3100E-QIY Interface Operation Manual

Quaesta Instruments

Version: NPM3100&QIY, v1.0.0

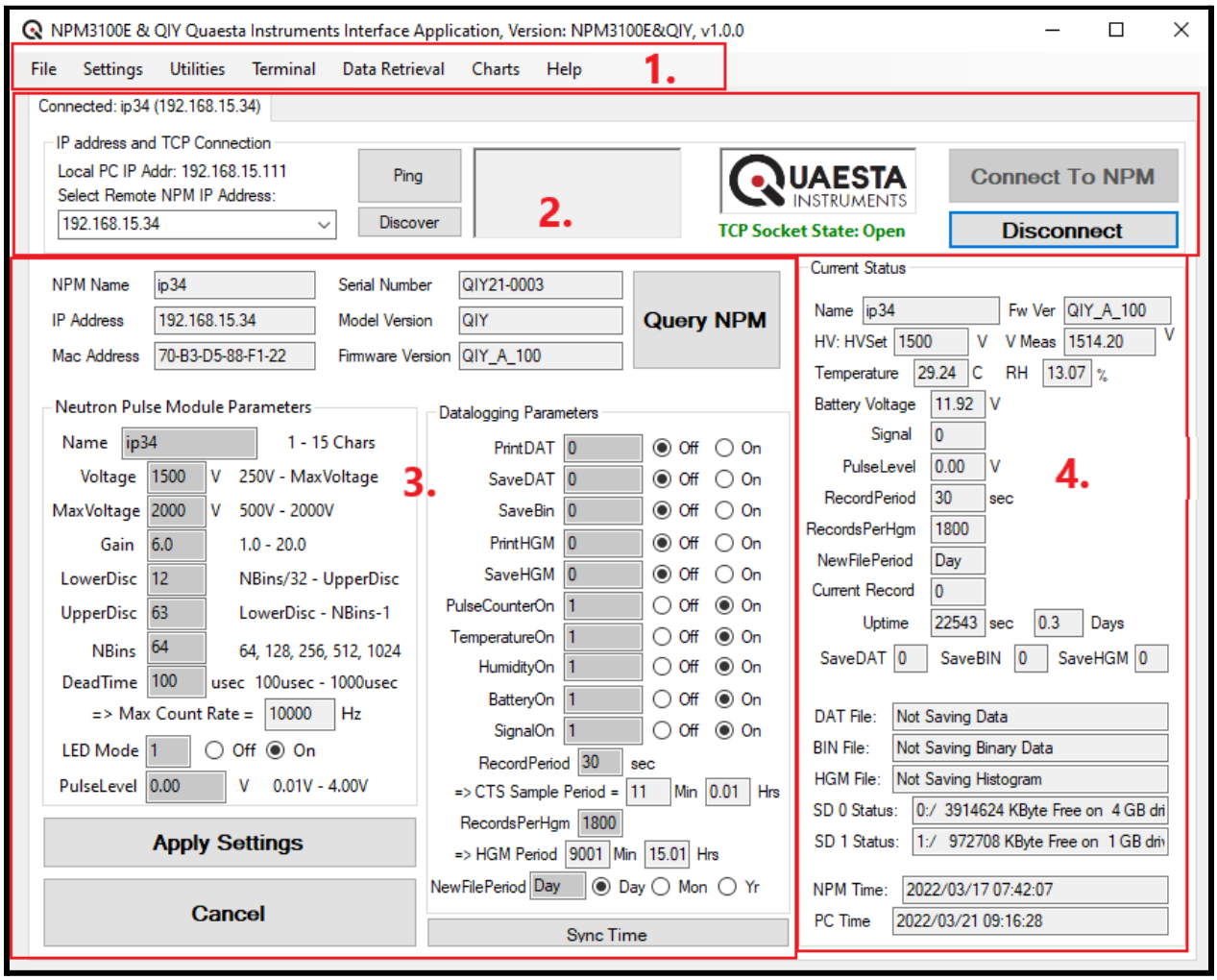

Table of Contents

Overview

Features

- Change/Tune NPM Parameters
- Data Retrieval
- Direct communication over TCP via terminal interface
- UDP Discovery
- Plot historical and live data
- Update NPM Firmware

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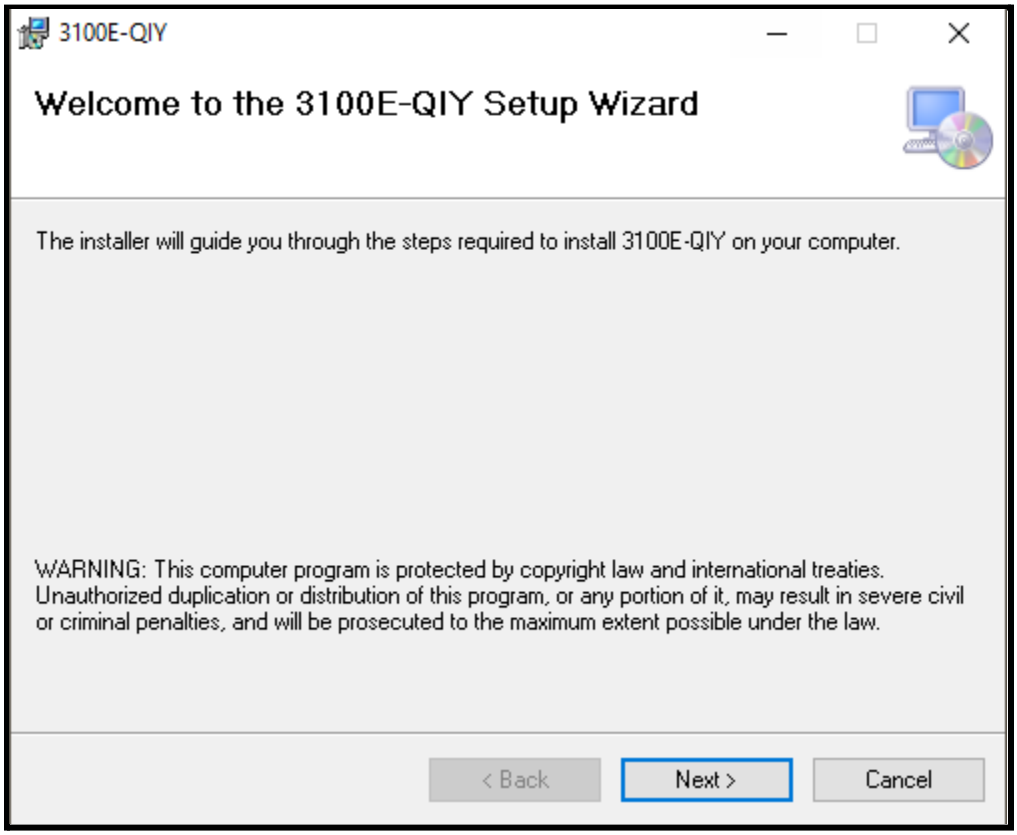
Installation

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

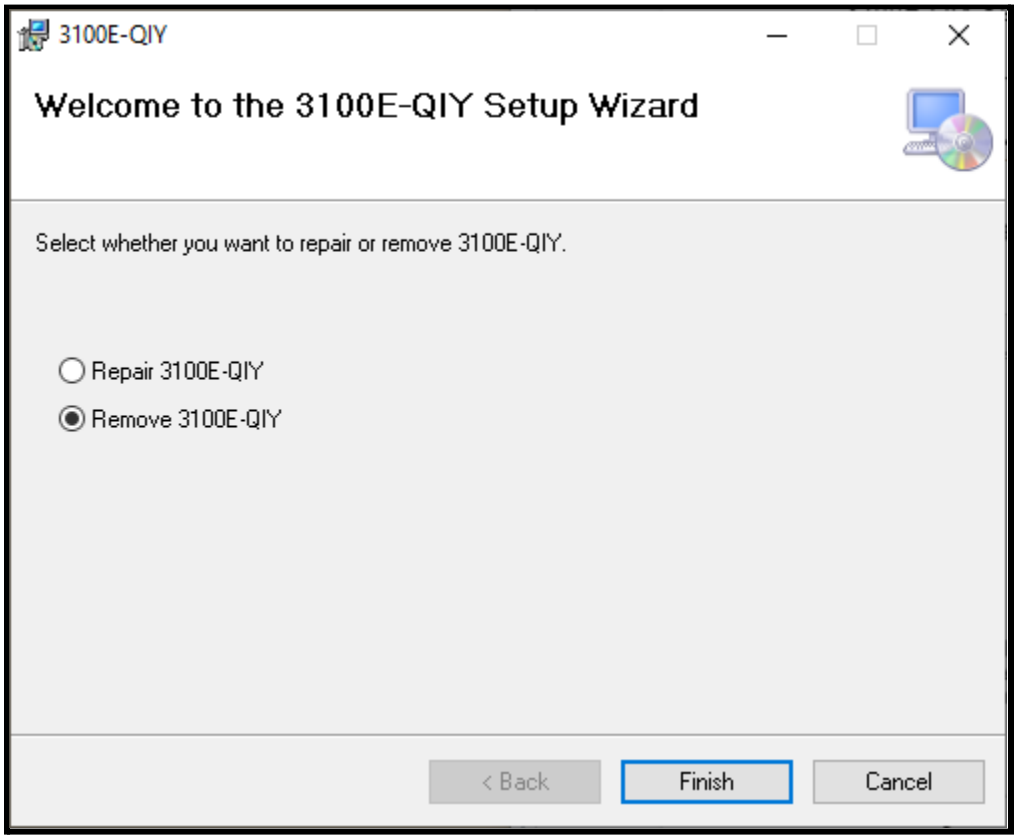


Choose a destination for the software. A Desktop shortcut to the application will be generated and can be removed if desired.

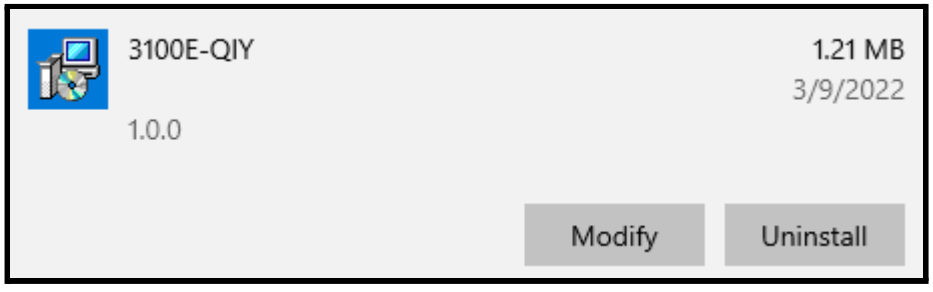
By default, the installation path is as such: [Program Files]\QuaestaInst\3100E-QIY\

Uninstall

There are a couple options to uninstall the program, but the easiest is to simply run either 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.

