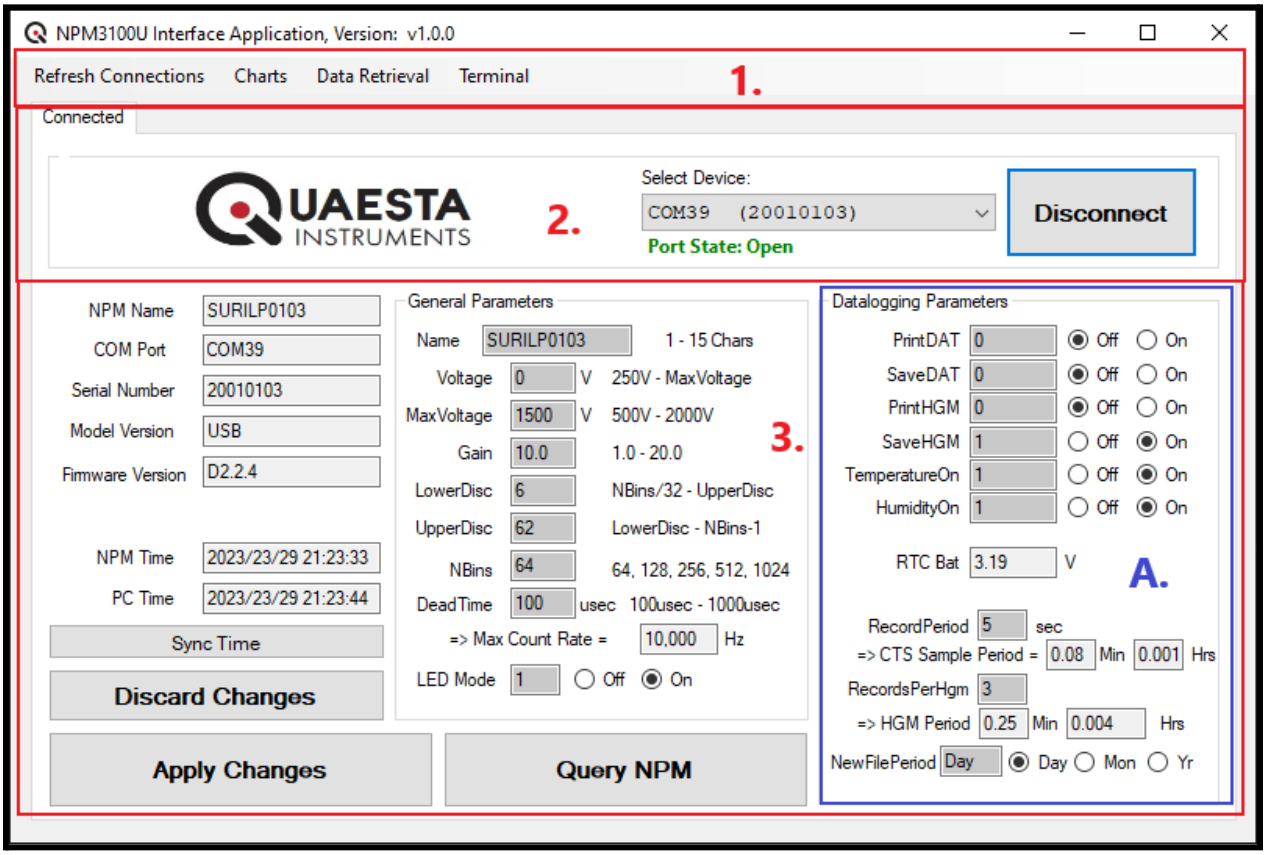
3100U GUI Interface Manual

Quaesta Instruments
Version: NPM3100U v1.0.0
Revision: June 29, 2023



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Support

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(520) 882-3706

INTERNET

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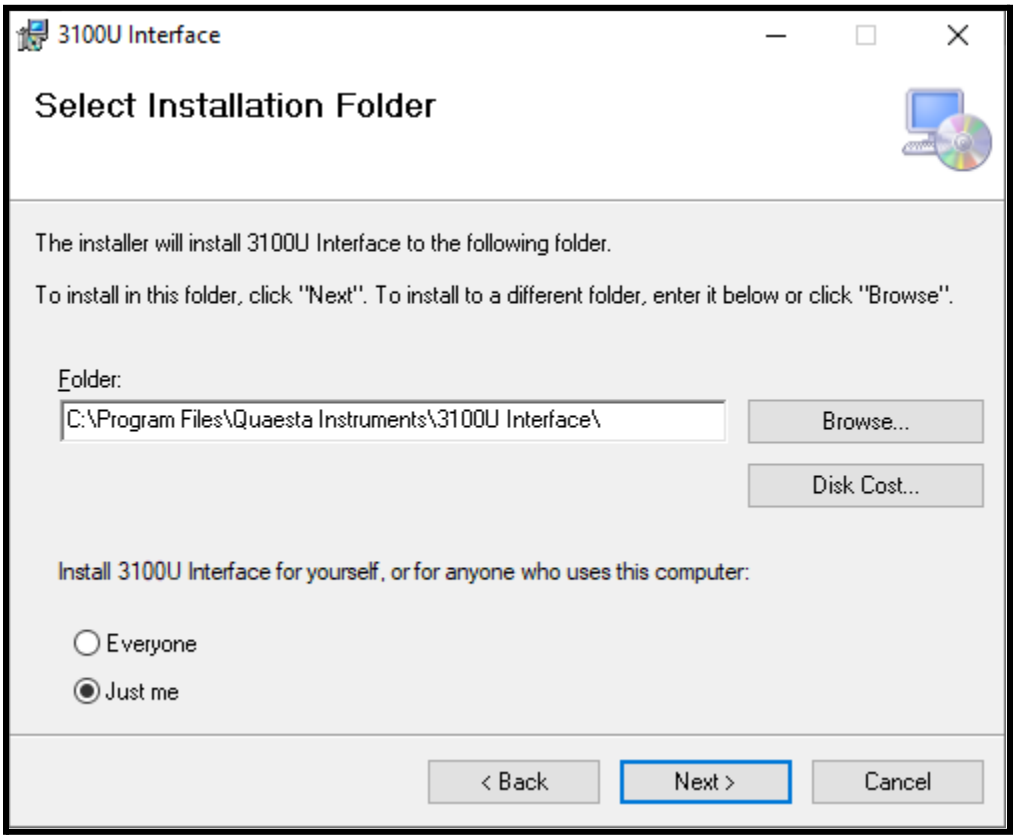
support@quaestainstruments.com

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

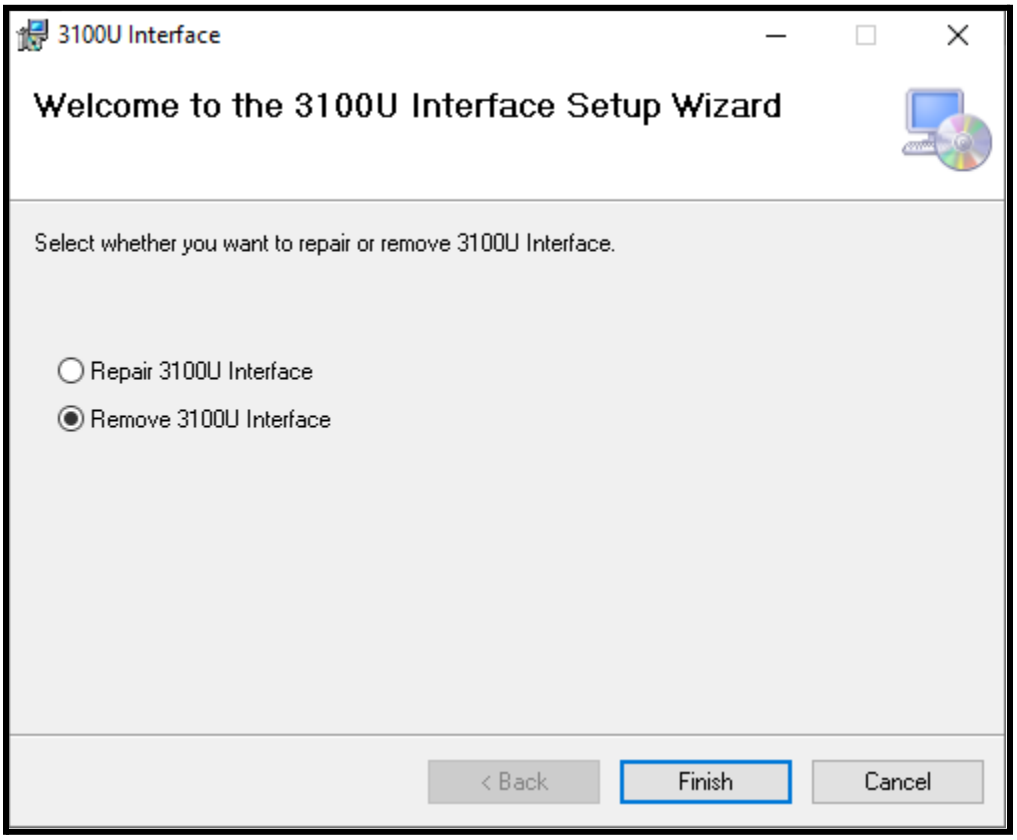


Choose a destination for the software. A Desktop shortcut to the application will be generated and can be removed if desired.

