The Helitron DV4Mini USB Stick for D-STAR, DMR and C4FM

Tim Kirby G4VXE gets to grips with a USB dongle that provides a local hotspot for the various digital voice modes.

Installing the Software on a Windows PC

The DV4Mini software can be found at: http://dv4m.ham-dmr.ch

It is recommended that you install DV4Mini software for a Windows machine under either Windows 7 or Windows 10. I did try installing on an old Vista machine but had some problems. I spoke to the team at Martin Lynch and they recommended using a more up to date version of Windows. I downloaded the latest (Test) version of the software from: http://dv4m.ham-dmr.ch/Testversionen/windows

I gather that using a Windows 10 tablet with a USB port is also a very successful way of setting up the software and dongle if you don’t have a suitable PC.

Installation on a Windows 10 machine proved very simple indeed. I plugged in the DV4Mini to one of the USB ports, to allow the driver for the dongle to be picked up and installed. Having done that, I ran the executable I’d downloaded and the program instantly picked up the dongle. Note, though, that you must be registered and have a 7-digit DMR/CCS7 ID, even if you don’t want DMR, because the software will not find the dongle without it.

Running the software allowed me to configure my callsign and my CCS7/DMR ID into the software, as well as the frequency that I wanted to use on the 70cm band.

Up and Running on D-STAR

As soon as I had installed the dongle, I connected to one of the D-STAR reflectors, DCS0058, using the control software on the PC and tuned my Icom IC-92 to the frequency of the dongle. I was quickly able to hear stations coming through. I was also able to connect to the REPO01C reflector on the D-PLUS reflector system and had a quick conversation with Peter Hyams GW4OZU in Pembrokeshire. Peter
Now for DMR and want to make use of DMR first of April can be quite interesting and might prove useful. Can up your DMR rig to use connc:

The main DV4Mini Control Centre screen, running on Windows 10

The Expert settings screen, which allows calibration of frequency correction, selection of the DMR master server and other features

kindly confirmed that everything sounded good.

There are some interesting features to play with too. If you connect on D-STAR to the DCS005F reflector, you will hear DMR stations coming through a bridge, which can be quite interesting and might prove useful if you only have a D-STAR radio and want to make QSOs with DMR users (Brandmeister only, not Phoenix or DMR-MARC).

The Control Panel software allows you to set up the hotspot to reject any traffic from callsigns other than your own coming from RF.

Now for DMR

To use on DMR, first of all you need to set up your DMR rig to use TimeSlot 2 and TalkGroup 9 on the appropriate frequency for your DV4Mini.

I was doing the setup around the time that the Brandmeister network (a DMR network) had just been commissioned. Currently, Brandmeister is the only network used on the DV4Mini as I mentioned above. Gary Spiers MOTIG, one of the team at Martin Lynch, recommended that I give that a go. In order to allow me to connect to the Brandmeister network, I had to add a hosts record onto my PC to allow my machine to connect to the network. However, I am told this is no longer needed because later software is fully updated with servers and hosts.

Under the Expert Setting tab, go to the DMR option, choose 'nearest DMR Master' field and select Master-UK-2342 (assuming you are in the UK). Then, go back to the DV Control panel, ensure that DV4Mini Settings says DMR+ (or Brandmeister, depending on which version of the software you are using). You should then be able to see a list of talkgroups (the DMR equivalent of reflectors) that you can connect to.

Before you try a QSO, you need to do a quick bit of setup. Connect to a reflector where you won't annoy anyone with some testing, perhaps 4403. Then tab to 'Expert Settings'. You need to use the Frequency Correction facility to make sure that your Dongle and DMR rig are properly matched. While you are transmitting, you can vary the Frequency Correction. The colour of the bargraph will change and you are trying to get the colour to go

DV4mini is a tiny but powerful USB stick that can change any PC into a HOTSPOT for the modes D-STAR, DMR and C4FM Fusion. It contains a powerful 32-bit microcontroller as well as a complete 70cm transceiver and modulator/demodulator for GMSK and 4FSK (including raised cosine) as well as a USB interface. It does not require its own power supply because it is powered through the USB interface. Thanks to a power saving voltage transformer, even older USB interfaces will suffice. It is shipped with a comprehensive but simple to use software package that allows for the linking with DCS reflectors for both D-STAR and DMR reflectors.

For Digital Voice enthusiasts: your handheld radio is no longer gathering dust. This hotspot brings the D-STAR or DMR reflector directly into your shack.

For DV Power Users: It is possible to plug several of these sticks into a PC, thus allowing simultaneous operation with several reflectors (even D-STAR and DMR mixed). If you so desire, you can fully use all your USB sockets with DV4minis and create a DV Centre that way.

For Homebrewers: the DV4mini runs well on single board computers such as Raspberry, BananaPi and Odroid. The minimum requirement is a dual-core processor. Such a hotspot would only need a few watts and would be useable in continuous service.

For Developers: the interface between the PC and the DV4mini is disclosed. With the DV4mini, you can transmit and receive digital data in the 70cm band, without regard to the mode, as long as the mode is coded for GMSK or 4FSK. That means you can transfer both digital voice and data. Your imagination is the limit. The interface between the GUI and the DV4mini software is also documented and available.