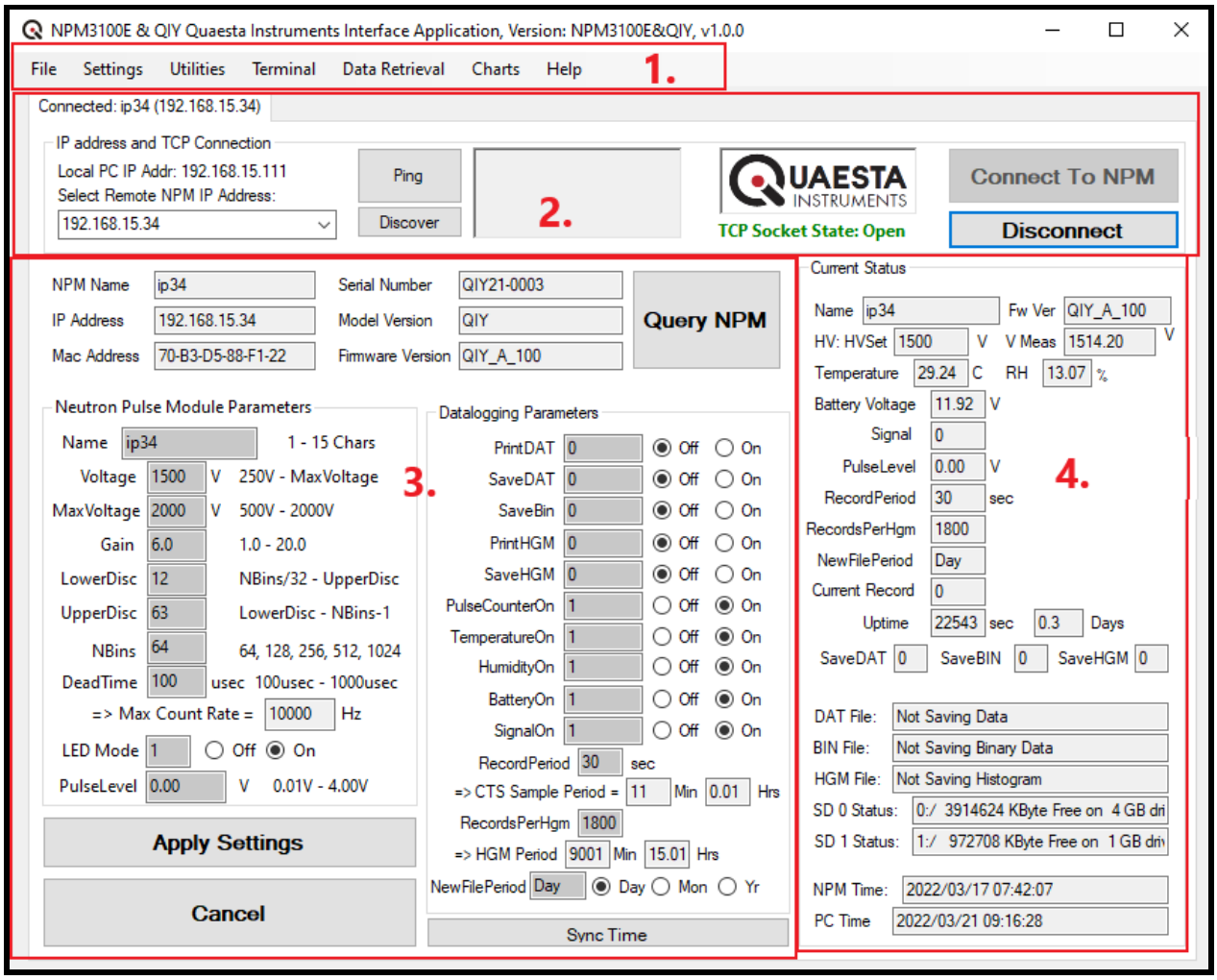


Alternatively, use Windows' built in uninstaller.
The easiest way to navigate to this tool is:
`Windows Key/search -> Add or Remove Programs -> 3100E-QIY -> Uninstall`



First Start

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

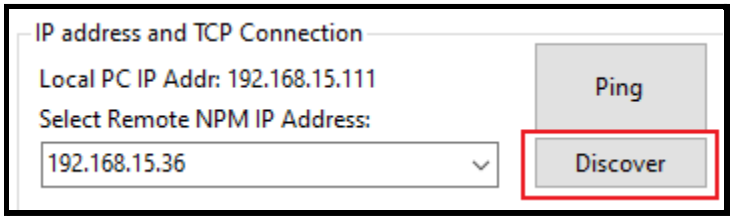


Segments 2, 3, and 4 will not contain any data until an NPM has been connected to and queried for information. Segment 2's list of IPs will be blank until a configuration is added, a UDP discovery is requested, or a known IP is directly entered into the blank. Each segment will have its own breakdown within this guide.

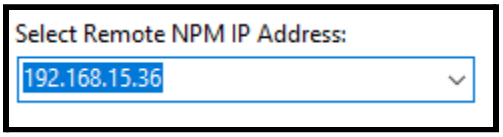
Connecting to an NPM

To connect directly to a QIY device from the main screen, the remote NPM IP Address must be known. You can populate the list in 3 ways:

1. **Request UDP Discovery:**
    a. Find the discovery button beside the IP Address list, or under **`Utilities`** in the menu bar, click **`Find Devices`**
    b. A UDP discovery will run for 5 seconds, and the list will populate if any are found on the network

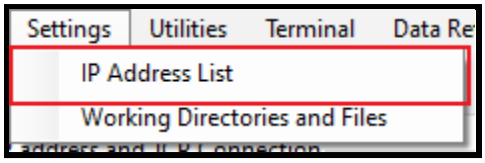


2. **Add a known IP address directly to the box:**
    a. The select ip can be directly manipulated to contain a desired IP address. This is considered temporary, and will not be saved to the dropdown if another is selected.



    b. Once the desired IP Address is entered into the box, you may ping the IP to verify validity, or directly connect as if it were a part of the list.

3. **Use the IP Management Window**
    a. The IP Management Window can be found in the toolbar under **`Settings`** and then **`IP Address List`**



    b. The IP Management Window Guide can be found on page 10

Once a valid IP Address is shown in the box, you may click **`Ping`** to send a 32b ping to the IP or connect to it by pressing the **`Connect To NPM`** button. If the IP is valid, segments 3 and 4 will populate with an automatic query of the NPM.

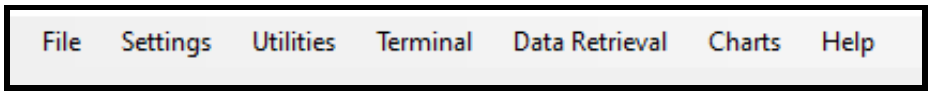
Connection Troubleshooting

There are multiple reasons a TCP connection would not be 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 deny a TCP connection if the device is already connected to it. Make sure nothing is connected to the device already.
2. **The IP Address is not valid**
    a. A TCP Connection can only be established if the IP Address is valid in the first place. Each section of the IP can be 0-255.
3. **The NPM is using a different IP than inputted**
    a. A valid IP Address leading to a device that the application was not designed for will produce undesirable results. Be sure the IP Address you're trying to connect to is a Quaesta Instruments NPM.

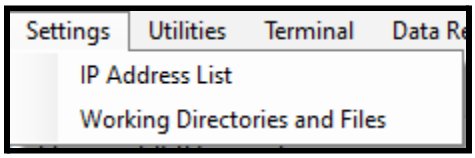
Segment 1. Menu Bar

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



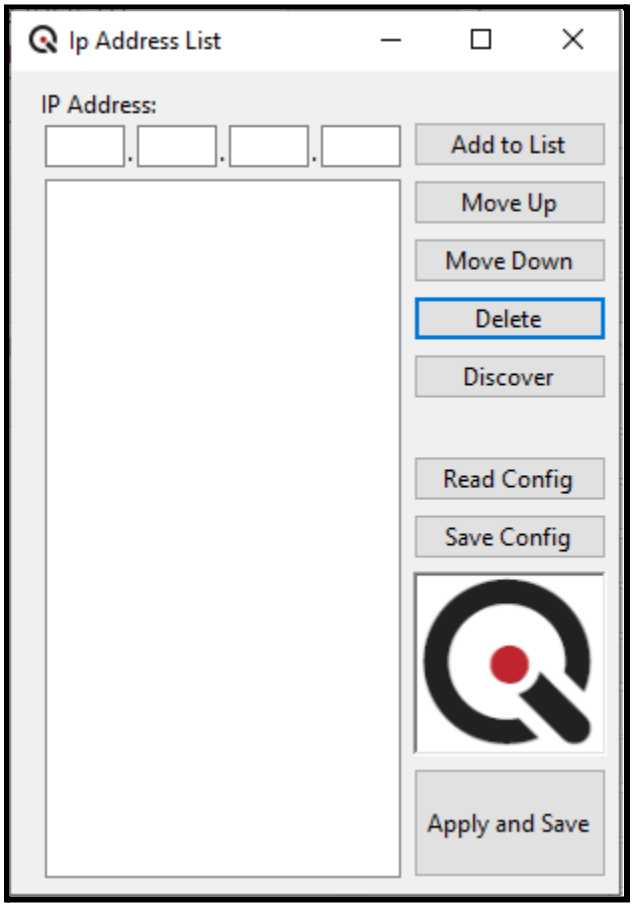
Settings

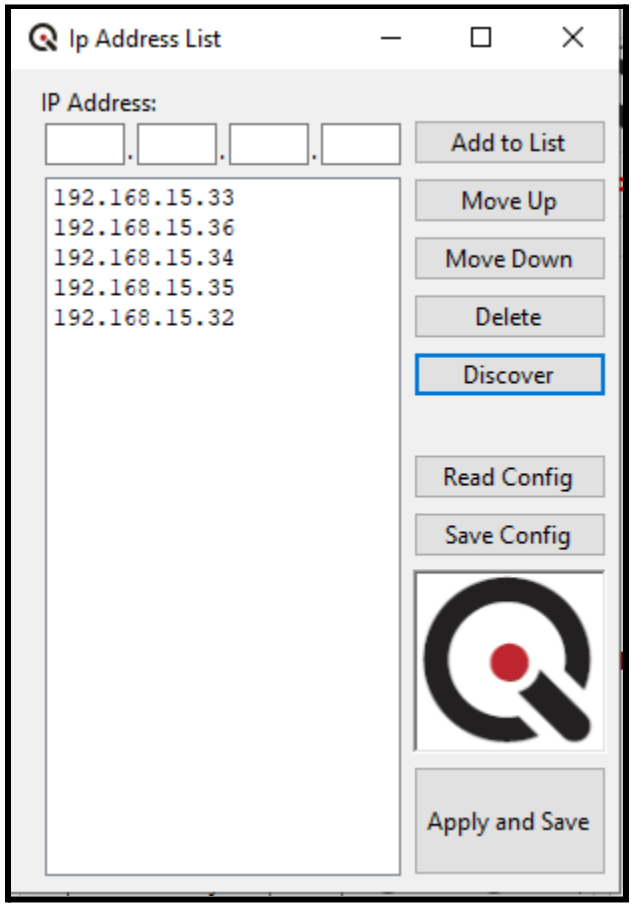
Tools to directly edit the config file under the settings tab.



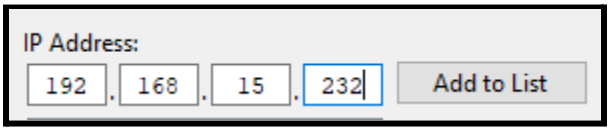
The IP Management Window

The IP Management Window is a reflection of the Remote IP dropdown box in segment 2. If there are already some known IP Addresses, they will appear in this box. Otherwise, the window will be empty.



