uSECTRUM PC Software

Applicable Models：MK350S | MK350S Premium | MK350N | MK350N Plus | MK350N Premium | MK350D | PG100N | MK550T | MD100N

Last Updated : 2018/ 04/ 10 Version : 1.0

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Appendix I

PC Requirements

Item	Description
Monitor resolution	1025 X 768 or higher
Ram	1.0 GB or higher
Color Depth	16-bit Color Depth or higher
Processor	Inter Core Ⅱ Duo @ 1.4GHz or higher
	Inter Core Duo @ 2.0GHz or higher
	AMD Athlon Neo X2 @ 1.6GHz or higher
	Inter Atom @ 2.13GHz or higher
	AMD Athlon 64X2 @1.7GHz or higher
	Note: Most processors produced in 2010 or later should work properly.
HD Space	300 MB free space
Operating System	Windows XP
	Windows 7
	Window 8
	Windows 10

Appendix II

➡The Version of uSpectrum Software

Version	Release Note
2.1.5.0	

1 uSPECTRUM Software Introduction

➨ PC Software for Windows PCs/Laptops

This guide takes you through the installation, features and operations for the uSpectrum PC Software used with any of the spectrometer devices. It allows you to control the spectrometer device using a Windows based PC/laptop with a USB connection.

With the uSpectrum PC software, larger screens provide a much more convenient viewing environment for comparing, sorting and analyzing data.

2 Software Installation

- Download uSPECTRUM Software to PC
- Preparation on Stand-alone Device
- Getting Started

Software Installation

This section gives instruction on how to download uSPECTRUM, start installing the software and connect the spectrometer with a USB cable to start measurement.

Requirements:

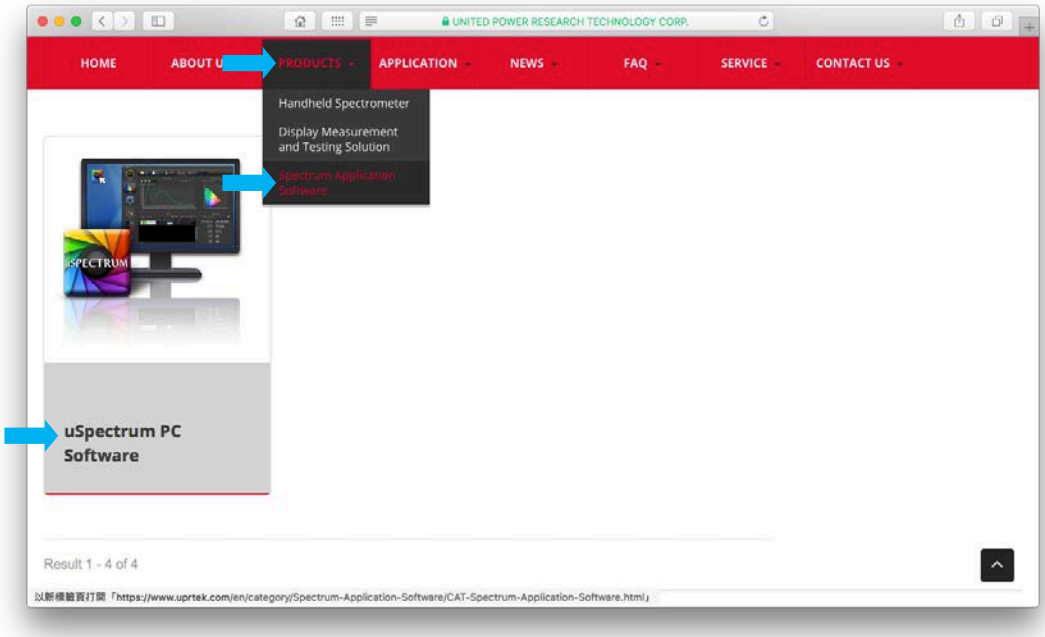
- Windows system
- Spectrometer (must support uSPECTRUM software)
- USB cable

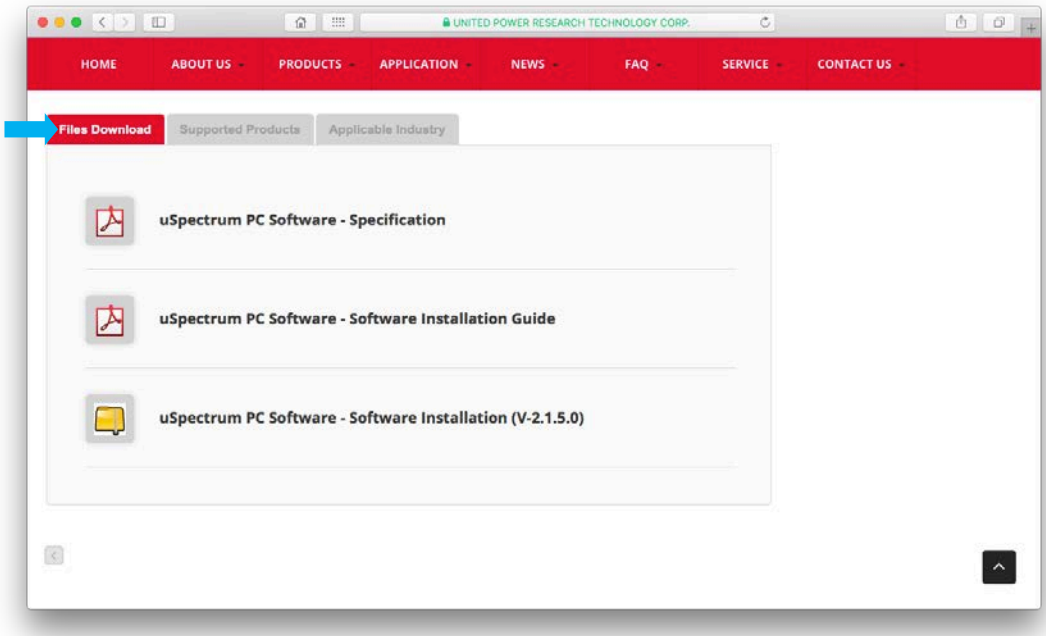
2.1 ➡ Download uSPECTRUM Software to PC

Visit UPRtek Website (www.uprtek.com) and click on the following steps

➔ Download uSPECTRUM

PRODUCTS → Spectrum Application Software → uSpectrum PC Software→ Files Download

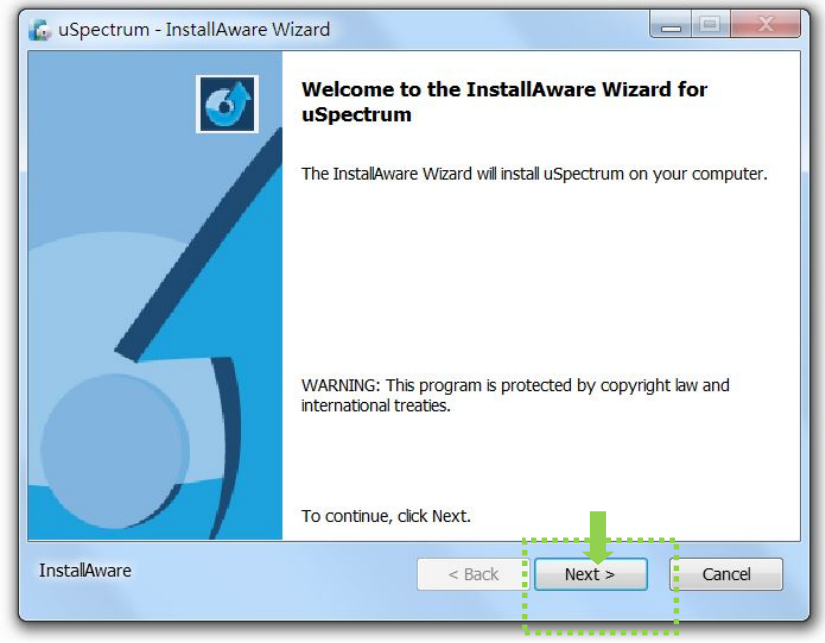




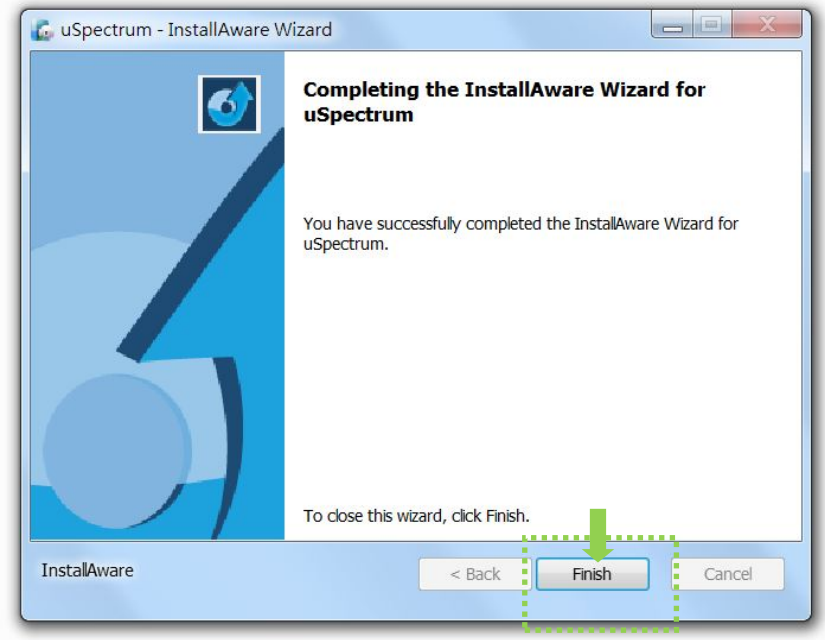
Install uSPECTRUM

Extract the uSPECTRUM_Installer.exe from the compressed (zip) file that you just downloaded.

Start the uSPECTRUM _Installer.exe program and click ***Next***. The installation may take a few moments.



When the installation is complete, press ***Finish***.

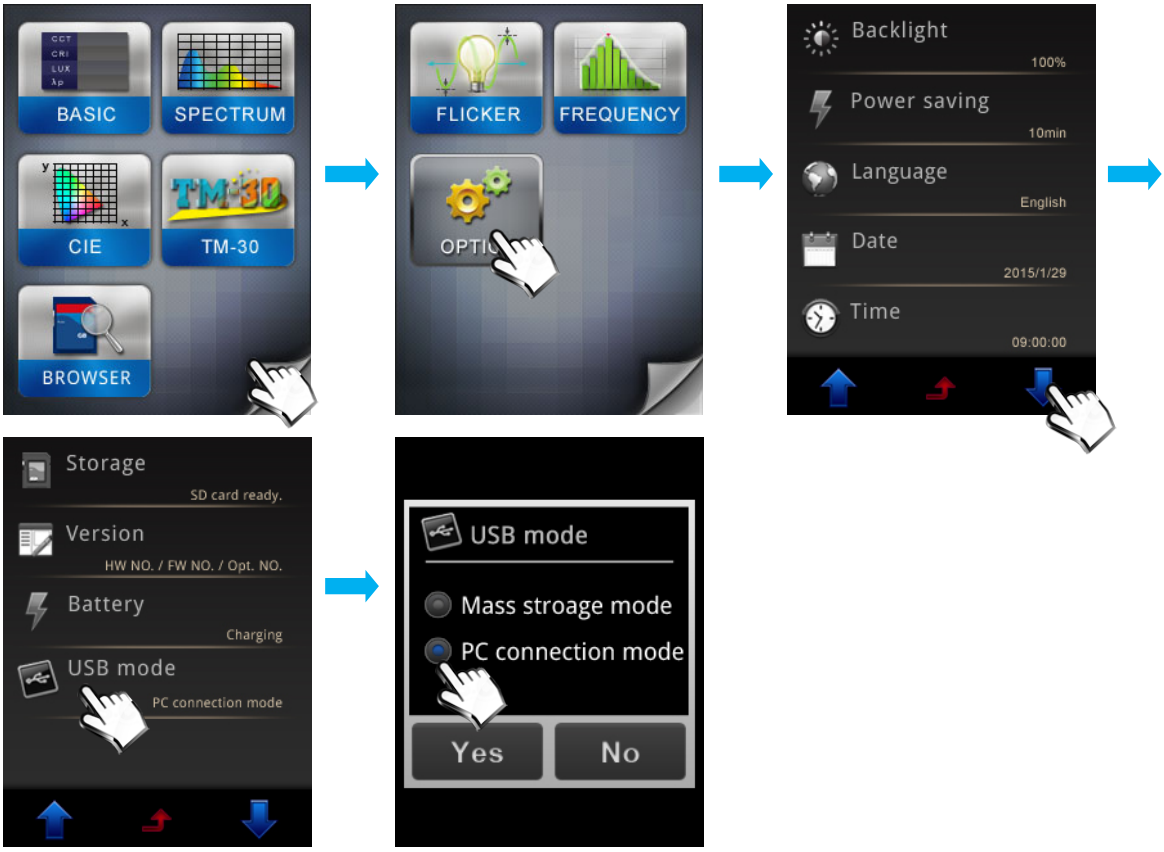


Congratulations, you have completed the PC software installation.

