NANOVNA Saver for the Blind
by Ian Spencer (DJ0HF) and Gena (M0EBP) Rev. 2.0

Download a copy of the NanoVNA Saver dot exe file, a possible link is given below :-

https://github.com/NanoVNA-Saver/nanovna-saver/releases

scroll down the page to the downloads and choose either Windows 64 bit or 32 bit or Linux or Mac. These instruction using Narrator are for the Windows versions. Gena and I tested with version 0.3.8 and the latest version of the program. 0.5.4 and it works with either version.
You can download the latest version if you want too from my web-site.

Just go to my web-site at www.spencerweb.net and choose the download button and then NanoVNA and you will find a link to download the NanoVNA Saver program for Windows, this is the 64 bit version.

This tutorial will cover measuring the VSWR of an antenna, measuring cable length or finding the velocity factor of a cable and also carrying out the calibration procedure if you want to do it, though in my experience just using the factory default settings gives pretty good results.

Before we carry out any operations with the NanoVNA we need to connect it to the computer and then to the NanoVNA Saver program.

Connecting the NanoVNA to NanoVNA Saver

Connect your NanoVNA to the computer with a standard USB C to USB A cable, the USB C connector is on the top to the left of the on/off switch on my NanoVNA, though the position of the connectors and controls may vary on your NanoVNA.

Turn on your NanoVNA (small slide switch on the top of the NanoVNA, on mine, Slide it to the right) and Windows should give you the connected tones.

Start Narrator by holding down the windows key plus Ctrl and hitting Enter.

Start the NanoVNA Saver dot exe program you downloaded earlier and which may take 5 or 10 seconds depending on the speed of your machine.

Then we need to connect the program to the NanoVNA so hold the shift key and Tab 6 times to get to the Connect button.

Now hit the space bar to connect. After connection the button will say disconnect and you are ready to go and can now carry out VSWR or Reflectometry measurements or Calibrate your NanoVNA.

Measuring VSWR of an Antenna

First connect your NanoVNA to the computer and to the NanoVNA Saver program as described above then **c**onnect your NanoVNA to your antenna using port 0 sometimes labelled CH0 or S0 that is the top port on the left hand side on my Nanovna (Ports are SMA connectors) but some newer version may have their ports and controls in a different position.

If you have just used the Connect button to connect your NanoVNA to the NanoVNA Saver program then you will still be focused on the Connect button and now we need to set up the start and stop frequencies for the Scan or sweep as it is called, so tab until you hear Sweep Control probably 7 tabs.

Now you can enter the start frequency for the sweep into this edit field, for example 14Mhz, you need to type the letters m h and z as well as the frequency.

Tab once to the stop edit field and enter the end frequency for the sweep so for example 14.35Mhz. Now you are ready to go.

Tab to the Sweep control probably 5 tabs and hit the space bar and the sweep will be carried out.

Now we need the data in a form we can hear so hold down the Caps Lock key at the same time as the Control key and hit Enter.

This brings up a search window with all the text on it and you are on the Search edit field. If the search window doesn't open then hold down the Control key and the Insert key at the same time and hit Enter to open the Search Window.

You can now cursor/Arrow down to whatever you would like to hear but for VSWR cursor down 9 times and you will hear the start frequency (Line 9 in the list)

Then 6 times and it will announce the VSWR for this frequency (line 15 in the list).

Now down arrow 20 times to line 35 and you will hear the middle frequency of the sweep, so in our example 14.175Mhz (Line 35 in the list) and then 6 times to hear the VSWR for this frequency (line 41).

Then again 20 arrow downs to hear the end frequency of the sweep (line 61) followed by 6 down arrows to hear the VSWR for this frequency (Line 67).

You now know the VSWR for the start middle and end frequencies for the band you have swept/scanned.

Close the search window by hitting Enter and just get back to the start frequency edit field by holding the shift key and hitting tab 7 times now you should be back on your start frequency.

Time Domain Reflectometry

Normally you would use this procedure to find the length of a coax cable or to find out where there is a short or break in a length of coax cable. Though it can also be used with a little maths to find the velocity factor if you know the cables length.

If you haven't already done it then Connect your NanoVNA to your computer and to the NanoVNA Saver program as described at the top of this tutorial.

Then connect the length of cable you want to find out the length of (or which you suspect has a short or break) to port 0, the same port you use for measuring the VSWR and leave the far end of the cable open circuit, that is unconnected.

If you are still focused on the connect button then hold the shift key and tab 4 times to get to the Time Domain Reflectometry button and then hit the space bar to start the measurement.

Tab once to move to the cable type combo box and then use Page Down and if you go too far Page Up to find the cable you want to use and then hit tab to select it.

