

# Small Animal Physiological Monitoring System

ECG • Respiration • Heart Rate • Warming & Temperature  
Blood Pressure • SpO<sub>2</sub> • EtCO<sub>2</sub>

Small Footprint  
Integrated & Ergonomic  
Intuitive Touchscreen  
Real-Time Numeric  
& Graphic Display



# Small Animal Physiological Monitoring System



System shown  
with mouse platform



## The Small Animal Physiological Monitoring System

is an instrument that measures multiple physiological parameters on one single small platform.

The system comes complete with a heated monitoring platform (for mouse or mouse/rat), a rectal probe, electrode gel, an Android tablet with a protective sleeve and stand, and Bluetooth communication module. These components are all supplied in a sturdy case for storage and transport.

The platform includes four electrocardiogram (ECG) surface electrodes, a respiration sensor and a heated surface that can be used at a set temperature or in a homeothermic setup using the rectal probe. Additional options to monitor oxygen saturation ( $\text{SpO}_2$ ), blood pressure and exhaled  $\text{CO}_2$  ( $\text{EtCO}_2$ ) can be purchased separately.

A head fixation option is also available. It includes ear bars, a tooth bar and either a nose clamp or an anesthesia mask. The head fixation device is screwed onto the platform, but can easily be removed depending upon the application.

The system has many benefits for surgical procedures. It requires less setup time at the beginning of procedures. A single data/power cable connects to a small wireless communication module, reducing the required space and the number of wires around the animal.

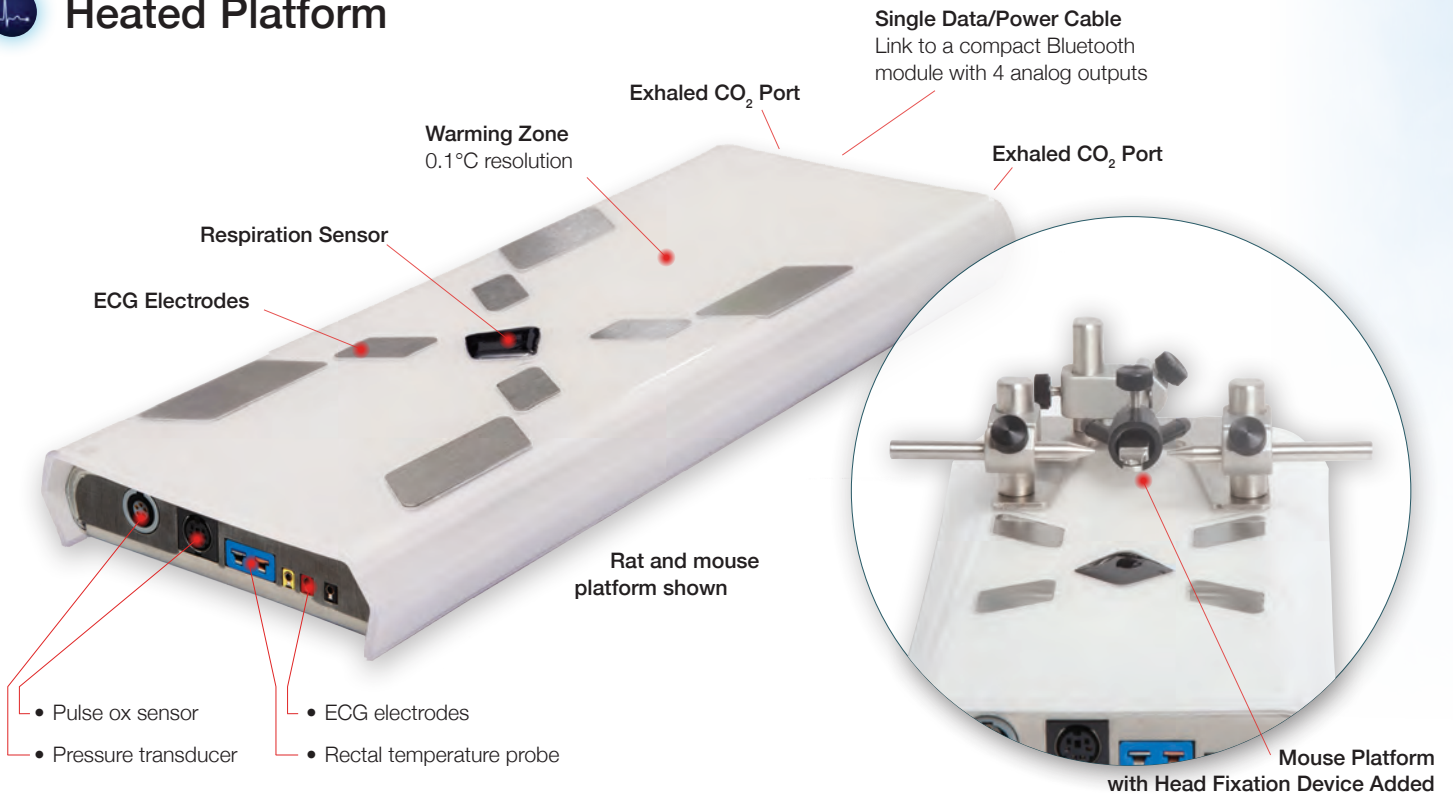
Monitoring software is pre-installed on the Android tablet. All data is transferred to the Android tablet by Bluetooth for display and saving. A real-time display provides numeric values as well as graphic waveforms that can be customized by the user. Multiple signals can be displayed on each of three waveform graphs.