2.2 ➡Preparation on Stand-alone Device

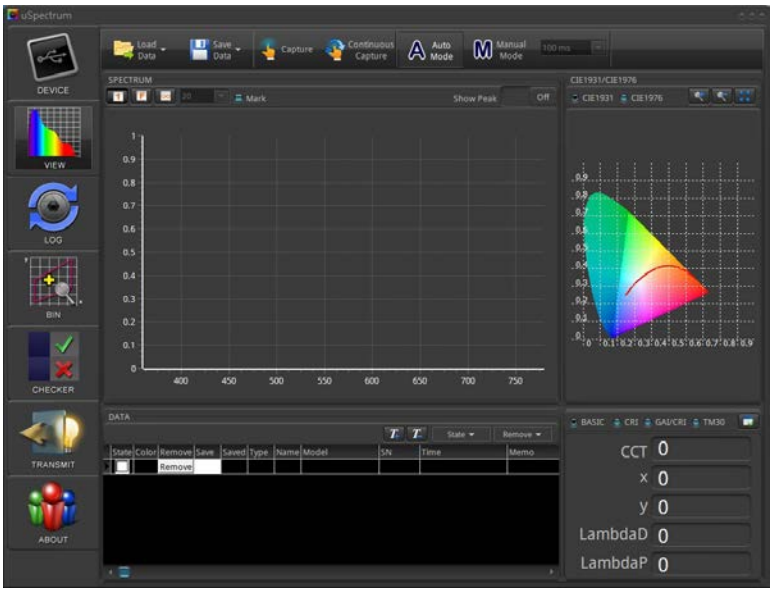
➔ Setting USB mode

Check USB mode of the device is selected ***PC connection mode***.



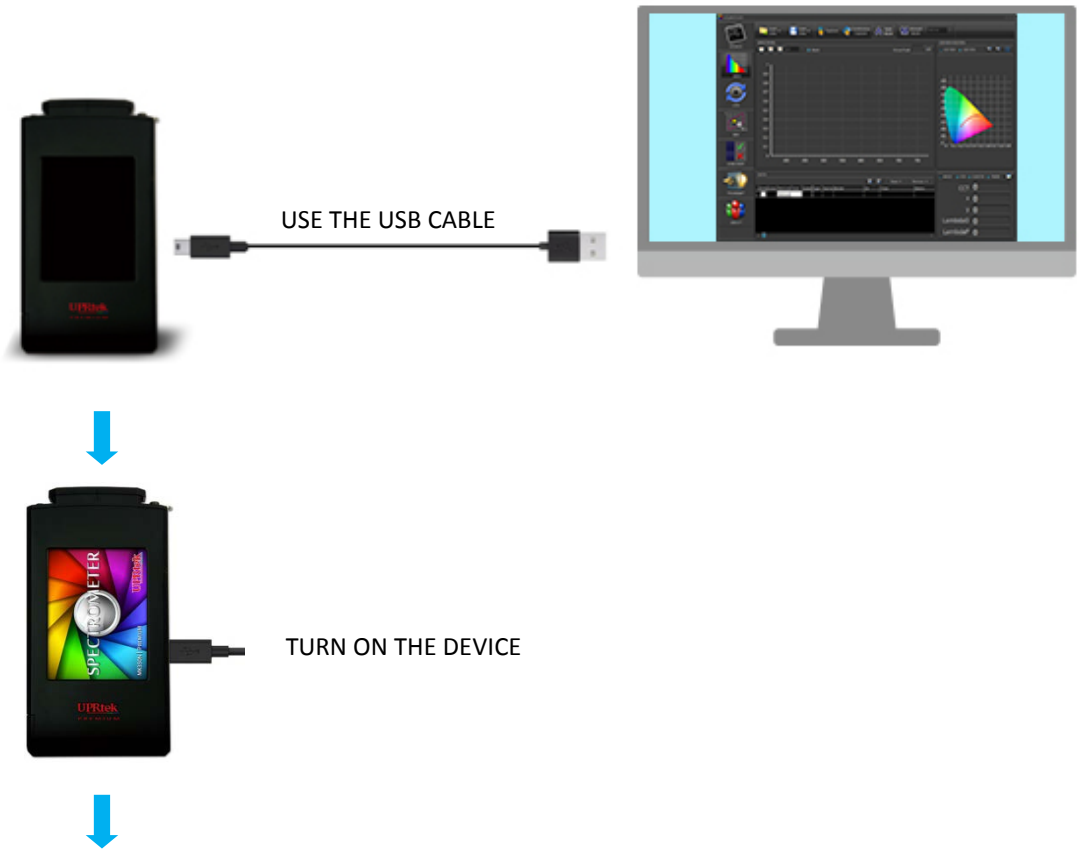
➔PC to MK350 Connections

You will find a “uSPECTRUM” icon on your desktop. Click on it.

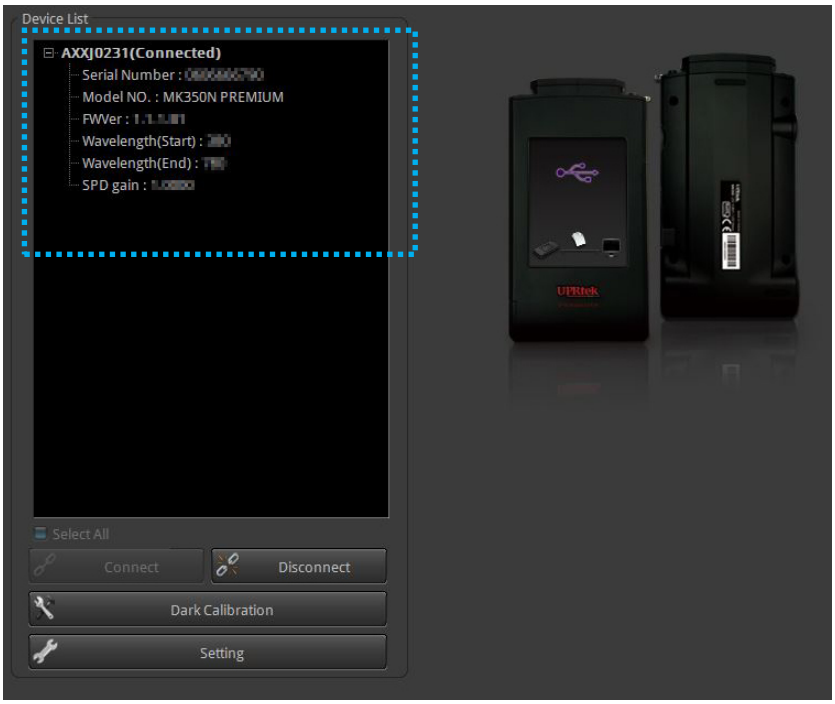


At this point, use the USB cable supplied in the packaging and connect it to the MK350N PREMIUM device and turn on the device.

ex. MK350N PREMIUM device.



DISPLAY A USB CONNECTION



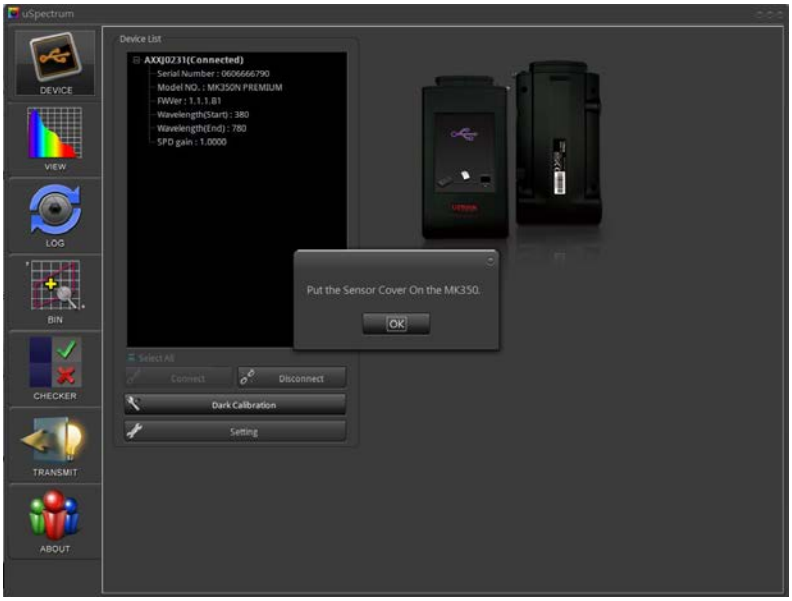
Device status will show basic information after successful auto connection.

2.3 ➨Getting Started

Put the optical sensor closely to the light source.

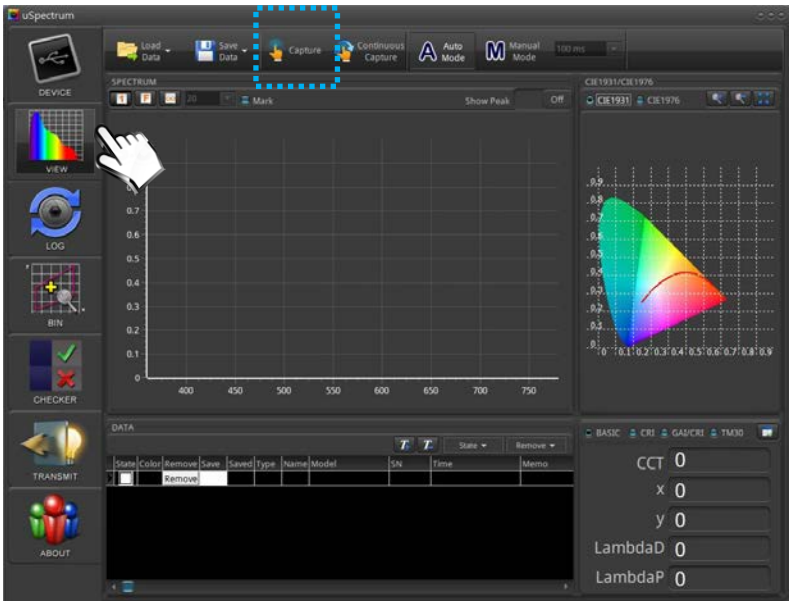
Dark Calibration

Click on Setting → Dark Calibration → OK



Take a measurement

Press ***Capture*** button to begin measurement.



