



miniVNA PRO USB Connection with GNU/Linux

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Introduction

[Dietmar Krause, DL2SBA](#), undertook the monumental effort to write the `vna/J` Java™ application for controlling a range of very affordable [mini Radio Solutions](#) vector network analysers (VNAs). Java™ applications are platform independent. Once written, these applications should run on every platform that supports Java™, without any need for recompilation.

The `vna/J` application forms no exception to this. It runs perfectly well on GNU/Linux distributions. However, the installation procedure on GNU/Linux has not been officially documented and requires a small effort.

This text is loosely based on the excellent [vna/J installation guide for SUSE and Ubuntu](#) written by [Andy Eskelson, G0POY](#). Below information is applicable to Ubuntu LTS based systems.

User groups

First and foremost, make sure that your username is a member of the `dailout`, `tty` and `uucp` GNU/Linux user groups:

```
$ sudo adduser username dailout
$ sudo adduser username tty
$ sudo adduser username uucp
```

[Log out and in again](#) for these changes to take effect.

Java™

Check whether a Java™ runtime environment is installed.

```
$ java -version
java version "1.8.0_101"
Java(TM) SE Runtime Environment (build 1.8.0_101-b13)
Java HotSpot(TM) 64-Bit Server VM (build 25.101-b13, mixed mode)
```

RXTX for Java™ no longer

In a personal communication, Dietmar confirmed that recent vna/J versions no longer require the [RXTX for Java™](#) library.

Launching vna/J with pkexec



One can [download vna/J](#) and its [user guide](#) amongst [other documentation](#) from Dietmar's site. On GNU/Linux, only the `.jar` Java™ archive file is required. Personally, I find it convenient to keep this file in the directory `/home/opt/ham/vna-j/`.

Below `bash` script helps with always launching the latest version of vna/J, even when more than once version is available in the `/home/opt/ham/vna-j/` directory. The script is stored in my `/home/bin/ham/` custom scripts folder under the filename `vna-j`. It should be made executable with `chmod +x vna-j`. Adding the `/home/bin/ham/` path to the `$PATH` environment variable might come handy for debugging Java™ errors.

```
# !/usr/bin/env bash

INSTALLDIR='/home/opt/ham/vna-j'

# Run the latest version of vna/J.
java -jar $(ls -lv $INSTALLDIR/vnaJ*.jar |tail -n 1) &
```

Because of a very annoying device read/write permission issue using Java™ on GNU/Linux, the script `vna-j` needs to be launched using `pkexec`. Strictly speaking, this is a Bluetooth Manager bug. However, if you were [using your miniVNA PRO with Bluetooth](#) and then plug the VNA back in with USB, you will equally be affected!

To successfully run the program using the **Polkit** infrastructure ([Archlinux info](#)), a `krause.vna.gui.policy` file needs to be created in the `/usr/share/polkit-1/actions/` directory. This policy file refers to my `/home/bin/ham/vna-j` launcher script.

```
sudo nano /usr/share/polkit-1/actions/krause.vna.gui.policy
```

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE policyconfig PUBLIC
"-//freedesktop//DTD PolicyKit Policy Configuration 1.0//EN"
"http://www.freedesktop.org/standards/PolicyKit/1/policyconfig.dtd">
<policyconfig>
  <action id="org.freedesktop.policykit.pkexec.vna-j">
    <vendor>Dietmar Krause, DL2SBA</vendor>
    <vendor_url>https://vnaj.dl2sba.com/</vendor_url>
    <description>Run vna/J program</description>
    <message>Authentication is required to run vna/J</message>
    <defaults>
      <allow_any>auth_admin</allow_any>
      <allow_inactive>auth_admin</allow_inactive>
      <allow_active>auth_admin</allow_active>
    </defaults>
    <annotate key="org.freedesktop.policykit.exec.path">/home/bin/ham/vna-
j</annotate>
    <annotate key="org.freedesktop.policykit.exec.allow_gui">true</annotate>
  </action>
</policyconfig>
```

