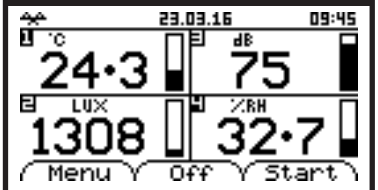
observer as a Meter, Datalogger, Oscilloscope and Stopwatch

Meter Mode



Meter Mode simply allows the user to view sensor data live on screen. No data is stored in Observer and it is a good way of checking the sensors are correct before starting a logging session.

To use Meter Mode:

- Press any button to switch on
- Insert sensors

Observer should automatically display the sensors and their correct SI units on the screen.

The bars to the right of each numerical data value is a graphical representation of how much of the sensors scale is currently being used by the sensor. The top of the bar is the maximum and the bottom is the minimum scale value.

Automatic logging

Automatic logging allows the user to simply plug in the desired sensors and start recording data with little setup. The logger automatically sets the log rate.

To start logging:
- Press any button to switch on
- Insert sensors
- Press the Green <Start> button
- Observer will now start recording data from each channel.

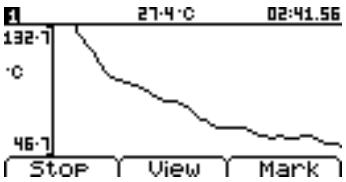
To stop logging:
Press the Red <Stop> button – Observer will now save the data readings in its memory and display the recorded data as a graph.

Notes: Observer starts recording data extremely quickly for the first 8 seconds, after which it will reduce the number of readings taken as the experiment progresses. When you stop logging the data is automatically saved. This can seem like a long time but depending on the log rate and duration, Observer may be saving up to 8000 data points per channel.

Manual logging

Observer allows the duration of the experiment and the rate each reading is taken to be set before logging takes place. If for example you needed to take a reading every 2 seconds for 10minutes, you would do that with this mode.

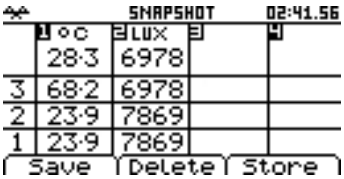
- Press any button to switch on
- Insert sensors
- Press the Red <Menu> button
- Press the Green <Select> button to select 'Logging Setup'
- Press the Red <Down arrow> button to cycle through selecting and setting the Sample rate and the total duration of the experiment followed by 'Start'



Snapshot logging

Snapshot logging can be thought of as taking a photo. When the logger is set to Snapshot mode, readings are only recorded when a button is pushed.

- Press any button to switch on
- Insert sensors
- Press the Red <Menu> button
- Press the Red <Down arrow> button to 'Snapshot' function
- Press the Green <Select> button to select snapshot mode
- Press the Green <Store> button to take a reading and use the Blue <Delete> to delete a reading
- Press the Red <Stop> button to exit the logging function and save the data



Note: You can delete as many readings as you need by repeatedly pressing the Blue <Delete> button whilst logging.

Stopwatch

If Observer is switched on with no sensors plugged in, the Green <Timer> button can be used to select a useful stopwatch/class timer.

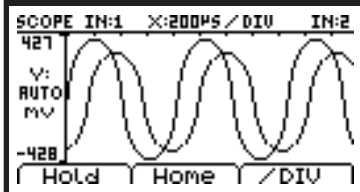
To use the timer:-

- Remove any sensors connected to Observer
- Switch on Observer & press the Green <Timer> button
- The Timer screen should be displayed
- Press the Green <Start> button to start the timer
- Press the Green <Stop> button again to stop the timer

You can restart the timer from this point by pressing the Green <Start> button again.

To reset the timer to zero at any time press the Red <Reset> button Press the Blue <Home> button to exit the timer and return to the Home screen.

Oscilloscope



Objective: To use the Oscilloscope function to capture 1 or 2 sound waves. This can be used to show Amplitude and Phase differences.

