# My notes on the QRP Labs QMX transceiver

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I am a licensed radio amateur and these notes reflect my personal experience on constructing and operating a QMX transceiver kit from QRP Labs. In my opinion, QMX is a low cost (less than £100) but capable entry point to HF Amateur Radio. I'm sharing my experience in the hope of encouraging others who might be keen to get started in HF but can't afford an expensive transceiver. I have no links or commercial interests with QRP Labs and my sole interaction with them was the purchase of one QMX kit.


Figure 1: The authors finished QMX transceiver in its optional enclosure

QMX is a QRP or low power transceiver, producing around 5 Watts of power which in the HF band is enough to obtain some remarkably long range QSOs or contacts. QMX offers traditional CW and SSB as well as digital modes when connected to a PC including the popular FT8 and WSPR modes amongst many others. A nice feature of QMX is that it can operate as a WSPR beacon in isolation without the need for a PC which is great for portable use. QRP labs produce a range of products (https://qrp-labs.com) but these notes will focus on QMX (https://qrp-labs.com/qmx.html) which is a remarkably small and low power 5 band transceiver. I chose the 80, 60, 40, 30 and 20m band version but other options include 20, 17, 15, 12, 11 and 10m or 60, 40, 30, 20, 17 and 15m bands. At the time of writing (July 2025) QMX was selling for $102.47 in kit form. The author considered that the optional enclosure (selling for around $20 at the time of writing) was a worthy addition to protect

your QMX and make it look very smart. The small size and low power requirements of this transceiver make it ideal for portable use (eg POTA, SOTA etc) but equally, only occupies a small space in your shack if space is limited. I liked the built-in test facilities which are a real advantage for the amateur who doesn't have much test equipment at home. An output bridge is included which measures SWR and output power. Additionally there is a lot of diagnostics available simply by connecting the radio to a PC via USB and running a terminal program such as PuTTY. Programming the radio with the latest firmware is also simply performed by 'copying & pasting' via the USB port where your QMX appears like a USB drive.

It is worth noting that QRP Labs QMX+ is larger and easier to build but slightly more expensive ($125 at the time of writing – July 2025) and offers almost exactly the same functionality with the full 160m to 6m band coverage in one radio. I'll consider this for a future date!

I consider QMX and QMX+ as an opportunity to practice your construction skills. The kit provides PCBs (Printed Circuit Boards) with all the required surface mount components already soldered in place which is just as well as these are tiny and difficult for the home constructor. This leaves the leaded components, capacitors, diodes, transistors etc for you to solder. The most time consuming part is winding the coils and transformers but there is no rush to this project. Some amateurs enjoy the construction as much as operating the finished radio and there is a great deal of satisfaction in seeing your home built transceiver work. There is a very detailed construction guide available online (Assembly manual for PCB Rev 4 – revision 4 at the time of writing) to take you through each step. In addition there is an excellent online community (https://groups.io/g/QRPLabs) who are only too willing to help answer your questions and guide you through any issues you might come across including fault finding. Of course, there is also your local radio club with a wealth of experience. Don't worry if you really don't feel confident to construct the kit as you can also order a factory assembled radio for around $50 more although there is often a long wait (around 3 months at time of writing) as these are popular and there is only a small construction team. Once assembled, there is a detailed Operators Manual (Operating manual for firmware 1_02_002 and 1_02_003 – firmware versions current at the time of writing).

Full circuit diagrams are available online if you wish to understand more about the design: https://qrp-labs.com/images/qmx/manuals/QMX_Rev1_Searchable_Schematic_1b.pdf.

There is also a video which describes the design available here: https://www.youtube.com/watch?v=6FheeAv3src