If you can’t find the cable you want then keep using Page Down until you reach custom and then hit tab to select it. Now you can delete the velocity factor showing and enter your own velocity factor, for example 0.80 or 0.99 or whatever you want to use. This is only possible when you are using the custom setting.

Now hold the Caps lock and Control key at the same time and hit Enter. The Search All window will open. If it doesn’t open then hold down the Control Key and the Insert key at the same time and hit Enter to open the search window.

Now hold down the cursor/arrow down key and it will keep repeating and take you to the end of the list and Narrator then starts voicing the cable length information and you know the length of your cable or where on the cable there is a short or open circuit.

Hold the Alternate key and hit F4 to close the Search window and then hold the Alternate key and hit F4 again to close the Reflectometry window and you are finished with your measurement.

With a little maths you can also find the velocity factor for a cable by connecting a cable where you know the length, for example 1Metre of cable and with 0.95 selected as velocity factor it says the cable is 1m 30cm long. Then there is a 30% error in the length of the cable so correct the velocity factor by 30% to get 0.66 which then gives approximately 1.0 metres so the velocity factor of the cable is 0.66.

Calibration Procedure

First if you haven't already done it then connect your NanoVNA to the computer and the NanoVNA Saver program as described at the beginning of this tutorial.

To carry out the calibration procedure you will need the calibration kit which came with your NanoVNA. It consists of 3 small SMA plugs, one of which is open circuit, one short circuit and one a 50 ohm load. The tallest one is the open circuit, the middle one is the 50 ohm load and the smallest is the shorted connector, at least in the set I have. However the difference in height is very small and if you are unsure then, the open circuit connector has no pin in the centre so is easy to identify. Then you just have to identify which is the short and which is the 50 ohm load. Screw either of them onto the Port 0/channel zero socket (left hand side top on my NanoVNA but some are different). Then do the Measure the VSWR procedure described at the beginning of this document for any frequency range, it isn't important which frequency range. If the VSWR is low then it is the 50 ohm test connector, if it is really high typically 500 to 1700 then it is the short and you now know which connector is which.

If you want to calibrate your NanoVNA for a particular frequency range then to carry out the calibration process you need to connect your NanoVNA to the computer and the NanoVNA Saver program as described at the beginning of this tutorial.

Now you need to choose a start and stop frequency for the calibration, just as you do for a VSWR measurement, in principle the smaller the frequency span you choose the more accurate the calibration will be but from my experience it's fine to just do a calibration for the whole of the short wave bands so perhaps 1.8Mhz for the start and 30Mhz for the stop and it will still give reasonable results when you measure an antenna on perhaps 2 metres or 70cm but it is up to you if you want to create new calibration settings for bands like 2 Metres or 70cm. You can enter the frequencies you want to use in the same way as for the VSWR measurement so after hitting the Space bar on the connect button you can do the 7 tabs to get to

the start frequency edit field to begin entering the start and stop frequencies.

We want to carry out the calibration process so after entering the stop frequency we need to get to the calibration button and the quickest way is to hold the shift key and hit tab 5 times and once you find the Calibration Button just hit the Space Bar to open the Calibration window.

When the window opens you are on the short button but we want to use the calibration assistant so hit tab 6 times and you should be on the calibration assistant button and then hit the Space Bar.

You are on the okay button so just hit Enter.

You are now on the calibration short window so you need to connect the shorted connector on port 0 of your NanoVNA (On mine this is the top port on the left hand side but with other versions the position may vary).

Now hit Enter and a new window will pop up and it is the Open Window, so you need to remove the short connector and screw on the open connector and then hit Enter.

A new pop up window will appear it is the load window, so disconnect the open connector and screw on the 50 ohm load connector and hit Enter.

The Calibration complete window will open and so now Tab once to get to the cancel button and hit Enter. We select cancel because we have done enough to set the calibration settings we want to use.

You are now on the Apply button so hit Enter to apply the new calibration settings. You can now exit the calibration procedure with ALT plus F4 or go on to save your calibration setting to the computer.

To save the calibration settings, tab twice to notes and then hold the caps lock and hit the right arrow twice followed by tab to get to the Save calibration settings button. Or if you are using insert as your Narrator key

then hold the insert and hit right arrow twice followed by tab to get to the save calibration settings button.

Hit enter and a standard windows explorer window will open and you can give your calibration file a name and save it.

When you want to reload a calibration file open the calibration window as you did before and hold the shift key and tab twice to get to the load calibration data button and hit enter to open a standard windows explorer window where you can select the calibration data file you want to reload.

You will then be on the Load Calibration button again and can tab 9 times to get to the Apply button and hit Enter to apply the new settings.