med associates inc

Instrumentation and Software for Research

2025 CATALOG

WELCOME!

This catalog is a companion to our website. Request a quote by navigating our online catalog, add items to your cart, and submit it - no user account required! Once received, a member of our team will review it, check in with you to ensure you're getting everything you need, and send you a quote!

med-associates.com | sales@med-associates.com | +1 (802) 527-2343

TABLE OF CONTENTS

MODULAR ENVIRONMENTS

These chambers (modular, shuttle box, and modular mazes) have channels to accommodate our wide range of modular components such as food+water delivery, response devices, lights, audio devices, and more, found in the following section.

CHAMBERS

CHAMBER COMPONENTS

APPLICATION COMPONENTS

SOFTWARE

If a piece of software is specific to an application it is listed with the relevant hardware (e.g. Video Fear Conditioning Software). If it is used with multiple types of hardware, it will be listed in this section.

EXPERIMENTAL CONTROL

DATA ANALYSIS

PRE-WRITTEN MSN PROTOCOLS

APPLICATION SOFTWARE

3RD PARTY COMPATIBILITY

POWER + CONTROL INTERFACE

To collect data from and send data to your equipment, as well as supplying power for it all to operate, you'll need some items from this section. With only a few exceptions, from one experiment to the next, our equipment is designed to work using the same interface cabinet, decode card, and interface card, without needing to purchase additional equipment. We also offer TTL converters for use with 3rd party equipment such as optometry light sources.

INTERFACE OVERVIEW

INTERFACE TYPES

CABLES

CONTINUED ON NEXT PAGE ➡

TABLE OF CONTENTS CONTINUED

TEST DEVICES (FIXED ENVIRONMENTS)

The following devices don't have modular channels, so they cannot accept modular accessories like lights, response devices, food+liquid delivery receptactles, etc. However, they are ideally suited for their particular protocol and areas of study, and still have opportunities for other customization.

E

MOLEX ACCESSORIES

MOLEX REMOVER TOOL

MOLEX-PULLER

An easy way to disconnect a molex cable! Slide it either above or below the cable end, and pull.

- Aluminum construction
- For both 2 and 3-pin molex
- Includes a lanyard

IMAGES

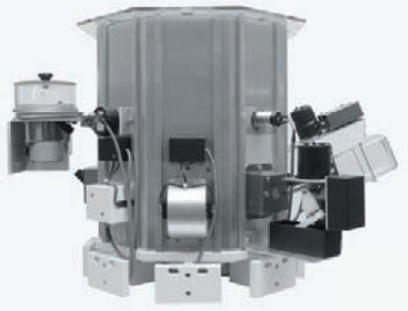
A) Use examples, from below and above.

DON'T SEE WHAT YOU NEED? ASK US ABOUT CUSTOM SOLUTIONS!

A

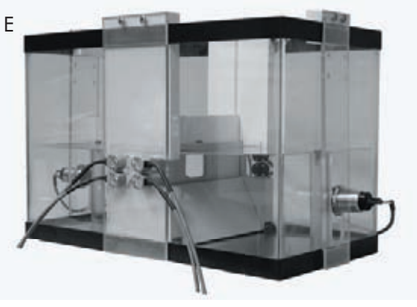
B

C



D

E



F

G

IMAGES: *A) Open Field Activity Arena with grid rod floor and modular components installed on the wall B) Custom 9 stimulus light modules above retractable levers V) Radial Arm Maze Hub used as a modular cage, with modular components installed in the arm channels D) Linear modular maze E) Zebra Fish Shuttle Box F) Modular chamber with nose poke wall and levers with lights mounted on the plexiglass wall G) Five Channel olfactory distributor mounted on the outside of the SAC*

MODULAR CHAMBERS

- Each modular test chamber includes a stainless steel waste pan *(floors sold separately)*
- White polypropylene base, clear polycarbonate door and rear panel
- Sturdy aluminum channels securely hold any modular component
- Designed to reduce distractions to improve shaping and performance

EXTRA TALL CHAMBER *(for mouse + rat)*
ENV-007

Versatile size can accommodate pigeons, rodents, or unrestrained small primates.

- Loading door that swings to the side

STANDARD CHAMBER *(for rat)*
ENV-008

Standard height recommended for most rodent work.

- Fits into less expensive SACs and takes up less shelf space than the Extra Tall Modular Chamber *(ENV-007)*
- Loading door that swings to the side

FOUR CHANNEL CHAMBER *(for mouse + rat)*
ENV-009A

FIVE CHANNEL CHAMBER *(for mouse + rat)*
ENV-009

Ideal for special applications with multiple response levers and/or dispensers, or just additional space for the animal.

- Loading door that swings to the side

CLASSIC MODULAR CHAMBER *(for mouse)*
ENV-307A

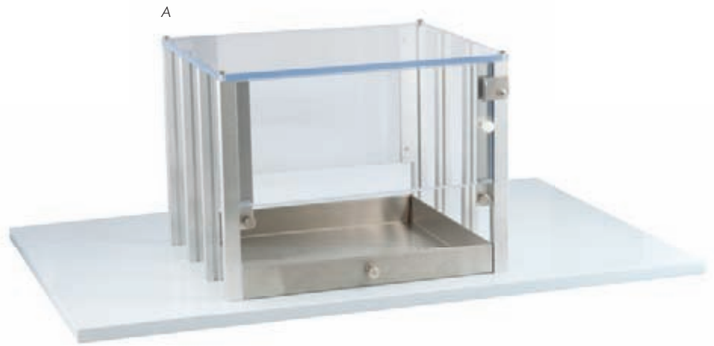
WIDE MODULAR CHAMBER *(for mouse)*
ENV-307W

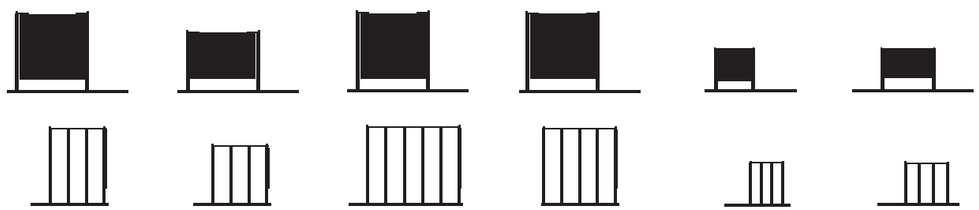
Standard height recommended for most rodent work.

- Front loading door that folds down, leaving an extra high lip to contain the animal until removed

IMAGES

A) Wide Mouse Chamber B) Extra Tall Chamber





ENV-007 *ENV-008* *ENV-009* *ENV-009A* *ENV-307A* *ENV-307W*

	MODULAR CHAMBER SPECS					
	NAME	SPECIES	BASE (L×W×H)	WORKING AREA (L×W×H)	CHANNELS	FITS IN SAC
ENV-007	Extra Tall Modular Chamber	Mouse + Rat	21″ x 13.8″ x 0.5″ *(53.3 x 35.1 x 1.3 cm)*	11.6″ x 9.3″ x 10.8″ *(29.5 x 23.6 x 27.4 cm)*	6 *(3 per wall)*	ENV-018MD / -018V ENV-022MD / -022V
ENV-008	Standard Modular Chamber	Rat	21″ x 13.8″ x 0.5″ *(53.3 x 35.1 x 1.3 cm)*	11.6″ x 9.8″ x 7.4″ *(29.5 x 24.9 x 18.8 cm)*	6 *(3 per wall)*	ENV-018MD / -018V ENV-022MD / -022V
ENV-009A	Four Channel Modular Chamber	Mouse + Rat	21″ x 13.8″ x 0.5″ *(53.3 x 35.1 x 1.3 cm)*	11.6″ x 12.5″ x 10.8″ *(29.5 x 31.8 x 27.4 cm)*	8 *(4 per wall)*	ENV-016MD
ENV-009	Five Channel Modular Chamber	Mouse + Rat	21″ x 20″ x 0.5″ *(53.3 x 50.8 x 1.3 cm)*	11.6″ x 15.7″ x 10.8″ *(29.5 x 39.9 x 27.4 cm)*	10 *(5 per wall)*	ENV-017M
ENV-307A	Classic Modular Chamber	Mouse	16″ x 11.5″ x 0.5″ *(40.6 x 29.21 x 1.3 cm)*	6″ x 5.3″ x 5″ *(15.2 x 13.5 x 12.7 cm)*	6 *(3 per wall)*	ENV-022MD / -022V
ENV-307W	Wide Modular Chamber	Mouse	21″ x 13.8″ x 0.5″ *(53.3 x 35.1 x 1.3 cm)*	8.5″ x 7.1″ x 5″ *(21.6 x 18 x 12.7 cm)*	6 *(3 per wall)*	ENV-022MD / -022V

CHAMBER TOPS

FLAP TOP
ENV-007 | ENV-008

- Standard on modular chambers for rat
- Clear polycarbonate center and two hinged stainless steel flaps secured with thumbscrews makes changing modules quick and easy

VALU-PAK TOP
ENV-007-VP | ENV-008-VP | ENV-009 | ENV-009A | ENV-307A | ENV-307W

- Standard on modular chambers for mouse
- A lower cost alternative that replaces the flap top with a solid clear polycarbonate pane screwed in place
  - To replace modular components, top must be unscrewed and removed
  - Ideal for applications that do not require frequent changing of accessories
  - Perfect for recording video from above

MODIFIED TOP/TETHER HOLE
ENV-007CT | ENV-008CT | ENV-009A-CT | ENV-009CT | ENV-307A-CT | ENV-307W-CT

- Has a slot for optometric or drug delivery tethers
- When not in use, a cover can be inserted *(included)*
- Stainless steel insert is available to prevent chewing *(ENV-008CT, sold separatelyl)*

WALL EXTENSION
ENV-008-EXT | ENV-307W-EXT

- High wall makes a ceiling unnecessary
- An alternative to the modified top/tether hole

IMAGES
A) Wall extension shown installed on classic mouse chamber B) Wide mouse chamber C) Modified top on a wide mouse modular chamber, shown with equipment in a typical self-admin setup D) Flap top

CHAMBER WALLS

REGULAR
ENV-007 | ENV-008 | ENV-009 | ENV-009A | ENV-307A | ENV-307W

Two walls of modular channels, one wall of clear plexiglass, and one clear plexiglass door are standard.

WHITE WALL
FAB-ENV-007-04K | FAB-ENV-008-04K

Swaps out the clear plexiglass wall on the rear of the chamber (opposite the door) with a piece of opaque white plastic for video capture applications such as video freeze fear conditioning.

TOUCH SCREEN
ENV-150R-007-UPG | ENV-150R-008-UPG | ENV-150M-307W-UPG

Convert a standard chamber's modular channel wall to accommodate a MedTouch touch screen unit by removing the center modular channel supports. *(see page 104 for more info)*

NOSE POKE WALL
ENV-115A-07 | ENV-115A-08 | ENV-115C | ENV-115C-A | ENV-1159NP | ENV-115C-9

A curved wall with either five or nine nose pokes on a modular channel wall. *(see page 64 for more info)*

INFRARED DETECTOR WALLS
ENV-007CT-PHA | ENV-008CT-PHA | ENV-307A-CT-PHA | ENV-307W-CT-PHA

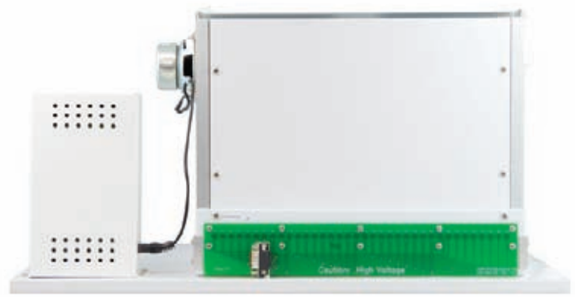
Convert a standard modular chamber to host infrared detectors mounted on the clear plexiglass walls.

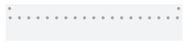
IMAGES
A) White wall shown installed on a standard chamber with a quick change floor B) Infrared detector walls shown installed on a wide mouse chamber with grid floor and connection panel. C) MedTouch screen for mouse shown installed in a chamber setup D) Five Hole Nose Poke for mouse shown installed in a chamber setup

C

B

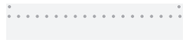
A



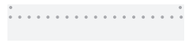


ENV-005

ENV-005A



ENV-009-GF



ENV-009A-GF

ENV-307A-GFW

ENV-307W-GFW

ENV-005FPU-M

ENV-005FPU-R

CHAMBER FLOORS

GRID FLOOR

ENV-005 | ENV-005A | ENV-009-GF | ENV-009A-GF | ENV-307A-GFW | ENV-307W-GFW

Stainless steel grid rods mounted in white polypropylene supports.

- Floor is easily removed via two thumbscrews for cleaning
  - Stainless steel waste pan is autoclavable
- Add the quick disconnect harness for aversive stimulation and/or contact lickometer applications

QUICK DISCONNECT GRID FLOOR HARNESS

ENV-005-QD | ENV-005A-QD | ENV-307A-QD | ENV-307W-QD

- Floor can be changed easily between subjects for improved throughput
- Spring-loaded contacts mounted in a polypropylene strip and wired in sequence to a DB9 connector
- When installed, each rod presses firmly against a contact for reliable shock delivery
- Attaches to the rear of the chamber and remains in place when the floor is removed for easy cleaning without wires
- Use the:
  - SG-219G-10 | M/F DB9 Shock Output Cable to connect with an aversive stimulator
  - SG-219G2M | Lickometer Controller Cable to connect with standard contact lickometers
  - SG-219G | M/F DB9 Shock Output Cable to connect with switching lickometers

NOTE: Incompatible with older floors that have been drilled and tapped

QUICK CHANGE FLOOR

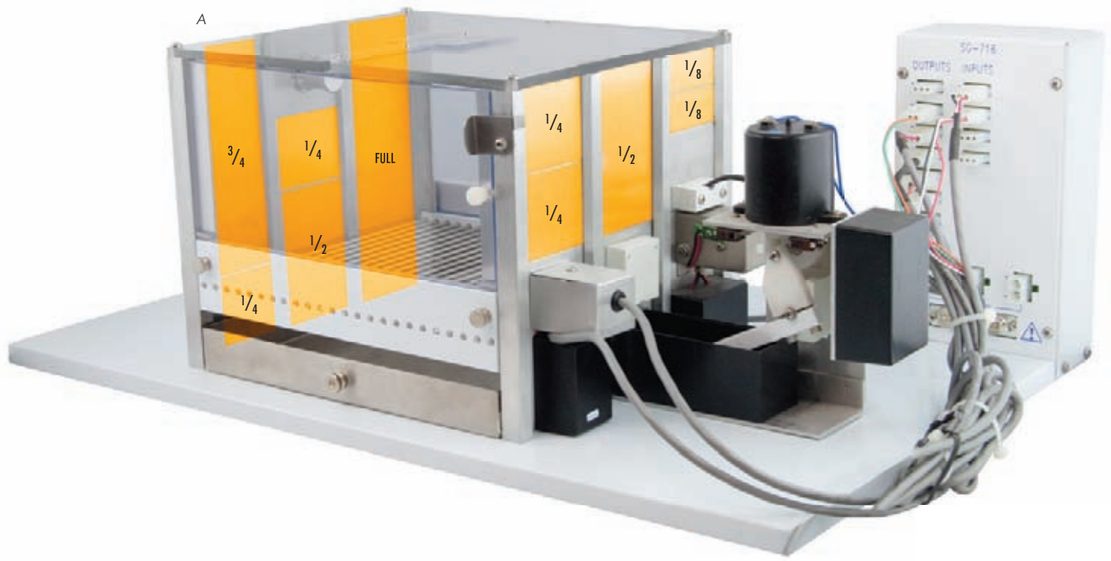
ENV-005FPU-M | ENV-005FPU-R

Combines a removable stainless steel waste pan and floor into one unit for an even easier swap out between subjects for improved throughput.

IMAGES

A) Quick Disconnect Harness shown installed B) Quick Change Floor C) Grid Floor shown installed

	CHAMBER FLOOR SPECS							
	RODS	ROD SIZE (OD)	ROD SPACING	SPECIES	FITS CHAMBER	CHAMBER TYPE	QUICK DISCONNECT HARNESS	WASTE PAN
ENV-005	19	0.2″ *(0.5 cm)*	0.6″ *(1.5 cm)*	Rat	ENV-007/-008	Standard	ENV-005-QD	ENV-007A3
ENV-005A	36	0.1″ *(0.3 cm)*	0.3″ *(0.8 cm)*	Mouse	ENV-007/-008	Standard	ENV-005A-QD	ENV-007A3
ENV-005FPU-M	36	0.1″ *(0.32 cm)*	0.3″ *(0.8 cm)*	Mouse	ENV-007/-008	Standard	N/A	N/A
ENV-005FPU-R	19	0.2″ *(0.5 cm)*	0.6″ *(1.5 cm)*	Rat	ENV-007/-008	Standard	N/A	N/A
ENV-009-GF	19	0.2″ *(0.5 cm)*	0.6″ *(1.5 cm)*	Rat	ENV-009	Standard	N/A	FAB-ENV-009-04
ENV-009A-GF	19	0.2″ *(0.5 cm)*	0.6″ *(1.5 cm)*	Mouse + Rat	ENV-009A	Standard	N/A	FAB-ENV-009-04C
ENV-307A-GFW	19	0.1″ *(0.3 cm)*	0.3″ *(0.8 cm)*	Mouse	ENV-307A	Classic	ENV-307A-QD	ENV-307-07
ENV-307W-GFW	24	0.1″ *(0.3 cm)*	0.4″ *(1 cm)*	Mouse	ENV-307W	Wide	ENV-307W-QD	ENV-307W-05



FILLER PANELS

FILLER PANEL PACKAGES

ENV-FP

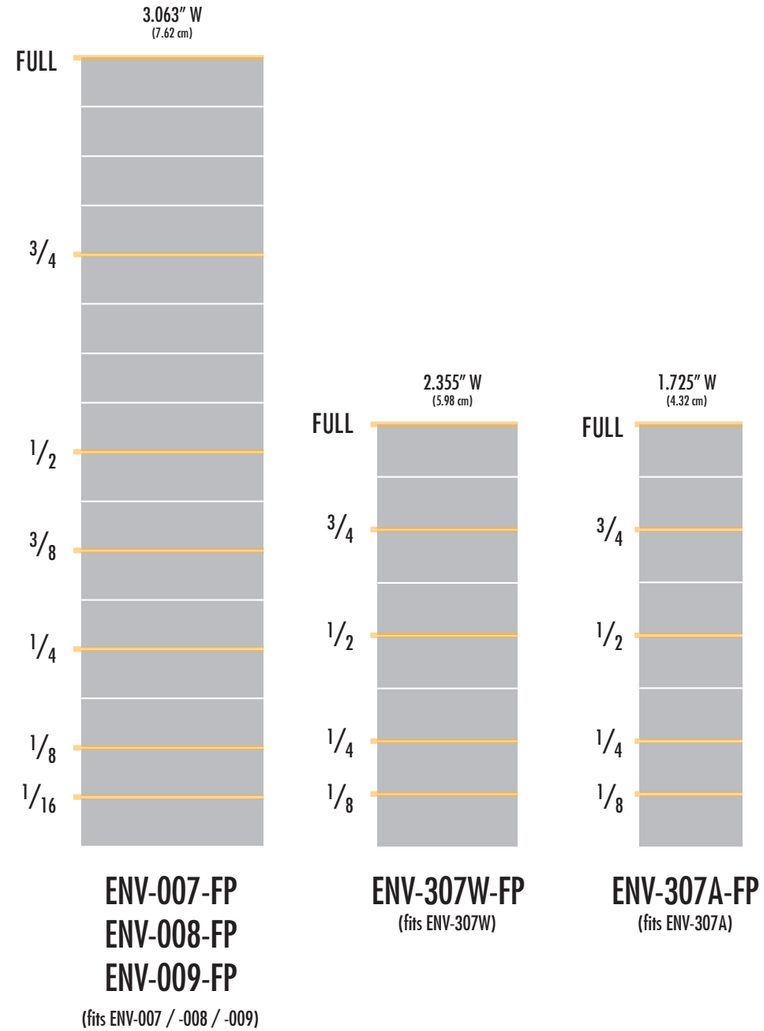
Assorted aluminum panels in various sizes to fill modular channels where components are either not used, or to adjust their vertical position.