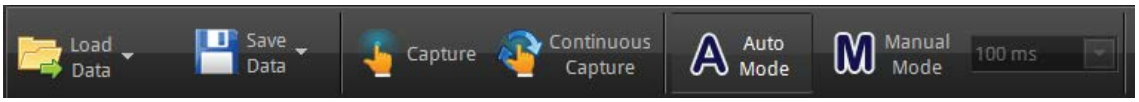
3

Software Operation Guidelines

- MAIN TOOL BAR
- MAIN FUNCTION：GENERAL
- CIE CHART WINDOW
- DATA WINDOW
- DATA WINDOW TOOLS
- BASIC / CRI WINDOW
- LOG FEATURE
- THE BIN FEATURE
- CHECKER FEATURE
- TRANSMIT

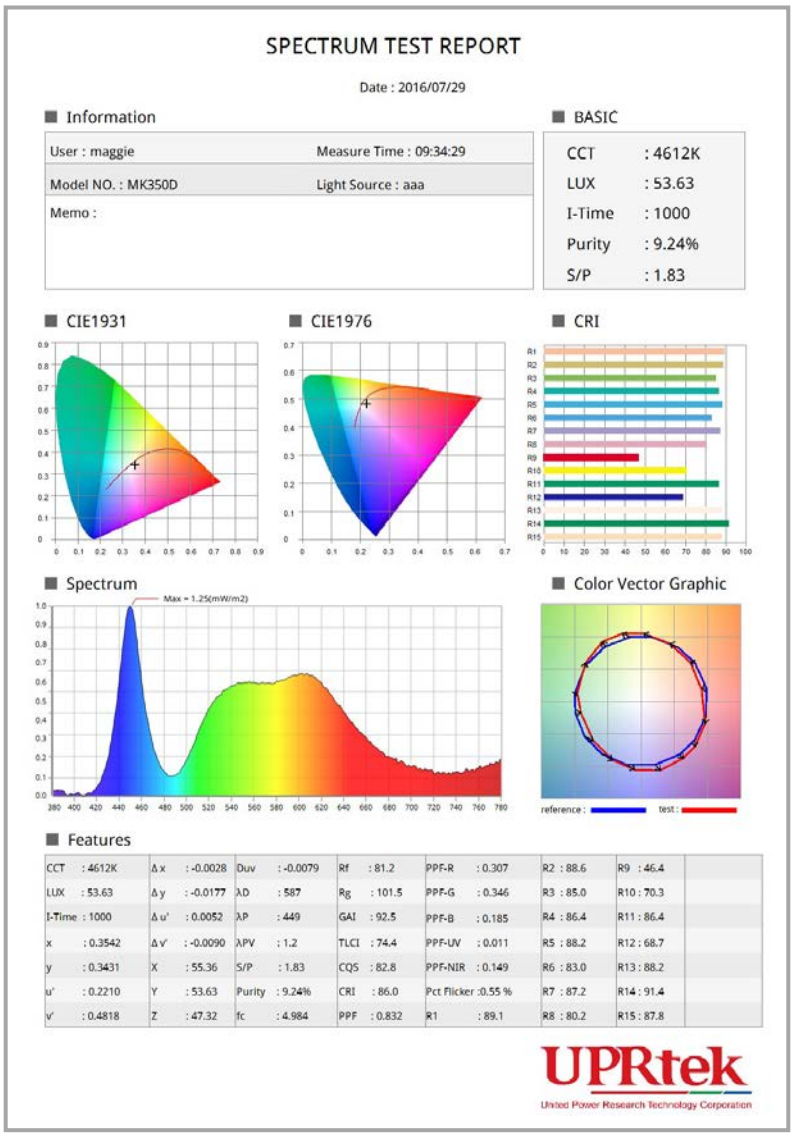
3.1 ➨ Main Tool Bar

The yop menu bar contains convenient functions and settings.



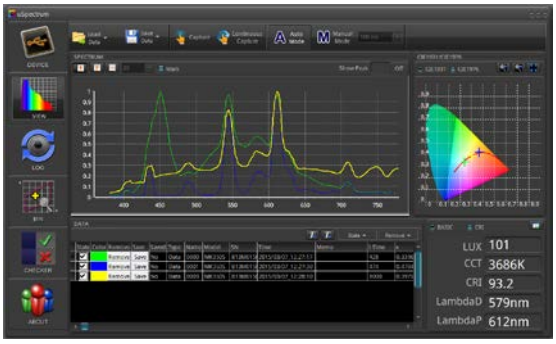
Function	Description
Load Data	Load historical data that is saved on your PC General Format is data previously saved by the spectrometer device onto the SD Card. Spectrum Format is data received from an outside source – it is a text file with pairs of wavelength and data as shown below (note that the wavelength and data are separated by a tab). *380nm 0.003232* *381nm 0.006464* *382nm 0.007244* *383nm 0.005685* *384nm 0.006072* Once you load the file you will be able to see Spectrum and CIE information for that data on the uSpectrum screen (note that it will not show in the "Data" area).
Save Data	Saves data onto your PC – data can be saved as Data, Image, Report or All. Data rows can also be "selected" to be saved by marking the "State" box for that row in the "Data" area.
Capture	Instructs spectrometer to take a light measurement

Continuous Capture	This function allows the spectrometer to continuously capture at very short intervals allowing you to move the position of the spectrometer and see changes immediately without having to press the capture button. Press this button and move the spectrometer device about and watch the spectrum change.
Auto Mode	Interval time for Continuous Capture is fixed
Manual Mode	Interval time is set manually when this item is selected (the interval is set in the next item below).



3.2 ➨ Main Function: General

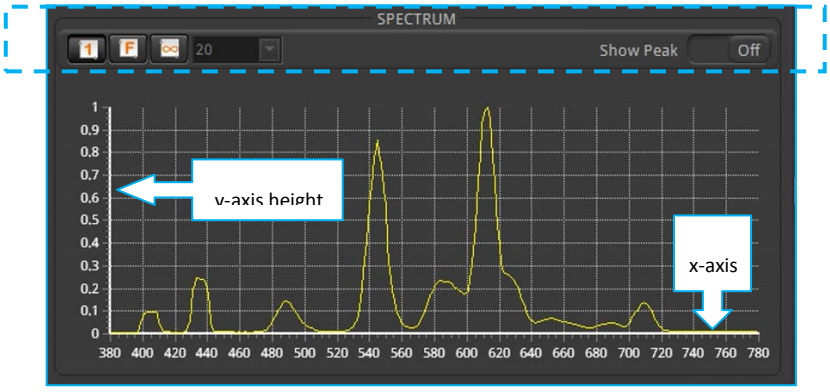
The Spectrum Window displays the wavelength spectrum for a light measurement. Several captures can be presented at the same time (see Data Window) The x-axis = wavelength, y-axis = intensity.



You can see the spectral colors for an individual spectrum, but not all at the same time since they will overlap. First uncheck all the “State” boxes and click on one of the data items to the right of the “Saved” column to see the spectral colors for that row.

You can also adjust the graph parameters (x,y axis gradiation) as shown below.

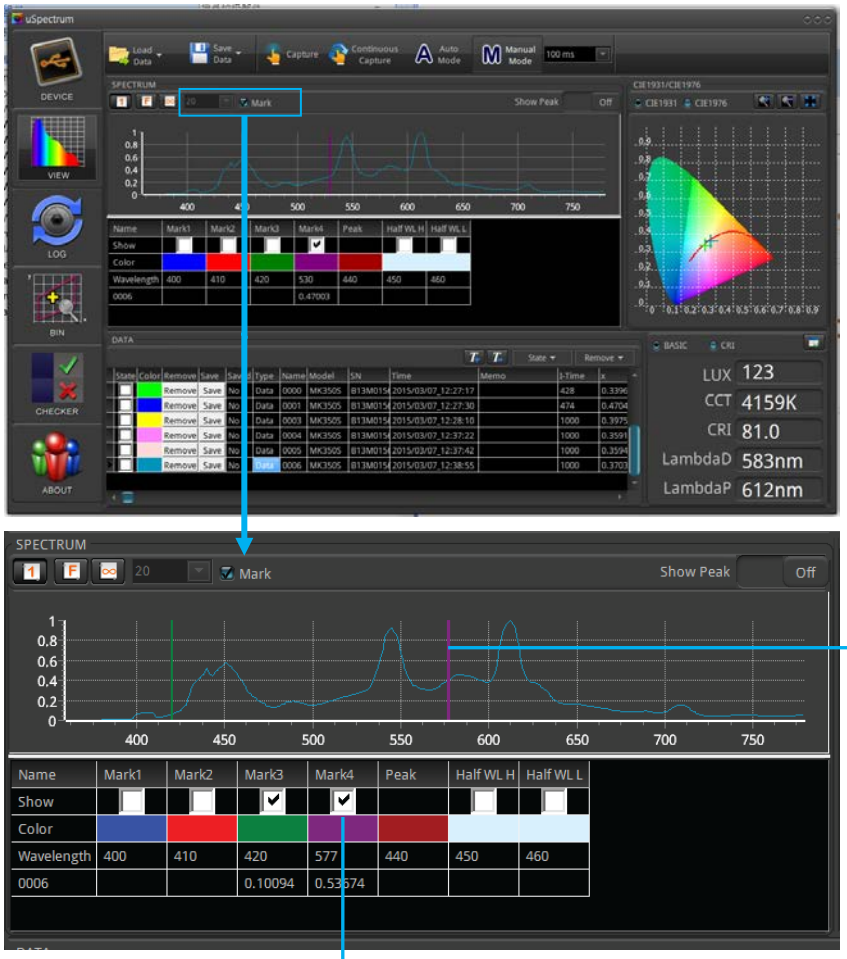
1 Mode



Function	Description
1 Mode	Displays the high peak wave (λp) at 100% of the y-axis height (for each spectrum displayed)
F mode	When displaying several spectra at once, all are displayed with their “relative” intensities.

∞ mode	Y-axis height is fixed, based on values in the drop-down box or a value that you can type into the box.
Show Peak	When turned “On”, the high peak (λp) and its half bandwidth are both marked
Mark	(see next page)

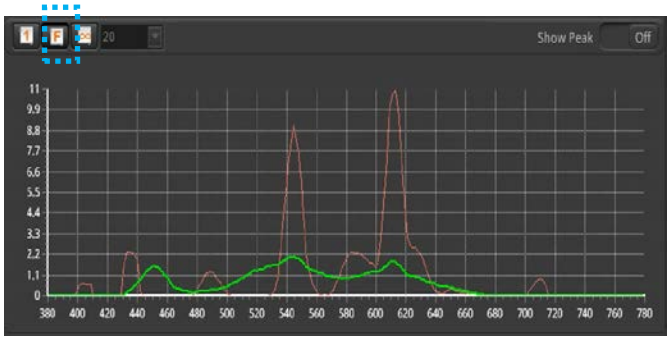
Selecting the “Mark” check box on the Data Window. This allows you to view numerical data for all measurements across a vertical cross section of the spectrum.



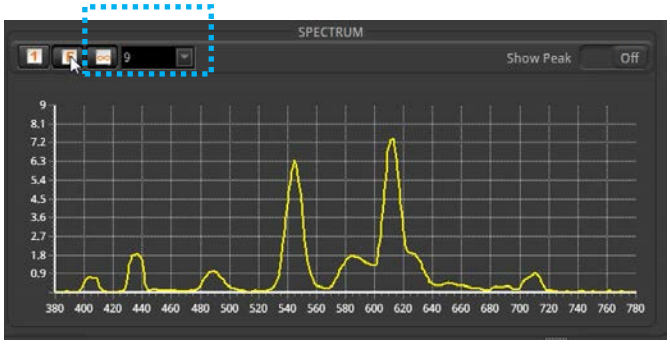
#2 - Left click and drag this purple vertical line across the spectrum and watch the values change in the Mark’ed screen below.

#1 - Check which spectrums you want to see numerical data for.

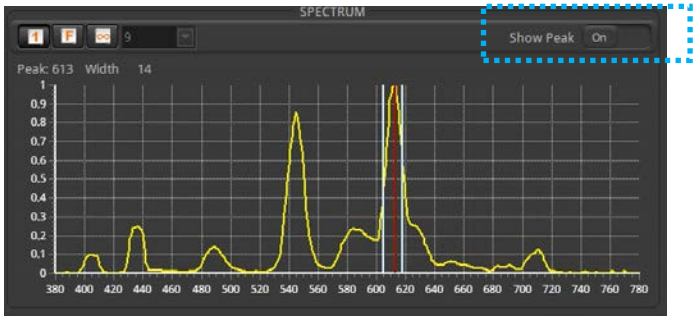
F Mode



∞ button with 9 units

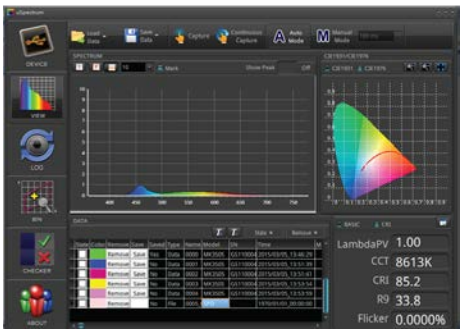


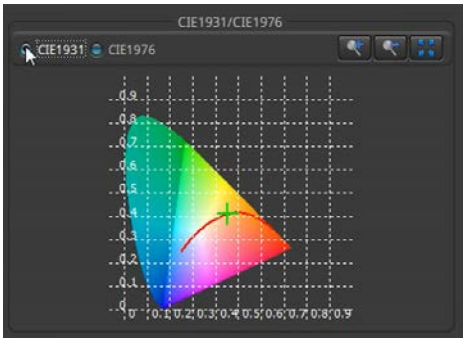
1 button & Show Peak

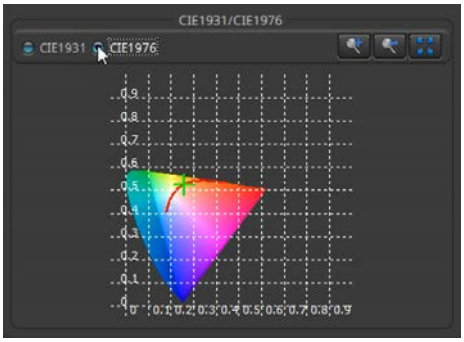


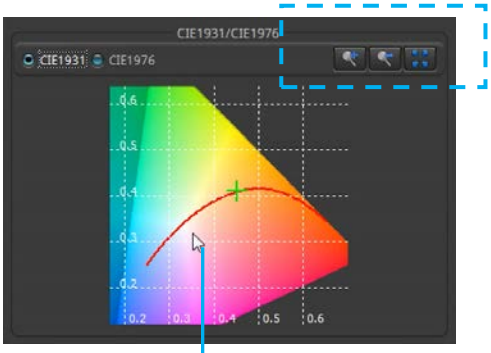
3.3 ➨ CIE Chart Window

The CIE Chart window can display either CIE 1931 or CIE 1976. You can display as many data as are selected in the “Data” window.









