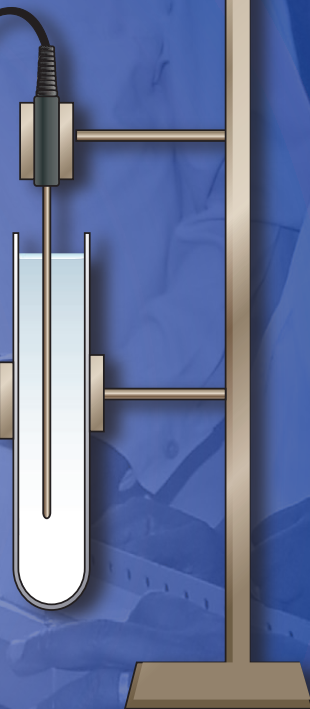


# XLlogger

Excel based datalogging 2010



Datalogging has just got easier...

**Ri**

Adopted by the Royal Institution for 'Young Scientist of the Year'.



## What is XLlogger?

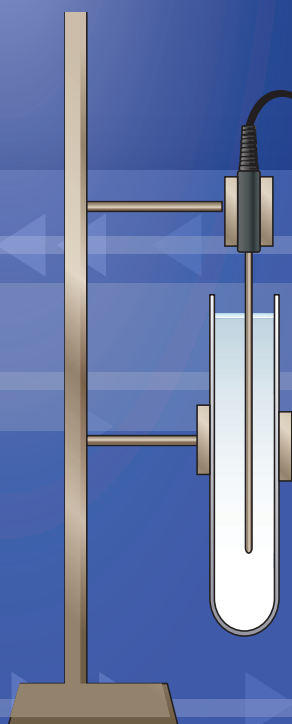
**XLlogger is an innovative datalogging system that uses Excel to capture and analyse data from USB sensors.**

The XLlogger datalogging system breaks the mould of traditional dataloggers by providing direct plug-in USB digital sensors sending data directly into Excel spreadsheets. The wide range of sensors can be plugged into any version of Excel on a PC, laptop or mini notebook. Multiple sensors can be plugged in via a USB hub.

Captured data is tabulated and graphed in Excel automatically, and can then be further analysed using normal Excel functions if desired. Ready made options mean that inexperienced users of Excel can carry out standard functions quickly with little prior knowledge, but equally, experienced users can develop their own analysis using all the power of Excel as the data may demand.

### Note:

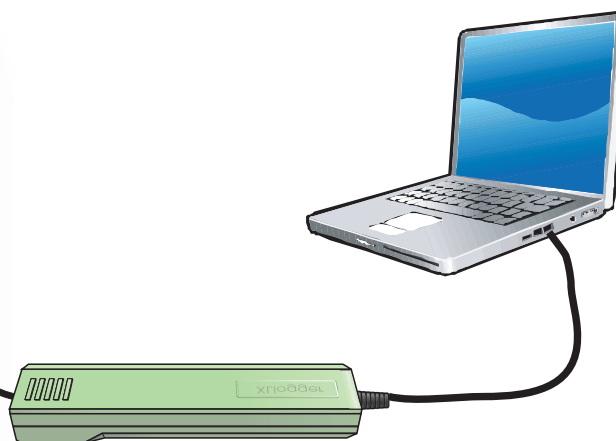
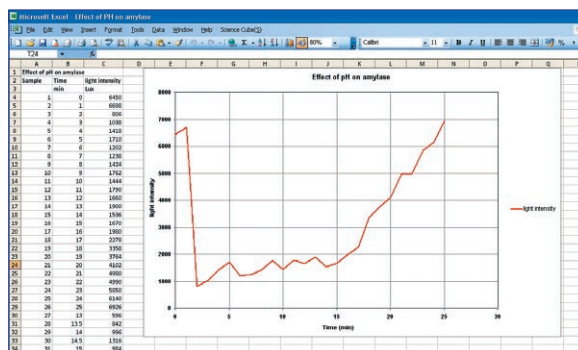
**XLlogger requires no interface or datalogger!**



## How does it work?

XLlogger is really simple to use in just 4 easy steps

- 1. Plug in the USB sensor(s) and open the XLlogger software.**
- 2. Use the easy-to-use toolbar buttons to set up your data capture parameters for the sensors.**
- 3. Allow Excel to tabulate and graph the data automatically.**
- 4. Work in the familiar, yet powerful environment of Excel to carry out further analysis if you so wish.**





## Software

XLlogger is built around Excel because this is the standard graphing and calculation package used by schools and colleges throughout the world. Because data is captured directly into Excel there is no need to export and move data from one package to another - unlike other datalogging systems.

