

At the Repair Bench – NanoVNA Touch Screen – June 2023

One recent Saturday afternoon, one of our fellow club members had cause to use the club's NanoVNA for some new equipment testing. Unfortunately, when he tried to operate the unit, the touch-screen feature was not working, and in fact, it seemed that the menu system was completely inoperative. I decided to bring it home with me to make the required repairs.

The club's NanoVNA is the H4 (Figure 1) variant which, at the time, was loaded with the DiSlord version 1.1.01 firmware dated 30 December 2021. While the firmware was most likely not the cause of the problem, as the unit had been working fine for a long while, I did notice that the firmware was about a year and a half old, which is a lifetime by today's electronic equipment standards. I slated it for a firmware update as a part of the repair.



Figure 1 - NanoVNA H4

In testing the NanoVNA quite thoroughly, I found that occasionally, I could get the menu system to operate via the multi-function control (MFC) wheel on the unit's top edge, after which the touch screen would occasionally operate until the next power-off. However, it was not consistent enough to say that this would be a usable work-around, so I kept on digging for an answer.

I opened up the unit and disconnected the battery and the touch screen ribbon cable. I then reseated the ribbon cable, reconnected the battery, and powered up the device. No change was evident, with the touch screen and menu system operating the same as it had before the disconnects.

A few more words about the actual behavior would seem appropriate at this point. If I was able to get the menu system to launch using the MFC wheel, it was then possible to navigate the menu using the stylus via the touch screen. It was even possible to re-launch the menu system via the touch screen, until the unit was powered off. Then the problem re-asserted itself and it was pot luck as to whether or not the menus would open via the MFC.

I turned to that giant reference resource called the internet for some help, and I came across an obscure reference in a forum somewhere – I never noticed where – that made mention of NanoVNA stability. This seemed to fit, so I looked some more into that concept – stability and how to control it. What I found was that the default settings for the DiSlord firmware versions are set to slightly overclock the NanoVNA. I decided to slow it down a little bit and see what happens.



Figure 2 - Threshold setting

The clock speed of the NanoVNA is controlled by a firmware value called *Threshold*, which is set to 300.000100MHz by default. The *Threshold* setting is found under *Config > Expert Settings*. I decided to set it down to 290MHz. *Voilà!* The touch screen now behaved normally in every regard! I figured that I had resolved this issue, though I still did not understand

what had happened, or specifically why it spontaneously stopped working after operating for so long, but I chose not to worry about that at this point.

I next went about performing a firmware upgrade on the NanoVNA. This is a simple operation that is done using the STMicroelectronics DfuSe software. I had the software (Figure 3) installed on my PC already, so all that I needed to do was to download the newest DiSlord firmware file in the commonly-used **.dfu** firmware format. That filename is **NanoVNA.H4.v1.2.20.dfu** which indicates that the firmware is version 1.2.20, dated 12 March 2023. The various firmware files can be downloaded from <https://github.com/DiSlord/NanoVNA-D/releases> under the Assets listing.

To update the firmware in the NanoVNA, the device must be placed into DFU mode. Start out by launching the STMicro DfuSe software and connecting the NanoVNA to the PC via an appropriate USB cable. Then, put the NanoVNA into DFU mode by holding down the MFC wheel while powering up the unit. Note that the screen will remain black in DFU mode, but the STMicro DfuSe software should indicate that the NanoVNA is connected and accessible. The next step is to use the **Choose** button in the DfuSe software to open the **.dfu** firmware file. The software will show



Figure 4 - Firmware loaded in DfuSe

again set to 300.000100MHz... but the unit was operating properly and with many more menu options than it had before.

OK – so slowing the clock speed solved the initial touch screen response issue in the old firmware. Of that there is no doubt. As a result, I feel comfortable suggesting that as a solution for anyone who may encounter a similar issue with the touch screen on a NanoVNA H4 and needs an immediate fix.

I also feel comfortable recommending the firmware upgrade to DiSlord version 1.2.20, as I have now installed and tested it extensively, and everything works as it should. Some of the new features include the ability to save a calibration set to the SD card, enter a custom name for any image file saved to the SD card (or simply check the *Autoname* check box to avoid having to enter a name – it will default to a date and time format naming convention). The new firmware allows loading an image from the SD card into the display, and there is also a *Pause Sweep* and *Resume Sweep* capability now. There are several changes to the *Calibrate* menu item as well

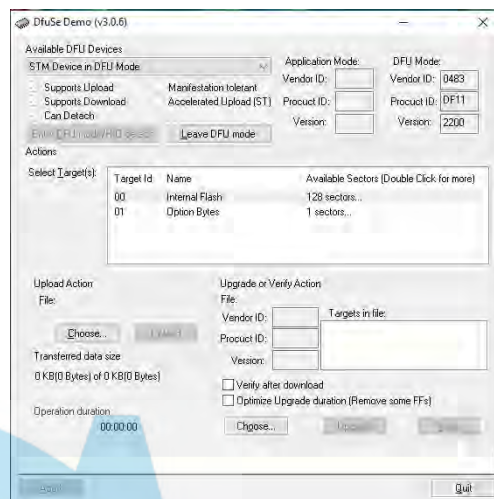


Figure 3 - DfuSe utility interface

(Figure 4) that the firmware file was successfully loaded into the utility and that it is ready for upload to the device. Upload that file to the device by clicking the *Upgrade* button. Once the upgrade is completed as indicated in the software (Figure 5), power off the NanoVNA and disconnect it from the PC.

The interesting thing about this repair is that post-upgrade of the firmware, that new firmware *Threshold* setting was once

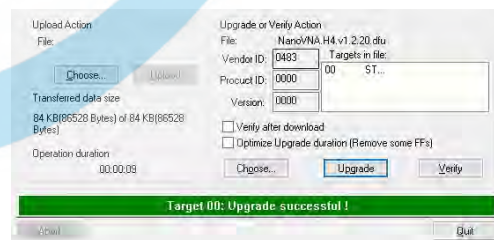


Figure 3 - Firmware update successful

as to several other menu items. This new firmware version is feature-rich and is well worth installing.

Having explored the new menu items and capabilities of the NanoVNA H4 under DiSlord firmware 1.2.20, I am happy to report that all of the new features work well, and are for the most part self-explanatory or very intuitive. This makes these new features easy to use without needing any type of documentation for them. I like the new firmware so much that I also installed it onto my personal H4 unit.

Unfortunately, a few days later, the club's NanoVNA once again failed to operate on touch screen, and this time, the menus would not open via the MFC as they would earlier. I ended up once again disassembling the unit, removing the battery and the display, and reflowing the solder on the MFC, which had cracked. Then, in order to restore touch screen functionality, I had to install a much earlier version of the NanoVNA H4 firmware, which was version 1.0.38 (**NanoVNA.H4.v1.0.38.dfu**) dated 19 September 2020. Once that firmware was installed, I was able to do a screen calibration, which tells the system where the upper left and lower right corners of the screen are located. Once that was done, I reinstalled the version 1.2.20 firmware and set the *Threshold* value to 290.000100MHz. Extensive testing there showed that everything was OK, so I increased the *Threshold* value to 300.000100MHz and repeated the testing. All appears to be functional, with the unit operating normally at this time. I returned it to service.

See you next month...