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

Uninstall

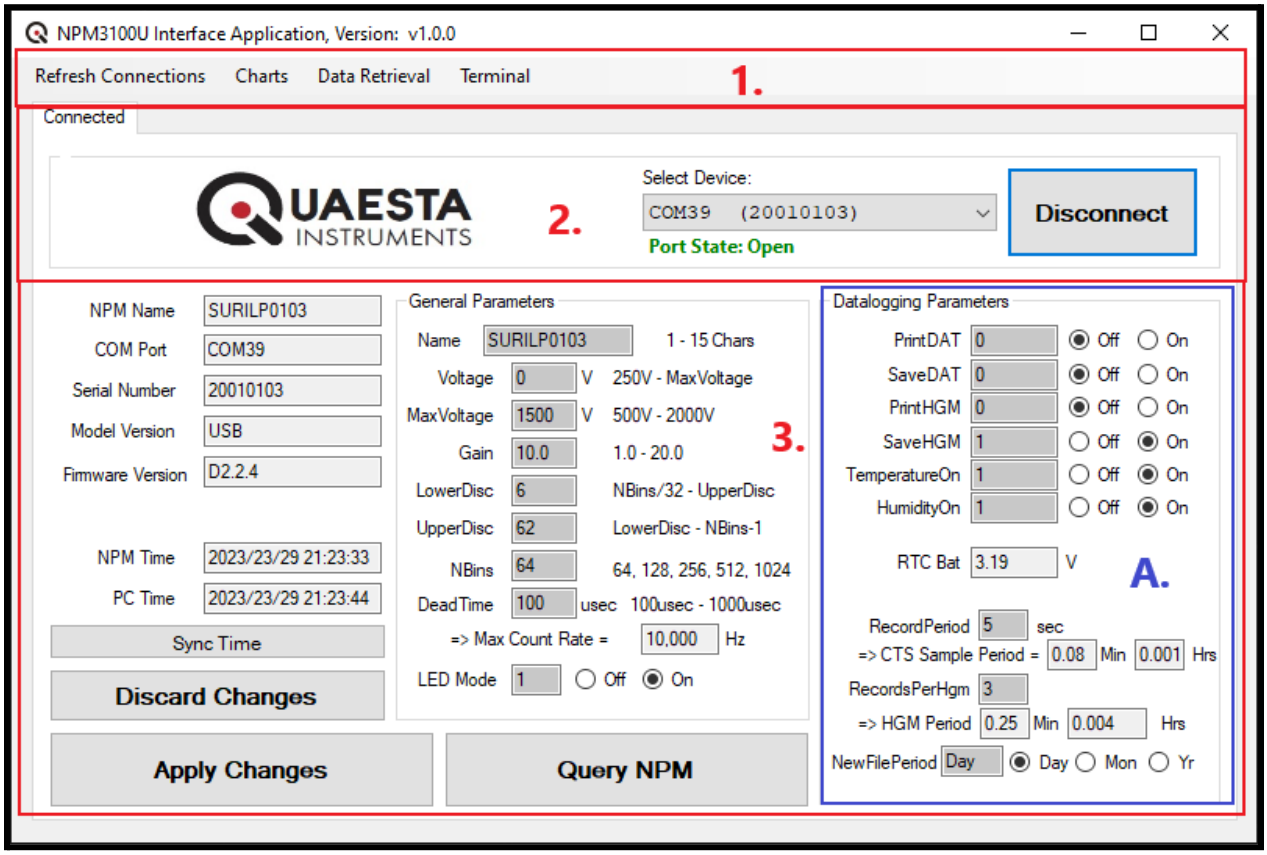
There are a couple options to uninstall the program. Run either (MSI or EXE) setup file again. If the application is installed, setup will start with a window as such: simply choose remove, and follow the rest of the dialogs to uninstall.



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

The main page of the application can be broken up into segments, shown below:



Segment 3 will not contain any data until an NPM has been connected to and queried for information. Segment 2's list of devices will be blank until one or more NPMs are detected. Each segment will have its own breakdown within this guide. The blue segment, A, will only become active on logging-enabled NPMs. Some features may not be active, depending on any add-ons you may have purchased with your 3100U 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.

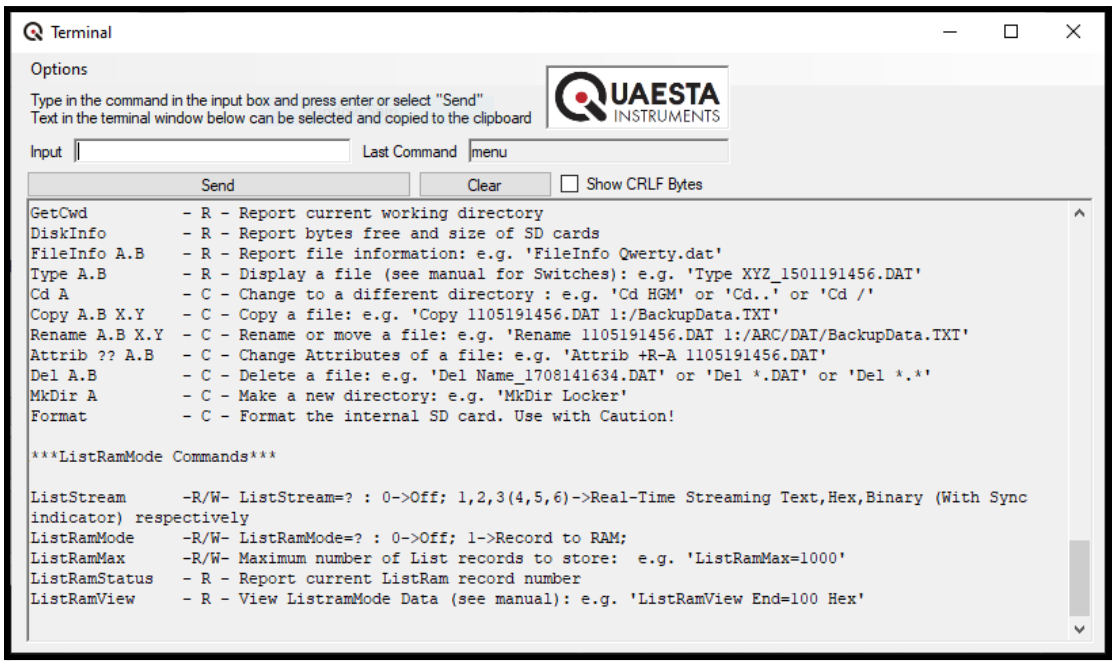
1. **The NPM is already connected to another application**
    a. Common terminal applications like TeraTerm will lock a port such that no other application can access it. Make sure the NPM isn’t connected elsewhere.
2. **The NPM is not configured for USB use**
    a. Some NPMs are intended for use over 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
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

Segment 1. 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

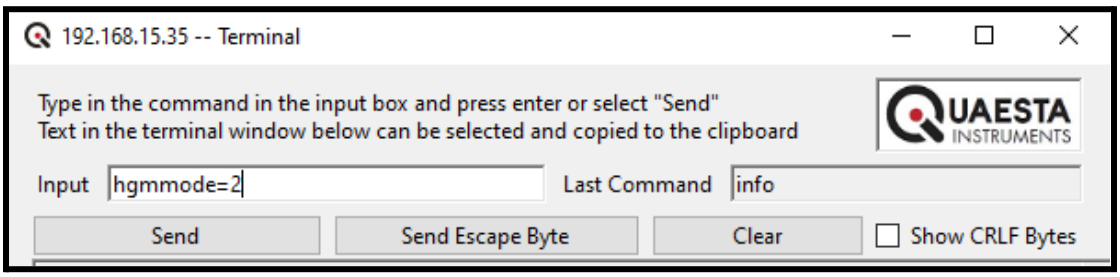
The terminal allows the user direct access to the NPMs API so long as a valid connection is established. Commands handled automatically by the application and the respective response can be seen in real time if a terminal window is open.



