

3100U Lite GUI Interface Manual

Quaesta Instruments

Version: NPMSPW v1.0.0

Revision: NOV 17, 2023

The screenshot displays the '3100U Interface Lite, Version: v1.0.0' application window. At the top, there are tabs for 'Refresh Connections', 'Histograms', and 'Terminal'. Below these, a 'Connected' status bar is visible. The main interface is divided into several sections:

- Top Section:** Features the Quaesta Instruments logo, a 'Select Device:' dropdown menu currently set to 'COM111 (19010999)', a 'Show all COM' checkbox, and a 'Disconnect' button. The 'Port State: Open' is indicated in green text.
- Left Section:** Contains input fields for device identification: 'NPM Name' (revc), 'COM Port' (COM111), 'Serial Number' (19010999), 'Model Version' (USB), and 'Firmware Version' (C2.2.1).
- Right Section (General Parameters):** A panel for configuring measurement parameters:
 - Name:** revc (1 - 15 Chars)
 - Voltage:** 0 V (250V - MaxVoltage)
 - MaxVoltage:** 1700 V (500V - 2000V)
 - Gain:** 4.0 (1.0 - 20.0)
 - LowerDisc:** 6 (NBins/32 - UpperDisc)
 - UpperDisc:** 63 (LowerDisc - NBins-1)
 - NBins:** 64 (64, 128, 256, 512, 1024)
 - DeadTime:** 100 usec (2usec - 200usec)
 - => Max Count Rate =** 10,000 Hz
 - LED Mode:** 1 (radio buttons for Off and On, with On selected)
 - Pulsesim:** 1000
- Bottom Section:** Includes three large buttons: 'Discard Changes', 'Apply Changes', and 'Query NPM'.

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Support

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INTERNET

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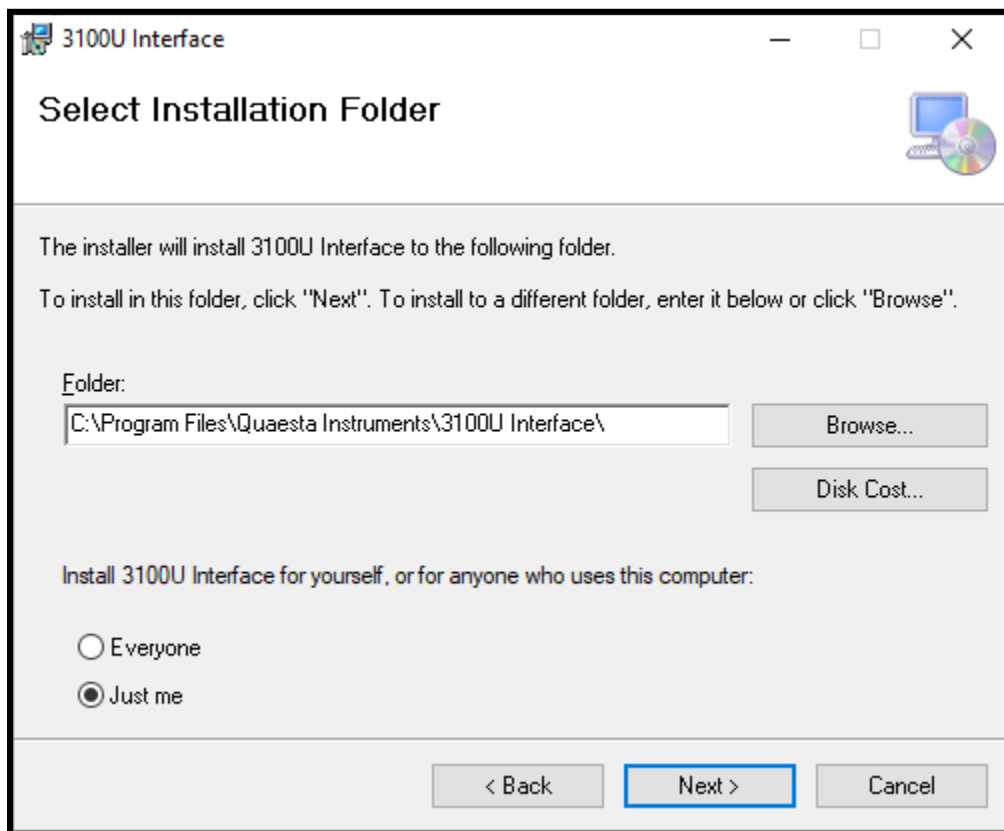
WRITE

