DATA HARVEST

1262PK - Wireless Timing Mats Pack

Revision: 0 | DS193

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Introduction

Thank you for purchasing the Smart Wireless Timing Mats. We pride ourselves on producing high quality products that meet with the demands of the busy classroom environment.

If you have any problems using this sensor, please read this documentation in full before contacting the Data Harvest support team.

Overview

Smart Wireless Timing Mats are designed to record timing events, using them independently and in conjunction with one another.

They are rugged pressure sensors that can connect wirelessly using the Wireless Switch Adapter to EasySense2 software (version 1.033 or later) for the recording and analysis of data.

Pack Contents

This product is supplied with the following items:

- 1 x Smart Wireless Switch Adaptor
- 1 x Timing Mats (pair)
- Connecting leads (mini DIN)
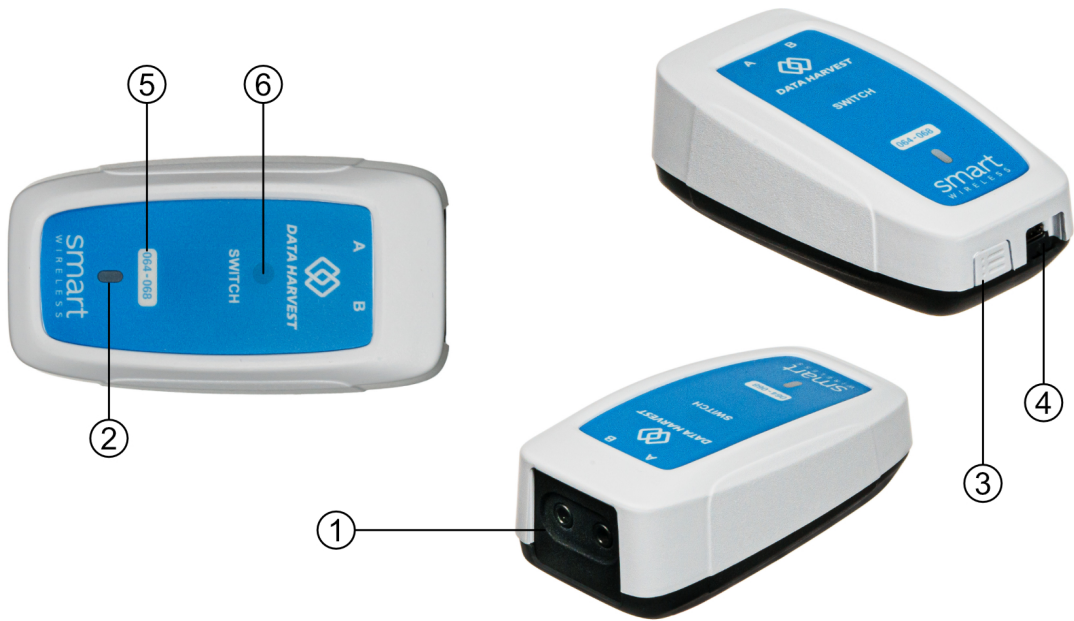- 2 x Connecting Cables

Additional Accessories

To get the most from your Smart Wireless timing Mats, the following items should be considered:

Data Harvest - Wireless Push Button Switch Pack (data-harvest.co.uk)

Operational Overview

The diagram below shows the specific parts of the Wireless Switch Sensor.

Read further to explore the functionality of each part.

1. Sensor End Connector
2. Status Indicator
3. On/Off Switch
4. USB Port
5. Unique ID Number
6. Switch State Indicator

Sensor End Connector (1)

Most Smart Wireless Sensors feature an end cap that is specific to the requirements of the device's internal sensor. The sensor's end cap is the direct interface between the device's internal sensor and your experiment.

Status Indicators (2)

The sensor features a single status indicator that changes colour and flashes. See the table below for further information.

Status Light		Indicates
No light		Sensor is Off. Short press the On/Off switch
Blue flashing		Sensor is On and Bluetooth advertising
White flashing		Charging via USB mains charger or USB port, Sensor is On and Bluetooth advertising

Red, Green, Blue Flashing		Charging via USB mains charger or USB port, Sensor is Off
Green flashing		Communication with the EasySense2 app (via USB or Bluetooth) has been established
Solid Green		Fully charged
Orange flashing		Recording data
Red flashing		Battery is low

On/Off Switch (3)

The sensor's on/off switch allows you to turn the sensor on, off or perform a hard reset.