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.

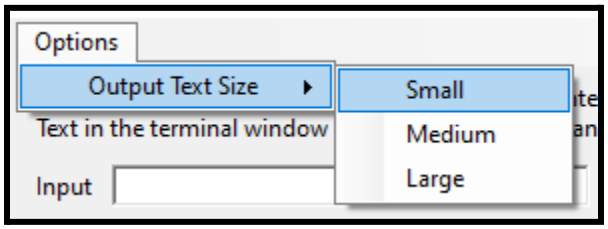


Last Command

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.

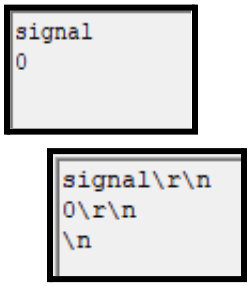


Clear Output

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.

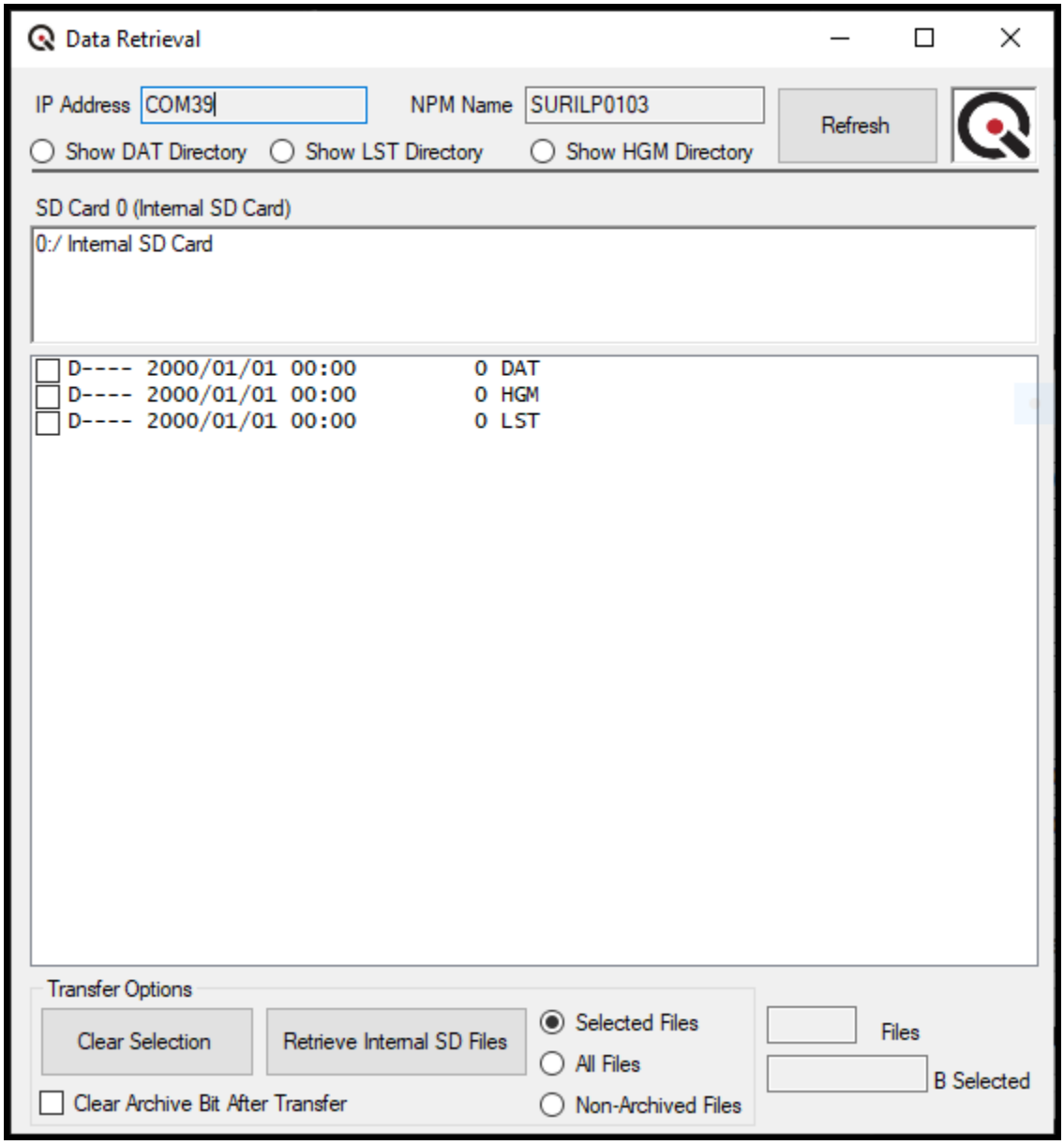


Resize Output

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.

Data Retrieval

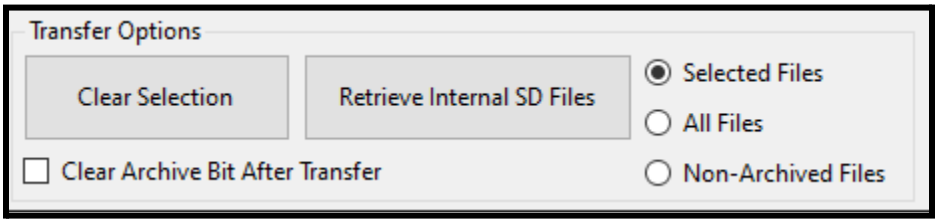
A user must be connected to an NPM, and the NPM must have logging enabled to access the **`Data Retrieval`** window.



Select A Directory

Under the NPM info area, there are three options: Show DAT Directory, Show LST Directory, and Show HGM Directory. These are listed by default on startup as they appear from the **Dir** command. Select the desired directory. If required, press the **`Refresh`** button to requery the NPM.

Select desired files manually by selecting them in the contents box, or by using the respective transfer options below.



Selected Files

Only files manually selected in the above window will be transferred.

All Files

All files will be transferred regardless of selection. Selection will persist, however.

Non-Archived Files

Non-Archived Files have '**`----A`**' in the file description. Regardless of selection, choosing this option will transfer all files with the mark. Archived files will appear with '**`-----`**' instead.

Clear Archive Bit After Transfer

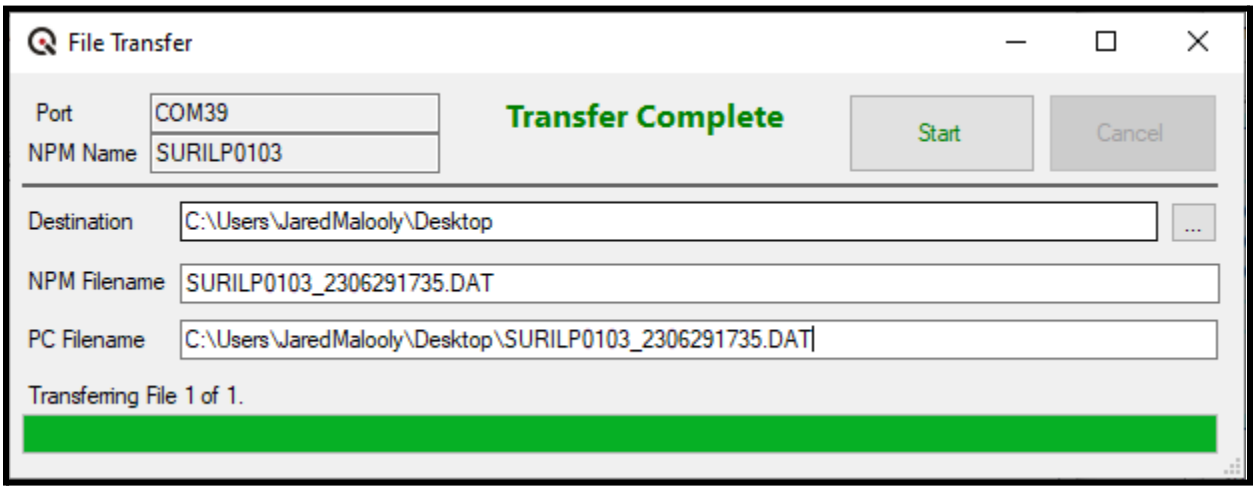
By checking the **`Clear Archive Bit After Transfer`** checkbox, the application will automatically clear the Archive bit (**`----A`**) after the files are transferred. On the next refresh, the files will appear with **`-----`** instead.