Attn: Customer Support
Quaesta Instruments, LLC
1665 E. 18th S, Ste 207
Tucson, AZ 85719 USA

Installation

Included in the software package are two installation files, titled "Setup.exe" and "3100E-QIY-Setup.msi"

Opening either of these files will begin an installation wizard for the software

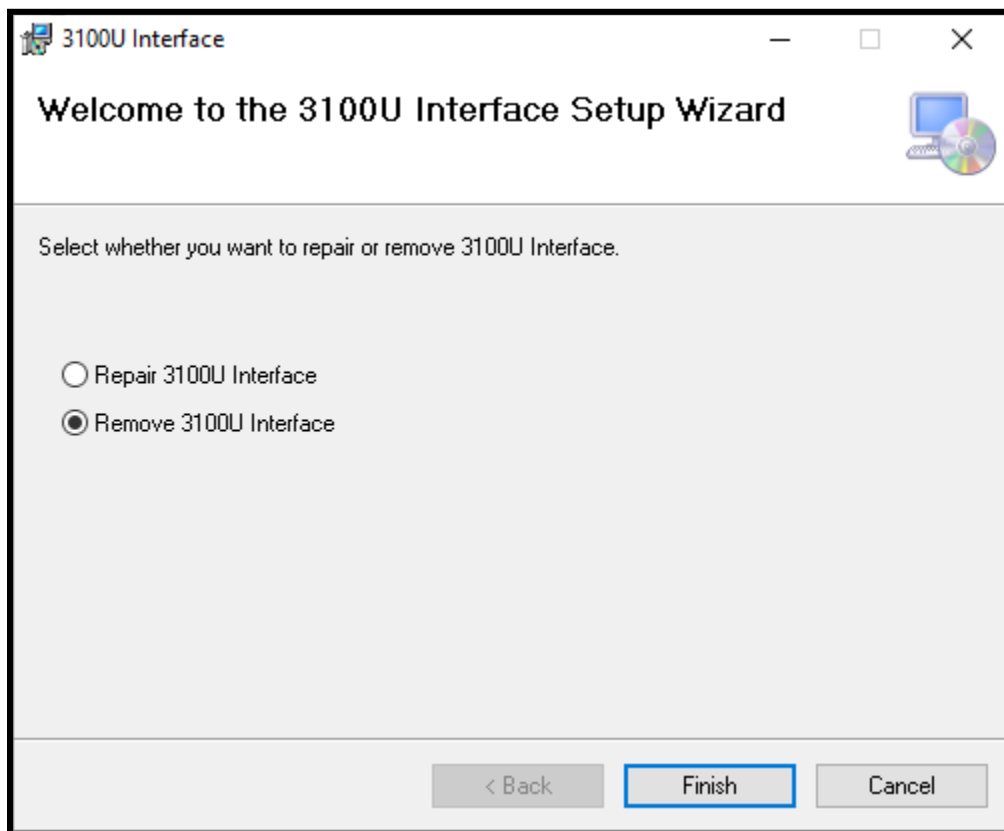


Choose a destination for the software. A Desktop shortcut to the application will be generated and can be removed if desired.

By default, the installation path is as such: [Program Files]\Quaesta Instruments\3100U Interface\

Uninstall

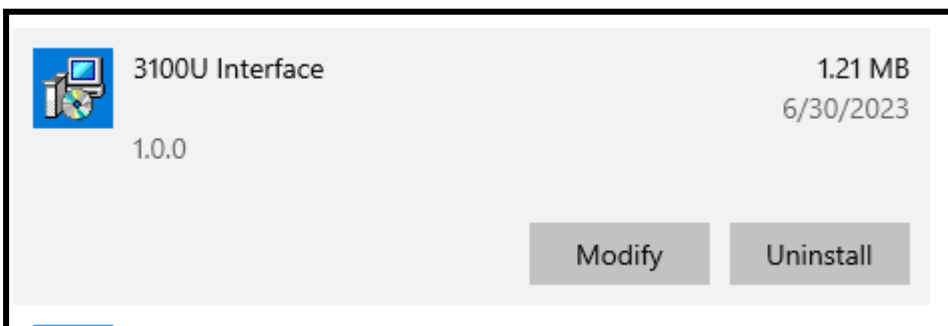
There are a couple options to uninstall the program. Run either (MSI or EXE) setup file again. If the application is installed, setup will start with a window as such: simply choose remove, and follow the rest of the dialogs to uninstall.



