

# Multi-Operational Apparatus for Reaction Time (MOART)

## User Instructions



3700 Sagamore Parkway North  
Lafayette, IN 47904 USA  
Tel: (765) 423-1505

[info@lafayetteinstrument.com](mailto:info@lafayetteinstrument.com)  
[www.lafayetteinstrument.com](http://www.lafayetteinstrument.com)

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## System Description

The Multi-Operational Apparatus for Reaction Time (MOART) is an integrated, versatile device used for the study of cognitive processing. It can perform a wide range of tests including reaction time, choice reaction time, reaction/movement time, and tapping tests. The MOART features state-of-the-art touch sensitive keypads for ultra-accurate reaction times with no key travel errors. It also uses tri-color stimulus lights and dual tone generation, giving it a high degree of versatility in stimulus presentation. Combined with the PsymCon control panel, it can provide six highly adaptable tests that will find use in any motor behavior laboratory.

This manual describes the MOART panel when used as a stand-alone device only. A second set of instructions will be issued with the software release describing the use of the MOART with the computer interface.

## Parts

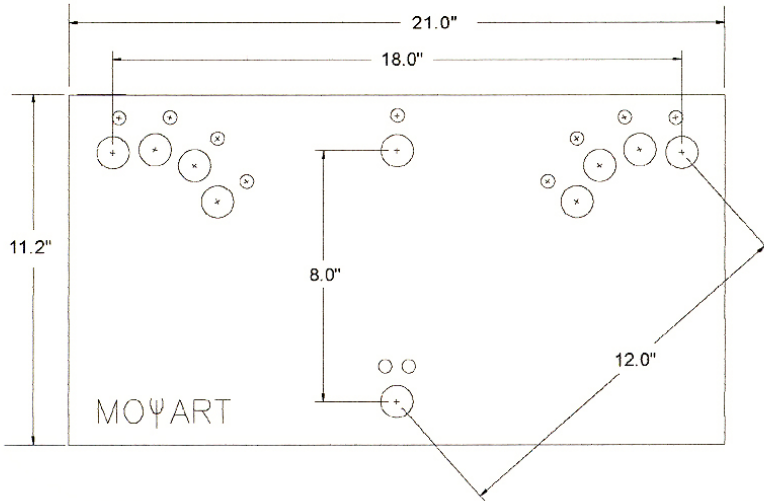
- MOART panel: Main panel for the system
- 10V DC power supply with power cord

## Specifications

<b>Low Tone:</b>	200Hz
<b>High Tone:</b>	1kHz
<b>Tone Volume:</b>	75-85 dB max.
<b>Headphone:</b>	90-105 dB max. depending on style
<b>Stimulus:</b>	9 tri-color lights, high or low tone
<b>Keys:</b>	Touch sensitive with dual accuracy zones
<b>Cue:</b>	Tri-color light, high or low tone
<b>Cue Time:</b>	Fixed, random or none
<b>Cue Time Range:</b>	0-25.5 seconds, 0.1 second resolution
<b>Error Types:</b>	Early response, no response, incorrect response, inaccurate response
<b>Response Timeout:</b>	0-25.5 seconds, 0.1 second resolution
<b>Tapping Duration:</b>	0-120 seconds, 1.0 second resolution
<b>Power:</b>	10V DC, 1.5 Amp supplied with AC adapter
<b>Computer Conn:</b>	USB
<b>Timing Resolution:</b>	0.001 seconds $\pm$ 0.005%
<b>Dimensions:</b>	21.0" x 11.2" x 2.5"
<b>Aux. Connector:</b>	8-pin circular mini-DIN

## Front Panel Description

The MOART front panel uses an ergonomic design for the button layout. The design is based on established normal distances for tapping tests and published standards for reaction time experiments. Each key site features a dual zone touch sensitive keypad. The inner and outer zone of each key can be monitored separately which allows the accuracy of responses to be monitored. Each key site also features a tri-color LED stimulus light. The light can be set for red, green or orange stimulus (orange available through computer control only). The main key site at the bottom of the panel (C0) uses two separate lights, which allows greater flexibility when presenting stimuli. Each key site is labeled on the panel and these labels are referenced in both the control hardware and software to set up the various experiments.



**Note: Static Discharge Information:** The metallic keys and connectors on the MOART are susceptible to static discharge. If a user or subject “shocks” one of the buttons or headphone connectors, errant operation may occur. This may include the LCD screen on the control going blank or tests that will not run correctly. Static discharges will not permanently damage panel and normal operation can be restored by turning the power off and restarting the panel. For best operation, always plug in headphones before starting the panel and avoid building up static charge before using the MOART.

## Rear Panel Description



The rear panel provides all of the external connections for the MOART. The following is the connector description for the panel, starting from the left side of the panel (when facing the back).

### USB connector

Used to connect the panel to the computer for software control. Plugging in the USB connector disables the Psymcon control module.

