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# Light Sensor

Triple Range

Product Number: ENLGT009-4



## Overview

This high precision, quick response light sensor is designed for measurements in three ranges:

- 0 to 600 lux
- 0 to 6000 lux
- 0 to 150 klux.

The Light sensor is an ideal sensor for both indoor and outdoor light measurements and can be used in Chemistry, Physics, and Biology experiments.

The Light sensor can be connected to all types of einstein™ data loggers.

## Typical experiments



### Physics

- Investigating the relationship between light intensity and distance
- Studying the interference, diffraction and polarization of light
- Demonstrating the flicker of the fluorescent lamps vs. other types



### Biology

- Studying the effect of light on photosynthesis rates

## How it works

The Light sensor uses a high precision Photodiode. When a reversed fixed voltage is applied to the Photodiode, any photon that hits it causes the Photodiode to release an electron. The result is that when light levels are higher, the current through the Photodiode increases. The current from the cell then passes through a resistor. The voltage is measured on this resistor and adjusted to the range of 0 - 3 V which is sent to the einstein™ device.

## Sensor specification

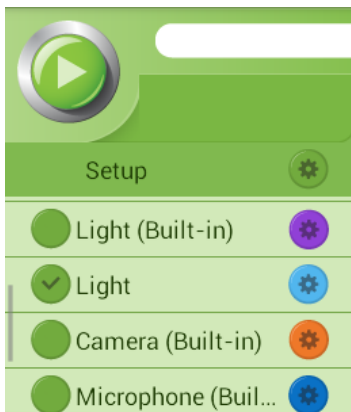
Range:	0 to 600 lx 0 to 6000 lx 0 to 150 klx
Accuracy:	±4 % over entire range
Resolution (12-bit):	For: 0 to 600 lx : 0.15 lx For: 0 to 6000 lx : 1.5 lx For: 0 to 150 klx : 37 lx
Default Sample Rate:	10 samples per second
Spectral Response:	Visible light

**Note: sensor cables sold separately**

## Data logging and analysis

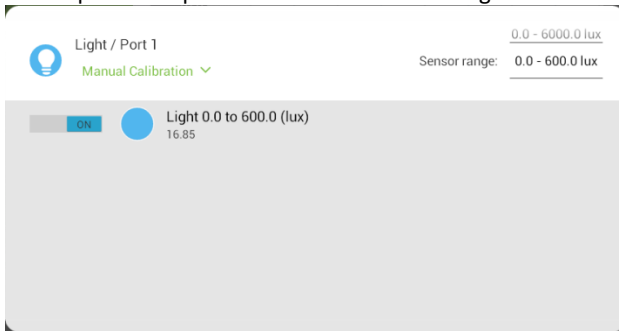
### MiLAB™

1. Take your einstein™ Tablet OR pair your einstein™LabMate with your Android or iOS tablet via Bluetooth
2. Insert the sensor cable into one of the sensor ports
3. Launch MiLAB
4. MiLAB will automatically detect the sensor and show it in the Launcher View



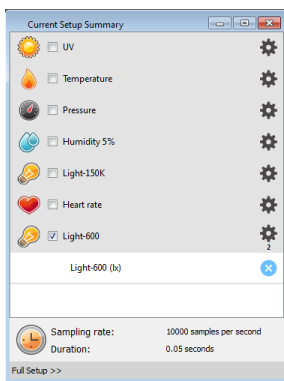
5. Make sure the icon is checked (  ) to enable it for logging

