

Description. A few key steps are required before the XRF Scanner software can be installed and ran, and specially before any software development work can be pursued. In particular there are two critical processes. The first, is to ensure that Qt and Qwt are properly configured and installed in your Linux machine. The second, is to install the required CAEN libraries and dependencies for data acquisition and control of the DPP parameters.

First. Configuring Qt and Qwt.

- i. Through the terminal, install these dependencies,

```
$ sudo dnf install qt5 qt5-devel qtcreator gcc-c++
```
- ii. Next, we will want to download **Qwt** from its project page, visit <https://qwt.sourceforge.net> for detailed instructions. The summary is the following,
 - (a) Download the qwt-x.x.x.tar.bz2 file from sourceforge, feel free to download the latest release, although we recommend qwt-6.1.3
 - (b) On the terminal, navigate to the folder where you downloaded the file and extract it,

```
$ tar xvf qwt-x.x.x.tar.bz2
```
 - (c) Move the extracted folder to your preferred install location, we recommend,

```
$ mv qwt-x.x.x /opt
```
 - (d) Then type these commands into the terminal (you might need to sudo),

```
$ cd /your/directory/choice/qwt-x.x.x  
$ /usr/lib64/qt5/bin/qmake qwt.pro  
$ make  
# make install
```
 - (e) Then create a file named **qwt.conf** in **/etc/ld.so.conf.d/** and write in the file,

```
/usr/local/qwt-x.x.x/lib
```
 - (f) Then type into the terminal,

```
$ run ldconfig
```
 - (g) In your **/home/yourusername/.bashrc** file append the following

```
QT_PLUGIN_PATH="${QWT_ROOT}/plugins:$QT_PLUGIN_PATH"  
export QT_PLUGIN_PATH
```
 - (h) Source your **.bashrc** file

```
$ cd ~/; source .bashrc
```

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- iii. Then enable QDebug on QT, i.e. create a file in `/etc/xdg/QtProject/qtlogging.ini` and write ,

```
[Rules]
*.debug=true
qt.*.debug=false
```

- iv. Lastly, on every **.pro** file for the XRF software write the following,

```
INCLUDEPATH += /usr/local/qwt-x.x.x/include
LIBS += -L/usr/local/qwt-x.x.x/lib -lqwt
QT += widgets
CONFIG += qwt
```

Second. To configure the CAEN libraries and dependencies, first download the **DPPDrivers** folder from this Github repository: <https://github.com/rodrigo-torres/chnet-nyuad>

- i. (Optional) It might help if you declare a local shell variable storing the name of the directory where you downloaded the Github repository folder, i.e. you can do,

```
$ cd /path/to/your/DPPDrivers/folder
$dppdir=$PWD
```

- ii. Install the **CAENVMELib-2.50** libraries

```
$ cd $dppdir/CAENVMELib-2.50/lib; ./install_x64
```

- iii. Install the **CAENComm-1.2** libraries

```
$ cd $dppdir/CAENComm-1.2/lib; ./install_x64
```

- iv. Install the **CAENDigitizer_2.7.6** libraries

```
$ cd $dppdir/CAENDigitizer_2.7.6; ./install_x64
```

- v. Install the **CAENDPPLib_1.4.4** libraries

```
$ cd $dppdir/CAENDPPLib_1.4.4; ./install
```

- vi. Install the CAEN USB communication protocols

```
$ cd $dppdir/CAENUSBdrvB-1.5.2; make
$ make install
```

- vii. And finally, install the CAEN DPP control software

```
$ cd $dppdir/DPP-PHA_ControlSoftware-1.2.3
$ ./configure; make
$ make install
```

If the CAEN USB protocol installation fails, try to turn off secure booting if you have an EFI machine.