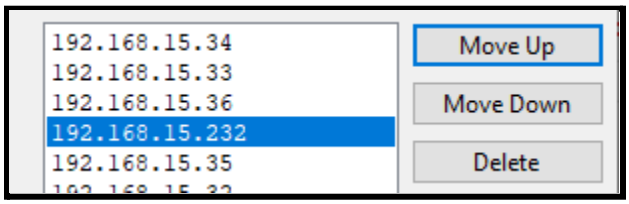


1. **Adding an IP**
    a. Four blank-by-default boxes can be found at the top of this window. These boxes represent the sections of the NPM's IP Address. Enter a valid ip and press **`Add to List`** to manually populate the list.
    NOTE: The IP Management Window will not validate an entered IP Address as a Quaesta Instruments Device, only as a valid IP Address.



    b. Alternatively, the **`Discover`** button may be used to send a UDP discovery request on the network.

2. **Ordering the List and Deleting Unwanted IPs**
    a. Since this list will be reflected in the dropdown menu when changes are applied, so too will the order of the IP Addresses.
    b. Selecting an IP and pressing **`Move Up`** or **`Move Down`** will edit the order of the list
    c. Selecting an IP and pressing **`Delete`** will remove the IP from the list
    NOTE : Changes will not be reflected on the main page until the APPLY AND SAVE button is pressed.



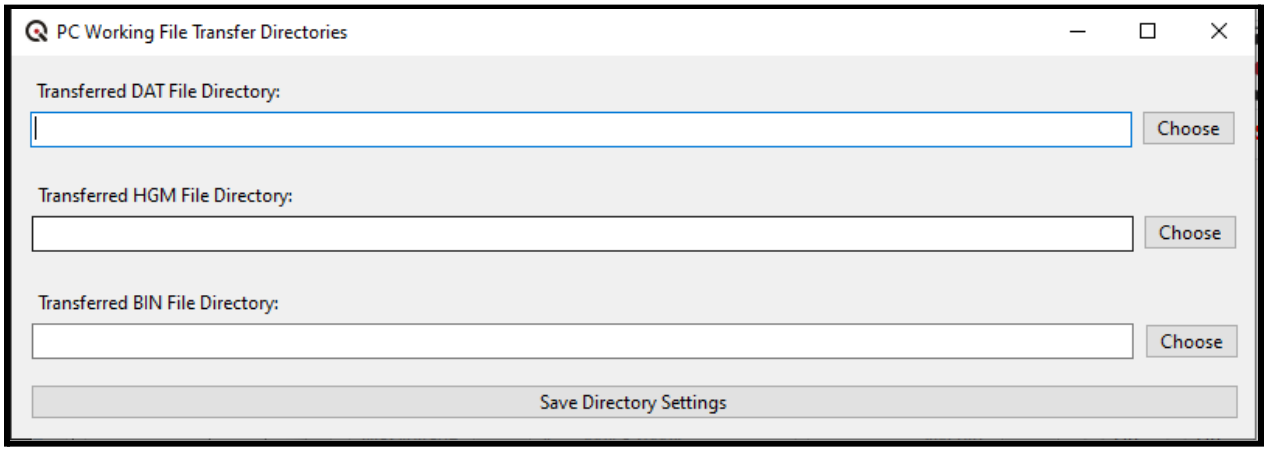
3. **Request a UDP Discovery**
    a. The **`Discover`** button will automatically send out a UDP request and add the responding NPM IP Addresses to the list.

4. **Reading from and Saving to the Config File**
    a. The **`Read Config`** button will clear the list and populate it with the IPs saved in the config file instead.
    b. Opposite, the **`Save Config`** button will save the current list to the config file.

5. **Apply and Save Changes**
    a. Changes to the list within this window will not be applied until this button is pressed, with exception to the config options. Remember to click **`Save and Apply`** upon finishing setting up the IP Addresses.

Working Directories and Files

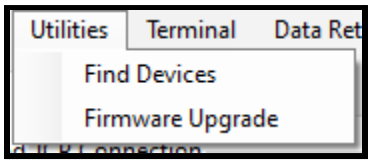
By default, the Working Directories and Files will be empty. Directly edit the config file using this tool to avoid spending time directing files manually when using the application.



When transferring files, these paths will be chosen by default as long as they are set up. Click the **`Choose`** button beside each textbox, or manually add the path to the directory you would like to store the respective filetype in. Your settings will only be written to the config file when **`Save Directory Settings`** is clicked.

Utilities

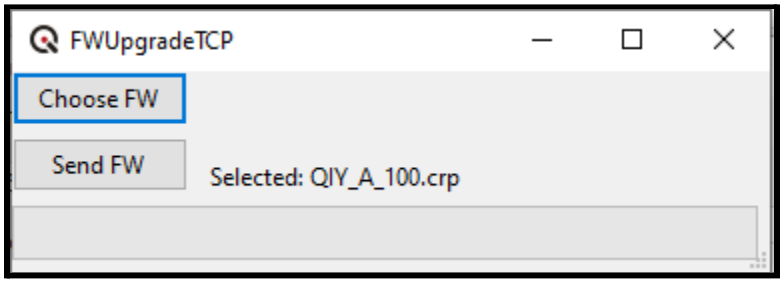
General functionality and tools will fall under the Utilities tab.

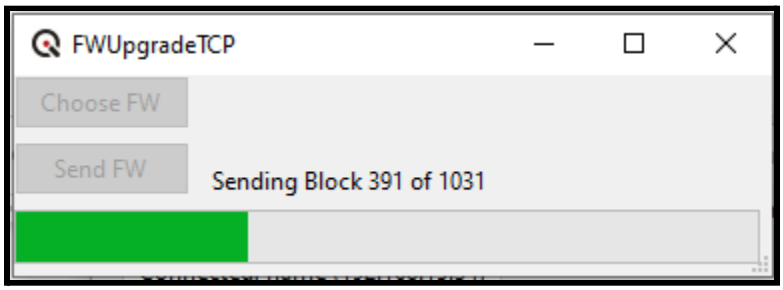


Here you will find an option to send a UDP Discovery request and change the NPM firmware if necessary.

Firmware Upgrade

If necessary, a user may change the NPM firmware fairly easily provided the .CRP file is on a local disk. The Firmware Upgrade window is simple, there are only two buttons and a progress bar.

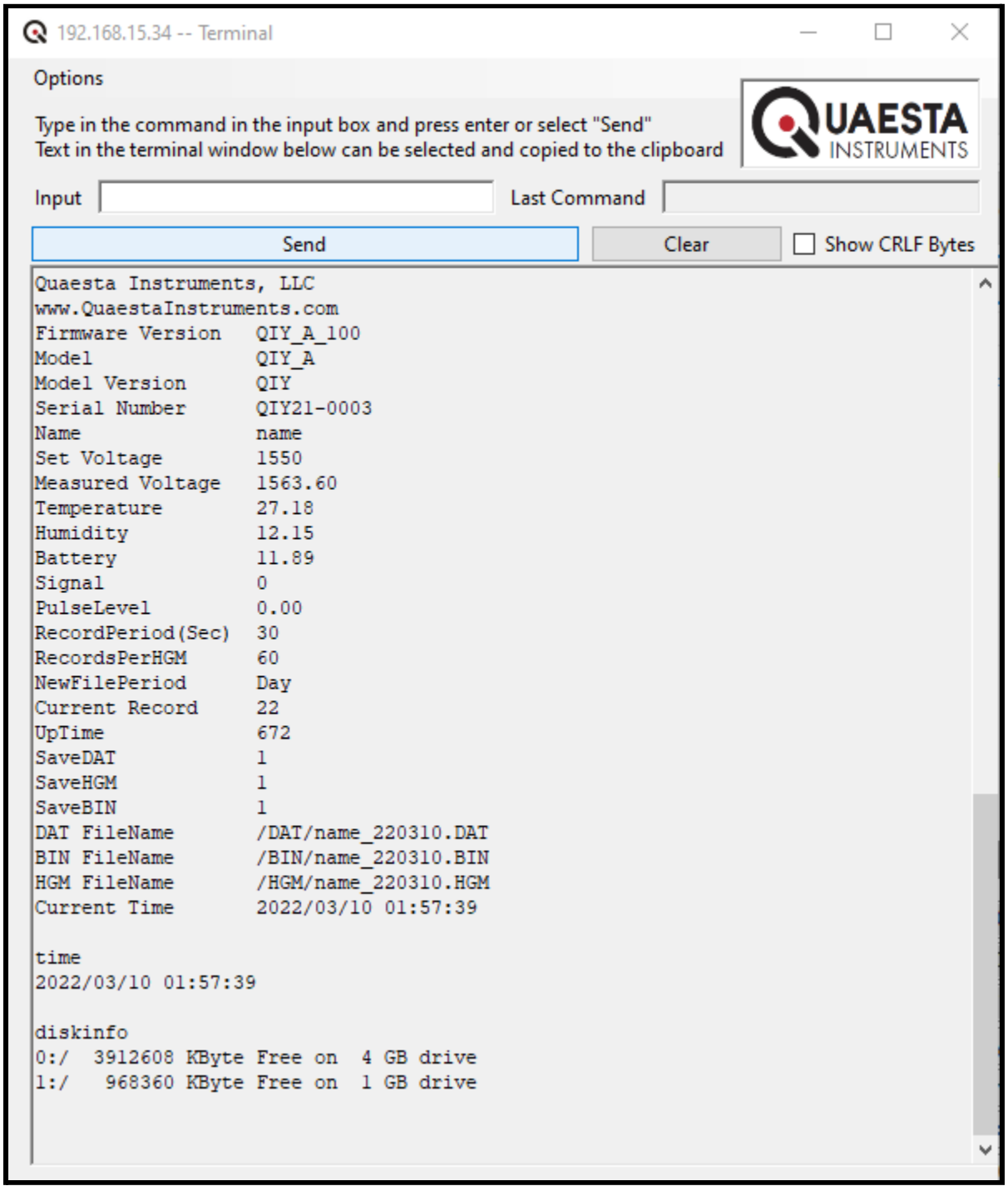




The user must select a .CRP firmware file provided by Quaesta Instruments, then simply click **Send**. The process will happen automatically and the window will close by itself.

Terminal

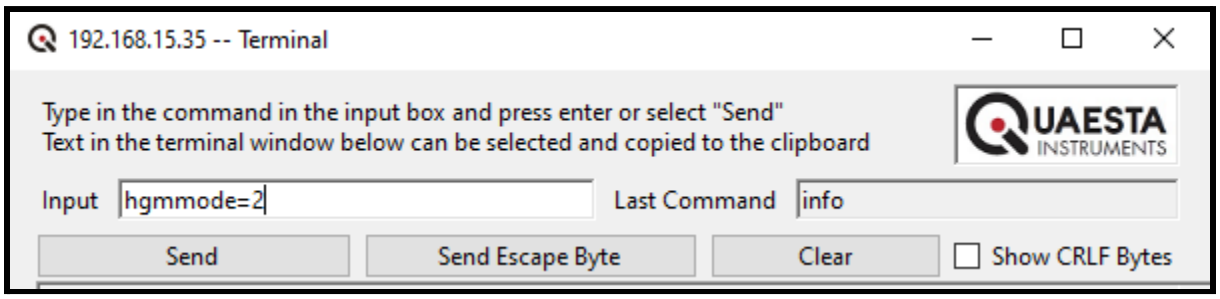
The terminal allows the user direct access to the NPMs API, so long as a valid connection is established. Commands sent by the application and the respective response can be seen in real time if a terminal window is open.



