | 16 | 0.5 | 1094 | ~ KB7COX <W6/UT5UF> +01 | | |
| 215115 | -9 | 0.1 | 2341 | ~ CQ VA2FCS FN35 | Canada | | 214915 | -10 | 0.2 | 2219 | ~ CQ POTA W9RWG EN61 | U.S.A. | |
| 215115 | -15 | 0.3 | 491 | ~ CQ KC3FJI FM19 | U.S.A. | | 214932 | Tx | | 2219 | ~ W9RWG KD9PUP DM41 | | |
| 215115 | -15 | 0.2 | 2410 | ~ CQ KD9ROR EN53 | U.S.A. | | 214945 | -3 | 0.2 | 2218 | ~ KD2JZZ W9RWG +26 | | |
| ----- 20m ----- | | | | | | | | | | | | | |
| 215130 | -8 | -0.1 | 593 | ~ CQ W4GKM EM75 | U.S.A. | | 215000 | -3 | 0.8 | 2218 | ~ CQ KE8WIG EN82 | U.S.A. | |
| 215130 | -6 | -0.2 | 1177 | ~ CQ KB2OBF FN02 | U.S.A. | | 215015 | -3 | 0.2 | 2218 | ~ CQ KE8WIG EN82 | U.S.A. | |
| 215130 | -13 | 0.5 | 2327 | ~ CQ KO4ANX EM87 | U.S.A. | | 215031 | Tx | | 2219 | ~ CQ KE8WIG EN82 | U.S.A. | |
| 215130 | -6 | 0.2 | 843 | ~ CQ KC2NJ FN20 | U.S.A. | | 215045 | -12 | 0.7 | 2218 | ~ CQ KE8WIG EN82 | U.S.A. | |
| 215130 | -13 | 0.1 | 1221 | ~ CQ VA2MFM FN02 | Canada | | 215100 | -9 | -0.1 | 2219 | ~ CQ KE8WIG EN82 | U.S.A. | |
| 215130 | -3 | 0.1 | 1558 | ~ CQ KE8WIG EN82 | U.S.A. | | 215130 | -8 | -0.1 | 593 | ~ CQ W4GKM EM75 | U.S.A. | |
| ----- 20m ----- | | | | | | | | | | | | | |
| 215146 | Tx | | 1558 | ~ KE8WIG KD9PUP DM41 | | | 215146 | Tx | | 1558 | ~ KE8WIG KD9PUP DM41 | | |

All Band FT8 Activity

Rx Frequency FT8 Activity

75 sec

Rx Frequency FT8 Activity

Auto sequencing Messages

15 second clock

CQ only Log QSO Stop **Monitor** Erase Decode **Enable Tx** Halt Tx Tune Menu

20m **14.074 000** Tx 1558 Hz Rx 1558 Hz Report -3 Auto Seq CQ: First

H DX Call DX Grid Generate Std Msgs Next Now Pwr

FT8 KE8WIG EN82 KE8WIG KD9PUP DM41 Tx 1

FT4 Az: 56 1700 mi KE8WIG KD9PUP -03 Tx 2

MSK Lookup Add KE8WIG KD9PUP R-03 Tx 3

Q65 2024 Jan 29 KE8WIG KD9PUP RR73 Tx 4

JT65 21:52:10 KE8WIG KD9PUP 73 Tx 5

CQ KD9PUP DM41 Tx 6

Example FT8 Contact

Display Reception x +
https://pskreporer...
On 20m, show signals, sent/rcvd by the callsign
KD9PUP using FT8 over the last 15 minutes
Go! Display options Permalink
Monitoring KD9PUP (last heard 1 mins ago)
markers are the 104 transmitters (show log)
(366 reports, 15 countries last 24 hours; 366 reports)
There are 1322 active FT8 monitors: 1307 on 15m, 139 on 17m, 121 on 10m, 109 on 8m, 88 on 12m, 69 on 16m, 61 on 60m, 9 on 6m, 8 on 2m, 8 on 600m, 3 on 2200m, 1 on 11m. Show all on all bands. Legend

Log Entry Automatically Created after 73



WSJT-X v2.6.1 by K1JT et al.