- Mouse walls are split up into 8 units, and 16 for rat
  (see chart for visual breakdown)

NOTE: With the purchase of chamber and accessories, appropriate size filler panels are supplied at no cost.

IMAGES

A) Example Wide Mouse Chamber setup with filler panels highlighted



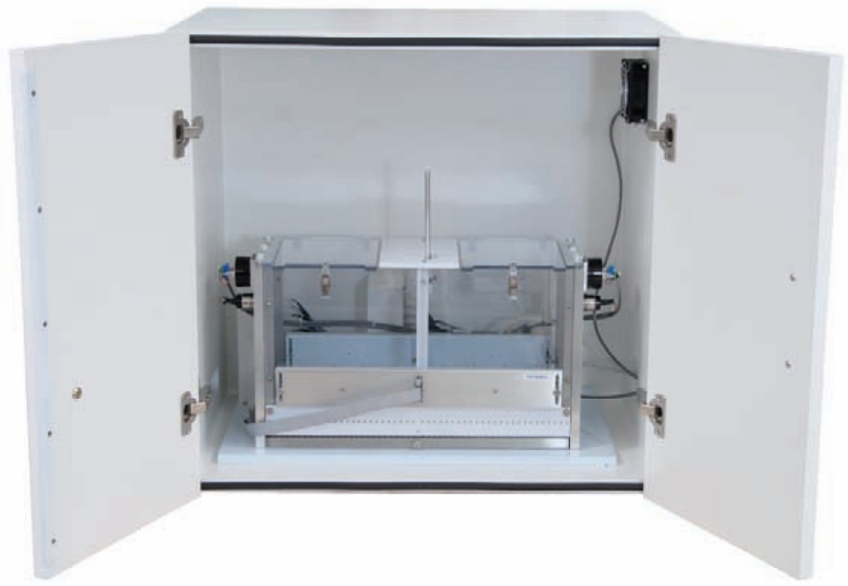
ENV-007-FP
ENV-008-FP
ENV-009-FP
(fits ENV-007 / -008 / -009)

ENV-307W-FP
(fits ENV-307W)

ENV-307A-FP
(fits ENV-307A)

	FILLER PANEL SPECS			
	NAME	SPECIES	FITS CHAMBER	PANEL TYPE
ENV-007-FP	Filler Panels	Mouse + Rat	ENV-007	Standard
ENV-008-FP	Filler Panels	Mouse + Rat	ENV-008	Standard
ENV-009-FP	Filler Panels	Mouse + Rat	ENV-009	Standard
ENV-307A-FP	Filler Panels	Mouse	ENV-307A	Classic
ENV-307W-FP	Filler Panels	Mouse	ENV-307W	Wide

A



SHUTTLE BOX CHAMBERS

SHUTTLE BOX PACKAGES

MED-APA

Packages Include: MDF SAC, Shuttle Box w/IR strips + controller, Grid Floor w/Quick Disconnect, LED Stimulus Light, Auto or Manual Door, Opaque Fabric Cover, Sonalert, Aversive Stimulator, Interface Cabinet, Interface Card, and cables.

SHUTTLE BOX

ENV-010MC | ENV-010MD | ENV-010MXL

- Shuttle box chamber is the same for both rats and mice
  - Convert by simply changing out the grid floor and adjusting the height of photobeam sensors
- Four independent infrared photobeams on each side of the chamber for accurate measurement of activity
  - More reliable and higher resolution than a tilting floor, pressure plate, or single photobeam solution
- Up to sixteen (16) chambers can be controlled with one computer, either a desktop or laptop*

  NOTE: Computer, power + control interface, and software are not included. See the Power + Control Interface section on page 138.
- White polyproplyne base, clear polycarbonate door and rear panel
- Sturdy aluminum channels for modular components
  - Variety of modular channel counts available
- Includes a stainless steel waste pan
- XL model includes quick disconnect harness

IMAGES

A) Shuttle Box Chamber setup for mouse B) Interface Cabinet with all necessary cards C) Shuttle Box - 1 channel D) Shuttle Box - 2 channel

B

	SHUTTLE BOX CHAMBER SPECS					
	NAME	SPECIES	SIZE	CHANNELS	BASE (W×H×D)	WORKING AREA (W×H×D)
ENV-010MC	Shuttle Box	Mouse + Rat	Standard	1	21″ x 0.5″ x 13.5″ *(53.3 x 1.3 x 34.3 cm)*	8″ x 8″ x 6.3″ *(20.3 x 20.3 x 16 cm)*
ENV-010MD	Shuttle Box	Mouse + Rat	Standard	2	21″ x 0.5″ x 13.5″ *(53.3 x 1.3 x 34.3 cm)*	8″ x 8″ x 6.3″ *(20.3 x 20.3 x 16 cm)*
ENV-010MXL	Shuttle Box	Rat	X-Large	3	34.5″ x 0.5″ x 14″ *(87.6 x 1.3 x 35.6 cm)*	11.3″ x 11.3″ x 9.5″ *(28.7 x 28.7 x 24.1 cm)*

ENV-010MC *ENV-010MD* *ENV-010MXL*

C

D

	SHUTTLE BOX FLOOR COMPATIBILITY			
	NAME	**SPECIES**	**FITS**	**FITS CHAMBER(S)**
ENV-005FPU-R	Quick Change Floor	Rat	X-Large	ENV-010MXL
ENV-010MA-GF	Stainless Steel Grid Floor	Mouse	Standard	ENV-010MC / -010MD
ENV-010MB-GF	Stainless Steel Grid Floor	Rat	Standard	ENV-010MC / -010MD
ENV-010MA-QD	Quick Disconnect Grid Floor Harness	Mouse	Standard	ENV-010MC / -010MD
ENV-010MB-QD	Quick Disconnect Grid Floor Harness	Rat	Standard	ENV-010MC / -010MD
ENV-010MXL-QD	Quick Disconnect Grid Floor Harness	Rat	X-Large	ENV-010MXL
ENV-013IR-2	Photobeam Sensors	Rat	X-Large	ENV-010MXL
ENV-256-8S	Photobeam Sensors	Mouse + Rat	Standard	ENV-010MC / -010MD

SHUTTLE BOX FLOORS

GRID FLOOR
ENV-010A | ENV-010AXL

- Stainless steel rods mounted in white polypropylene supports
- Have extra floors on hand to eliminate cleaning time between animals
- Floor is easily removed via two thumbscrews for cleaning
- Add the quick disconnect harness for aversive stimulation and/or contact lickometer applications

QUICK DISCONNECT GRID FLOOR HARNESS
ENV-010MA-QD | ENV-010MB-QD | ENV-010MXL-QD

- Patented design enables the floor to be changed easily between subjects for improved throughput
- Spring-loaded contacts mounted in a polypropylene strip and wired in sequence to a DB9 connector
  - When installed, each rod presses firmly against a contact for reliable shock delivery
  - Attaches to the rear of the chamber, and remains in place when the floor is removed for easy cleaning without wires, circuit boards, or other connections
  - Use the SG-219G-10 $^{M}/_{F}$ DB9 Shock Output Cable to connect to an aversive stimulator

NOTE: Incompatible with older floors that have been drilled and tapped

QUICK CHANGE FLOOR
ENV-005FPU-R

- Combines a removable stainless steel waste pan and floor into one unit for an even easier swap out between subjects for improved throughput

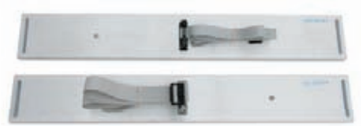
PHOTOBEAM SENSORS
ENV-013IR-2 | ENV-256-8S

- Pair of infrared (IR) array strips with individual IR photo-beam sources and detectors
- Easy to install and to adjust height for accommodating both rats and mice

IMAGES

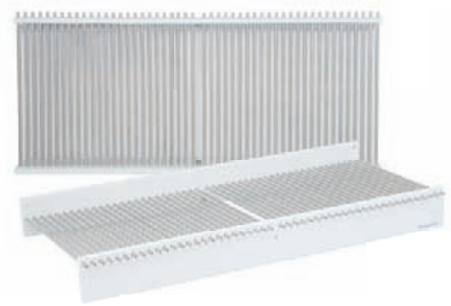
A) Infrared Strips B) Quick Disconnect Harness C) Grid Floor D) Quick Change Floor

A



B

C



D

	SHUTTLE BOX FLOOR SPECS						
	NAME	**SPECIES**	**ROD DIAMETER**	**ROD LENGTH**	**ROD SPACING***	**ROD TOTAL**	**QTY PER CHAMBER**
ENV-010MA-GF	Grid Floor	Mouse	0.1″ *(0.3 cm)*	6.3″ *(16 cm)*	0.3″ *(0.76 cm)*	50	1
ENV-010MB-GF	Grid Floor	Rat	0.2″ *(0.5 cm)*	6.3″ *(16 cm)*	0.6″ *(1.5 cm)*	26	1
ENV-005FPU-R	Quick Change Floor	Rat	0.2″ *(0.5 cm)*	9.5″ *(24.1 cm)*	0.6″ *(1.5 cm)*	19	2

**center to center*

	SHUTTLE BOX COMPONENT SPECS			
	NAME	SPECIES	FITS	FITS CHAMBER(S)
ENV-010A	Manual Door	Mouse + Rat	Standard	ENV-010MC / -010MD
ENV-010AXL	Manual Door	Rat	X-Large	ENV-010MXL
ENV-010B2	Auto Door	Rat	Standard	ENV-010MC / -010MD
ENV-010BXL2	Auto Door	Rat	X-Large	ENV-010MXL
ENV-010M-17	Hurdle	Mouse + Rat	Standard	ENV-010MC / -010MD
ENV-010MSD	Step Down Insert	Mouse + Rat	Standard	ENV-010MC / -010MD
ENV-010MSD-XL	Step Down Insert	Rat	X-Large	ENV-010MXL
ENV-010C	Opaque Cover	Mouse + Rat	Standard	ENV-010MC / -010MD

SHUTTLE BOX COMPONENTS

MANUAL DOOR
ENV-010A | ENV-010AXL

- Our most cost-effective door
- Easily removed for cleaning
- A small arm extends from the top that allows the door to be lifted and locked in the open position

AUTO DOOR
ENV-010B2 | ENV-010BXL2

- Turn the door control line ON (ground) to open the door, turn the control line OFF to allow the door to free fall to the "closed" position
- Smooth, quiet motor raises and lowers door
- Easily removed for cleaning
- I/Os required: 1 OUT

HURDLE
ENV-010M-17

Polycarbonate obstacle used to divide the two sides of the grid floor when doors are not being used.

STEP DOWN INSERT
ENV-010MSD | ENV-010MSD-XL

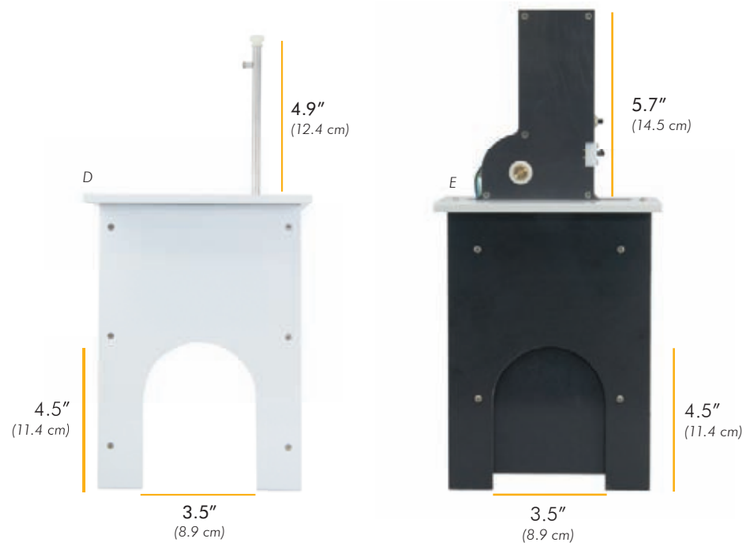
- Used for passive avoidance studies
- Easily inserted and removed from the chamber
- Cut-out area for unimpeded photobeam transmission

OPAQUE COVER
ENV-010C

- Covers half of the shuttle box for passive avoidance
- Machine washable cotton "duck" fabric
- Velcro straps secure cover in place
- Does not interfere with IR photobeams

IMAGES

A) Step Down Insert shown installed, highlighted in orange B) Hurdle
C) Opaque Cover shown installed D) Manual Door E) Auto Door



SHUTTLE BOX SOFTWARE

ACTIVE AVOIDANCE FR-2 PROTOCOL

SOF-700RA-23

- Animal has to cross from one side, to the other, then back again
  - After activating the conditioned stimulus, aversive stimulation is activated on both sides of chamber
  - Animal has to cross two times to deactivate it
- Each session is automatically divided into five blocks:
  - Acclimation period, FR-1 trials, observation period, FR-1 trials, FR-2 trials

NOTE: Durations are user defined and can be eliminated as needed

- Stimuli presentation (5 sec) followed by an aversive stimulus escape interval (25 sec max)
- Mean Inter-Trial Interval (ITI): 15 sec
- Maximum session time: 60 minutes
- User defined parameters include:
  - Stimuli, avoid times, escape times, CS/UCS overlap, session time, ITI crossings punishment
- Data Collected:
  - Trial count, FR value, avoid counts & latency, escape counts & latency, left & right movements, crossings, ITI aversive stimulations

ACTIVE/PASSIVE AVOIDANCE PROTOCOL

SOF-700RA-7 | SOF-700RA-30

The shuttle box task has been used to study conditioning in non-human animals for over seventy years. Shuttle box tests of avoidance and escape from aversive stimulus are used in contemporary research because these behavioral assays are efficient and standardized methods for testing learning and memory processes. Two types of procedures are generally used:

Active Avoidance

A stimulus signals that an aversive stimulus is imminent, and the subject learns to avoid the aversive stimulus by moving to the other side of the two-compartment chamber after the presentation of the stimulus.

The primary dependent measures include whether the subject escapes the aversive stimulus or avoids the presentation of the aversive stimulus entirely by using the stimulus to predict its occurrence.

- User defined parameters include:
  - Number of trials to run, available stimuli, avoid/escape intervals, CS/UCS overlap to punish ITI crossings flags, maximum session time
- Data are created with variables including:
  - Trial number, avoids/escapes, avoid/escape latency, left/right chamber activity, crossings and/or punished crossings, total inter-trial interval shocks

Passive Avoidance

The subject is motivated (trained) to move to the preferred side of the two-compartment chamber. The subject is then confined to the dark portion of the chamber, and experiences inescapable aversive stimulus. The subject is removed, and placed back into the light portion of the chamber for testing.

Then, the subject is allowed free access to the dark side of the chamber. If the inescapable aversive stimulus during the training phase was sufficient to produce conditioning, then this should be evidenced by increased latencies to enter the dark side of the chamber.

Notes

- To run these protocols in our extra-large shuttle box *(ENV-010MXL)*, a modified version is available *(SOF-700RA-30)*.

SHUTTLE BOX SOFTWARE CONTINUED

SHUTTLE BOX LEARNED HELPLESSNESS PROTOCOL

SOF-700RA-28

- Training delivers many trials of aversive stimulation using one compartment of the shuttle box
- Testing determines if repetitive aversive stimulation is associated with deficits in escape responding
- User defined independent variables include: *(default values)*
  - Tone duration, CS/UCS Overlap, escape Interval, aversive stimulus duration, ITI period, total training trials run, total testing trials run, acclimation period, avoid interval
- Data Collected:
  - Avoids, escapes, crossings

Training Phase

- Subject is loaded into either side of the chamber.
- On START command, the program detects if the subject has been loaded into the chamber.
- If so, the experiment begins with both lights turning on, and the door opens.
- The ITI period begins, then a tone signals the end of ITI as an aversive stimulus is delivered. The program alternates between these two phases until the specified number of trials to run has completed.

Testing Phase

- Subject is loaded into either side of the chamber.
- On START command, program detects if the subject has been loaded into the chamber.
- If so, the experiment begins. Both lights turn on, the door opens, and the acclimation period begins.
- After acclimation, the door closes for an ITI period. Once that ends, the door opens, a tone is presented in the same side as the subject, and the trial begins.
- Trial begins with the avoid interval. If the subject crosses over to the other side of the chamber during this time, an avoid is recorded and the trial ends.
- If the subject does not cross over to the other side of the chamber before the end of the avoid interval, the escape interval begins, the aversive stimulus turns on.
- If the CS/UCS overlap, the tone will stay on until the aversive stimulus turns off.
- If the subject crosses over to the other side of the chamber during the escape interval, an escape is recorded, the aversive stimulus turns off, and the trial ends.
- At the end of the escape interval, if the subject has not crossed over to the other side of the chamber, the aversive stimulus is turned off, a failure to escape is recorded, and the trial ends.
- At end of each trial, the door closes and the tone turns off.
- Then, another ITI period, followed by another trial until the number of trials to run has been reached.
- At the end of experiment, the lights turn off and the door closes.

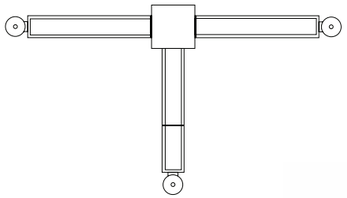
STEP DOWN PROTOCOL

SOF-700RA-11

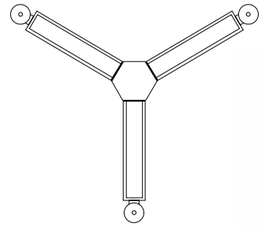
The platform should be placed so the subject steps down into the right side of the chamber.

Training and testing phases can both be done in either level or toggle mode.

- User defined parameters include:
  - Delay to aversive stimulation onset, aversive stimulation duration, no-response time, inter-trial interval
- Data Collected:
  - Trial numbers, response latencies




A




B

MODULAR MAZES

MODULAR MAZE PACKAGES

MED-TM | MED-YM | MED-RAM

Packages Include: Maze Hub, Runways, Auto or Manual Doors, Pellet Receptacle Troughs w/Head Entry Detectors, Pellet Dispensers w/maze mounts, IR detectors w/ Controller, Superport cards, SmartCtrl Package 4in/8out, and cables

Our modular mazes make it easier than ever to have the type of maze you need when you need it. With four runway length options for rat and two for mouse, you can create the desired configuration easily and economically without the need to purchase additional maze systems.

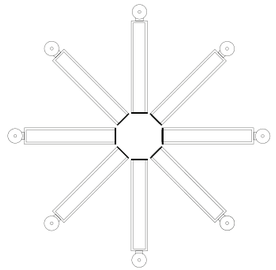
By adding the IR Beam detection components, the software can differentiate between runway exploration and entrance by using dual sensors at the entrance to each runway and one sensor in the center. This results in more accurate position detection and reliable results. A pellet receptacle and head entry detector at the end of each goal runway with pellet dispensers allow for automated reinforcement.