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 either press the send button or the enter key.

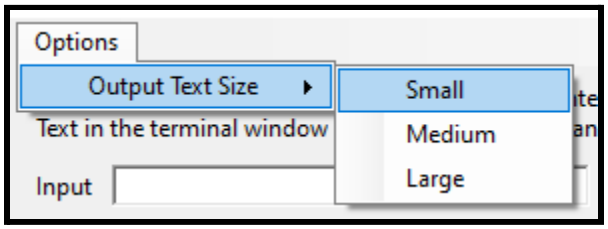


Last Command

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 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.

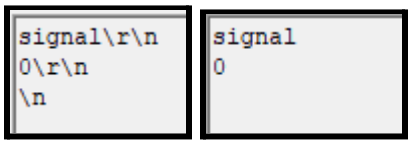


Clear Output

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.

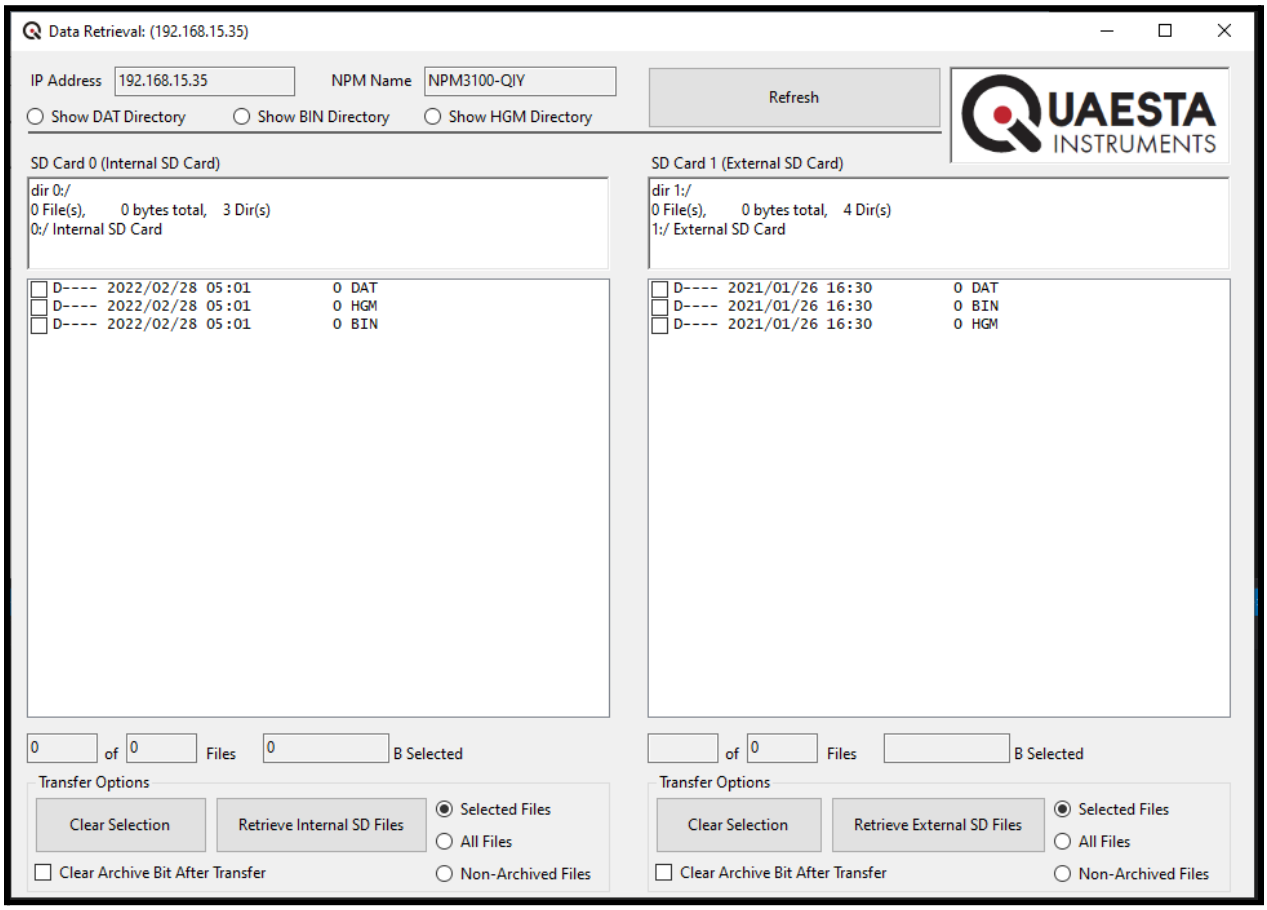


Resize Output

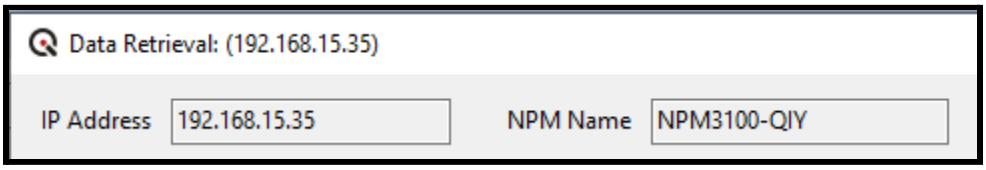
The terminal output may be resized for large lines that break on a smaller window. Simply change the width/height of the window to expand the output.

Data Retrieval

A user must be connected to an NPM to access the **`Data Retrieval`** window.

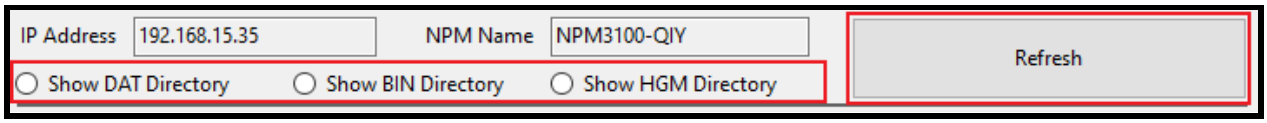


The connected NPM's IP Address and given name will be displayed at the top of the window, and also in the window's title. Verify you are connected to the intended NPM here.



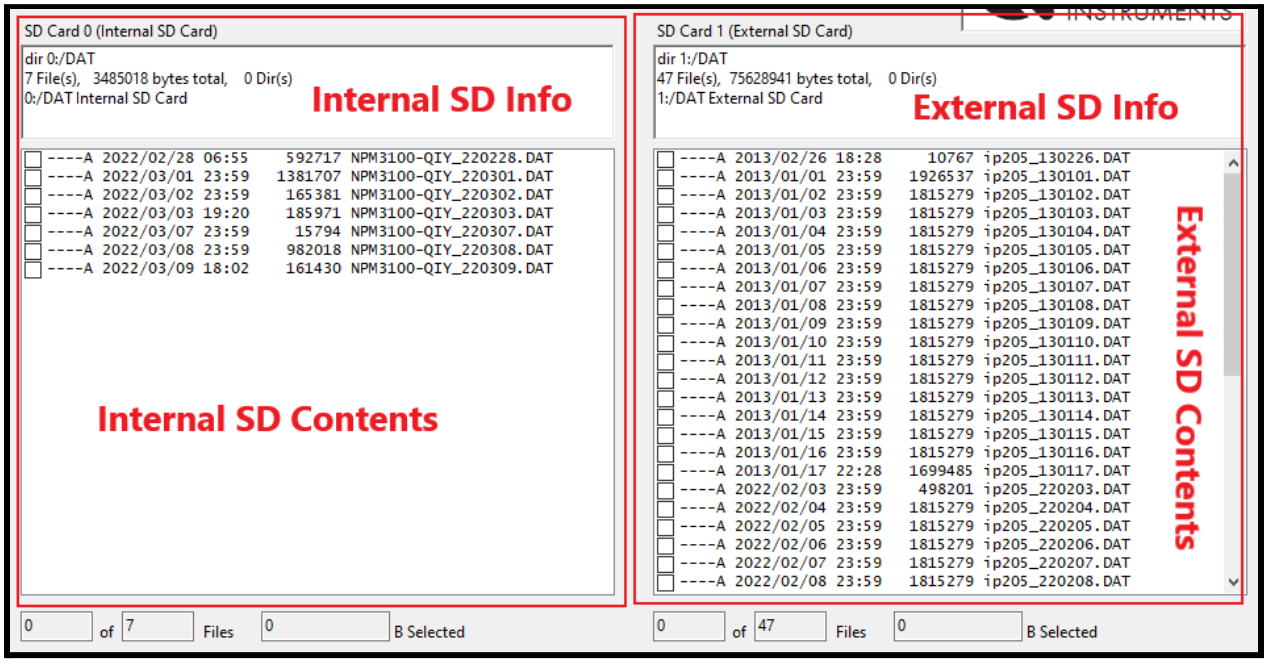
Select A Directory

Under the NPM info area, there are three options: Show DAT Directory, Show Bin Directory. Select one and the directory should expand into the two large boxes below. If required, press the **`Refresh`** button to requery the directory.

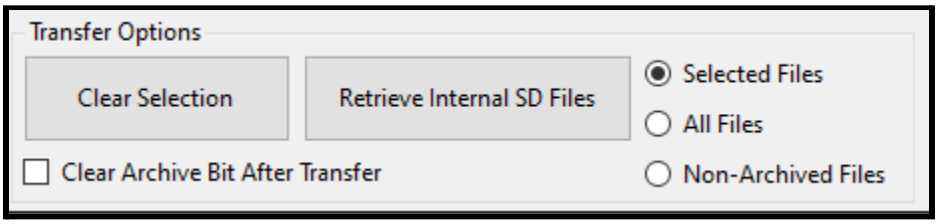


Choose Files

The interface is split down the middle, with the *internal* card contents/information on the left and the *external* card contents on the right. These should populate with the selected directory's contents as it is selected or Refresh is pressed.



Select desired files manually by selecting them in the contents box, or by using the respective transfer options below.
NOTE: Each transfer option box is specific to the corresponding internal or external card.