To switch the sensor off

- Press and hold down the On/Off switch until the white light shows, then release.
- If not communicating with the EasySense2 app, the sensor will turn off after a period of one hour of inactivity.

Hard resetting of the sensor

- If necessary, attach the sensor to power.
- Press and hold down the On/Off button for at least 8 seconds until the status LED gives a flash of blue light, then release.
- If the sensor fails to respond, contact Product Support at Data Harvest. Please provide details of:
  - The computer platform it is being used with and the EasySense2 app's version number.
  - A description of the problem being encountered.

USB Port (4)

Use to connect to a computer or a charging unit.

For specific USB or Bluetooth connectivity instructions, please see the 'Connectivity' section of this documentation.

For instructions on charging your device, see the section on 'Charging the Sensor'.

Unique ID Number (5)

All Smart Wireless Sensors are labelled with a unique ID number. This number is used in the EasySense2 app, so that you can identify each sensor when making a connection wirelessly.

Switch State Indicator (6)

This provided confirmation that a switch has been pressed.

The Timing Mat

Timing Mat Sensor (1)

This rugged surface provides the pressure sensitive surface for measuring events.

Connector Lead (2)

Two connectors are shown, one is attached to each of the mats. A " mini DIN" provides a link from here to the Wireless Switch Sensor (above).

Mini DIN to 3.5mm Jack Connecting Cable

Connection for the Switch Sensor (mini DIN) (1)

Connect this end to the switch sensor's jack input.

Connection for the Timing Mat (2)

Connect this end to the timing mat connecting lead (above).

Connectivity

The sensor is both USB and Bluetooth compatible. Install the EasySense2 app, if it is not already on your device. For details of how to operate the EasySense2 app, please refer to the EasySense2 documentation.

USB Connectivity

Quick Steps

1. Connect the sensor to the computer's USB port using the USB cable supplied.
2. The computer will automatically detect a new device and depending on your operating system, will install any applicable device drivers.
3. Start EasySense 2 app.
4. Within the EasySense2 app, the Devices icon will change to green to show that the sensor is connected, and the status light on the sensor will also turn green.
5. Begin your practical investigations.

Bluetooth Connectivity

Using Bluetooth, the sensor can wirelessly connect to mobile devices such tablets and mobile phones, as well as desktop or laptop computers, giving students the ability to run experiments independently without being tethered to a device.

See the EasySense2 app user manual system requirements for further details.

Quick Notes on Bluetooth Connectivity

Only use with the EasySense2 app, you do not need to pair the device. If paired, the sensor will not be available to the EasySense2 app.

Computers or devices will need to support Bluetooth Low Energy (BLE). For further information refer to the instructions provided for the EasySense2 app.

Quick Steps

1. Short press the on/off switch to turn the sensor on, blue LED will flash.
2. Open the EasySense2 app.
3. Select the Devices icon.
4. Select your sensor from the list of available sensors to connect to the device. Your sensor is identified by its unique ID in the list.
5. Click on connect at the side of your sensor in the list.
6. The Devices icon will change to green and the status light on the sensor will flash green to indicate a connection has been established.
7. Begin your practical investigations.

Charging the Sensor

The Smart Wireless sensors are fitted with a rechargeable lithium-ion battery and can be charged via the USB port. Use the supplied USB lead to connect the sensor either directly to a USB port on your computer, a powered USB hub or a USB mains charger that outputs 5 V at 500 mA or more.

A full charge can take up to 4 hours.

Additional Information

Whenever the sensor is connected to the USB port on the computer or to a USB mains charger (output 5 V at 500 mA or more), it will automatically recharge the battery (LED status flashing white).

When connected to a computer, the computer should be turned on and not in sleep or standby mode, as the battery may drain instead of charge.

The sensor will stay awake for 5 minutes when Bluetooth advertising (LED status flashing blue).

Lithium-ion batteries are 'memory-free' and prefer a partial rather than a full discharge. Constant partial discharges with frequent recharges will not cause any harm. Frequent full discharges should be avoided whenever possible. Ideally the sensor should be stored at about 40% or more charge.

The speed at which a lithium-ion battery will age is governed by both its storage temperature (preferably less than 40 C) and state-of-charge.

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Firmware Updates

Occasionally Data Harvest may release updated firmware which will contain improvements or new features.

Updates will take place when you connect your sensor to the EasySense2 app. You will be given the option to decline an update.

