

DV4mini Multimode Digital Hotspot

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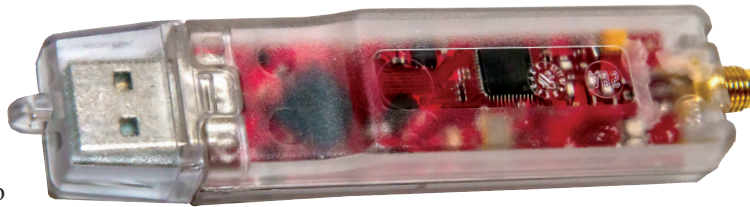
In 2016, all aspects of our daily life are going digital — and Amateur Radio is no exception. More and more modulation protocols from different vendors are now available for the ham community, including D-STAR, DMR, and C4FM (Yaesu's System Fusion). This variety of new technologies is an opportunity for operators eager to learn something new.

The two main advantages of digital voice modes over conventional analog FM are their tolerance to noise and interference, and their ability to transport the signal over the Internet without modification. Sure, we can transport an analog signal over Internet Protocol (IP), but it will not be as good quality as a digital signal. Digital voice modes also add the ability to transport data such as GPS information.

In the ham digital world, a *reflector* is a server connected to the Internet that acts as a virtual repeater. Digital *hotspots* provide the ability for amateurs to connect to those Internet reflectors from their digital transceivers. Hotspots contain a low-power transmitter and receiver for amateur frequencies, and plug into a computer connected to the Internet.

A year ago, the only hotspots available on the market were for D-STAR. The DV4mini hotspot is a real game-changer because it works with D-STAR, DMR, System Fusion (C4FM), APC025, DPMR, NXDN, and other digital modes that are based on GMSK, 2FSK, or 4FSK.

The DV4mini enables amateurs to reach all reflectors using any of these modes through the Internet. This technology is very flexible and the possibilities are endless, only



model available in Europe is blue. As far as I know, they are the same except for the color. The unboxing experience will be short, as the impressive part resides under the hood — in the software.

limited to a certain degree by the operator's creativity.

Overview

Physically, the DV4mini looks like a simple USB storage drive with an antenna connector at the end. The red model shown in the lead photo is the US version, while the

There are three versions of the DV4mini available at the moment: 2-meter VHF, 70-centimeter UHF, and AMBE 70-centimeter UHF. The AMBE version contains an AMBE vocoder chip that allows the use of a PC microphone and speaker to talk simultaneously to reflectors through the DV4mini, while also allowing the use of any digital radios in range.

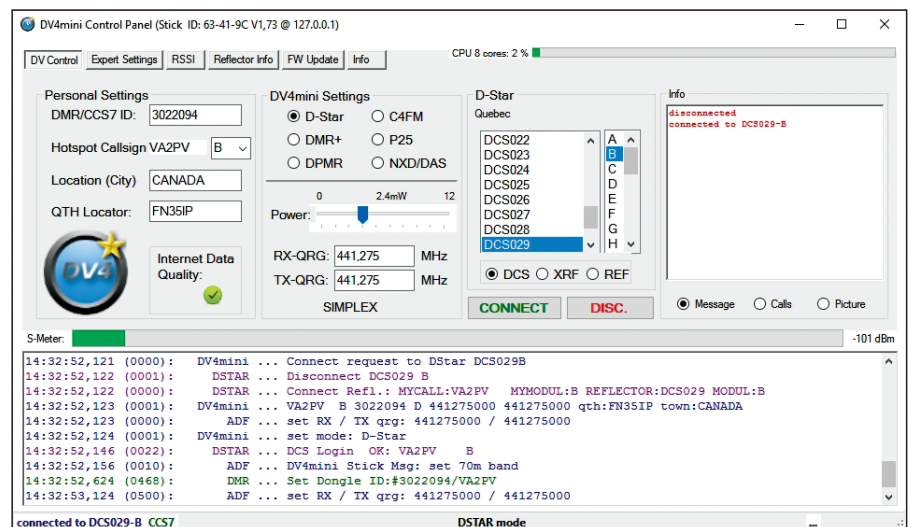
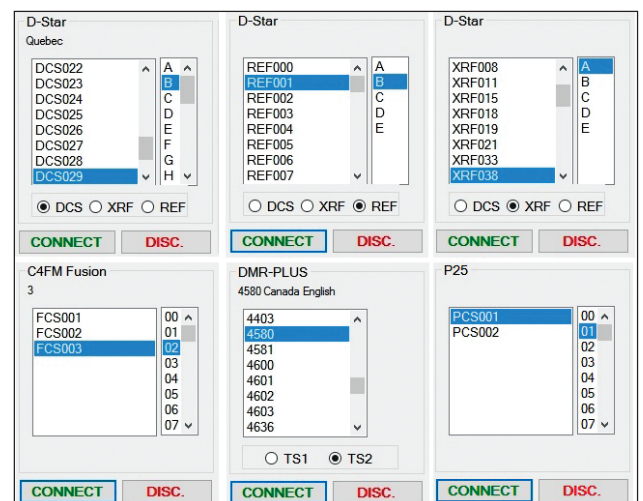