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

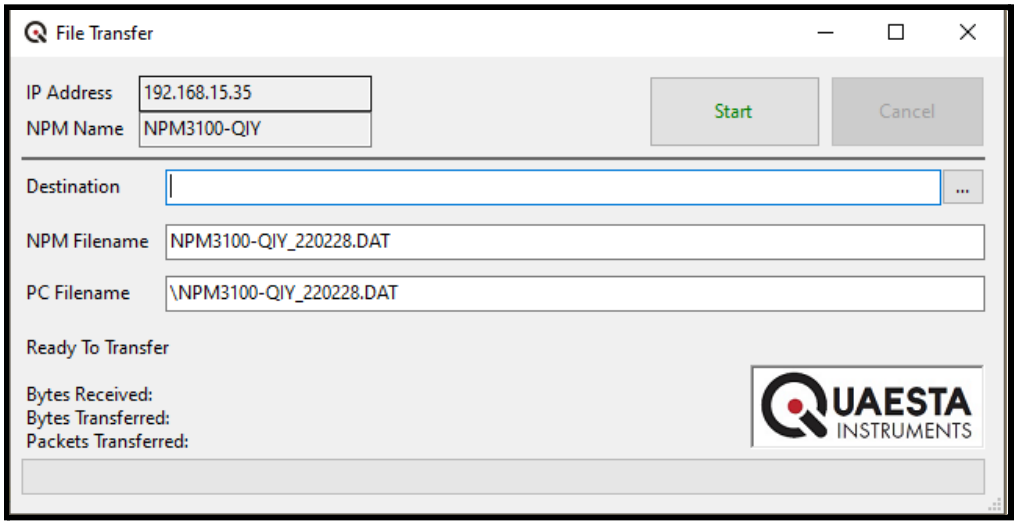
All Files
All files will be transferred regardless of selection. Selection will persist, however.

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.

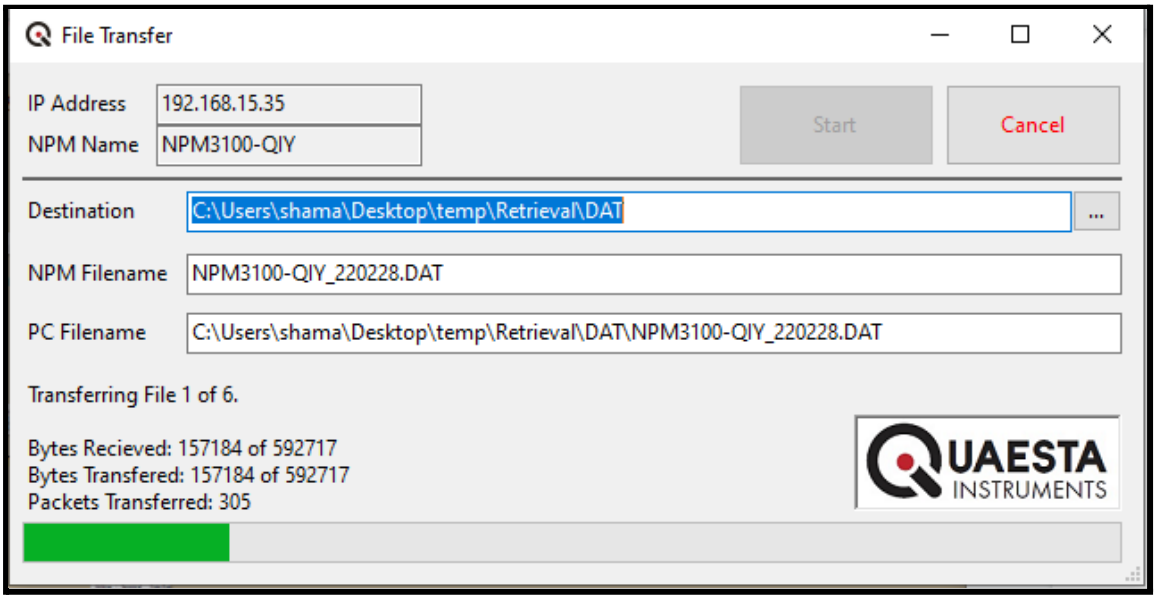
Retrieve SD Files

Clicking either **`Retrieve Internal SD Files`** or **`Retrieve External SD Files`** will spawn the 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, simply click **`Start`** and allow the application to receive the files. Progress will be displayed below.



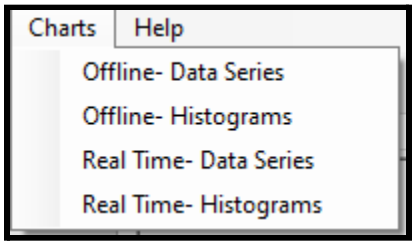
Cancel Transfer

Clicking the **`Cancel`** button will cancel the transfer operation, but finish printing the remainder of the current file.

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.



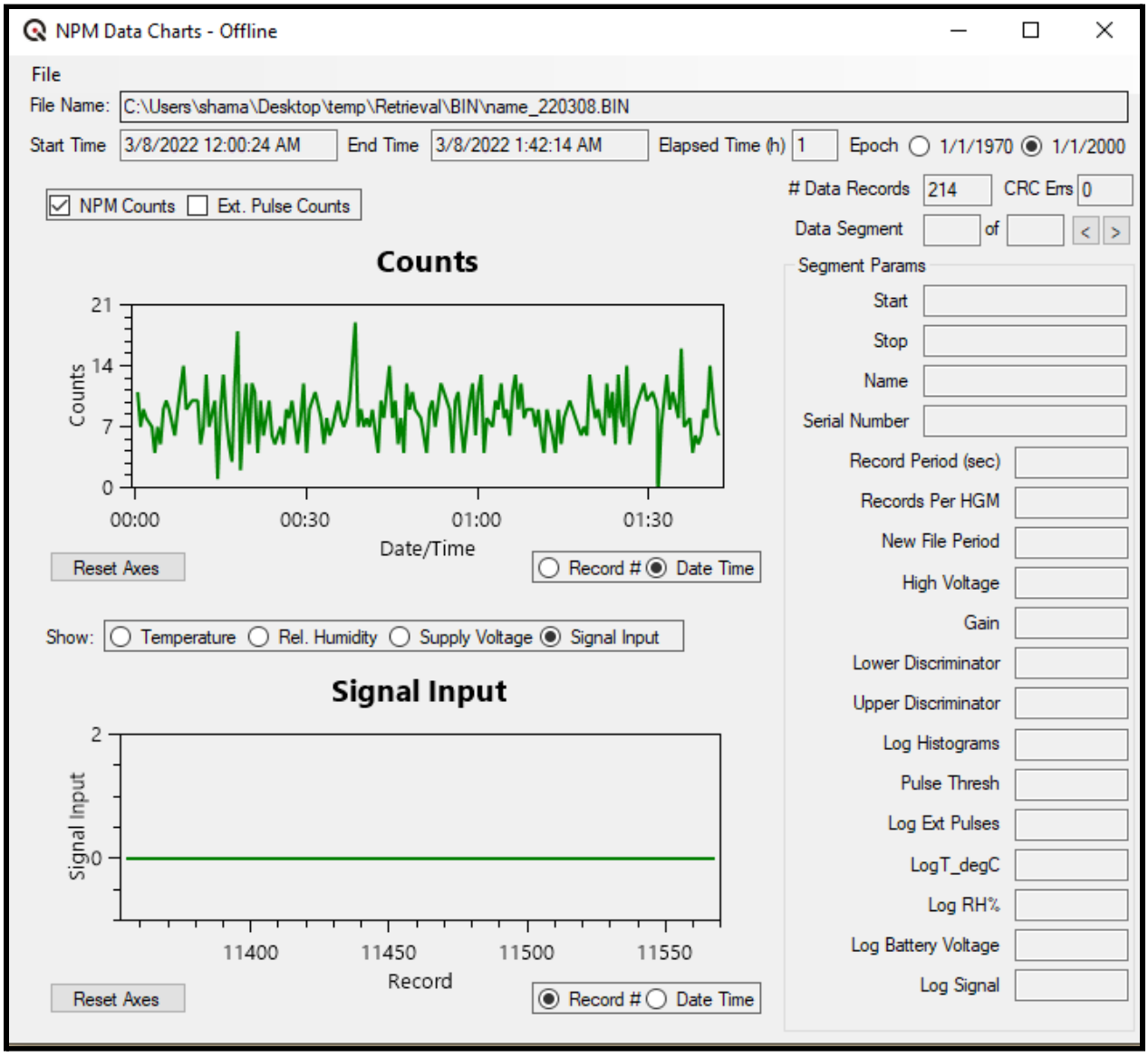
All charts are resizable to fit whichever view is most comfortable. Simply adjust the window size.

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

Open a bin file by clicking **`File`** and selecting **`Open BIN File.`** If default directories have been set up, the ap

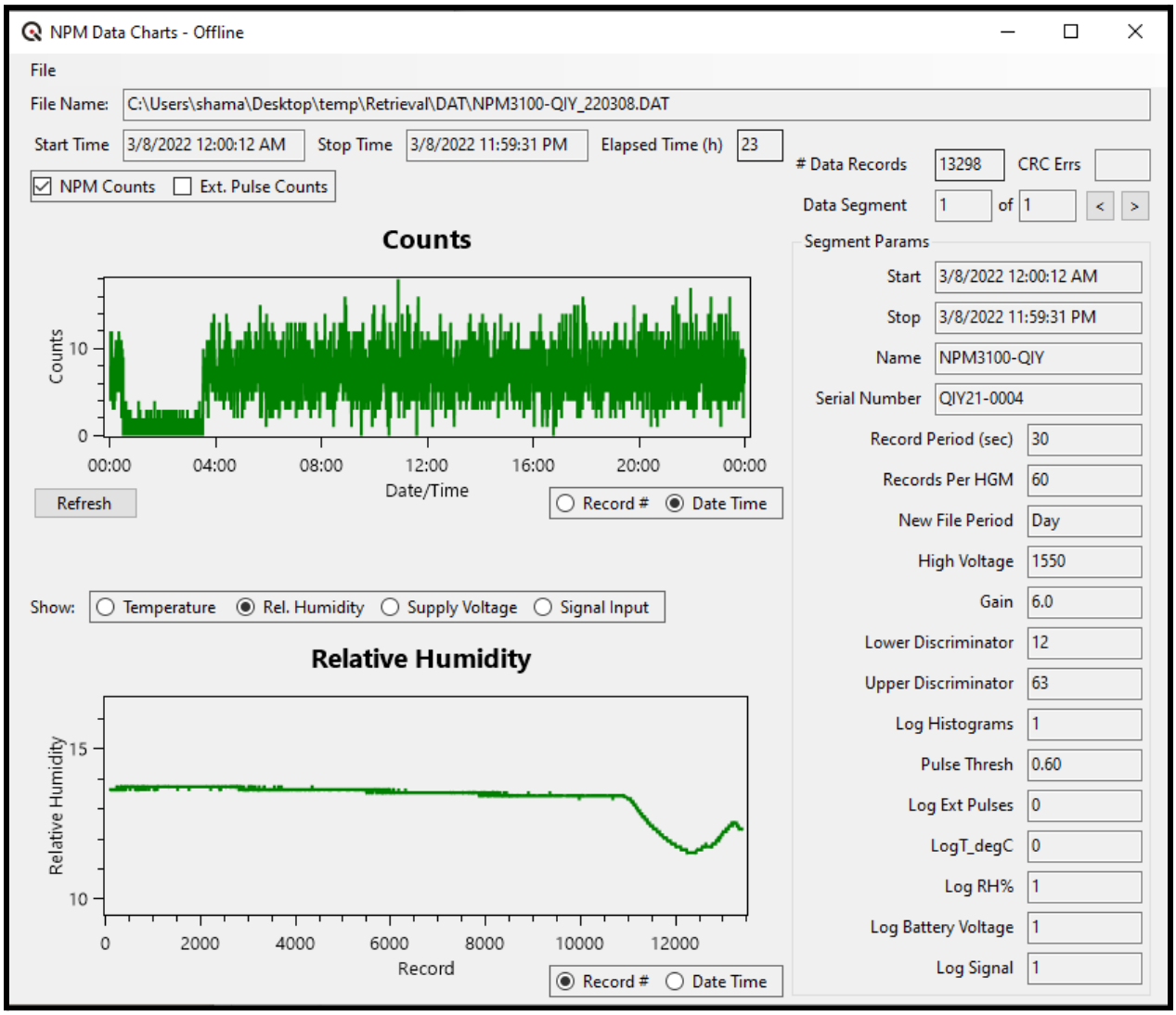


plication will automatically open the respective directory.