Construction Top Tips

- The most common problem, by far, is failing to properly scrape off the enamel coating from the wound inductors and transformers before soldering. Although the manual suggests you can burn it off from the thinner wire with your soldering iron, I suggest scraping it with a knife until it is nice and shiny.
- The next most common problem is 'dry' or 'cold' solder joints. Inspect your work very closely with a good magnifier and reflow suspect joints.
- Solder bridges or short circuits are easily done with such fine component spacing. Again inspect thoroughly with a good magnifier before applying power.
- Construction of the QMX is tight with very limited clearances on some components. This is essentially because the designer squeezed two radios into one and kept the same sized enclosure giving an impressively compact radio. Take your time in construction and be cautious of not touching the already soldered surface mount devices.
- Some might say the BS170 output power transistors are not really power transistors at all and as such operate a little close to their maximum specifications (voltage, power, heat etc). There are in fact 2 pairs of push-pull devices to share the load hence 4 transistors in total. I've heard of people 'blowing their finals' and some even consider fitting sockets for these devices such as half of a 6 way turned-pin IC socket to ease replacement. This is more practical on QMX+ where there is more space available. With a socket there is a risk of poorer contact than that of a soldered joint. I've operated my QMX numerous times at 12V on WSPR transmissions which last nearly 2 minutes each at 5W output with no issues so far – this is probably one of the most extreme scenarios. Never exceed the power supply voltage and consider reducing the volts to be kinder to the output stage. One less Watt will make little difference to range.

Power Supply

I usually power my QMX from a PD (Power Delivery) compatible USB power bank with a 12V PD Trigger cable. This power bank is around the same size as the QMX and provides many hours of use. This is sufficient for mobile use eg POTA, SOTA etc. Selection of the correct 12V PD Trigger Cable ensures 12V is maintained to the QMX, and hence full power output, as the battery discharges. The on-board display indicates battery time remaining at that current draw and also indicates time remaining when charging from USB (5V).