Retrieve SD Files

Clicking either **`Retrieve Internal SD Files`** or **`Retrieve External SD Files`** will create a File Transfer window. This action disables other windows until closed to avoid retrieving incorrect information.

If the application's working directories have not been set up, you must choose a valid destination for the files to go. Otherwise, the application will send DAT, HGM, and BIN files to their respective destinations with no user action required.

If the destination is valid, click **`Start`** and allow the application to receive the files. Progress will be displayed below.



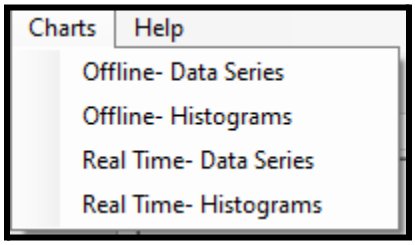
Cancel Transfer

Clicking the **`Cancel`** button will cancel the transfer operation.

Disconnecting from the NPM will cause the file transfer window to close.

Charts

Various charting options are available for both real time and historical data.



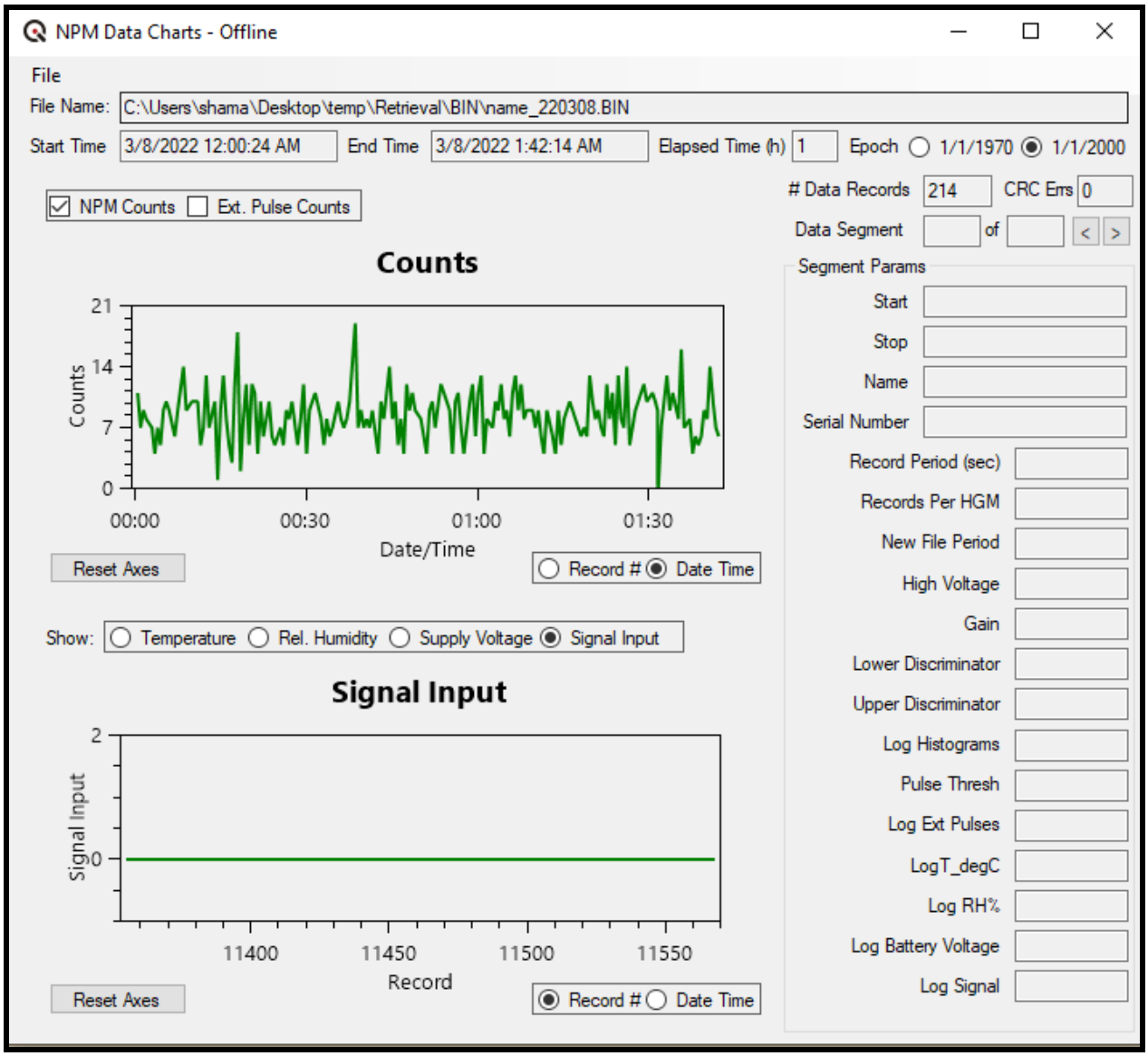
All charts are resizable to fit whichever view is most comfortable. Simply adjust the window size.

Offline Data Series

Selecting **`Offline- Data Series`** will open an offline charting window for viewing raw Bin and Dat files. The window will show common information for both files such as **Start, End,** and **Elapsed Time, Number of records,** and the **File Name.**

Bin Files (Not available on some models)

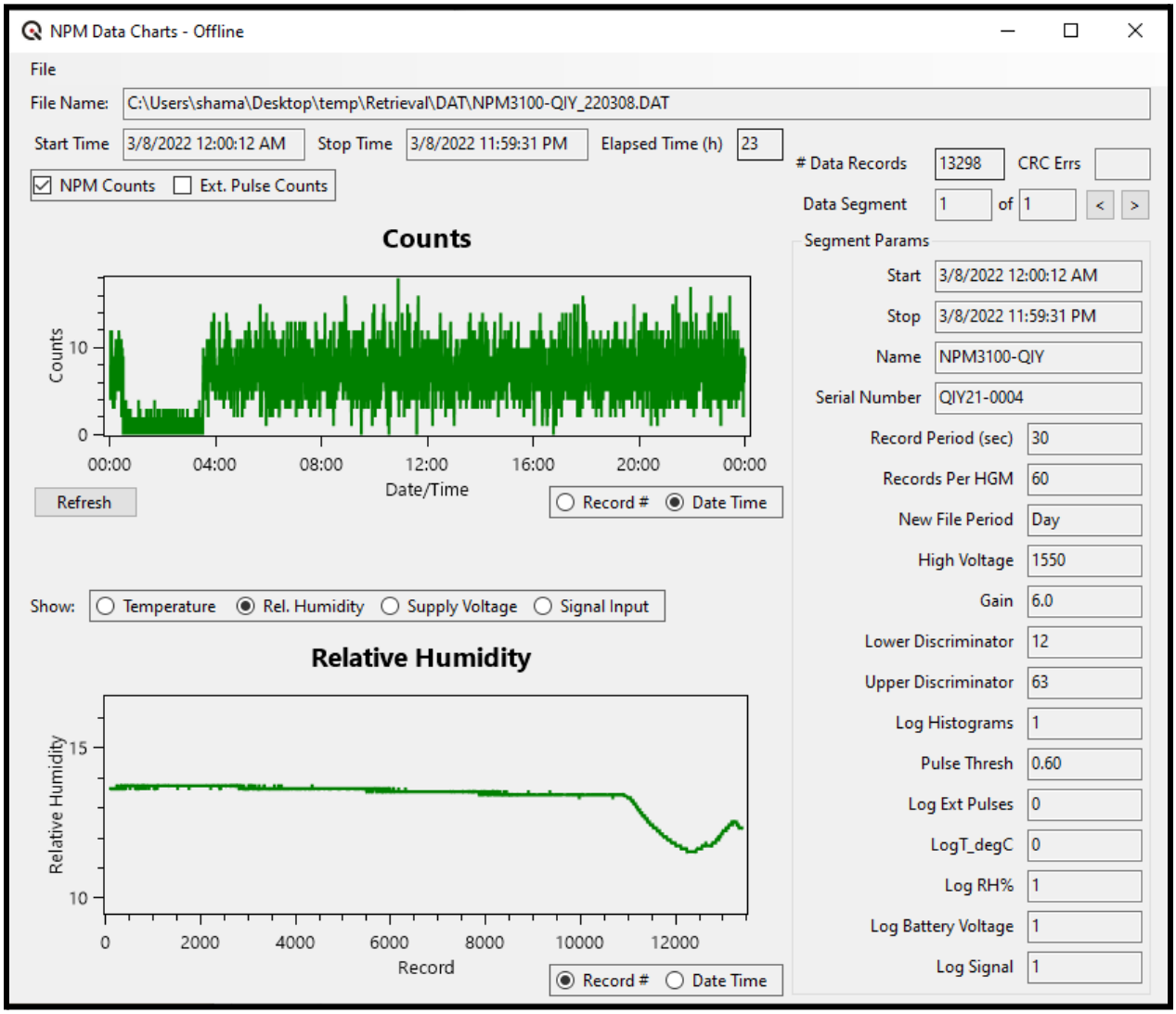
Open a bin file by clicking **`File`** and selecting **`Open BIN File.`** If default directories have been set up, the application will automatically open the respective directory.



