NEX-GEN XD4 Portable Spot II

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The first time I tried a digital multimode hotspot was back in 2015, and at the time, it was a game changer for digital mode enthusiasm. A hotspot is an internet gateway for amateur transceivers using digital modes — such as DMR, D-STAR, and Yaesu System Fusion — so that you can connect to various amateur networks if there is no on-air repeater within range. Since 2015, there have been many developments, and some of the first-generation devices are now discontinued.

Hotspots Based on the Raspberry Pi

In 2019, many popular hotspots use a Raspberry Pi microcontroller (RPi) with an add-on modem board, and there are a number of kits available to assemble and customize a hotspot. The RPi is a miniature Linux PC with different hardware versions (RPi 2, 3, and Zero). Most of the available add-on boards use open-source hardware/software based on the MMDVM (multimode digital voice modem), and many use the Pi-Star image for the RPi. An image is a file containing preconfigured software, and it can be stored on a microSD card that acts as a storage drive for the RPi. This means that you can download an image file that will replicate a software configuration, store it on the microSD card, and load it into your RPi, so you don't have to install everything manually.

Bottom Line

The NEX-GEN XD4 Portable Spot II is a well-executed plug-and-play alternative to building a Raspberry Pi-based hotspot kit.

The open-source software and hardware mean that many people can contribute, and this ensures the continuity of improvement and faster development. The downside is that sometimes the device can be unstable — you need to choose the right image with the right hardware. One of the most critical parts is the quality of the microSD card. I had many problems in the past when using cheap microSD cards with an RPi board. If I didn't shut down

the device properly, the software package got corrupted, and I had to re-flash the card all over again — not very good if you want to use it for portable or mobile operation.

For many hams, the fact that the RPi is based on Linux is a drawback, as it requires some effort to learn to use it. For those willing to learn, Linux can be fun, as you can build and customize your own hotspot. Fortunately, there are now good premade images that are stable, such as Pi-Star, but you will still need to build and configure a kit version. But if you just want an open-source RPi-based hotspot without dealing with the complexity, there is another option.

A Ready-to-Go Hotspot

This review is about the NEX-GEN XD4 Portable Spot II, one of several models offered by NEX-GEN Custom Hot Spots. The hardware consists of a Raspberry Pi Zero W with a Jumbo Hat modem board for MMDVM, and it uses the Pi-Star image. What sets this device apart is that NEX-GEN offers fully assembled and preconfigured hotspots, so you can benefit from the latest technology for hotspots without having to build it yourself. It's a plug-and-play device with high-quality hardware.

The NEX-GEN XD4 supports multiple digital modes — DMR, D-STAR, C4FM (Yaesu System Fusion), P25, and NXDN. It's completely standalone, and it has a Wi-Fi interface (2.4 GHz, 802.11g/n). You can also buy an eth-ernet adapter that enables you to con-nect a wired connection using one of the micro USB ports. The RF portion is a low-power UHF (70-centimeter) transceiver. Note that this unit does not convert analog FM signals to any digital mode, and you need a digital-mode transceiver to use it.

The XD4 has a large heatsink for the RPi microprocessor, and the custom case uses passive cooling with con-vection airflow. The antenna connector is SMA female. The unit also has a
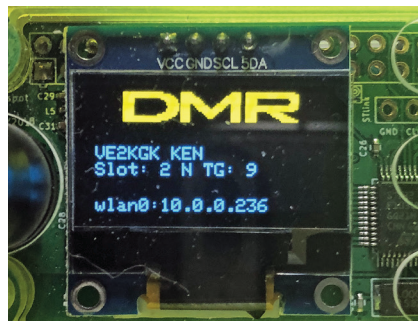

Figure 6 — Top to bottom: the NEX-GEN XD4 hotspot in DMR, D-STAR, and Fusion (C4FM) mode.

very useful OLED to display basic information on the hotspot status, and it's located under the clear case for protection (see Figure 6). Although the software is based on the Pi-Star image, depending on the hardware version, some available features shown in the Pi-Star interface may not be available. See the manufacturer's website for more details.

Ordering the Hotspot

The main differentiator of the NEX-GEN hotspots is the service they offer, taking care of everything for you so that the unit you receive is fully

plug-and-play. Although I'm able to pro-gram it myself, I wanted to test their offer, so I ordered the unit and waited for the next step.

First, I created an account on their website and ordered the unit. The next day I received an email thanking me for the order and asking me for infor-mation so they could customize my unit. They asked for my call sign, my DMR ID, my Wi-Fi network SSIDs with the passwords, and the 70-centimeter simplex frequency I wanted to use. With this information, they were able to preconfigure my hotspot specifically for me, with my home and mobile Wi-Fi networks programmed, so I can switch internet connections seamlessly be-tween my home and mobile stations.

