

# DXCC in 40 Days with 4 watts!

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I recently assembled the latest HF QRP transceiver kit from QRP Labs in Turkey (<http://qrp-labs.com>). Over the last few years I have built several of their kits, including a single band CW transceiver and 50-watt linear amplifier, a signal generator, a couple of clocks and several GPS units. I have always found their kits to be well designed, well documented and well supported by Hans Summers, G0UPL.

The latest kit is the QMX, a 5-band, multi-mode QRP rig. The transceiver covers 80, 60, 40, 30 and 20 metres and currently operates on CW and digital modes including FT8 and FT4 with plans to include SSB as the firmware develops. Like all QRP Labs kits the surface mount components are already on the board when it is shipped. The kit builder still must solder all the through-hole components, as well as wind the toroids and transformers. Some experience at kit building and a level of soldering skill is needed. Above all, the manual needs to be followed accurately step by step.

You can also follow Hans Summers' instructions on YouTube at:

[https://www.youtube.com/watch?v=pBZ\\_SXO-LIM](https://www.youtube.com/watch?v=pBZ_SXO-LIM)

My QMX transceiver kit arrived in late August and I built and tested it over four evenings. The kit included several carefully packaged bags of components, a single printed circuit board (PCB) and an optional case. The single PCB must be carefully scored and broken into a main PCB, 5-volt power supply, 3.3-volt power supply, a control board, a display board, two spacers and, wait for it, a QRP-Labs key fob.

The kit build includes winding all the transformers, low-pass filter inductors, installing the through-hole parts and connectors. The builder must decide if the unit will be powered by a 9-volt or 12-volt power source. I chose a 12-volt supply and the QMX means 12 volts not 13.8 volts!

Figure 2 shows the layout of the completed main board – with both power supply boards, behind the DC jack plugged into it.

The control board and display board plug into the main PCB (Figure 3).

The “nested” assembled boards were installed into the optional case and the little rig was ready for testing.

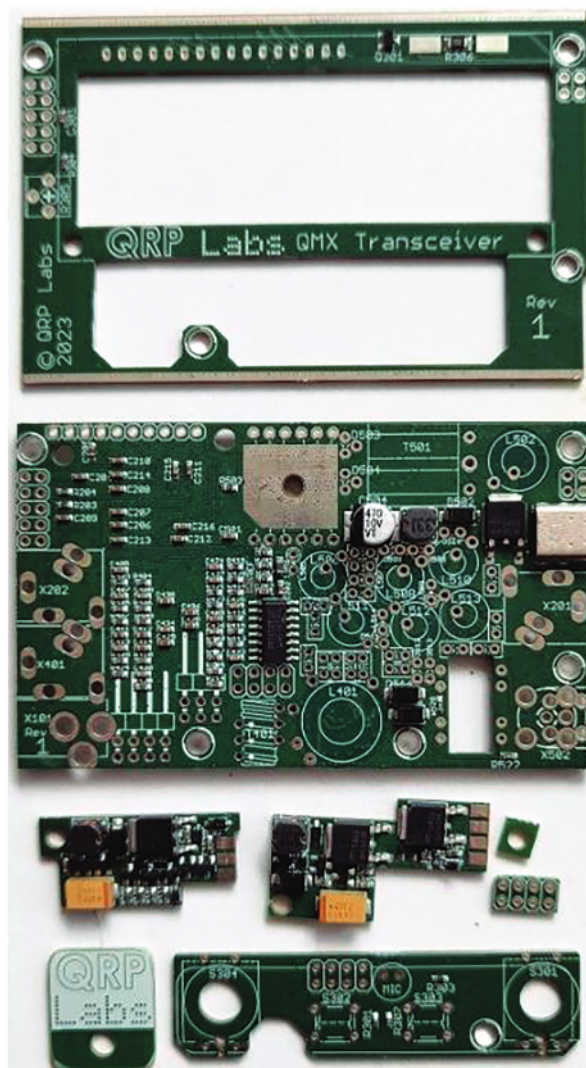


Figure 1: Printed Circuit Board (PCB).