Figure 2: USB PD Power Bank

## Construction photos

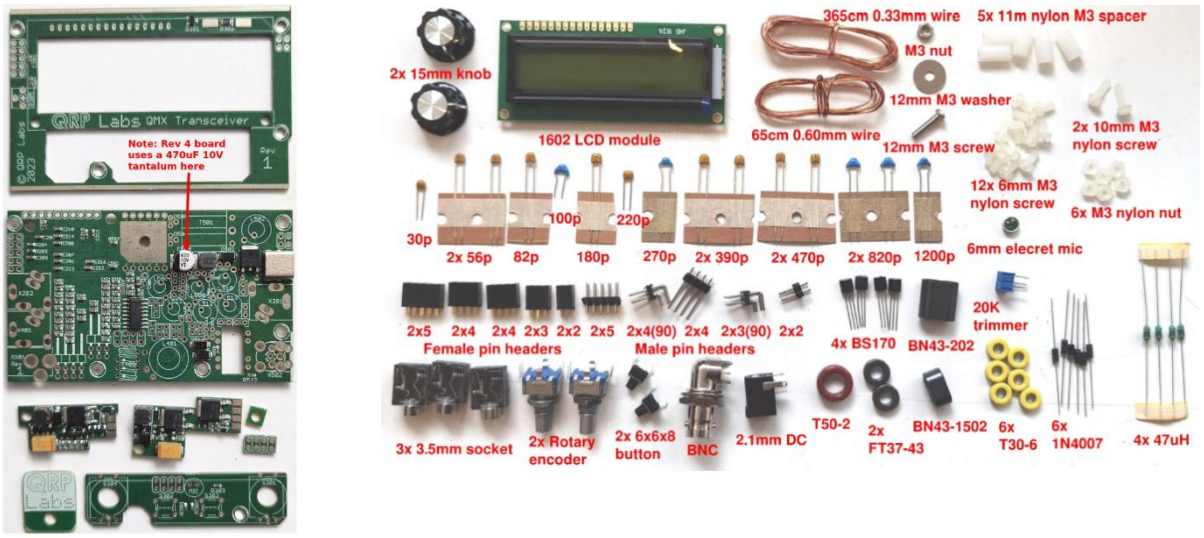


Figure 3: PCBs as supplied and components to be fitted

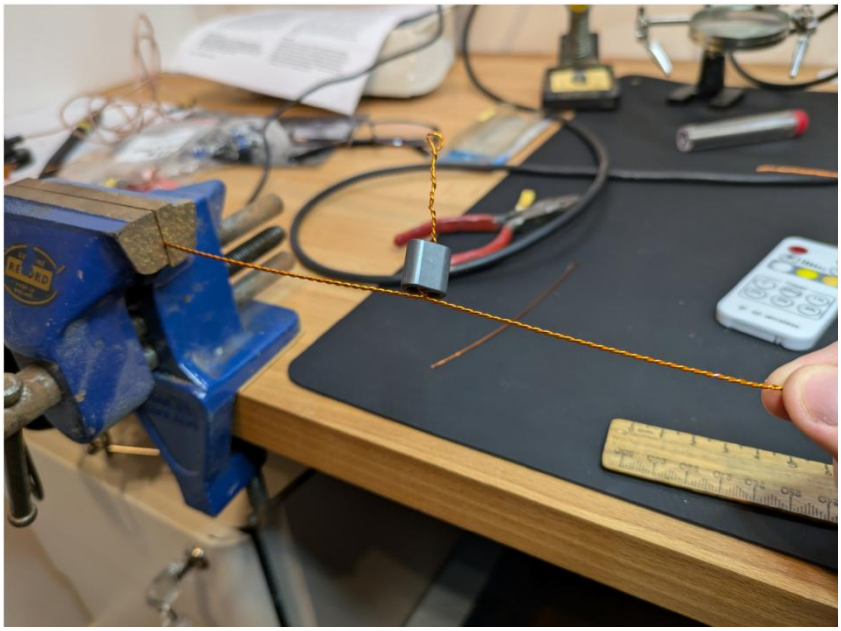

Figure 4: Winding the output transformer

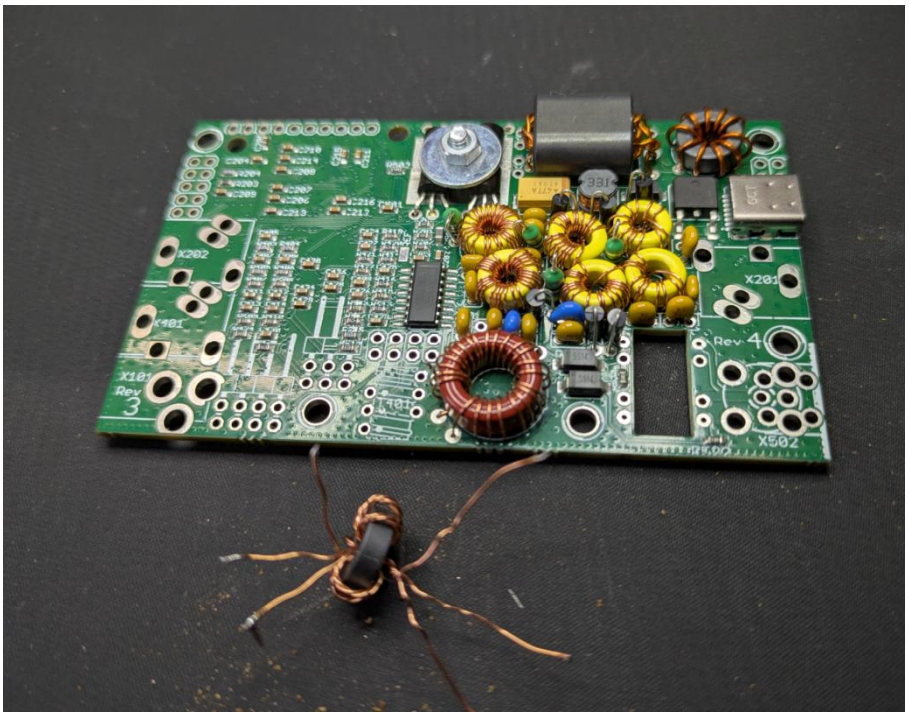