Alternatively, use Windows' built in uninstaller. This is probably the easiest way to uninstall the application.

The easiest way to navigate to this tool is:

Windows Key/search -> Add or Remove Programs -> 3100U Interface -> Uninstall



First Start

After connecting to a device, the main screen provide top level parameters visible to the user:

The screenshot displays the '3100U Interface Lite, Version: v1.0.0' window. At the top, there are tabs for 'Refresh Connections', 'Histograms', and 'Terminal'. Below these is a 'Connected' status bar. The main area features the Quaesta Instruments logo on the left. To the right of the logo, there is a 'Select Device:' dropdown menu showing 'COM111 (19010999)' and a 'Show all COM' checkbox. Below the dropdown, the 'Port State: Open' is indicated in green. A 'Disconnect' button is located to the right of the device selection. On the left side of the main area, there are input fields for 'NPM Name' (revc), 'COM Port' (COM111), 'Serial Number' (19010999), 'Model Version' (USB), and 'Firmware Version' (C2.2.1). Below these fields are 'Discard Changes' and 'Apply Changes' buttons. On the right side, there is a 'General Parameters' section with various settings: 'Name' (revc), 'Voltage' (0 V), 'MaxVoltage' (1700 V), 'Gain' (4.0), 'LowerDisc' (6), 'UpperDisc' (63), 'NBins' (64), 'DeadTime' (100 usec), 'LED Mode' (1, with Off and On radio buttons), and 'Pulsesim' (1000). A 'Query NPM' button is located at the bottom right of the parameters section.

3100U Interface Lite, Version: v1.0.0

Refresh Connections Histograms Terminal

Connected

QUAESTA
INSTRUMENTS

Select Device: ☐ Show all COM
COM111 (19010999)
Port State: Open

General Parameters

Name: revc 1 - 15 Chars

Voltage: 0 V 250V - MaxVoltage

MaxVoltage: 1700 V 500V - 2000V

Gain: 4.0 1.0 - 20.0

LowerDisc: 6 NBins/32 - UpperDisc

UpperDisc: 63 LowerDisc - NBins-1

NBins: 64 64, 128, 256, 512, 1024

DeadTime: 100 usec 2usec - 200usec

=> Max Count Rate = 10,000 Hz

LED Mode: 1 ☐ Off ☒ On

Pulsesim: 1000

Discard Changes

Apply Changes

Query NPM

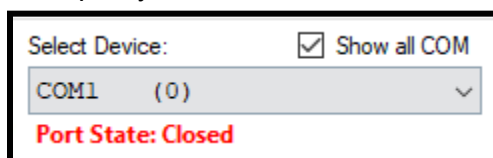
Connecting to an NPM

To connect directly to an NPM from the main screen, connect the device via USB, and find it in the dropdown menu.

Connection Troubleshooting

There are multiple reasons a USB connection isn't able to properly establish itself. Here are some of those reasons and how to troubleshoot around them.

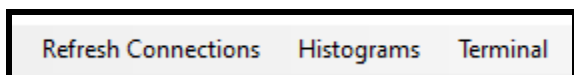
1. **The NPM is already connected to another application**
 - a. Common terminal applications like TeraTerm will lock a port such that no other application can access it. Make sure the NPM isn't connected elsewhere.
2. **The NPM is not configured for USB use**
 - a. Some NPMs are intended for use over ethernet or via a Quaesta Instruments Datalogger. This is set before shipping.
3. **You do not have the correct drivers installed**
 - a. You may need to install the STM Virtual COM port drivers for the application to work properly. You can find these by googling "STM Virtual COM Port Drivers," or by following this link:
<https://www.st.com/en/development-tools/stsw-stm32102.html#get-software>
 - b. If you do not wish to download the drivers, then you may click the **Show all COM** checkbox to show all available USB COM ports. This is not recommended, however, as Quaesta Instruments will not be filtered. You will need to know what COM port your device is attached to.



