

# The ANY-maze Operant interface M



## Overview

The ANY-maze Operant interface M is designed to directly connect ANY-maze to the popular range of Operant conditioning equipment available from Med Associates.

## General

- Allows ANY-maze to read inputs and control outputs.
- Works as a direct replacement for an existing Med Associates connection panel.
- Each interface connects directly to the computer via USB, no Med Associates interface cards are required.

- The interface can be powered from an optional standalone power supply or from an existing Med Associates power supply.

## Inputs

- 10 independent inputs
- Inputs use Med Associates standard 3-pin Molex connectors

## Outputs

- 20 independent outputs
- Outputs use Med Associates standard 3-pin Molex connectors
- All outputs can optionally dim lights or LEDs connected to them
- 3 28V power outputs

## Technical specification

<b>Connection to PC</b>									
Connection type	USB (USB1.1, USB2.0, USB3.0 compatible)								
Interface power	The interface itself is powered from the USB bus								
Maximum current drawn from USB	130mA								
<b>Power supply</b>									
Input voltage	90 - 264 VAC								
Output voltage	28 VDC								
Output current	2.5A minimum								
LED (note 1)	<table border="0"> <tr> <td>Off</td> <td>No power connected</td> </tr> <tr> <td>Red</td> <td>Connected to 28V power but not to USB</td> </tr> <tr> <td>Flashing green</td> <td>Connected to USB but not to 28V</td> </tr> <tr> <td>Solid green</td> <td>Connected to USB and 28V</td> </tr> </table>	Off	No power connected	Red	Connected to 28V power but not to USB	Flashing green	Connected to USB but not to 28V	Solid green	Connected to USB and 28V
Off	No power connected								
Red	Connected to 28V power but not to USB								
Flashing green	Connected to USB but not to 28V								
Solid green	Connected to USB and 28V								
Switch	Power switch on the interface								
<b>Inputs</b>									
Number of channels	10								
Input isolation	3750 V <sub>RMS</sub>								
Input voltage range	0 – 28V								
Connector	3 pin Molex connector: Pin 1 = 28VDC power Pin 2 = Input signal Pin 3 = GND (0V)								
<b>Outputs</b>									
Number of channels	20								
Output isolation	3750 V <sub>RMS</sub>								
Output on voltage (note 2)	0V								
Output off voltage (note 3)	28V								
Light/LED dimming capability	Available on all channels (note 4)								
Connector	3 pin Molex connector: Pin 1 = 28VDC power Pin 2 = Output signal Pin 3 = GND (0V)								

### Notes

- LED can be suppressed, which is useful for tests performed in darkness and/or to avoid providing potential cues to the animals.
- When on, each output signal pin can sink a maximum of 0.5A. The absolute maximum current across all outputs is 2.5A
- When off, each output signal pin can source almost no current (it is pulled high through a 10K resistor).
- Light dimming is performed using Pulse Width Modulation (PWM) at 320Hz.

## Supported Med Associates components

If you have a component that is not listed here (or in the subsequent list of not-supported components) please contact us at [techsupport@anymaze.com](mailto:techsupport@anymaze.com) to confirm compatibility.

### Audio stimuli

- ENV-223 Multiple tone generator
- ENV-230 Multi-purpose sound generator
- ENV-135M Clicker (Rat chamber)
- ENV-223A Sonalert with volume control 2900Hz (Rat chamber)
- ENV-223AM Sonalert with volume control 2900Hz (Rat chamber)
- ENV-223HAM Sonalert with volume control 4500Hz (Rat chamber)
- ENV-225SM White noise amplifier with speaker (Rat chamber)
- ENV-323AM Sonalert with volume control 2900Hz (Classic mouse chamber)
- ENV-323HAM Sonalert with volume control 4500Hz (Classic mouse chamber)
- ENV-325SM White noise amplifier with speaker (Classic mouse chamber)
- ENV-335M Clicker (Classic mouse chamber)
- ENV-323AW Sonalert with volume control 2900Hz (Wide mouse chamber)
- ENV-323HAW Sonalert with volume control 4500Hz (Wide mouse chamber)
- ENV-325SW White noise amplifier with speaker (Wide mouse chamber)
- ENV-335W Clicker (Wide mouse chamber)