Figure 5: Partial assembly with trifilar transformer

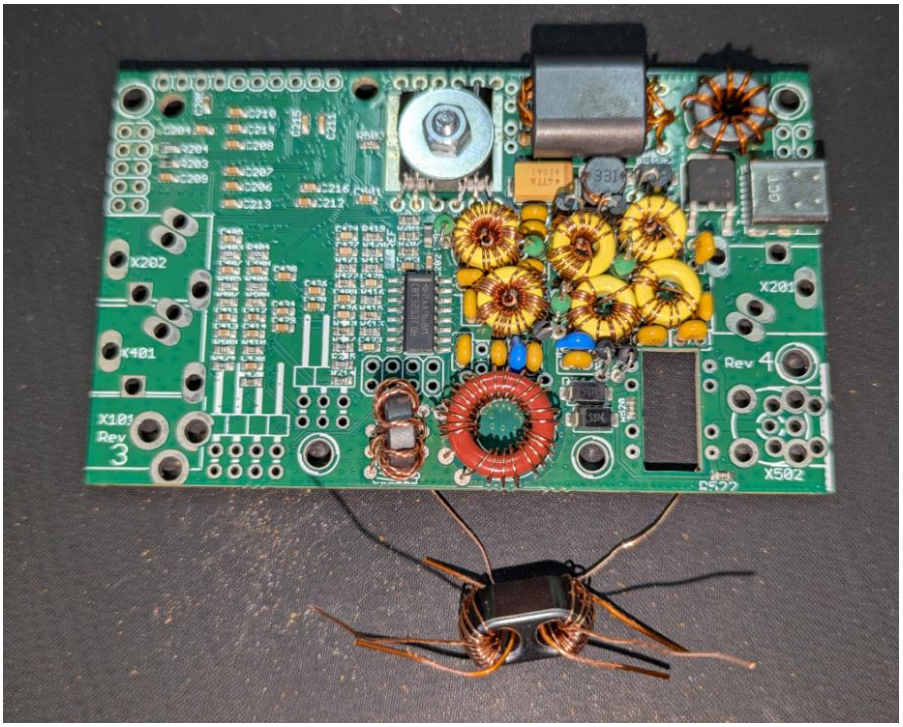


Figure 6: Partial assembly with binocular transformer

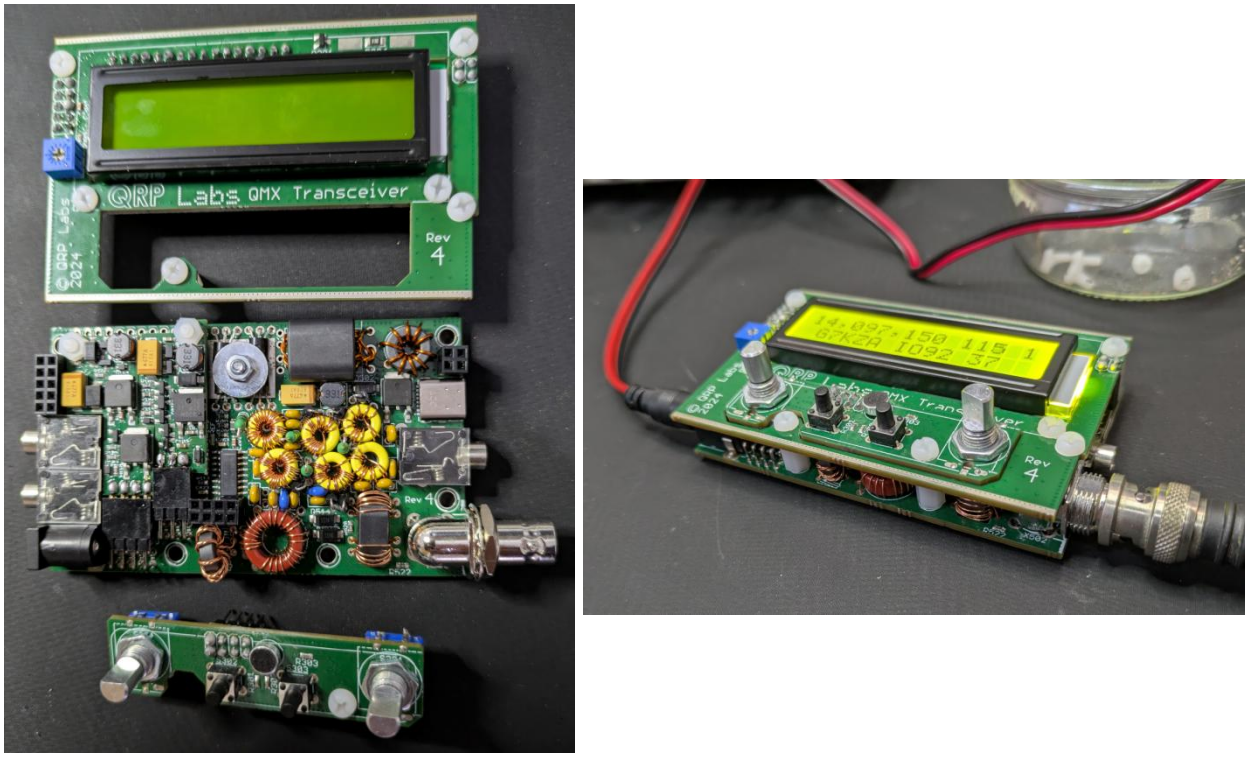


Figure 7: Completed PCBs and final assembly (without enclosure)