Opening a Bin file will populate all available charts, even if data collection was not on for certain sections (eg, temperature may have been off for the collection of this data). NPM params are not available when opening a Bin file. Please note that 3100E RevD2 NPMs currently do not support BIN files.

Dat Files

Open a data file by clicking **`File`** and selecting **`Open DAT File.`** If default directories have been set up, the application will automatically open the respective directory.

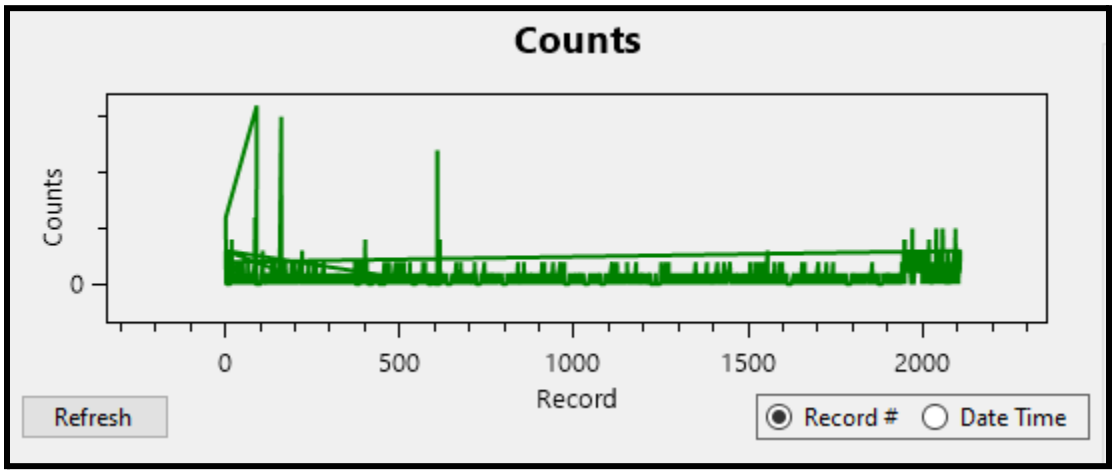


Opening a Dat file will populate only charts where data collection was on. The segment params will be displayed in this mode if available.
NOTE: Modified Dat files with no header may not be parsed correctly, if at all. Do not remove the header information from these files to avoid missing data.

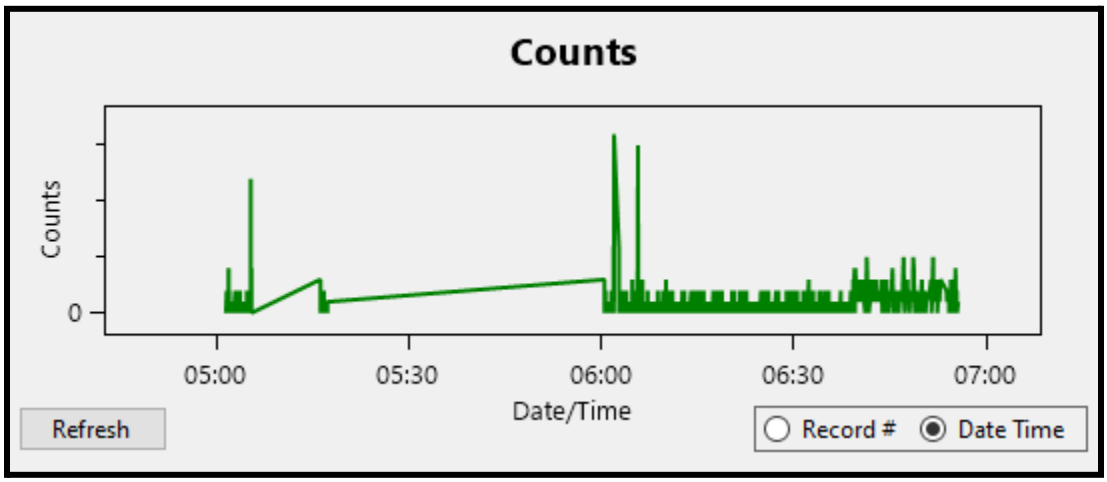
If the device was rebooted during data collection, there may be multiple segments. Scan through the segments using the arrow buttons near the top left of the window.
NOTE: The charts will show the entire data set, scanning through data segments will only show changed parameters in the ***Segment Params*** *section.*

Navigate between the charts by selecting the respective buttons above and below each respective plot.

NOTE: Charts may appear to go "back in time." This is due to reboots and changed NPM time. If the device was rebooted, the next datapoint will appear to be the first record period. Similarly, if the time is changed, the next datapoint will follow suit. This can make for misleading charts.



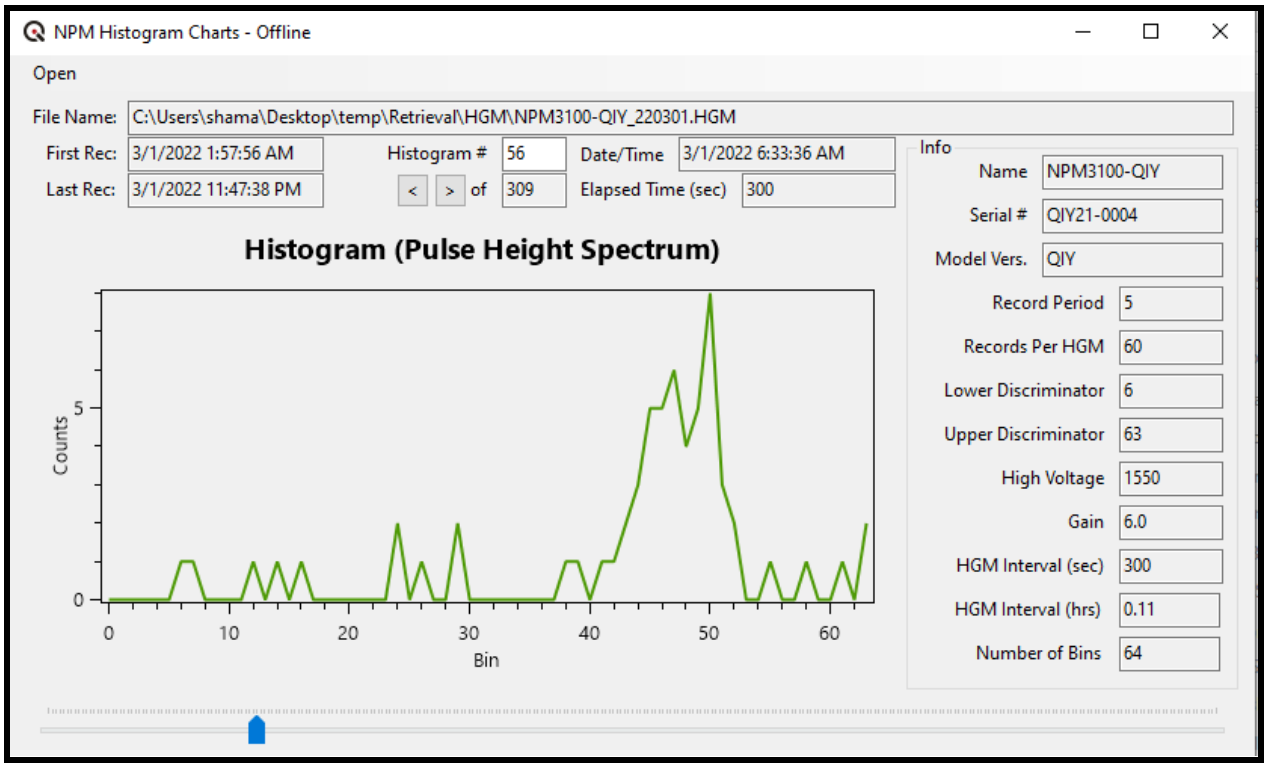
*Above, a chart of an NPM which was rebooted multiple times. Viewing this chart with **Record #** selected is not ideal. Below, the x axis has been swapped to Date Time, displaying a plot with more digestible data.*



Offline Histograms

Selecting **`Offline- Histograms`** will open an offline charting window for viewing raw HGM files.