Zoom in

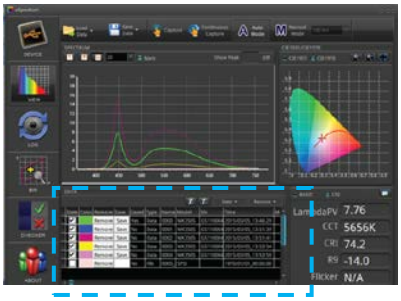
Zoom out

Zoom fit

Left click n’ drag your mouse to move the CIE chart on the screen.

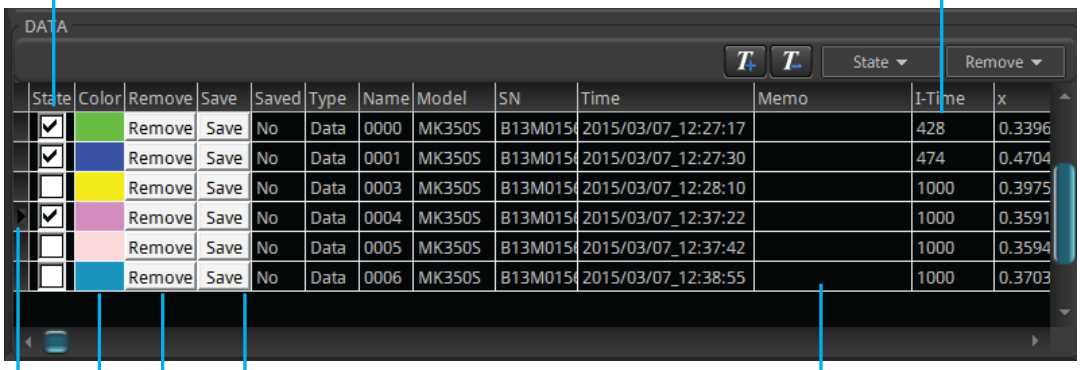
3.4 ➨ Data Window

In the Data Window view, you can see a complete history of all of your captured light data in an organized table. Furthermore, this screen provides features to allow you to sort, organize and administrate easily and efficiently.



Select items to display in Spectrum and CIE charts

Sort on any column - click on col. title



Highlight item in charts

Delete item

Data saved or not yet saved

Make notes, exception reporting.

To customize color, double clicks

Color Picker

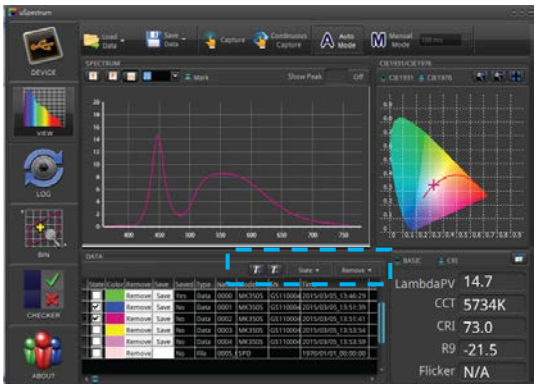
Data values that marked with “N/A” indicate that the data was originally taken by a spectrometer device which does not supply that information because of differences in versions.

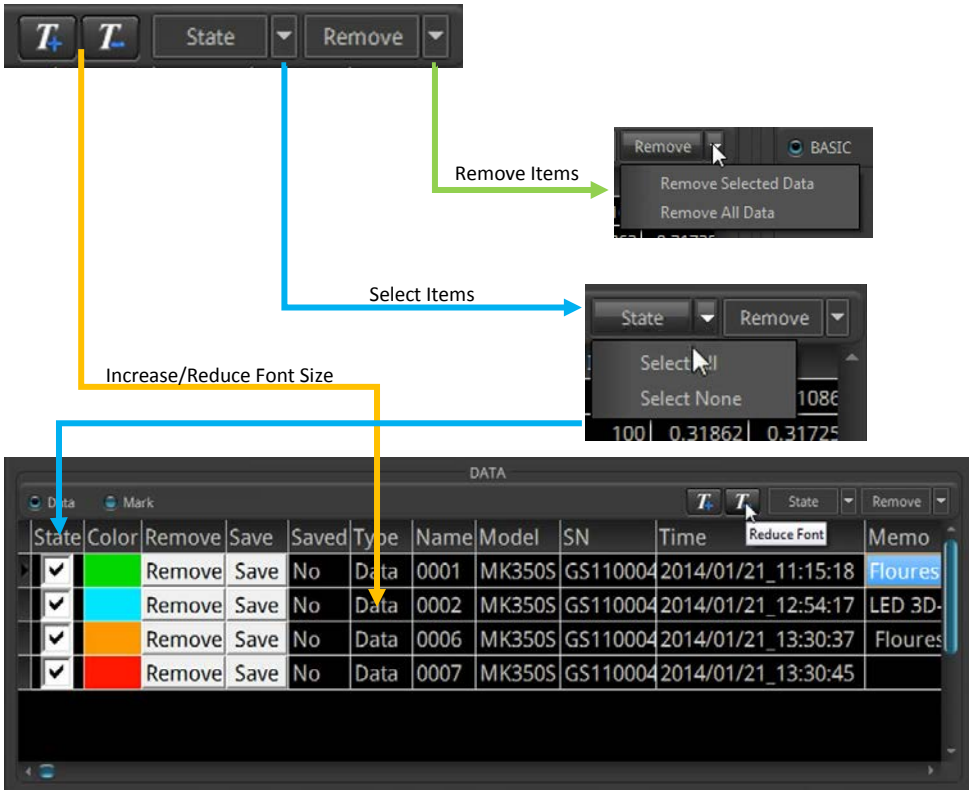
The first 12 columns in the Data window are explained below.

Column	Description
State	Select the data row to be displayed in the charts
Color	Color of chart markers for a row of data
Remove	Click to delete data row
Save	Click to save data (in row) to PC
Saved	Data saved (Yes) or not yet saved (No)
Type	“Data” means the data was captured by the spectrometer device. “File” means that the data was retrieved from the PC (previously saved data).
Name	If the data was retrieved from the PC, this will be the name of the file and location. Otherwise, it will be the Serial Number of the spectrometer device.
Model	Model of the spectrometer device that took the original measurement – MK350S, MK350S PREMIUM, MK350N PREMIUM, MK350N,MK350N+ , MK350D,PG100N
SN	Serial number of the spectrometer device that took the measurement. This can help when multiple spectrometer devices are concurrently in use.
Time	The date/time that the measurement was taken
Memo	Enter notes, memos, reminders, environment conditions.
I-Time	The Integration Time (exposure time) at the time the measurement was taken

3.5 ➨ Data Window Tools

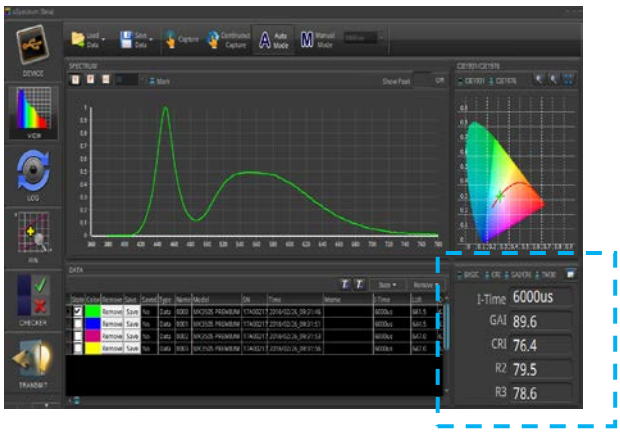
There are convenient tools on the Data window to help you organize and administrate data.



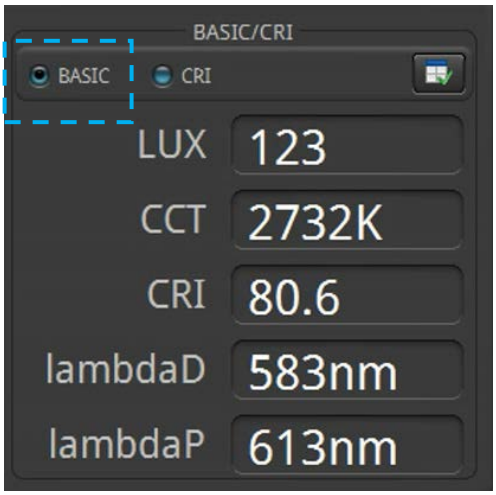


3.6 ➨ Basic / CRI Window

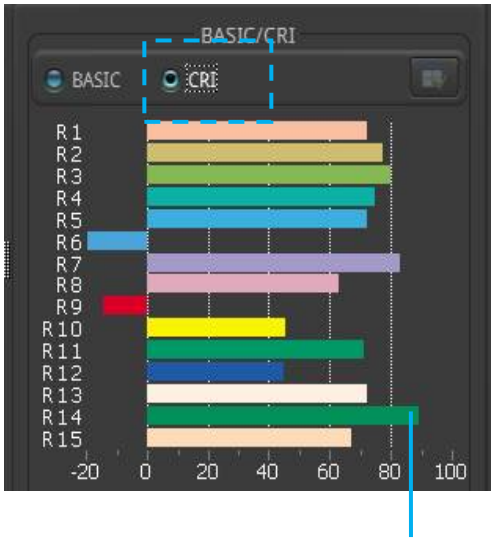
You can choose to display either the Basic List, CRI chart, AI/CRI, TM30 in the lower right corner window.



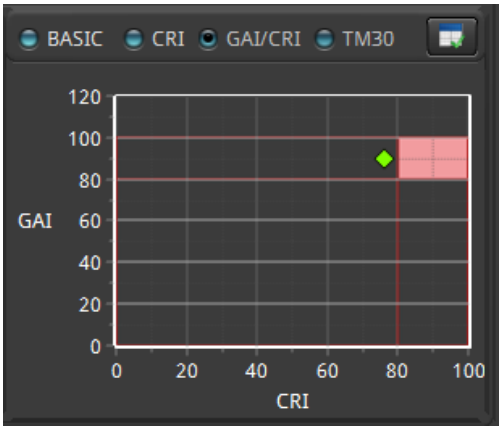
Basic List



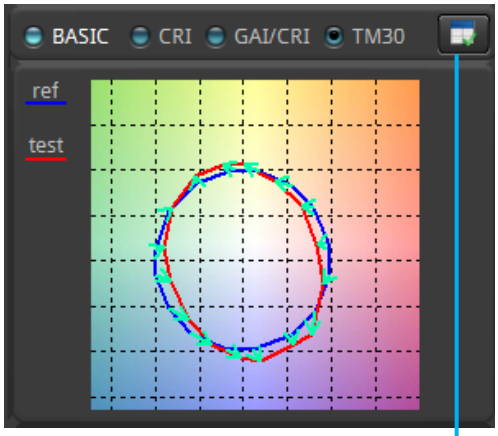
CRI



Place mouse over bars to see data values



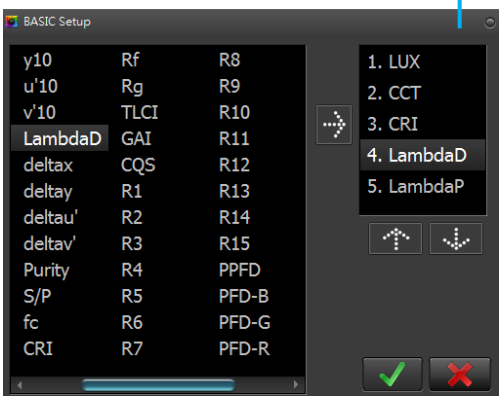
you can choose to display CAI/CRI location.



Blue line as a reference light source and red line as a test light source.

The Basic List has 5 items - you can replace any of the items using the setup screen.