Results

The map in Figure 8 shows the reported reception from my 5 Watt WSPR (Weak Signal Propagation Reporter) transmission fed into a horizontally polarised OCFD (Off-Centre Fed Dipole) at my home location on the 20m band over a few hours in July 2025. I think this is a great tool to test the polar diagram (almost literally) and performance of your antenna.

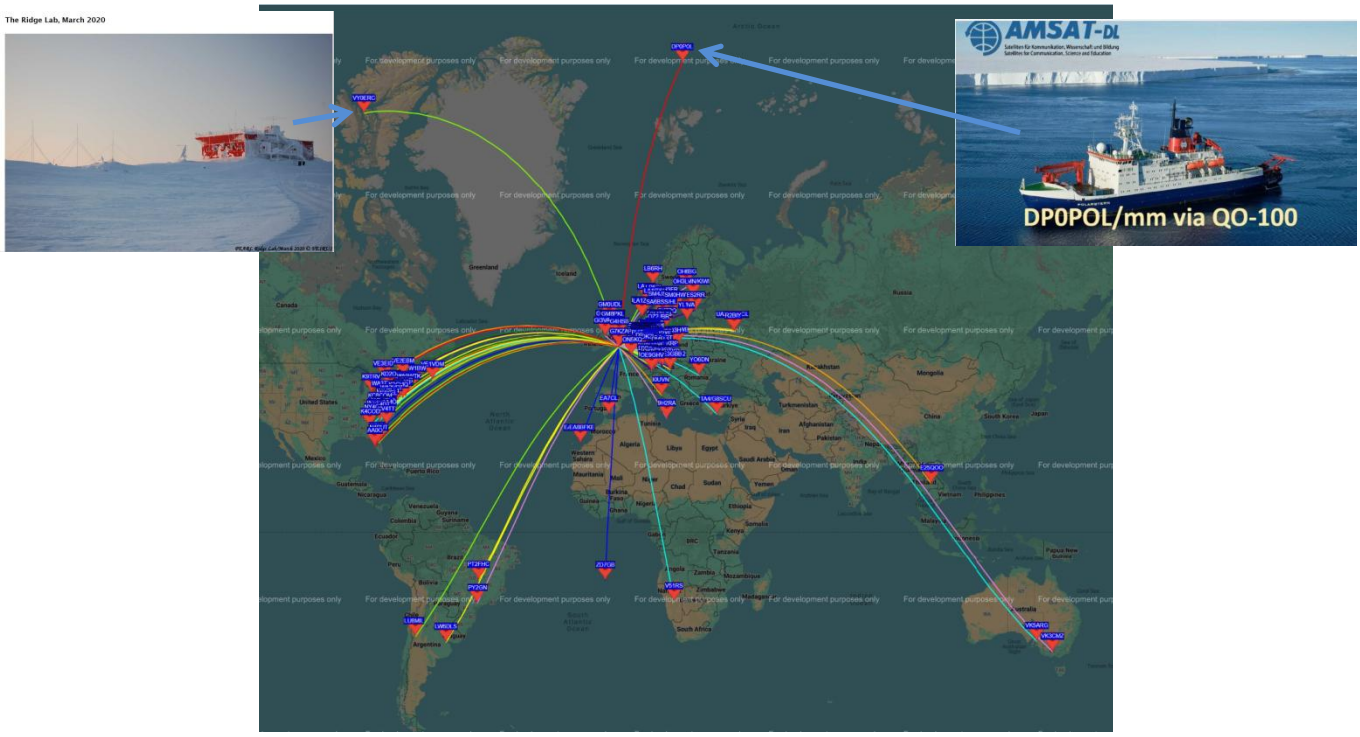


Figure 8: WSPR reception from 5 Watts into OCFD