

# Chronos™

## A Multifunctional Response and Stimulus Device



Chronos

Chronos is a powerful new USB-based response and stimulus device. Chronos allows the accurate collection and verification of tactile, auditory, visual, and analog responses along with the precise source of audio and generic analog output timing

Chronos features millisecond accuracy and consistent sound output latencies across machines. Chronos includes 16 digital inputs and 16 digital outputs, eliminating the need for a parallel port. All responses collected are synchronous to the E-Prime time domain. Multiple Chronos devices can be connected to a single PC using E-Prime 2.0 Professional. Chronos also introduces a large set of Task Events to facilitate the design of basic to complex experiments without the use of script (E-Prime 2.0 Professional).

### Response Features

#### Keys

- 5 buttons
- 16 digital inputs\*
- Voice key
- 2 foot pedals (accessories)
- n-key rollover
- Programmable debounce intervals

#### Audio Recording

- Stream and save vocal responses
- Start recording at object onset OR when speaking begins

#### Voice

- Sound-activated response (voice key)
- Condenser- or dynamic- microphone compatible
- Configurable audio input gain
- Configurable threshold settings for incoming audio responses and recording
- Detect sound to silence (offset threshold/post-silence interval)

#### Analog Input\*

- 3 Analog Inputs (plus Photo Sensor) with configurable onset and offset thresholds

### Stimulus Presentation Features

#### LEDs

- 5 LEDs with programmable RGB color values (>4,000 colors per LED)
- Assign color values as response mapping verification, stimuli, or as feedback based on accuracy

#### Audio Output

- Present auditory stimuli with accurate and precise sound output latencies of 1 ms (Mix Mode 1) or a fixed latency of 6 ms (Mix Mode 2) across different machine hardware
- Configurable onset and offset output thresholds per channel

#### Digital Output

- 16 Digital Outputs

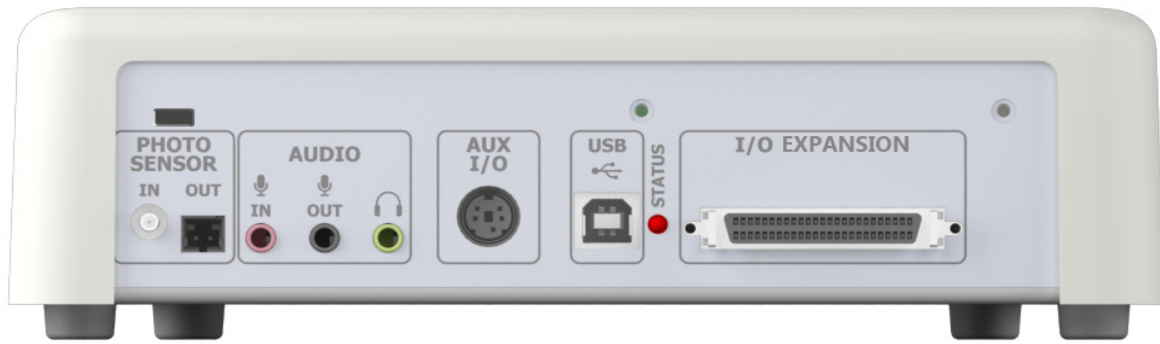
#### Analog Output

- 4 Analog Outputs
- Generate sine, saw tooth, square, triangle, and custom waveforms

#### Pulse Generator\*

- Generate square waveforms of configurable frequency

\*These features require a separate purchase of the Chronos I/O Expander for full functionality



## Includes

### Chronos Console

### Microphone

### Photo Sensor

- The Photo Sensor accessory can be used on CRT, LCD, and projection displays to detect stimulus onset events, refreshes, and measure rise and fall times
- High speed photodiode adapted to human eye sensitivity

### USB cable

### Auxiliary I/O breakout cable assembly

- 2 digital inputs, 2 digital outputs, 1 power (5 V), 1 digital ground, 1 analog input, and 1 analog ground

### Samples and Tutorials

### Kensington® lock support (lock not included)

## Optional Accessories

### I/O Expander

- Required for full capability of external analog and digital I/O
- Provides access to 16 digital inputs, 16 digital outputs, 1 pulse generator, digital powers and grounds, 3 analog inputs, 4 analog outputs, analog grounds

### Custom Expansion Kit

- Includes prototyping board, interface cables, mounting hardware, and enclosure
- Requires I/O Expander
- LEDs, switches, and dials are available to configure customization of up to 16 inputs and outputs

### Foot Pedal

- Single or dual



**Microphone**

(4" x 9 3/4")



**Photo Sensor**

(1 3/4" x 1 3/8" x 3/4")



**I/O Expander**

(3" x 4" x 2")



**Foot Pedal**

(2 5/8" x 3 1/2" x .85")

## Machine Requirements

### Chronos is compatible with PCs running:

- Windows® 8/8.1 64-bit
- Windows® 7 SP1 32 and 64-bit

### Chronos minimum machine configuration:

- Pentium compatible Dual-Core or Multi-Core Processor 2GHz
- 2GB RAM
- USB 2.0 or 3.0 Port or powered hub port
- E-Prime 2.0 SP1 2.0.10.353 Standard/Professional



The Chronos graphical user interface allows for user-friendly implementation of the system's wide range of features.

## Chronos Pricing

<b>Chronos</b> <i>Includes Microphone and Photo Sensor</i>	\$795
<b>Chronos I/O Expander</b>	\$250
<b>Chronos Custom Expansion Kit</b> <i>LEDs, switches, and dials are sold separately to configure customization</i>	\$110
<b>Chronos Foot Pedal</b>	\$95
<b>Chronos Dual Foot Pedal</b>	\$175

Quantity discount of 10% for orders of 5 or more.  
Prices are subject to change without notice.

The listed prices are provided in US funds and do not include shipping and handling.



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