Figure 2 — DV4mini Control Panel software — DV CONTROL tab.

Figure 3 — Selecting available reflectors for different modes.



Bottom Line

The DV4mini digital hotspot offers the opportunity to interface your digital handheld via the Internet with users worldwide. It works with many popular digital modes, including C4FM, DMR, and D-STAR.

Prerequisites

You cannot just enter your call sign in the DV4mini software. You must first enter a DMR unique ID, and this will give you access to all the reflectors on all modes. So, in order to use the DV4mini, you must obtain a DMR-MARC digital ID, which is coordinated worldwide, even if your intention is to use the DV4mini exclusively in a mode other than DMR. This registration process is free, and the DMR-MARC team is very quick to respond. For details, see dmr-marc.net.

You also need to make sure you are registered to the D-STAR trust server in order to use this mode. For more information, please contact your local D-STAR repeater club, or visit dstargateway.org.

The Software

You can download the latest firmware and the *Windows* version of the software from the North American manufacturer's website, www.wirelesshold.com. If you don't already have it, you also need to install Microsoft *Visual C Runtime*. A link for that is provided on the Wireless Holdings website. The firmware upgrade is simple and risk-free.

On the European website (dv4m.ham-dmr.ch) you can find versions of the software for *Linux* and for the Raspberry Pi. There is no Mac version. One Raspberry Pi version, called *DV4mini Compact*, is optimized for running the software with a small 3.5-inch touchscreen. Using the DV4mini with a Raspberry Pi allows hams to set up a very compact, low-power-consumption standalone hotspot.

Getting on the Air

First, install a correct antenna onto the DV4mini's SMA connector and insert the device into a USB port on your PC. Wireless Holdings offers small 2-meter and 70-centimeter antennas and adapters. There is no driver to configure and no port forwarding to set up into your home router. It's plug-and-play wherever you are — that makes the DV4mini the perfect companion for those on the move.

Every time you launch the DV4mini software, it will automatically search for the stick. Once you do the initial setup, the next time you open the software it will load the latest configurations that were used in the previous session. If you change anything, it will be saved automatically, and the next

time you open the software, it will be set on the same mode/frequency, ready to use.

The DV4mini Control Panel (see Figure 2) is exactly the same in the *Linux* and Raspberry Pi versions. Before doing anything else, in the Control Panel's PERSONAL SETTINGS area, you need to insert your DMR-MARC ID in the DMR/CCS7 ID field. Your call sign will be automatically inserted into the field HOTSPOT CALLSIGN. The letters beside that field are used to differentiate hotspots if you have more than one. If you only have one DV4mini, just choose any one. Then enter your LOCATION (CITY) and QTH LOCATOR (grid square).