Updates can be performed over USB or Bluetooth and will typically take less than one minute. Updating firmware over USB will be quicker than Bluetooth.

Do not disconnect the sensor, or power off during the update.

If you have a wireless connection to the EasySense2 app, the sensor will have to be reconnected after performing the update.

Firmware Updates

Usage Information

The Timing Mats have two states, open and closed; these are used to generate the experimental data.

They are connected to the Wireless Switch Adaptor using the supplied cables. One Mat is assigned input A and the other to B. This adaptor will, in turn, form a connection (USB or Bluetooth) to EasySense2 software for data recording.

Each Timing Mat can start a time event, when a pressure change is registered by the mat (when someone jumps off of a mat). This event will terminates when a sufficient pressure change is again registered (e.g. when someone lands on a mat). When Timing Mats are used together, the "overall event" is when an activity is triggered on Timing Mat A and terminates with Timing Mat B (when someone jumps from one to another).

Ensure that you have the EasySense2 software (version 1.033 or later) installed on your data collection device.
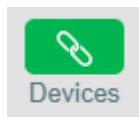
Usage With EasySense2 Software

Physically connect the Timing Mats to the Wireless Switch Adaptor using the supplied connectors .

Turn on the Wireless Switch Adapter.

Start the EasySense2 software.

The software icons that you will need are shown below:

 devices   *Allows control, connection, and calibration of the available*
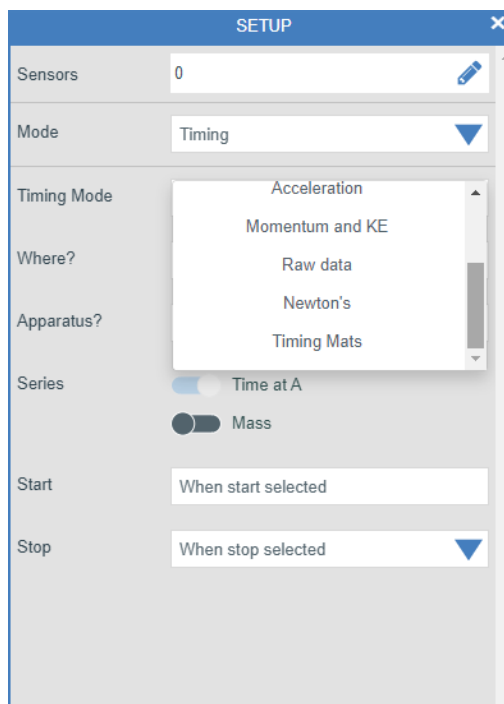
            Defines how an experiment is run

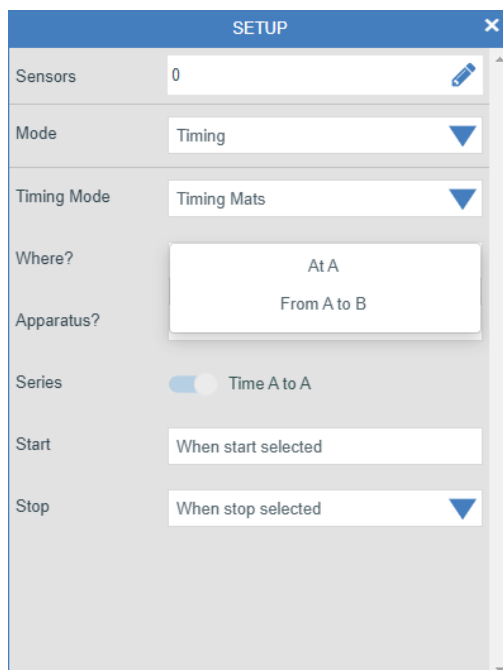Choose Timing from the "What type of experiment do you want to run?" if prompted.

Select the Devices icon and connect to the Wireless Smart Switch Adaptor. The Wireless Switch Adaptor may then be connected to the EasySense2 software. The Devices icon will change to green to show that the sensor is connected, and the status light on the sensor will also turn green. Close this dialogue.

Pressing Setup, will give the following:

Use the following: Mode - Timing, Timing Mode - Timing Mats (see above)

The Where? option allows the Timing Mats to be used independently (At A), or in combination with one another (From A to B).