Band Activity

| UTC | dB | DT | Freq | Message |
|--------|-----|----|------|---------|
| 215630 | -5 | | | |
| 215630 | -14 | | | |
| | -7 | | | |
| | -2 | | | |
| | -1 | | | |
| | 4 | | | |
| | -5 | | | |
| | 5 | | | |
| | -5 | | | |
| 215730 | 1 | | | |
| 215730 | -2 | | | |
| 215730 | -6 | | | |
| 215730 | -11 | | | |
| 215800 | 7 | | | |
| 215800 | -6 | | | |
| 215800 | -16 | | | |
| 215800 | -18 | | | |
| 215800 | -9 | | | |
| 215800 | -8 | | | |
| 215800 | -19 | | | |

Log QSO

Click OK to confirm the following QSO:

| Call | Start | End |
|-------|--------------------|--------------------|
| K6TBC | 1/29/2024 21:57:15 | 1/29/2024 21:58:15 |

Mode: FT8, Band: 20m, Rpt Sent: -03, Rpt Rcvd: -15, Grid: CN84

Tx power: 5W, Retain:

Comments: QDX, Retain:

Operator: _____, Exch sent: _____, Rcvd: _____

Prop Mode: _____, Retain:

OK Cancel

Rx Frequency

| UTC | dB | DT | Freq | Message |
|--------|-----|------|------|---------------------------|
| 215330 | -14 | 0.4 | 1702 | ~ CQ HS0ZOY OK14 Thailand |
| 215351 | | | 1702 | ~ HS0ZOY KD9PUP DM41 |
| 215400 | -10 | 0.4 | 1701 | ~ CQ HS0ZOY OK14 Thailand |
| 215415 | | | 1702 | ~ HS0ZOY KD9PUP DM41 |
| 215430 | -9 | 0.6 | 1701 | ~ PY2PM HS0ZOY -20 |
| 215445 | 15 | 0.3 | 1701 | ~ HS0ZOY N6UNX DM14 |
| 215445 | -3 | 0.1 | 1296 | ~ CQ KF0ARQ EM38 U.S.A. |
| 215504 | | | 1296 | ~ KF0ARQ KD9PUP DM41 |
| 215530 | | | 1296 | ~ KF0ARQ KD9PUP DM41 |
| 215515 | 12 | 0.1 | 394 | ~ CQ N4VFR EM90 U.S.A. |
| 215545 | 15 | 0.1 | 394 | ~ CQ N4VFR EM90 U.S.A. |
| 215600 | | | 394 | ~ N4VFR KD9PUP DM41 |
| 215615 | 10 | 0.1 | 394 | ~ AA4DM N4VFR -05 |
| 215630 | -17 | 0.2 | 386 | ~ EA8J AC3KA FN20 |
| 215630 | -1 | -1.0 | 812 | ~ CQ K6TBC CN84 U.S.A. |
| 215648 | | | 812 | ~ K6TBC KD9PUP DM41 |
| 215700 | 4 | -1.0 | 812 | ~ CQ K6TBC CN84 U.S.A. |
| 215715 | | | 812 | ~ K6TBC KD9PUP DM41 |
| 215730 | -3 | -0.9 | 812 | ~ KD9PUP K6TBC -15 |
| 215745 | | | 812 | ~ K6TBC KD9PUP R-03 |
| 215800 | -3 | -1.0 | 812 | ~ KD9PUP K6TBC RR73 |
| 215815 | | | 812 | ~ K6TBC KD9PUP 73 |

