

10MHz controller - Installation



Revision History

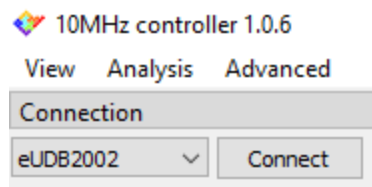
Date	Version	Description
18/08/2022	2.2	Specified USB 3.0 port required
12/04/2022	2.1	Version 1.0.7: new driver support
29/03/2022	2.0	Version 1.0.6: supports latest device release
25/05/2021	1.0	First version of document



Installation

Download the 10MHz controller installer for Windows from Elements' website <https://elements-ic.com/downloads/>.

At the end of the software installation, plug the device to a USB3.0 port and launch the software executable. As soon as the device is recognized its serial number will appear and the connect button will be enabled.



If this doesn't happen the more probable causes are:

- Improper device connection: be sure the device is connected to a USB 3.0 port via the provided cable and that the device is connected to its power supply.
- Installing Connection driver: it is possible that the device driver takes a while to properly recognize the device the first time it is connected to the computer, so try to turn off the 10MHz controller software and wait 5-10 minutes before launching the software again.
- Connection driver not installed: it is possible that due to limited privileges the driver does not get installed properly. Go to the installation folder (default: C:\Program Files (x86)\Elements - 10MHz controller) and into subfolders driversFX3\bin\Win10\x64: there right click on the file cyusb3.inf and click "Install". In Windows 11 the option "Install" might be hidden in the "Show more properties".

To actually start controlling the device and acquiring data click connect.

Calibration

The acquired current (I_a) is corrected via a calibration procedure to return the calibrated current (I_c) via the following formula: $I_c = I_a * G + O$.

The gain G and offset O are loaded by the software from a calibration file that must be placed in the software root folder.

For example, for the device with serial number eUDB2002 rename the file XXXXXXXX.csv in the installation folder to eUDB2002.csv. The calibration values are loaded when the connect button is pressed, so if the file is copied or updated when the device is also connected, click disconnect and connect to reload it.



Recalibration

The user can decide to recalibrate the device if needed.

The calibration file has the following simple format:

```
iGain
<gain>
iOffset [nA]
<offset>
```

Where <gain> and <offset> are replace with the actual gain and offset values, e.g.:

```
iGain
1.0
iOffset [nA]
0.0
```

In order to recalibrate the device follow this procedure:

- Disconnect the device
- Return the values in the calibration file to the default values <gain> = 1.0 and <offset> = 0.0 and save the file
- Connect the device
- Insert the provided model cell in the device (10 MΩ total resistance)
- From the “Analysis” menu open the noise report and start it
- Apply some voltage values trying to cover especially the range you will be using the most
- For each voltage value take note of the current offset from the noise report in order to get a table of V,I pairs
- Set <gain> so that the final gain is 1/10 MΩ = 0.1 nA/mV. This can be done by filling the table in [this spreadsheet](#) (make copy to be able to modify it)
- Remove the model cell
- Set <offset> equal to minus the offset value from the noise report
- Save the calibration file
- Disconnect and reconnect the device