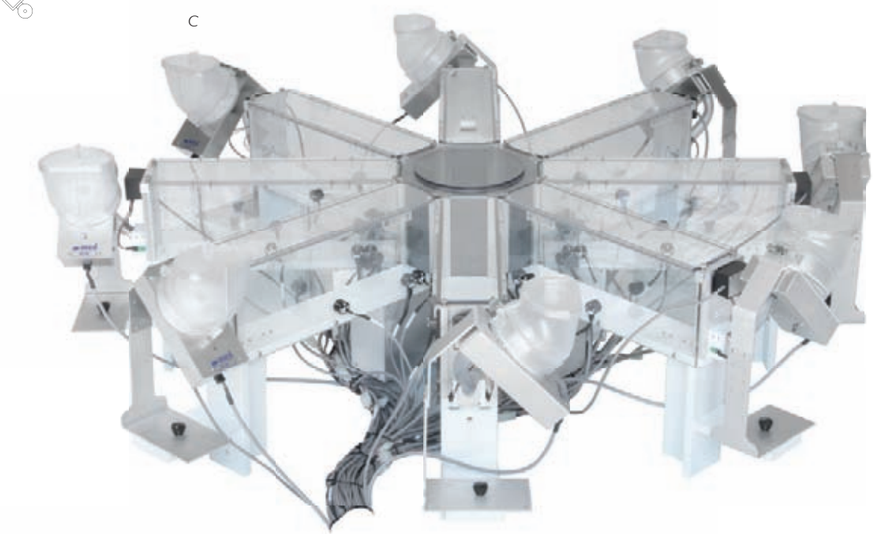
Our Near-Infrared (NIR) Backlit Mazes make identifying and tracking test animals easy regardless of coat or maze color, and without worrying about ambient light sources. NIR light is invisible to the animal, eliminating distractions caused by bright visible lighting. Backlighting the maze eliminates variables such as shadows, glare, and reflections common when using overhead lighting systems. The animal's movement can then be captured by a monochrome camera with a NIR filter mounted above the maze to capture an evenly illuminated maze floor silhouetting the animal, and producing a high contrast video image *(camera and filter sold separately)*.

- Quiet automatic doors mounted underneath the maze floor which eliminate blind spots found in other mazes.
- No special equipment is needed, as the runway ends and hubs are compatible with our full line of current generation pellet feeders, receptacles, and guillotine doors for added versatility
- Our standard packages can be easily converted to IR beam detection systems, making the standard package a versatile option for any lab
- Modular design allows swapping out of runways and hubs as needed, and can be used with Y-Maze (triangular), T-Maze (square), and Radial (octagonal) hubs
- Available in standard, IR beam detection, or NIR backlit configurations
- Optional blue runway inserts for improved contrast in video applications

IMAGES

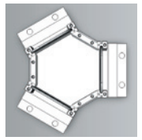
A) T-Maze setup B) Y-Maze setup C) Radial Maze setup w/IR + feeders



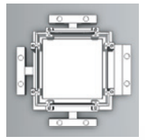

C

	MAZE HUB SPECS					
	NAME	SPECIES	SIDES	ARM OFFSET	OVERALL (LxWxH)	WORKING AREA (LxWxH)
ENV-333U	Triangle Maze Hub	Mouse	3	120°	6.8" x 6.8" x 12.7" *(17.3 x 17.3 x 32.21 cm)*	3.3" x 3.3" x 5" *(8.4 x 8.4 x 12.7 cm)*
ENV-533U	Triangle Maze Hub	Rat	3	120°	7.9" x 7.9" x 15.9" *(20.1 x 20.1 x 40.3 cm)*	4.6" x 4.6" x 6.6" *(11.7 x 11.7 x 16.8 cm)*
ENV-334U	Square Maze Hub	Mouse	4	90°	6.7" x 6.7" x 12.9" *(17 x 17 x 32.8 cm)*	3.8" x 3.8" x 6.2" *(9.7 x 9.7 x 15.7 cm)*
ENV-534U	Square Maze Hub	Rat	4	90°	7.4" x 7.4" x 16" *(18.8 x 18.8 x 40.6 cm)*	4.5" x 4.5" x 6.5" *(11.4 x 11.4 x 16.5 cm)*
ENV-338U	Octagonal Maze Hub	Mouse	8	45°	11" x 11" x 12.8" *(27.9 x 27.9 x 32.5 cm)*	8.1" x 8.1" x 5" *(20.6 x 20.6 x 12.7 cm)*
ENV-538U	Octagonal Maze Hub	Rat	8	45°	14" x 14" x 16" *(35.6 x 35.6 x 40.6 cm)*	11.1" x 11.1" x 6.6" *(28.2 x 28.2 x 16.8 cm)*

A



B



C

MODULAR MAZE HUBS

MODULAR MAZE HUBS

ENV-33U | ENV-533U | ENV-334U | ENV-534U | ENV-338U | ENV-538U

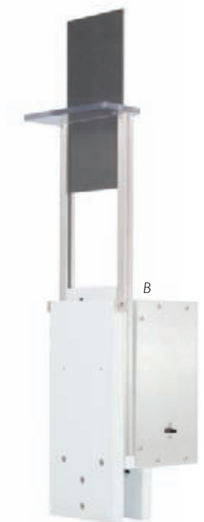
- Durable, easily cleaned white polypropylene base
- Sets of modular channels that accommodate modules such as pellet feeders, levers, nose pokes, and more
- Compatible with all standard runways and doors
- Video friendly design accommodates optional under-mounted auto doors for obstruction-free video tracking
- Removable polycarbonate lid
- Use the triangle for Y mazes, square for T or Plus mazes, and the radial for any maze type

IMAGES

A) Triangle Hub B) Square Hub C) Octagonal Hub

	MAZE DOOR SPECS			
	NAME	FITS	SPECIES	OPENING (WxH)
ENV-339U	Manual Door	Runway	Mouse	2" x 2" *(5.1 x 5.1 cm)*
ENV-340U	Auto Door	Runway	Mouse	2" x 2" *(5.1 x 5.1 cm)*
ENV-340U-GB	Auto Door	Goal Box	Mouse	2" x 2" *(5.1 x 5.1 cm)*
ENV-539U	Manual Door	Runway	Rat	2.7" x 4" *(6.8 x 10.2 cm)*
ENV-540U	Auto Door	Runway	Rat	2.7" x 4" *(6.8 x 10.2 cm)*
ENV-540U-GB	Auto Door	Goal Box	Rat	2.7" x 4" *(6.8 x 10.2 cm)*

A



B

MODULAR MAZE DOORS

AUTOMATIC / AUTO DOORS

ENV-340U | ENV-340U-GB | ENV-540U | ENV-540U-GB

Apply a standard ground signal on the single control line to raise the door and remove the signal to release it, allowing it to fall back to the floor.

I/Os Required: 1 OUT

MANUAL DOORS

ENV-339U | ENV-539U

- Ideal for situations where it is unnecessary to have the process automated
- Defaults to a "normally down" position, must be held in the "up" position manually

IMAGES

A) Manual door shown on octagonal hub B) Auto door

	BLUE MAZE INSERT SPECS		
	NAME	SPECIES	USE WITH
MED-TMAZM-BI	Blue Floor Insert	Mouse	T-Maze
MED-TMAZR-BI	Blue Floor Insert	Rat	T-maze
MED-YMAZM-BI	Blue Floor Insert	Mouse	Y-maze
MED-YMAZR-BI	Blue Floor Insert	Rat	Y-maze
MED-RAMM-BI	Blue Floor Insert	Mouse	Radial Maze
MED-RAMR-BI	Blue Floor Insert	Rat	Radial Maze

D

E

MODULAR MAZE ARMS

RUNWAYS

ENV-341U | ENV-343U | ENV-541U | ENV-542U | ENV-543U | ENV-544U

- Durable and easy to clean design, constructed with white polypropylene and clear polycarbonate
- Modular end walls to accommodate our modular components such as pellet/liquid receptacles and stimulus lights
- Runway side walls are pre-drilled for the addition of IR photobeam sensors
- Easily detachable pedestal for easy storage
- Includes removable ventilated lid
- Walls are pre-drilled for easy installation of optional IR photobeam sensors

START/GOAL BOXES

ENV-346U | ENV-546U

- Attach directly to the hub for use as a start box or as a goal box at the end of a runway
- Durable and easy to clean design, constructed with white polypropylene and clear polycarbonate
- Hinged ventilated lid
- Modular end walls to accommodate our modular components such as pellet/liquid receptacles and stimulus lights
- Walls are pre-drilled for easy installation of optional IR photobeam sensors

BLUE FLOOR INSERTS

MED-TMAZM-BI | MED-TMAZR-BI | MED-YMAZM-BI | MED-YMAZR-BI | MED-RAMM-BI | MED-RAMR-BI

Our low profile (0.1" / 3 mm) blue PVC blue floor inserts provide a contrasting floor color for even better video tracking performance when using lightly colored animals.

- Will not interfere with IR beams or doors
- Easily installed or removed

IMAGES

A) Cropped image of Y maze to highlight the runway leg B) Goal Box C) Runway D) Blue Floor Insert show installed E) Blue Insert for Radial Maze Hub

A

12"

14.5"

18"

24"

30"

B

C

	MODULAR MAZE ARM SPECS				
	NAME	SPECIES	LENGTH	LEG (H)	WORKING AREA (L×W×H)
ENV-341U	Runway	Mouse	12" *(30.5 cm)*	6.9" *(17.5 cm)*	11.6" x 2.9" x 5" *(29.5 x 7.4 x 12.7 cm)*
ENV-343U	Runway	Mouse	14.5" *(36.8 cm)*	6.9" *(17.5 cm)*	14.2" x 2.9" x 5" *(36.1 x 7.4 x 12.7 cm)*
ENV-541U	Runway	Rat	12" *(30.5 cm)*	8.5" *(21.6 cm)*	11.8" x 3.6" x 6.6" *(30 x 9.1 x 16.8 cm)*
ENV-542U	Runway	Rat	18" *(45.7 cm)*	8.5" *(21.6 cm)*	17.8" x 3.6" x 6.6" *(45.2 x 9.1 x 16.8 cm)*
ENV-543U	Runway	Rat	24" *(61 cm)*	8.5" *(21.6 cm)*	23.8" x 3.6" x 6.6" *(60.5 x 9.1 x 16.8 cm)*
ENV-544U	Runway	Rat	30" *(76.2 cm)*	8.5" *(21.6 cm)*	30" x 3.6" x 6.6" *(76.2 x 9.1 x 16.8 cm)*
ENV-346U	Start/Goal	Mouse	7.25" *(18.4 cm)*	6.9" *(17.5 cm)*	7.1" x 2.9" x 4.9" *(18 x 7.4 x 12.37 cm)*
ENV-546U	Start/Goal	Rat	10" *(25.4 cm)*	8.5" *(21.6 cm)*	9.8" x 3.6" x 6.6" *(24.9 x 9.1 x 16.8 cm)*

MODULAR MAZE SOFTWARE

These MedState Notation Utilities add maze data collection functionality to our flagship Med-PC software. Developed for use with our IR beam modular maze systems, data is collected each time a pair of beams is broken by the test animal.

Data can also be exported using our MPC2XL Data Transfer Utility for further analysis. *(sold separately)*

These MedState Notation™ procedures may be edited by the user or used as a model to create unique applications. Custom coding services are available *(sold separately, contact Sales for more info).*

Y-MAZE TRAINING & ALTERNATION PROTOCOL

SOF-700RA-32

Designed for testing Delayed Alternation using our photobeam modular maze systems.

The procedure consists of an initial trial in which the animal has to obtain a reinforcer within a specified period of time from either the right or left arm (specified or randomly selected). If the animal successfully completes the first trial, a second trial is conducted in which the animal must now obtain a reinforcer from the opposite arm that was used during the first trial.

Training procedure can be used to train animals with:

- Only right arm open
- Only left arm open
- Both arms open
- Random selection of right or left arm open

Trial ends if the animal:

(a) Successfully retrieves a reinforcer
(detected by head entry into pellet receptacle)

(b) Fails to move within a specified period of time

(c) Reaches the maximum trial time without making a head entry into a pellet receptacle

T-MAZE TRAINING & TESTING PROTOCOL

SOF-700RA-9

- Run left or right goal arm training as well as force run with random left/right selections.
- System is designed to end a trial (all doors closed) if:

  (a) The animal does not complete the start runway within the user defined move time

  (b) Following head detection

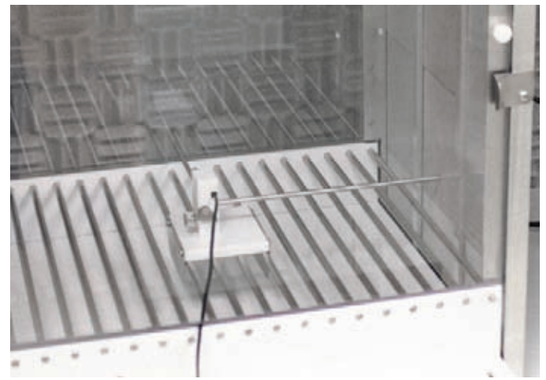
  (c) The total trial time has elapsed
- User defined parameters:
  - Number of trials to run, selecting training side or test, set minimum times of move, total trial, and ITI
- Data Collected:
  - Total trials completed, total move errors, total trials incomplete, side code, movement time, arm time, latency to goal

RADIAL MAZE DATA COLLECTION PROTOCOL

SOF-700RA-6

- Define adaptation and session test times
- The procedure will end a test session in the event that the animal has fully explored all eight runways
- Data Collected:
  - Number of entries and time in zone for the hub and all eight runways, end counts in each runway, total runways correct, total runway errors, sequence of runways entered, elapsed time to runway completion (in seconds)

B



A

SOUND MEASUREMENT

SOUND PRESSURE LEVEL MEASUREMENT PKG

ANL-930

Provides detailed measurements of either noise or pure tone signals.

- When measuring pure tone, it shows amplitude and frequency
- When measuring any other sound, it shows noise and sound pressure level of frequency range

- We have made a considerable R&D investment to offer this product at a fraction of the cost of typical sound pressure level measurement equipment
- Use for stimulus verification and calibration
- The unique design of the included microphone holder ensures consistent microphone placement from chamber to chamber and get readings outside of the cubicle for a true measurement
- The sound level meter displays the sound level in dB as well as the frequency in real time
- Rechargeable 18650 3500mAh 3.7V lithium-ion battery with an average life of 8 hours

Dynamic Range: 60 – 120dB

Frequency Range: 100 – 70,000 Hz

IMAGES

A) ANL-930 front and back B) Microphone shown in chamber

AUDIO GENERATORS

OMNICTRL™ CONNECTION PANEL w/SOUND AMP
OSC-112

The same features as the OmniCtrl 12 I/O Connection Panel, with the addition of a built-in programmable audio generator! Capable of producing pure tones, white noise, clicks, and playing WAV files.

Output Offset Range: -20 to +5 dB *(per channel)*

MULTIPLE TONE GENERATOR
ENV-223

Ideal economical choice for experiments that only need a pure tone, and changing frequency during a session is needed.

I/Os Required: 4 OUT

15 pure tone frequencies: 1, 1.5, 2, 2.5, 3, 3.5, 4, 5, 6, 8, 9, 10, 12, 15, 20 kHz

- Fixed rise/fall to eliminate speaker click or pop when turning tones on or off

MULTIPURPOSE SOUND GENERATOR
ENV-230

For producing white noise, clicks, or pure tones, and when changing sound type during a session is not needed.

I/Os Required: 1 OUT

15 pure tone frequencies: 1, 1.5, 2, 2.5, 3, 3.5, 4, 5, 6, 8, 9, 10, 12, 15, 20 kHz

- Both the volume and duration of each sound are adjustable between sessions

PROGRAMMABLE AUDIO GENERATOR
ANL-926

For producing white noise, clicks, or pure tones, and when adjusting or changing just about anything during a session is needed.

- Single-width panel, install in our interface cabinets
- Single microprocessor controller and audio amplifier
- Volume, noise, frequency, and duration of each sound are adjustable mid-session via Med-PC®.

WHITE NOISE AMPLIFIER + CAGE SPEAKER
ENV-225S

I/Os Required: 1 OUT

- Speaker and white noise amplifier sold together
- Available for standard rat, classic mouse, and wide mouse chambers
  - Panel sizes: Rat: 1/4 / Mouse: 1/2
- Flat frequency response from 10 - 25,000 Hz
- Max Amplitude: 90 dB
  - Adjust using a ten-turn potentiometer
  - Volume factory set to 80 dB
- For an auditory stimulus or background masking

IMAGES

A) Programmable Audio Generator B) Multiple Tone Generator C) Multi-purpose Sound Generator D) White Noise Amplifier E) OmniCtrl Connection Panel w/Sound Amp

A

B

D

C

E

	AUDIO GENERATOR SPECS						
	NAME	PURE TONE FREQ RANGE	CLICK FREQ RANGE	WHITE NOISE	RISE/ FALL TIME	DURATION	AMPLITUDE
OSC-112	OmniCtrl Connection Panel w/Sound Amp	0.1 - 70 kHz	1 - 100 Hz	Broadband	0 to 1000 ms	1 - 65,535 ms *(via Med-PC)*	20 - 100 dB**
ANL-926	Programmable Audio Generator	0.01 - 35 kHz *(1 Hz increments)*	1 - 100 Hz	Broadband	1 ms - 1 s *(1 ms increments)*	1 - 65,535 ms *(via Med-PC)*	20 - 100 dB *(Med-PC)*
ENV-223	Multiple Tone Generator	1 - 20 kHz *(15 presets)*	N/A	N/A	Fixed	0.1 ms - infinite, user defined *(via Med-PC)*	0 - 80 dB *(screwdriver)*
ENV-230	Multipurpose Sound Generator	1 - 20 kHz *(15 presets)*	10 Hz	Broadband	4.5 µs	0.5 s, 1 s, user defined *(via Med-PC)*	0 - 100 dB *(screwdriver)*
ENV-225S	White Noise Amplifier	*N/A*	N/A	Broadband	N/A	N/A	*90 dB (ten-turn potentiometer)*

*** In 1 dB increments. SPL obtainable with ENV-228AM or ENV-328BM/BW speakers. Measured at 7.5 cm, 0° axial offset with ANL-930 SPL Meter.*

NOTE: Speaker sold separately, see next page


A


B

SONALERTS + CLICKERS				
	NAME	SPECIES	PANEL	FREQ
ENV-223AM	Sonalert Module w/Volume Control	Rat	1/8 Standard	2,900 Hz
ENV-223HAM	Sonalert Module w/Volume Control	Rat	1/8 Standard	4,500 Hz
ENV-323AM	Sonalert Module w/Volume Control	Mouse	1/4 Classic	2,900 Hz
ENV-323AW	Sonalert Module w/Volume Control	Mouse	1/4 Wide	2,900 Hz
ENV-323HAM	Sonalert Module w/Volume Control	Mouse	1/4 Classic	4,500 Hz
ENV-323HAW	Sonalert Module w/Volume Control	Mouse	1/2 Wide	4,500 Hz
ENV-135M	Response Feedback Clicker	Rat	3/8 Standard	90 Hz
ENV-335M	Response Feedback Clicker	Mouse	1/2 Classic	90 Hz
ENV-335W	Response Feedback Clicker	Mouse	1/2 Wide	90 Hz

SPEAKERS

SPEAKER - MODULAR OR CEILING MOUNT

ENV-224AM-3 | ENV-224BM | ENV-324M | ENV-324W | ENV-224DM | ENV-324DW | ENV-324DM

- Plugs into any of our tone generators
  - Use the chart to pair with a tone generator based on the frequency range you need to present

SPEAKER + LIGHT COMBINED, CEILING MOUNT

ENV-224CM

Mount a speaker and light assembly *(ENV-224CM)* anywhere inside the SAC. Typically positioned directly above the chamber.