4. **The NPM is malfunctioning beyond your control**
 - a. If neither the application nor any other serial terminal application (TeraTerm) can open and interface with the NPM, the device may be malfunctioning. Please contact support@QuaestaInstruments.com

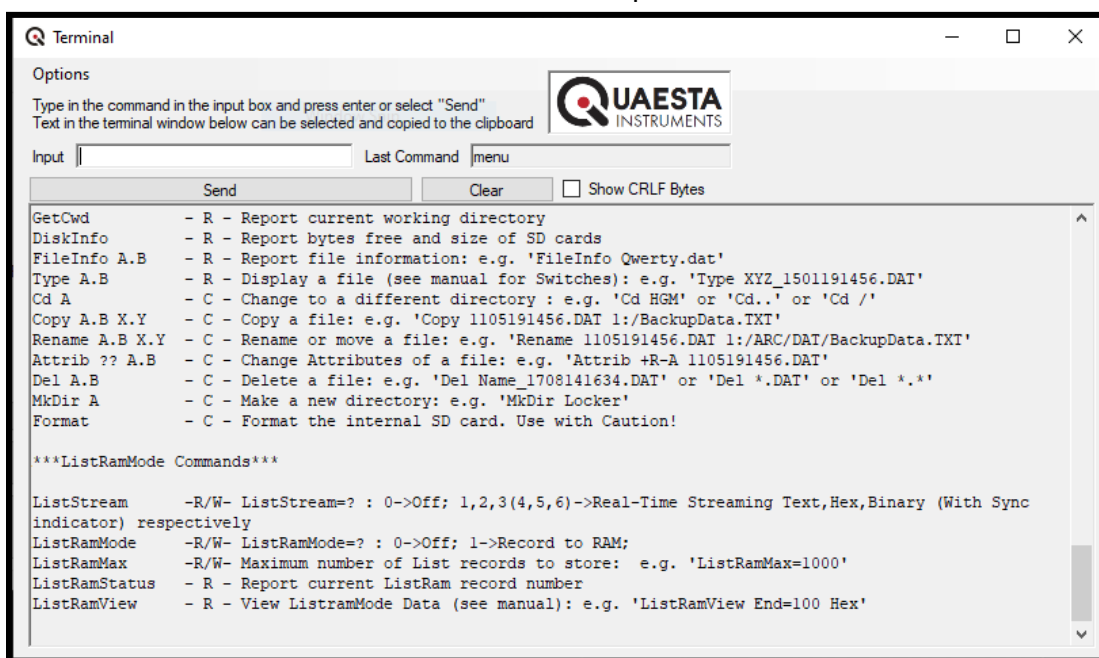
Menu Bar

The Menu Bar is located at the top of the main menu, and allows the user control over some windows in the application.



Terminal

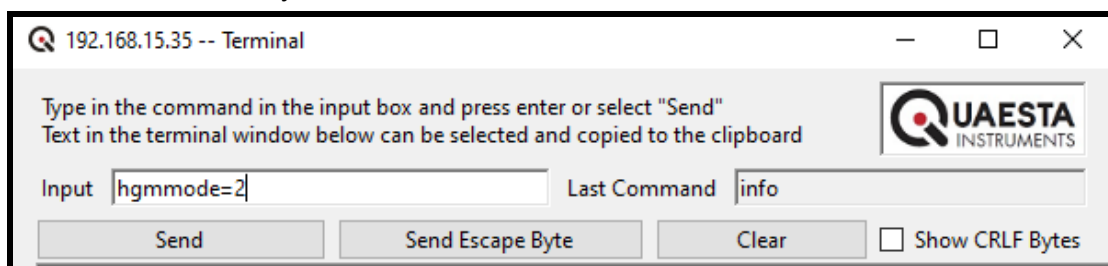
The terminal allows the user direct access to the NPMs API so long as a valid connection is established. Commands handled automatically by the application and the respective response can be seen in real time if a terminal window is open.



The terminal itself is fairly basic, with an input, output, and a couple optional features.

Input

To send a command to the NPM, simply enter the command in the input box and press the send button or the enter key.