```
$ pkexec vna-j
```

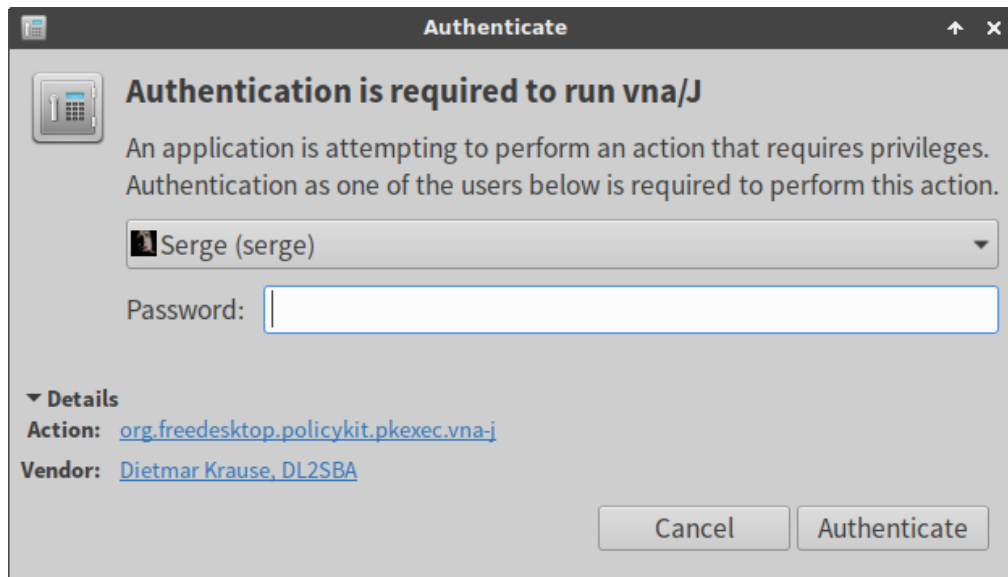


Figure 1: Authentication when launching vna/J using pkexec

The same command may also be launched from a custom desktop launcher button. The method to create desktop launchers differs with each desktop environment. To the left of this paragraph, one can find the official vna/J icon.

Once vna/J launched, you need to indicate to which ttyUSB port number, the miniVNA is connected. This can easily be checked by executing the dmesg command on the command line, immediately after plugging in the VNA. The last dmesg entries should be similar to those below, mentioning the exact ttyUSB number.