I/Os Required: 1-2 OUT

NOTE: Consists of a speaker (ENV-224AM-3) and stimulus light (ENV-221-LED) combined in a single housing

IMAGES

A) Modular Speaker B) Ceiling Mount Speaker shown on a classic mouse chamber

SONALERTS + CLICKERS

SONALERT MODULE w/VOLUME CONTROL

ENV-223AM | ENV-223HAM | ENV-323AM | ENV-323AW | ENV-323HAM | ENV-323HAW

Simple device designed to deliver a single tone frequency.

- Factory set at 65 dB
  - Manually adjustable (using a screwdriver) from approximately 60 – 80 dB

I/Os Required: 1 OUT

RESPONSE FEEDBACK CLICKER

ENV-135 | ENV-335M | ENV-335W

A very simple 28V mechanical relay that reliably produces a “click” sound. Commonly paired with pellet dispenser for a reward cue.

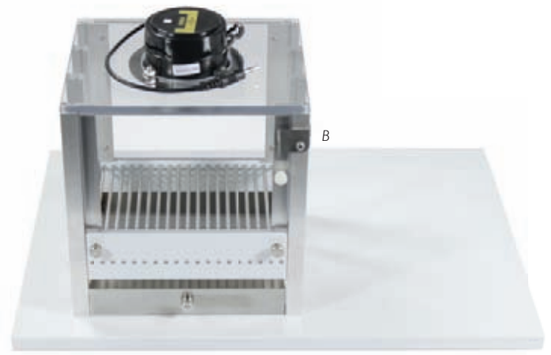
Max Frequency: 90 Hz

I/Os Required: 1 OUT

IMAGES

A) Response Feedback Clicker B) Sonalert Module


A


B

AUDIO DEVICE SPECS		
	NAME	FREQ RANGE
OSC-112	OmniCtrl Connection Panel w/Sound	0.1 - 70 kHz
ENV-223	Multiple Tone Generator	1- 20 kHz
ENV-230	Multipurpose Sound Generator	1- 20 kHz
ANL-926	Programmable Audio Generator	0.01 - 35 kHz
ENV-225S*	White Noise Amplifier*	N/A*

AUDIO GENERATOR & SPEAKER PAIRING GUIDE

Once you decide on which tone generator best suits your needs, use the chart below to pick a speaker based on the frequency range you need to present.

**White Noise Amplifier to be paired only with ENV-224AM-3, ENV-324M, and ENV-324W (depending on chamber used)*

SPEAKER SPECS					
	NAME	SPECIES	MOUNT	FREQ RANGE	SENSITIVITY
ENV-224AM-3	Modular cage speaker	Rat	1/4 Standard Panel	1–7 KHz	10 dB down @ 700 Hz and 7.5 KHz
ENV-224BM	Modular cage horn tweeter	Rat	1/4 Standard Panel	5–15 KHz	10 dB down @ 2 and 18 KHz
ENV-224CM	Speaker w/light & enclosure	Mouse + Rat	SAC Ceiling	1–7 KHz	10 dB down @ 700 Hz and 7.5 KHz
ENV-324M	Modular cage speaker	Mouse	1/2 Classic Panel	1–5.5 KHz	15 dB down @ 700 Hz and 6.5 KHz
ENV-324W	Modular cage speaker	Mouse	1/2 Wide Panel	1–5.5 KHz	15 dB down @ 700 Hz and 6.5 KHz
ENV-224DM	Modular cage super tweeter	Rat	1/4 Standard Panel	5–35 KHz	10 dB down @ 3 KHz and 45 KHz
ENV-324DW	Top mount super tweeter	Mouse	Wide Chamber Ceiling	5–35 KHz	10 dB down @ 3 KHz and 45 KHz
ENV-324DM	Top mount super tweeter	Mouse	Classic Chamber Ceiling	5–35 KHz	10 dB down @ 3 KHz and 45 KHz

PELLET DISPENSERS

VERIFEED™ PELLET DISPENSER

ENV-204

Reward variability should be based on your experimental design, not on the performance of your equipment. This method delivers. It has been completely re-invented from the ground up, informed by years of feedback from the field. With multiple design features that ensure reliable delivery and easy maintenance, we are setting the new standard. *NOTE: Modular panel mounts, pedestal stand, and discs sold separately.*

I/Os Required: 1 IN / 1 OUT

Hopper + Motor

- Easy-to-clean hopper snaps to the bracket with magnets, and opens into two separate parts
- Quickly and easily fill, empty, disassemble, and reassemble the hopper without tools
- Compatible with any Med Associates interface
  - Requires one input and output
- Alerts Med-PC when hopper runs empty
- An infrared photo-beam detector is located at the entry point, and if pellet presence is not confirmed, it will run through a logic sequence to dispense a pellet within 10 seconds
  - No additional coding required

Hopper Capacity: ~4500 (20mg) and ~3000 (45mg)

Pellet Types: Grain or Sucrose

Response Time: <10 ms of input signal

Operation: Remote via Med-PC, using 28V DC Output
(6-pin micro-fit Molex to 3-pin Mini-Molex)

Construction: Aluminum, brass, neodymium, polycarbonate, stainless steel

DISC

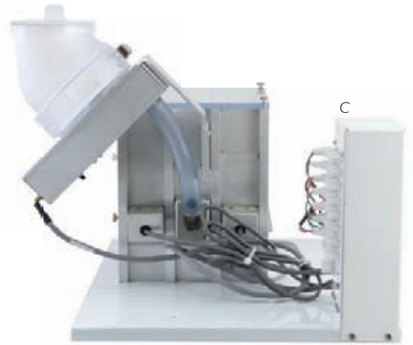
- Change pellet size by swapping out the hopper disc, no further adjustments necessary
- Variable torque motor and optimized entry port prevents crushing delicate pellets, such as sucrose
- Designed to prevent buildup and minimize breakage

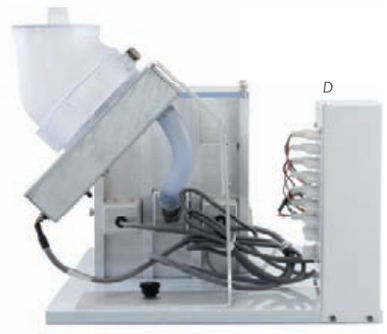
Bracket

- Can be mounted on any modular panel or placed next to the chamber on a pedestal
- Fits on all standard chambers and SACs for both rat and mouse

IMAGES

A) VeriFeed Pellet Dispenser shown without mount B) Modular mount C) 90° Modular Mount D) Pedestal Mount E) Close-up of status light



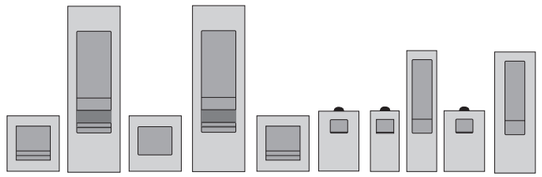


	ENV-204 COMPONENTS + ACCESSORIES
DISCS *(sold separately)*	20mg pellet disc *(ENV-204D-20)* 45mg pellet disc *(ENV-204D-45)*
MODULAR MOUNTS *(sold separately)*	Modular mount, classic mouse *(ENV-204MM)* Modular mount, wide mouse *(ENV-204MWM)* Modular mount, standard rat *(ENV-204MR)*
90° MODULAR MOUNTS *(sold separately)*	Modular mount, classic mouse, 90° *(ENV-204M90M)* Modular mount, wide mouse, 90° *(ENV-204M90WM)* Modular mount, standard rat, 90° *(ENV-204M90R)*
PEDESTAL MOUNT *(sold separately)*	Pedestal mount *(ENV-204P)*

D

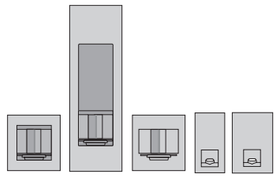
B

C



TROUGH

ENV-200R2M, ENV-200R2M-6.0, ENV-200R2MA, ENV-200R2MA-6, ENV-200R7M, ENV-303R2W, ENV-303M, ENV-303M-4.25, ENV-303W, ENV-303W-4.25



CUP

ENV-200R1M, ENV-200R1M-6, ENV-200R1AM, ENV-300R1AM, ENV-300R1AW

FOOD RECEPTACLES

- Add a receptacle light for illumination or a head entry detector *(sold separately, see pages 52 and 54)*
- Extra tall 4.25" or 6" opening models are ideal for applications where the animal is fitted with a head block for drug infusion or micro-dialysis

AD-LIB CUP PELLET RECEPTACLES

ENV-200FC | ENV-303FC

- Provides a reserve of food for ad lib feeding
- For more sophisticated data collection, consider a "take and replace" pellet delivery system
- Add the Pellet Receptacle Door to limit access *(see page 54 for more info)*
- Rat model *(ENV-200FC)* requires 1.3" *(3.3 cm)* of space underneath for food storage bin

CUP PELLET RECEPTACLES

ENV-200R1M | ENV-200R1AM | ENV-300R1AM | ENV-300R1AW | ENV-200R1M-6

- Available in external (unenclosed) and internal (enclosed) designs
  - External cups are mounted unenclosed, making it ideal for tethered animals without an opening that needs to be made tall and therefore takes up less space in the modular channel

TROUGH PELLET RECEPTACLES

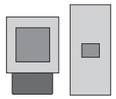
ENV-200R2M | ENV-200R2M-6.0 | ENV-200R2MA | ENV-200R2MA-6 | ENV-200R7M | ENV-303R2W | ENV-303M | ENV-303M-4.25 | ENV-303W | ENV-303W-4.25

- Available only in internal (enclosed) design, so for tethered animals, tall versions are available

IMAGES

A) Ad-Lib Cup B) Internally Mounted Cup C) Externally Mounted Cup D) Trough Pellet Receptacle w/detail shot

A



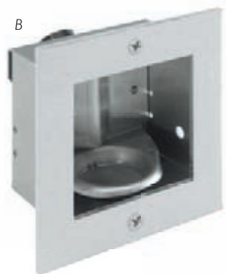
AD-LIB

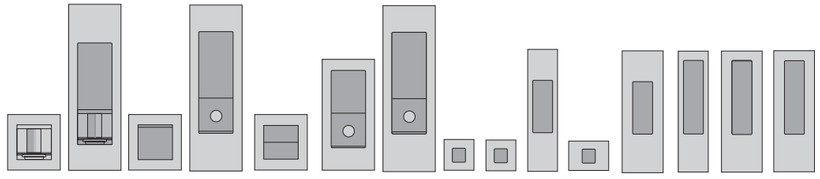
ENV-200FC, ENV-303FC

	FOOD RECEPTACLE SPECS				
	NAME	TYPE	SPECIES	PANEL	OPENING (W×H)
ENV-200FC	Ad-lib Cup Pellet Receptacle	Internal	Rat	1/4 Standard	2″ x 2″ *(5.1 x 5.1 cm)*
ENV-303FC	Ad-lib Cup Pellet Receptacle	Internal	Mouse	3/4 Wide	1″ x 0.8″ *(2.5 x 2 cm)*
ENV-200R1M	Cup Pellet Receptacle	Internal	Rat	1/4 Standard	2″ x 2″ *(5.1 x 5.1 cm)*
ENV-200R1M-6	Cup Pellet Receptacle - Tall	External	Rat	Full Standard	2″ x 6″ *(5.1 x 15.2 cm)*
ENV-200R1AM	Cup Pellet Receptacle	External	Rat	1/4 Standard	N/A
ENV-300R1AM	Cup Pellet Receptacle	External	Mouse	1/2 Classic	N/A
ENV-300R1AW	Cup Pellet Receptacle	External	Mouse	1/2 Wide	N/A
ENV-200R2M-6.0	Trough Pellet Receptacle - Tall	Internal	Rat	Full Standard	2″ x 6″ *(5.1 x 15.2 cm)*
ENV-200R2M	Trough Pellet Receptacle	Internal	Rat	1/4 Standard	2″ x 2″ *(5.1 x 5.1 cm)*
ENV-200R2MA	Trough Pellet Receptacle	Internal	Rat	1/4 Standard	2″ x 1.7″ *(5.1 x 4.3 cm)*
ENV-200R2MA-6	Trough Pellet Receptacle - Tall	Internal	Rat	Full Standard	2″ x 6″ *(5.1 x 15.2 cm)*
ENV-200R7M	Trough Pellet Receptacle	Internal	Rat	1/4 Standard	2″ x 2″ *(5.1 x 5.1 cm)*
ENV-303M	Trough Pellet Receptacle	Internal	Mouse	1/2 Classic	1″ x 0.8″ *(2.5 x 2 cm)*
ENV-303M-4.25	Trough Pellet Receptacle - Tall	Internal	Mouse	Full Classic	1.1″ x 4.3″ *(2.8 x 10.9 cm)*
ENV-303W	Trough Pellet Receptacle	Internal	Mouse	1/2 Wide	1″ x 0.8″ *(2.5 x 2 cm)*
ENV-303W-4.25	Trough Pellet Receptacle - Tall	Internal	Mouse	Full Wide	1.1″ x 4.3″ *(2.8 x 10.9 cm)*
ENV-303R2W	Trough Pellet Receptacle	Internal	Mouse	1/2 Classic	1″ x 0.8″ *(2.5 x 2 cm)*

A

B





LIQUID CUP

ENV-200R1BM, ENV-200R1BM-6, ENV-200R3AM, ENV-200R3AM-6, ENV-200R3BM, ENV-200R3BM-4.5, ENV-200R3BM-6, ENV-303LP, ENV-303LPHD, ENV-303LPHD-RL-3, ENV-303LPHDW, ENV-303LPHDW-RL-3, ENV-303LPHD-4.25, ENV-303LPHDW-4.25, ENV-303LPHDW-RL-4.25

LIQUID RECEPTACLES

LIQUID CUP RECEPTACLE

ENV-200R3AM | ENV-200R3BM | ENV-200R3AM-6 | ENV-200R3BM-4.25 | ENV-200R3BM-6 | ENV-303LP | ENV-303LPHD | ENV-303LPHDW | ENV-303LPHD-RL-3 | ENV-303LPHDW-RL-3 | ENV-303LPHD-4.25 | ENV-303LPHDW-4.25 | ENV-303LPHDW-RL-4.25

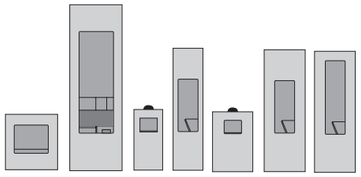
- More accurate than liquid valve style drop dispensers
- Prevents evaporation from the reservoir typical with liquid dippers
- Ideal for alcohol studies
- Use with any syringe pump for precise delivery
- Receptacle light models *(-RL)* have a light built-in
- Add a receptacle light for illumination or a head entry detector *(sold separately, see pages 52 and 54)*
- Extra tall 4.25" or 6" opening models are ideal for applications where the animal is fitted with a head block for drug infusion or micro-dialysis

Pipe(s): 18 gauge

	LIQUID RECEPTACLE SPECS					
	NAME	SPECIES	PANEL SIZE	CUP TYPE	OPENING (WXH)	CAPACITY
ENV-200R1BM	Liquid Cup Receptacle *(1 Cup / 2 Pipes)*	Rat	1/4 Standard	Internal	2″ x 2″ *(5.1 x 5.1 cm)*	4cc
ENV-200R1BM-6	Liquid Cup Receptacle - Tall *(1 Cup / 2 Pipes)*	Rat	3/4 Standard	Internal	2″ x 6″ *(5.1 x 15.2 cm)*	4cc
ENV-200R3AM	Liquid Cup Receptacle *(2 Cups / 2 Pipes)*	Rat	1/4 Standard	Internal	2″ x 2″ *(5.1 x 5.1 cm)*	0.35cc/cup
ENV-200R3AM-6	Liquid Cup Receptacle - Tall *(2 Cups / 2 Pipes)*	Rat	3/4 Standard	Internal	2″ x 6″ *(5.1 x 15.2 cm)*	0.35cc/cup
ENV-200R3BM	Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Rat	1/4 Standard	Internal	2″ x 2″ *(5.1 x 5.1 cm)*	0.35cc
ENV-200R3BM-4.5	Liquid Cup Receptacle - Tall *(1 Cup / 1 Pipe)*	Rat	1/2 Standard	Internal	2″ x 4.3″ *(5.1 x 10.9 cm)*	0.35cc
ENV-200R3BM-6	Liquid Cup Receptacle - Tall *(1 Cup / 1 Pipe)*	Rat	3/4 Standard	Internal	2″ x 6″ *(5.1 x 15.2 cm)*	0.35cc
ENV-303LP	Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Mouse	1/4 Classic	Internal	0.8″ x 0.8″ *(2 x 2 cm)*	0.5cc
ENV-303LPHD	Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Mouse	1/4 Classic	Internal	0.8″ x 0.8″ *(2 x 2 cm)*	0.5cc
ENV-303LPHD-2	Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Mouse	1/4 Classic	Internal	1.1″ x 2″ *(2.8 x 5.1 cm)*	0.5cc
ENV-303LPHDW	Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Mouse	1/4 Wide	Internal	0.8″ x 0.8″ *(2 x 2 cm)*	0.5cc
ENV-303LPHDW-2	Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Mouse	1/4 Wide	Internal	1.1″ x 2″ *(2.8 x 5.1 cm)*	0.5cc
ENV-303LPHD-RL-3	Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Mouse	Full Classic	Internal	1.1″ x 3″ *(2.8 x 7.6 cm)*	0.5cc
ENV-303LPHDW-RL-3	Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Mouse	Full Wide	Internal	1.1″ x 3″ *(2.8 x 7.6 cm)*	0.5cc
ENV-303LPHD-4.25	Liquid Cup Receptacle - Tall *(1 Cup / 1 Pipe)*	Mouse	Full Classic	Internal	1.1″ x 4.3″ *(2.8 x 10.9 cm)*	0.5cc
ENV-303LPHDW-4.25	Liquid Cup Receptacle - Tall *(1 Cup / 1 Pipe)*	Mouse	Full Wide	Internal	1.1″ x 4.3″ *(2.8 x 10.9 cm)*	0.5cc

C

D



FOOD + LIQUID

ENV-202R2MA, ENV-202R2MA-6, ENV-303RMA, ENV-303RMA-3, ENV-303RMW-3, ENV-303RMW, ENV-303RMW-4.25

E

FOOD + LIQUID RECEPTACLES

- Add a receptacle light for illumination or a head entry detector *(sold separately, see pages 52 and 54)*
- Extra tall 4.25" or 6" opening models are ideal for applications where the animal is fitted with a head block for drug infusion or micro-dialysis

PELLET TROUGH/LIQUID CUP RECEPTACLE

ENV-202RMA | ENV-202RMA-6 | ENV-303RMA | ENV-303RMW | ENV-303RMA-3 | ENV-303RMW-3 | ENV-303RMW-4.25

- Separate cup and trough
- Use a syringe pump for liquid delivery *(sold separately, see page 72 for more info)*
- Uses the same stainless steel cup as the pellet receptacle *(ENV-200R1M)*
- All wetted parts are stainless steel

Cup spacing: 0.9" apart from center
(dual cup models only)

Pipe(s): 18 gauge

PELLET CUP + LIQUID CUP RECEPTACLE

ENV-200R1AM-LP | ENV-200R1AM-LP-12

- For use with either pellet or liquid, both are piped to a single cup

IMAGES

A) Liquid Cup Receptacle (2 Cups / 2 Pipes) B) Liquid Cup Receptacle (1 Cup / 2 Pipes) C) Pellet Cup + Liquid Cup Receptacle (1 Cup / 1 Pipe) D) Pellet Trough + Liquid Cup Receptacle Detail E) Pellet Trough + Liquid Cup