Open a hgm file by clicking the **`Open`** menu option and selecting one. The chart should automatically populate with data if the file is valid.



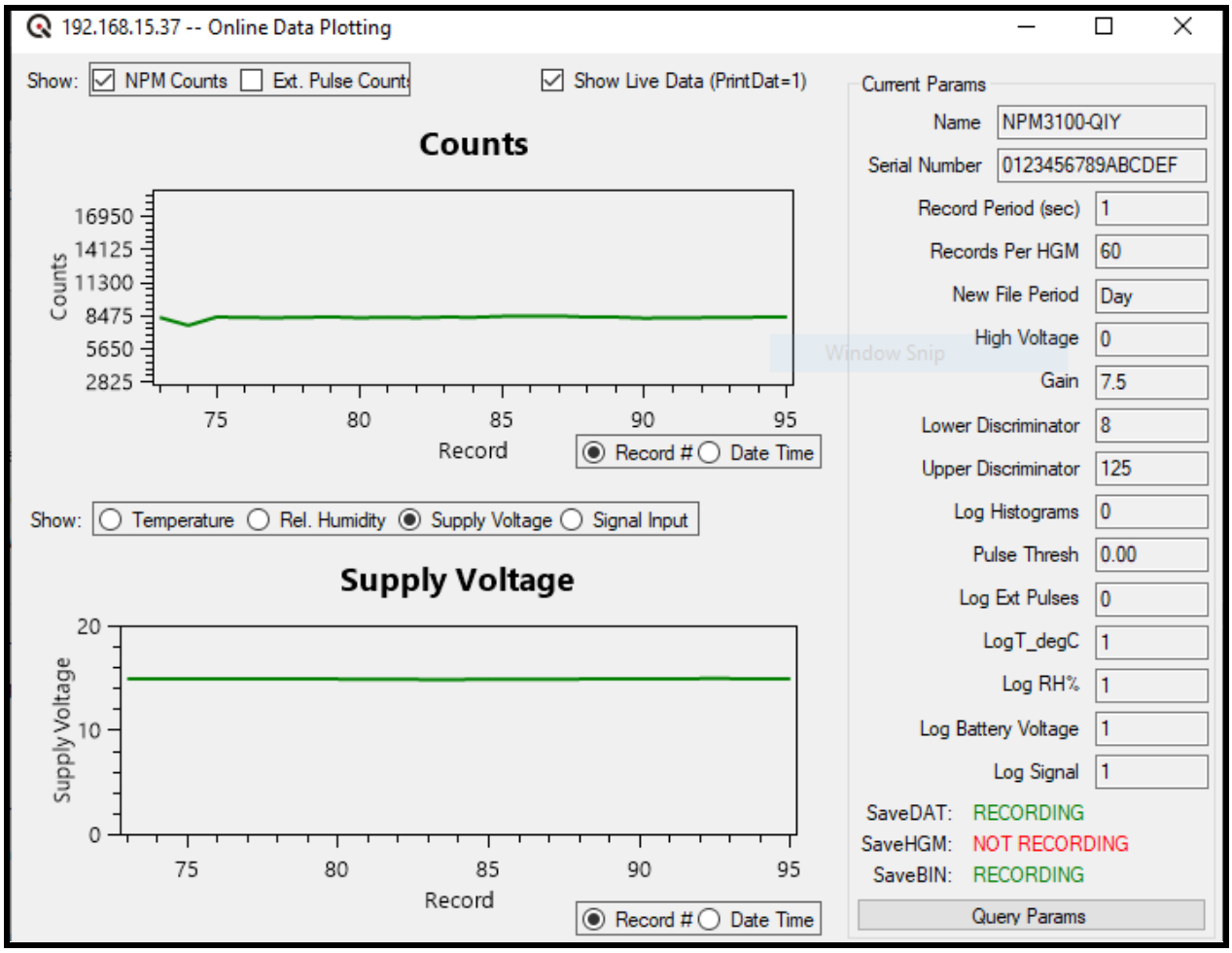
View different histograms by either

1. Using the slider at the bottom to quickie skim histograms
2. Using the arrow buttons above the chart
3. Editing the **`Histogram #`** text box and pressing the enter key.

Histograms are ordered chronologically, and indexed starting at 1.
Information is gathered from the last available header prior to the selected histogram.

Real Time Data Series

Selecting **`Real Time- Data Series`** will open an online charting window for viewing current data. An NPM must be connected for this window to open, and the parameter **`PrintDat`** must be **1** to view incoming data. Otherwise, the plots will remain blank. You may turn on **`PrintDat`** from the plotting window by enabling **Show Live Data.**



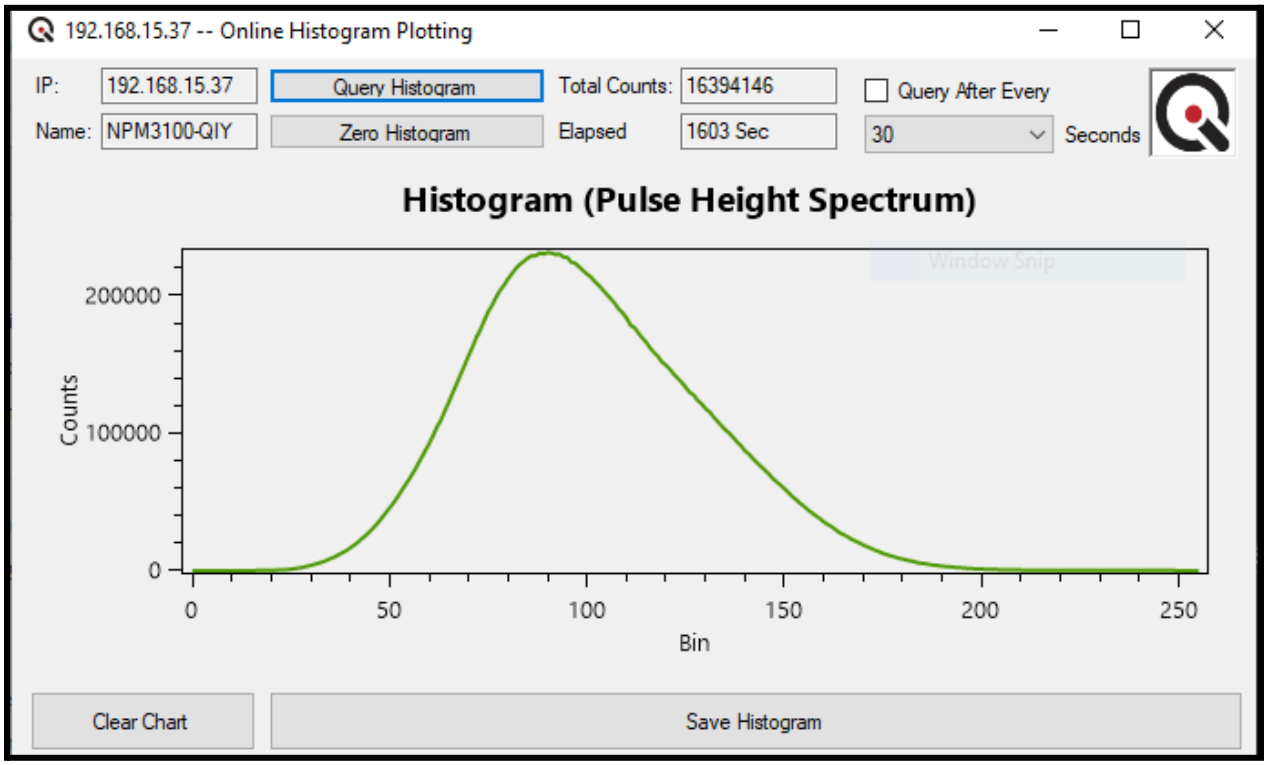
This tool is meant to reflect what is being written to the cards in real time. The same options are presented in this window as are in the offline plots.