Last Command

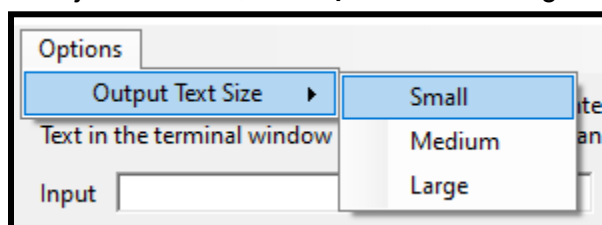
When the input box is selected, the up and down arrows may be pressed to navigate the history of *user entered* commands. The up arrow will display the last command, going back in time, and the down arrow will do the opposite.

The last (user) sent command will appear in the **Last Command** box after it is submitted to the terminal.

Adjust Output Font Size

If using this application on a higher resolution monitor, text size may be an issue. By default, small text is selected.

To adjust font size, click **Options** and navigate to the desired size.



Clear Output

The **Clear** button will clear only the terminal output.

Show CRLF Bytes

When debugging, the **Show CRLF** checkbox will display all Carriage Return (0x0D) as 'r' and Line Feed (0x0A) as 'n'. Shown below is the same command with **Show CRLF** on and off respectively.

```
signal
0
```

```
signal\r\n
0\r\n
\n
```

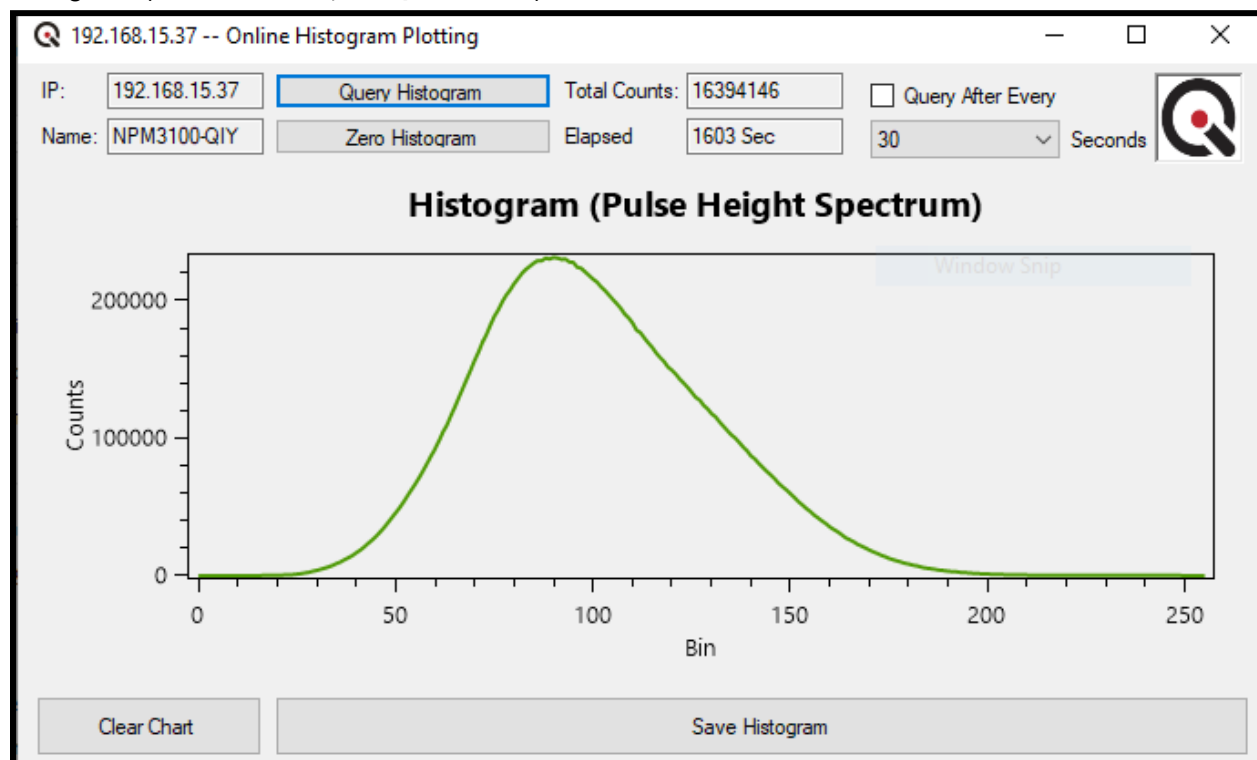
Resize Output

The terminal output may be resized for large lines that break on a smaller window. Just change the width/height of the window to expand the output.