Using "At A" (above), records the time events for Timing Mat A alone (e.g. jumping). "From A to B" is used for both Mat A and B to produce a singular event:
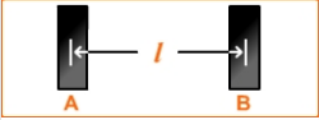
In the above, Distance A to B will report the average speed measured for an event between the mats. The "Speed A to B" slider is set active for this to happen.

$$\text{Speed (A to B)} = l / \text{Time}$$

Close this Setup dialogue and click Start to initiate collection, Stop to complete.

Start recording your data!

Example

Timing from "A to B"

The data display above may be changed using the Chart option shown above (top left in chart and expanded below).
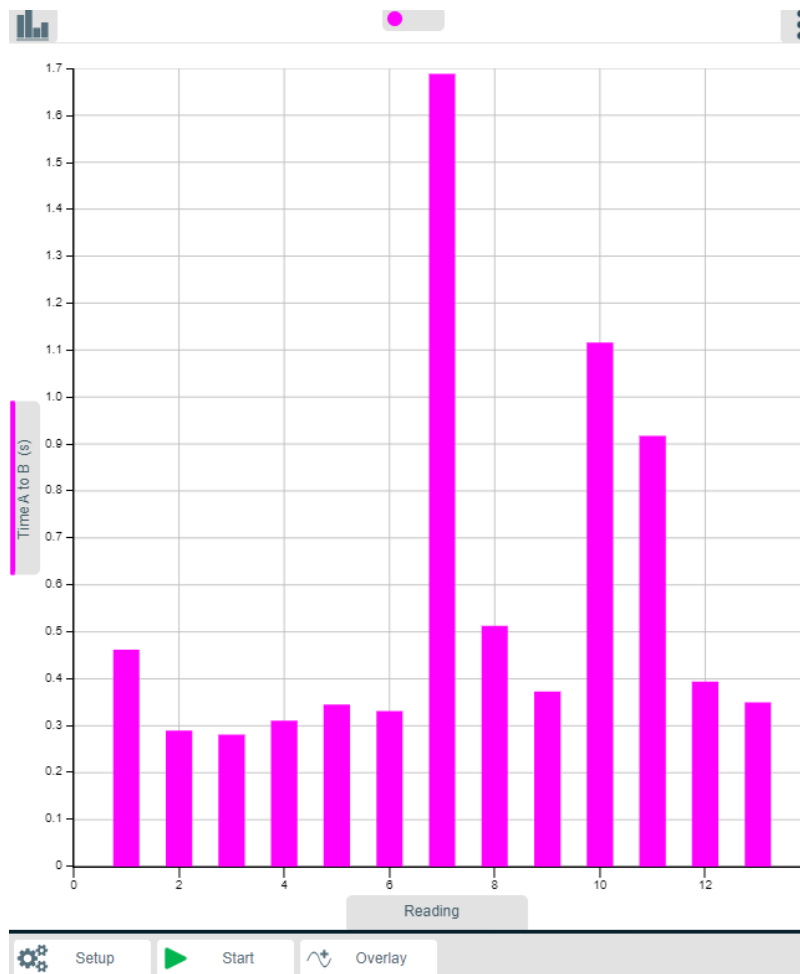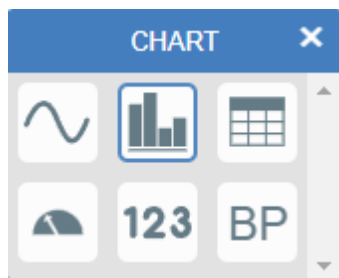

The data recorded may be stored as an .es2 file for future review. It may also be exported as an Excel file for more detailed analysis if required. Please see the EasySense2 User Manual for many more data presentation options.

Maintenance

The Timing Mats are designed to be used as described and we do suggest placing them on a flat dry surface which is free of materials that can damage them. Please place the Timing Mat in a way so that any possible impact to the connectors is minimised.

Care should be taken with this equipment, so we recommend cleaning with a soft non-abrasive cloth and non-harmful solvent; avoid the use of solvents such as acetone.

Please also refer to the operating recommendations listed in this manual.

Practical Investigations

There are many experiments that can be conducted using the Timing Mats.

User examples:

- How long does it take to jump a defined distance?
- How fast can I jump between two points?
- The speed of a passing bicycle?
- How long can I remain in the air when I jump?

Practical Investigations

Sensor Specifications

Please read the following table for sensor specifications.