14.074 000

DX Call: K6TBC, DX Grid: CN84

Az: 327, 1088 mi

Report -3

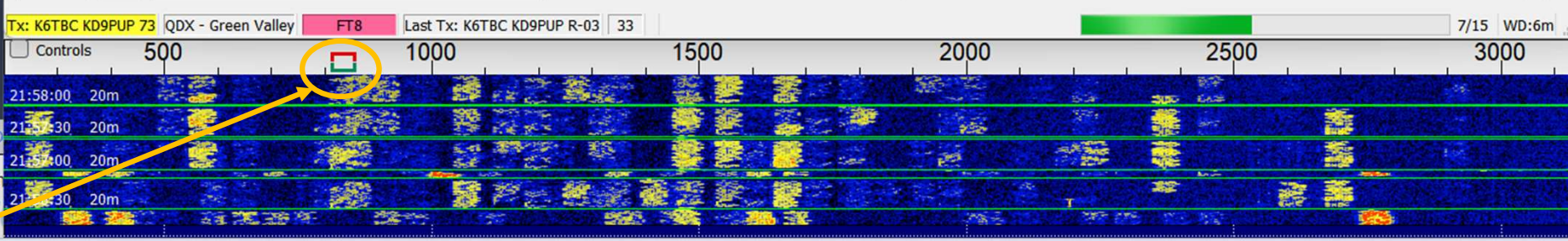
2024 Jan 29 21:58:22

TX: K6TBC KD9PUP 73 QDX - Green Valley FT8 Last Tx: K6TBC KD9PUP R-03 33

Decode

Generate Std Msgs

| Next | Now |
|-----------------------|----------------------------------|
| <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/> | <input type="radio"/> |
| <input type="radio"/> | <input checked="" type="radio"/> |



Waterfall (50 Hz)

Digital Mode Radio (for POTA Hunters?)

iCOM ic-7300



The iCOM ic-7300 is a very popular mainstream HF radio.

Transceiver presents as a PC Sound Card, and can be controlled by audio CAT commands from a computer.

Computer application like WSJT-x takes control of the radio to run digital modes.



USB Printer Cable Port

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- 9 **Second Century**
Exceptional Acceptance
- 30 **WindChime4: A Four-Band Vertical Dipole**
Richard Lawn, W2JAZ
- 33 **Measuring the Frequency Accuracy and Stability of WWV and WWVH**
Michael Lombardi, K0WWX
- 38 **A Remote-Controlled Balanced Antenna Tuner**
Randy Mather, AJ7B
- 41 **Product Review**
Pascal Villeneuve, VA2PV
QRP Labs QDX 5-Band HF QRP Digital Transceiver; Signal Generators
- 57 **Ham Radio After Downsizing**
Harry Cohen, K0VZT
- 58 **Desert Portable**
Gregg Mulder, W8GG
- 60 **The Care and Feeding of SOTA Chasers**
Darryl Holman, WW7D
- 63 **W9BSP: Remembering a Historic CW Mentor, 100 Years Later**
Leanna Figlewski, KC1RMP



QST Magazine

March 2023

Product Review

QRP Labs QDX 5-Band HF QRP Digital Transceiver

Reviewed by Charles Powell,
NK8O/VE3ISD/5H3DX
nk8o@arri.net

The QRP Labs QDX Digital Transceiver is a low-power, low-cost radio for digital operations. The reviewed unit covers five HF bands — 80, 60, 40, 30, and 20 meters — and the maximum power output is 5 W, with support for digital modes only. It comes in a kit to be built, and you can buy a fully assembled unit for an extra \$45. See Figure 1 for the kit parts packaging. The printed circuit board (PCB) comes with pre-installed surface-mount device (SMD) components (Figures 2 and 3 show each side of the PCB). It includes an embedded software-defined receiver (SDR), 24-bit 48 kilo samples per second (kS/s), a USB sound card, CAT control, and a synthesized VFO with TCXO reference. The QDX transmits a single, clean output signal, as it is not an SSB modulator with associated unwanted sideband and residual carrier, or intermodulation due to amplifier non-linearity (more on this later).

The QDX is suitable for single-tone operations. It is reported on the QDX forum that successful RTTY operation has been accomplished. It is not suitable for CW operation using *fldigi* or similar programs. It is my

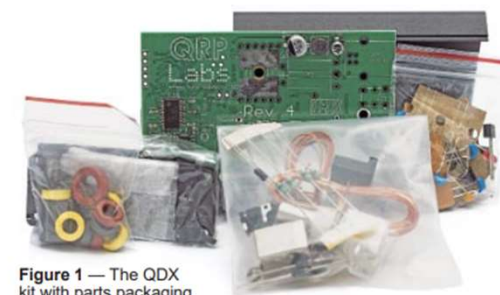


Figure 1 — The QDX kit with parts packaging.

QDX: a feature-packed, high performance, five-band (80, 60, 40, 30, 20m) or **six-band** (high bands 20, 17, 15, 12, 11 and 10m) **5W** Digi-modes transceiver kit, including embedded SDR, 24-bit 48 ksps USB sound card, CAT control, synthesized VFO with TCXO reference.

- QDX outputs a **pure single signal**,
- It is not an SSB modulator with associated unwanted sideband and residual carrier, or intermodulation due to amplifier non-linearity.
- QDX is suitable **only** for single tone FSK modes, which covers the majority of digital modes in use today.