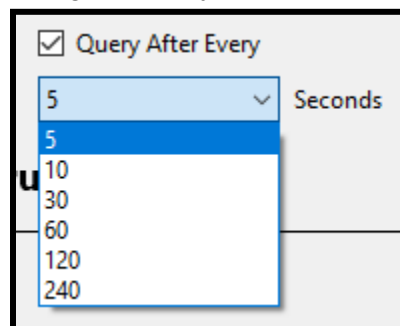
Histograms

Selecting **Real Time- Histograms** will open an online charting window for viewing current Histograms (pulse height spectrums). An NPM must be connected for this window to open.

Manually query a connected NPM by clicking the **Query Histogram** button. The chart should populate immediately with the most recent histogram, and information associated with the histogram (**total counts**, **elapsed time**) will fill in as well.



By selecting **Query After Every** __ **Seconds** checkbox, the application will query and update the histogram every n seconds, the time is selectable in a dropdown menu below.



Zero the histogram by clicking the **Zero Histogram** button. This operation resets all bins.

HGM Modes

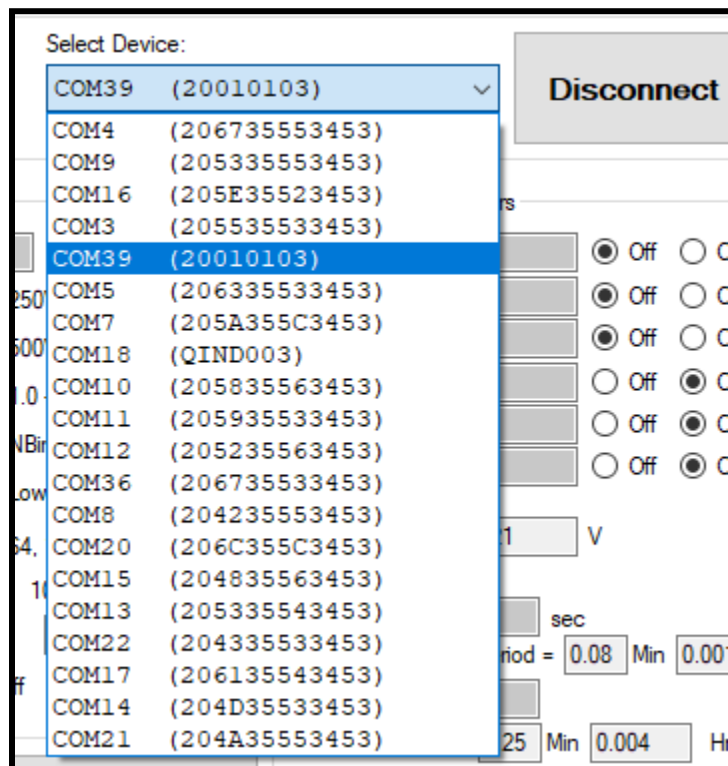
Select a histogram mode with the command **HGMMODE=N** where **N** is a number 1-4

1. The histogram consists of a single column with `Nbins` number of rows. Each row contains the number of pulse counts that have been placed in the corresponding bin number.
2. The histogram is displayed in a similar manner to `HgmMode=1` except that a prefixed column is added which specifies the bin number for each histogram value
3. The histogram is displayed in a similar manner to `HgmMode=1` except that the histogram values are scaled such that the histogram peak has a value of 255. This is useful for normalized graphical representations of the histogram. Since the Pulse Height spectrum is a property of the Tube and the operating parameters, the shape of the curve should be independent of the total counts accumulated (ignoring Poisson statistical fluctuations).
4. The histogram consists of a single comma separated line corresponding to the selected number of bins.

The plot will display histogram data respective to the selected `HgmMode`.

Connection Status

Connect and disconnect to an NPM in this section.



Discover

To refresh NPMs connected via USB, click **Refresh Connections** in the top left in the menu bar.

On Connection

Upon establishing a valid USB connection to the NPM, a query sequence will automatically run and the NPMs information will be displayed.