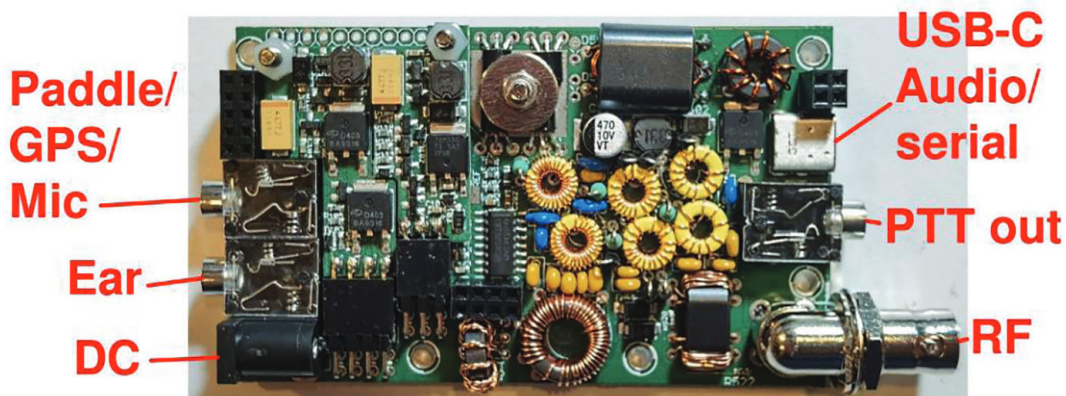


Figure 2: Ports

All that is needed to implement the digital modes and update the firmware is a USB-C to USB-A cable. An electret mic, which is included with the kit, can be soldered into the control board.



Figure 3: Ports



Figure 4: Assembled

Figure 5 below: DXCC list. Stations in bold have been confirmed via Logbook of The World.

| #  | DXCC                | Call       | #  | DXCC             | Call   | #   | DXCC              | Call      |
|----|---------------------|------------|----|------------------|--------|-----|-------------------|-----------|
| 1  | Alaska              | KL7VX      | 34 | Estonia          | ES5QA  | 67  | Peru              | OA4DPM    |
| 2  | Angola              | D2UY       | 35 | European Russia  | RD4A   | 68  | Philippines       | DV1UAR    |
| 3  | Anguilla            | VP2ETE     | 36 | Finland          | OH6PP  | 69  | Poland            | SP9W      |
| 4  | Antarctica          | VP8/UW5EHR | 37 | France           | F4EXC  | 70  | Portugal          | CT1GTI    |
| 5  | Argentina           | LW2EY      | 38 | French Polynesia | TX6D   | 71  | Pples Repub China | BG2CPT    |
| 6  | Asiatic Russia      | UA0ZFW     | 39 | Germany          | DK7ZT  | 72  | Puerto Rico       | KP4B      |
| 7  | Australia           | VK1AO      | 40 | Ghana            | 9G5AR  | 73  | Repub Korea       | DS1TUW/2  |
| 8  | Azores Islands      | CU3HN      | 41 | Greece           | SV8DY  | 74  | Repub S. Africa   | ZS6ZA     |
| 9  | Barbados            | 8P6PD      | 42 | Greenland        | OX3LX  | 75  | Reunion Island    | FR4OP     |
| 10 | Belarus             | EW8W       | 43 | Guadeloupe       | FT5GP  | 76  | Romania           | YO4NF     |
| 11 | Belgium             | ON2BCB     | 44 | Guam             | WA00II | 77  | Samoa Islands     | 5W1SA     |
| 12 | Belize              | V31DL      | 45 | Hawaii           | WH6S   | 78  | Scotland          | GM4SJB    |
| 13 | Bosnia-Herzegovinia | E74K       | 46 | Indonesia        | YC8RDG | 79  | Senegal           | 6W/IV3FSG |
| 14 | Brazil              | PY5XT      | 47 | Italy            | IK5PWQ | 80  | Serbia            | YT3PL     |
| 15 | Bulgaria            | LZ2KTS     | 48 | Jamaica          | 6Y5PE  | 81  | Singapore         | 9V1YC     |
| 16 | Canada              | VA5KEN     | 49 | Japan            | JA9ELE | 82  | Slovenia          | S58WW     |
| 17 | Canary Islands      | EH8SDC     | 50 | Kenya            | 5Z4VJ  | 83  | Spain             | EB2AM     |
| 18 | Cayman Is.          | ZF1EJ      | 51 | Kuwait           | 9K2YM  | 84  | St. Helena        | ZD7MY     |
| 19 | Ceuta & Melilla     | EA9ACR     | 52 | Latvia           | YL3CW  | 85  | St. Lucia         | J68HZ     |
| 20 | Chile               | XO1KK      | 53 | Lebanon          | OD5KU  | 86  | St. Vincent       | J88IH     |
| 21 | Colombia            | HK3W       | 54 | Madeira Island   | CT3MD  | 87  | Swains Island     | W8S       |
| 22 | Costa Rica          | TI7ORC     | 55 | Malawi           | 7Q7EMH | 88  | Sweden            | SE2T      |
| 23 | Croatia             | 9A9TT      | 56 | Marshall Islands | V73AH  | 89  | Switzerland       | HB9HSJ    |
| 24 | Cuba                | CO2AV      | 57 | Martinique       | FM4SK  | 90  | Taiwan            | BX6ABC    |
| 25 | Curacao             | PJ2MAN     | 58 | Mexico           | XE2DDA | 91  | Thailand          | HS0ZOY    |
| 26 | Czech Republic      | OK1FAK     | 59 | Nauru            | C21TS  | 92  | Trinidad & Tobago | 9Y4DG     |
| 27 | Denmark             | OU4N       | 60 | Netherlands      | PD5MVH | 93  | Tristan de Cuna   | ZD9W      |
| 28 | Dominican Republic  | HI8MDQ     | 61 | New Caledonia    | FK8HM  | 94  | Tuvalu            | T22T      |
| 29 | East Malaysia       | 9W8ZAL     | 62 | New Zealand      | ZL4KYH | 95  | Ukraine           | UR3LM     |
| 30 | Ecuador             | HC5EG      | 63 | Northern Ireland | MI0SAI | 96  | Uruguay           | CX8FB     |
| 31 | El Salvador         | YS1CH      | 64 | Norway           | LABENA | 97  | USA               | K1RH      |
| 32 | England             | G3ZQH      | 65 | Panama           | HP1DAV | 98  | Venezuela         | YV5DRN    |
| 33 | Equatorial Guinea   | 3C3CA      | 66 | Paraguay         | ZP6LMR | 99  | Vietnam           | XV9R      |
|    |                     |            |    |                  |        | 100 | Wales             | MW0ZZK    |