Real Time Histograms

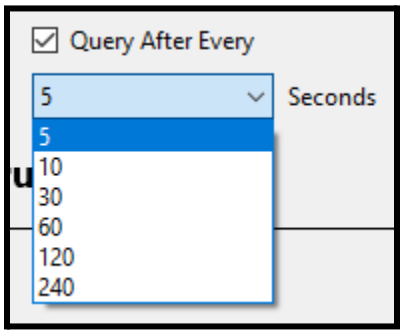
Selecting **`Real Time- Histograms`** will open an online charting window for viewing current Histograms (pulse height spectrums). An NPM must be connected for this window to open.

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

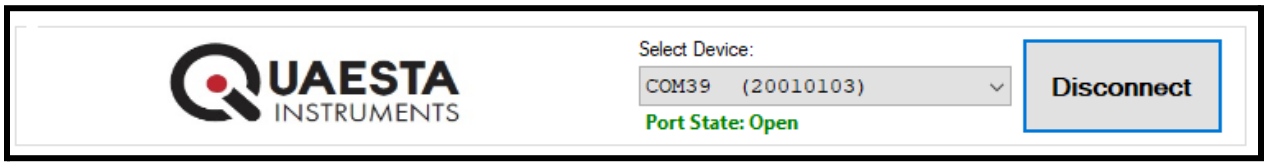
1. The histogram consists of a single column with `Nbins` number of rows. Each row contains the number of pulse counts that have been placed in the corresponding bin number.
2. The histogram is displayed in a similar manner to HgmMode=1 except that a prefixed column is added which specifies the bin number for each histogram value

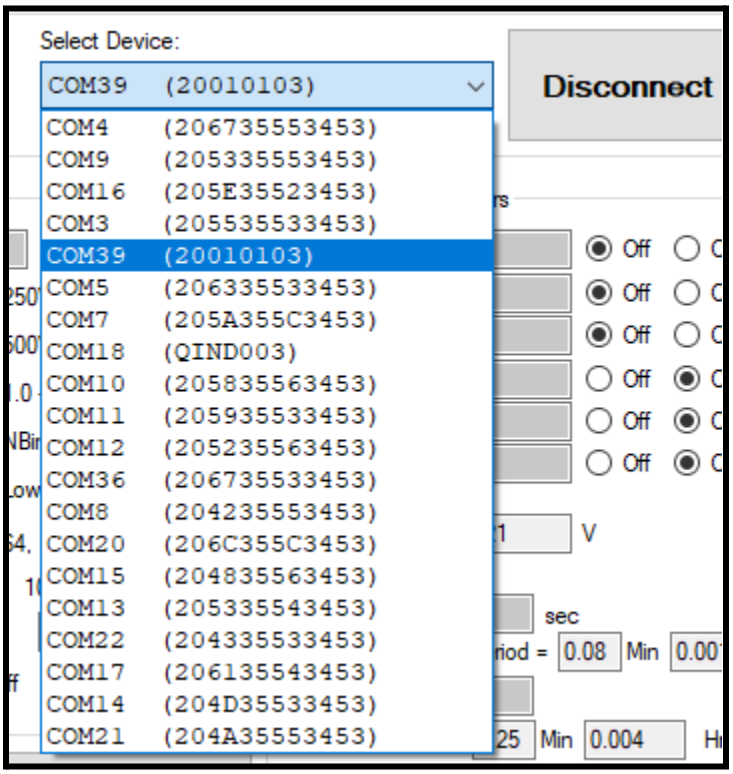
3. The histogram is displayed in a similar manner to `HgmMode=1` except that the histogram values are scaled such that the histogram peak has a value of 255. This is useful for normalized graphical representations of the histogram. Since the Pulse Height spectrum is a property of the Tube and the operating 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`.

Segment 2. Connection Status and General TCP Information

Connect and disconnect to an NPM in this section.





Discover

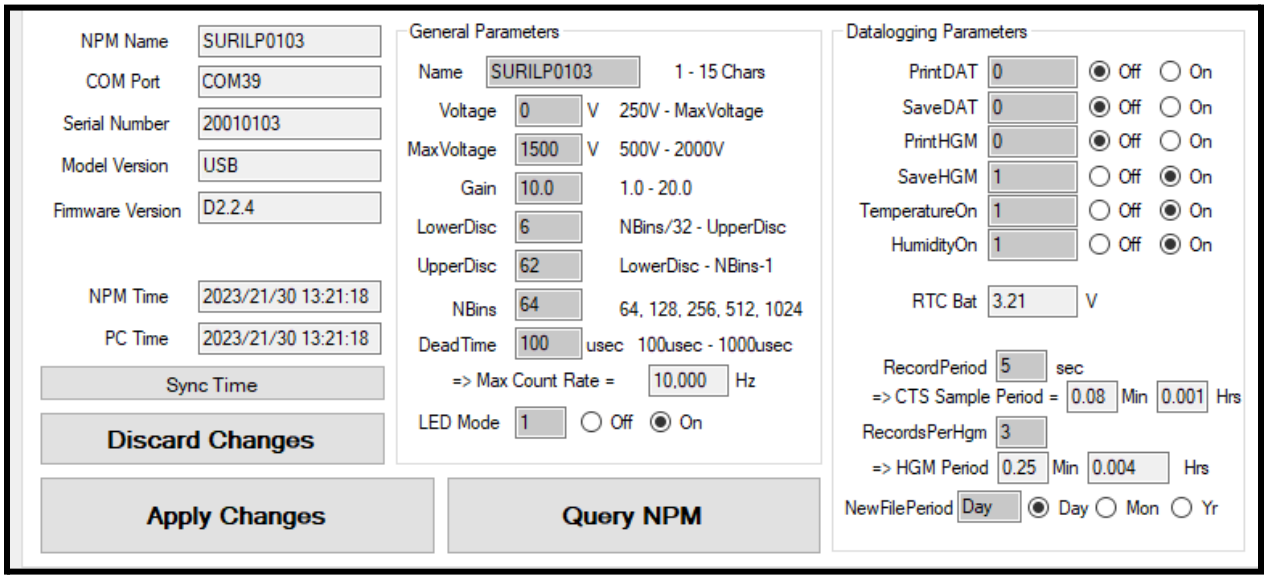
To refresh NPMs connected via USB, click **Refresh Connections** in the top left in the menu bar.

On Connection

Upon establishing a valid USB connection to the NPM, a query sequence will automatically run and the NPMs information will be displayed to segment 3.

Segment 3. NPM Parameters

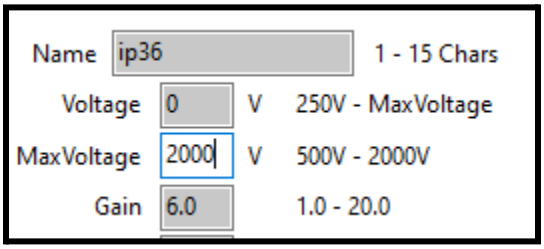
This segment of the main display visualizes *most of* the available parameters of the NPM as well as some direct controls used to tune the NPM. This segment will not be enabled until an NPM is connected, but will retain a disconnected NPMs parameters.



Editable and Read Only Parameters

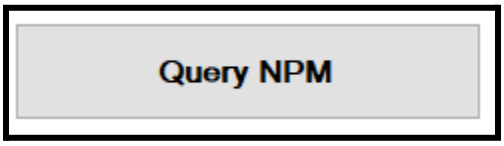
The color scheme used by text boxes in this segment is intended to make changing NPM parameters intuitive. The color scheme is as follows:

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.



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.