Four days after ordering, I received an email saying, "We have your machine built, will ship in the morning." I re-ceived the tracking number the next day and the unit a few days later.

Using the Hotspot

The first thing I noticed when I received the NEX-GEN XD4 Portable Spot II is the quality of the assembly — it's clear to me that very good care was taken when they built the unit. When I unboxed the XD4, I was amazed at how well they packed this unit. In the box there was the hotspot, a flexible antenna, a microSD-to-SD card adapter, a micro USB cable for pow-ering the unit, and very clear instruc-tions on how to use the device the first time. There was also a personalized card thanking me for my business — a nice finishing touch.

After the unboxing, I immediately con-nected the unit with the provided cable using a USB power source. The first time the hotspot boots, it takes a moment. This is normal, and you have to be patient, but after the first time, start-up is much faster. I was anxious to see if it would be truly plug-and-play. The IP address showed on the little OLED screen, so it connected to my Wi-Fi network immediately. Using my computer browser, I entered the

address and connected to the Pi-Star web interface (see Figure 7).

Before I could activate a digital mode and connect to a reflector, I needed to click on **CONFIGURATION** at the top of the screen, and it asked for a user-name and password. You will find the information in the documentation, but it's easy because it used the Pi-Star default credentials.

In Figure 8, which shows the digital voice configuration screen, you can see that I have only activated D-STAR and YSF (Yaesu System Fusion), but keep in mind that you can activate all the modes at the same time. I activated the Fusion FCS003 on the Echo Reflector 99 and did a quick echo test; it worked instantly. It was the easiest hotspot deployment I ever did, and it uses a Linux-based RPi. Even my time zone was correctly configured.

The best feature of this hotspot is that you can activate multiple digital modes at the same time and monitor a reflec-tor on each mode (it receives only one mode at a time). It's like scanning between reflectors. The hang time (see Figure 8) lets you make a contact, and then after a period of inactivity, it starts scanning again between the modes.

When you are on the configuration page, you can scroll down to set up or change your information, such as your call sign and your DMR ID. It's also where you select your reflectors for the activated modes, as shown in Figure 9. In this example, I have two activated modes, D-STAR on REF001 C and Fusion on FCS003 /90. In the accom-panying video (see the link at the end of this review), I demonstrate scanning between the two modes. Every time you change modes, reflectors, or any-thing else, you have to click on **APPLY CHANGES**, and it will take a moment (about 15 seconds) before it's effective.

You can update the software package with one click at the top of the **DASHBOARD** screen. NEX-GEN also recommends that you do a backup
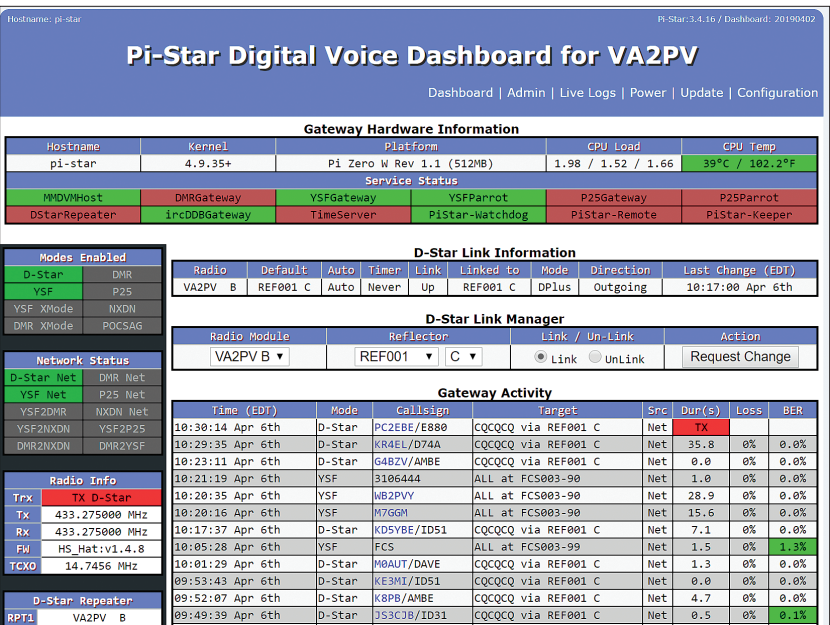