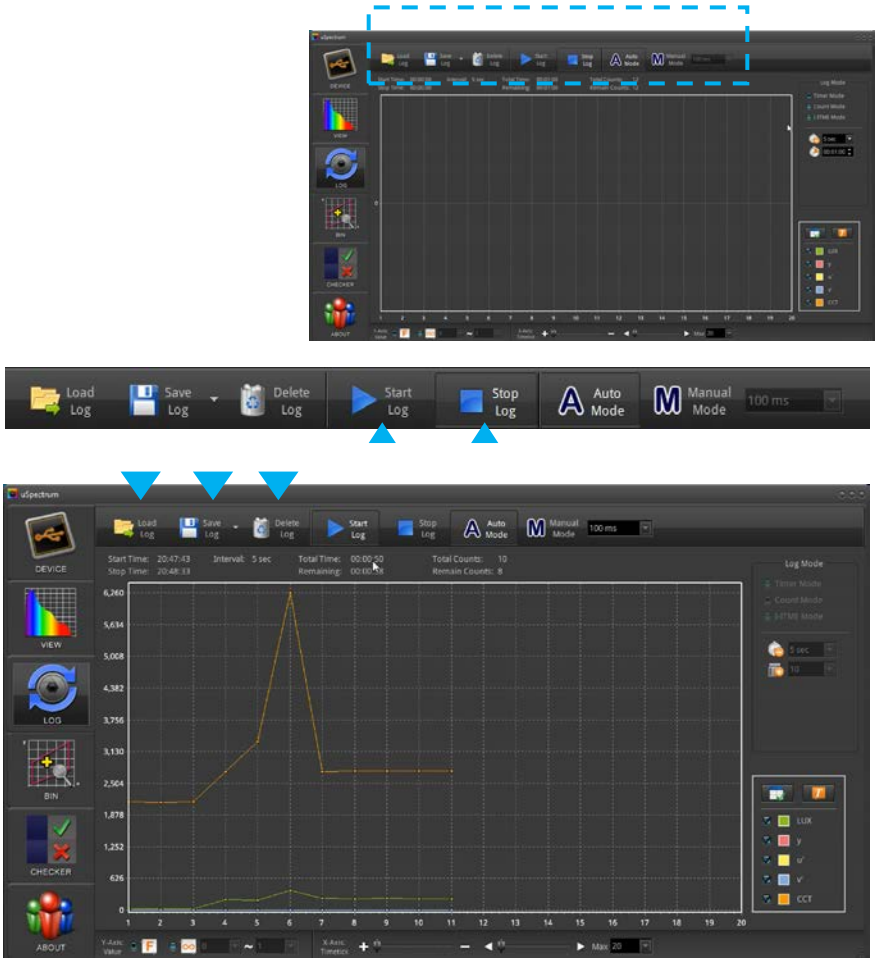
1. Select an item to be replaced
2. Select the new item
3. Press the right-arrow
4. Press the Commit Button



3.7 ➨ Log Feature

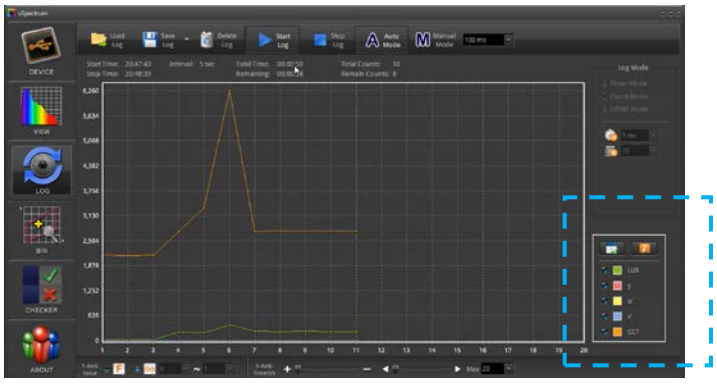
The Log Feature automatically captures and logs light measurement at certain intervals. The data can be saved to the PC/laptop and recalled later.

After you press the log button, log screen appears (below).

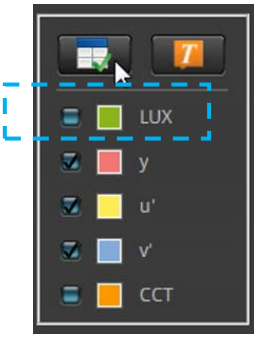


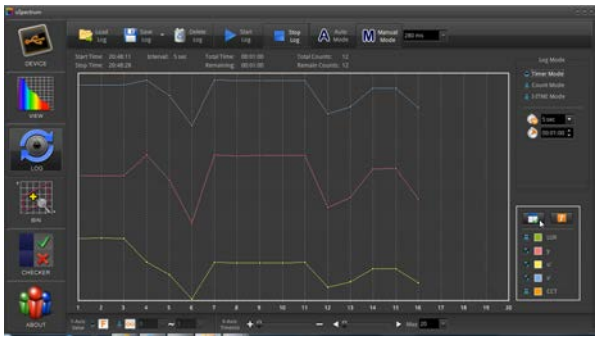
Use the tool bar to delete log data or save log data to your PC. Saved log data can later be re-loaded and reviewed on the screen at a later time.

The Log screen has an item list window (mWm^2) – you can determine which of the items in the list are displayed on the graph by marking the check boxes.

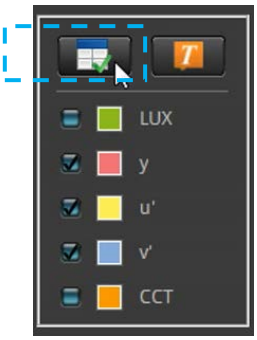


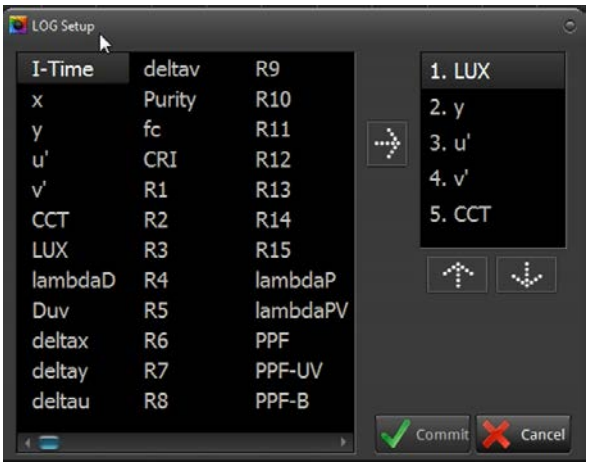
In the graph above, the y, u',v' are actually displaying on the graph, but the values are so small that they are compressed towards the bottom. If you deselect the proportionately larger LUX and CCT values, the y, u', and v' values become visible (below).



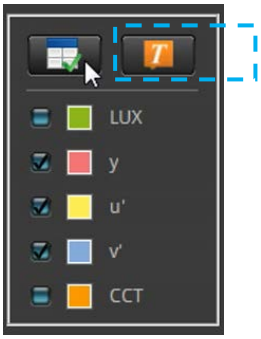


You can also change the items on the list with the Setup button which brings up the Setup screen (see the Basic List).

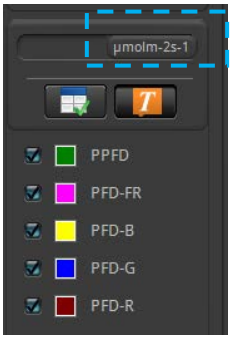


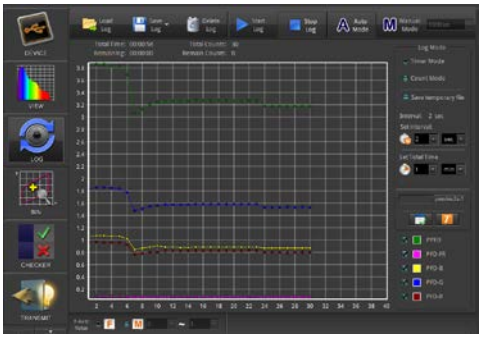


You can also use the display numerical values button to display numerical values for each point on the graphs.



The Log screen has an item list window (µmolm-2s-1) – you can determine which of the items in the list are displayed on the graph by marking the check boxes.





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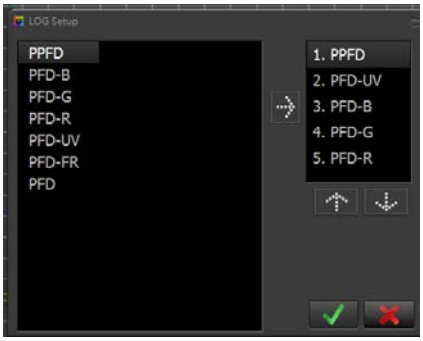
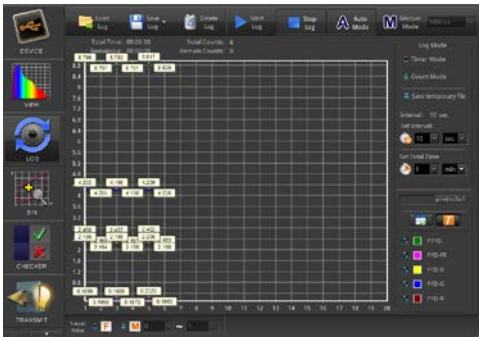
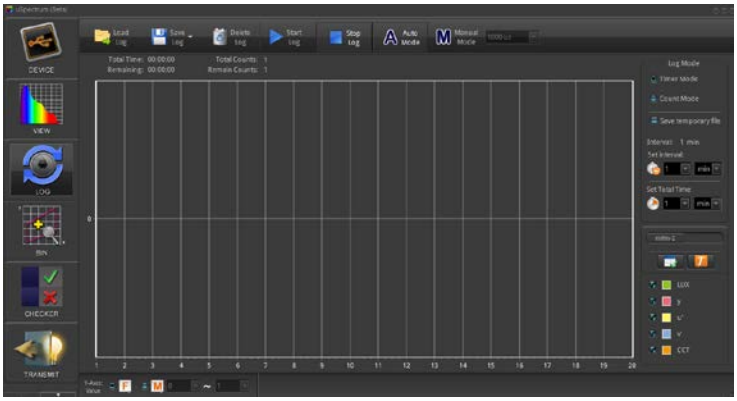


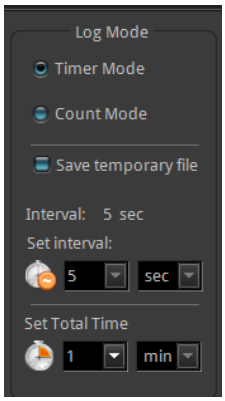
You can also use the display numerical values button to display numerical values for each point on the graphs.



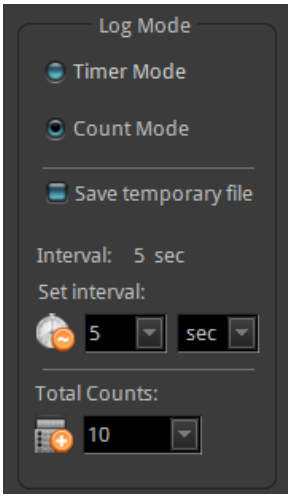
You can also change the color of the graph lines by double clicking in the colored box next to the measurement symbol (e.g. y, u') and then selecting from the color picker screen.

The Log Mode setup determines the intervals for automatic continuous captures. There are 2 modes – Timer, Count. The parameters for each mode will change as you select its radial button.





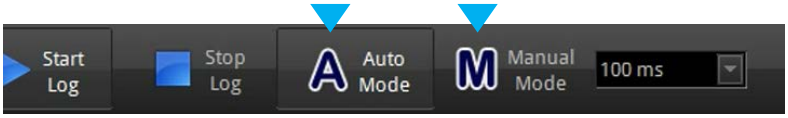
Timer Mode – Uses Interval and Total Time as parameters. In the example above, the spectrometer captures data every 5 seconds [1] until it reaches 1 minute [2].



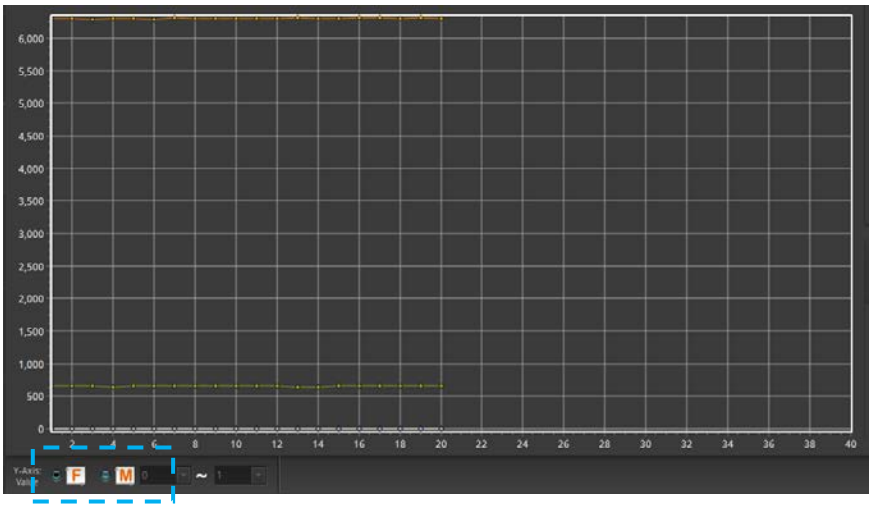
Counter Mode – Uses Interval and Total Number of Captures. In the example (right), the spectrometer will capture data every 5 seconds [1] until it reaches 10 captures [2].