## 6. Tap the Setup icon to set the sensor's range

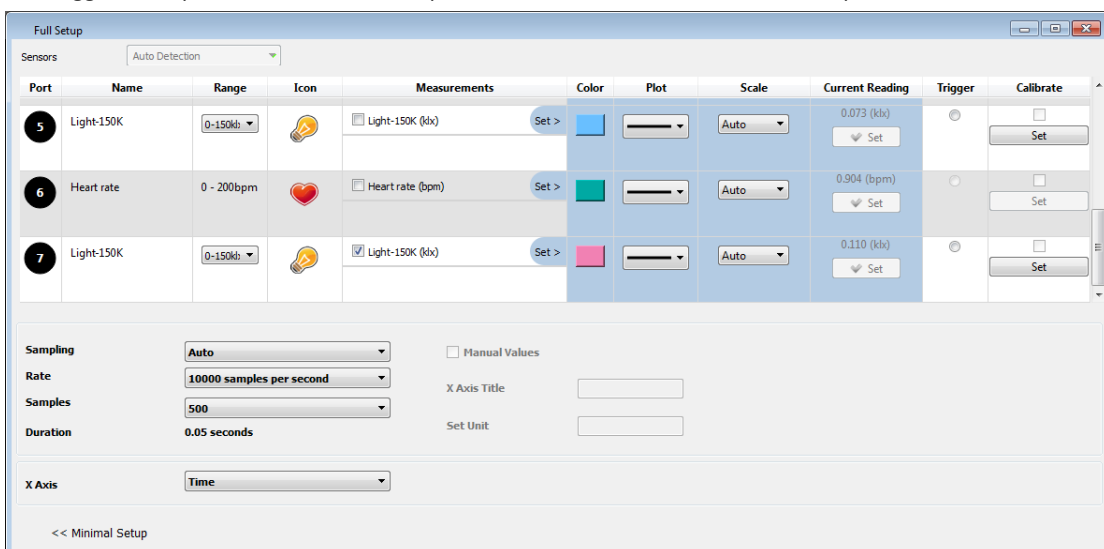



## MiLAB Desktop

1. Pair your einstein™LabMate with your PC, MAC, or Linux machine via Bluetooth, or connect it via the USB cable (found in the einstein™LabMate box).
2. Insert the sensor cable into one of the sensor ports
3. Launch MiLAB
4. MiLAB will automatically detect the sensor and show it in the Current Setup Summary window



5. Click Full Setup, located at the bottom of the Current Setup Summary window to program the data logger's sample rate, number of samples, units of measurement, and other options



6. Click the Run button (  ) to start logging

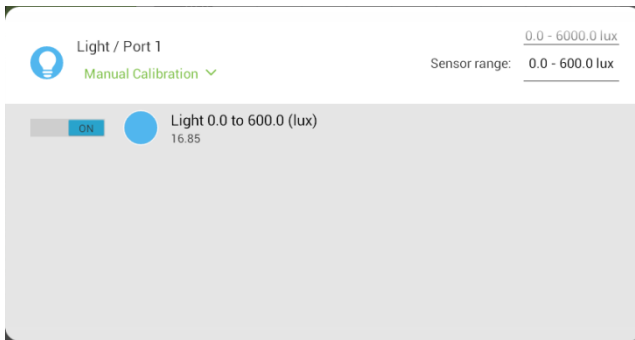
## Calibration

The Light sensor is shipped fully calibrated.

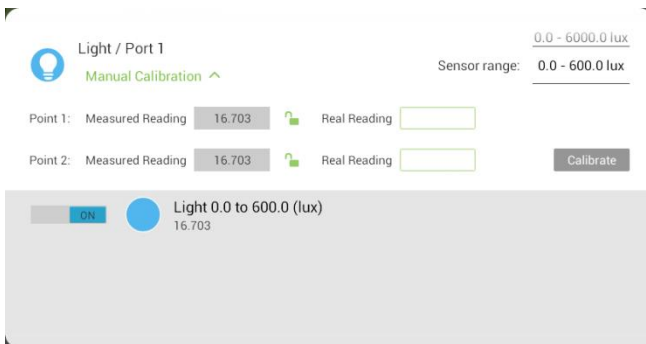
For more accurate results the sensor can be manually calibrated.



### MiLAB

1. Tap the Settings button next to the sensor's name



2. Tap Manual Calibration

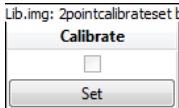


3. Measure a light of known value (e.g. 100 lux). Enter this known value in the Point 1, Real Reading field
4. Measure the light and wait for the readings to stabilize.
5. Tap the lock icon 
6. Measure a light of a different known value (e.g. 400 lux). Enter this known value in the Point 2, Real Reading field
7. Measure the light and wait for the readings to stabilize.
8. Tap the lock icon 
9. Tap Calibrate.