QDX kit = \$69 + \$20 cover

(Assembled = \$134)



<https://qrp-labs.com/>

12V Power

- Auto Plug
- Wall Plug
- Battery

\$26 at Amazon



TalentCell Rechargeable
12V DC Output, 3000mAh
Lithium ion Battery

WSJT-x add-ons?

- PSK Report
- Gridtracker



Laptop running WSJT-x
(Tablet or Smart Phone?)

QDX kit assembled
& modified by KJ4A*



20, 17, 15, 12, and 10m
Reset to replace 11m with 30m

QDX Setup Experience



Sharp SF-20
\$50 at Amazon

Mobile Antennae

- 10m & 20m Hamsticks
- Tripod mount w/ *radials*
- Mag-mount on car
- EF wire

Notes:

- QDX has no internal tuner; so a balanced antenna required?
- Recent time synch needed (use personal hotspot on phone?)
- May need to change your Maidenhead grid square

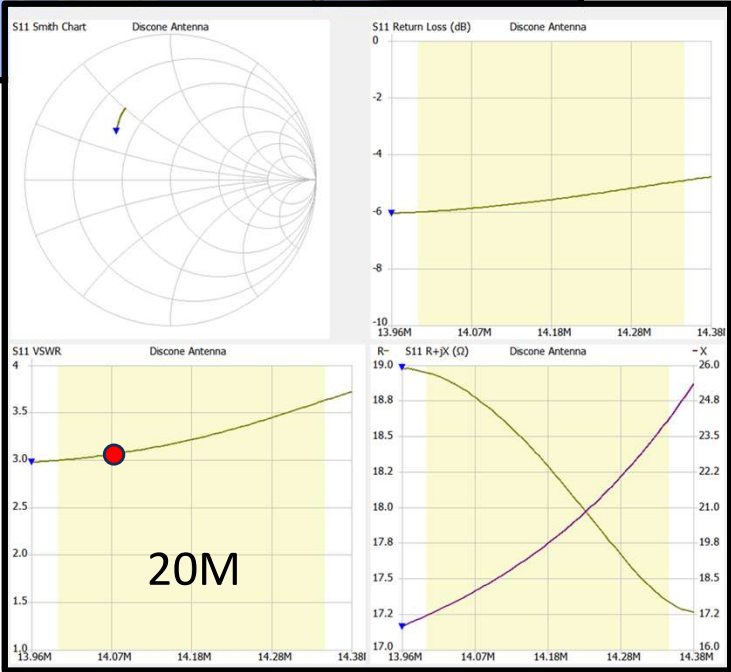
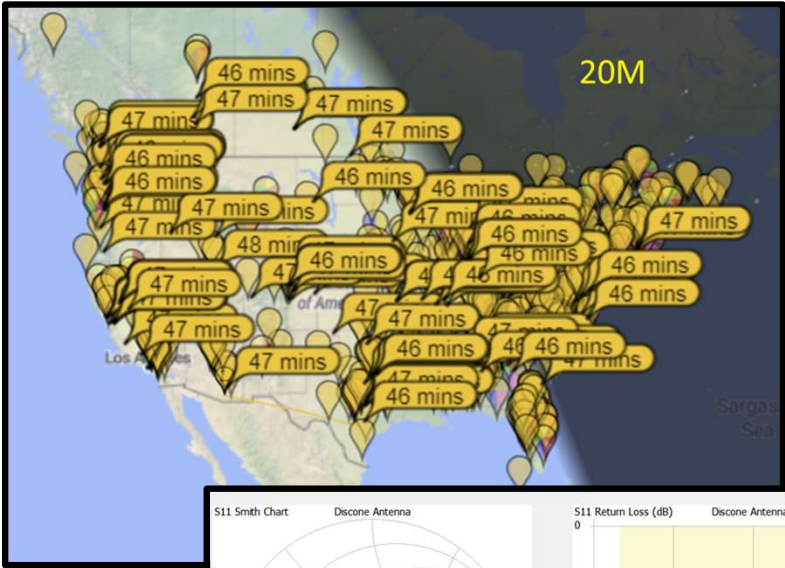


K-4429, Coronado NF (AZ)
Activated 30 Jan 2024
Tripod hamstick antenna
12v battery pack