NPM Parameters

This segment of the main display visualizes *most of* the available parameters of the NPM as well as some direct controls used to tune the NPM. This segment will not be enabled until an NPM is connected, but will retain a disconnected NPMs parameters.

The screenshot displays the NPM Parameters interface. On the left, there are five input fields: NPM Name (Name), COM Port (COM24), Serial Number (SPWMC23-0008), Model Version (USB), and Firmware Version (QIX_SW_A_100X1). Below these is a 'Discard Changes' button. To the right, the 'General Parameters' section includes: Name (Name), Voltage (0 V, range 250V - MaxVoltage), MaxVoltage (1400 V, range 500V - 2000V), Gain (1.0, range 1.0 - 20.0), LowerDisc (1, range NBins/32 - UpperDisc), UpperDisc (62, range LowerDisc - NBins-1), NBins (64, range 64, 128, 256, 512, 1024), DeadTime (6 usec, range 2usec - 200usec), and LED Mode (0, with radio buttons for Off and On). Below the 'General Parameters' section is a 'Query NPM' button. At the bottom center is an 'Apply Changes' button.

Editable and Read Only Parameters

The color scheme used by text boxes in this segment is intended to make changing NPM parameters intuitive. The color scheme is as follows:

1. **Dark Gray:** This parameter type is editable and can be changed directly from this control panel. A parameter will appear Dark Gray if it is validated by the NPM itself.
2. **Light Gray:** This parameter type is *Read Only*, it cannot be changed directly from the control panel. These parameters must be set by an operator.
3. **White:** An editable text box will appear white if a Dark Gray, Editable text box is modified. A white text box does not necessarily reflect the status of the parameter as it is not validated by the NPM.

This close-up shows the top part of the NPM Parameters panel. The 'Name' field contains 'ip36' and is dark gray. Below it, 'Voltage' is 0 (dark gray), 'MaxVoltage' is 2000 (white), and 'Gain' is 6.0 (dark gray). The labels '1 - 15 Chars', 'V', and '1.0 - 20.0' are visible next to their respective fields.

Validating Parameters

By querying the device, the application can verify parameters and adjust the color of their text box to Dark Gray if necessary. To query and validate parameters, click the **Query NPM** button located in the bottom center of this segment.



Alternatively, in the terminal, using the command **Info** will achieve the same effect.

Change and Apply New Parameters

After changing a parameter in the panel, the text box will appear white. This indicates the parameter has been changed in the application, but not validated by or updated on the NPM itself. To apply changes, click the **Apply Changes** button in the bottom left corner of the application.

This action will trigger a query sequence after changing the parameters, and each will be validated by the NPM. There is no need to query the NPM after changing parameters in this way.

Alternatively, pressing the **Cancel** button will remove changes made in the application and requery the NPM.

NOTE: The application has some hints about parameter values, but these vary between devices and may not be accurate for the model you have.

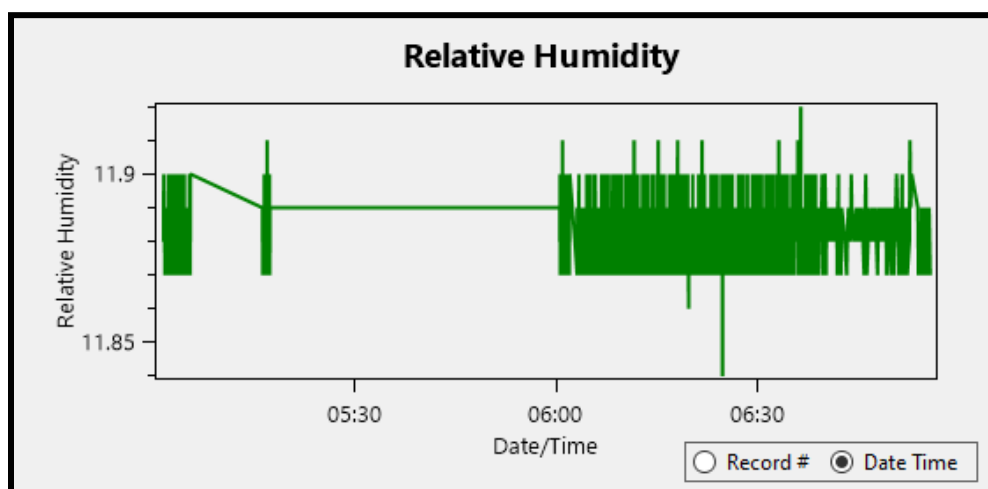
Manipulating Plots

Most plots are automatically adjusted to fit the data, but often a better view can be found by manipulating the level of zoom, axes, or scale.