At the end of experiments, recorded data can easily be transferred to any computer for analysis. Scripts and utilities are provided to convert data in LabChart or CSV format and to display signals in Excel and MATLAB.





## Heated Platform



## Physiological Parameters

### ECG

Integrated electrodes under the paws & external electrodes

### Respiration

Waveform acquired with a sensor under the animal

### Heart & Breath Rate

Real-time display from the ECG and respiration waveform

### Warming & Temperature

Heated platform and rectal probe for precise control and monitoring

### Blood Pressure (option)

Connection for a pressure transducer (purchased separately)

### SpO<sub>2</sub> (option)

Pulse oximetry and oxygen saturation with a paw/tail sensor (included with option)

### Exhaled CO<sub>2</sub> (option)

Gas ports for precise CO<sub>2</sub> measurements (must be used with an external ventilator)



## Advanced Display Interface



**Touchscreen display**  
Pinch to zoom on waveforms (works with surgical gloves).

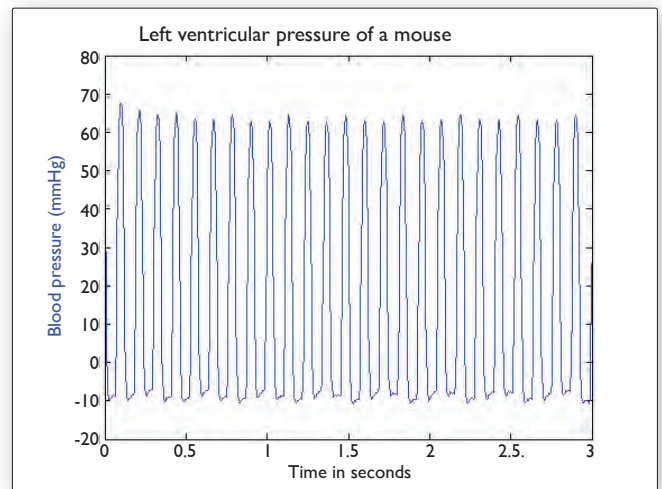
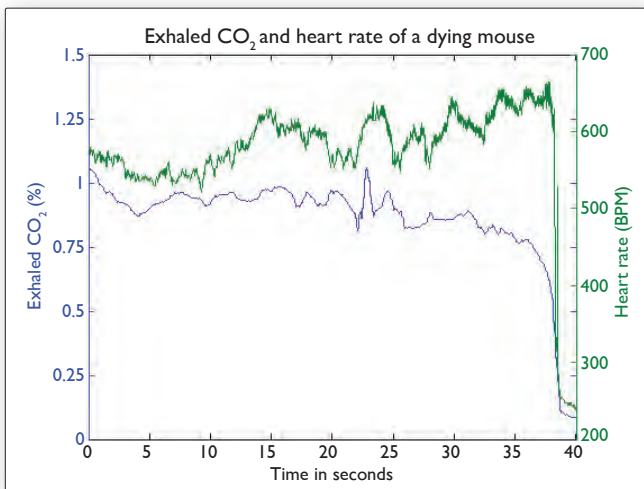
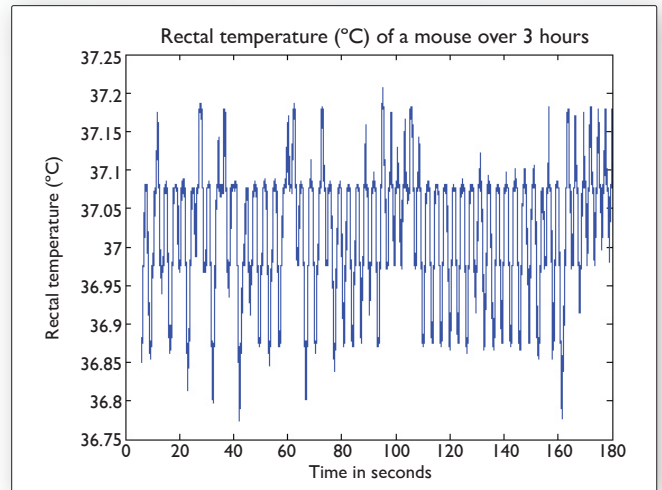
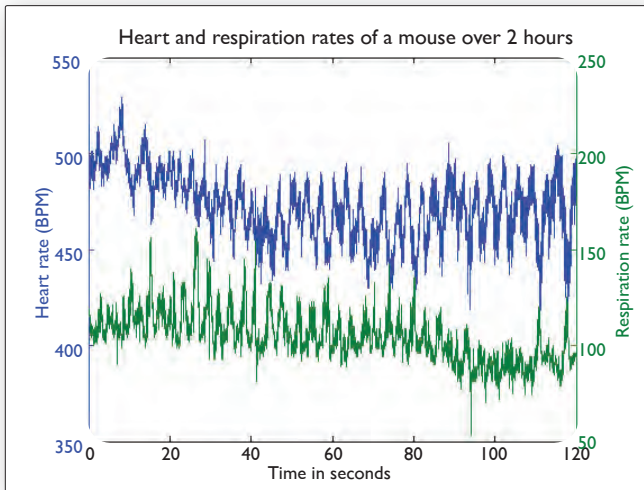
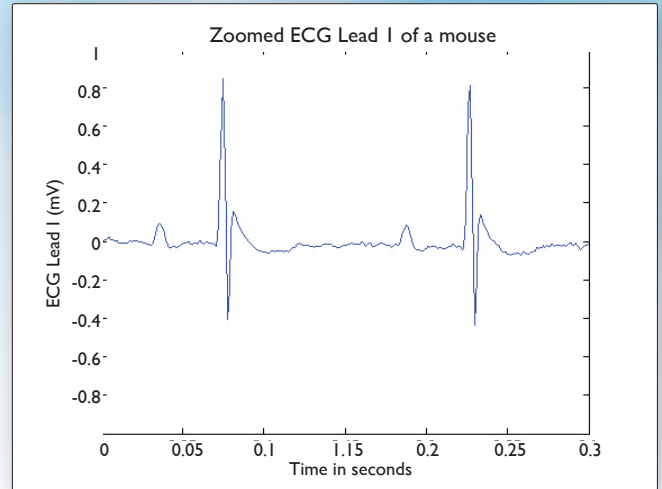
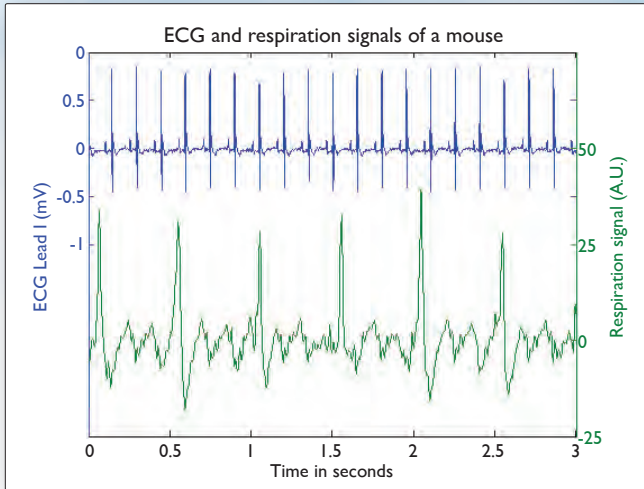
**1 to 5 second waveforms**  
Select any signal to display.