In all boxes you can either use the drop down menu or type in a value directly.

The I-Time (exposure time) for the Timer Mode and Count Mode stays constant during logging and is automatically or manually set on the tool bar at the top of the Log screen.



At the bottom of the Log screen is another tool bar which adjusts the y-axis, x-axis dimensions of the graph to allow you to see more or less data on the screen.

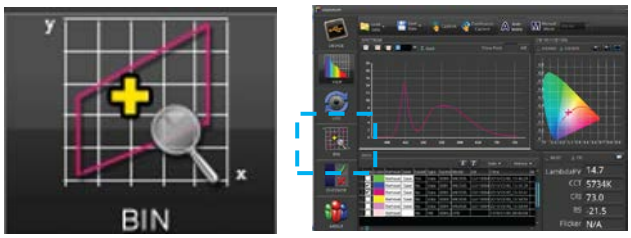


The ***F (Fit) mode*** adjusts the y-axis so that it can "fit" all values in the graph.

The ***M mode*** allows you to manually set the y-axis "min to max" values (use drop down boxes next to the radial button).

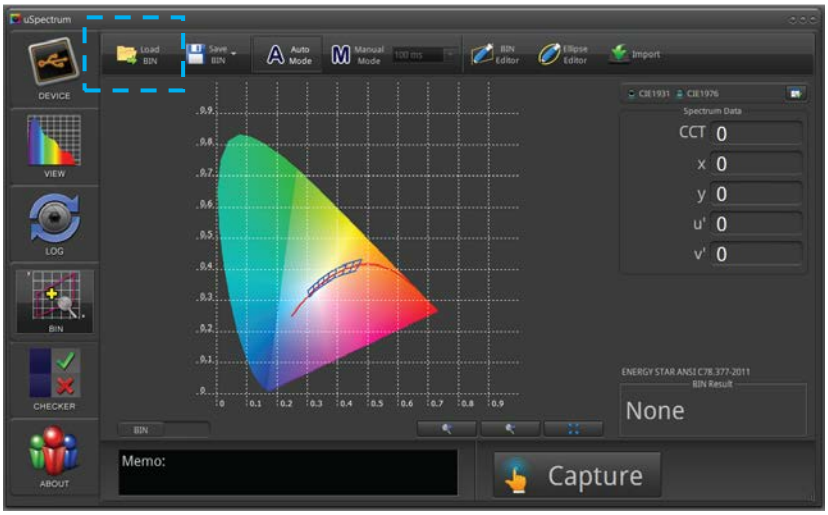
3.8 ➨ The BIN Feature

The BIN Feature is used to classify a light measurement within a given range of boundaries as mapped on the CIE charts. Press the Bin icon on the left panel.

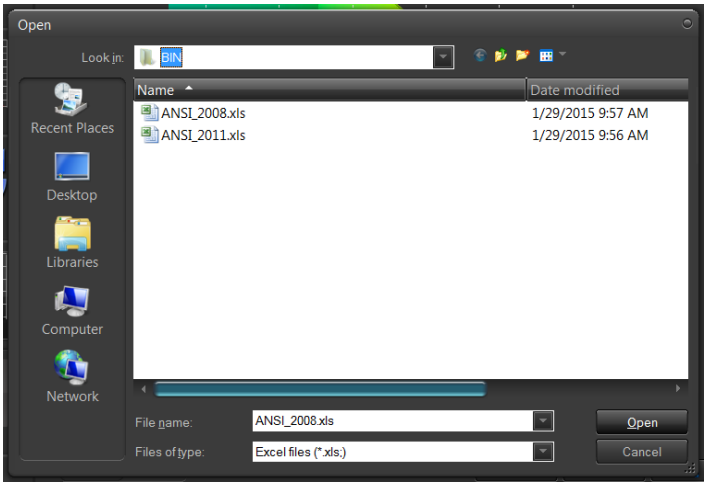


Next, load a BIN chart by pressing ***Load BIN***

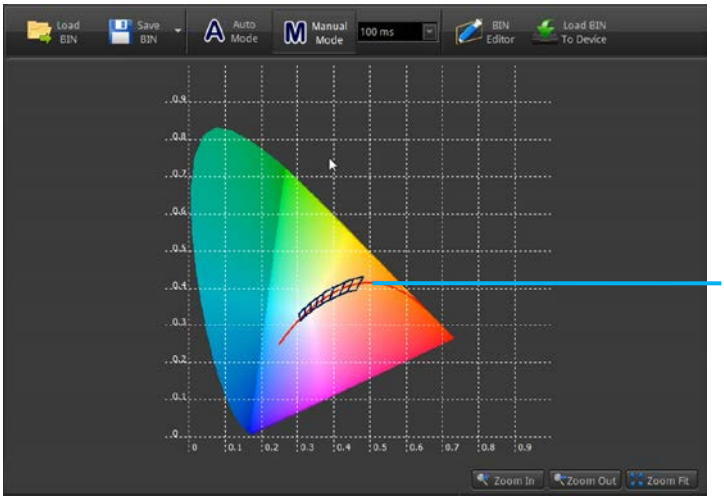
Load a Bin chart



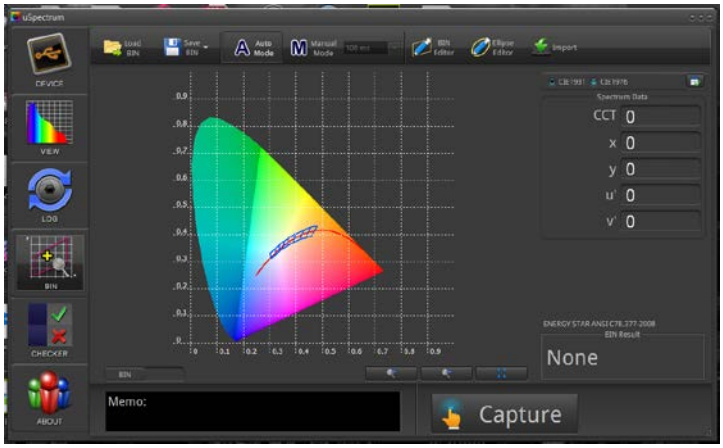
You can find the Energy Star ANSI BIN C78.377 files where the uSpectrum files were installed – usually installed in:
c:/Program Files/uSpectrum/Examples/BIN or
c:/Program Files (x86)/uSpectrum/Examples/BIN
(We can accept file formats in ANSI C78.377.2011 and ANSI C78.377.2008)

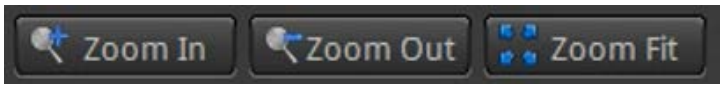


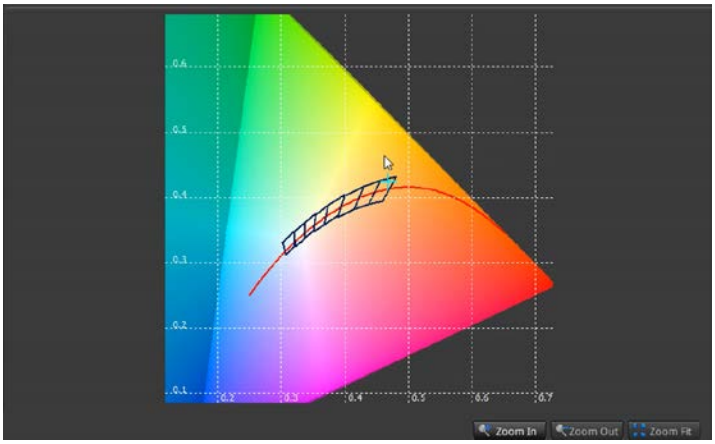
After loading a file, you should see bin boundaries on the spectrum.



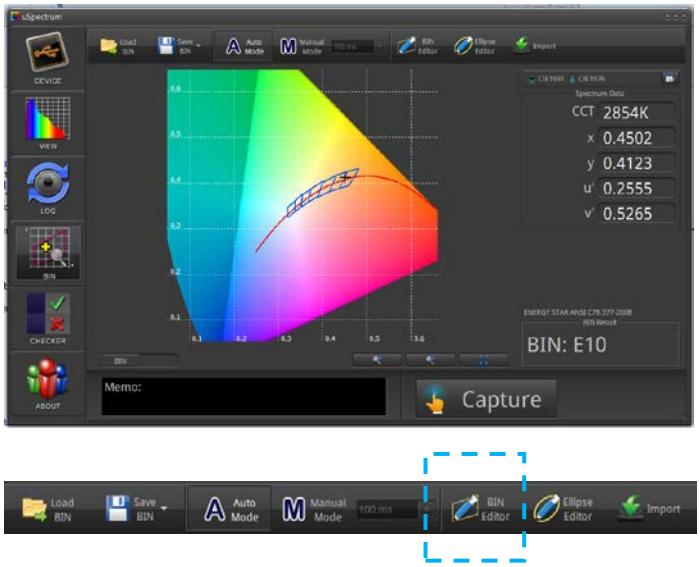
If you take a measurement (Capture button lower right), a mark will show you whether the measurement is within the acceptable boundaries for the Energy Star standards. You can use the Zoom tool to enlarge the screen.



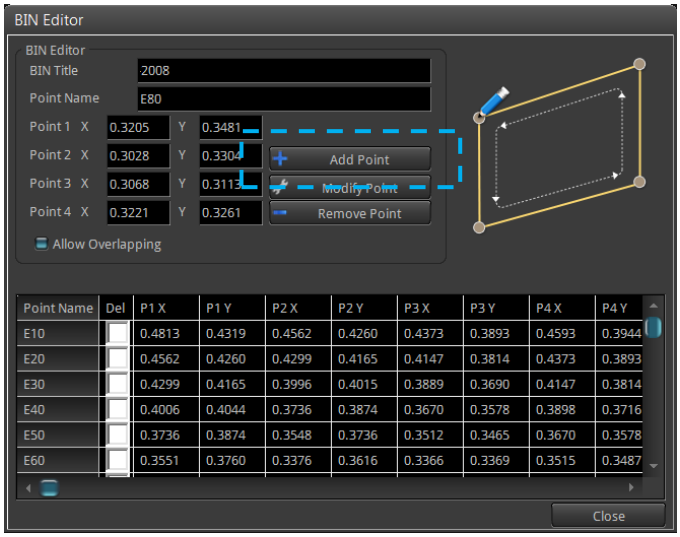




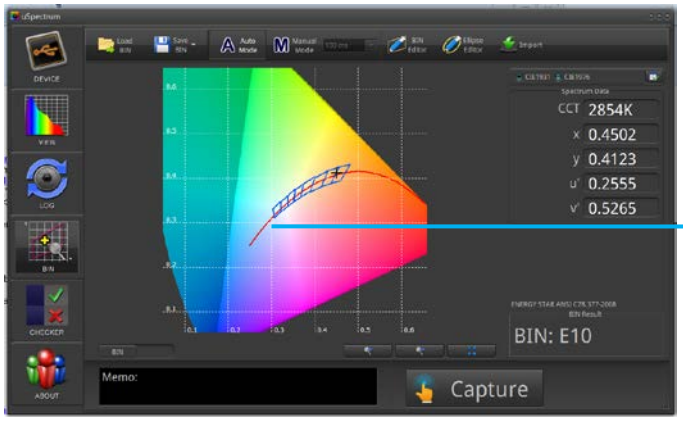
You can also add to or remove boundaries from the current BIN chart by using the ***BIN Editor***.



Enter in 4 sets of x,y coordinates for one BIN boundary and hit “Add Point”. Note that you need to precede each point with a leading zero and decimal point (0.4813) for numbers less than 1. Also, Point 1 should represent the upper left corner of the boundary. Points 2, 3, 4 should continue in counter clockwise order. You can also modify points for removes points accordingly. Close the screen.