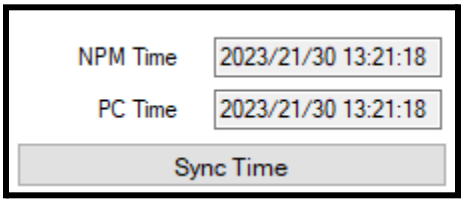
Change and Apply New Parameters

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.

Sync NPM Clock

To sync the NPM's clock, simply click the **`Sync Time`** button.



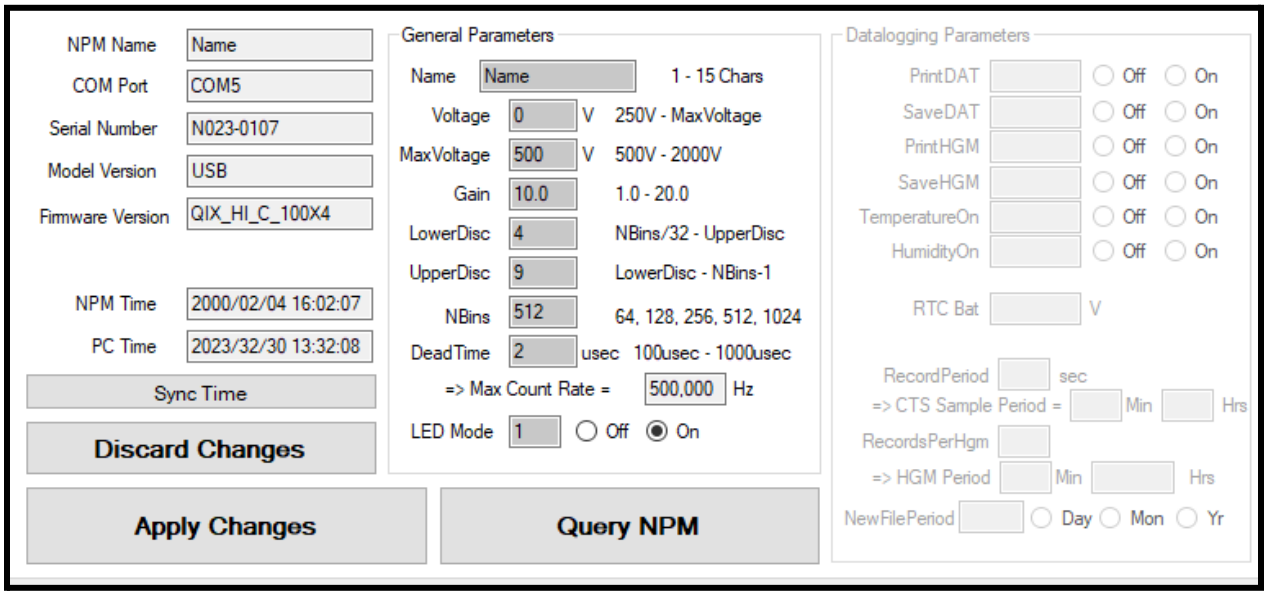
NOTE: Changing the NPM time will affect any datalogging currently enabled on the NPM. The next record will be synced regardless of previous records times.

Time

Time is not constantly updated within the segment, it is only refreshed when the user clicks the **`Query NPM`** button, or by sending the **`time`** command in the terminal.

Segment 3A. Inactive Components

Depending on your NPM model or package, some features will be unavailable in the application. Datalogging is a separate feature, and is contained entirely on the main screen. These options will simply appear as disabled unless an NPM is detected to have them.



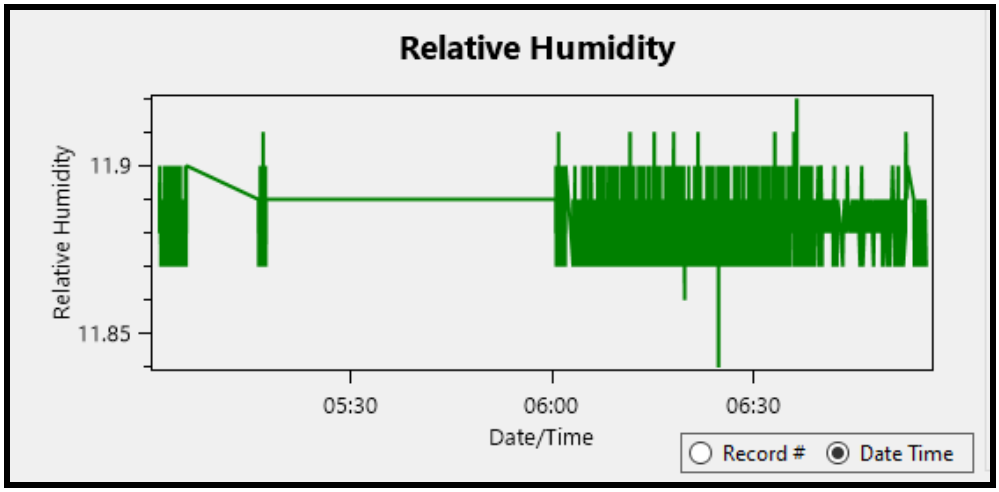
Manipulating Plots

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.

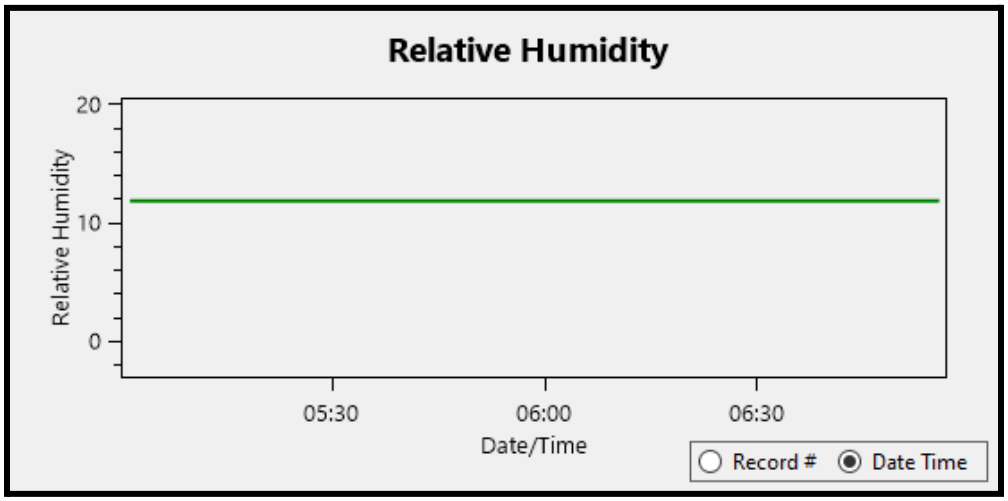
Adjusting axes

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.

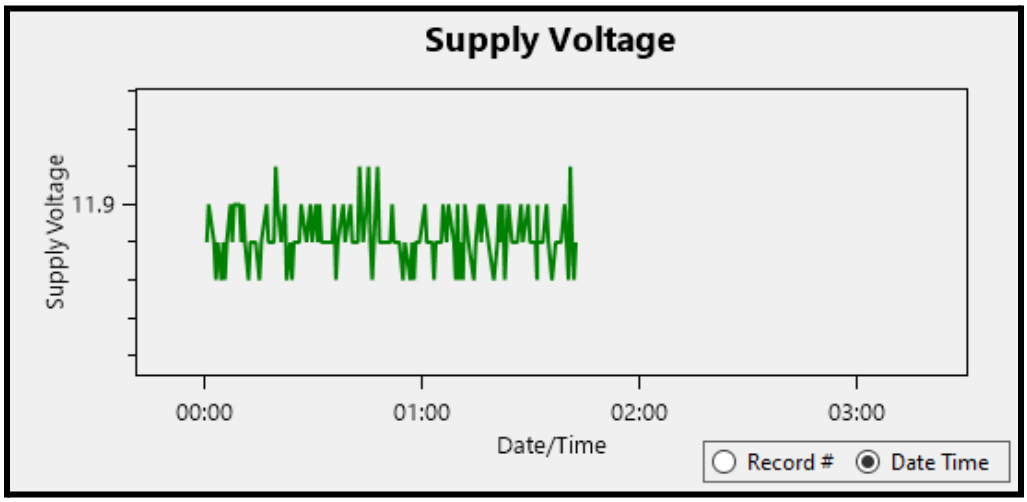
To adjust both axes at the same time, or “zoom” the entire plot, use the scroll wheel while hovering over the plot area.



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.