

test and measurement software  
**SENSIT**

**Sensor Solution Source**

Load · Torque · Pressure · Multi Axis · Calibration · Instruments · Software

[www.futek.com](http://www.futek.com)



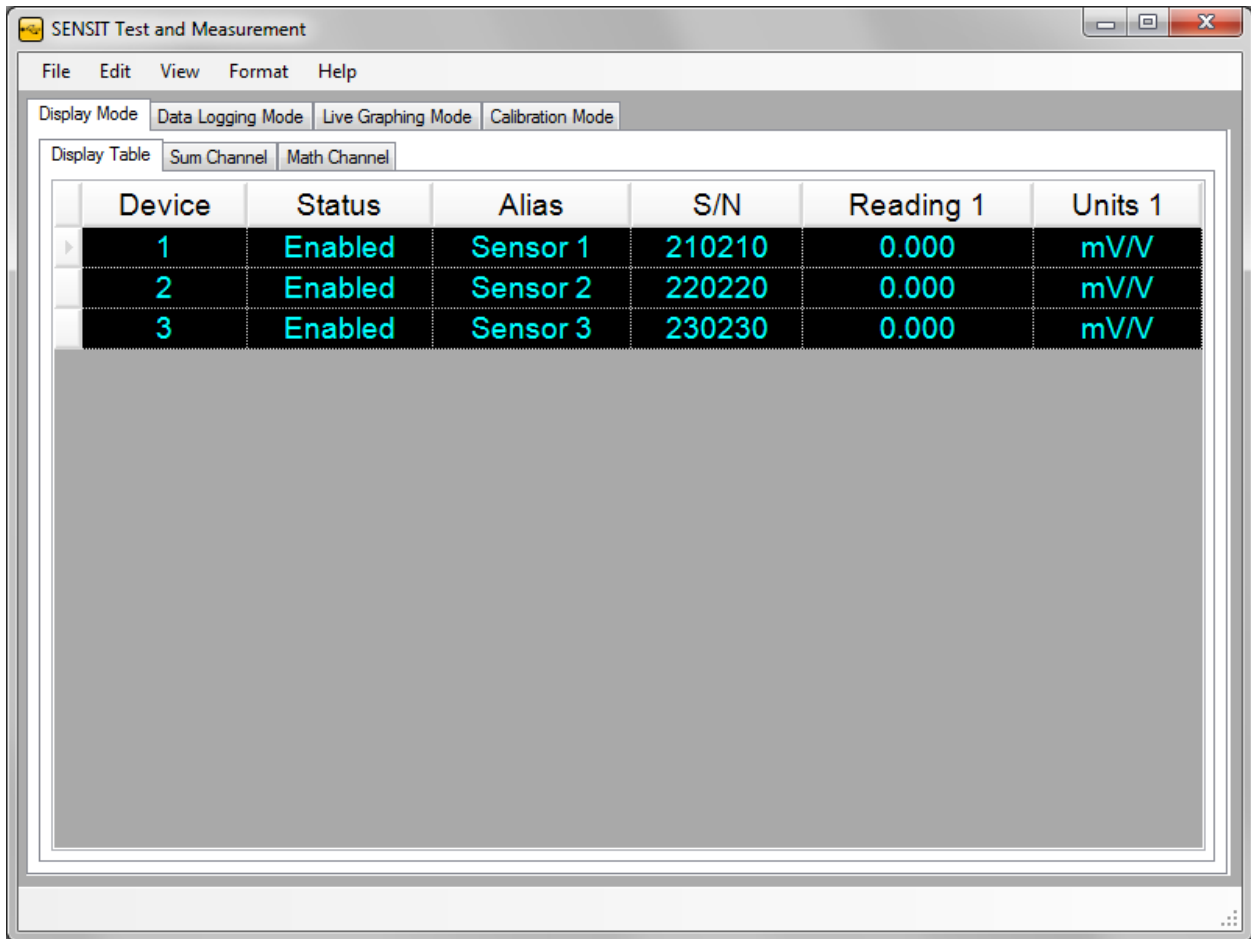
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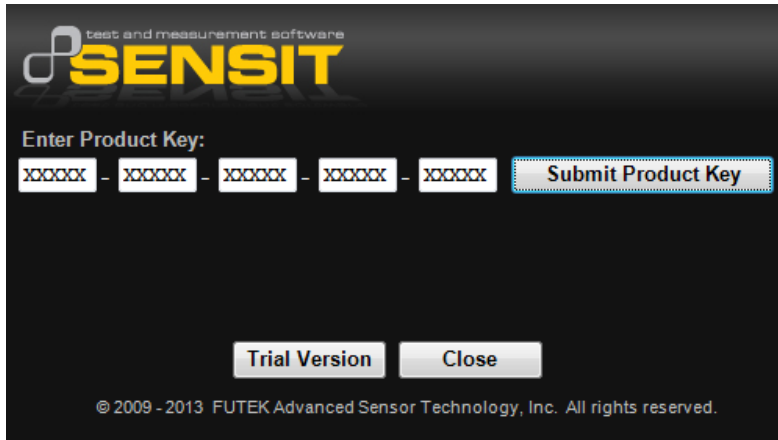
This software manual outlines all of the features available in the SENSIT Test and Measurement software. This software is for computers running Windows based 32 or 64 bit (x86 or x64) operating systems.



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SENSIT Test and Measurement requires a product key to be entered to validate the license that has been purchased. If you do not have a product key, then you may use the Trial Version of the software for up to 14 days from the time of installation.

The product key has the following format: XXXXXXXX -XXXXX -XXXXX -XXXXX.



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SENSIT Test and Measurement supports the use of several models. When connecting more than one type of model family, the software will require the user to select which model(s) to communicate with when running the application.

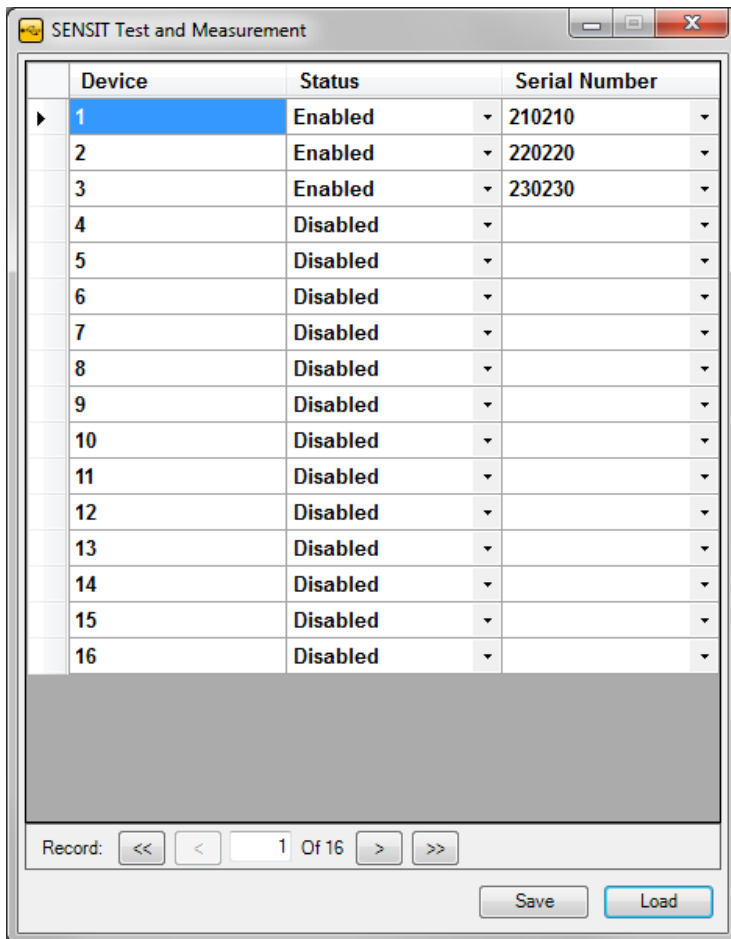


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SENSIT Test and Measurement automatically populates all of the available device serial numbers in a drop-down list. Each device is assigned to a unique row in ascending order by serial number. The device selection table can be used to enable or disable each of the devices and to assign a serial number to a specific device number. There is an option to save the settings for each device that has been enabled or disabled, which will be reflected the next time the software is executed.

Please Note:

1. Each serial number must be unique and cannot be assigned to more than one row.
2. Only devices that have been enabled will be used in the software.
3. If a device number has been disabled, then the subsequent devices will be ignored in the software.



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Device	Status	Alias	S/N	Reading 1	Units 1
1	Enabled	Sensor 1	210210	0.000	mV/V
2	Enabled	Sensor 2	220220	0.000	mV/V
3	Enabled	Sensor 3	230230	0.000	mV/V

### File

Load Default Settings loads the default display, data logging, live graphing, color and font settings of the software.

Load Saved Settings loads the previously saved changes to the display, data logging, live graphing, color, and font settings

Save Current Settings saves the current changes to the display, data logging, live graphing, color, and font settings

Exit will close the application.

### Edit

Display Table allows the user to change the heading of the columns on the display table.

### View

Display Table Columns allows the user to select the columns that will be visible on the display table.

Display Table Rows allows the user to select the rows that will be visible on the display table.

Display Front Panel Orientation allows the user to change the orientation of the display front panel to horizontal or vertical.

Display Front Panel Zoom allows the user to change the size of the display front panel between 100% and 300% of actual size.

### Format

Culture Information allows the user to change the number, date, and time format associated with the software based on regional language settings.

Font allows the user to change the font of the display table.



Background Color allows the user to change the background color of the display table and display front panel.

Foreground Color allows the user to change foreground (text) colors of the display table and display front panel

### *Help*

Additional Information allows the user to view system properties, sensor properties, unit conversions, and unit codes

Transducer Electronic Data Sheets (TEDS) allows the user to view the TEDS template data.

Software Manual allows the user to view a .pdf of the software manual that relates to their software.

About SENS IT Test and Measurement allows the user to view information about the software and the manufacturer.

