Overview

Microphone sensor
Range from <40 to 100dBA
Software offers different scales

Multicolour indicator
Colour corresponds to the sensor
channel on the computer screen
and flashes when logging

Locking bay
Locks to other uLog sensors

Single button operation
Press once to start logging
Press again to mark events
Press & hold to stop logging

• Sensors can lock together

• Fit direct to stand

• Cable storage

Getting started with uLog

1 Insert the CD and install SensorLab
   (see last page for more information)

2 Run SensorLab and plug your uLog sensor into a free USB port
   You should see live readings from your sensor on the screen

3 Press the uLog button to start logging
   You should see a graph recording your live readings

4 To mark an event, press the button again
   You will add a small arrow marker at the top of the graph

5 To stop logging, press and hold the button
   Your graph will show the complete set of data

   Congratulations, you have recorded your first sensor data using uLog!

More with SensorLab
You can use SensorLab to do much more than display live readings and a graph. Just hover the pointer over any icon to see what it does. Full details of all SensorLab functions are in the comprehensive user guide on the CD - here are a few of the extra features you can explore:

- **Change range or calibration of a sensor:** Click the icon above the gauge when you start
- **Change logging type: SensorLab defaults to automatic logging**
- **Switch a sensor display on or off:** Click on gauge display or when graphing click on tick
- **Zoom in on a graph:** Draw a box around where you wish to zoom or click Magnifier icon
- **Take precise readings from graph:** Click on graph & position cursor with mouse or arrows
- **Label different points on the graph:** Click **IA** icon or Graph / Annotate
- **Change SensorLab complexity level:** Click level icon bottom right of screen to increment
- **Find information about the experiment:** Click on the *i* icon
- **To print graph:** Click on the Printer icon or select menu File / Print menu
- **Save SensorLab file onto your computer:** Click Disc icon or use File / Save As menu
- **Export data in a different format for use in another program or share:** File / Export menu

Using multiple uLog sensors
You can connect several uLog adapters and sensors to the same computer for multi channel logging on the same graph. The multicolour LED on each uLog will show which sensor is displayed on which channel (especially useful if using several sensors of the same type). Note that the number of uLog sensors you can use is dependant on the computers processing power, number of USB ports available and the USB power available (particularly limited on smaller computers). Use a high quality **powered** USB hub to increase both number of USB ports and power capacity. You can move uLog sensors further away from the computer by using a USB extension cable.

Other SensorLab functions
As well as graphs, SensorLab can also display data from some sensors in different ways.
Oscilloscope: Some analogue sensors which respond quickly (such as sound, light, voltage) can be also displayed as a live oscilloscope waveform on your computer screen - to view the output of a sensor as a waveform click the oscilloscope icon on the home screen. You can also store and transfer the screen data onto the normal graph for later analysis.
Setup: The setup icon on the home screen (cog wheel) enables you to change the types of logging. You can also select Timing from this option to use with sensors such as Light Gates etc
Full details of the scope & all SensorLab functions are in the comprehensive user guide on the CD.

Sound Level and Sound Wave

You can measure and display both sound levels and sound waves with the uLog sound sensor:

Sound Level

The SensorLab software defaults to measuring sound level.

Sound levels are not usually measured very close to the source of the sound but from the closest distance which someone would normally be positioned. For example, traffic noise is usually measured from the side of the road with the sensor held about 1 metre above the ground, but in a noisy room or hall the sensor would ideally be positioned at ear level. The sensor is specifically designed to record average levels of reasonably continuous sound. It therefore allows trends of sound level to be easily recorded using relatively large sample time intervals.

Using the uLog sound sensor, you can choose between a 'General' range or a 'Quiet' setting for measuring very low levels of sound. To select ranges, start SensorLab software, connect the uLog sound sensor and click on the arrow above the sensor to choose which scale is required. When experimenting and analysing sound level measurements you should remember that the dBA scale is logarithmic (like the human ear) and that a doubling of the noise power only shows an increase of 3 decibels. A 3dB increase is only just detectable to the human ear - a 100 Watt sound system is actually only 3dB louder than a 50 Watt system! The human ear and brain do not respond to noise equally at all audible frequencies - generally they are most sensitive in the range of 400Hz to 4kHz. This sensor has been designed to have a similar response which is internationally known as the A-weighted response. It's range is from less than 50dBA to 100dBA, which is approximately equivalent to the sound level of a quiet conversation to a pneumatic hammer. Sound can be reflected and absorbed so that in some environments small changes in position can make significant changes to the reading. For comparative tests use the sensor firmly fixed in the same position away from vibrations and keep away from nearby hard surfaces which can reflect or deflect unwanted sound towards the sensor.

Sound Waves

The uLog sound sensor can also display sound waves live on your computer screen on an oscilloscope type display. To show sound waves, start SensorLab and click on the oscilloscope icon. You can adjust the sensitivity (Y axis) and frequency (X axis) using pull down menus and also store and transfer readings into SensorLab graphs or Excel etc. With the upgraded SensorLab Plus edition of software you can also analyse and compare multiple sets of waveforms.

Full details of the scope & all SensorLab functions are in the comprehensive user guide on the CD.

Ideas for experiments

Investigate which type of material would be best to sound proof a classroom?
Study the difference between noise in the school, by roads and in rural areas.
Monitor and analyse classroom noise for a day.
Monitor traffic noise - do certain vehicles make more noise than others? Did the noise level change during the day? Point the sound sensor across a road (at a 90° angle to the kerb side) and notice what happens when a vehicle passes in front of the sound sensor.
Setting the software to show sound waves, compare high and low frequency sounds
Compare waveforms of a pure sound, such as a tuning fork, and a complex sound, like speech
Be aware of the dangers of exposure to high sound levels - follow your school safety policies

Further experiment ideas using LogIT sensors

Further experiments can be found on the CD supplied with uLog or from www.logitworld.com