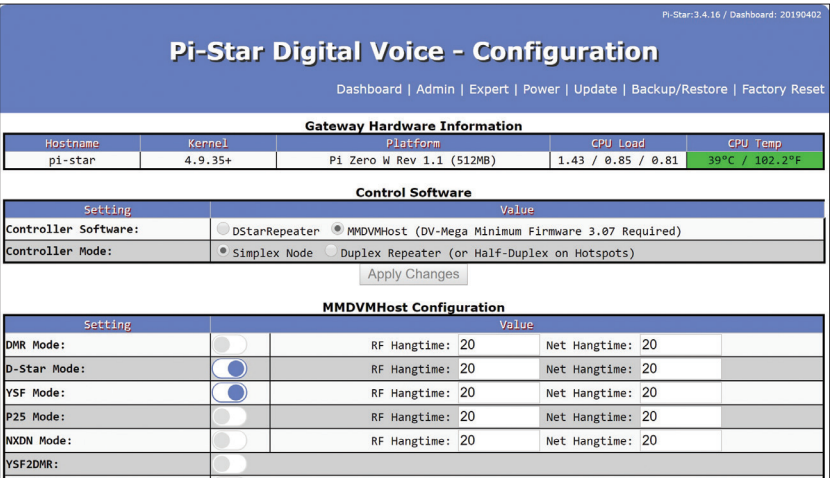Figure 7 — A portion of the Pi-Star web interface dashboard screen.

Figure 8 — A portion of the Pi-Star configuration screen with D-STAR and Yaesu System Fusion modes activated.
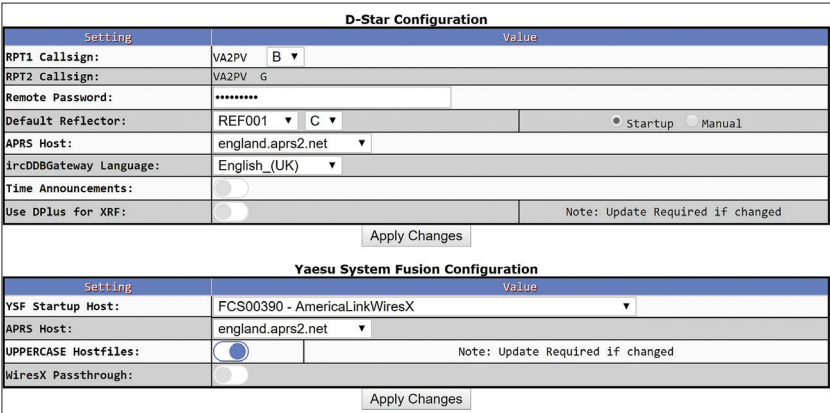

Figure 9 — A section of the Pi-Star configuration screen, showing D-STAR and Fusion reflector setup.

upon receiving the XD4. This is very easy with Pi-Star — select **BACKUP/RESTORE** at the top of the configuration screen, and with only one click, you can save or restore your settings.

Operation

Once your digital mode is selected, you're connected to a reflector, and your radio is configured correctly, you're all set to have fun. I own a few DMR, D-STAR, and Yaesu System Fusion radios, so I was able to test three digital modes. The frequency I used to communicate with the XD4 is 433.275 MHz simplex (please follow your area's band plan), and it's the same frequency for all the modes. If you have a radio on each mode using the same frequency, only one radio at a time will decode the received signal. If the signal is DMR, only the DMR radio will be receiving; if it's Fusion, only the Fusion radio will be receiving, and so on. All the other radios will be muted if they can't decode the received digital mode, but they will show a received signal on the S-meter.

The XD4 operates like my other hotspots, so I didn't have to reprogram my radios. It performs very well, and the audio quality is also very good. Keep in mind that even though the hotspot is "plug-and-play," you still need to know how to program your radios and how to access or switch reflectors for each mode.

Conclusion

With this hotspot you don't have to be a Linux expert. Order the device, answer the questions, receive the unit, and start it up. I think it's a great product for those who just want something that works right out of the box. I have had mine for 3 months now. I unplug and plug in the USB power very often without any special shutdown procedure, and it never crashes.

It's true that this unit is more expensive than building your own open-source hotspot, but this one is made from quality parts, is well tested, and is
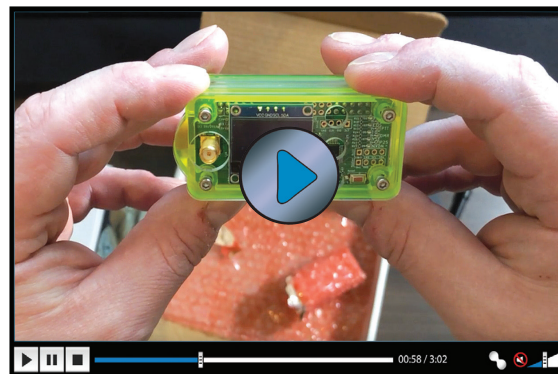
Visit https://youtu.be/t86MrfrhtPI to see our review of the NEX-GEN XD4 Portable Spot II on YouTube.

stable. Full support is available for your personalized configuration, and this saves time and effort on your end. I think it's a good value, even though I could have assembled a comparable unit on my own. At the same time, many hams believe that a DIY project is part of the fun, and those are available too.

Manufacturer: NEX-GEN Custom Hot Spots; **hamradio1.com**; tel 858-568-6673. Price: $225.