	FOOD + LIQUID RECEPTACLE SPECS					
	NAME	SPECIES	PANEL SIZE	CUP TYPE	OPENING (WXH)	CAPACITY
ENV-200R1AM-LP	Pellet Cup + Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Rat	1/4 Standard	External	2" x 2" *(5.1 x 5.1 cm)*	4cc
ENV-200R1AM-LP-12	Pellet Cup + Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Rat	1/4 Standard	External	2" x 2" *(5.1 x 5.1 cm)*	4cc
ENV-202RMA	Pellet Trough + Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Rat	1/4 Standard	Internal	2" x 2" *(5.1 x 5.1 cm)*	5cc
ENV-202RMA-6	Pellet Trough + Liquid Cup Receptacle - Tall *(1 Cup / 1 Pipe)*	Rat	3/4 Standard	Internal	2" x 6" *(5.1 x 15.2 cm)*	5cc
ENV-303RMA	Pellet Trough + Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Mouse	1/2 Classic	Internal	1" x 0.8" *(2.5 x 2 cm)*	0.5cc
ENV-303RMA-3	Pellet Trough + Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Mouse	Full Classic	Internal	1" x 3" *(2.5 x 7.6 cm)*	0.5cc
ENV-303RMW	Pellet Trough + Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Mouse	1/2 Wide	Internal	1" x 0.8" *(2.5 x 2 cm)*	0.5cc
ENV-303RMW-3	Pellet Trough + Liquid Cup Receptacle *(1 Cup / 1 Pipe)*	Mouse	Full Wide	Internal	1" x 3" *(2.5 x 7.6 cm)*	0.5cc
ENV-303RMW-4.25	Pellet Trough + Liquid Cup Receptacle - Tall *(1 Cup / 1 Pipe)*	Mouse	Full Wide	Internal	1.1" x 4.3" *(2.8 x 10.9 cm)*	0.5cc


A

LIQUID DROP

LIQUID DROP DISPENSER
ENV-201A

- Attaches to the top of the liquid drop receptacle *(sold separately)*
- Miniature solenoid-activated valve dispenses drops or small quantities of non-viscous liquid reinforcer
- Release from one to several drops of approximately 0.01cc, valve activated by a 28V DC output, and controlled by an adjustable timer:
  - Drop/Activation Interval *(approx.)*: 1 s / 2.5 s
- Reservoir consists of a 65cc syringe tube that is easily removed from the luer fitting on the valve
- Syringe tube can be sealed and is fully calibrated, measurements of total volume are easy to make
- Economic option

I/Os Required: 1 OUT

LIQUID DROP RECEPTACLE
ENV-200R3M | ENV-200R3M-4.5 | ENV-200R3M-6

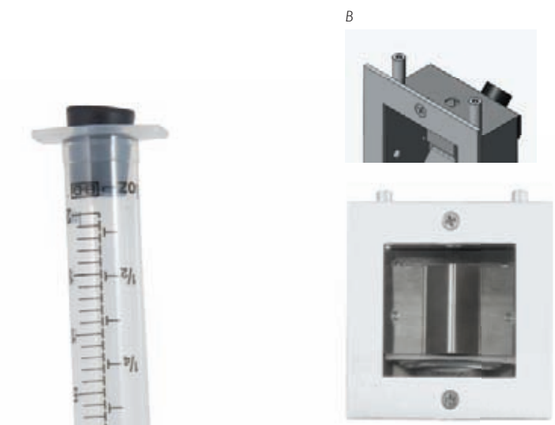
- Use with Liquid Drop Dispenser *(ENV-201A)*
- Prevents evaporation from the reservoir typical with liquid dippers
- Ideal for alcohol studies
- Add a receptacle light for illumination or a head entry detector *(sold separately, see pages 52 and 54)*
- Extra tall 6" opening is ideal for applications where the animal is fitted with a head block for drug infusion or micro-dialysis

Pipe(s): 18 gauge

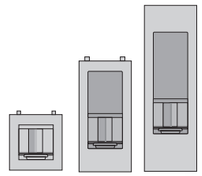
IMAGES

A) Tall Liquid Drop Dispenser shown installed on a chamber setup B) Liquid Drop Dispenser C) Liquid Drop Receptacle w/detail

	LIQUID DROP RECEPTACLE SPECS					
	NAME	SPECIES	PANEL SIZE	CUP TYPE	OPENING (WXH)	CAPACITY
ENV-200R3M	Liquid Drop Receptacle (1 Cup / 1 Pipe)	Mouse + Rat	1/4 Standard	Internal	2" x 2" *(5.1 x 5.1 cm)*	4cc
ENV-200R3M-4.5	Liquid Drop Receptacle - Tall (1 Cup / 1 Pipe)	Mouse + Rat	1/2 Standard	Internal	1.1" x 4.3" *(2.8 x 10.9 cm)*	4cc
ENV-200R3M-6	Liquid Drop Receptacle - Tall (1 Cup / 1 Pipe)	Mouse + Rat	3/4 Standard	Internal	2" x 6" *(5.1 x 15.2 cm)*	4cc


A

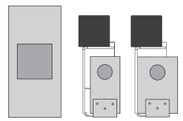
B


C

LIQUID DROP

ENV-200R3M, ENV-200R3M-4.5, ENV-200R3M-6

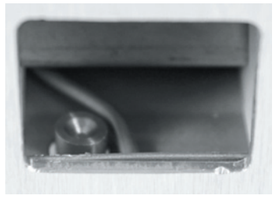
C

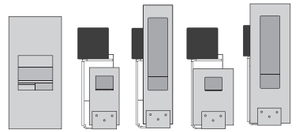


SWITCHABLE LIQUID DIPPERS

ENV-202M-S, ENV-302M-S, ENV-302W-S

D





SWITCHABLE LIQUID DIPPERS W/DUAL PELLET RECEPTACLE

ENV-202RM-S, ENV-302RM-S, ENV-302RM-S-4IN, ENV-302RW-S, ENV-302RW-S-4IN

SWITCHABLE LIQUID DIPPERS

- Add a receptacle light for illumination or a head entry detector *(sold separately, see pages 52 and 54)*
- Extra tall 4.25" or 6" opening models are ideal for applications where the animal is fitted with a head block for drug infusion or micro-dialysis

SWITCHABLE LIQUID DIPPER

ENV-202M-S | ENV-302M-S | ENV-302W-S | ENV-302W-S-4IN

- Ideal for applications where the availability of the reinforcer is time-limited once earned (user defined)
- Motor driven dipper arm raises a cup to deliver a precise volume of liquid
  - Arm movement is smooth and consistent to minimize spillage
  - Cup is presented to the animal as close to the front panel as possible
- Can be operated in two positions:
  - Normally down: arm remains up only as long as power is applied
  - Normally up: arm remains in the up position until activated by a 28V DC control line
- Use with anything from water to highly viscous fluids such as condensed milk
- Stainless steel cups snap onto any dipper delivery arm without tools.
- Available cup sizes:

  All | ENV-202C

  0.1 cc | ENV-202C-10* *included*

  0.08 cc | ENV-202C-08

  0.06 cc | ENV-202C-06

  0.04 cc | ENV-202C-04

  0.02 cc | ENV-202C-02

I/Os Required: 1 OUT

NOTE: Volumes are nominal, actual volumes may vary and will depend on the viscosity of the fluid used. Custom sizes also available with modified receptacle.

SWITCHABLE LIQUID DIPPER W/DUAL PELLET RECEPTACLE

ENV-202RM-S | ENV-302RM-S | ENV-302RW-S | ENV-302RM-S-4IN | ENV-302RW-S-4IN

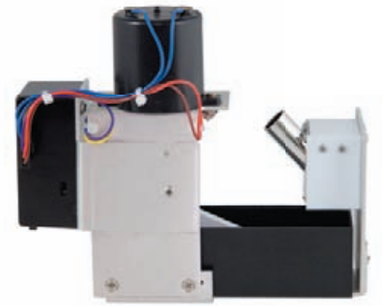
- Dipper with a split floor receptacle capable of delivering both pellet and liquid rewards to the same area.
- Pellet dispensers sold separately *(see p.32)*

I/Os Required: 1 OUT

IMAGES

A) Switchable Liquid Dipper B) Dipper Cups C) Switchable Liquid Dipper Detail D) Switchable Liquid Dipper w/Dual Pellet Receptacle Detail

A

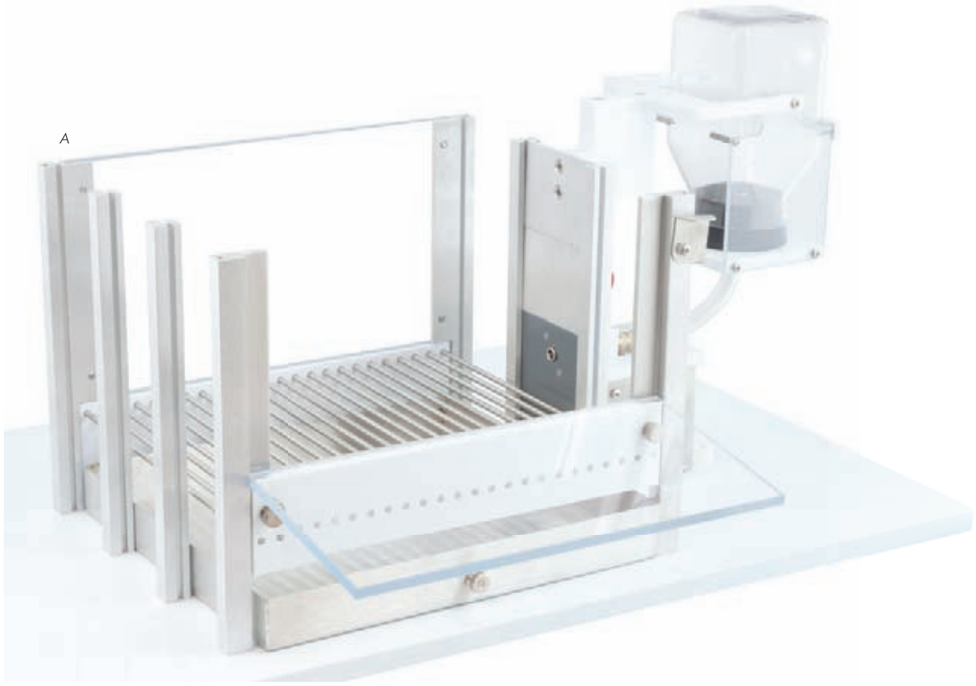


B

SWITCHABLE LIQUID DIPPER SPECS

	NAME	SPECIES	TYPE	PANEL	OPENING (W×H)	VERTICAL CLEARANCE
ENV-202M-S	Switchable Liquid Dipper	Rat	Internal	1/2 Standard	2″ x 2″ *(5.1 x 5.1 cm)*	N/A
ENV-302M-S	Switchable Liquid Dipper	Mouse	Internal	1/2 Classic	0.9″ ID *(2.3 cm)*	2.5" *(6.4 cm)*
ENV-302W-S	Switchable Liquid Dipper	Mouse	Internal	1/2 Wide	0.9″ ID *(2.3 cm)*	2.5" *(6.4 cm)*
ENV-302W-S-4IN	Switchable Liquid Dipper - Tall	Mouse	Internal	Full Wide	0.9" x 4" *(2.3 x 10.2 cm)*	N/A
ENV-202RM-S	Switchable Liquid Dipper w/Dual Pellet Receptacle	Rat	Internal	1/2 Standard	2″ x 2″ *(5.1 x 5.1 cm)*	N/A
ENV-302RM-S	Switchable Liquid Dipper w/Dual Pellet Receptacle	Mouse	Internal	1/2 Classic	1″ x 0.8″ *(2.5 x 2 cm)*	2" *(5.1 cm)*
ENV-302RM-S-4IN	Switchable Liquid Dipper w/Dual Pellet Receptacle - Tall	Mouse	Internal	Full Classic	1" x 4" *(2.5 x 10.2 cm)*	N/A
ENV-302RW-S	Switchable Liquid Dipper w/Dual Pellet Receptacle	Mouse	Internal	1/2 Wide	1″ x 0.8″ *(2.5 x 2 cm)*	2" *(5.1 cm)*
ENV-302RW-S-4IN	Switchable Liquid Dipper w/Dual Pellet Receptacle - Tall	Mouse	Internal	Full Wide	1" x 4" *(2.5 x 10.2 cm)*	N/A

A



RETRACTABLE SIPPERS

RETRACTABLE SIPPER w/LIXIT + BOTTLE

ENV-252AM | ENV-252M | ENV-352-2M | ENV-352-2W | ENV-352A | ENV-352AW

- Includes standard water bottle and Lixit® valve
- Horizontal Lixit® needle valve connects to a 28V DC solenoid valve to prevent liquid flow when the Lixit® is retracted, even if the needle is displaced
  - Valve moves in and out quickly without spillage
  - Extensive travel of the tube ensures that the rodent cannot reach it when retracted
- Bottle: 8 oz *(236.6 mL)*
  - Extra bottles available for fast change-outs between subjects, contact Sales for more info
- Lixit Extension (into arena): 0.6" *(1.5 cm)*

I/Os Required: 1 OUT

RETRACTABLE SIPPER w/PIPETTE

ENV-352A | ENV-352AW

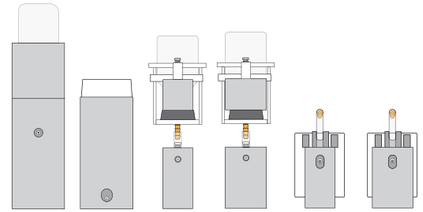
- Motor driven sipper tube for programmed control

Pipette Capacity: 10 mL

I/Os Required: 1 OUT

IMAGES

A) Retractable Sipper w/Lixit + Bottle shown on wide mouse chamber
B) Retractable Sipper w/Lixit + Pipette

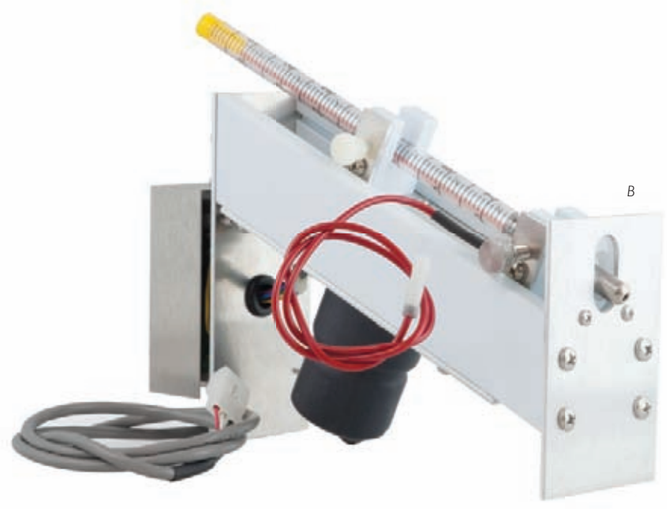


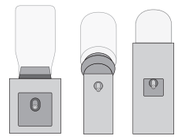
RETRACTABLE SIPPERS

ENV-252AM, ENV-252M, ENV-352-2M, ENV-352-2W, ENV-352A, ENV-352AW

RETRACTABLE SIPPER SPECS				
	NAME	SPECIES	PANEL SIZE	SIPPER *(OD)*
ENV-252AM	Retractable Sipper w/Lixit+Bottle	Rat	1/2 Standard	0.5" *(1.3 cm)*
ENV-252M	Retractable Sipper w/Lixit+Bottle	Rat	1/2 Standard	0.5" *(1.3 cm)*
ENV-352-2M	Retractable Sipper w/Lixit+Bottle	Mouse	3/4 Classic	0.4" *(1 cm)*
ENV-352-2W	Retractable Sipper w/Lixit+Bottle	Mouse	1/2 Wide	0.4" *(1 cm)*
ENV-352A	Retractable Sipper w/Pipette	Mouse	1/2 Classic	N/A
ENV-352AW	Retractable Sipper w/Pipette	Mouse	1/2 Wide	N/A

B





WATER BOTTLE W/SIPPER TUBE

ENV-250RM, ENV-350RM, ENV-350CW

	WATER BOTTLE + SIPPER TUBE SPECS				
	NAME	SPECIES	PANEL TYPE	OPENING (W×H)	VERTICAL CLEARANCE
ENV-250RM	Water Bottle + Sipper Tube	Rat	1/4 Standard	2″ x 2″ *(5.1 x 5.1 cm)*	5″ *(12.7 cm)*
ENV-350RM	Water Bottle + Sipper Tube	Mouse	1/2 Classic	N/A	3.3″ *(8.4 cm)*
ENV-350CW	Water Bottle + Sipper Tube	Mouse	3/4 Wide	1″ x 1.1″ *(2.5 x 2.8 cm)*	2.8″ *(7.1 cm)*

WATER BOTTLE + SIPPER TUBES

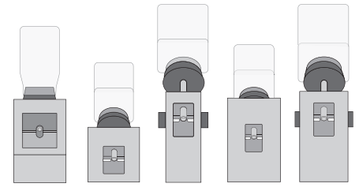
WATER BOTTLE + SIPPER TUBE

ENV-250RM | ENV-350RM | ENV-350CW

- Thumbscrew secures the sipper tube and connects to a lead for the contact lickometer amplifier
- Use in one of two ways:
  - As-is for ad-lib delivery of water (or other liquids)
  - Add a contact lickometer to record lick counts
- A replacement bottle with stopper and sipper tube can be ordered *(ENV-250BT for Rat, ENV-350BT for mouse)*
- PVC plastic mounting panel decreases static
- Drain fitting may be connected to plastic tubing to collect spilled liquid

IMAGES

A) Water Bottle + Sipper Tube



LICKOMETERS

ENV-251L, ENV-251M, ENV-351M, ENV-351R, ENV-351W

	LICKOMETER SPECS				
	NAME	SPECIES	PANEL TYPE	OPENING (W×H)	VERTICAL CLEARANCE
ENV-251L	Lickometer w/Photobeam Controller	Rat	1/4 + 1/8 Standard	2″ x 2″ *(5.1 x 5.1 cm)*	4.5″ *(11.4 cm)*
ENV-251M	Light Pipe Lickometer w/Photobeam Controller	Rat	1/4 Standard	2″ x 2″ *(5.1 x 5.1 cm)*	3.8″ *(9.7 cm)*
ENV-351M	Light Pipe Lickometer w/Photobeam Controller	Mouse	5/8 Classic	1″ x 1.6″ *(2.5 x 4.1 cm)*	4.5″ *(11.4 cm)*
ENV-351W	Light Pipe Lickometer w/Photobeam Controller	Mouse	5/8 Wide	1″ x 1.6″ *(2.5 x 4.1 cm)*	4.5″ *(11.4 cm)*
ENV-351R	Light Pipe Lickometer w/Photobeam Controller	Rat	3/8 Standard	1″ x 1.6″ *(2.5 x 4.1 cm)*	4.5″ *(11.4 cm)*

LICKOMETERS

LICKOMETER w/PHOTOBEAM CONTROLLER

ENV-251L

- Places the sipper tube behind a “V” plate so that the animal is forced to lick for liquid delivery
- An infrared photobeam is placed between the stainless steel plate and the sipper tube to accurately count each beam break by the tongue.

  NOTE: This count may be much less than the count provided by the “light pipe” configuration where any part of the snout can break the beam. We do not recommend substituting one for the other in an ongoing study.
- May be preferred to the contact lickometer in applications using scrambled foot aversive stimulation
- Extra bottles available for fast change-outs between subjects, contact Sales for more info

I/Os Required: 1 IN

NOTE: Lickometer uses a $^1/_4$ panel, and the controller uses a $^1/_8$ panel. To fill the empty space with the fewest panels, use a $^1/_2$ and $^1/_8$ panel.