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## Display Table

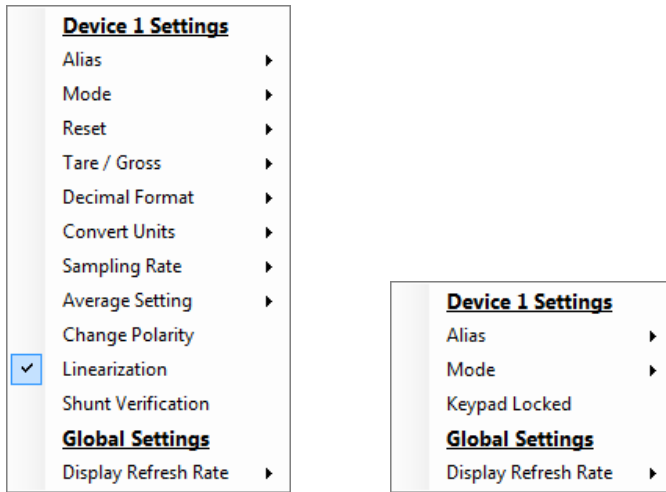
This tab displays all of the relevant information that is related to the reading of each device. The settings of each device can be controlled individually using the right click to display the settings menu.

Device	Status	Alias	S/N	Reading 1	Units 1
1	Enabled	Sensor 1	210210	0.000	mV/V
2	Enabled	Sensor 2	220220	0.000	mV/V
3	Enabled	Sensor 3	230230	0.000	mV/V

## How to Use the Display Settings

1. Click on the device whose settings will be changed so that the device is highlighted.
2. Right click anywhere on the Display Table and select the [Display Settings](#) to change for that device.

## Display Settings



### Device Settings

The device settings allow the user to view/modify settings that relate to a specific device.

#### Alias

This device setting allows the user to enter a descriptive field for each unique device serial number.

#### Sensor Profile

This device setting allows the user to select one of the available sensor profiles that are created during calibration. This feature is only available when using the USB520.

#### Supply Voltage

This device setting allows the user to select one of the available supply voltages that can be used to externally power amplified sensors. This feature is only available when using the USB520.

#### Mode

This device setting allows the user to select the display mode. This feature is useful when monitoring clockwise and counter clockwise torque values, tension and compression load values, and pressure values. Each mode can be used depending on the application or type of test being performed. Examples are listed below the description of each mode.

**Tracking Mode** allows continuous readings to be displayed on the screen.

For example: This mode would be useful in monitoring a live test.

**Peak Mode** allows a peak (high) reading to be displayed on the screen. The peak reading will only change if a reading greater than the current peak reading is registered.

For example: This mode would be useful in measuring the greatest torque or load value in the positive direction.

Valley Mode allows a valley(low) reading to be displayed on the screen. The valley reading will only change if a reading less than the current valley reading is registered.  
For example: This mode would be useful in measuring the greatest torque or load value in the negative direction.

#### Reset

This device setting allows the user to reset the peak or valley readings.

Peak Reset allows the max peak value shown to be reset back to zero so further peak values can be observed.

Valley Reset allows the max valley value shown to be reset back to zero so further valley values can be observed.

#### Tare / Gross

This device setting allows the user to toggle between the tare and gross readings.

Tare allows any existing preloads or readings to be zeroed out or nullified on the screen.

For example: This function should be used before performing any tests or calibrations in order to receive an accurate reading.

Gross shows the actual value of the display, including the true zero reading.

#### Decimal Format

This device setting allows the user to select how many digits after the decimal point to display. More digits after the decimal point can be used for measuring lower loads with relatively large units.

#### Convert Units

This device setting allows the output units to be converted to a desired unit by selecting from the list available in the pull down menu. A unit can only be converted to another unit of the same type of measurement.

For example: lb to kg, Nm to ft-lb, or psi to bar

#### Sampling Rate

This device setting allows the user to select the number of samples taken per second. A higher sampling rate would be desired for dynamic applications, whereas a lower sampling rate would be sufficient for static applications. Selecting different values for the sampling rate will affect the number of bits of resolution.

#### Average Setting

This device setting allows the number of samples taken, before an average is calculated, to be changed. Selecting a higher number of samples will result in a steadier reading.

Disable Average stops averaging samples and updates the display as the input is read.

Moving Average is used in dynamic applications where the output changes rapidly over time. The oldest sample is discarded and a new average is calculated.

Mean Average is used in static applications where the output changes slowly over time. The mean average waits until the number of samples to average has been received before calculating the average.

#### Change Polarity

This device setting allows the user to reverse the sign that is displayed.

#### Keypad Locked

This device setting allows the user to lock/unlock the physical keypad on the IHPM.

#### Linearization

This device setting takes into account the nonlinearity of the sensor and compensates for it. This function is useful for sensors whose nonlinearity does not meet specifications.

#### Shunt Verification

This device setting is used to verify the calibration of a sensor. When shunted, the value should be close to the initial shunt value on the calibration certificate. If the value is significantly off, then the sensor would need to be recalibrated.

### Global Settings

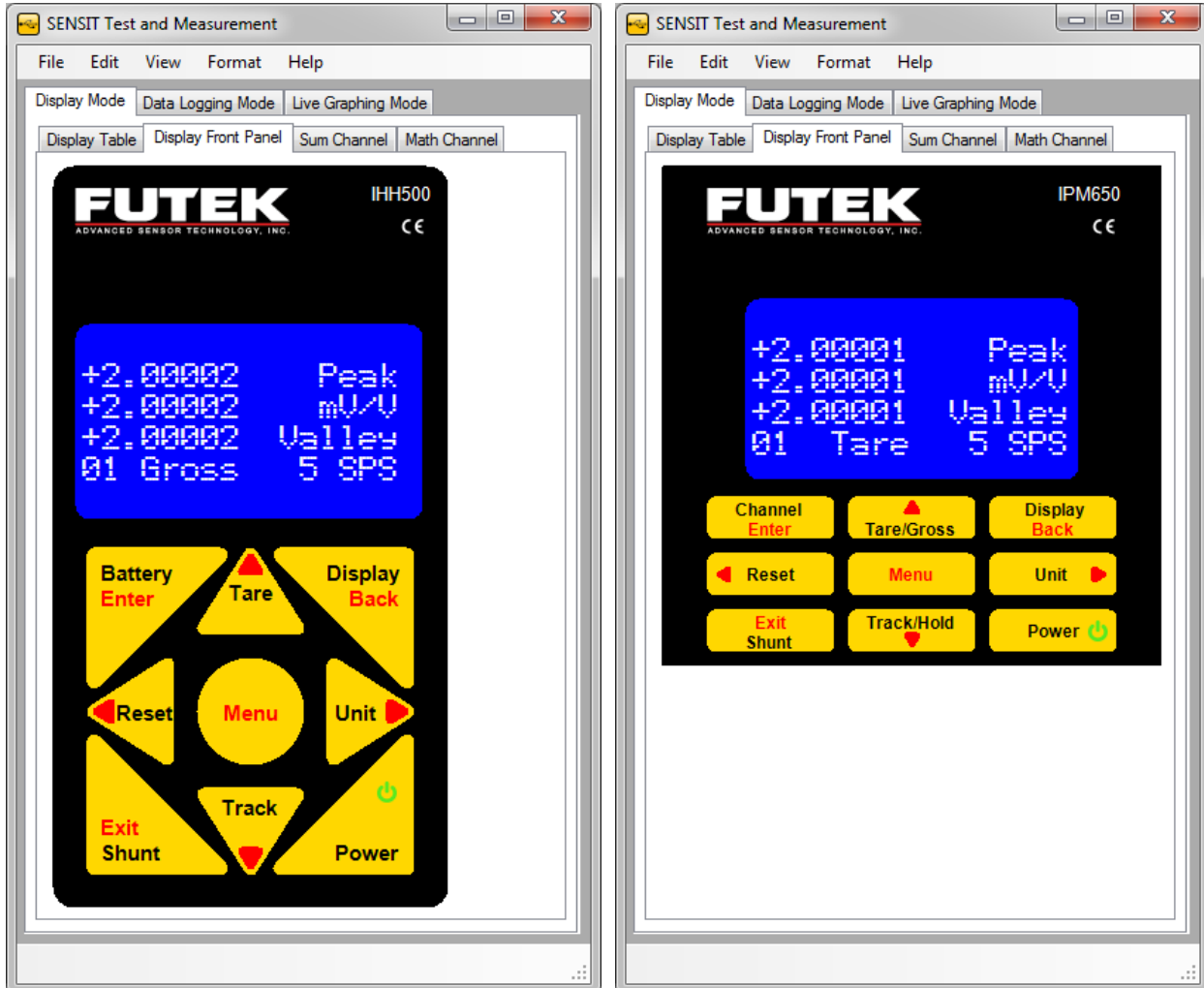
The global settings allow the user to view/modify settings that relate to all devices. In order to view the

#### Display Refresh Rate

This setting allows the user to select how fast the readings will update on the display and display front panel.

## Display Front Panel

This tab displays the front panel user interface. The software provides access to all of the same functions of the keypad on the IHHM hardware and displays the same messages as the LCD. All functions performed by the software are the same as if they were performed using the hardware with the exception of the Power Key. The Power Key can only be used by the hardware.



## Keypad Functions

### Battery *Enter* Key (IHH only)

This key is used to display the battery life when used in normal mode. This Key is used as an enter key when used in menu mode.

### *Channel /EnterKey (IPM only)*

This key is used to display the channel information when used in normal mode. This Key is used as an enter key when used in menu mode.

### *Tare / Gross Key*

This key is used to tare (zero) the current readings or display the gross value of the current readings when used in normal mode. This Key is used as an up arrow when used in menu mode.

### *Display / Back Key*

This key is used to switch between various states on the LCD display when used in normal mode. This Key is used as a back key when used in menu mode.

### *Reset Key*

This key is used to reset the current readings when used in normal mode. This Key is used as a left arrow when used in menu mode.

### *MenuKey*

This key is used to enter the menu mode.

### *Unit Key*

This key is used to switch between various engineering units when used in normal mode. This Key is used as a right arrow when used in menu mode.

### *Shunt /Exit Key*

This key is used to enable the shunt value when used in normal mode. This Key is used to exit when used in menu mode.

### *Track / Hold Key*

This key is used to track the current readings or hold the current displayed values when used in normal mode. This Key is used as a down arrow when used in menu mode.

### *Power Key*

This key has no function in the software. It can only be used directly on the hardware keypad.