XLlogger has incorporated into Excel all the requirements of standard datalogging software, but with the additional advantage of access to all the calculating power of Excel for better data analysis.

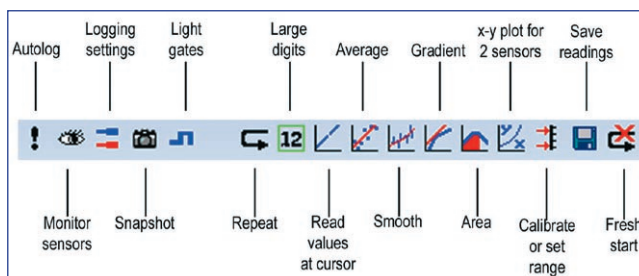
Installation is a simple procedure on any standalone PC or laptop, or on any network. Once installed, XLlogger is always available from within Excel.

Sensors are auto-recognised when plugged in and many offer different input and sensitivity ranges.

### Key features:

XLlogger uses a series of toolbars to enable you to navigate the software easily.

#### Main and analysis toolbar



**Autolog:** use this for continuous logging where sample time and duration are not important.

**Logging settings:** choose duration of activity, sample time, plus graph titles etc.

**Snapshot:** use for taking individual readings when time is not a variable. A unique feature of Snapshot is the ability to label each measurement individually.

**Timing settings:** for use with light gates for recording timing in dynamics experiments. Pre-set options makes this a simple task for pupils.

**Replay:** need to show the graph again? Simply hit the replay icon and the graph will be re-drawn for you.

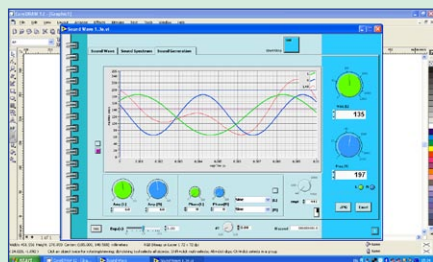
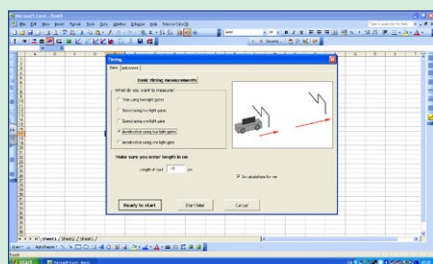
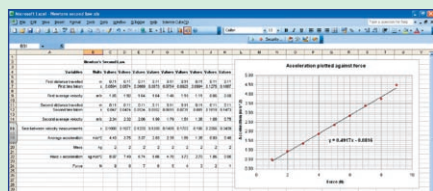
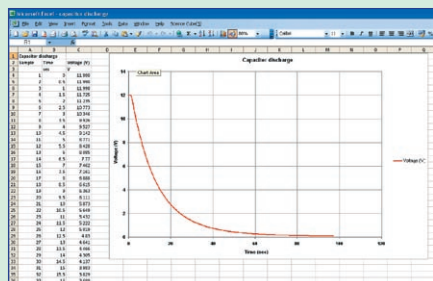
**Repeat:** Carry out a repeat of the same experiment and average the results.

**Work in progress:** allows experiments to be retained as templates and then sent to users - who can then click Repeat and add further data series.

**Display options:** there are a range of display options such as full screen and large digital display.

Graph formatting toolbar provides all you need to manipulate your graphs.

Graph plots toolbar gives you complete control over which plots to display.





## Sensors

Datalogging has just got easier...

## Accelerometer



## Specification

<b>Full range:</b>	-47m/s <sup>2</sup> ~ +47m/s <sup>2</sup>
<b>Available range:</b>	-19 m/s <sup>2</sup> ~ +19m/s <sup>2</sup>
<b>Resolution:</b>	0.038m/s <sup>2</sup>
<b>Frequency response:</b>	0 ~ 100Hz

## Notes

The accelerometer measures acceleration in m/s<sup>2</sup> along a line marked by the arrow on the sensor. The accelerometer is gravity sensitive and this can be used to calibrate the sensor. It may also be used for inclinometer to measure angles.

## Barometer



## Specification

<b>Range:</b>	0 ~ 2,068hPa
<b>Resolution:</b>	0.6hPa

## Notes

The Barometer sensor measures Atmospheric Pressure. It can be used for one off recording with the Snapshot option in the software or for continuous recording against time.

For general gas pressure measurements see Gas Pressure sensor XLS1032.