LIGHT PIPE LICKOMETER w/PHOTOBEAM CONTROLLER

ENV-251M | ENV-351M | ENV-351W | ENV-351R

- Photobeam is directed through the glass pipes in front of the sipper tube to record beam breaks
- May be preferred to the contact lickometer in applications using scrambled foot aversive stimulation

I/Os Required: 1 IN

IMAGES

A) Lickometer w/photobeam controller B) Light Pipe Lickometer w/photobeam controller

CONTACT LICKOMETER CONTROLLERS

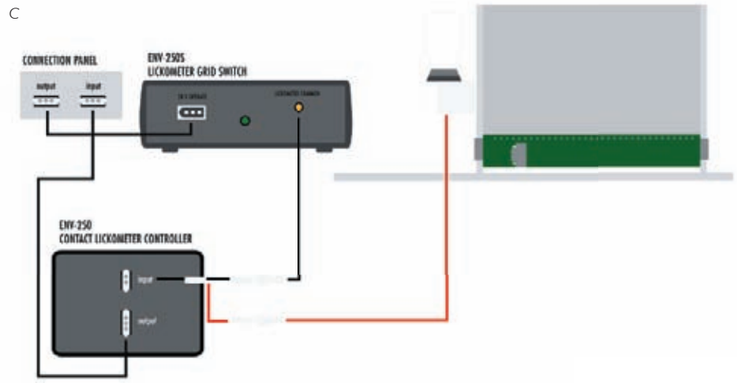
CONTACT LICKOMETER CONTROLLERS
ENV-250 | ENV-250B | ENV-250C

- Record licks from drinking devices installed in the same chamber
  - Connects to the sipper tube and grid floor
  - When the animal is both touching the grid floor and licking the tube, the circuit is completed and a signal is sent to the interface and input count is registered
- Output drinking connector plugs directly into an open input of a suitable connection panel
- Registers input impedance up to 8.3 mega-ohms (MΩ) with a subject current of 0.6 micro-amps (μA)
- Available models:
  - Single | ENV-250
  - Dual | ENV-250B
  - Triple | ENV-250C
- Not suitable for aversive stimulation suppression
- Includes DB9 to mini Molex cable *(SG-219G2M)*

NOTE: Grid floor harnesses may be required to complete a lickometer package. Contact Sales with any questions.

IMAGES

A) Single B) Dual C) Triple D) Single contact lickometer controller (ENV-250) example setup: Classic mouse chamber with VeriFEED pellet dispenser, exterior cup pellet receptacle, house light, water bottle + sipper tube, and a grid floor with quick disconnect harness



LICKOMETER AVERSIVE STIMULATORS

SWITCHING CONTACT LICKOMETER CONTROLLER
ENV-250A-C

Complete lickometer unit that will also switch a direct aversive stimulation output to the sipper tube spout.

- Switching relay is activated by 28V DC ground
- Input is automatically disabled when aversive stimulation is applied to the sipper tube
- Aversive stimulators *(SG-219G)* and cables *(SG-219N)* are sold separately
- Includes Sabre cable *(SG-219N-C)*

Note: Grid floor harnesses may be required to complete a lickometer package. Contact Sales with any questions.

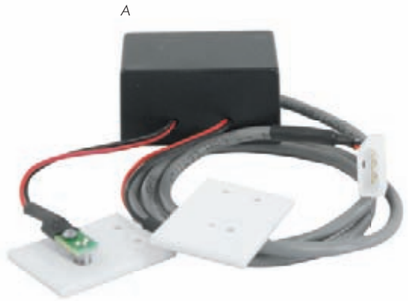
LICKOMETER GRID SWITCH
ENV-250S

- Delivers scrambled aversive foot stimulation with any of our lickometers by switching each of the nine leads of the grid harness between the lickometer amplifier and the outputs of the Solid State Grid Floor Scrambler
- Alternative to the Switching Contact Lickometer Controller *(ENV-250A-C)*
  - Does not include lickometer amplifier, and must be used with one of the standard lickometers *(ENV-250 / -250B / -250C)*
- Aversive stimulation delivery briefly interrupts lick data collection
  - For continuous data collection use one of our photobeam lickometers *(ENV-251L / -251M)*
- Includes $^{M}/_{F}$ DB9 shock cable *(SG-219G)*

NOTE: Grid floor harnesses may be required to complete a lickometer package. Contact Sales with any questions.

IMAGES

A) Lickometer Grid Switch B) Switching Contact Lickometer Controller C) Illustration of setup using an ENV-250S Lickometer Grid Switch


A


B


C

HEAD ENTRY DETECTOR SPECS				
NAME	FITS	SPECIES	PANEL	
ENV-302HD	Head Entry Detector	Liquid Dippers	Mouse	Wide
ENV-303HDA	Head Entry Detector	Pellet Receptacles	Mouse	Classic
ENV-303HDW	Head Entry Detector	Pellet Receptacles	Mouse	Wide
ENV-254-FB	Head Entry Detector	Solid/Liquid Receptacles	Mouse + Rat	N/A

INFRARED DETECTION

Photobeams allow for easy monitoring of positional information, applications include:

- Activity monitoring
- Head-entry into pellet receptacles
- Monitoring the presence of a food pellet in a receptacle trough

...and more

- Use with any input card to produce a "response" whenever an animal breaks the beam
- Uses mounting blocks that either attach to the outside of a receptacle or replace the side panel of a receptacle
- Not suitable for areas with high levels of ambient light
- Single IR light source and detector
- Maximum Range: x < 6" *(15.24 cm)*

HEAD ENTRY DETECTOR FOR FOOD/WATER RECEPTACLES
ENV-254-FB

- Add to most pellet or dipper receptacles for mice or rats

HEAD ENTRY DETECTOR FOR LIQUID DIPPERS
ENV-302HD

- Add to most liquid dipper receptacles for mice

HEAD ENTRY DETECTOR FOR PELLET RECEPTACLES
ENV-303HDA | ENV-303HDW

- Add to most pellet or dipper receptacles for mice

IMAGES

A) Head Entry Detector for Pellet Receptacles, shown with mounting blocks
B) Head Entry Detector for Solid/Liquid Receptacles w/Flexible Board, shown installed on an example setup C) Individual Infrared Source/detector (pair)

INFRARED CONTROLLER SPECS			
NAME	SPECIES	CHANNELS	
ENV-253B	Infrared Source/Detector/Controller	Mouse + Rat	1
ENV-253	Infrared Controller	Mouse + Rat	4
ENV-256I-8	Infrared Controller	Mouse + Rat	8
ENV-256I	Infrared Controller	Mouse + Rat	16

A

B

C

INFRARED DETECTION CONTINUED

INFRARED CONTROLLERS
ENV-253 | ENV-256I-8 | ENV-256I

- Models available:
  - 4 Channel | ENV-253
  - 8 Channel | ENV-256I-8
  - 16 Channel | ENV-256I
- Synchronizes the 40 kHz pulse stream emitted by each light source with the activation of each detector at a rate of 3.9 kHz
  - Synchronizing at this rate effectively creates a continuous beam, eliminating interference from adjacent beams or outside light sources
  - Pulse produces a beam that is better focused and casts a sharper "shadow"
- Use with any interface card *(sold separately)*

Minimum Spacing: x > 0.75"

NOTE: Away from another IR pair to prevent interference, measured center to center

Minimum Range: x > 0.25" *(0.635 cm)*

Maximum Range: x < 30" *(76.2 cm)*

Carrier Frequency: 40 kHz

Optical Wavelength: 940 nm

INFRARED SOURCE/DETECTOR/CONTROLLER - SINGLE CHANNEL
ENV-253B

- Single optical integrated circuit sensor and 40kHz pulsed IR source using an infrared LED
- Includes 28V DC compatible controller housed in a plastic case

Maximum Range: x < 30" *(76.2 cm)*

Cylinders *(x2)*: 0.75" OD *(1.91 cm)*

Cables *(x2)*: 4' L *(1.3 m)*

NOTE: Multiple units in a common area are not recommended. For such applications, see the four channel IR controller (ENV-253), or the sixteen channel IR controller (ENV-256I).

INDIVIDUAL INFRARED SOURCE/DETECTOR (PAIR)
ENV-253SD

- Single IR light source and detector
  - Order as many pairs as needed to go with the 4, 8, or 16 channel controllers
  - Encased in plastic cylinders with holes for mounting on chamber walls

Maximum Range: x < 30" *(76.2 cm)*

Cylinders *(x2)*: 0.75" OD *(1.91 cm)*

Cables *(x2)*: 4' L *(1.3 m)*

IMAGES

A) 4 Channel Infrared Controller B) Infrared source/detector/controller - single channel C) 16 Channel Infrared Controller

A

B

C

D

RECEPTACLE ACCESSORY SPECS			
	NAME	SPECIES	PANEL
ENV-210M-S	Pellet Receptacle Door	Rat	Standard
ENV-340A	Pellet Receptacle Door	Mouse	Wide
ENV-200-27	Dual Feeder "Y" Tube Adapter	Mouse	N/A
ENV-200-27	Dual Feeder "Y" Tube Adapter	Rat	N/A
ENV-200RL-LED	Receptacle Light	Rat	Standard
ENV-302RL-1	Receptacle Light	Mouse	Top Mount
ENV-302RL-2	Receptacle Light	Mouse	Back Mount
ENV-303RL	Receptacle Light	Mouse	Wide
ENV-303RL	Receptacle Light	Mouse	Classic

RECEPTACLE ACCESSORIES

PELLET RECEPTACLE DOOR
ENV-210M-S | ENV-340A

- Limit access to the reinforcer by placing this motorized door in front of a standard receptacle cup
  - Modified receptacle and custom chamber top required, contact Sales for more info
- Aluminum door comes standard
  - Clear acrylic door also available *(M-CLEAR)*

I/Os Required: 1 OUT

DUAL FEEDER "Y" TUBE ADAPTER
ENV-303HDA | ENV-303HDW

- Connects two pellet dispensers to one receptacle

Tube: 0.5" OD *(barbed)*

RECEPTACLE LIGHT
ENV-200RL-LED | ENV-302RL-1 | ENV-302RL-2 | ENV-303RL | ENV-303RL-3

- Can be added to most receptacles

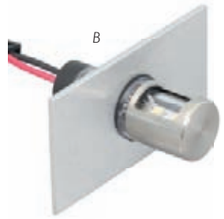
NOTE: When light is top-mounted, it may prevent placement of some modules directly above the receptacle

IMAGES

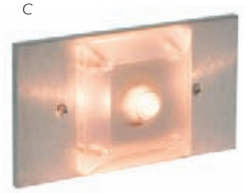
A) Pellet Receptacle Door B) Pellet Receptacle Door shown on ENV-007 chamber w/Door Detail C) Receptacle Light D) Dual Feeder "Y" Tube Adapter

A

B



C



HOUSE LIGHT SPECS			
	NAME	SPECIES	PANEL
ENV-215M-LED	LED House Light - Modular	Mouse + Rat	1/8 Standard
ENV-315M-LED	LED House Light - Modular	Mouse	1/4 Classic
ENV-315W-LED	LED House Light - Modular	Mouse	1/4 Wide
ENV-221CL-LED	LED House Light - Ceiling Mount	Mouse + Rat	N/A
ENV-227M	Incandescent House Light w/Diffuser	Mouse + Rat	1/8 Standard

HOUSE LIGHTS

LED HOUSE LIGHT
ENV-215M-LED | ENV-315M-LED | ENV-315W-LED | ENV-221CL-LED

- Hood can be rotated to direct light down on the working area or up to reflect light off the ceiling
  - *NOTE: Modular models only*
- May be wired to the fan circuit to be on all the time or connected to a 28V DC output for computer programmed control

I/Os Required: 1 OUT

NOTE: Multiple lights may be needed to fully illuminate larger cubicles (ceiling mounted model only)

INCANDESCENT HOUSE LIGHT w/DIFFUSER
ENV-227M

- Use as a house light or stimulus light
- Light is diffused to illuminate the entire chamber
- Clear acrylic beveled diffuser block
- Comes installed with 40 mA lamp

I/Os Required: 1 OUT

IMAGES

A) LED Ceiling Mount House Light B) LED House Light C) Incandescent House Light w/Diffuser

ENV-321DM, ENV-321DW, ENV-321M, ENV-321W

ENV-222M, ENV-322M, ENV-322W

ENV-221M-LED, ENV-229M

color options:

A

B

C

D

	STIMULUS LIGHT SPECS				
	NAME	**SPECIES**	**PANEL**	**LIGHT (OD)**	**POSITION**
ENV-221M-LED	LED Stimulus Light - Single	Rat	1/8 Standard	1″ *(2.5 cm)*	0.8" *(2 cm)*
ENV-222M	LED Stimulus Light - Triple	Rat	1/8 Standard	0.3″ *(0.8 cm)*	0.8" *(2 cm)*
ENV-229M	LED Stimulus Light - Single White	Rat	1/8 Standard	1″ *(2.5 cm)*	0.8"*(2 cm)*
ENV-321DM	LED Stimulus Light - Dual Yellow	Mouse	1/4 Classic	0.3″ *(0.8 cm)*	1.4"*(3.6 cm)*
ENV-321DW	LED Stimulus Light - Dual Yellow	Mouse	1/4 Wide	0.3″ *(0.8 cm)*	1.4"*(3.6 cm)*
ENV-321M	LED Stimulus Light - Single Yellow	Mouse	1/4 Classic	0.3″ *(0.8 cm)*	1.4"*(3.6 cm)*
ENV-321W	LED Stimulus Light - Single Yellow	Mouse	1/4 Wide	0.3″ *(0.8 cm)*	1.4"*(3.6 cm)*
ENV-322M	Triple LED Stimulus Display	Mouse	1/4 Classic	0.2″ *(0.5 cm)*	1.3"*(3.3 cm)*
ENV-322W	Triple LED Stimulus Display	Mouse	1/4 Wide	0.2″ *(0.5 cm)*	1.3"*(3.3 cm)*

STIMULUS LIGHTS

LED Expected Life: 100,000 hours

LED STIMULUS LIGHT - SINGLE

ENV-221M-LED | ENV-221AM-LED | ENV-221GN-LED | ENV-221RD-LED | ENV-229M

- Lens is mounted flush with the metal rim to minimize animal chewing
- Standard white diffuser included
- Colored lens covers: *(sold separately, for ENV-221M-LED only)*
  - amber, green, white, and red

I/Os Required: 1 OUT

LED STIMULUS LIGHT - TRIPLE

ENV-222M | ENV-322M | ENV-322W

- Three LEDs (red/green/yellow) in a horizontal array

I/Os Required: 1-3 OUT

LED STIMULUS LIGHT - YELLOW

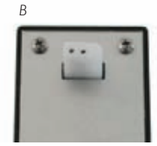
ENV-321DM | ENV-321DW | ENV-321M | ENV-321W

I/Os Required: 1 OUT

IMAGES

A) LED Stimulus Light - Single Yellow B) LED Stimulus Light - Triple C) LED Stimulus Light - Single D) LED Stimulus Light - Single (w/colored lens options)

B



A

C

LIGHT CONTROL

LIGHT FADER CONTROLLER 1 CHANNEL / 2 LEVEL

ENV-226

- Creates a stimulus of either full or reduced intensity
  - Precision screwdriver adjustable control and power regulator circuit

I/Os Required: 2 OUT

NOTE: Not compatible with LED lights

LIGHT FADER CONTROLLER 3 CHANNEL / VARIABLE LEVEL

ENV-226D

- Three independent light intensity dial controls
  - Connect up to two stimulus lamps *(170 mA at 28V DC max, incandescent or LED)*
  - Record and repeat settings precisely
- Connect directly to a power supply when used to counterbalance natural preferences in multiple compartment chambers

I/Os Required: 1 OUT per channel *(optional)*

IMAGES

A) Light Fader Controller, 3 Channel, Variable Level B) Light Fader Controller 1 channel / 2 level

LIGHT MEASUREMENT

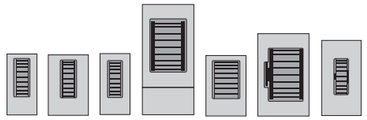
LUX METER

ANL-950

- Accurately displays light level in terms of Foot Candles (fc) or Lux (lumens) over three ranges:
  - Fc: 0-200 / 0-2,000 / 0-5,000
  - Lux: 0-2,000 / 0-20,000 / 0-50,000
- Sample modes:
  - Fast (1 second)
  - Slow (2 seconds)
- Generates 1 mV per count analog output readings to be captured by a compatible recording device
- Precision photo diode and color correction filter
- 9V battery and carrying case included

IMAGES

C) Lux Meter



ENV-113AM, ENV-113AMW, ENV-113AS, ENV-113AW, ENV-113M, ENV-113S, ENV-113WS

A

B

	RESPONSE WHEEL SPECS					
	NAME	SPECIES	PANEL	WHEEL WIDTH	ROD SIZE (OD)	ROD SPACING
ENV-113AM	Response Wheel	Mouse	1/2 Classic	0.6″ *(1.5 cm)*	0.1″ *(0.3 cm)*	0.3″ *(0.8 cm)*
ENV-113AMW	Response Wheel	Mouse	1/2 Wide	0.6″ *(1.5 cm)*	0.1″ *(0.3 cm)*	0.3″ *(0.8 cm)*
ENV-113AS	Micro-switch Response Wheel	Mouse	1/2 Classic	0.6″ *(1.5 cm)*	0.1″ *(0.3 cm)*	0.3″ *(0.8 cm)*
ENV-113WS	Micro-switch Response Wheel	Mouse	3/4 Wide	0.6″ *(1.5 cm)*	0.1″ *(0.3 cm)*	0.3″ *(0.8 cm)*
ENV-113AR	Response Wheel	Mouse	1/2 Classic	0.6″ *(1.5 cm)*	0.1″ *(0.3 cm)*	0.3″ *(0.8 cm)*
ENV-113AW	Response Wheel	Mouse	1/2 Wide	1.4″ *(3.6 cm)*	0.1″ *(0.3 cm)*	0.3″ *(0.8 cm)*
ENV-113M	Response Wheel	Rat	3/8 Standard	1.6″ *(4.1 cm)*	0.1″ *(0.3 cm)*	0.4″ *(1 cm)*
ENV-113S	Micro-switch Response Wheel	Rat	3/8 Standard	1.6″ *(4.1 cm)*	0.1″ *(0.3 cm)*	0.4″ *(1 cm)*

RESPONSE WHEELS

- Mouse models use an optical encoder to report four responses for every 90 degrees of rotation, while the rat models use a switch
- Minimal drag

RESPONSE WHEEL
ENV-113AM | ENV-113AMW | ENV-113AR | ENV-113AW | ENV-113M

- Modeled after the design by Dr. Conan Kornetsky while at Boston University
- Well suited for intracranial self stimulation, triadic learned helplessness, or any fine motor performance impairing activity

I/Os Required: 1 IN

MICRO-SWITCH RESPONSE WHEEL
ENV-113AS | ENV-113S | ENV-113WS

- Uses a cam operated micro-switch to report four responses for every 90 degrees of rotation
- Provides audible and tactile feedback to the animal

I/Os Required: 1 IN

IMAGES
A) Micro-switch Response Wheel B) Response Wheel

	OMNIDIRECTIONAL CEILING ROD SPECS			
	NAME	SPECIES	CHAMBER	ROD (ODxL)
ENV-111A	Omnidirectional Ceiling Rod	Rat	Standard	0.3″ x 4.7″ *(0.8 x 11.9 cm)*
ENV-311A	Omnidirectional Ceiling Rod	Mouse	Classic	0.2″ x 3.8″ *(0.5 x 9.7 cm)*
ENV-311W	Omnidirectional Ceiling Rod	Mouse	Wide	0.2″ x 3.8″ *(0.5 x 9.7 cm)*

A

CEILING RODS

OMNIDIRECITONAL CEILING ROD
ENV-111A | ENV-311A | ENV-311W

- Stainless steel rod extends from the center of the chamber lid
- Can also substitute for a “pole jump” avoidance response
- Used primarily in chaining studies where it is desirable to have a response that is topographically dissimilar from lever pressing