```
$ dmesg
[ 4975.484020] usb 6-1: new full-speed USB device number 4 using uhci_hcd
[ 4975.686034] usb 6-1: New USB device found, idVendor=0403,
idProduct=6001
[ 4975.686039] usb 6-1: New USB device strings: Mfr=1, Product=2,
SerialNumber=3
[ 4975.686042] usb 6-1: Product: FT232R USB UART
[ 4975.686045] usb 6-1: Manufacturer: FTDI
[ 4975.686048] usb 6-1: SerialNumber: A8005Bji
[ 4975.694074] ftdi_sio 6-1:1.0: FTDI USB Serial Device converter
detected
[ 4975.694113] usb 6-1: Detected FT232RL
[ 4975.696377] usb 6-1: FTDI USB Serial Device converter now attached to
ttyUSB2
```

Now, you are good to calibrate your particular VNA measurement setup with a short, open and load (SOL) calibration set prior to performing the actual measurements. In the rare case of experiencing erratic calibration results (Figure 1), continue reading the remainder of this document.

Failed to open port!

Even though vna/J was properly launched using pkexec, one may still very occasionally run into a Failed to open port! error when trying to connect to the port indicated by the dmesg command. If this happens, hitting the funky red `FUNC` button on the VNA should resolve this temporary problem.

Calibration

Correct usage of a VNA indispensably requires calibrating the virtual measuring plane of any new measurement setup, jig, cables, etc. Personally, I prefer the mode 2 calibration with some overscans and an adequate number of calibration steps.

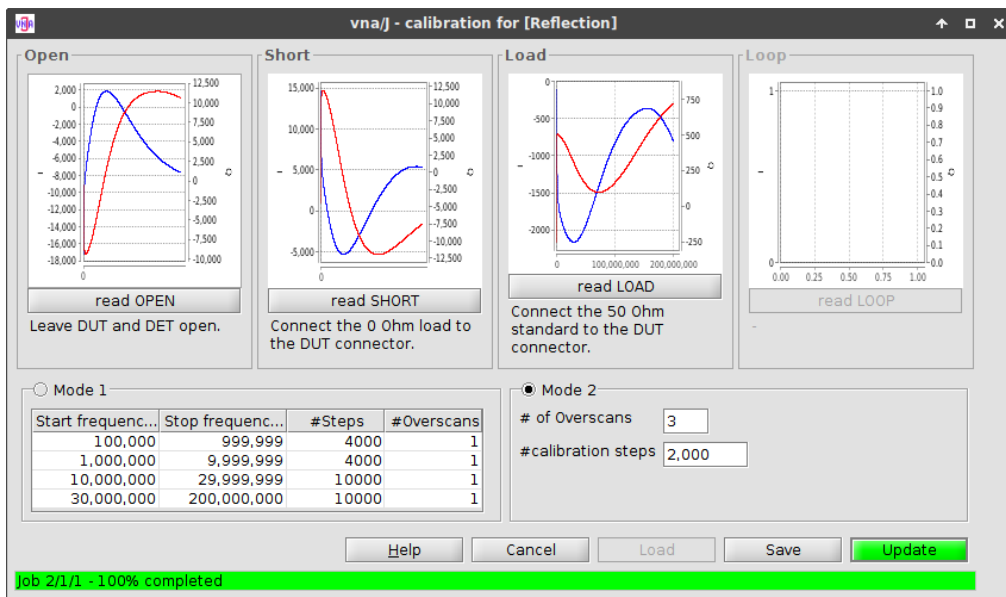


Figure 2: Mode 2 calibration with 3 overscans and 2000 calibration steps. More for both is better, but takes more time.

Erratic calibration & measurements



After not having used my **miniVNA PRO** for a while, I had a strange case of erratic calibration and measurement results (see Figure 2). The resulting graphs were noncontinuous and showed many spikes over an impossible measurement range.

The issue remained even after fully charging the lithium-ion battery.

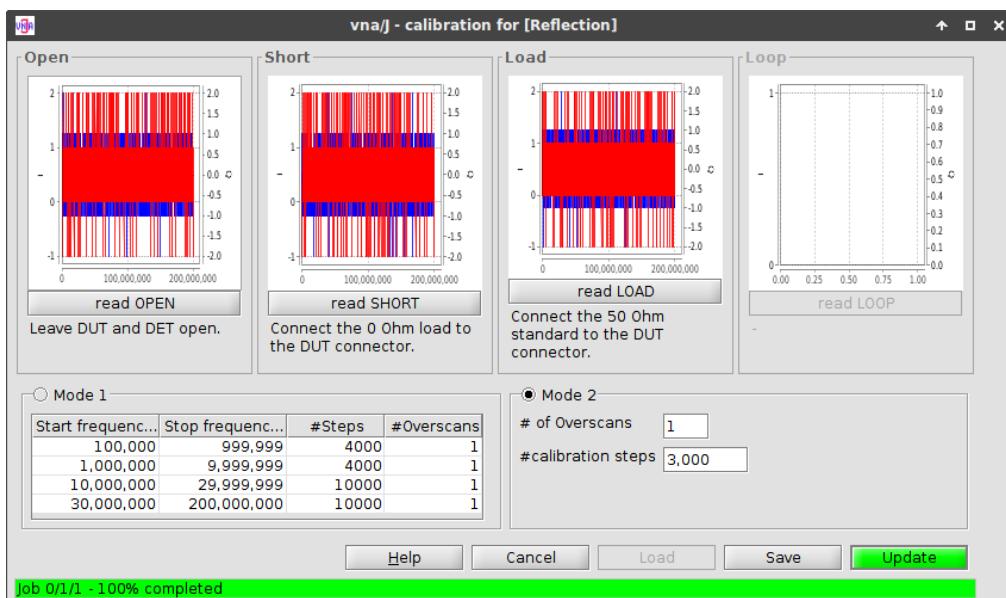


Figure 3: Erratic calibration results

Solution: Reinstall the firmware

Hitting the red `FUNC` key showed different but still impossible values for one subsequent measurement only. Eventually, this led me to conclude that something might be wrong with the firmware, even though the device reported the firmware to be up to date.

Indeed, [reinstalling the latest firmware using vna/J](#) on GNU/Linux resolved my issue. This seems to indicate that the miniVNA PRO's firmware memory is volatile when the lithium-ion battery loses its charge.



Figure 4: The lithium-ion battery pack inside the miniVNA PRO

Bluetooth connectivity

Only after [successfully completing above steps](#), [continue reading here](#) to learn how to connect the miniVNA PRO using Bluetooth on GNU/Linux.



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Unattended CSS typesetting with . The Prince logo features the word "Prince" in a stylized purple font with "Print with CSS" written in smaller text above it.

This work is published at <https://hamwaves.com/minivna.pro/en/>.

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