### Psymcon connector

Used to connect the optional manual control module (Psymcon) to the MOART. The 25 pin connecting cable is included with the system.

### DC Power Inlet

The 10V-power supply plugs into this connector.

### Power Switch

Turns the panel OFF and ON.

### Power Indicator

Illuminates when power is applied.

### External Initiate (RCA style connector)

A switch closure on this input starts a test. This input can be used to remotely initiate tests or allow a second piece of equipment to control the initiate function.

### Event Out 2 (3.5mm phono style connector)

Event marker output for schedule 2. The output is normally at a 5V level. The event mark pulls the output to 0V for 20, 40, or 60 milliseconds depending on the event type:

Stimulus events:	20 ms
Response events:	40 ms
End of Schedule:	60 ms
Other events:	20 ms

When used in stand alone operation, schedule 2 is not implemented and this event marker is not used. When used with the computer software, a mark can be assigned to any event in the schedule 2 experiment.

### Event Out 1 (3.5mm phono style connector)

Event marker output for schedule 1. The output is normally at a 5V level. The event mark pulls the output to 0V for 20, 40, or 60 milliseconds depending on the event type:

Stimulus events:	20 ms
Response events:	40 ms
End of Schedule:	60 ms
Other events:	20 ms

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When used in stand alone operation, the cue, stimulus, response (correct, errors, and taps) and the End of Schedule automatically cause event marks. When used with the computer software, a event mark can be assigned to any event in the schedule 1 experiment.

### **Trigger Out 2 (RCA style connector)**

Trigger output for schedule 2. The trigger is used to send timing signals to other equipment. The trigger line is normally at a 5V level. The trigger drives the output to 0V for 60 ms. In stand alone operation, schedule 2 is not implemented and this trigger output is not used. When used with the computer software, a trigger can be assigned to any event in the schedule 2 experiment.

### **Trigger Out 1 (RCA style connector)**

Trigger output for schedule 1. The trigger is used to send timing signals to other equipment. The trigger line is normally at a 5V level. The trigger drives the output to 0V for 60 ms. When the panel is used in stand alone operation, the end of schedule automatically causes a trigger. This end of schedule trigger is fixed. It cannot be turned off and no other triggers can be implemented. When used with the computer software, a trigger can be assigned to any event in the schedule 1 experiment.

### **Auxiliary 5 through Auxiliary 1 (8 pin mini-DIN style connector)**

Connectors for Auxiliary keys or lights. These ports allow peripheral devices to be connected to the MOART panel. When used with the Psymcon control module, auxiliary ports are limited or unavailable for certain test types, as documented in the test type descriptions. Computer operation allows the use of all auxiliary ports. Auxiliary devices may include, but are not limited to:

- touch keys
- stimulus lights
- remote response buttons
- switch mats
- foot switches
- photobeam switches

\* Custom devices can be made to interface to the auxiliary ports.

### **Headphone Jack (3.5mm stereo jack)**

Connector for headphones. The headphones can be used to listen to the tone or the external audio input signal. Plugging in the headphones automatically disables the internal speaker.

### **Audio In (3.5mm stereo jack)**

Allows an external audio signal to be input into the panel. The audio signal overrides the tone settings for an experiment. Any cue or stimulus setting that uses high or low tone will activate the external audio instead.

### **Volume control**

Controls the volume of the tone. The volume adjust controls the tone whether it is routed to the headphones or to the internal speaker. The volume has no control of the external audio signal on the "Audio In" jack. This volume must be controlled by the external audio source.

## Notes

Write user notes here for your convenience.



# Terms and Conditions

## LIC Worldwide Headquarters

Toll-Free: (800) 428-7545 (USA only)

Phone: (765) 423-1505

Fax: (765) 423-4111

Email: [sales@lafayetteinstrument.com](mailto:sales@lafayetteinstrument.com)

[export@lafayetteinstrument.com](mailto:export@lafayetteinstrument.com) (Outside the USA)

## Mailing Address:

Lafayette Instrument Company

PO Box 5729

Lafayette, IN 47903, USA

## Lafayette Instrument Europe:

Phone: +44 1509 817700

Fax: +44 1509 817701

Email: [eusales@lafayetteinstrument.com](mailto:eusales@lafayetteinstrument.com)

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3700 Sagamore Parkway North  
Lafayette, IN 47904, USA.

Shipments cannot be received at the PO Box. The items should be packed well, insured for full value, and returned along with a cover letter explaining the malfunction. An estimate of repair will be given prior to completion ONLY if requested in your enclosed cover letter. We must have a hard copy of your purchase order by mail or fax, or repair work cannot commence for non-warranty repairs.

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3. This warranty does not cover damage to components due to improper installation by the customer.
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7. Failure by the customer to perform normal and reasonable maintenance on instruments will void warranty claims.
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