K-4097, Kickapoo SRA (IL)
Activated 23 May 2023
Mag mount hamstick antenna
Cigarette Lighter power

QDX on Discone Antenna





GVARC Resources

Rick Rodgers, K7RCR



POTA Elmer

Randy Walker, K7NOJ



POTA Elmer

Tom Rice, NO7T



FT8 Digital Elmer

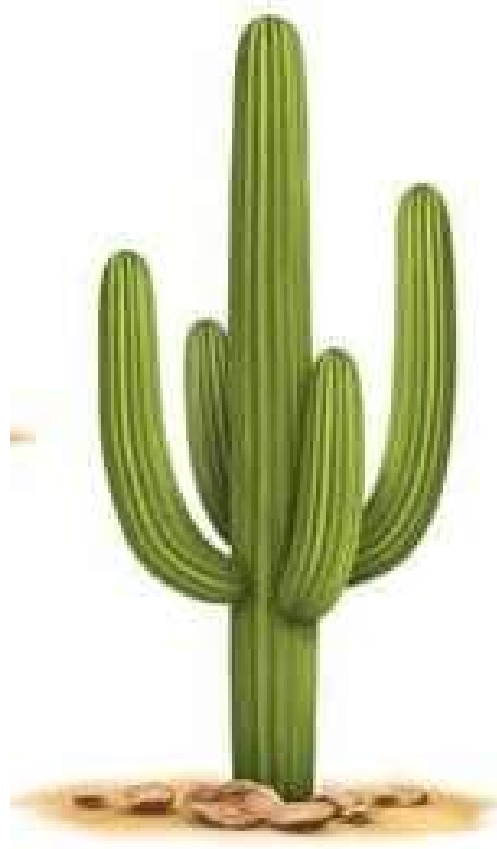
Ed Toal, N9MW



FT8 Digital Elmer

See: Feb2023 GVARC presentation by Rick Rodgers – posted on GVARC Website

*AZ POTA
Event
2024*



Why Not?



QDX Modifications

Alert: The QDX transceiver from QP Labs is a Kit Level design that may still evolve. Based on field experience, the following modifications are suggested – for both kits and pre-assembled units.

1. **Strongly** recommended that every QDX be equipped with a commutating diode across inductor L14. That has proven to be the single most effective action to prevent failure of the output transistors.
2. Recommend the installation of a 22K ohm resistor at the BNC antenna port. The value is not critical. It serves as a bleed-off for static charges that might build up on an antenna and damage QDX.
3. If building from kit, put a thin layer of thermal paste between the flat side of each of 4 output transistors and the circuit board metallization that they press against. This helps overcome surface irregularities and improves heat transfer from transistors to circuit board. This widens the SWR tolerance performance of QDX a bit.
4. An optional suggestion to replace the BS170 output transistors with TN0110 transistors. These are more robust and more performant, producing somewhat higher output on all bands. It is a slightly tricky mod as the transistor pinouts are different.

*For QDX Technical Issues, see the forum at: <https://groups.io/g/QRPLabs>
And QDX troubleshooting at: <https://qrp-labs.com/qdx/qdxtrouble.html>*

Implementing the commutating diode mod



The diode is a garden variety 1N4184, one of the most widely available P/Ns. As you can see in the photo, the banded end goes to one terminal of toroid inductor L14, the power supply side. The other end of the diode goes to the center tap of the binocular output transformer inductor. This effectively places the diode in parallel with L14, oriented properly to commutate harmful voltage spikes.

L14 can be spotted in the bottom center of this schematic diagram:

<https://qrp-labs.com/images/qdx/schem5.png>

In a stock QDX, a lot of energy is stored in a magnetic field in that inductor during a transmit interval. At the end of the transmission the output transistors turn off abruptly. The magnetic field in the inductor collapses rapidly inducing a huge voltage spike that exceeds the maximum voltage rating of the transistors.

The diode provides a shunt path around the inductor, enabling the magnetic field to collapse more slowly by letting current circulate in the inductor/diode loop and preventing the reactive spike from occurring.

The added diode is the pink-orange glass-bodied cylinder with wire leads that you see in the upper center part of the photo (yellow oval). The toroid L14 is at the lower lead and left of the diode. The binocular output transformer is at the upper lead and to the left of the diode.

<https://qrp-labs.com/images/qdx/schem5.png>