**1 to 30 minute trends**  
View temperature, heart and breath rate trends, and numeric values.

**Easy data saving**  
Add notes, save and export data for an easy analysis.



# Example Waveforms



## Specifications

### ECG

- Display Leads I, II, III, aVL, aVR & aVF
- Supine or prone position
- 1 kHz, 24-bit acquisition
- 3 external electrode connections (2 mm)

### Respiration

- 250 Hz acquisition
- Heart and breath rate
- 200 to 800 beats/min
- 25 to 330 breaths/min
- Calculated every second

### Warming & Temperature

- Heated surface up to 45°C
- 0.1°C resolution
- Closed loop PID controller keeps the animal within  $\pm 0.1^\circ\text{C}$  of set temperature

### Blood Pressure

- Full waveform display
- Systolic and diastolic numeric values
- Comes standard with Redel 5-pin connector
- Adaptor available for 8-pin DIN connector
- 250 Hz acquisition, 24-bit bridge amplifier

### Exhaled CO<sub>2</sub>

- Connect ventilator directly to the platform (1/8 inch tubing)
- 1 Hz refresh rate
- 0.1% accuracy

### SpO<sub>2</sub>

- 80 to 100% saturation
- 250 Hz, 24-bit acquisition
- Red and infrared channel display

## Ordering Information

Order No.	Product
75-1500*	Physiological Monitoring System for Mouse (10 g to 100 g)
75-1501*	Physiological Monitoring System for Rat and Mouse (10 g to 600 g)
75-1502	Blood Pressure Option (BP Transducer purchased separately)
75-1503	End Tidal CO <sub>2</sub> Option
75-1504	SpO <sub>2</sub> Option (Pulse Ox Sensor included with option)

## System Information

### Heated Platform

- Easy to clean surface
- 10 x 21 x 2.5 cm (mouse)
- 12 x 30.4 x 2.5 cm (rat and mouse)

### Tablet

- 8-inch Android tablet (10-inch available)
- High resolution touchscreen display
- Capacity of over 400 hours of saved data
- 5 to 8 hours battery life
- USB cable and charger

### Bluetooth Communication Module

- Bluetooth and analog outputs are in a separate enclosure to avoid interference
- 9 x 11 x 2.5 cm
- 100 to 240 V power supply
- 15 to 25 meters typical range between the communication module and the display unit

### Analog Outputs

- 4 configurable outputs
- BNC connectors,  $\pm 5$  V range
- 1 kHz, 16-bit refresh rate