### *Software Display*

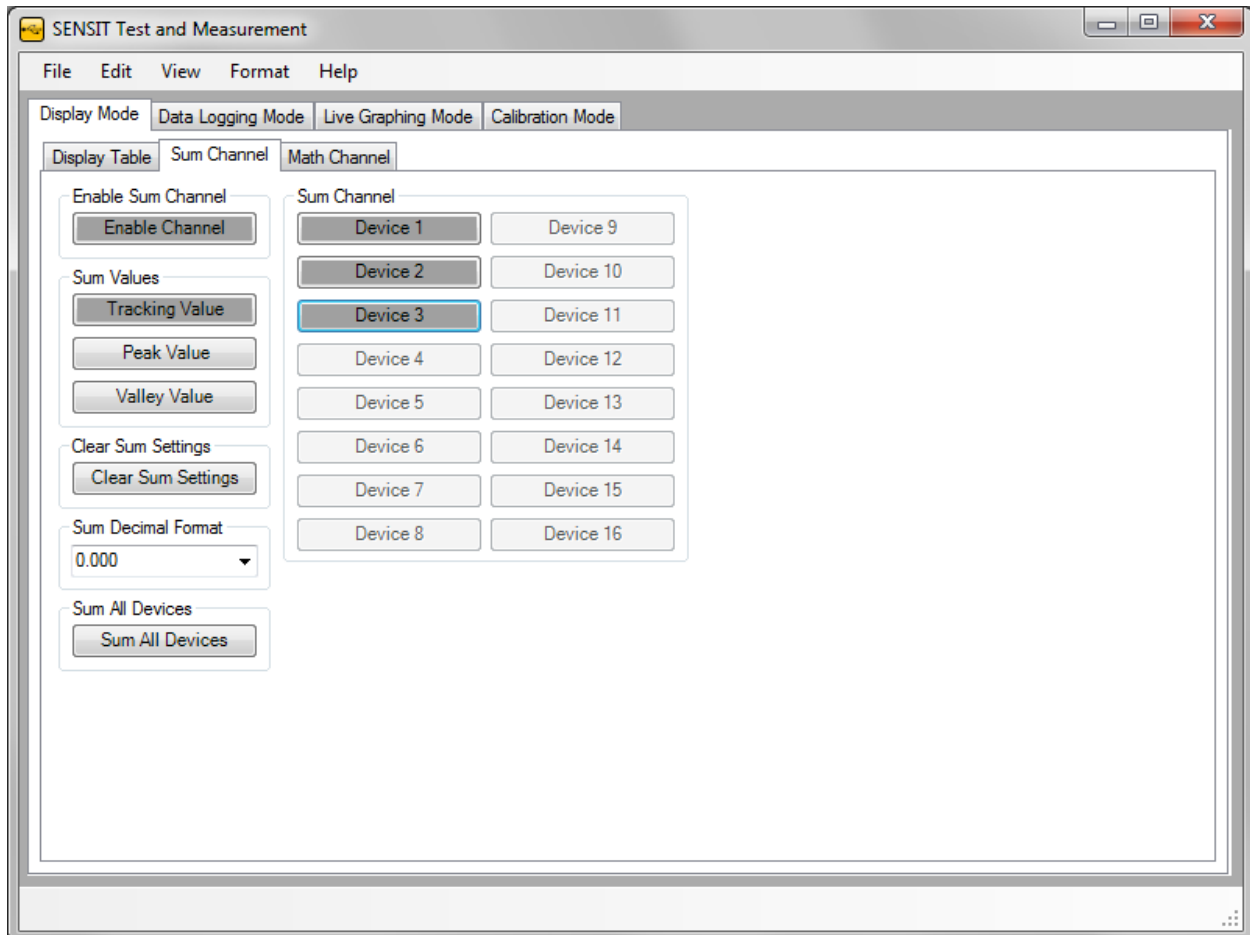
### *Software Display*

This is used to replicate the characters displayed on the IHH/IPMLCD.

## Sum Channel

This feature allows the user to sum the readings from multiple devices into one reading that is shown on the Display Table.

For example: It can be used to find the total weight that a scale using multiple sensors is supporting.



### How to Use the Sum Channel

1. Click Enable Channel.
2. Select the values that will be summed (Tracking Value, Peak Value, or Valley Value).
3. Select the devices that will be added together.
4. Click on the Display Table tab. The Sum row will be displayed with the appropriate reading.



The screenshot shows the 'SENSIT Test and Measurement' software window. It has a menu bar (File, Edit, View, Format, Help) and a toolbar with 'Display Mode', 'Data Logging Mode', 'Live Graphing Mode', and 'Calibration Mode'. Below the toolbar are tabs for 'Display Table', 'Sum Channel', and 'Math Channel'. The 'Display Table' tab is active, showing a table with the following data:

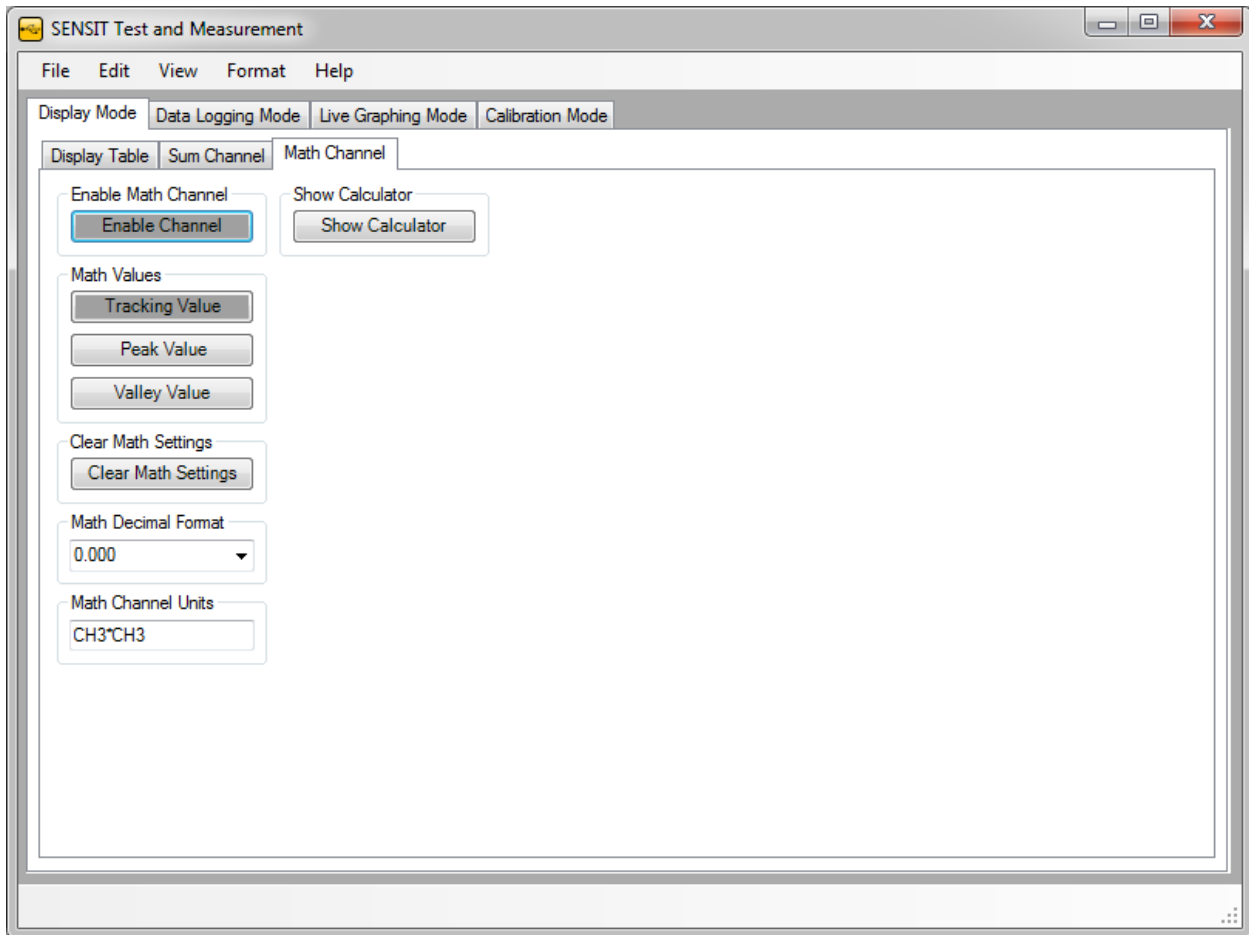
Device	Status	Alias	S/N	Reading 1	Units 1
1	Enabled	Sensor 1	210210	0.000	mV/V
2	Enabled	Sensor 2	220220	0.000	mV/V
3	Enabled	Sensor 3	230230	1.000	mV/V
Sum	Enabled	N/A	N/A	1.000	mV/V

### Other Sum Channel Features

Clear Sum Settings clears the sum value and resets all of the summing functions to default settings.  
 Sum Decimal Format changes the number of digits displayed after the decimal point in the reading.  
 Sum All Devices enables the addition of all the devices available.

## MathChannel

This feature allows the user to perform simple mathematical calculations on the live reading. With the proper scale factor, this feature can be used to convert units of a live reading to a custom unit that is not available on the Display Table.



### How to Use the Math Channel

1. Click Enable Channel.
2. Select the values used in the calculation (Tracking Value, Peak Value, or Valley Value).
3. Click Show Calculator and perform the appropriate calculation to the desired channel.
4. Close the [Math Channel Calculator](#) and click the Display Table tab. The Math row will be displayed with the appropriate calculations.

