Multi-animal Monitoring and Gating Systems for use with MR, PET, CT, SPECT and Optical

Configurations:

- **2 to 20 channels**
- **one or multiple Imaging systems**

Temperature control

Waveform & trend data acquisition

Monitoring

- **ECG**
- **Respiration**
- **Temperature**

Retrospective Gating

- **ECG**
- **Respiration**
- **ECG & respiration**

Multi-animal monitoring and gating systems have been designed to meet the physiological monitoring and gating needs for anesthetized mice, rats and larger animals in the MR, PET, CT, SPECT, Optical and laboratory environments. Systems can be configured to accommodate up to 20 animals. Each system consists of one or more ECG, respiration and temperature (ERT) data acquisition and processing modules located near the animals and a PC Interface (PCI) Module connected to a PC located near the operator console. The PC displays multiple waveforms, measured values, trends and gating pulses for all animals. The data acquisition modules are controlled by menu driven software from the PC. System configuration can accommodate multiple animals in multiple imaging environments

ECG waveforms are measured for each animal using two or three leads with sub-dermal needle electrodes, gold disk surface electrodes or radio translucent pads. Each ECG waveform is processed to detect the R-wave, generate an ECG gate and to determine the heart rate.

Temperature is measured using small thermister temperature probes. The temperature probe can be located in the rectum or on the animal's skin. Any animal temperature measurement can be used with the Heater System to control the temperature of the animals.

Respiration is obtained from small pneumatic pillow sensors placed next to the abdomen of each animal. The waveforms are automatically processed to detect inspiration, expiration and respiration rate.

Auxiliary gate input channels allow the user to synchronize the animal's physiological measurements with data from the imaging system which in turn allows retrospectively gated images.

Gating algorithm, which is user configured, allows gates to be generated for each animal from ECG, respiration or ECG and respiration. The user can control the start, stop and width of each animal's gate.

Power for the ERT Module is supplied from a battery. The PC Interface Module is powered from an external 12 VDC power supply operating from 100-230 VAC, 50-60 Hz.

Compatible with imaging systems from all manufactures

Specifications:

ECG	range:	40 - 900 BPM
	accuracy:	±1%
	input range:	-2.50 mV to 2.5mV
	input Impedance:	>10 MΩ at 10 Hz
	CMRR:	100 dB at 60 Hz
Temp	probe types	thermister
	tip diameter	1.0, 2.5 or 3.0 mm
	range	20 – 60 ºC
	accuracy	+/-0.2 ºC
Resp	range	13 - 300 bpm
	accuracy 1 count	
	sensor type	pneumatic pillow
ERT Module	multiple channels and modules	1 – 20
	power	battery
	patient isolation	optical
PCI Module	aux gate inputs	3
	power	+12 VDC
Gating	R-wave to gate delay	selectable - 0 ms to 600 ms
	expiration gate width and delay	selectable - 1 ms step size
Temp	heater control	fiber optic PWM

PC requirements:

Software:	Windows
Hardware:	>1 GHz processor
	Serial or USB port
	CD reader

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MONITOR DISPLAY

Waveform & trend data for the selected cell

ECG gate: red when R-wave detected, white when ECG & respiration satisfied.

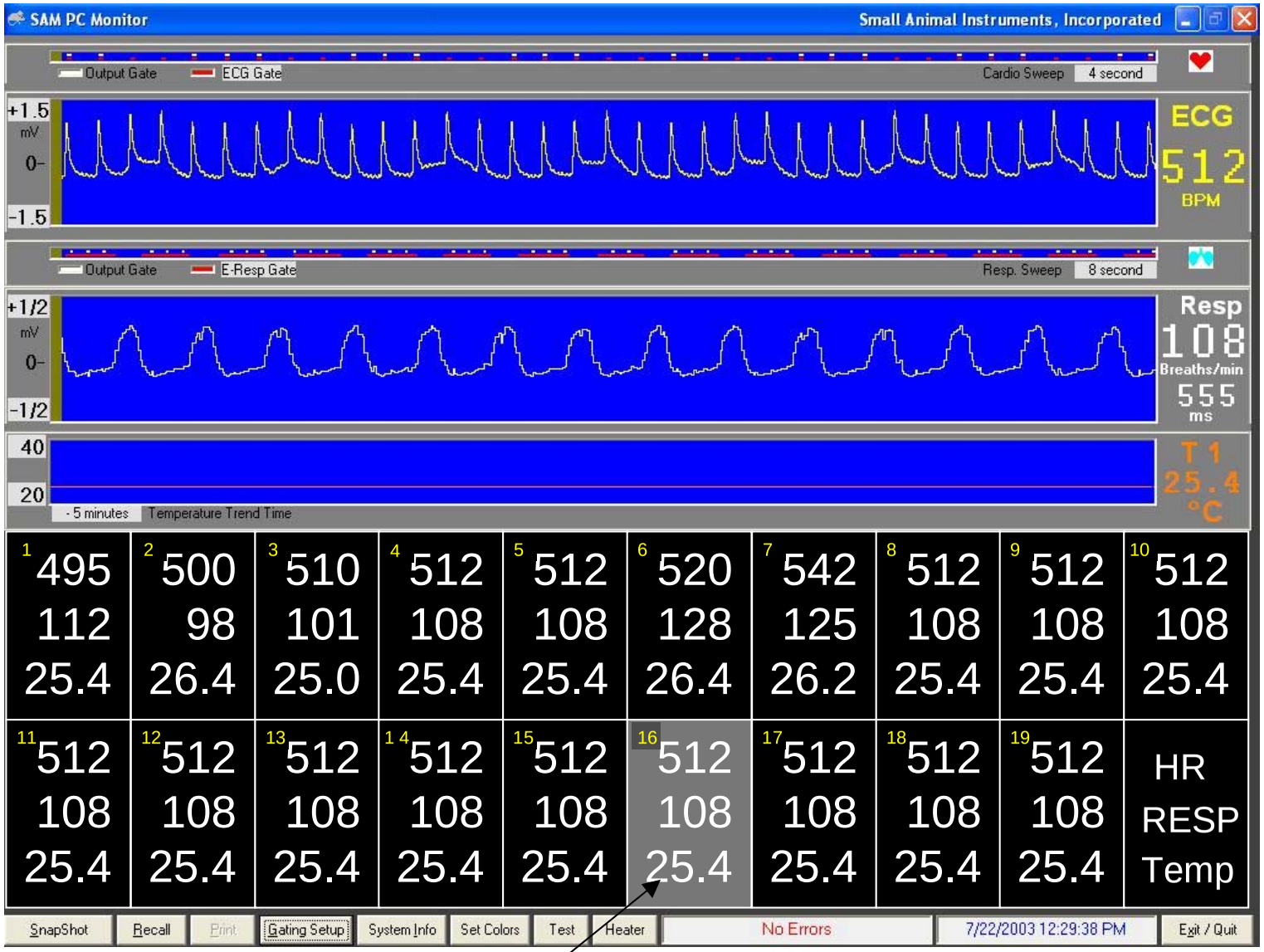
ECG waveform

Respiration gate: red when respiration algorithm is satisfied

Respiration waveform

Temperature trend

Heart rate, respiration rate and temperature for all cells



Click to select cell. Gates, waveforms & trend for the selected cell are displayed above