## Current Sensor



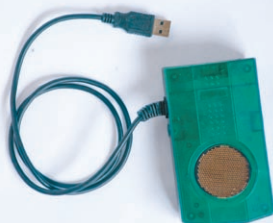
## Specification

<b>Range:</b>	DC -1.0 ~ +1.0 A
<b>Resolution:</b>	±0.6 mA (12bit)
<b>Power consumption:</b>	Max. 5W (0.01Ω)

## Notes

The Current Sensor allows investigations in the basic principles of electricity. Use the current probe to measure currents in low voltage AC and DC circuits. With a range of ±1.0 A, this system is ideal for use in most battery and bulb circuits. Use it with the Voltage Sensor to explore the characteristics of circuit components including Ohm's Law.

## Distance / Motion Sensor



## Specification

<b>Range:</b>	0.4 ~ 6 m
<b>Resolution:</b>	±1.5 mm
<b>Gauging principle:</b>	ultrasonic transducer
<b>Beam angle:</b>	cone, around 15°
<b>Sampling rate:</b>	depends on measuring distance (max 100 samples/second).

## Notes

The Distance Sensor is designed to detect position using ultrasound waves. You can do a variety of dynamics experiments with the Distance Sensor, such as recording pendulum movement or free fall under gravity. Using the distance measurements from this sensor, the XLlogger software will automatically plot velocity and acceleration graphs.



## Sensors

Datalogging has just got easier...

### Force Sensor (dual range)



#### Specification

<b>Range:</b>	$\pm 10\text{N}/\pm 80\text{N}$
<b>Resolution:</b>	$\pm 0.0056/\pm 0.056$
<b>Sensor type:</b>	Electrical strain gauge

#### Notes

The Force sensor can be used as a portable balance or be used for moving objects in collisions, harmonic motion etc.

### Gas Pressure Sensor A (general use)



#### Specification

<b>Full range:</b>	$-100\,000 \sim 300\,000 \text{ Pa}$
<b>Resolution:</b>	120 Pa
<b>Tolerance:</b>	$-100\,000 \sim 300\,050 \text{ Pa}$
<b>Response time:</b>	0.2 ms average

#### Notes

The Gas Pressure Sensor A is suitable for general gas pressure experiments such as the gas laws, respiration and rates of reaction.

### Humidity Sensor



#### Specification

<b>Full range:</b>	0 ~ 100%
<b>Resolution:</b>	0.1%

#### Notes

The Humidity Sensor can be used to measure relative humidity in environmental investigations, as part of a weather station, for transpiration rates in plants and for greenhouse monitoring.

### Light Gate



#### Specification

<b>Internal Gate</b>	
<b>Rising time:</b>	2.5 $\mu\text{s}$
<b>Falling time:</b>	3.8 $\mu\text{s}$
<b>External Gate</b>	
<b>Infrared source peak wavelength :</b>	880 nm
<b>Spectral sensitivity :</b>	500 ~ 1050 nm
<b>Rising time:</b>	8 $\mu\text{s}$
<b>Falling time:</b>	10 $\mu\text{s}$

#### Notes

The Light Gate is a switch-type sensor that detects when a narrow infrared beam is interrupted. The Light Gate comprises an infrared transmitter and a receiver mounted and aligned in a plastic frame. Essential for speed, velocity, acceleration, and all related timing and motion experiments. Easily understood setup diagrams are provided by the XLlogger software when light gate experiments are chosen.

**Light gates sold in pairs**



## Sensors

Datalogging has just got easier...

### Light Sensor



#### Specification

**Full range:** 0 ~ 15,000 lux  
**General purpose range:** 0 ~ 6,000 lux  
**Sensitive range:** 0 ~ 600 lux  
**Resolution:** adjusts according to setting (12bit)  
**Peak spectral response:** 580 nm

#### Notes

The Light Sensor allows a wide range of investigations including photosynthesis, environmental monitoring, the inverse square law and rates of reaction e.g. thiosulphate reaction.

### Magnetic Field



#### Specification

**Range:** -50 ~ +50G  
**Resolution:** 0.024G  
**Sensor depth:** 5.0mm  
**Sensor type:** Radiometric, Linear Hall Effect

#### Notes

The Magnetic Field sensor can be used for general magnetic field experiments as well as Flemings Rule & Lorentz's Rule.

**Magnetic field also available with scaled rod shaped probe for use with narrow and long coils.**

### Microphone



#### Specification

**Full range:** 20 Hz ~ 2000 Hz

#### Notes

Together with the Sound Wave Programme, the Microphone can be used to display sound waveforms (like an oscilloscope), and also to analyse the frequency spectrum of a sound. Valuable for teaching about the nature of sound waves, including the differences between various musical instruments. Soundwave software is free when purchased with microphone and a sensor.