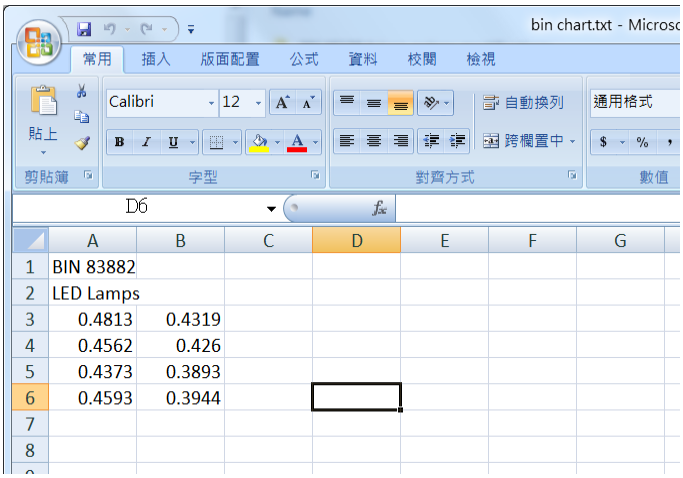
A new boundary should appear in the data view.

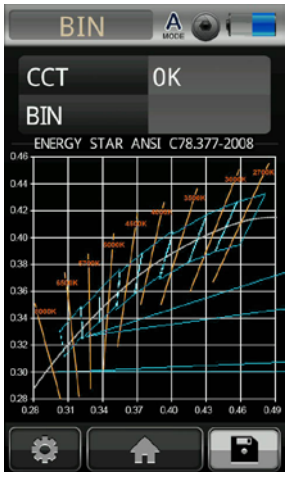


New BIN boundary

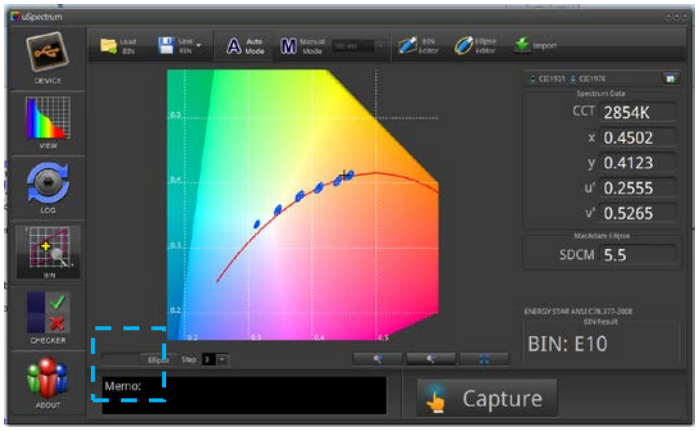
Finally, you need to save your new BIN chart and import the chart into the spectrometer device.

The new chart will appear as follows when opened in Excel.
After you disconnect the spectrometer device from the PC, you should be able to see the new chart information.

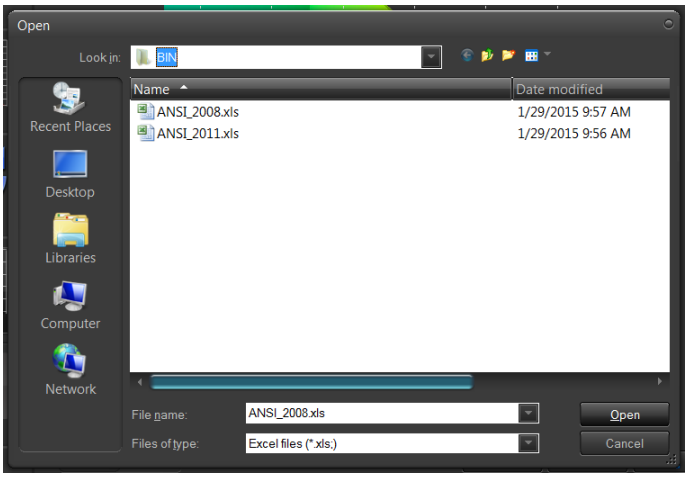




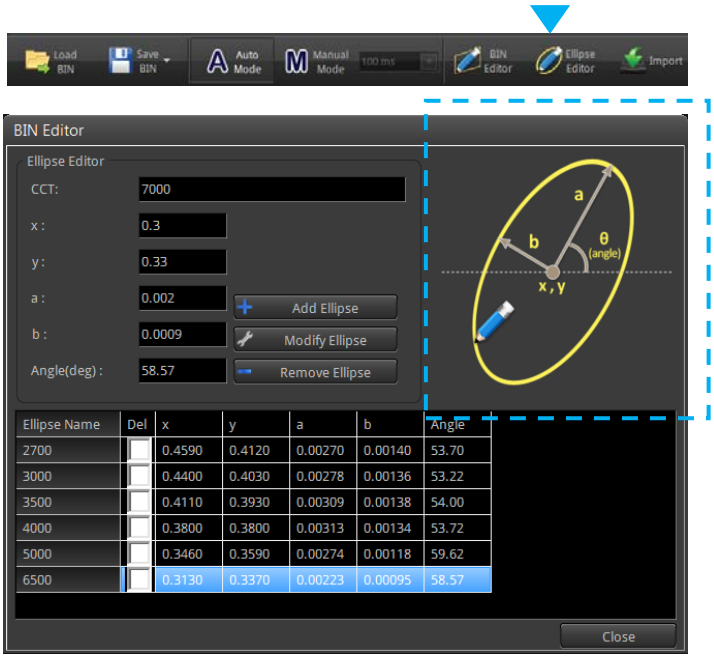
There is also an Elliptical Bin feature that is very similar to the previous BIN feature but the bins are elliptical in shape as opposed to rectangular. You can access the Elliptical Bin feature with the slider button shown below.



The files you loaded for the Bin feature can also be loaded for the Ellipse feature (file contains both rectangular and elliptical bin data).

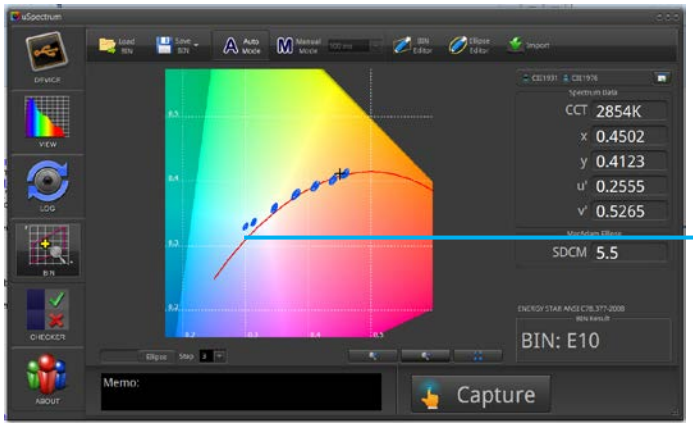


Once loaded you can add/remove ellipse boundaries using the ***Ellipse Editor***. CCT is the name of the boundary and must be represented by a number between 2700-8000 (representing the CCT number). The x, y coordinates represent the center of the ellipse. The a, b represents the half-height and half-width of the ellipse. The angle represents the slant angle of the ellipse. You can reference the yellow line diagram below for a visual orientation.



You can add the new boundary by clicking on the “Add Ellipse” button. When you close the screen, the new Ellipse boundary will appear.

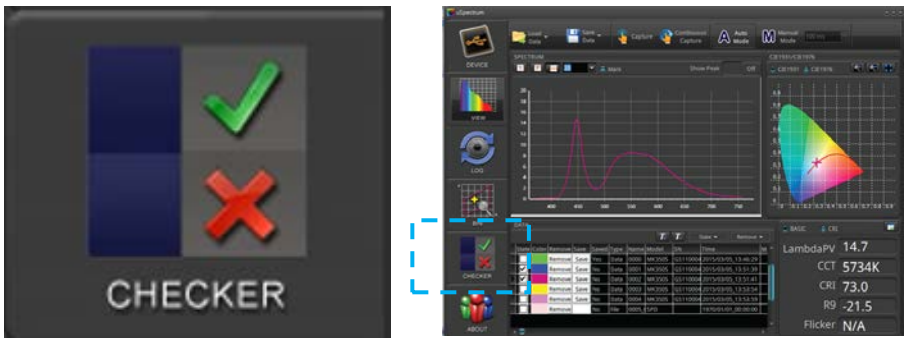
After you return to the previous screen, you can “Save” the bin data and then “Import” it into the spectrometer device.



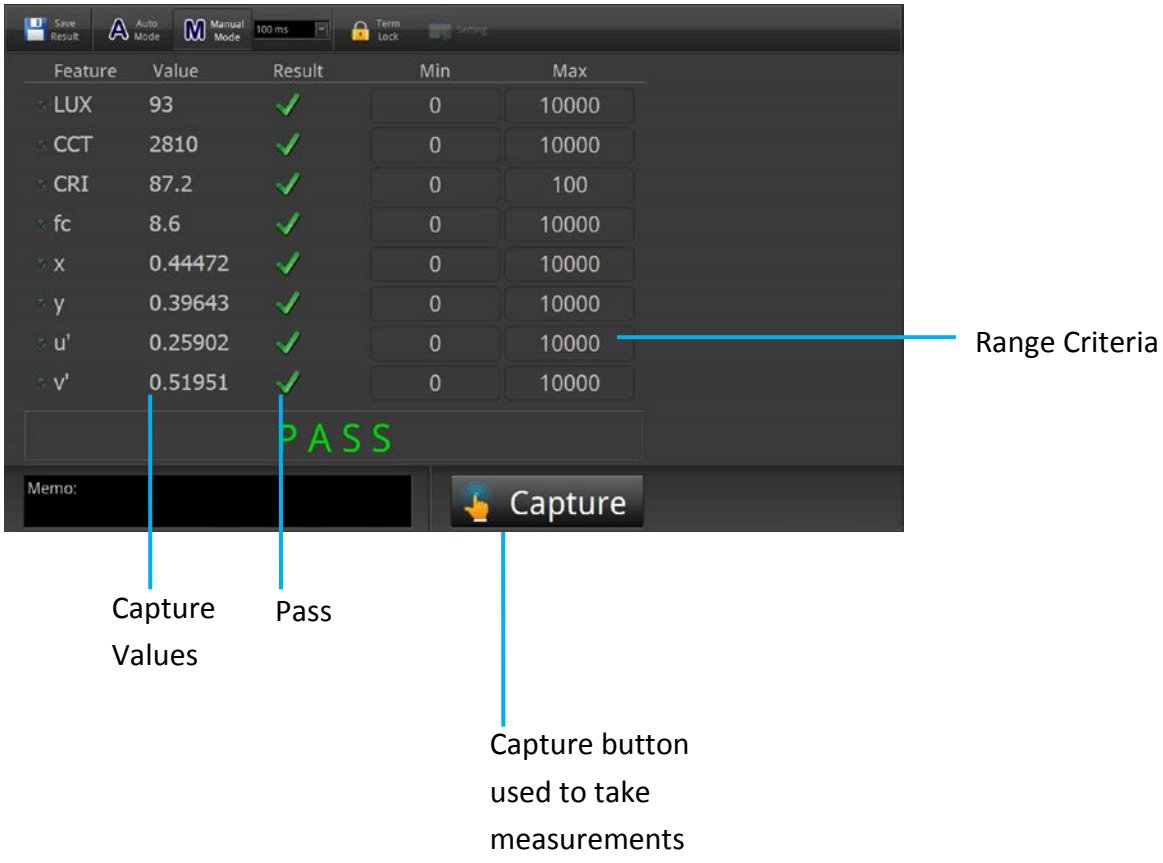
New BIN boundary

3.9 ➨ Checker Feature

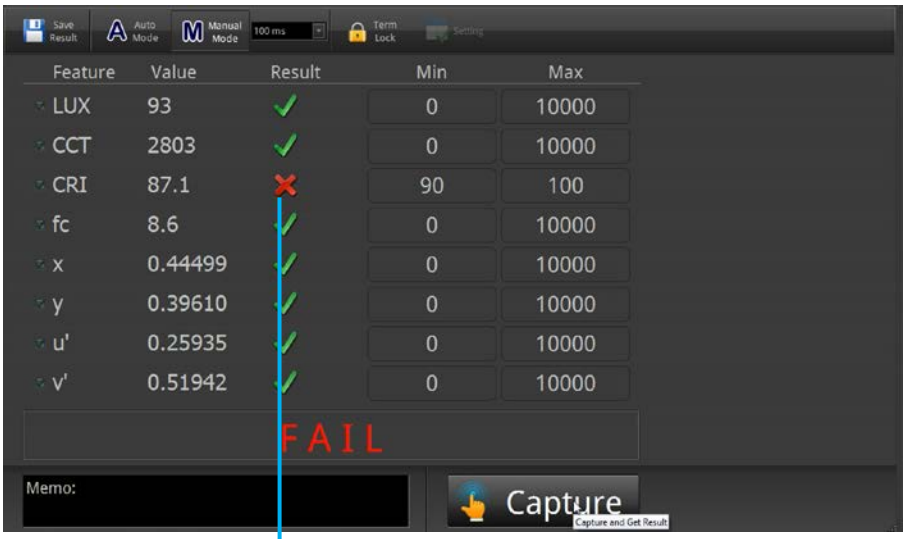
The Checker screen is used to validate a light measurement against ranges of configurable criteria (e.g. CRI 90-100) and determine whether the light meets or fails the required criteria.