The first thing you'll notice is just how small this little rig is. It easily fits into your hand!

I cautiously powered up my new QMX and there were a couple of glitches. In all cases the problem was poor soldering by the builder – me! The PCBs are six-layer and on the interconnection from the main board to the control board I had applied insufficient heat to a ground connection on an 8-pin header. An easy fix and so I loaded the firmware and put it on the air on 20 metres with a couple of CW contacts.

Next I thought I'd try FT8 with a whopping 3.3 watts to a 3-element SteppIR on 20 metres! After a few tweaks I was able to push the output to slightly more than 4 watts and I began to chase DX on 20m in earnest!

The little rig was amazing. Between September 1 and October 10 (40 days), I was able to work 100 DXCC entities, 95% FT8, with 4 watts! You can see my DXCC list in Figure 5. Stations in bold have been confirmed via Logbook of The World (LoTW).

Over the same period the firmware has been updated several times and options protecting the rig from over-voltage and high standing wave ratio (SWR) are now included.

In summary, I love this little rig! The software defined radio (SDR) hears well, the CW QSK (break-in) is smooth, and the output from the built-in sound card is clean! You get a lot of bang for the buck. The rig, optional metal case and FedEx shipping and handling cost approximately \$140 USD!

What's next? QRP-Labs has announced that a 20 through 10 metre version of the QMX is now available. I have already placed my order!

*Rick Williams, VE7TK/VE7ASR, is an avid DXer and occasional contester. First licensed in 1987, he is a member of the ARRL DXCC Honor Roll with 338 of the current 340 DXCC entities confirmed. In addition, Rick is an ARRL authorized DXCC Card Checker and a member of the BCDX Club, the ORCA DX and Contest Club and the Island HF Club.*