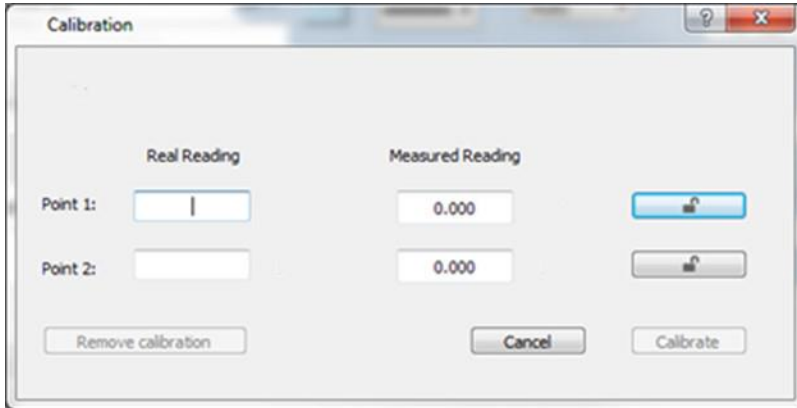
*Note: For the most accurate results try to calibrate the sensor with one Real Reading under the expected results and one Real Reading over the expected results.*



### MiLAB Desktop

1. Go to the Full Setup window and in the Calibrate column click Set



2. The Calibration window will appear



3. Measure a light of known value (e.g. 100 lux). Enter this known value in the Point 1, Real Reading field
4. Measure the light and wait for the readings to stabilize.
5. Click the lock icon 
6. Measure a light of a different known value (e.g. 400 lux). Enter this known value in the Point 2, Real Reading field
7. Measure the light and wait for the readings to stabilize.
8. Click the lock icon 
9. Click Calibrate

*Note: For the most accurate results try to calibrate the sensor with one Real Reading under the expected results and one Real Reading over the expected results.*

## An Example of using the Light (Triple Range) sensor

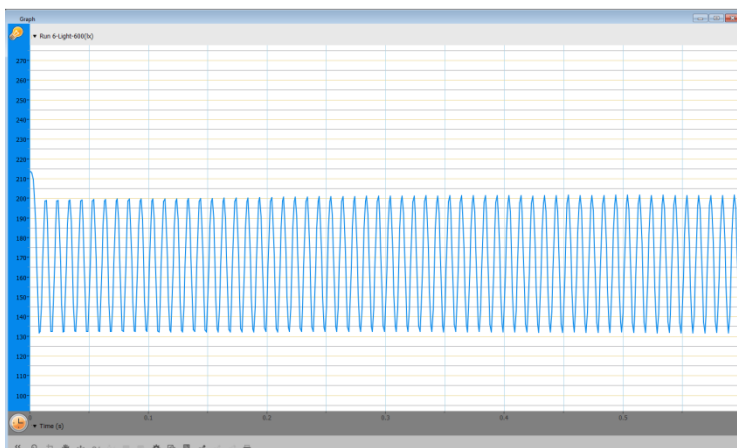
### Investigating Fluorescent Light

In this experiment, we will investigate the pattern and the frequency of fluorescent light.

Set the Sampling Rate to 1000 samples per second.

Point the sensor at a fluorescent lamp and select Run.

By using the cursors you can determine the frequency of the fluorescent light.



## Troubleshooting

If the Light sensor isn't automatically recognized by MiLAB, please contact Fourier Education's technical support.

## Technical support

For technical support, you can contact the Fourier Education's technical support team at:

Web: [www.einsteinworld.com/support](http://www.einsteinworld.com/support)

Email: [support@fourieredu.com](mailto:support@fourieredu.com)

Phone (in the US): (877) 266-4066

## Copyright and Warranty

All standard Fourier Systems sensors carry a one (1) year warranty, which states that for a period of twelve months after the date of delivery to you, it will be substantially free from significant defects in materials and workmanship.

This warranty does not cover breakage of the product caused by misuse or abuse.

This warranty does not cover Fourier Systems consumables such as electrodes, batteries, EKG stickers, cuvettes and storage solutions or buffers.

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