The screenshot shows the 'SENSIT Test and Measurement' software window. It has a menu bar (File, Edit, View, Format, Help) and a mode selection bar (Display Mode, Data Logging Mode, Live Graphing Mode, Calibration Mode). Below this is a 'Display Table' tab with sub-tabs for 'Sum Channel' and 'Math Channel'. The table displays the following data:

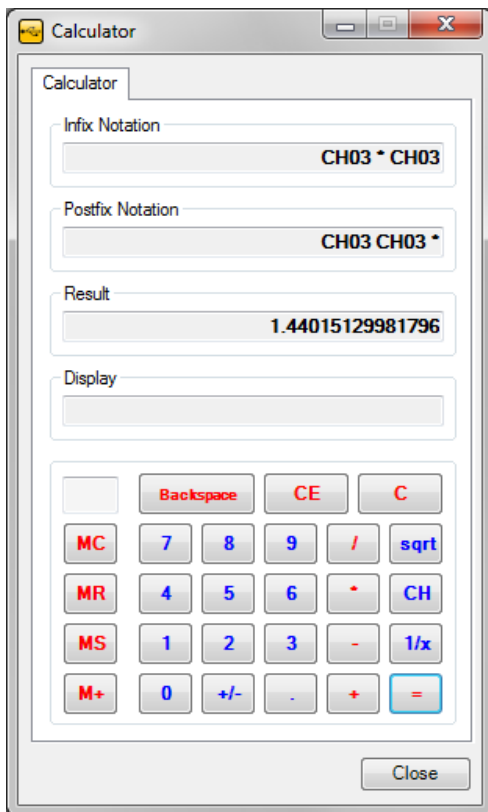
Device	Status	Alias	S/N	Reading 1	Units 1
1	Enabled	Sensor 1	210210	0.000	mV/V
2	Enabled	Sensor 2	220220	0.000	mV/V
3	Enabled	Sensor 3	230230	1.200	mV/V
Math	Enabled	N/A	N/A	1.440	CH3*CH3

### Other Math Channel Features

Clear Math Settings clears the calculation and sets the math channel functions to default settings.  
 Math Decimal Format changes the number of digits displayed after the decimal point in the reading.  
 Math Channel Units The units entered here will show on the Display Table tab for the Math row.

## Math Channel Calculator

This feature allows the user to perform simple mathematical calculations. It performs all of the functions found on a standard calculator such as: multiplication (\*), division (/), addition (+) and subtraction (-). There are several memory functions including: memory clear (MC), memory recall (MR), memory store (MS) and memory plus (M+). The calculator also includes functions for finding the square root (sqrt) and inverse (1/x) of a number. One feature that is unique to the math channel calculator is the CH key which should be used when applying a calculation to one of the channels. The user should press the CH key followed by the number of the channel.

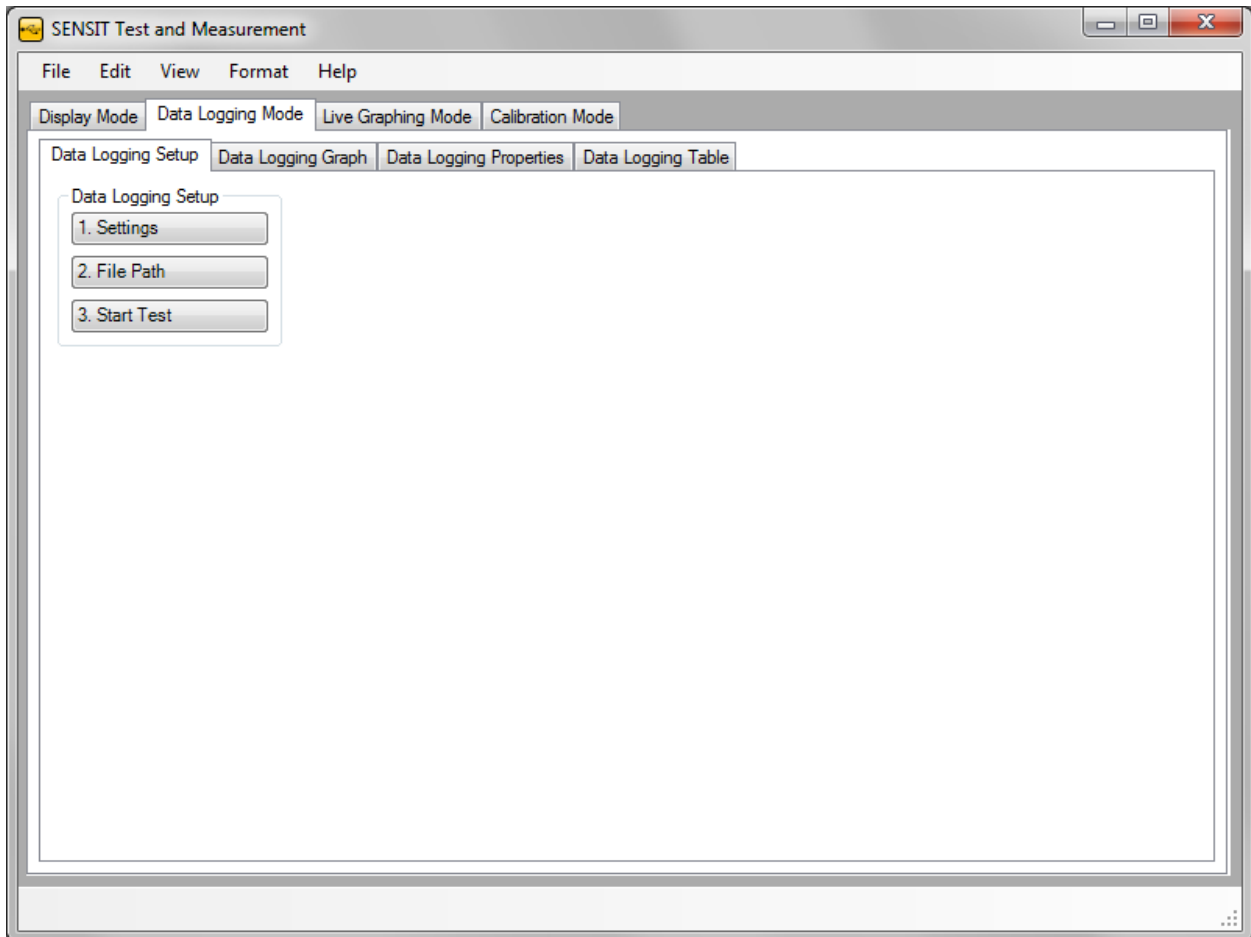


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## Data Logging Setup

This tab allows the user to set all of the necessary parameters to begin logging data.

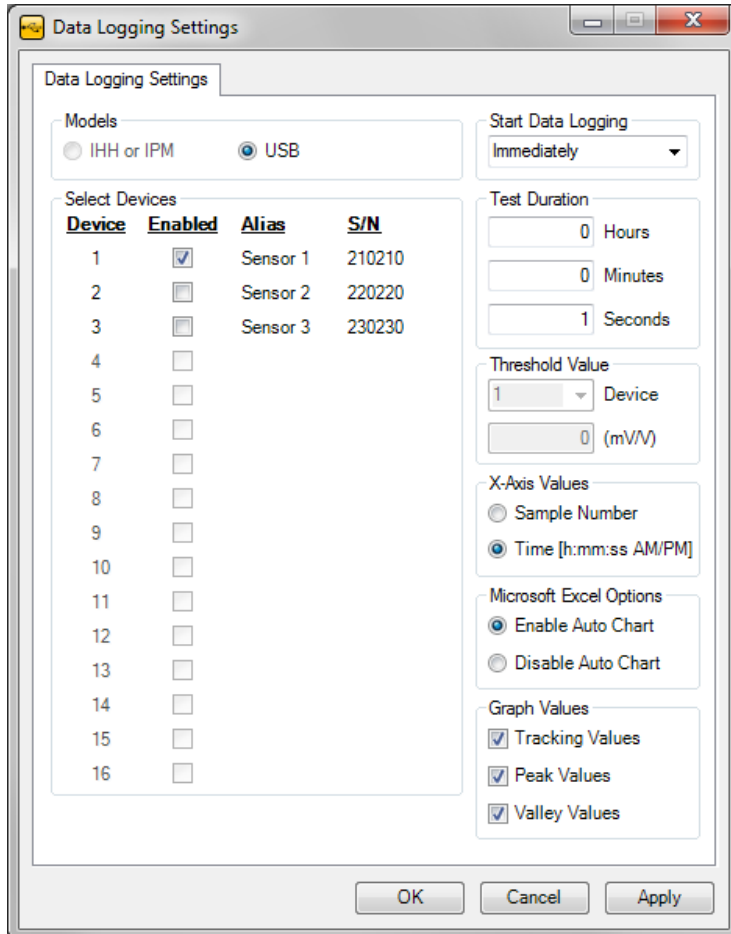
Please Note: Some Data Logging features may require Microsoft Excel.



## How to Setup and Start a Data Logging Test

1. Click Settings to modify the [Data Logging Settings](#)
2. Click File Path and specify a filename and path for the data file.
3. Click Start Test to begin the test. The test will complete after the predetermined test duration and the data will be exported to a file. The data file will open and the USB Software will automatically graph the recorded data to the [Data Logging Graph](#) tab.

## Data Logging Settings



### Models

The user must select the model to be used for data logging.

### Select Devices

The user must select the device(s) to be used for data logging.

### Start Data Logging

There are three options to specify when to start data logging: (1) Immediately, (2) Above Threshold, or (3) Below Threshold.

### Test Duration

Once the data logging begins, test duration specifies the total length of time in hours, minutes and seconds that the data will be collected.

### *Threshold Value*

The threshold value allows the user to select a device and a specific threshold that the reading must be above or below in order for the data logging to begin. This value will be ignored if start data logging is set to begin immediately.

### *X-Axis Values*

The x-axis of the [Data Logging Graph](#) can be configured by Sample Number or Time. The Time will be formatted based on the [Culture Information](#)

### *Microsoft Excel Options*

When exporting data to an Excel file, the user can enable the option to enable or disable the automatic charting feature. If it is enabled, then a chart that resembles the one in the software will also be created in the Excel file. If it is disabled, then there will not be any charts in the Excel file. When collecting a large amount of data, it may be preferable to disable the auto chart in order shorten the amount of time that it takes to export the data to Excel.