### Oxygen Gas Sensor



#### Specification

**Full range:** 0 ~ 100% O<sub>2</sub>  
**Output voltage range:** 0 ~ 4 V in air at 25°C sea level (standard)  
**Resolution:** 0.03%

#### Notes

The Oxygen Gas Sensor measures the gaseous oxygen concentration in the range 0 ~ 100%. Use for breathing and respiration analysis, photosynthesis, burning a candle in a bell jar.



## Sensors

Datalogging has just got easier...

### Oxygen Reduction Sensor



#### Specification

**Electrode probe** has a sealed, gel filled epoxy body. Wet storage is in pH4/KCl solution.

**Temperature range:** 0 ~ 600C

**ORP sensor range:** -450mV ~ 1100mV

**Resolution:** 0.5mV

**Voltage output range:** 0 ~ 5V

#### Notes

ORP stands for Oxidation-Reduction Potential or Redox Potential. The sensor measures the ability of a solution to act as an oxidising or reducing agent.

### pH Sensor



#### Specification

**Full range:** pH 0 ~ 14

**Resolution:** ± 0.0036 pH units

#### Notes

A pH range of 0 -14 allows measurement of pH in any standard Chemistry or Biology experiments such as titrations, enzyme behaviour, etc.

### Stethoscope



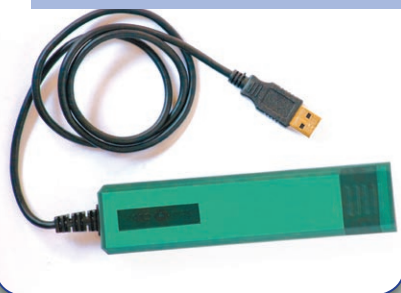
#### Specification

**Full range:** 20 Hz ~ 2000 Hz

#### Notes

The Stethoscope is used with the SoundWave software to show heart beat. SoundWave software is free of charge when purchased with stethoscope and one sensor.

### Sound Level Sensor (decibels)



#### Specification

**Full range:** 40 ~ 110 dBA

**Resolution :** 0.1dB

**Frequency range:** 100Hz ~ 7KHz

**Microphone:** 1/2" Electric Condenser Microphone

**Response time:** 250ms

#### Notes

The Sound Sensor allows capture of sound levels for general and for environmental use. For sound wave investigation see the microphone and related software.



## Sensors

Datalogging has just got easier...

### Temperature Sensor – (stainless steel)



Specification	Notes
<b>Full range :</b>	-25°C ~ +125°C
<b>Resolution:</b>	±0.1 °C
<b>Probe properties:</b>	thermistor, stainless steel covered
<b>Response time:</b>	10 s (to 90%), 0.2 s (to 100%)
<b>Chemical resistance:</b>	15 minutes (in 1M HCl)

The most ubiquitous of sensors, temperature can be used for a wide range of experiments in all science disciplines from cooling curves to environmental monitoring.

### Turbidity sensor



Specification	Notes
<b>Range:</b>	0 ~ 200NTU
<b>Resolution:</b>	0.25NTU

The Turbidity sensor will measure the turbidity of fresh or saline solutions in NTU, the national standard units. A glass cuvette is included for measurement.

### Voltage Sensor



Specification	Notes
<b>Measuring range:</b>	±12.0 V
<b>Max. input voltage:</b>	±14.5 V
<b>Input impedance (to ground):</b>	10 MΩ
<b>Linearity:</b>	0.01%
<b>Resolution:</b>	(12bit): 3.1 mV

This differential voltage sensor is designed for exploring the basic principles of electricity. Use the probe to measure currents in low voltage AC and DC circuits. With a range ±12.0 volts, this sensor is ideal for use in basic electricity investigations, induced e.m.f and capacitor discharge. Or use with the Current Sensor to explore Ohm's Law, phase relationships in reactive components, etc.

## Balances

### Balance 200g/500g



Specification	Notes
<b>Range :</b>	0 ~ 200g and 0 ~ 500g
<b>Resolution:</b>	200g ~0.01g 500g ~0.1g

These are direct USB balances and can be used with Excel, for example, transpiration, rates of reaction and force on a conductor experiments. These balances can be used as normal stand alone balances without connection to XLlogger.



## Equipment

### Dynamics system



### Specification

The **Dynamics system** is a 1.2M track designed for use in physics enabling more accurate and precise experiments by minimizing friction. It can be used independently or with XLlogger software and sensors, such as light gates, motion sensor, force and accelerometer.