### Data Analysis

- .csv conversion tool
- MATLAB® & Excel® import and display scripts
- Compatible with third-party analysis software (LabChart)

For more complete product details, please visit our website: [www.harvardapparatus.com](http://www.harvardapparatus.com)

Order No.	Product
73-4905	APT300 Pressure Transducer for Small Animal Physiological Monitoring System
73-5019	ECG 3-Needle Electrodes, 29 gauge
75-1539	Nose Cone Holder
75-1540	Head Fixation Kit with Gas Anesthesia Mask for 75-1500 Platform
75-1541	Head Fixation Kit with Nose Clamp for 75-1500 Platform
75-1542	Head Fixation Kit with Gas Anesthesia Mask for 75-1501 Platform (for mouse only)
75-1543	Head Fixation Kit with Nose Clamp for 75-1501 Platform (for mouse only)
75-1552	BP adapter to DIN-8

\*NOTE: At the end of the part number add EU for Europe, UK for United Kingdom and CN for China models.

## Contact us for more information!



### CMA Microdialysis, AB

Torshamnsgatan 30A  
SE-164 07 Kista, Sweden

phone +46.8.470.10.00  
e-mail [cma@microdialysis.se](mailto:cma@microdialysis.se)  
web [www.microdialysis.se](http://www.microdialysis.se)



### Harvard Apparatus

84 October Hill Road  
Holliston, MA 01746, USA

phone +1.508.893.8999  
toll free +1.800.272.2775 (USA Only)  
fax +1.508.429.5732  
e-mail [support@hbiosci.com](mailto:support@hbiosci.com)  
web [www.harvardapparatus.com](http://www.harvardapparatus.com)



### Harvard Apparatus Canada

6010 Vanden Abeele  
Saint-Laurent, Quebec H4S 1R9

phone +1.514.335.0792  
toll free +1.800.361.1905  
fax +1.514.335.3482  
e-mail [sales@harvardapparatus.ca](mailto:sales@harvardapparatus.ca)  
web [www.harvardapparatus.ca](http://www.harvardapparatus.ca)



### Harvard Apparatus China

Room 8C, Zhongxi Tower  
121 Jiangsu Road,  
Changning District  
Shanghai, China, 200050

phone +86.21.6226.0239



### Biochrom Limited - Harvard Apparatus UK

East Wing, Building 1020  
Cambourne Business Park, Cambourne  
Cambridge, CB23 6DW, United Kingdom

phone +44.1732.864001  
fax +44.1732.863356  
e-mail [sales@harvardapparatus.co.uk](mailto:sales@harvardapparatus.co.uk)  
web [www.harvardapparatus.co.uk](http://www.harvardapparatus.co.uk)



### Harvard Apparatus, S.A.R.L.

6 Avenue des Andes  
Miniparc - Bat. 8  
F-91952, Les Ulis Cedex

phone +33.1.64.46.00.85  
fax +33.1.64.46.94.38  
e-mail [info@harvardapparatus.fr](mailto:info@harvardapparatus.fr)



### HUGO SACHS ELEKTRONIK

a division of Harvard Bioscience, Inc.

### Hugo Sachs Elektronik / Harvard Apparatus, GmbH

Gruenstrasse 1  
March-Hugstetten D-79232, Germany

phone +49.0.7665.9200.0  
fax +49.0.7665.9200.90  
e-mail [info@hugo-sachs.de](mailto:info@hugo-sachs.de)  
web [www.hugo-sachs.de](http://www.hugo-sachs.de)

## Panlab

### Panlab, S.L. / Harvard Apparatus Spain

C/Energia, 112 08940 Cornellà  
Barcelona, Spain

phone +34.934.750.697 (International Sales)  
+34.934.190.709 (Sales in Spain)  
fax +34.934.750.699  
e-mail [info@panlab.com](mailto:info@panlab.com)  
web [www.panlab.com](http://www.panlab.com)