### *Graph Values*

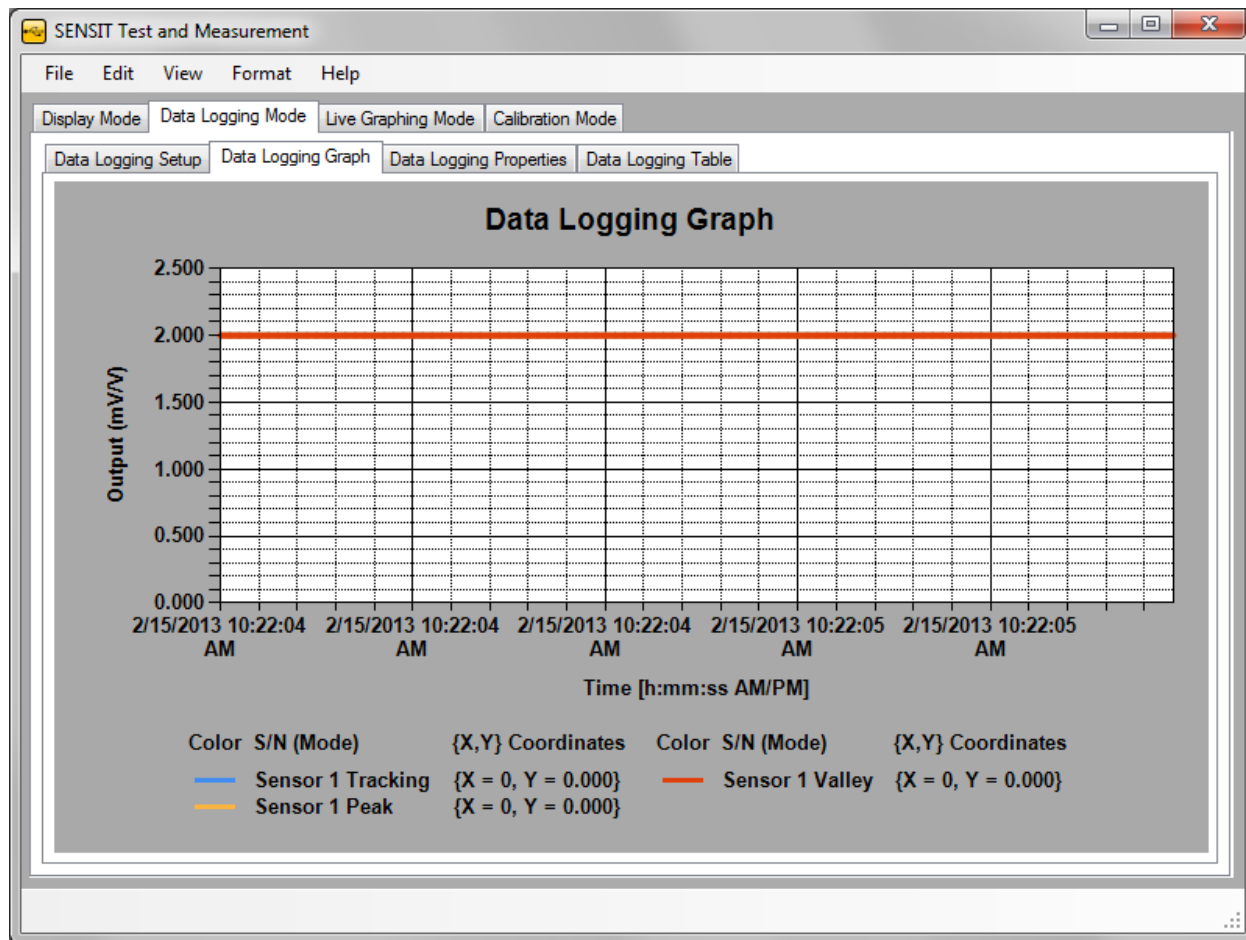
The user must select the graph values to be used for data logging.

### *Apply Settings*

The settings must be applied prior to starting a new data logging test.

## Data Logging Graph

This tab is used to view a graph of the data collected from the data logging test. The tracking, peak, and valley values are shown for each device that is enabled.



## How to Zoom In and Out

### Zoom In

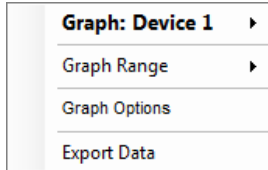
Click and drag a rectangular box on the graph. The highlighted area will be zoomed into.

### Zoom Out

1. Click the button on the  $x$ -axis to zoom out from the  $x$ -axis.
2. Click the button on the  $y$ -axis to zoom out from the  $y$ -axis.



## Other Data Logging Graph Features



### *How to View a Graph from another Device*

Right click on the graph and select [Graph Device](#). Select the desired device to graph from the pull down menu.

### *How to Change the Graph Range*

The graph range of the axis can be changed by selecting the graph range and specifying a maximum value to graph to.

### *How to Change the Graph Options*

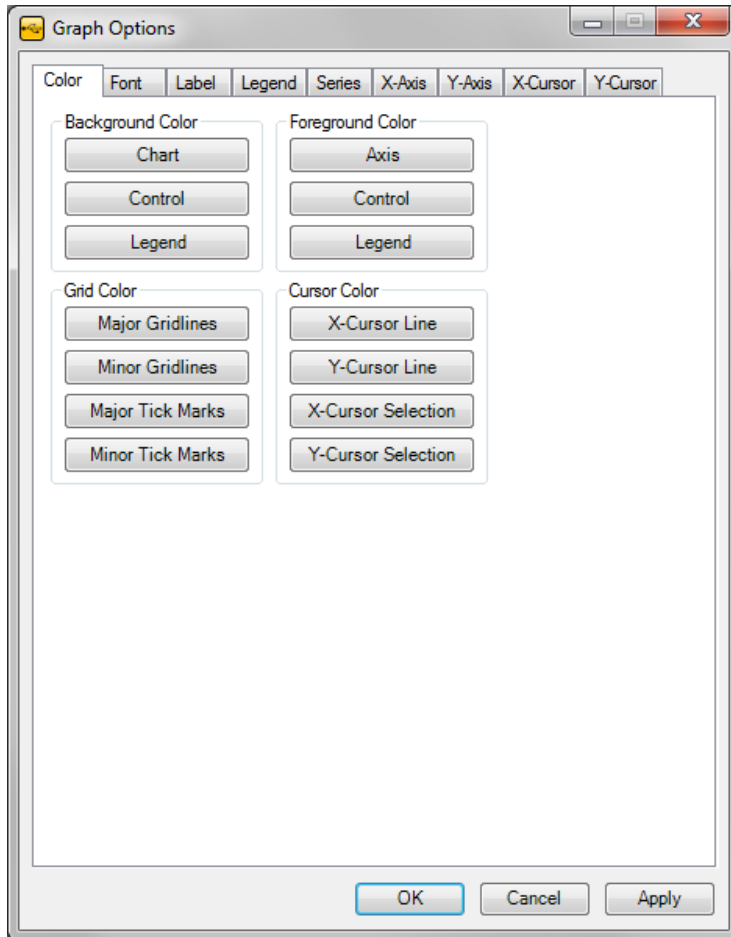
Right click on the graph and select [Graph Options](#)

### *How to Export Data*

Right click on the graph and select [Export Data](#). Please Note: The software will automatically export the data to the specified file when the test is complete. This feature allows the user to export the data again to a specified location and file type.

## Graph Options

The graph options are used to change the various settings that control how the graph is displayed.



### *Color*

This tab allows the user to change the color of the background, foreground (text), grid, and cursor.

### *Font*

This tab allows the user to change the font settings (font, style, size) for the title and legend.

### *Label*

This tab allows the user to change the titles of the graph, x-axis, and y-axis.

### *Legend*

This tab allows the user to change the alignment and docking location of the legend.

### *Series*

This tab allows the user to change the borderwidth of the graph that is plotted.

### *X-Axis*

This tab allows the user to change the settings of the axes (grid interval, tick mark intervals, and min. and max. value).

### *Y-Axis*

This tab allows the user to change the settings of the axes (grid interval, tick mark intervals, and min. and max. value).

### *X-Cursor*

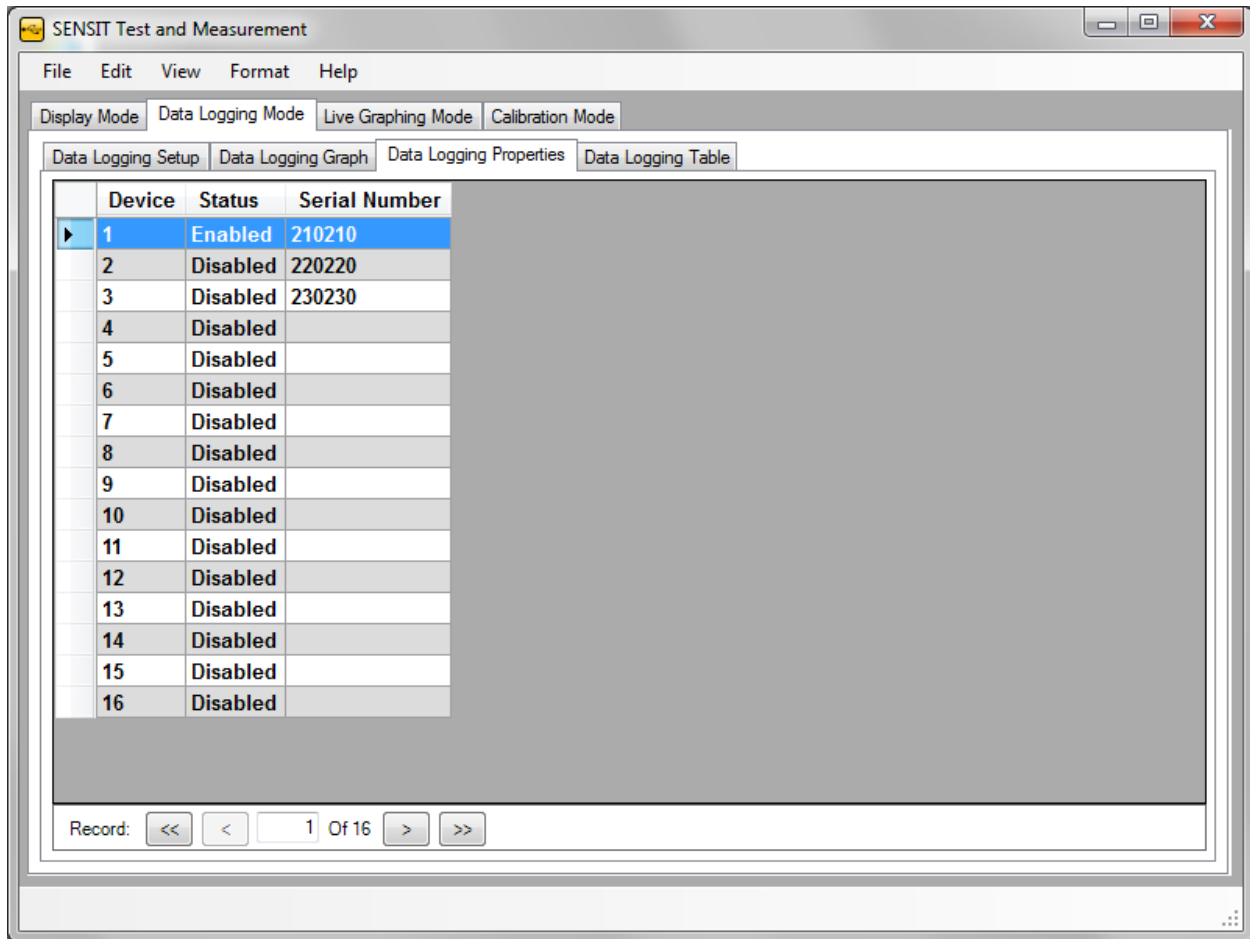
This tab allows the user to change the settings of the x-axis cursor (cursor interval, line width, and selection start and end).