Procedure:
- Press any button to switch on
- Connect a suitable sensor into channel 1 & 2 if required (eg Sound Wave)
- Press the Red <Menu> button
- Press the Red <Down arrow> button to 'Scope function'
- Press the Green <Select> button
- The Scope should now display on the screen
- To capture the data, press the Red <Hold> button
- To change the Time base divisions press the Green </DIV> button
- Use the <Run> button to start the scope again or <Save> to save the data. <Home> will return to the home screen.

Triggered logging

Objective: To capture 1 or 2 sound waves. This method can be used to record the speed of sound in air when using 2 sensors.

Procedure:
- Connect a Sound Wave sensor into channel 1, or channel 1 & 2
- Press the Red <Menu> button
- Press the Red <Down arrow> button to 'Triggered Logging'
- Press the Green <Select> button
- Observer will now wait for a level on channel 1 to change by approximately 10% of the sensor range
- Clap your hands in front of the Sound Wave sensor
- Observer will record the remaining data points and plot the graph
- To capture the data, press the Red <Hold> button
- To change the Time Base (time along the bottom), press the Green </DIV> button (range from 500µS per Division to 100ms)

Note: The Time Base can be changed before the triggered event or if the Time Base needs changing after an experiment as data was not captured, use <Reset> and then change the Time Base again. Repeat as many times as required.

Connecting iPad

To connect to Observer:

- Start the SensorLab app on your iPad
- Switch on Observer noting the name shown at the bottom of the startup screen
- On the APP's home screen, select 'Select Logger'
  If the Observer is not shown in the list, toggle 'Scan for new loggers' and press 'Clear loggers list'
- Once the named Observer appears, press to select it and then press 'Select' at the top of the Window

The Home screen should now show the selected logger.

Note: If the iPad fails to find Observer, make sure Bluetooth is activated by checking the symbol in the top left of the screen. Observer uses low energy Bluetooth and will only function on iPad mini or iPad 3 and above. For a full list of supported devices, see the compatibility chart on iTunes.

observer as a Physics Timer

Time at A

To Time at a single sensor on Observer, connect one light gate to channel 1

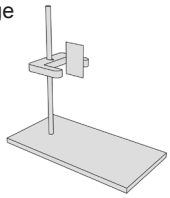
- Press any button to switch on
- Press the Red <Menu> button
- Press the Red <Down arrow> button to select 'Timing'
- Press the Red <Down arrow> button to 'Time' function
- Select 'at A'

This mode produces the time taken for a single object to pass through the light gate connected to channel 1(A)

A single interrupt will produce the time from the leading to trailing edge of the object.

A double interrupt will produce the time from the leading edge of the first bar to the leading edge of the second bar.

A five bar picket fence will produce 4 times from each bars leading edge to trailing edge.



Time at A and B

To Time at either sensor on Observer, connect two light gates to channel 1 & 2 respectively.

- Press any button to switch on
- Press the Red <Menu> button
- Press the Red <Down arrow> button to select 'Timing'
- Press the Red <Down arrow> button to 'Time' function
- Select 'at A and B'

This mode produces the time taken for a single object to pass through either light gate connected to channel 1(A) and channel 2(B)

In this mode you can only use a single or double interrupt card which produce a single time each pass through of either light gate.

LogIT interrupt Timing cards are ideal for use with the Observer.

The LogIT set consists of Single, Double & Five bar picket fence.

D101130 Single set of three £9

Time from A to B

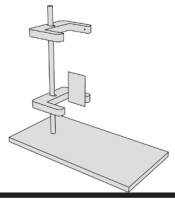
To Time from one sensor to another on Observer, connect two light gates to channels 1 & 2 respectively.

- Press any button to switch on
- Press the Red <Menu> button
- Press the Red <Down arrow> button to select 'Timing'
- Press the Red <Down arrow> button to 'Time' function
- Select 'from A to B'

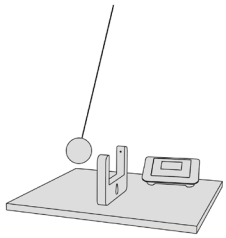
This mode produces the time taken for a single interrupt to pass from the first light gate to the second.