Next, go to DV4MINI SETTINGS. From here, you can select the digital mode you want to use. You need a radio that is able to transmit using the selected mode at the desired frequency, unless you have a DV4mini AMBE that can use a microphone and speaker directly from your PC. The DV4mini hotspots are multimode, but you can only use one mode at a time.

For the POWER settings, you can adjust the transmitter from 0 to 12 mW, depending on how far you want your hotspot to cover. In my tests, I used a small flexible antenna from a handheld transceiver. At 12 mW, with the hotspot indoors on the first floor, I covered a radius of about 500 to 600 feet. It is not recommended to use a high-gain outdoor antenna or any RF amplifier, because this device is designed to be a low-power unit only.

The RX-QRG and TX-QRG fields are used

to set the DV4mini's receive and transmit frequencies. In the Figure 2 example, I used a simplex frequency, but you could set up an offset using different frequencies for RX-QRG and TX-QRG. Please note that the software will memorize the frequencies for all modes, even if they are different.

You will also need to specify the reflector to use. Figure 3 shows the reflector choices available to me, using the various supported modes (DPMR and NXDN are not shown; they look similar to P25). In D-STAR there are three different types of reflectors: DCS, REF, and XRF. Each one is like a different mode, so you need to select the desired type, but your radio setup will be the same configuration for all. In C4FM (Yaesu System Fusion), P25, DPMR, and NXDN there's only one type of reflector. You can find all the reflector dashboard links on the website xreflector.net, which shows the activities and the connected stations. See Figure 4 for a C4FM dashboard example showing connected stations.

After configuring the items on the DV CONTROL tab, the EXPERT SETTINGS tab is the only other section you need to set up. In this tab (see Figure 5), you can set the local or network mode (this is for IP networks only). Local is preferable if you run the software on the same PC as the DV4mini stick. If you are running the DV4mini on another computer within your network, you can control it remotely by using the IP address of the remote PC. This is great if you have multiple DV4mini hotspots.



The screenshot shows a web browser displaying the 'x-NET FCS003 Dashboard'. The dashboard has a navigation menu on the left with 'HOME', 'USER', and 'INFO' tabs. The main area displays a table titled 'Fusion Reflector System by DG1HOT'. The table has columns for NR, CALL, Group, LOGINTIME, ID, TX QRG, RX QRG, QTH, SYSTEM ID, and Netz. It lists 25 connected stations with their respective call signs, groups, login times, IDs, and frequencies.