### *Y-Cursor*

This tab allows the user to change the settings of the y-axis cursor (cursor interval, line width, and selection start and end).

## Data Logging Properties

This tab shows the status of each device that is plugged in, whether it is enabled or disabled. It can be used as a reminder to the user as to which devices are enabled or disabled during the data logging test.



## Data Logging Registers

This tab shows the register values associated to various internal registers. It can be used to review the settings that were set at the time of data logging.

Please Note: This feature is only available for the IHH/IPM models

Internal Register	Register Value
Data Logging Type	All
Data Logging Counter	0
Tare Value Register	8649009
Offset Value Register	8389280
Fullscale Value Register	12688128
Reverse Fullscale Value Register	0
Fullscale Load Register	2.00000 mV/V
Decimal Point Register	5
Unit Code Register	mV/V
Direction Register	One Direction
RTD Enabled Flag	0
TEDS Enabled Flag	1
Shunt Enabled Flag	0
Pulse Input Enabled Flag	0
Current Input Enabled Flag	0
Voltage Input Enabled Flag	0
Bridge Input Enabled Flag	1
Power Enabled Flag	0
Reserved Enabled Flag	0

## Data Logging Table

This tab shows a table of the samples recorded during the data logging session. It can be used as a reference instead of opening the Excel sheet that has been exported after the data logging session has been completed.

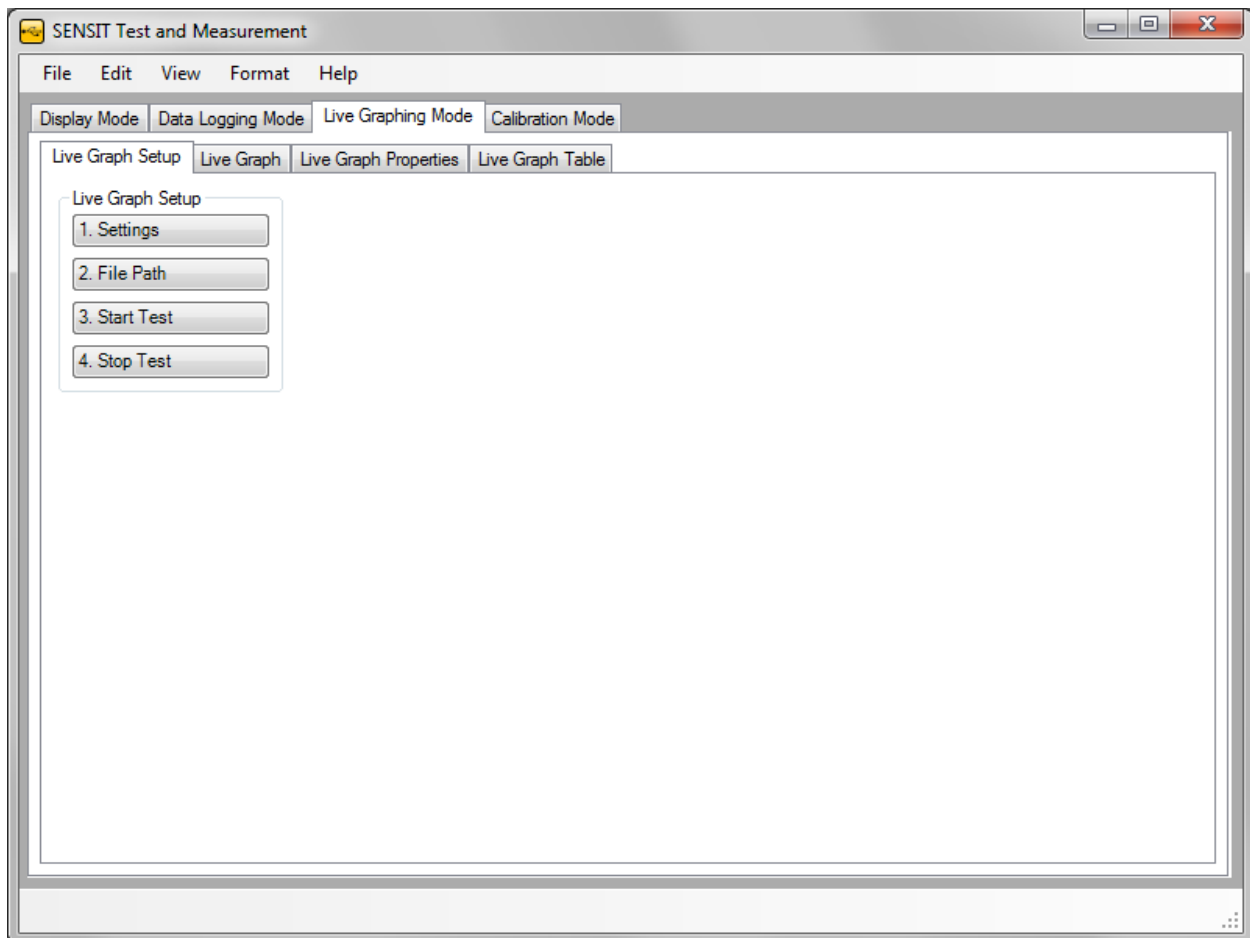
Sample Number	Number of Samples	ADC Value	Tracking Value	Peak Value	Valley Value	Date
0	1	12537241	2.000	2.000	2.000	Friday, February 15, 2008
1	1	12537349	2.000	2.000	2.000	Friday, February 15, 2008
2	1	12537512	2.000	2.000	2.000	Friday, February 15, 2008
3	1	12537557	2.000	2.000	2.000	Friday, February 15, 2008
4	1	12537517	2.000	2.000	2.000	Friday, February 15, 2008
5	1	12537414	2.000	2.000	2.000	Friday, February 15, 2008
6	1	12537335	2.000	2.000	2.000	Friday, February 15, 2008
7	1	12537366	2.000	2.000	2.000	Friday, February 15, 2008
8	1	12537467	2.000	2.000	2.000	Friday, February 15, 2008
9	1	12537530	2.000	2.000	2.000	Friday, February 15, 2008
10	1	12537401	2.000	2.000	2.000	Friday, February 15, 2008
11	1	12537268	2.000	2.000	2.000	Friday, February 15, 2008
12	1	12537282	2.000	2.000	2.000	Friday, February 15, 2008
13	1	12537393	2.000	2.000	2.000	Friday, February 15, 2008
14	1	12537564	2.000	2.000	2.000	Friday, February 15, 2008
15	1	12537529	2.000	2.000	2.000	Friday, February 15, 2008
16	1	12537426	2.000	2.000	2.000	Friday, February 15, 2008

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## Live Graph Settings

This tab allows the user to set all of the necessary parameters to begin live graphing, also allow the user to log the data that has been graphed.

Please Note: Some Live Graph features may require Microsoft Excel.



## How to Setup and Start Live Graph

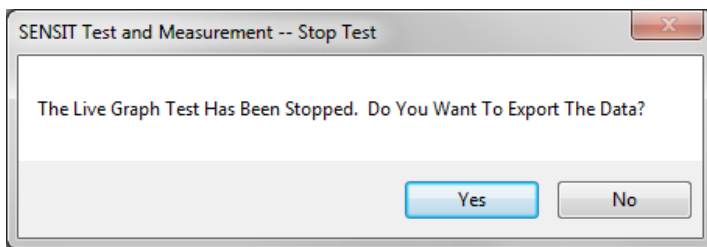
1. Click Settings to modify the [Live Graph Settings](#)
2. Click File Path and specify a filename and path for the data file.
3. Click Start Test to begin the test. The tab will automatically switch from Live Graph Settings to Live Graph once the test has begun. It will complete after the predetermined test duration and export the data to a file.

Please Note: The data logged in Live Graphing Mode is slower than the data logged in Data Logging Mode due to the software updating the graph. If higher data logging speeds are required for certain tests, use the Data Logging Mode instead.