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.

Dat Files

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

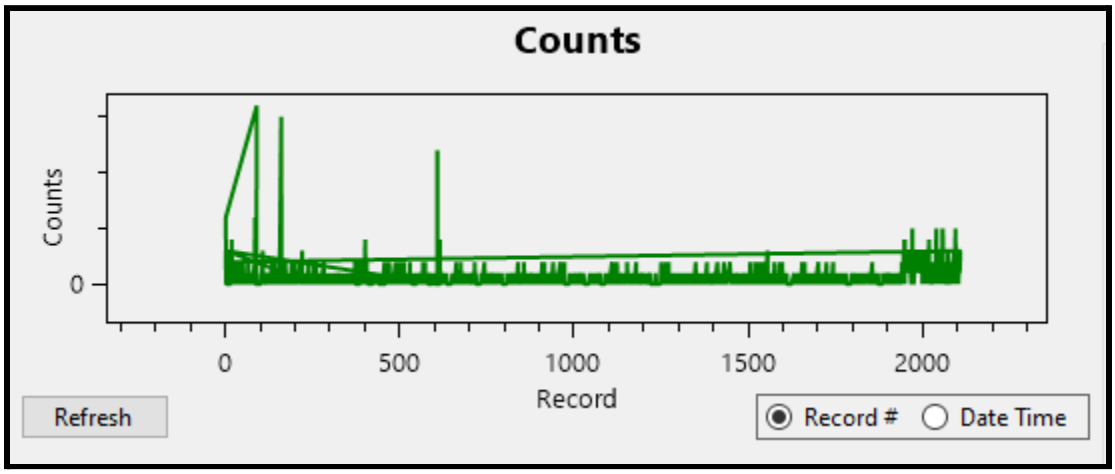


Opening a Dat file will populate only charts where data collection was on. The segment params will be displayed in this mode if available.
NOTE: Modified Dat files with no header may not be parsed correctly, if at all. Do not remove the header information from these files to avoid missing data.

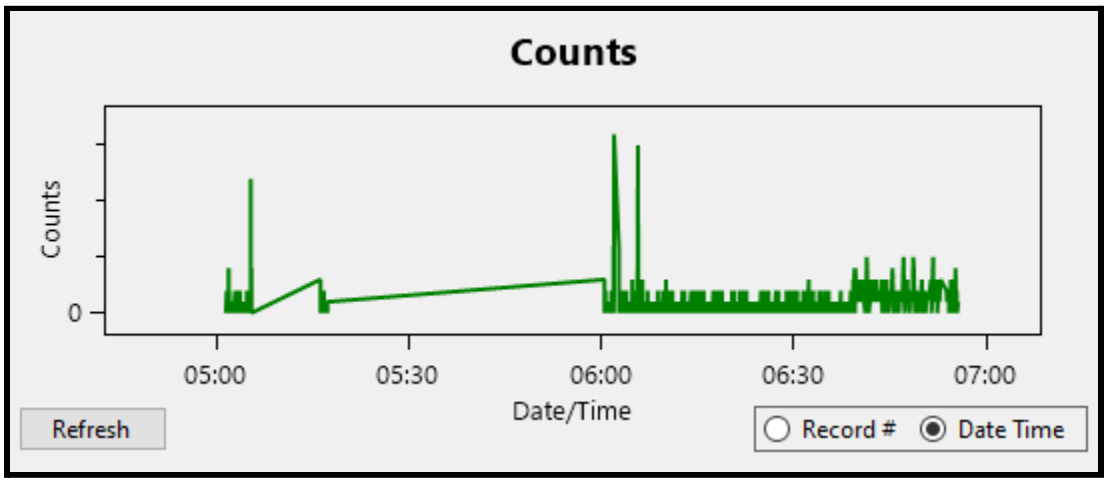
If the device was rebooted during data collection, there may be multiple segments. Scan through the segments using the arrow buttons near the top left of the window.
*NOTE: The charts will show the entire data set, scanning through data segments will only show changed parameters in the **Segment Params**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



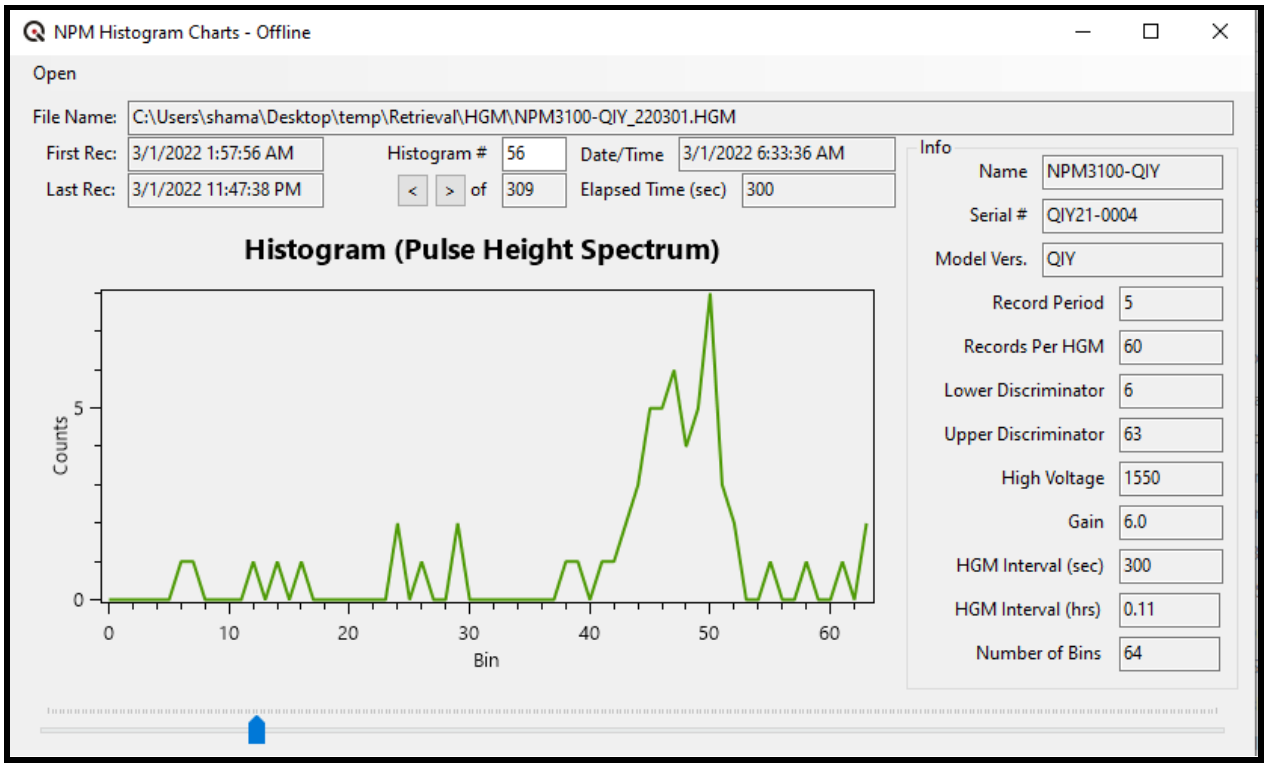
*Above, a chart of an NPM which was rebooted multiple times. Viewing this chart with **Record #** selected is not ideal. Below, the x axis has been swapped to Date Time, displaying a plot with more digestible data.*



Offline Histograms

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

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



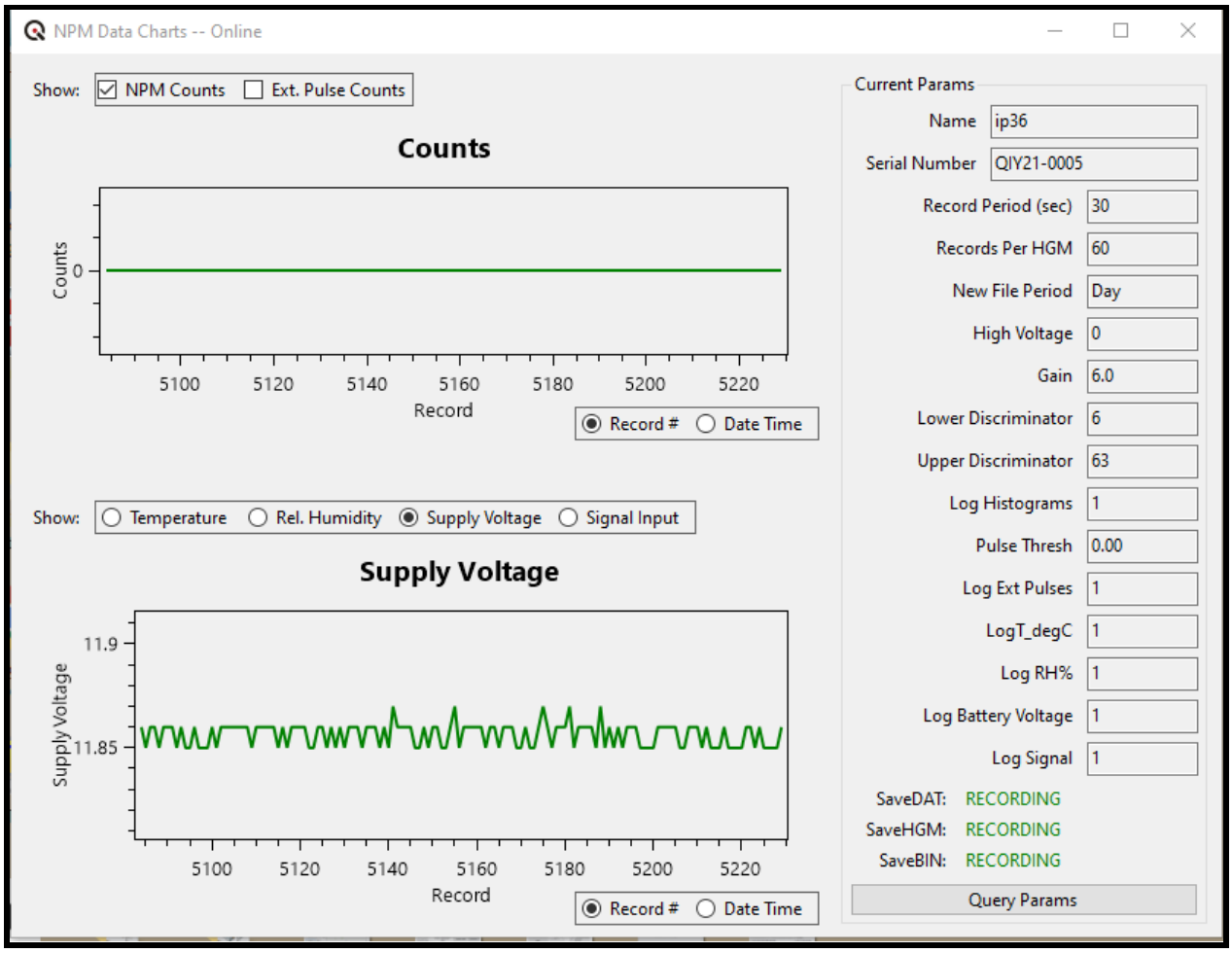
View different histograms by either

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.