I/Os Required: 1 IN

IMAGES
A) Omnidirecitonal Ceiling Rod

B

C

MANUAL TRIGGERS

HAND-HELD PUSH BUTTON
ENV-205

FOOT SWITCH
ENV-205FS

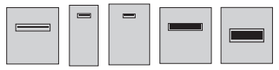
- Can be used as:
  - An input to trigger an event
  - An output with Y-Cable *(SG-216C)* for shaping

Cable: 15′ L *(4.6 m)*

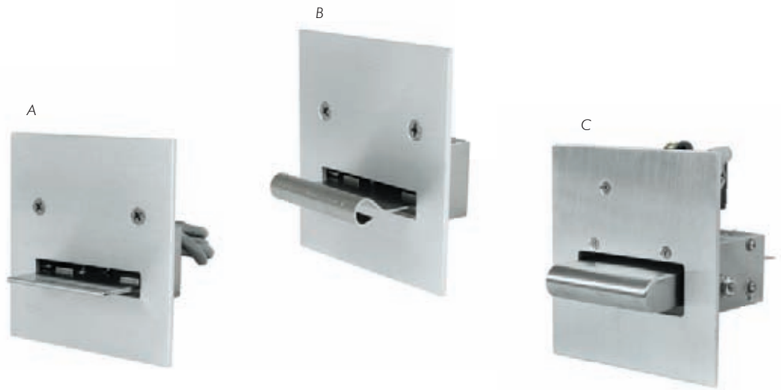
I/Os Required: 1 IN or 1 OUT

NOTE: Specify the intended use at time of order so that the proper connector can be added

IMAGES
B) Foot Switch C) Hand-held Push Button



ENV-110M, ENV-310M, ENV-310W,
ENV-110RM, ENV-116M



LEVERS

- Mechanical stop protects switch from excessive pressure

STANDARD LEVER
ENV-110M | ENV-310M | ENV-310W

- Mouse models referred to as "ultra-sensitive", due to the use of a photobeam rather than a mechanical switch

I/Os Required: 1 IN

STANDARD LEVER w/ROLLED EDGE
ENV-110RM

I/Os Required: 1 IN

GERBRANDS STYLE EXTRA THICK LEVER
ENV-110RM

- Designed in the style of the original Gerbrands lever
- Paddle has a smooth, rounded end to discourage chewing and biting

I/Os Required: 1 IN

RETRACTABLE LEVER
ENV-112CM | ENV-112CML | ENV-312-3M | ENV-312-3W

- Quiet, smooth, reliable operation
- Friction-free pivot
- Sends inputs to report lever response and position
- Requires minimal holding current to control lever position
- Illuminated option available *(ENV-112CML)*
- Retraction speed / Cycle Time:
  - Rat: 350 ms *(+/- 20 ms)* / 1 s cycle
  - Mouse: 205 ms *(+/- 20 ms)* / 175 ms cycle

I/Os Required: 1 IN* / 1 OUT

**NOTE: Rat model has optional lever position function, requiring a second input*

IMAGES

A) Standard Lever B) Standard Lever w/Rolled Edge C) Gerbrands Style Extra Thick Lever D) Retractable Lever w/Illumination shown in the dark E) Retractable Lever w/Illumination back side F) Retractable Lever

ENV-112CM, ENV-112CML,
ENV-312-3M, ENV-312-3W

	LEVER SPECS							
	NAME	SPECIES	PANEL	WIDTH	EXTEND	EDGE (OD)	POSITION (H)	RESPONSE
ENV-110M	Standard Lever	Rat	1/4 Standard	1.8″ *(4.6 cm)*	0.8″ *(2 cm)*	0.1″ *(0.3 cm)*	1.1″ *(2.8 cm)*	15-100 g *(adjustable)*
ENV-110RM	Standard Lever w/Rolled Edge	Rat	1/4 Standard	1.8″ *(4.6 cm)*	0.9″ *(2.3 cm)*	0.3″ *(0.8 cm)*	1.1″ *(2.8 cm)*	15-100 g *(adjustable)*
ENV-116M	Gerbrands Style Extra Thick Lever	Rat	1/4 Standard	1.9″ *(4.8 cm)*	0.8″ *(2 cm)*	0.5″ *(1.3 cm)*	1.3″ *(3.3 cm)*	35 g
ENV-310M	Standard Lever	Mouse	1/2 Classic	0.6″ *(1.5 cm)*	0.3″ *(0.8 cm)*	0.1″ *(0.3 cm)*	2.9″ *(7.4 cm)*	2 g
ENV-310W	Standard Lever	Mouse	1/2 Wide	0.6″ *(1.5 cm)*	0.3″ *(0.8 cm)*	0.1″ *(0.3 cm)*	2.9″ *(7.4 cm)*	2 g
ENV-112CM	Retractable Lever	Rat	1/4 Standard	1.8″ *(4.6 cm)*	0.8″ *(2 cm)*	0.1″ *(0.3 cm)*	2.5" *(6.4 cm)*	15-100 g *(adjustable)*
ENV-112CML	Retractable Lever - Illuminated	Rat	1/4 Standard	1.8″ *(4.6 cm)*	0.8″ *(2 cm)*	0.1″ *(0.3 cm)*	2.5" *(6.4 cm)*	15-100 g *(adjustable)*
ENV-312-3M	Retractable Lever	Mouse	1/2 Classic	0.6″ *(1.5 cm)*	0.4″ *(0.95 cm)*	0.1″ *(0.3 cm)*	2.9" *(7.4 cm)*	2 g
ENV-312-3W	Retractable Lever	Mouse	1/2 Wide	0.6″ *(1.5 cm)*	0.4″ *(0.95 cm)*	0.1″ *(0.3 cm)*	2.9" *(7.4 cm)*	2 g

	NOSE POKE SPECS					
	NAME	SPECIES	PANEL	OPENING (OD×D)	POSITION (H)	RESPONSE
ENV-114AM	Nose Poke Response Key w/IR Detection	Rat	3/8 Standard	1″ x 0.8″ *(2.5 x 2 cm)*	3.9″ *(9.9 cm)*	N/A
ENV-119M-1	Nose Poke Response Key	Rat	3/8 Standard	1″ x 0.1″ *(2.5 x 0.3 cm)*	2.6″ *(6.6 cm)*	15 g
ENV-119M-2	Nose Poke Response Key	Rat	3/8 Standard	2″ x 0.1″ *(5.1 x 0.2 cm)*	2.6″ *(6.6 cm)*	15 g
ENV-316M	Nose Poke Response Key	Mouse	3/4 Classic	0.6″ x 0.1″ *(1.5 x 0.3 cm)*	2.6″ *(6.6 cm)*	3 g
ENV-316W	Nose Poke Response Key	Mouse	3/4 Wide	0.6″ x 0.1″ *(1.5 x 0.3 cm)*	2.6″ *(6.6 cm)*	3 g
ENV-114BM	Illuminated Nose Poke	Rat	1/4 Standard	1″ x 0.8″ *(2.5 x 2 cm)*	2.3″ *(5.8 cm)*	N/A
ENV-313M	Illuminated Nose Poke	Mouse	1/2 Classic	0.5″ x 0.4″ *(1.3 x 1 cm)*	2.6″ *(6.6 cm)*	N/A
ENV-313W	Illuminated Nose Poke	Mouse	1/2 Wide	0.5″ x 0.4″ *(1.3 x 1 cm)*	2.6″ *(6.6 cm)*	N/A
ENV-114M	Nose Poke w/Triple Cue Light	Rat	3/8 Standard	1″ x 0.8″ *(2.5 x 2 cm)*	3.9″ *(9.9 cm)*	12-15 g
ENV-314M	Nose Poke w/Triple Cue Light	Mouse	1/2 Classic	0.5″ x 0.4″ *(1.3 x 1 cm)*	2.6″ *(6.6 cm)*	N/A
ENV-314W	Nose Poke w/Triple Cue Light	Mouse	1/2 Wide	0.5″ x 0.4″ *(1.3 x 1 cm)*	2.6″ *(6.6 cm)*	N/A

NOSE POKES

NOSE POKE RESPONSE KEY
ENV-114AM | ENV-119M-1 | ENV-119M-2 | ENV-316M | ENV-316W

- Provides tactile feedback, a fundamental element that helps facilitate shaping and learning
- Plastic target can be backlit
- Infrared detector placed 0.25″ *(0.64 cm)* in from the front edge *(ENV-114AM only)*

I/Os Required: 1 IN

ILLUMINATED NOSE POKE
ENV-114BM | ENV-313M | ENV-313W

- Yellow stimulus light at the back of the nose poke opening for an enhanced visual cue
- Infrared detector placed 0.25″ *(0.64 cm)* in from the front edge
- Light Color: 585 nm *(yellow)*
  - *NOTE: Other light colors are available upon request*

I/Os Required: 1 IN / 1 OUT

NOSE POKE w/TRIPLE CUE LIGHT
ENV-114M | ENV-314M | ENV-314W

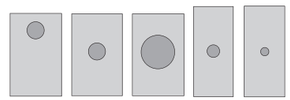
- Individually controlled red, yellow, and green LED lights at the back of the access opening
- Infrared detector placed 0.25″ *(0.64 cm)* in from the front edge

I/Os Required: 1 IN / 1-3 OUT

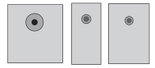
IMAGES

A) Nose Poke Response Key B) Illuminated Nose Poke C) Nose Poke w/Triple Cue Light

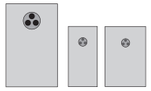
A



ENV-114AM, ENV-119M-1, ENV-119M-2, ENV-316M, ENV-316W



ENV-114BM, ENV-313M, ENV-313W



ENV-114M, ENV-314M, ENV-314W

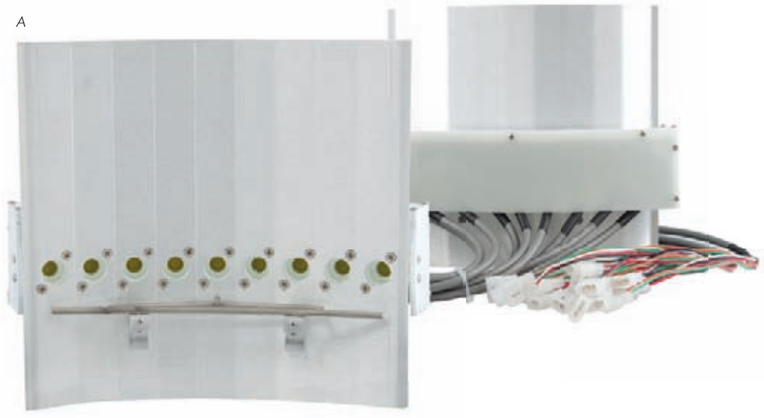
B

C

	NOSE POKE WALL SPECS						
	NAME	SPECIES	FITS CHAMBER	HOLES	LIGHT (OD)	IR PLACEMENT (FROM FRONT)	OPENING (OD×D)
ENV-115A-07	Five Hole Curved Nose Poke Wall	Rat	ENV-007	5	0.3″ *(0.8 cm)*	0.5″ *(1.3 cm)*	1″ x 0.8″ *(2.5 x 2 cm)*
ENV-115A-08	Five Hole Curved Nose Poke Wall	Rat	ENV-008	5	0.3″ *(0.8 cm)*	0.5″ *(1.3 cm)*	1″ x 0.8″ *(2.5 x 2 cm)*
ENV-115C	Five Hole Curved Nose Poke Wall	Mouse	ENV-307W	5	0.3″ *(0.8 cm)*	0.2″ *(0.5 cm)*	0.5″ x 0.4″ *(1.3 x 1 cm)*
ENV-115C-A	Five Hole Curved Nose Poke Wall	Mouse	ENV-307A	5	0.3″ *(0.8 cm)*	0.3″ *(0.8 cm)*	0.5″ x 0.4″ *(1.3 x 1 cm)*
ENV-115-9NP	Nine Hole Curved Nose Poke Wall	Rat	ENV-007	9	0.3″ *(0.8 cm)*	0.5″ *(1.3 cm)*	1″ x 0.8″ *(2.5 x 2 cm)*
ENV-115C-9	Nine Hole Curved Nose Poke Wall	Mouse	ENV-307W	9	0.3″ *(0.8 cm)*	0.2″ *(0.5 cm)*	0.5″ x 0.4″ *(1.3 x 1 cm)*

NOTE: Nine hole curved nose poke wall cannot fit on a classic mouse chamber.

A



CURVED NOSE POKE WALL

CURVED NOSE POKE WALL
ENV-115A-07 | ENV-115A-08 | ENV-115C | ENV-115C-A | ENV-1159NP | ENV-115C-9

- Installs in a modular chamber by removing the two center supports and sliding the ends of the wall into the remaining modular channels.
  - An extra grid rod is attached to the wall to fill the gap created by the curve *NOTE: Extra grid rod cannot be used for aversive stimulus.*
- A yellow stimulus light is mounted flush with the back wall
- Access openings in mouse units are circular, while rat are square

I/Os Required: 5 or 9 OUT

IMAGES

A) Nine Hole Curved Nose Poke Wall for mouse B) Five hole nose poke wall for rat shown in an example setup

B

FIVE + NINE CHOICE SERIAL REACTION TIME TASK PROTOCOLS

FIVE CSRTT PROTOCOL
SOF-700RA-8A

FIVE CSRTT W/OLFACTORY PROTOCOL
ENV-700RA-33

NINE CSRTT PROTOCOL
SOF-700RA-8

- Includes basic preset procedures for both a reward and test interval
- User defined parameters:
  - Run, limited hold *(duration of the serial choice phase)*, time out, reward duration, session time, cue duration, ITI duration
- Data Collected:
  - Responses correct/incorrect/premature/perseverant/time out, omissions, total receptacle head entries, percent correct/incorrect/omission, average latency to responses correct/incorrect, average latency to reward

NOTE: Any MedState Notation™ utility may be modified by the user, or custom coded by our software engineering department. Please contact Sales for details.

	RESPONSE KEY w/LCD DISPLAY SPECS					
	NAME	SPECIES	PANEL	OPENING (OD×D)	POSITION (H)	RESPONSE
ENV-131M	Response Key w/LCD Stimulus Display	Rat	3/8 Standard	1″ x 0.1″ *(2.54 x 0.25 cm)*	1.5″ *(3.8 cm)*	N/A

RESPONSE KEY w/LCD STIMULUS DISPLAY

RESPONSE KEY w/LCD STIMULUS DISPLAY
ENV-131M

- Create custom images on the computer software, then display them using the Response Key Image Downloader *(ENV-131M-DL, sold separately)*
- Comes pre-loaded with 48 image/color combinations:
  - 7 white shapes
    - Triangle, circle, plus, square, X, vertical bar, horizontal bar
  - 6 solid background colors
    - Black, red, green, blue, yellow, ecru
  - 1 no shape

I/Os Required: 1 IN / 1-6 or 12 OUT

RESPONSE KEY IMAGE DOWNLOADER
ENV-131M-DL

- Store and display up to 64 custom full color 240x320 px 16-bit bitmap (*.bmp) images
- Med Image Downloader Software *(SOF-400, included)* enables the creation and import of custom images
- Display images on an unlimited amount of response keys *(ENV-131M)*
- Connects to PC via USB and the Response Key *(ENV-131M)* via CAT-5 *(both included)*

IMAGES

B) Response Key w/LCD Stimulus Display C) Response Key Image Downloader

NOTE: Pictured with old feeder, now includes VeriFEED pellet dispenser

A

SELF-ADMINISTRATION

SOCIAL SELF-ADMIN PACKAGES
MED-SOCIAL

Originally created for Marco Venniro and Yavin Shaham* as a custom build, the social self-administration chamber is now available as a standard product.

This chamber was crafted to run an operant model in which the rodent engages in lever pressing, rewarded with either social interaction, or a drug infusion. This model is intended for studying the role of operant social reward in addiction, as well as addiction vulnerability.

- A chamber with a modified top for the resident (drug user) rodent is conjoined with a smaller chamber that houses their drug naïve social partner
- The automatic door linking the two has a custom-designed grate to prevent the rodents from being able to touch, but can still see, smell, and hear each other

**Venniro, M., Shaham, Y. An operant social self-administration and choice model in rats. Nat Protoc 15, 1542–1559 (2020).*

Packages Include: An MDF SAC, a social chamber w/ modified top, house light and stimulus lights, fixed lever, retractable levers (x2), pellet dispenser with a cup, single speed syringe pump, sonalert module, 8in/16out SmartCtrl package, drug delivery arm, Instech VAB setup, and cables

ORAL DRUG SELF-ADMIN PACKAGES
MED-XXX-B3 | MED-XXX-B4

Packages Include: Extra tall MDF SAC, modular chamber w/modified top, dual liquid cups or liquid dipper, house light and stimulus lights, fixed levers (x2), 4in/8out SmartCtrl package, single speed syringe pumps (x2), liquid delivery kit, and cables

INRTAVENOUS DRUG SELF-ADMIN PACKAGES
MED-XXX-B1 | MED-XXX-B2 | MED-XXX-D1

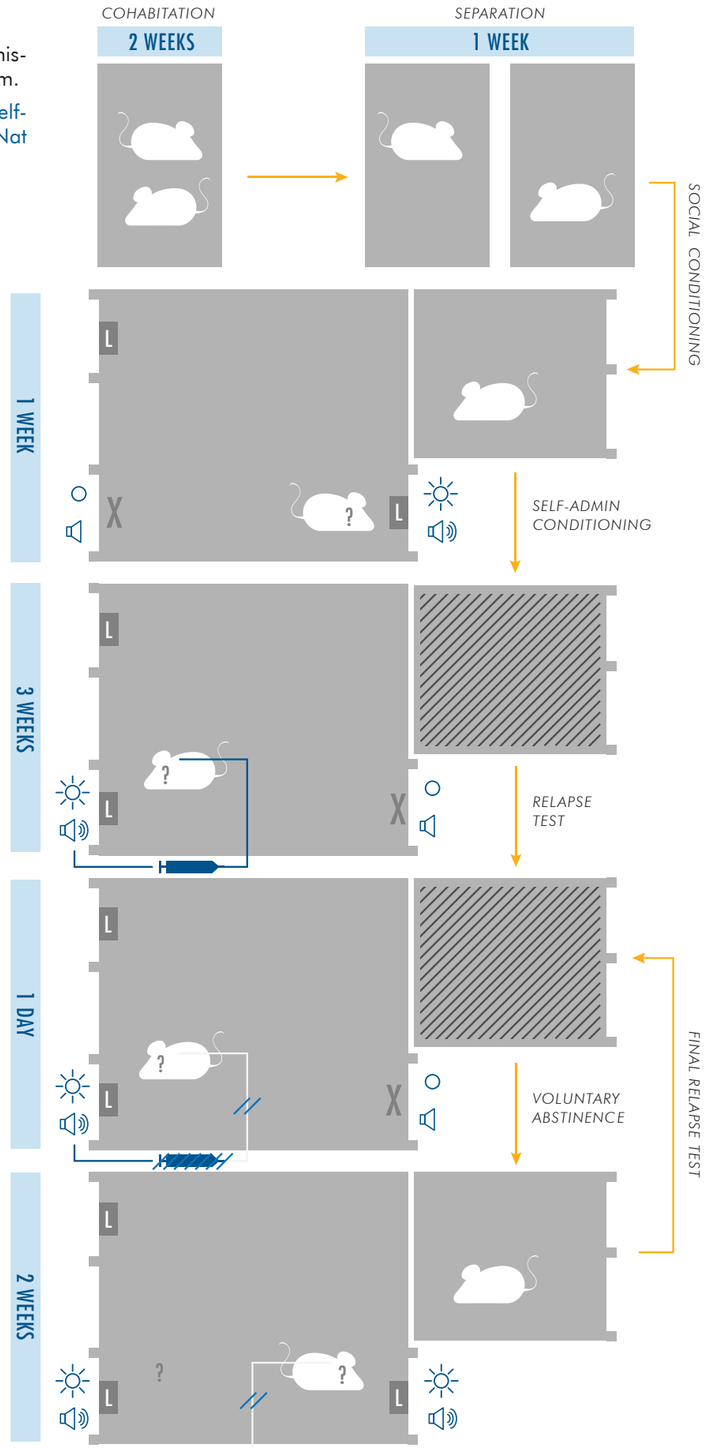
Packages Include: A standard MDF SAC, modular chamber w/modified top, house light and stimulus lights, fixed or retractable levers, nose pokes, pellet dispenser with a trough, single or variable speed syringe pump, 4in/8out SmartCtrl package, drug delivery arm, Instech VAB set-up, and cables.