For Vacationers: due to the tiny size, it can be brought with you on your vacation and thus create a hotspot in your hotel.
green. Once that’s done, you’re all set so disconnect and connect to the main UK Brandmeister talk group 4400. You should hear activity and see stations pop up on the screen – both on the computer and, if your DMR rig has it, on the rig’s display.

My first DMR QSO was with John Perry MOJNP in Paignton, who kindly confirmed that all was well. The DV4Mini, once configured, worked very well and I experienced no difficulties. I had very many excellent and interesting QSOs on both DMR and D-STAR.

**Other Modes**

The DV4Mini supports more than D-STAR and DMR. If you have a Fusion rig, then you can use it with the DV4Mini and connect it to one of the Fusion reflectors (but not with Yaesu Fusion Wires-X nodes). There’s also P25 (and C4FM). If you wanted to experiment and listen to these modes, you could easily set up a laptop, perhaps with an RTL-SDR dongle, running the DSDplus software to decode the Fusion and P25 modes. Some software for the DV4Mini supports an experimental implementation of PDMR.

**Setting up the DV4Mini with a Raspberry Pi**

Although I was delighted with how the DV4Mini worked on the Windows 10 PC, I wanted to see whether I could make it work with a Raspberry Pi. I have a Raspberry Pi 2 in the shack and it’s very convenient to use for this sort of application, rather than tying up a ‘main’ PC. Fortunately, it’s pretty easy to set up a Raspberry Pi.

I was able to download an image onto a MicroSD card and boot up the Raspberry Pi. There are also images for Banana Pi and Odroid machines. Files are available from the site below:

http://dv4m.ham-dmr.ch/V1.6/Linux/ARM/RaspberryPi_Images

The image I used was prepared on a German machine, which you may be happy to accept, but I decided to change it into English using the following procedure:

Go into Raspi-config, which is on the desktop of the Pi. There’s an internationalisation section (4). Then choose 11 to change locales. I chose the EN UTF-8 one. You then go through 12 and 13 to change time zone and keyboard layout.

When you reboot, you’ll get a huge number of errors, which must be related to the locale. Don’t panic, it will fix them all itself but may take three to four minutes of you looking at errors. After all that, it should come up in English!

Finally, to change the DV4Mini Control Panel into English, go into the ‘Expert Settings’ tab and change the Language Setting from Deutsch to English. While you’re there, you might as well change the Frequency Correction to the same frequency setting that you used in Windows. It’s easier to establish the frequency correction on the Windows software, currently.

The Raspberry Pi and DV4Mini configuration was the one that I used for 99% of the time – it worked really well on both DMR and D-STAR.

Towards the end of the review period I learned that a new version of the DV4 Control Panel software had been released, which I was able to download and install to the Raspberry Pi. This too worked well and resolved a couple of problems connected to the D-PLUS D-STAR reflectors, which I had noted with earlier versions.

**Firmware Upgrades**

The Control Panel software allows you to flash a firmware upgrade to the DV4Mini. I was slightly concerned about doing this on a review model but it worked fine and I ended up trying a beta version of the firmware and then reinstalling the original version. Just follow the instructions shown on the screen. The ability to do this is welcome and should offer the opportunity for the firmware and the software using the DV4Mini to evolve.

**Overall Impressions**

I really enjoyed the DV4Mini. I have both DMR and D-STAR handhelds and it was really good to be able to hook the DV4Mini up to the various reflectors and use the rigs around the house and garden or perhaps when I was doing some work on the computer or in the shack. As ever, when you have the rig on like that, you make some interesting QSOs. If you’re interested in digital voice operation across various modes – D-STAR, DMR, C4FM and P25 – then the DV4Mini provides you with a useful platform to experiment and to try things out.

The 10mW output was more than sufficient to cover the house, garden and immediate locality, even with the antenna on the bench in the shack. In fact, I turned the output down to around 5mW because that seemed adequate.

Setting up on a Windows 10 machine was very straightforward, with just the smallest of tweaks to get it going on the Brandmeister network. This is probably the configuration to get started with because that way you will soon be up and running.

I was pleased that I invested a little more time in getting the DV4Mini up and running on my Raspberry Pi2. That does take a little more experimentation and perhaps a little more computer knowledge but it’s pretty easy to do and there’s plenty of support on the internet if you get stuck.

Particular thanks are due to Martin Lynch and Sons for their loan of the DV4Mini and to Gary Spiers MOTIG for his kind assistance with my queries during the initial setup. The DV4Mini costs £99.95 and is available from Martin Lynch and Sons.

---

**Technical specifications:**

- **Transmitter:**
  - Output Power: approx. 10mW
  - Modulation types: GMSK, 4FSK
  - Operating modes: D-STAR, DMR, C4FM Fusion
  - Harmonics: better then – 60dB

- **Receiver:**
  - Sensitivity: –120dBm
  - Modulation types: GMSK, 4FSK
  - Operating modes: D-STAR, DMR, C4FM Fusion

**Digital specifications:**

- Data rates: 9600 or 4800 Baud, depending on the operating mode
- Bit rate HF: 4800 bit/s or 4800 dlbts/s
- TCXO: long term stability better than 2.5ppm
- TCXO: short term stability better than 1ppm

**Interfaces:**

- USB plug type A to connect direct, no cable needed
- Power supplied via USB
- Antenna SMA-socket, 50Ω (you will need an external antenna, which is available from the shop)