In the Checker screen, use the ***Capture*** button to take a measurement – pass condition shown below.

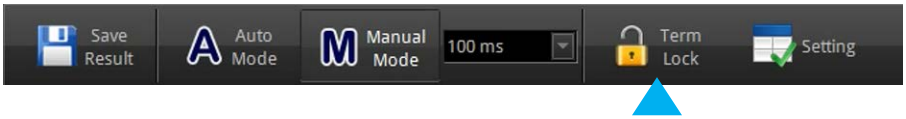


Checker Screen – Fail Condition

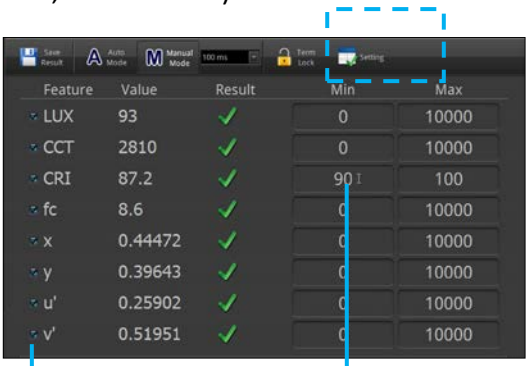


Fail

You can change the Min-Max criteria by first clicking on “Term Lock” at the top of the Checker screen.

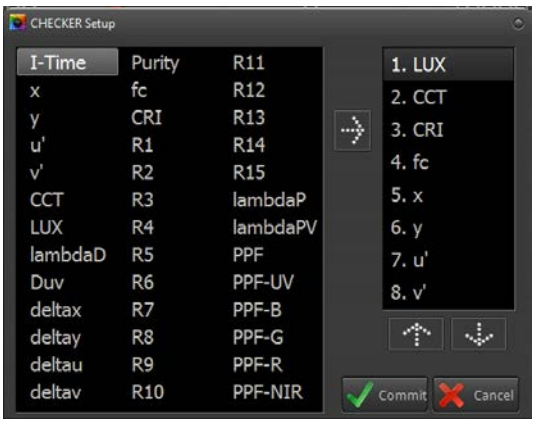


In “unlocked” mode, you can change the Min/Max values directly in their input boxes. You can also click the Setting icon to change the list on the screen (e.g. LUX, CCT, CRI and etc.).



This check box temporarily disregard criteria check

Enter in new values directly into range box

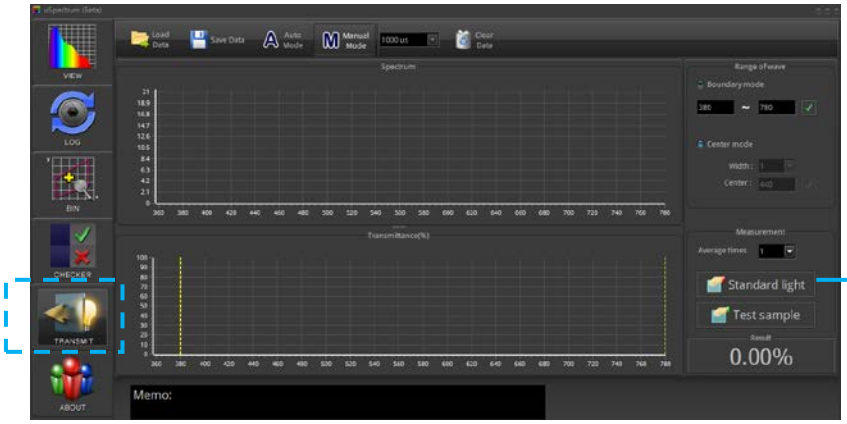


See Basic List for usage

You must lock the “Term Lock” icon again before being able to capture another light measurement.

3.10 ➨ Transmit

Transmit is used to measure the transmittance between the standard light and the test sample. Press the Transmit icon on the left panel. There are 2 modes. Boundary mode and Center mode. The parameters for each mode will change as you select its radial button.



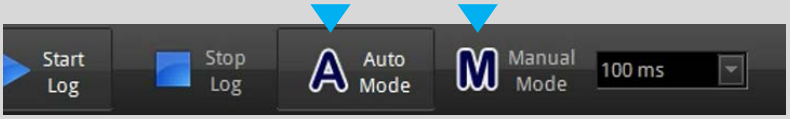
The spectrometer device measure a light source

Enter the wavelength range

Choose to measure the average times

The spectrometer device measure a test sample

Automatically or Manually set on the Tool bar at the top of the Log screen.

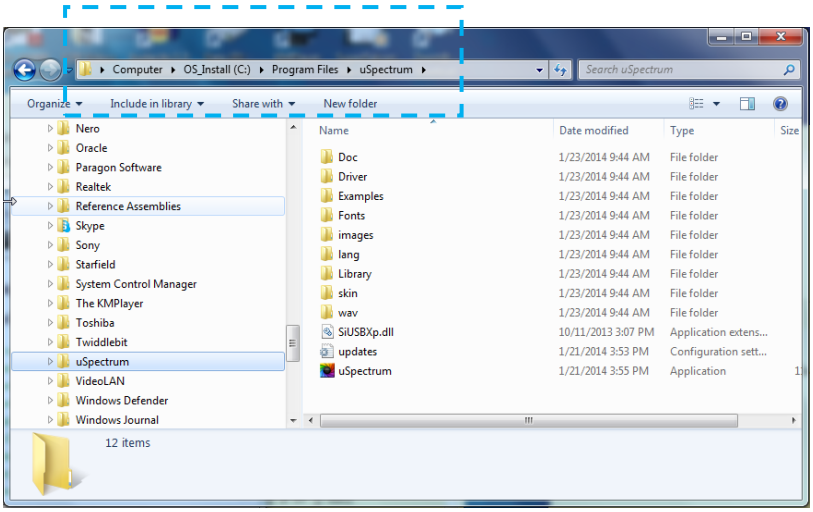


4 Spectrometer Custom Programming

- Manual Driver Download

UPRtek provides .dll libraries for users wishing to custom program Windows based applications for the spectrometer device. These .dll functions perform basic spectrometer device control and data access/retrieval functions.

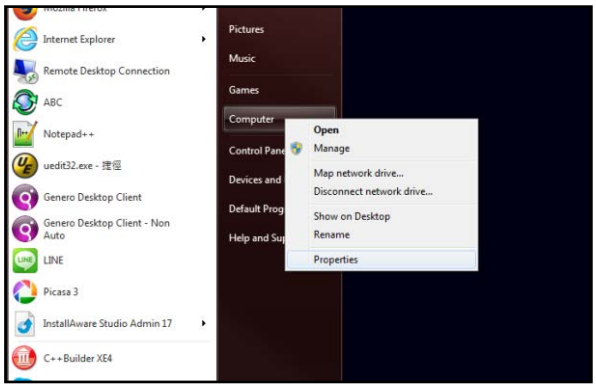
The spectrometer developer's kit is loaded onto your PC when you install the PC Software. The .dll libraries, documentation and example code are all provided in the install directory, typically located in the directory shown below. But it may be different depending on where you originally installed the PC Software files.



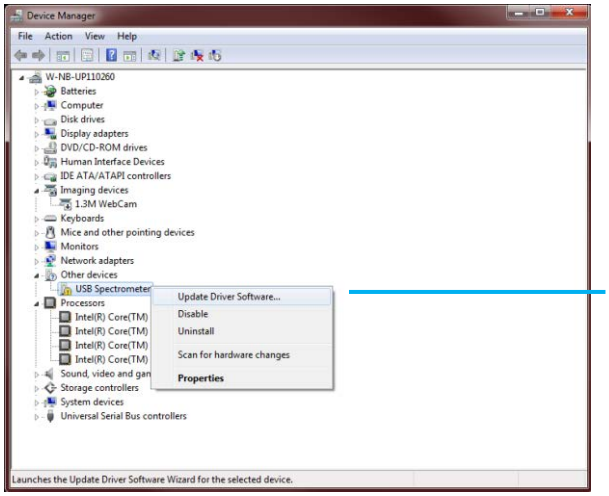
4.1 ➨ Manual Driver Download

These procedures are performed when an error message showing that the uSpectrum driver has not been installed properly.

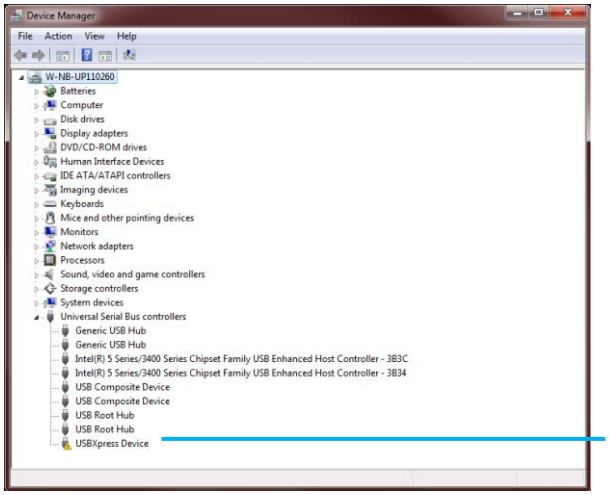
Step 1: On your Windows PC, click the Start Menu Icon (usually in lower left hand corner)  . The screen below will display. Right Click “Computer” and select “Properties”.



Step 2: Select “Device Manager”. Then, in the second screen, find the Device with an exclamation warning. It may be under “Other Devices”, “USBXpress Device” or “Universal Serial Bus Controllers”. Right click and select “Update Driver Software”.

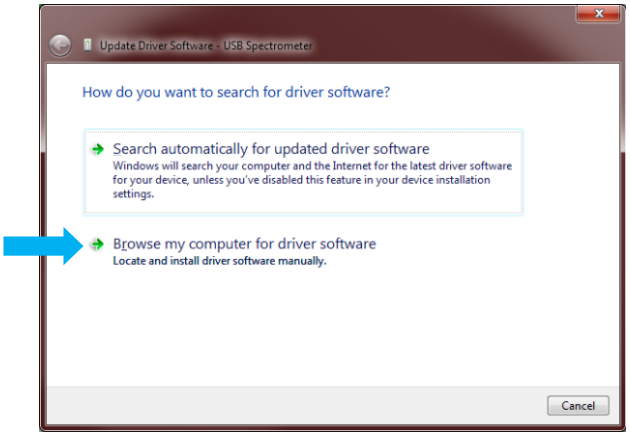


Device may be here…

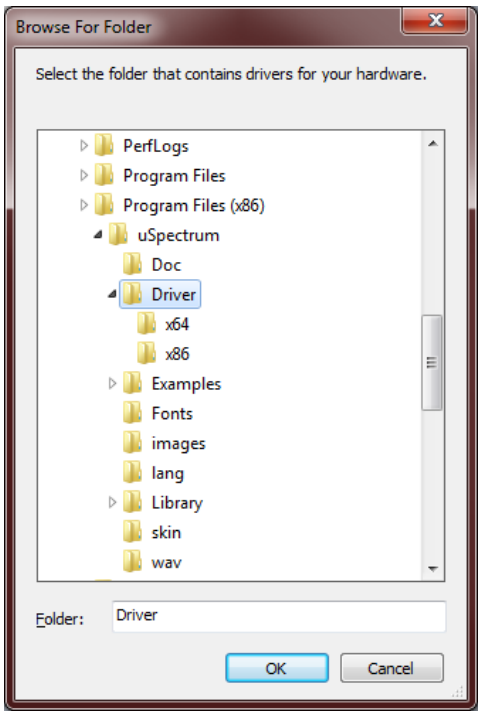


… or maybe here

Step 3: Select “Browse my computer for driver software”. And then click the “Browse” button on the next screen.



Step 4: Browse to the uSpectrum Driver folder. It is typically in c:/Program Files/uSpectrum/Driver, where the installation files were placed. Click OK.



Step 5: Hit Next. The driver should install correctly and you should be able to bring up your uSpectrum software.