When using this mode its important to setup the experiment so that the interrupt passes through the light gate connected to channel 1(A) first and the light gate connected to channel 2(B) second.

Since the timing starts as soon as the first light gate is passed through, there is no need to use anything other than a single interrupt.



Simple Harmonic Motion



To use Simple Harmonic Motion, connect one light gate to channel 1

- Press any button to switch on
- Press the Red <Menu> button
- Press the Red <Down arrow> button to select 'Timing'
- Press the Red <Down arrow> button to 'Simple Harmonic Motion'

This section shows how to use Observer to measure the Simple Harmonic Motion/Time Period of a object mounted on a pendulum or an object mounted on a spring

The screen will display time period t1 to t10 and will wait until the object passes through the light gate for the first time.

Once the pendulum is swinging, all 10 times will be recorded and displayed. An average can then be found if required.

Speed at A

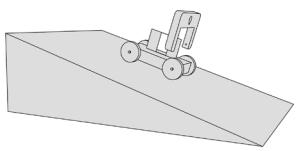
To measure Speed at a single sensor on Observer, connect one light gate to channel 1

- Press any button to switch on
- Press the Red <Menu> button
- Press the Red <Down arrow> button to select 'Timing'
- Press the Red <Down arrow> button to 'Speed' function
- Select 'at A'

This mode produces the Speed for a single object passing through the light gate connected to channel 1(A)

A single LogIT interrupt will produce the Speed from the leading to trailing edge of the object using the length of the interupt as the distance travelled. Observer uses 60mm as this interupt.

A double interrupt will produce the time from the leading edge of the first bar to the leading edge of the second bar.



Speed at A and B

To measure the Speed at either sensor on Observer, connect two light gates to channels 1 & 2 respectively.

- Press any button to switch on
- Press the Red <Menu> button
- Press the Red <Down arrow> button to select 'Timing'
- Press the Red <Down arrow> button to 'Speed' function
- Select 'at A and B'

This mode produces the Speed for a single object to pass through either light gate connected to channel 1(A) and channel 2(B)

In this mode you can only use a LogIT single or double interrupt card which produce a single Speed for each pass through the light gate.

The screen will display a Speed for A and B.

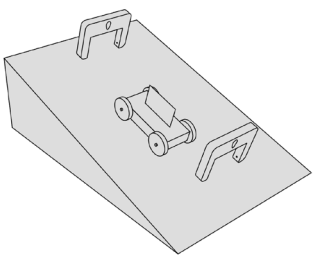
Speed from A to B

To measure Speed from one sensor to another on Observer, connect two light gates to channels 1 & 2 respectively.

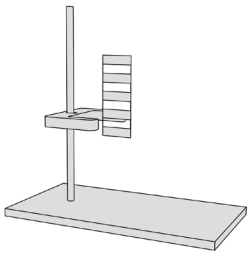
- Press any button to switch on
- Press the Red <Menu> button
- Press the Red <Down arrow> button to select 'Timing'
- Press the Red <Down arrow> button to 'Speed' function
- Select 'from A to B'

Produces the Speed of an object, 1 metre apart from the first light gate to the second.

The interrupt only needs to be a single length and can be any size as the timing is performed from leading edge to leading edge. The calculation is made over 1 metre.



Acceleration



The Acceleration option on Observer is for use with the LogIT five bar picket fence. It is fixed at a bar width of 20mm and a gap between each bar of 20mm. 40mm total.

Note: If you wish users to derive Acceleration using motion laws or equivalent, use the 'Time at A, A to B, B' option and use a single or two bar interrupt card.

To use Acceleration on Observer, connect one light gate to channel 1(A)

- Press any button to switch on
- Press the Red <Menu> button
- Press the Red <Down arrow> button to 'Timing' function
- Press the Red <Down arrow> button to select 'Acceleration'