## Other Features

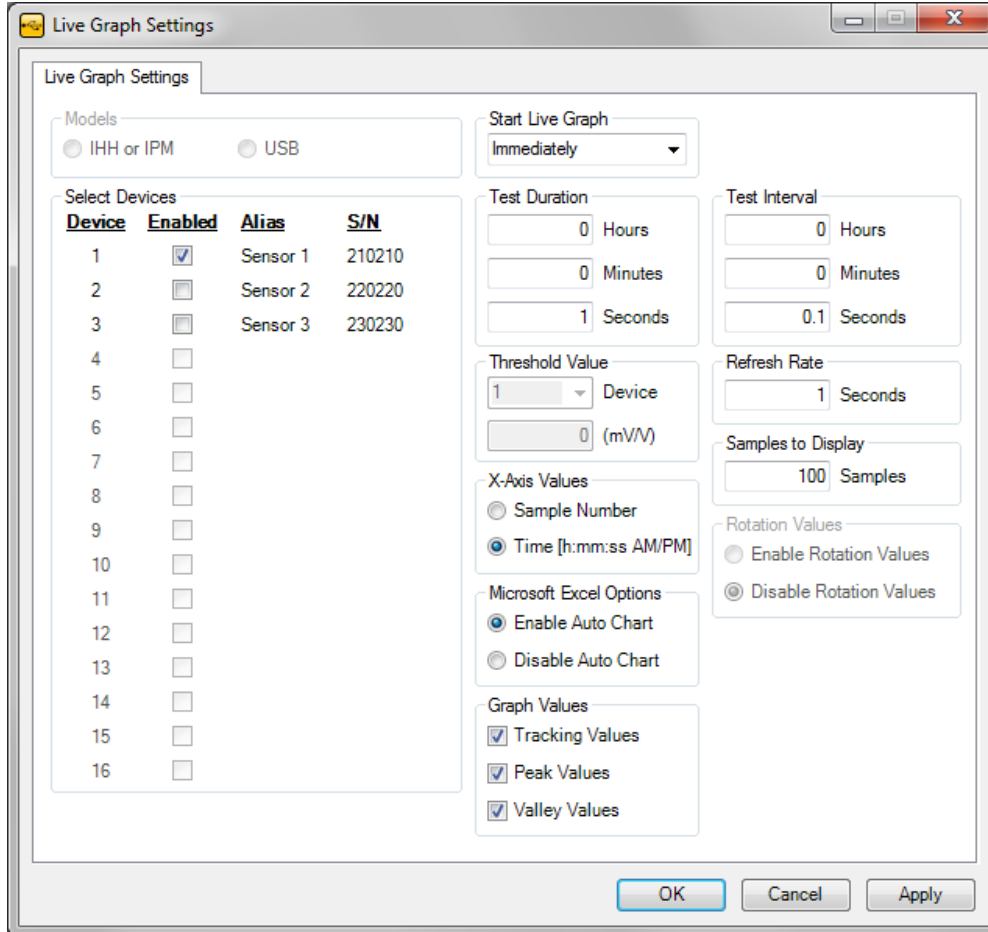
### Stop Test

This will stop the test immediately and show the recorded samples on the [Live Graph Table](#). The software will then ask if you still want to export the data to a file.





## Live Graph Settings



### Models

The user must select the model to be used for live graphing.

### Devices

The user must select the device(s) to be used for live graphing.

### Start Live Graph

There are three options to specify when to start live graphing: (1) Immediately, (2) Above Threshold, or (3) Below Threshold.

### Test Duration

Once the data logging begins, the test duration specifies the total length of time in hours, minutes and seconds that the data will be collected.

### *Threshold Value*

The threshold value allows the user to select a device and a specific threshold that the reading must be above or below in order for the graph to begin. This value will be ignored if start graph is set to begin immediately.

### *X-Axis Values*

The x-axis of the [Live Graph](#) can be configured by Sample Number or Time. The Time will be formatted based on the [Culture Information](#)

### *Microsoft Excel Options*

When exporting data to an Excel file, the user will have the option to enable or disable the automatic charting feature. If it is enabled, then a chart that resembles the software will also be created in the Excel file. If it is disabled, then there will not be any charts in the Excel file. When collecting a large amount of data, it may be preferable to disable the auto chart in order shorten the amount of time takes to export the data to Excel.

### *Graph Values*

The user must select the graph values to be used for graphing

### *Test Interval*

The test interval specifies the interval that a request will be made for the latest reading.

### *Refresh Rate*

The refresh rate specifies how often the live graph will be updated or refreshed.

### *Samples to Display*

The number of samples to display scales the axis while the live graph is in progress.

### *Rotation Values*

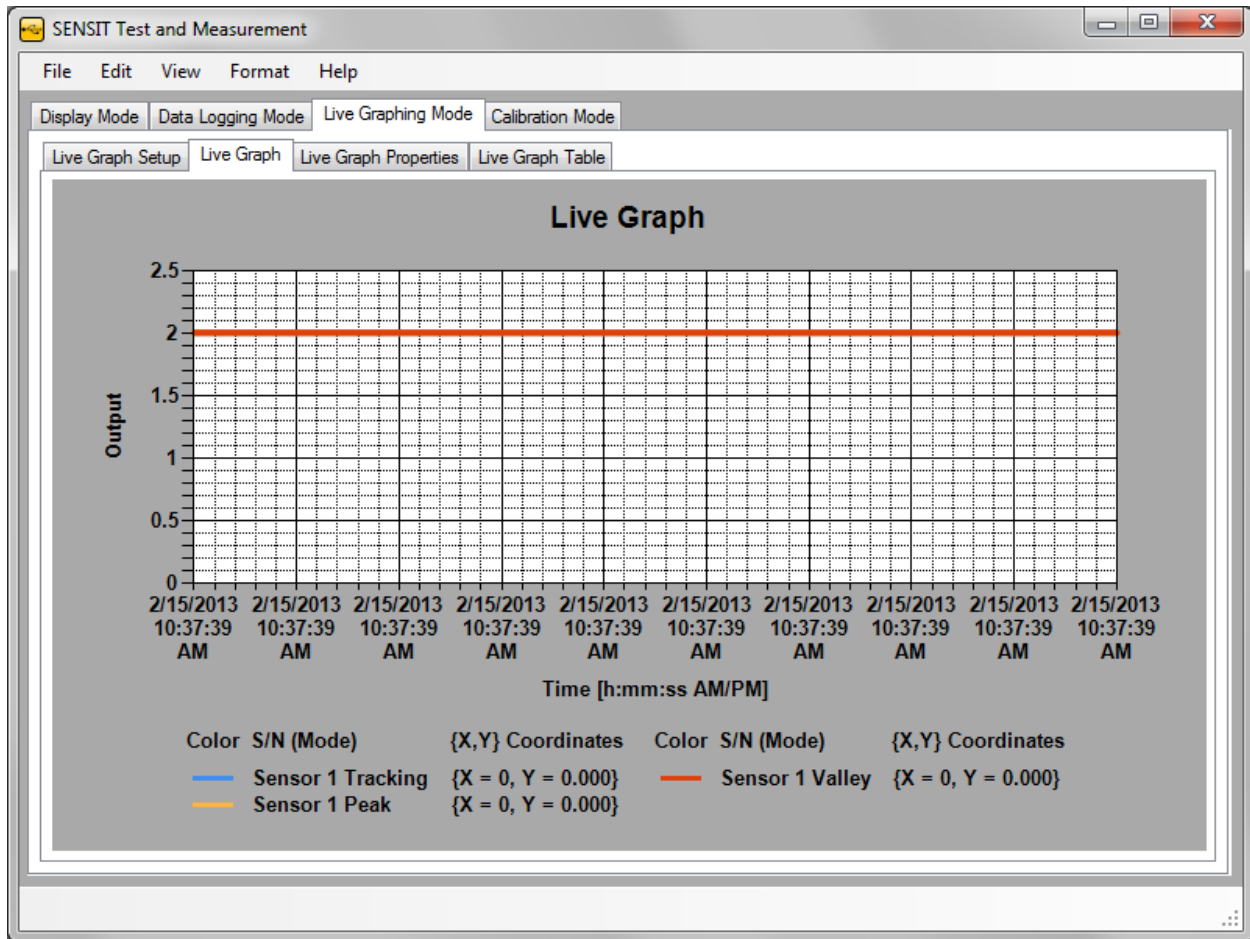
When using a device that has the ability to read an encoder, the user will have the option to enable or disable the rotation values from being displayed in the live graph.

### *Apply Settings*

The settings must be applied prior to starting a live graph test.

## Live Graph

This tab is used to view the live graph as the test is being performed. The tracking, peak, and valley values are shown for each device that is enabled.



## How to Zoom In and Out

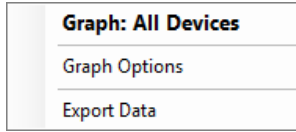
### Zoom In

Click and drag a rectangular box on the graph. The highlighted area will be zoomed into.

### Zoom Out

1. Click the button on the  $x$ -axis to zoom out from the  $x$ -axis.
2. Click the button on the  $y$ -axis to zoom out from the  $y$ -axis.

## Other Live Graph Features



### *How to Change the Graph Options*

Right click on the graph, and select [Graph Options](#)

### *How to Hide the Chart Area*

If the rotation values are enabled, then the chart will have two chart areas. Chart Area 1 contains the Peak, Tracking, Valley and Power measurements. Chart Area 2 contains the Angle and RPM measurements.

### *Hide Chart Area*

You can choose to hide Chart Area 1 or Chart Area 2. The remaining chart will be resized to fill the contents of the Live Graph tab.

### *How to Export Data*

Right click on the graph and select Export Data. Please Note: The software will automatically export the data to the specified file when the test is complete. This feature allows the user to export the data again to a specified location and file type.