Feature	Detail
Measurement Ranges	Timing Data, A and B inputs
Resolution	1 ms
Connectivity	Wired via USB Wireless via Bluetooth
Bluetooth Specifications	Bluetooth 4.2 low energy radio, single mode compliant Transmit (TX) power: 0 dBm Receiver (RX) sensitivity: - 90 dBm Usable transmission range: up to 10 m in open air Frequency Range: 2.402 to 2.480 GHz operation Operating range: 0 - 40 C and 0 to 95% RH (non-condensing)
Internal Battery	Rechargeable internal lithium-ion 3.7 V Power specification: 5 V at 500 mA
Storage/Operating Temperature	0 - 40 C
Humidity	0 to 95% RH (non-condensing)
Physical Specifications	Weight: approx. 80 g External dimensions: approx. height 33 mm x width 50 mm x length 90 mm Stainless steel rod: 3 mm dia. x 160 mm

Limited Warranty

For information about the terms of the product warranty, see the Data Harvest website at: https://data-harvest.co.uk/warranty

Product Repairs

When returning goods to Data Harvest, please download and complete the repair return form to ensure you have sent us all the information we require, and send it to us alongside the item to be repaired. The second page of this form includes a return address label.

If you have purchased a Data Harvest manufactured product via a different company, please also supply proof of purchase.

Postage Charges

- In the event of a fault developing, the product must be returned in suitable packaging to Data Harvest for repair or replacement at no expense to the user other than postal charges.
- There will be no postal charge for the return of repaired goods to any mainland UK address (for other areas, additional shipping charges may apply).

Out of Warranty Repairs

Please visit https://data-harvest.co.uk/repairs for the most up to date charges for out of warranty repairs.

Warranty on Repaired Items

Once an item has been serviced and repaired, the product will have 1 year warranty against further failure of the component repaired.

International Returns

Please contact the authorised Data Harvest representative in your country for assistance in returning equipment for repair.

Compliance

This product complies to the following standards

Waste Electrical and Electronic Equipment Legislation

Data Harvest Group Ltd is fully compliant with WEEE legislation and is pleased to provide a disposal service for any of our products when their life expires. Simply return them to us clearly identified as 'life expired' and we will dispose of them for you.

FCC Details

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CE

This product conforms to the CE specification. It has been assessed and deemed to meet EU safety, health and environmental protection requirements as required for products manufactured anywhere in the world that are then marketed within the EU.

UKCA

This product conforms to the UKCA specifications.
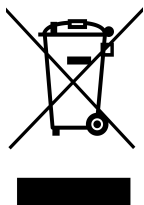
Troubleshooting

If you experience any problems with your product, please try the following troubleshooting tips before contacting the Data Harvest support team.

Feature	Detail
Loss of Bluetooth Connectivity	**If the sensor loses Bluetooth connection and will not reconnect try:** Closing and reopening the EasySense 2 app. Switching the sensor Off and then On again. If you are using a Bluetooth Smart USB Adaptor on your computer, unplug the adaptor, plug back in again and try to reconnect. Hard reset the sensor and then try to reconnect.

Troubleshooting

Notices

Please read the following notices with regards to using your sensor

1. The sensor is much smarter than traditional Bluetooth sensors and you are not required to pair the device. If paired, the sensor will not be available to the EasySense 2 app.
2. When the sensor is connected to a computer, the computer should be turned on and not in sleep or standby mode, as the battery may drain instead of charge.
3. Data Harvest products are designed for educational use and are not intended for use in industrial, medical or commercial applications.
4. We reserve the right to change the product specifications and documentation at any time without further notice.
5. The sensor is not waterproof.
6. Plastic parts may fade or discolour over time if exposed to UV light. This is normal and will not affect the operation of the sensor.

Contact Information

To contact Data Harvest directly, please use any of the following channels

Traditional Communications

Data Harvest Group Ltd.
1 Eden Court, Eden Way,
Leighton Buzzard,
Bedfordshire,
LU7 4FY
United Kingdom

Tel: +44 (0) 1525 373666
Fax: +44 (0) 1525 851638
Sales email: sales@data-harvest.co.uk
Support email: support@data-harvest.co.uk

Online Communications

We have active social media support channels using the following platforms
- Facebook
- Twitter
- YouTube

Office Opening Hours

Monday to Thursday - 08:30 to 16:45
Friday - 08:30 to 13:30
Saturday & Sunday & UK Bank Holidays - Closed

PDF Translations