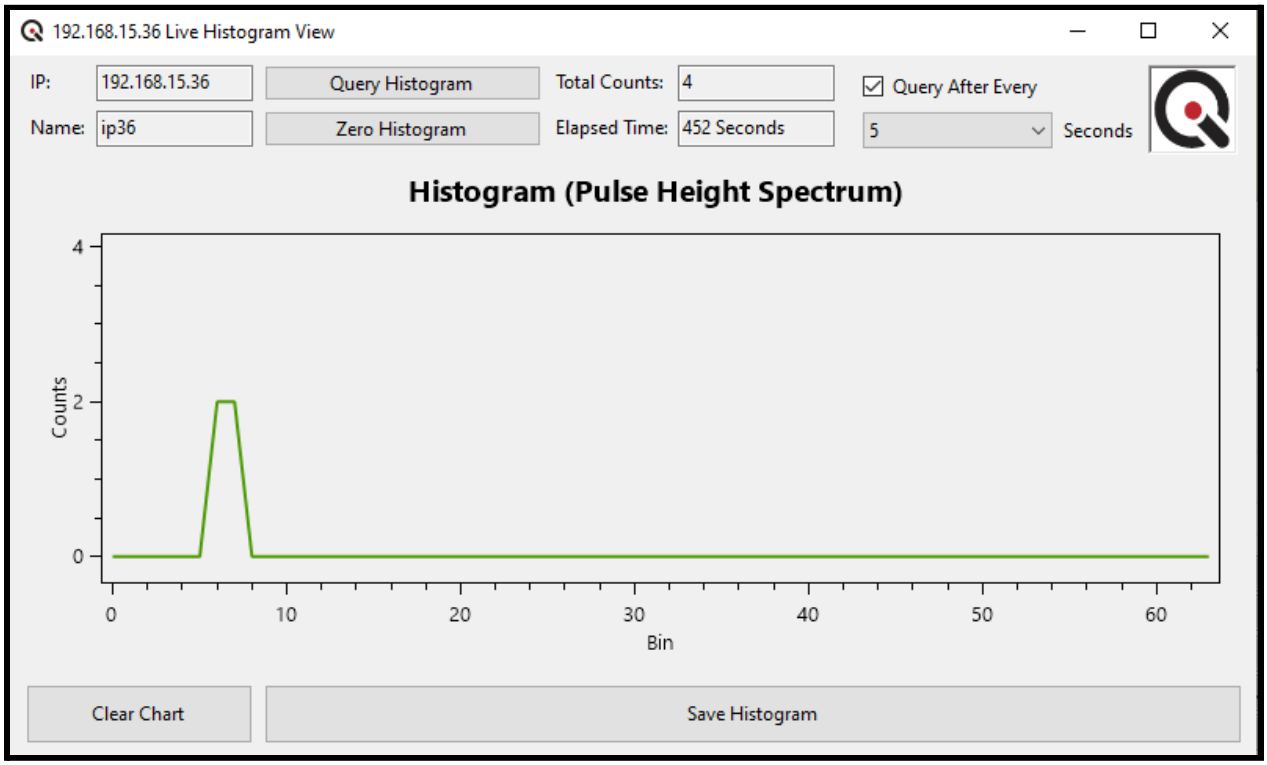
This tool is meant to reflect what is being written to the cards in real time. The same options are presented in this window as are in the offline plots.

Real Time Histograms

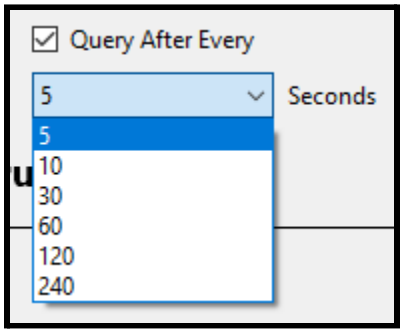
Selecting **`Real Time- Histograms`** will open an online charting window for viewing current Histograms (pulse height spectrums). An NPM must be connected for this window to open.

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`.

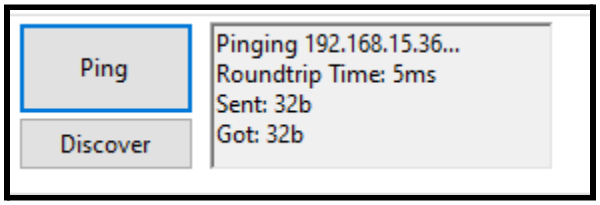
Segment 2. Connection Status and General TCP Information

This section will display the socket state and the connected NPM's Name and IP address. Connect and disconnect to an NPM using the respective buttons.

Ping an IP

To ping an IP Address, select or type the IP into the dropdown box labeled **`Select Remote NPM IP Address`** and click the button titled **`Ping`**.

A 32b ping will be sent to the selected IP Address and the roundtrip time will be reported in ms in the box to the right.



Discover

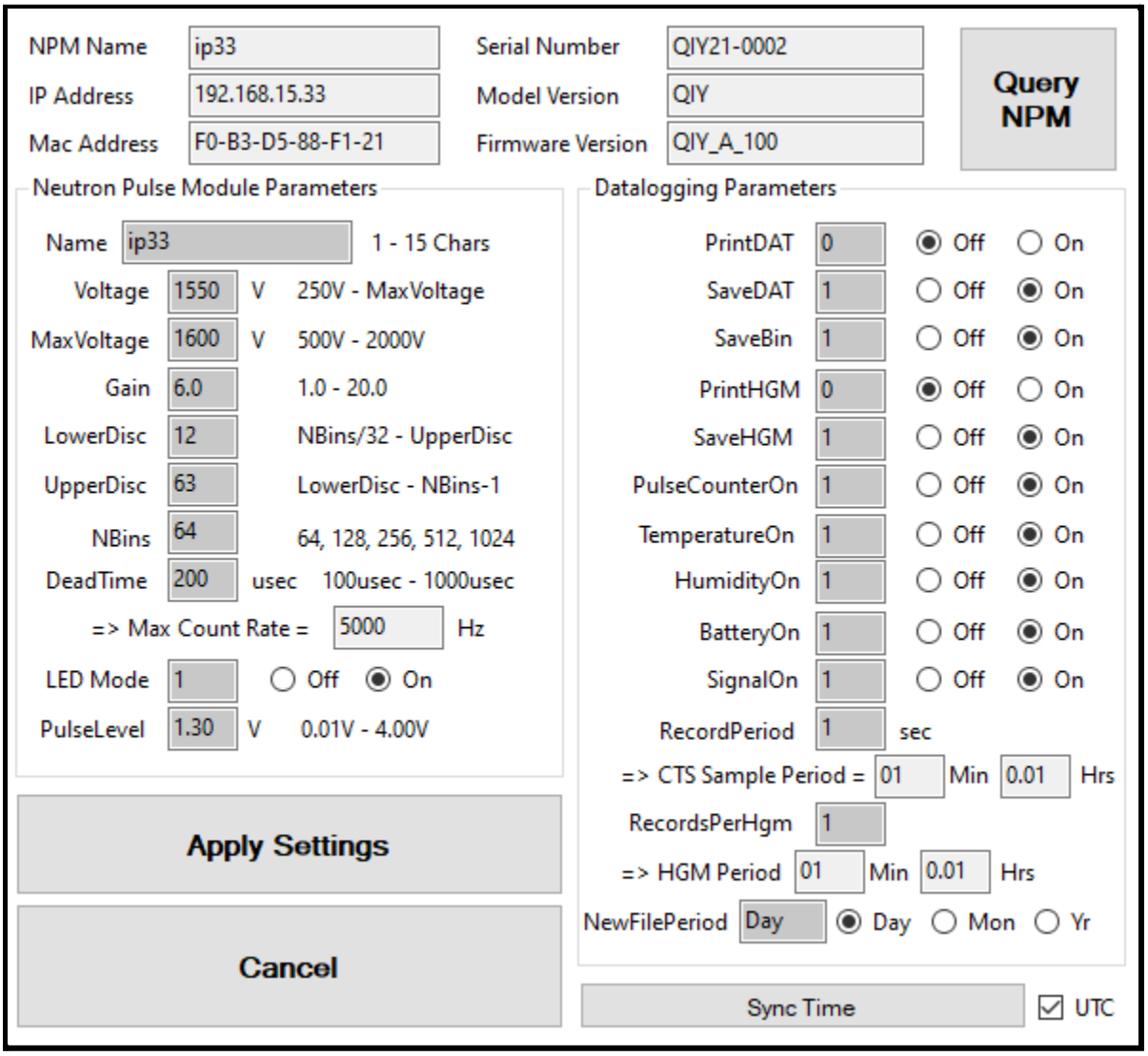
To discover NPMs on the network, request a UDP Discovery by pressing **`Discover`**. The dropdown will automatically fill in as NPMs are discovered.

On Connection

Upon establishing a valid TCP connection to the NPM, a query sequence will automatically run and the NPMs information will be displayed to segments 3 and 4.

Segment 3. NPM Parameters

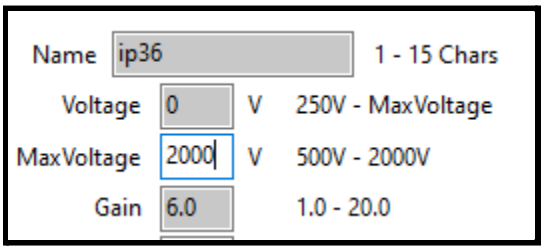
This segment of the main display visualizes *most of* the available parameters of the NPM as well as some direct controls used to tune the NPM. This segment will not be enabled until an NPM is connected, but will retain a disconnected NPMs parameters.