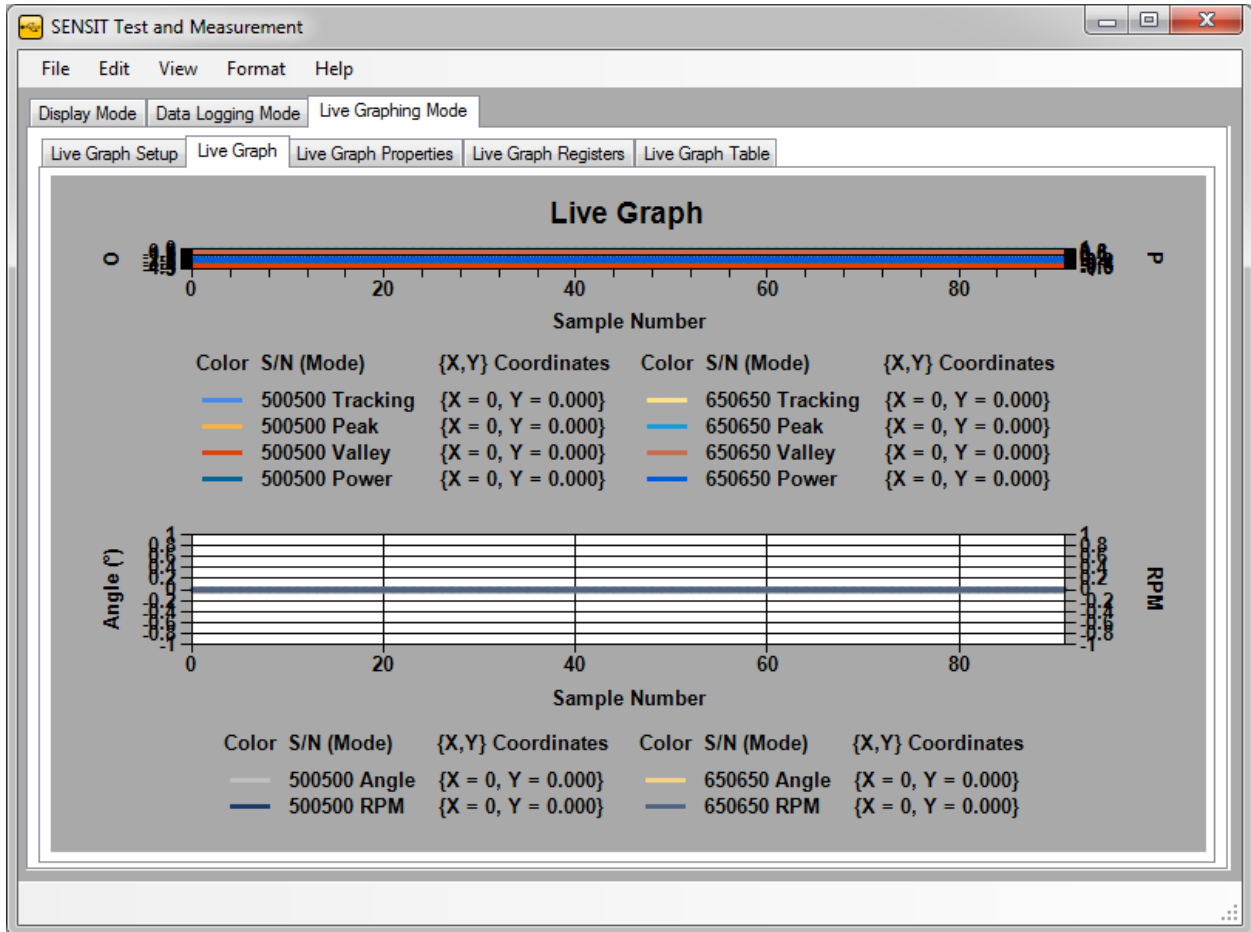


Chart Area 1: Visible, Chart Area 2: Visible

The following two images show Chart Area 1 by itself and Chart Area 2 by itself.

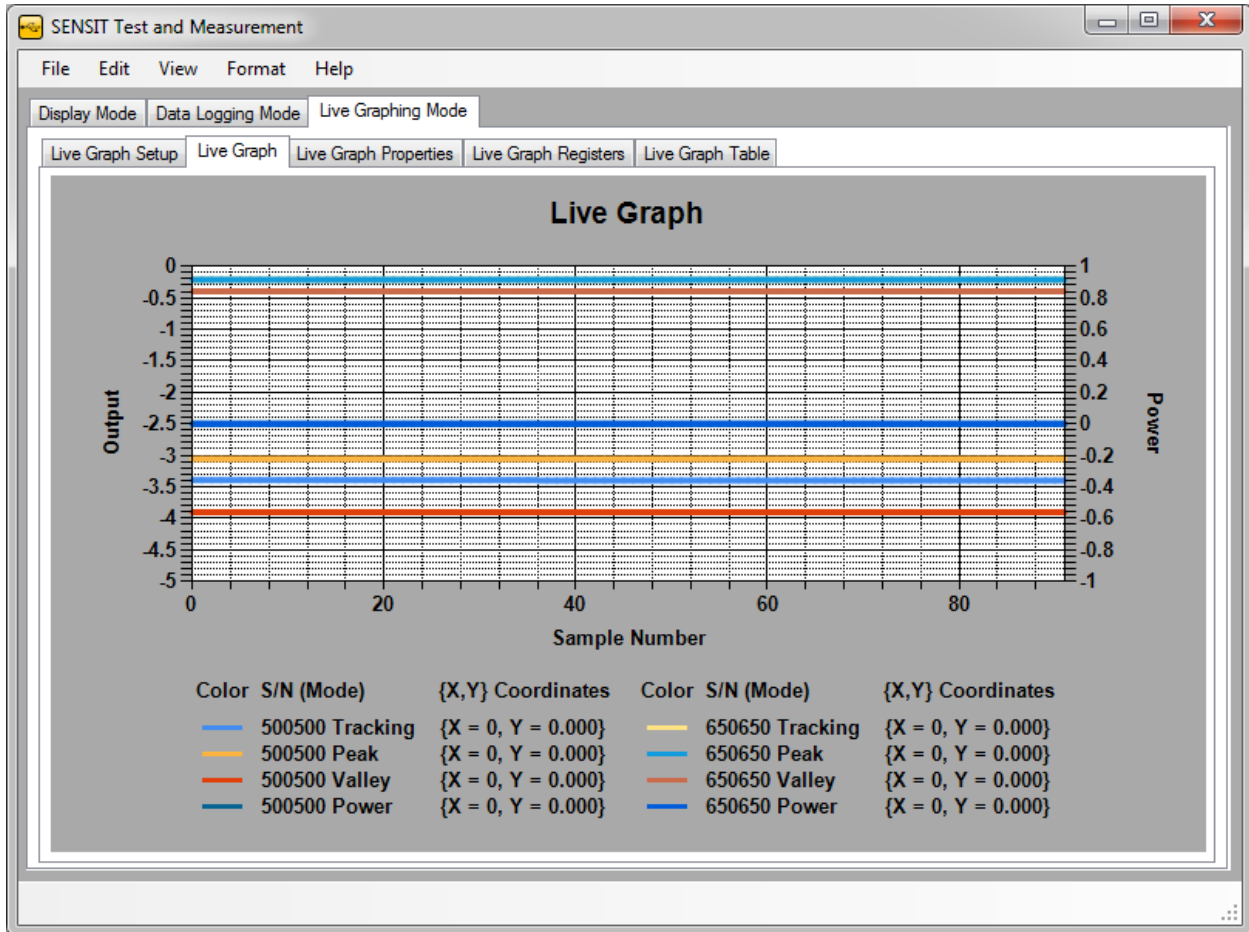


Chart Area 1: Visible, Chart Area 2: Hidden

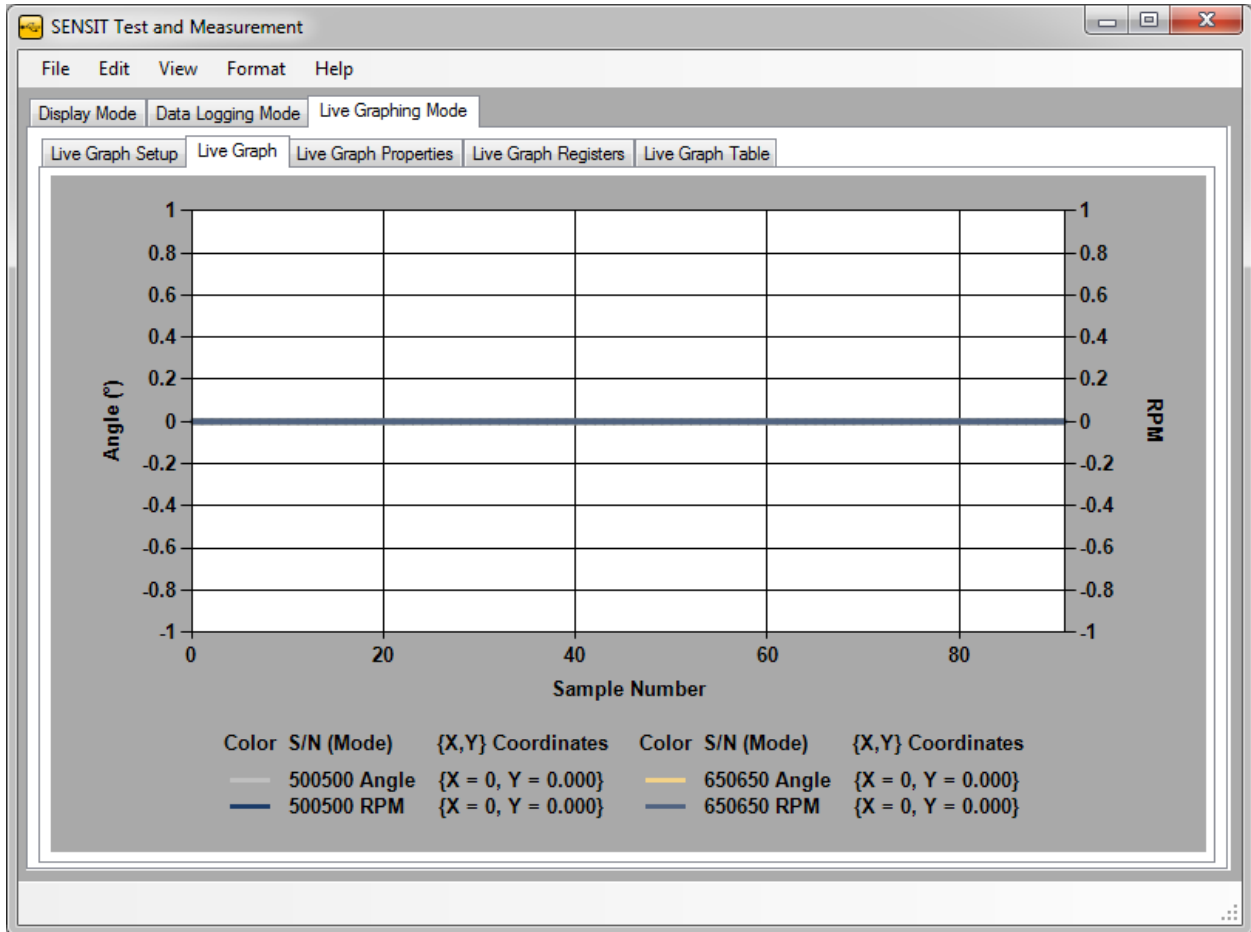


Chart Area 1: Hidden, Chart Area 2: Visible

## *Live Graph Properties*

This tab shows the status of each device that is plugged in, whether it is enabled or disabled. It can be used as a reminder to the user as to which devices are enabled or disabled during the live graph test



























