### Aversive stimuli

- ENV-410B Dual range constant current aversive stimulation module
- ENV-414 Aversive stimulator/scrambler module
- ENV-414S Standalone aversive stimulator/scrambler (115V)
- ENV-414SA Standalone aversive stimulator/scrambler (230V)
- ENV-414SA-SR Shocker/scrambler module for startle reflex
- ENV-416S Square wave aversive stimulator

### Ceiling rods

- ENV-111 Omnidirectional ceiling rod (Rat chamber)
- ENV-111A Omnidirectional ceiling rod (Rat chamber)
- ENV-311 Omnidirectional ceiling rod (Classic and wide mouse chamber)
- ENV-311A Omnidirectional ceiling rod (Classic mouse chamber)
- ENV-311W Omnidirectional ceiling rod (Wide mouse Chamber)
- ENV-111C Chain Pull Response (Modified chamber)

### Doors

- ENV-010B Auto Guillotine Door

### House lights

- ENV-215M House Light (Rat chamber)

- ENV-227M House/stimulus light with diffuser (Rat chamber)
- ENV-315M House light (Classic mouse chamber)
- ENV-315W House light (Wide mouse chamber)
- ENV-221CL Ceiling mounted house light
- ANL-955 Light detector

### Levers

- ENV-110M Standard Lever (Rat chamber)
- ENV-110RM Standard lever with rolled edge (Rat chamber)
- ENV-116M Gerbrands Style Extra Thick Lever (Rat chamber)
- ENV-112BM Retractable Lever (Rat chamber)
- ENV-112CM Retractable Lever (Rat chamber)
- ENV-310M Ultra-Sensitive Lever (Classic mouse chamber)
- ENV-312-2M Retractable ultra-sensitive lever (Classic mouse chamber)
- ENV-312-3M Retractable ultra-sensitive lever (Classic mouse chamber)
- ENV-310W Ultra-Sensitive Lever (Wide mouse chamber)
- ENV-312-2W Retractable ultra-sensitive lever (Wide mouse chamber)
- ENV-312-3W Retractable ultra-sensitive lever (Wide mouse chamber)
- ENV-610M Standard Lever (Primate)
- ENV-612M Retractable Lever (Primate)
- ENV-122 Lindsley Manipulandum

### Lickometers

- ENV-251L Lickometer with photobeam controller (Rat chamber)
- ENV-251M Light pipe lickometer with photobeam controller (Rat chamber)
- ENV-351W Light pipe lickometer with photobeam controller (Wide mouse chamber)
- ENV-250 Contact lickometer controller
- ENV-250B Dual contact lickometer controller
- ENV-250C Triple contact lickometer controller
- ENV-250A Switching contact lickometer controller
- ENV-250S Lickometer grid switch

### Light faders

- ENV-226 Single-channel two-level stimulus light fader controller
- ENV-226A Single-channel four-level stimulus light fader controller
- ENV-226B Three-channel variable level light fader controller

### Liquid dispensers

- ENV-202M Liquid dipper (Rat chamber)
- ENV-202M-S Switchable liquid dipper (Rat chamber)
- ENV-202RM-S Switchable liquid dipper (Rat chamber)
- ENV-252M Retractable sipper (Rat Chamber)
- ENV-252A Retractable sipper with Lixit (Rat chamber)

- ENV-302M-S Switchable liquid dipper (Classic mouse chamber)
- ENV-302RM-S Switchable liquid dipper with combined pellet receptacle (Classic mouse)
- ENV-352AW Retractable sipper with graduated pipette (Classic mouse chamber)
- ENV-352-2M Retractable sipper with Lixit (Classic mouse chamber)
- ENV-302W-S Switchable liquid dipper (Wide mouse chamber)
- ENV-302RW-S Switchable liquid dipper with combined pellet receptacle (Wide mouse)
- ENV-352W Retractable Sipper with Lixit (Wide mouse chamber)
- ENV-352-2W Retractable Sipper with Lixit (Wide mouse chamber)
- ENV-652M Retractable Sipper with Lixit (Primate)
- ENV-652AM Retractable Sipper with Lixit and solenoid valve (Primate)
- ENV-652FM Sipper with Lixit and solenoid valve (Primate)
- ENV-201A Liquid drop dispenser