### Notes

Typical experiments include:  
Newton's Law, Conservation of Energy  
Uniform Motion, Spring Constant, Motion under constant acceleration, Inelastic collisions & Elastic collisions,

Sensors under development for 2010:

Accelerometer 25g

Galvanometer

Heart rate

CO<sub>2</sub> gas

O<sub>2</sub> Dissolved

Colorimeter

Conductivity

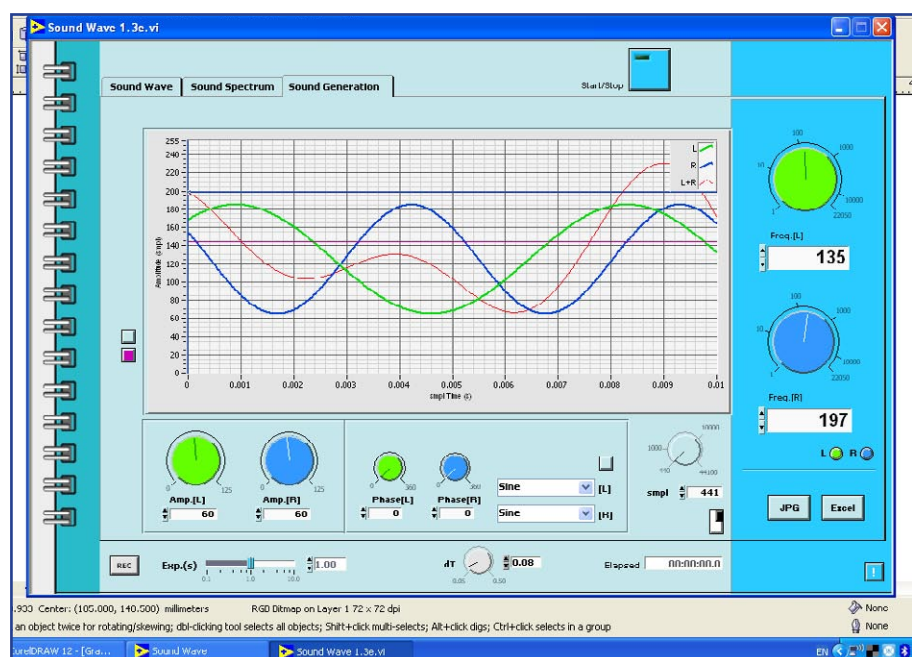
Thermocouple

ECG

## Sound Wave program

Innovative software that captures sound and allows you to generate sound waves as an on-screen oscilloscope. Valuable for teaching about the nature of sound waves, including the differences between various musical instruments.

- use the Microphone to display sound waveforms,
- analyse the frequency spectrum of a sound
- generate a range of sounds and display the wave form



**Sound Wave is free when you purchase a microphone or a Stethoscope with XLlogger software and a minimum of one sensor.**



# Order Form

please complete order form and either fax or post back to the address below:

Contact Name:	Any additional information for deliveries please indicate here
Name of Institution:	
Address of Institution:	
Post/Zip Code: Country:	

Item	Description	Unit price	Quantity	Total
<b>Computers &amp; Software</b>				
XLC2001	XLlogger software (site licence school)			
XLC3010	SoundWave software - free with microphone if purchased with XLlogger software and one sensor			
XLC6001	XLlogger USB hub			
<b>Sensors</b>				
XLS1001	Stainless Steel Temperature Sensor			
XLS1033	Light Sensor			
XLS1007	Magnetic Field Sensor I			
XLS1009	Voltage Sensor			
XLS1010	Current Sensor			
XLS1012	Microphone (free software included)			
XLS1013	Sound sensor			
XLS1014	Accelerometer 5G			
XLS1016	Barometer			
XLS1017	Turbidity sensor			
XLS1008	Relative Humidity Sensor			
XLS1042	Motion Detector			
XLS1005	pH Sensor			
XLS1029	Force Sensor			
XLS1032	Gas Pressure Sensor-A (General Pressure Sensor)			
XLS1047	O2 Gas Sensor			
XLS1023	Lightgate set of 2			
XLS1039	ORP sensor			
XLS1057	Stethoscope (free software included)			
XLS1063	Magnetic Field Sensor II scaled probe			
<b>Equipment</b>				
XLS1053	Balance 200g/0.01g			
XLS1054	Balance 0-500g/0.1g			
XLE5000	Dynamics Track			
XLE5001	Dynamics Track with accessories			
Sub total value				
VAT				
Total				
<b>Delivery charge additional</b>				
<b>Note: XLlogger requires no datalogger or interface saving you hundreds of pounds</b>				

Prices valid from September 2009 to December 2010

## itec ltd

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**tel: 07780 736306 fax: 01789 490832**