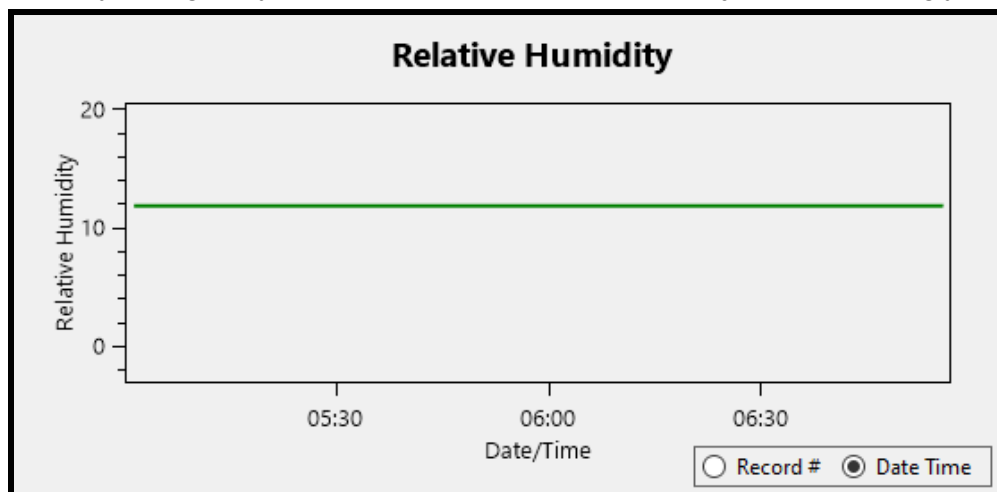
Adjusting axes

Adjusting individual axes can be done using the scroll wheel while hovering over the desired axis. Scrolling “out” while hovering over the x axis will not affect the y axis.

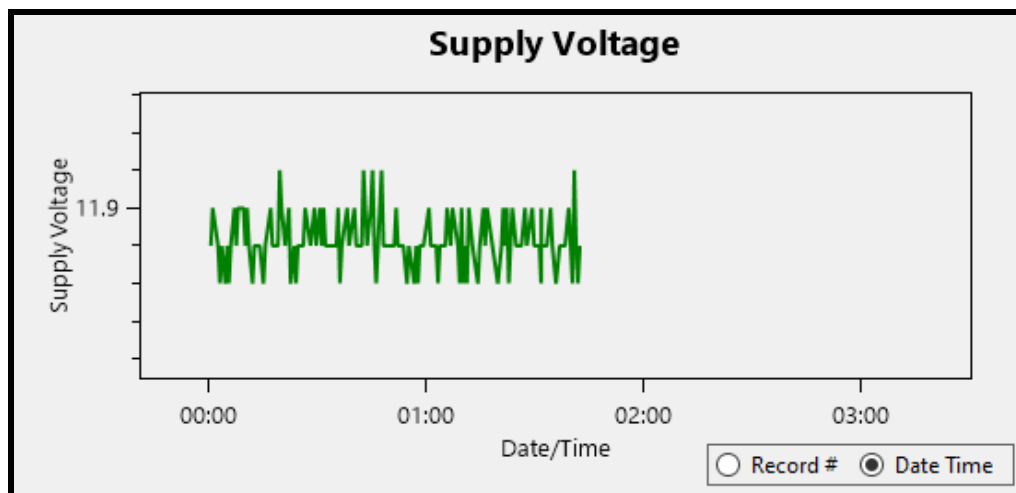
To adjust both axes at the same time, or “zoom” the entire plot, use the scroll wheel while hovering over the plot area.



Above, the relative humidity plot appears to vary drastically, but by adjusting the y axis, we see it has only changed by .05%. The below plot has been adjusted accordingly.



The data may also be panned by dragging over the main plot area or each axis while holding the *right* mouse button.



Pinpointing Plot Values

Holding the *left* mouse button over a plot will display the values of the function at the point closest to the mouse.