### Nose poke / Response keys

- ENV-114AM Nose poke (Rat chamber)
- ENV-114BM Nose poke with yellow cue light (Rat chamber)
- ENV-114M Nose poke with three color cue lights (Rat chamber)
- ENV-119M-1 Nose poke response key 1" (Rat chamber)
- ENV-119M-2 Nose poke response key 2" (Rat chamber)
- ENV-275-NPP Nose poke with olfactory ports and yellow cue light (Rat chamber)
- ENV-115A Five hole nose poke wall (Rat chamber)
- ENV-115-9NP Nine hole nose poke wall (Rat chamber)
- ENV-115A-OF Five hole nose poke wall with olfactory ports (Rat chamber)
- ENV-313M Nose poke with yellow cue light (Classic Mouse chamber)
- ENV-314M Nose poke with three color cue lights (Classic mouse chamber)
- ENV-316M Nose poke response key (Classic mouse chamber)
- ENV-375-NPP Nose poke with olfactory ports / yellow cue light (Classic mouse chamber)
- ENV-313W Nose poke with yellow cue light (Wide mouse chamber)
- ENV-314W Nose poke with three color cue lights (Wide mouse chamber)
- ENV-316W Nose poke response key (Wide mouse chamber)
- ENV-115C Five hole nose poke wall (Wide mouse chamber)
- ENV-115C-9 Nine hole nose poke wall (Mouse chamber)
- ENV-115C-OF Five hole nose poke wall with olfactory ports (Wide mouse chamber)
- ENV-123A-C Response key, clear (Pigeon)
- ENV-123A-O Response key, opaque (Pigeon)
- ENV-125M Response key, clear (Pigeon)
- ENV-125AM Response key, clear (Pigeon)
- ENV-123AM Response key with three color display (Pigeon)
- ENV-124AM Response key with multi-color display (Pigeon)
- ENV-126AM (Legacy) Response key with multi-color display (Pigeon) (Legacy mode)
- ENV-126AM Response key with multi-color display (Pigeon)

**Olfactory Systems**

- ENV-275 Two-channel olfactory stimulus system
- ENV-275-5 Five-channel olfactory stimulus system
- PHM-276 Olfactory column saturator
- ENV-275-F Exhaust Fan (Rat chamber)
- ENV-375-F Exhaust Fan (Classic mouse chamber)

**Pellet and food dispensers**

- ENV-203-14P Pellet dispenser, pedestal - 14mg (Mouse)
- ENV-203-20 Pellet dispenser, pedestal - 20mg (Mouse)
- ENV-203M-20 Pellet dispenser, modular - 20mg (Rat)
- ENV-203M-45 Pellet dispenser, modular - 45mg (Rat)
- ENV-203M-45IR Pellet dispenser, modular with IR sentry - 45mg (Rat)
- ENV-203-45 Pellet dispenser, pedestal - 45mg (Rat)
- ENV-203-45IR Pellet dispenser, pedestal with IR sentry - 45mg (Rat)
- ENV-203-75 Pellet dispenser, pedestal - 75mg (Rat or primate)
- ENV-203-75IR Pellet dispenser, pedestal with IR sentry - 75mg (Rat or primate)
- ENV-203-94 Pellet dispenser, pedestal - 94mg (Rat or primate)
- ENV-203-94IR Pellet dispenser, pedestal with IR sentry - 94mg (Rat or primate)
- ENV-203-190 Pellet dispenser, pedestal - 190mg (Rat or primate)
- ENV-203-190IR Pellet dispenser, pedestal with IR sentry - 190mg (Rat or primate)
- ENV-203-300 Pellet dispenser, pedestal - 300mg (Primate)
- ENV-203-300IR Pellet dispenser, pedestal with IR sentry - 300mg (Primate)
- ENV-203-1000 Pellet dispenser, pedestal with IR sentry - 1000mg (Rat)
- ENV-203P Peanut dispenser, pedestal
- ENV-203-MINI Mini M&M's dispenser, pedestal
- ENV-702 Standard M&M's dispenser, pedestal with IR sentry
- ENV-205M Grain feeder, modular (Pigeon)

**Pellet and liquid dispenser head entry detectors**

- ENV-254-CB Head entry detector for solid/liquid receptacles (Rat chamber)
- ENV-200FCW Food Intake Monitor (Weight sensor not supported) (Rat chamber)
- ENV-303HDA Head entry detector for pellet receptacle (Classic mouse chamber)
- ENV-303HDM Head entry detector for pellet receptacle (Classic mouse chamber)
- ENV-303LPHD Liquid pipe receptacle with head entry detector (Classic mouse chamber)
- ENV-303HDW Head entry detector for pellet receptacle (Wide mouse chamber)
- ENV-302HD Head entry detector for liquid dipper (Wide mouse chamber)