NR	CALL	Group	LOGINTIME	ID	TX QRG	RX QRG	QTH	SYSTEM ID	Netz
01	VA2REX	FCS003 02	Mon Sep 5 10:19:19 2016	3022004	444.7250	449.7250	FN35BA	0201734F8B0D	Internet
02	VE3VCF	FCS003 70	Mon Sep 5 10:24:53 2016	3023448	445.5250	445.5250	FN25FK	0201739D1EDA	Internet
03	KB8IUO	FCS003 35	Wed Aug 31 10:12:18 2016	3136996	446.7500	445.7500	EN71PI	0201649D6567	Internet
04	VA2PV	FCS003 70	Mon Sep 5 10:12:43 2016	3022094	446.2750	446.2750	FN35LP	110050f6d9ae	Internet
05	K4WAM	FCS003 88	Thu Sep 1 11:33:27 2016	3137017	430.3500	430.3500	EM95LE	020165F5094B	Internet
06	WA6VYX	FCS003 71	Mon Sep 5 06:26:56 2016	3106501	436.0000	436.0000	J100AA	11005028539d	Internet
07	WA6VYX	FCS003 70	Sun Sep 4 12:09:39 2016	3106501	433.0000	433.0000	DM12LO	02017359E096	Internet
08	AB2HM	FCS003 88	Mon Sep 5 10:35:41 2016	3134306	436.0000	436.0000	FM29KT	02016459ECE0	Internet
09	KC8YQL	FCS003 35	Mon Sep 5 10:26:16 2016	3139086	439.0000	439.0000	J100AA	11005048C2db	Internet
10	VK2PSF	FCS003 70	Sat Sep 3 18:02:18 2016	5052082	441.1000	441.1000	QF56OD	000165636C91	Internet
11	W3HH	FCS003 15	Sat Sep 3 12:35:46 2016	3112678	439.4500	439.4500	EL89VB	020173F56264	Internet
12	KJ4VO	FCS003 88	Mon Sep 5 08:19:18 2016		0.0000	0.0000			Internet
13	KC8YQL	FCS003 70	Mon Sep 5 10:27:13 2016	3139086	430.0000	429.9990	J055AA	02016559E696	Internet
14	WP3BX	FCS003 75	Sat Sep 3 08:25:05 2016	3142158	446.5000	446.5000	FN20AI	000165F773A	Internet
15	W1KFR	FCS003 70	Sat Sep 3 21:07:31 2016	3113032	434.6625	434.6625	EM90DS	0201739D5AFA	Internet
16	NU3S	FCS003 15	Sat Sep 3 19:03:13 2016	3142271	436.2500	436.2500	EN90XJ	020173655A60	Internet
17	W1KFR	FCS003 35	Mon Sep 5 00:52:51 2016	3113032	438.1125	438.1125	EM90DS	1100502ab0b0	Internet
18	VE2PVR	FCS003 01	Mon Aug 29 20:11:15 2016	3022099	443.7750	448.7750	FN35IP	0001738DDF3A	Internet
19	WA3ADI	FCS003 70	Mon Sep 5 10:29:47 2016	3142049	446.5000	446.5000	FM29IX	02017359E959	Internet
20	NU3S	FCS003 15	Mon Aug 29 16:04:59 2016	3142271	444.4500	449.4500	EN90XJ	020173655A60	Internet
21	ND6C	FCS003 70	Sun Sep 4 09:41:10 2016	3106438	439.0000	439.0000	J055AA	020165F5094B	Internet
22	W4PHR	FCS003 75	Sun Sep 4 10:16:18 2016	3112650	446.8500	441.8500	J055AA	02017359E9A8	Internet
23	K3XT	FCS003 70	Mon Sep 5 09:34:02 2016	3112464	435.0000	435.0000	EL99FX	02017359DD5A	Internet
24	K7EP	FCS003 70	Mon Sep 5 09:57:50 2016	3153216	434.2000	434.2000	DN06JG	0201649D8195	Internet
25	KC4GYB	FCS003 75	Mon Sep 5 09:37:40 2016	1112250	436.0000	436.0000	J055AA	0201739CEA76	Internet

Figure 4 — A C4FM dashboard, showing connected stations.

MISC SETTINGS is used to select the buffering time in seconds. This is useful if you have Internet connection quality issues. You can adjust the DMR frequency if you experience packet loss (DMR QRG CORRECTION section). The C4FM section allows you to force a call sign into the network. This is useful for linking repeaters to reflectors.

In order to use the DMR+ reflectors, you need to set a DMR-Master server in the EXPERT SETTINGS tab. For best performance, always select the closest DMR-Master for your location. This logic applies to reflectors for all other modes. It's also possible to connect to another type of DMR reflector called BrandMeister.

Using the DV4mini on the Air

Once you've set your DV4mini hotspot, it's time to try it. Select your mode and radio, make sure you have the same frequency on both, and go on the reflector dashboard to find any activities. See Figure 6 for a C4FM dashboard activities example. Then connect to the desired reflector's port and start listening. You can also connect randomly to any reflectors, but finding activities using a dashboard will be quicker to test your setup. If you want to introduce yourself, do it just like you would do on a local repeater. Some reflectors, such as the FCS (C4FM Fusion) use an ECHO test port (99). From there, you can test your transmission and your reception without being broadcast anywhere.

Conclusion

With the DV4mini, you can finally use all of the capabilities of your fancy digital handheld and enjoy all-mode digital QSOs anywhere in the world. It is a low-cost multimode digital hotspot that represents only the tip of the iceberg for digital communications evolution. The developers are now working on multiple projects that have already attracted a lot of attention. The DV4mini is a very good addition in the shack — it's small, but it has huge possibilities.