Editable and Read Only Parameters

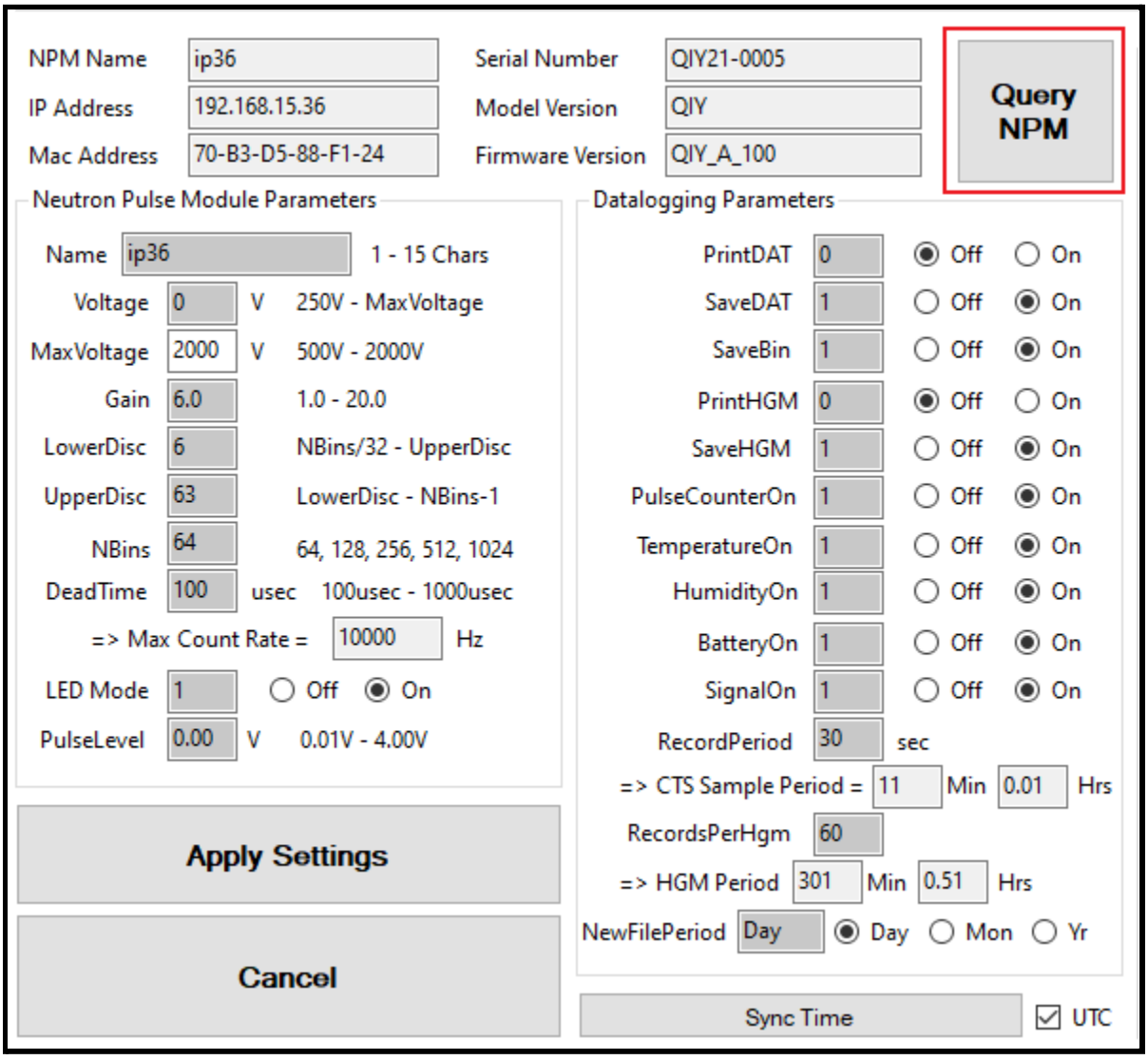
The color scheme used by text boxes in this segment is intended to make changing NPM parameters intuitive. The color scheme is as follows:

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, simply click the **`Query NPM`** button located in the top right corner 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 Settings`** button in the bottom right corner of the application.

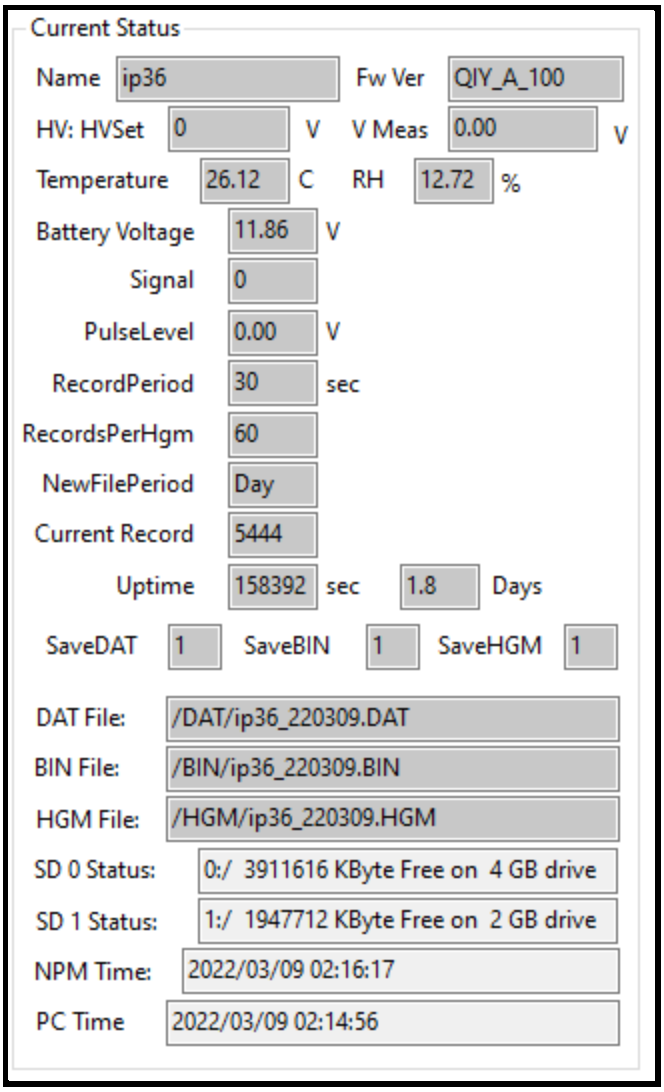
This action will trigger a query sequence after changing the parameters, and each will be validated by the NPM. There is no need to query the NPM after changing parameters in this way.
Alternatively, pressing the **`Cancel`** button will remove changes made in the application and requery the NPM.

Sync NPM Clock

To sync the NPM's clock, simply click the **`Sync Time`** button located in the bottom left of the segment.
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.

Segment 4: Status, Paths, and Time

This segment displays the current NPM status, the current DAT, BIN, and HGM file paths, and Current NPM and PC Time.



Status

The NPM will report its own status if queried with the command **`Status.`** An NPM status reports current temperature, Relative Humidity, Supply Voltage, Signal, the current record, uptime (sec, days), and measured voltage. These text boxes are indicated by a dark gray background, but are considered Read Only.

Query the Status by either clicking the **`Query NPM`** button, or by sending the **`Status`** command in the terminal.

Paths and SD Card Status

This segment will also display the current DAT, BIN, and HGM file paths and both internal and external SD Card statuses. Query this section by either clicking the **`Query NPM`** button, or by sending the **`DiscInfo`** command in the terminal.

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.

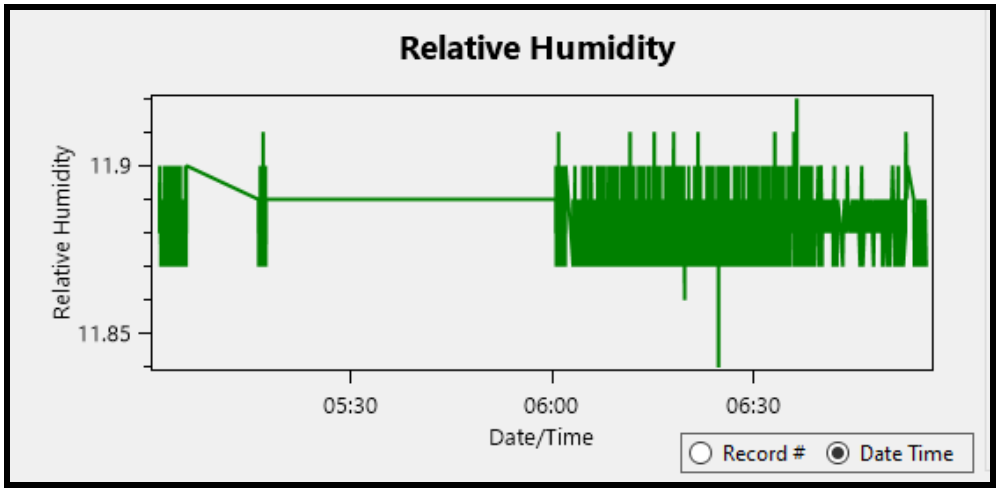
Manipulating Plots

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.

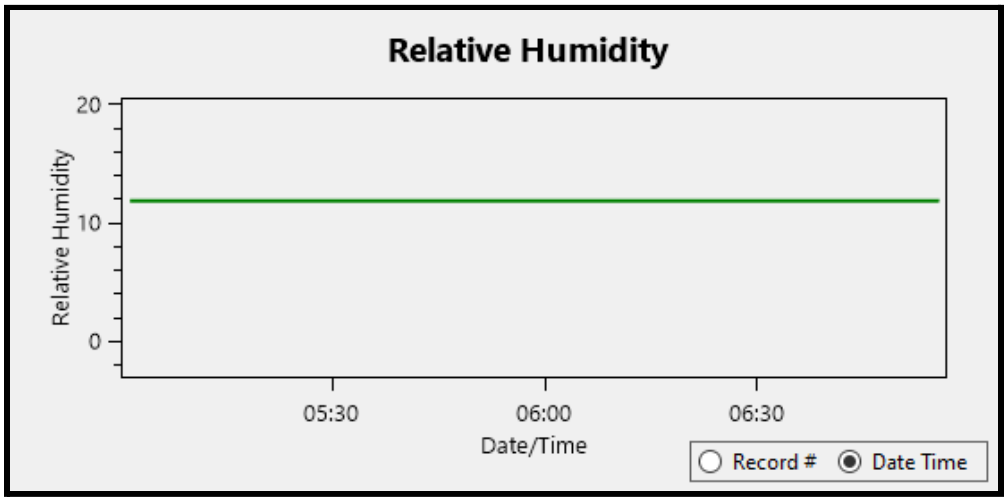
Adjusting axes

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.

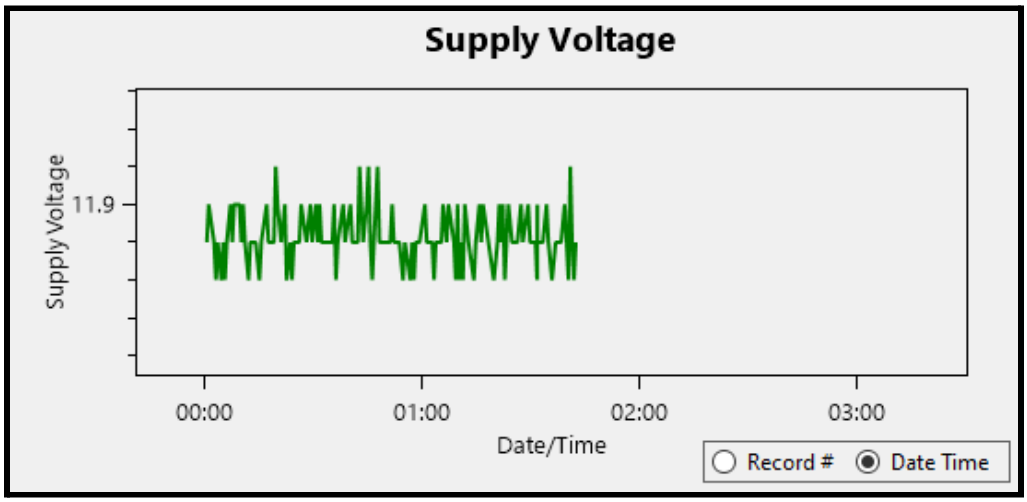
To adjust both axes at the same time, or “zoom” the entire plot, use the scroll wheel while hovering over the plot area.



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.