**Pellet and liquid dispenser receptacle doors**

- ENV-210M Modular pellet receptacle door (Rat chamber)
- ENV-340A Modular pellet receptacle door (Classic mouse chamber)
- ENV-200FCW-D Food intake monitor with retractable door (Weight sensor not supported) (Rat chamber)

**Pellet and liquid dispenser receptacle lights**

- ENV-200RL Pellet receptacle light (Rat chamber)
- ENV-302RL-1 Top mounted liquid dipper receptacle light (Classic & wide mouse)
- ENV-302RL-2 Back mounted liquid dipper receptacle light (Classic & wide mouse)
- ENV-303RL Pellet receptacle light (Wide mouse chamber)

**Photobeam sensors**

- ENV-253B Single channel IR controller
- ENV-253 Four channel IR controller
- ENV-253C Eight channel IR controller

**Response wheels**

- ENV-113M Response wheel (Rat chamber)
- ENV-113S Micro-switch Response wheel (Rat chamber)
- ENV-113AM Response wheel (Classic mouse chamber)
- ENV-113AS Micro-switch Response wheel (Classic mouse chamber)
- ENV-113AW Response wheel (Wide mouse chamber)
- ENV-113AMW Wide Response wheel (Wide mouse chamber)
- ENV-113WS Micro-switch Response wheel (Wide mouse chamber)

**Stimulus lights**

- ENV-221M Incandescent stimulus light - white (Rat chamber)
- ENV-229M LED stimulus light - white (Rat chamber)
- ENV-222M Triple LED stimulus light (Rat chamber)
- ENV-321M LED stimulus light - yellow (Classic mouse chamber)
- ENV-321DM Dual LED stimulus light (Classic mouse chamber)
- ENV-322M Triple LED stimulus light (Classic mouse chamber)
- ENV-321W LED stimulus light - yellow (Wide mouse chamber)
- ENV-321DW Dual LED stimulus light (Wide mouse chamber)
- ENV-322W Triple LED stimulus light (Wide mouse chamber)
- ENV-621 Stimulus light (Primate)
- ENV-621L Stimulus light (Primate)
- ENV-621L-RD LED stimulus light - Red (Primate)
- ENV-621L-WH LED stimulus light - White (Primate)
- ENV-621L-GRN LED stimulus light - Green (Primate)
- ENV-622M Triple stimulus light (Primate)

**Syringe pumps**

- PHM-100 Single speed syringe pump (Standard speed 3.33rpm)
- PHM-100A Single speed syringe pump 230V (Standard speed 3.33rpm)
- PHM-100-\* Single speed syringe pump (Non-standard speed)
- PHM-100A-\* Single speed syringe pump 230V (Non-standard speed)
- PHM-108 Single speed syringe pump with safety timer (Standard speed 3.33rpm)

- PHM-108-\* Single speed Syringe Pump with safety timer (Non-standard speed)
- PHM-100VS Variable speed syringe pump with safety timer
- PHM-100VSA Variable speed syringe pump 230V with safety timer
- PHM-100VS-2 Variable speed syringe pump with safety timer
- PHM-107 Variable infusion rate syringe pump
- PHM-111-EC Advanced variable infusion rate syringe pump
- PHM-104A High/low speed precision microliter syringe pump
- PHM-109 Intracranial pump

\* These pumps end with a numeric code that denotes their speed. All speed variants are supported.

## Med Associates components not supported

The following components are **not** supported by the interface. This list is not exhaustive, but it contains other Med Associates components that might be used in Operant conditioning experiments, or that we have been specifically asked about.

- ANL-926 Programmable audio generator
- ANL-937-1 Ultrasonic vocalization detector
- ENV-118 Force lever
- ENV-251FM Force lickometer for rat
- ENV-251-LIM Liquid intake monitor for rat
- ENV-252-LIM Liquid intake monitor with retractable sipper for rat
- ENV-256I 16 channel IR controller
- ENV-256I-8 8 channel IR controller
- ENV-520 48 channel IR controller
- ENV-520USB 48 channel IR controller
- ENV-258R 16 beam IR source + detector strips for rat
- ENV-258-HB Hole board IR source + detector strips for rat
- ENV-413 Computer controlled constant current aversive stimulation module
- PHM-150B Programmable ICSS stimulator
- PHM-150B/2 Programmable ICSS stimulator
- PHM-152 Programmable ICSS stimulator
- PHM-152/2 Programmable ICSS stimulator