Manufacturer: Available in the US and Canada from Wireless Holdings LLC, Naples, FL; www.wirelesshold.com. Price: 2-meter version, \$149; 70-centimeter version, \$129; AMBE version, \$228; 2-meter antenna, \$12.50; 70-centimeter antenna, \$14.35.

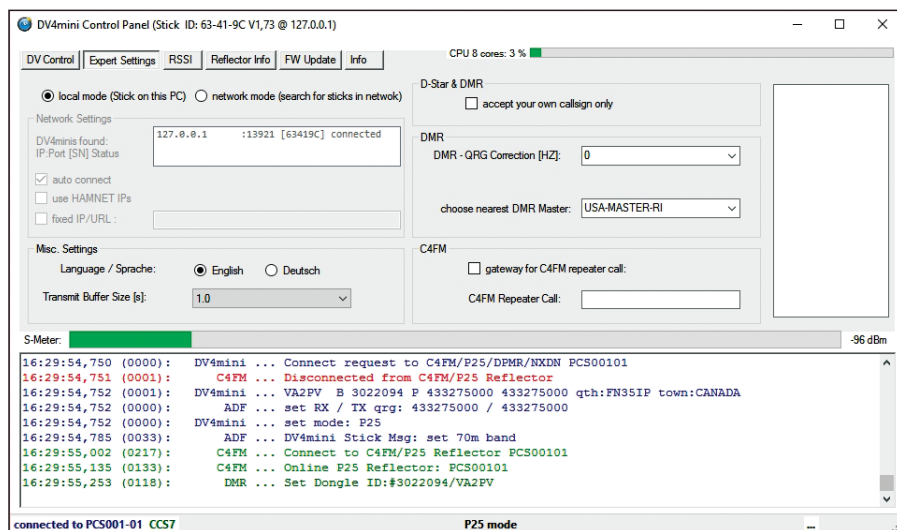


Figure 5 — The EXPERT SETTINGS tab.

Nr.	CALL	Last Heard	Name	Group
1	ND6C	11 s	SoCal Link Society	70
2	KC8YOL	3 m 23 s	SoCal Link Society	70
3	WA3ADI	9 m 19 s	SoCal Link Society	70
4	AB2HM	9 m 55 s	SoCal Link Society	70
5	W3HH	11 m 3 s	Pa-Fi Link Society	15
6	VE5RS	12 m 21 s	SoCal Link Society	70
7	VA2REX	15 m 52 s	FUSION-QUEBEC-OR English	02
8	WA6YVX	16 m 38 s	SoCal Link Society	70
9	KC4GYB	17 m	In use	75
10	WP3BX	17 m 44 s	In use	75
11	W4PHR	20 m 53 s	In use	75
12	NU3S	24 m 4 s	Pa-Fi Link Society	15
13	W1KFR	26 m 14 s	SoCal Link Society	70
14	K4WAM	30 m 15 s	In use	88
15	VA2SPB	36 m 40 s	FUSION-QUEBEC-OR English	02
16	VK2PSF	39 m 31 s	SoCal Link Society	70
17	KJ4VO	52 m 29 s	In use	88
18	KB8UO	1 h 35 m 26 s	Ohio NET	35
19	VE2PVR	2 h 37 m 47 s	FUSION-QUEBEC-OR French	01
20	HP1CQ	5 h 3 m 16 s	In use	75
21	VE7OVY	7 h 32 m 58 s	British Columbia	10
22	PE1NMM	9 h 4 m 17 s	In use	82
23	KM6BUX	10 h 17 m 56 s	SoCal Link Society Café	71
24	PY2DZA	10 h 55 m 58 s	ECHO	99
25	KG5VIP	15 h 8 m 46 s	FUSION-QUEBEC-OR French	01

Figure 6 — A C4FM dashboard, showing activities.



See the Digital Edition of QST for a video overview of the DV4mini hosted by Pascal Villeneuve, VA2PV.