IMAGES

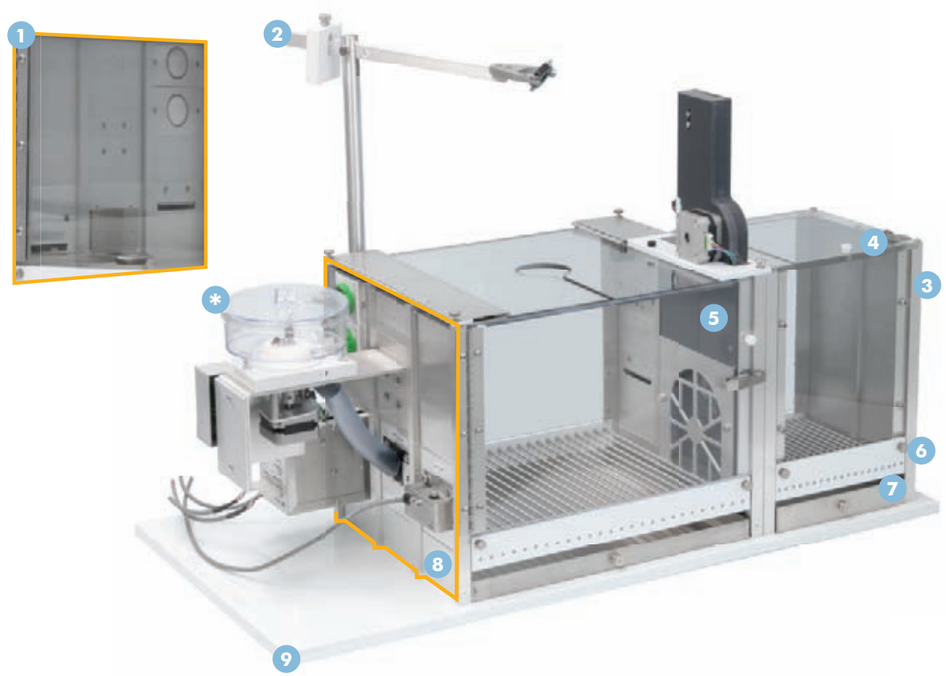
A) Intravenous Self Admin setup

Summary of the original social self-administration protocol used by Venniro & Shaham.

Venniro M, Shaham Y. An operant social self-administration and choice model in rats. Nat Protoc. 2020 Apr;15(4):1542-1559.



	SOCIAL SELF-ADMIN CHAMBER SPECS			
	BASE (L×W×H)	MAIN CHAMBER (L×W×H)	SIDE CHAMBER (L×W×H)	FITS IN SAC
ENV-008CT-SOCIAL	27″ x 13.8″ x 0.5″ *(68.6 x 35.1 x 1.3 cm)*	11.6″ x 9.8″ x 7.4″ *(29.5 x 24.9 x 18.8 cm)*	6.1″ x 6.3″ x 7.4" *(15.5 x 16 x 18.8 cm)*	SAC-302216-27
ENV-307WCT-SOCIAL	27″ x 13.8″ x 0.5″ *(68.6 x 35.1 x 1.3 cm)*	8.5″ x 7.1″ x 5″ *(21.6 x 18 x 12.7 cm)*	6.1″ x 4.9″ x 5" *(15.5 x 12.4 x 12.7 cm)*	ENV-018MD



1. Two retractable levers help focus self-administration conditioning, by removing access to them or adding as a reward. In this example, one opens the social door, the other administers pellet reward. In addition, one fixed lever as control, additional reward, or event trigger, and one pellet dispenser and receptacle.
2. One single speed syringe pump, drug delivery arm, magnetic vascular access button (VAB), and single channel magnetic VAB tether kit create a drug delivery reward system to model chemical dependency and addiction through the blood.
3. Operant partner chamber provides an experimental environment to condition subject animals to perform various experimental actions to produce predictable effects.
4. Clear polycarbonate access doors.
5. A solid auto door with a specialized grid in front of it, completely blocks contact when closed. When opened, it enables the animal to see, smell, and hear the partner animal, but prevents contact.
6. Stainless steel grid floors supported with polypropylene walls come out in one piece with only two thumb screws.
7. Autoclavable stainless steel waste pans help to create an experimentally replicable environment.
8. Aluminum channels affixed to the base support the easy-to-clean stainless steel modular components, which are designed to be easily changed out for all your current and future experimental needs.
9. White polypropylene base is easy-to-clean and chemical resistant.

NOTE: Social Chamber for Rat shown with old feeder, now includes VeriFEED pellet dispenser

SELF ADMINISTRATION COMPONENTS

STAINLESS STEEL SWIVEL - SINGLE CHANNEL
PHM-115I | PHM-124B

- Includes a universal swivel-to-tether clamp that connects to all of Instech's button, harness, and head block tethers
- Fully autoclavable
- Mouse 25 ga *(PHM-124B)* Rat 22 ga *(PHM-115I)*

DISPOSABLE PLASTIC SWIVEL - SINGLE CHANNEL
PHM-115IP | PHM-115IP-25

- Instech's plastic infusion swivels are designed for researchers that require components touching the fluid path to be replaced after each experiment
- Shipped sterile and individually packaged
- Not autoclavable
- Mouse 25 ga *(PHM-115IP-25)* Rat 22 ga *(PHM-115IP)*

DRUG DELIVERY ARM
PHM-110-SAI

- 3/8" Gimbal Ring
- Includes an aluminum block for mounting on most rat modular test chambers
  - The back wall on our ENV-007/-008 modular test chambers is pre-drilled for this block, or it can be mounted on a modular panel
- The post adjusts to extend up to 8" *(20.3 cm)* above the chamber and 7" *(17.8 cm)* over the center with a pivot-arm and dual action gimbal
- An adjustable counterbalance weight maintains sufficient tension to keep the leash assembly away from the test animal

MULTI-AXIS LEVER ARM
PHM-124A | PHM-124MA

- Generates a light adjustable upward lift to remove tether slack which helps keep the tether out of the animal's reach while allowing unhindered motion of the swivel (sold separately) as it follows the animal
- The classic mouse chamber model is mounted on a modular panel (left), while the wide mouse chamber model is screwed into the ceiling

VASCULAR ACCESS BUTTON
PHM-VABM1B/25 | PHM-VABR1B/22

Instech's mouse VAB™ permits quick, aseptic connection and disconnection of a catheterized mouse and an infusion tether. This updated design uses magnets for ease of use and reduction of impact on animal welfare.

- Built-in ports create a closed system to minimize bacteria, air and backflow which will compromise patency.
- Choose round-tip polyurethane jugular vein catheters with insertion length based on body weight; 3Fr for rats, 2Fr for mice. Proper tip placement is critical for long-term patency (surgical SOPs are available from Instech).
- Access the port of the button using a syringe fitted with a mating PinPort™ injector.
- When the animal is placed in the chamber, snap the tether onto the button with a simple magnetic connection.
- Aluminum caps (sold separately) are available to protect the button when group housing animals.
- Mouse 25 ga *(PHM-VABM1B/25)* Rat 22 ga *(PHM-VABR1B/22)*

TETHER KIT
PHM-KVABM1T/MED | PHM-KVABR1T/MED

- Septum permits aseptic technique
- Quick, low profile connection with minimal backflow
- Mouse 25 ga *(PHM-KVABM1T/MED)* Rat 22 ga *(PHM-KVABR1T/MED)*

CATHETER
C20PU-MJV2012 | C20PU-MJV2013 | C20PU-MJV2014 | C30PU-RJV2323 | C30PU-RJV2326 | C30PU-RJV2329 | C30PU-RJV2332

Use with Mouse VAB (VABM1B/25)

20g: C20PU-MJV2012
25g: C20PU-MJV2013
30g: C20PU-MJV2014

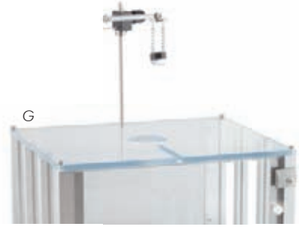
Use with Rat VAB (VABR1B/22)

225g: C30PU-RJV2323
250g: C30PU-RJV2326
300g: C30PU-RJV2329
350g: C30PU-RJV2332

IMAGES

A) Tether Kit for mouse and rat B) Disposable Plastic Swivel C) Stainless Steel Swivel D) Vascular Access Button E) Drug Delivery Arm shown installed on a chamber setup F) Multi-axis lever arm shown installed on a wide chamber setup G) Multi-axis lever arm shown installed on a classic chamber setup

	SELF-ADMIN ARM SPECS				
	NAME	SPECIES	FITS CHAMBER	MOUNT	GAUGE
ENV-131M	Drug Delivery Arm	Rat	ENV-007 / -008	Modular panel	N/A
PHM-124MA	Multi-Axis Lever Arm	Mouse	ENV-307A	Modular panel	N/A
PHM-124A	Multi-Axis Lever Arm	Mouse	ENV-307W	Ceiling	N/A



A

B

C

D

E

STANDARD SYRINGE PUMPS

The next generation of our time-tested PHM-100 series syringe pump has significant improvements, including a complete redesign of the enclosure, anti-siphoning hardware, and a purge/flush feature.

- Can be operated standalone, or activated and de-activated by a Med-PC® 28 V output (3-pin micro-fit Molex)
- Time "on" determines the dose
- A built-in limit switch disconnects power when the plunger reaches the end of the syringe
- Stainless steel and aluminum construction

NOTE: A calibration sheet is included with every pump, which supplies a formula for calculating flow rate using any syringe.

SINGLE SPEED SYRINGE PUMP
PHM-200

The motor is single fixed speed, the speed of the motor determines the infusion rate for the syringe.

- Speeds available: 0.1, 0.5, 1, 1.5, 2, 3.33, 5, 10, 15, 20, 30 RPM

NOTE: 3.33 RPM is standard

I/Os Required: 1 OUT

VARIABLE SPEED SYRINGE PUMP
PHM-210

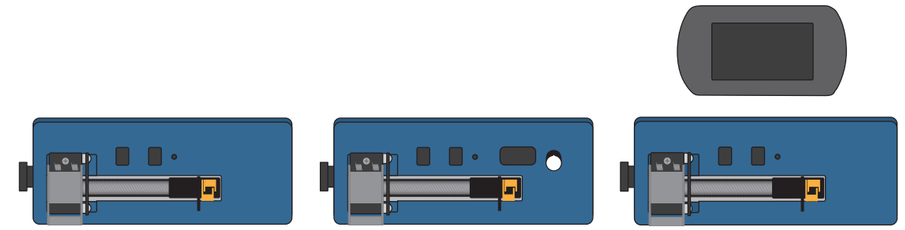
The motor speed is adjustable, the speed of the motor determines the infusion rate for the syringe.

- Adjustable from 0.1 – 30 RPM in 0.1 increments

I/Os Required: 1 OUT

IMAGES

A) Right side (MED control and power connections) B) 1mL syringe with R-ACC micro syringe adapter (sold separately) C) Left side (drive screw adjustment knob) D) Single speed syringe pump (PHM-200) shown with 30mL syringe E) Variable speed syringe pump (PHM-210) shown with 30mL syringe

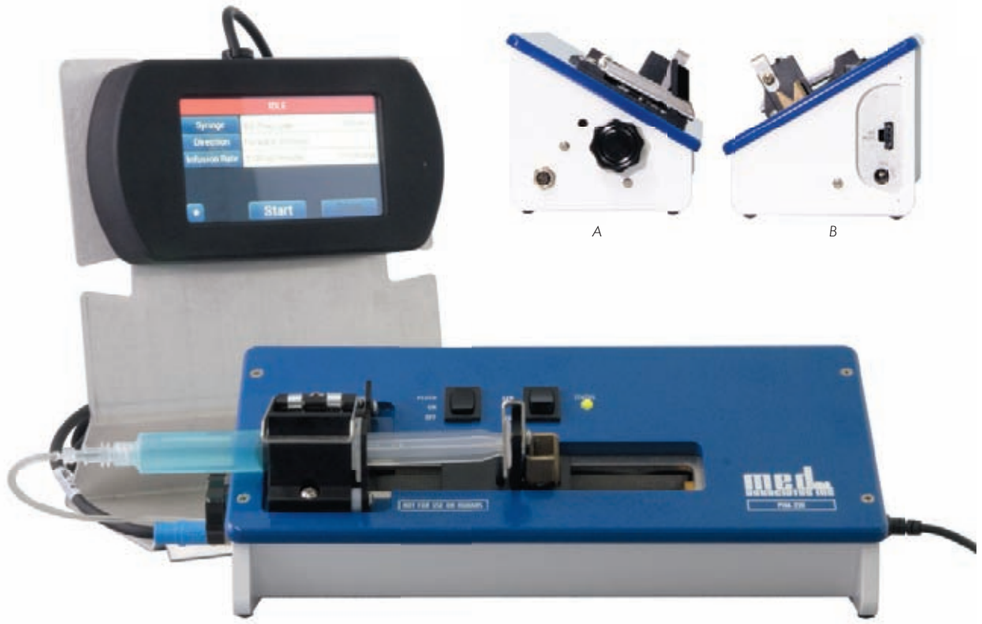


	PHM-200	PHM-210	PHM-220
COMPARABLE MODELS	PHM-100, PHM-108	PHM-100VS-2, PHM-107	PHM-111-EC
OPERATION	◦Standalone ◦Remote via Med-PC *using 28V Output, a 3-pin micro-fit Molex*	◦Standalone ◦Remote via Med-PC *using 28V Output, a 3-pin micro-fit Molex*	◦Standalone ◦Remote via Med-PC or Razel IPC *using 28V Output, a 3-pin micro-fit Molex or USB serial port*
TYPE	Single Speed	Variable Speed	Variable Speed
MOTOR SPEED RANGE	3.33 RPM standard *(available: 0.1, 0.5, 1, 1.5, 2, 3.33, 5, 10, 15, 20, 30 RPM)*	0.1 - 30 RPM *(adjustable in 0.1 RPM increments)*	0.1 - 30 RPM *(adjustable in 0.01 RPM increments)*
SPEED SELECTOR	N/A (factory set)	1.7" display w/rotary encoder	Dose Control Interface w/4.25" Touchscreen
INFUSION RATE RANGE[1]	From 0.2 mL/hr *(0.1 RPM + 1mL syringe)* to 32.1 mL/min *(30 RPM + 50mL syringe)*	From 0.2 mL/hr *(0.1 RPM + 1mL syringe)* to 32.1 mL/min *(30 RPM + 50mL syringe)*	From 0.2 mL/hr *(0.1 RPM + 1mL syringe)* to 32.1 mL/min *(30 RPM + 50mL syringe)*
SYRINGE SIZES[2]	1 - 60 mL *(small syringes require R-ACC adapter)*	1 - 60 mL *(small syringes require R-ACC adapter)*	1 - 60 mL *(small syringes require R-ACC adapter)*
SYRINGE TYPE	Plastic or Glass	Plastic or Glass	Plastic or Glass
ELECTRICAL	28V DC, 700 mA 100V-240V AC, 50-60 Hz, 25W	28V DC, 700 mA 100V-240V AC, 50-60 Hz, 25W	28V DC, 700 mA 100V-240V AC, 50-60 Hz, 25W
ACCURACY	+/- 1.0% CV	+/- 1.0% CV	+/- 1.0% CV
LIMIT SWITCH?	YES	YES	YES
REVERSE?	NO	YES	YES
PURGE/FLUSH SPEED	20 RPM	20 RPM	20 RPM
CONSTRUCTION	Aluminum, Stainless Steel	Aluminum, Stainless Steel	Aluminum, Stainless Steel
OVERALL SIZE	10.5" L x 4.3" W x 3.5" H *(26.7 x 10.9 x 8.9 cm)*	10.5" L x 4.3" W x 3.5" H *(26.7 x 10.9 x 8.9 cm)*	10.5" L x 4.3" W x 3.5" H *(26.7 x 10.9 x 8.9 cm)*
ACCESSORIES	R-ACC *(for microsyringes)*	R-ACC *(for microsyringes)*	R-ACC *(for microsyringes)*

$$\text{Flow Rate (mL/min)} = 0.19538 \times \text{Motor RPM} \times \text{Syringe Cross Sectional Area (cm}^2\text{)}$$

1) Infusion range is approximate, calculated using example syringes (1mL = 0.174cm² / 50mL = 5.477cm²), different syringes may yield greater or lesser infusion rates.

2) Using syringes with plunger flanges greater than 1" OD requires removal of the plunger lock, which disables the syringe reversal feature. 30 mm diameter barrel max.



A

B

ADVANCED SYRINGE PUMPS

ADVANCED USB TOUCHSCREEN SYRINGE PUMP

PHM-220

The Advanced USB Touchscreen Syringe Pump offers the ability to control the operation of the pump either locally using the intuitive touchscreen interface, or remotely via a serial USB port, or a 28V Med-Connect port.

- Specify a syringe from a list of makes and capacities, as well as set the desired infusion rate
- Our recommended pump for variable speed and remote operated infusion or siphoning applications
- The pump can be controlled via computer using:
  - Med-PC software *(w/SOF-111)*
  - RAZEL-IPC Infusion Pump Control software *(w/SOF-111)*
  - SOF-111 USB Syringe Pump Test Program *(included)*
  - 3rd party/custom software
- Safety features:
  - Automatic shut-off switch
  - Alarm
  - Safety Timer
- Replaces the PHM-111-EC pump
- Compare all pumps using the chart on the previous page

I/Os Required: 1 OUT

IMAGES

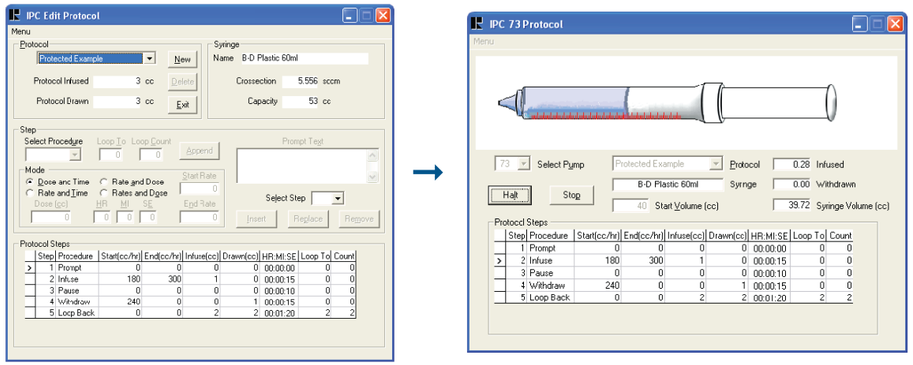
A) Right side (MED control and power connections) B) Left side (drive screw adjustment knob)

- The PHM-220 pump is pre-loaded with syringe settings for common commercially available syringe makes and sizes. The device can operate in both direction modes with most commercially made syringes. The inner barrel diameter (ID) and subsequent flow rate ranges of many commercial makes are available in the manual.
- Common glass syringes are integrated into the pump interface and can be selected to reference a calculated flow rate estimate.
- Syringes are organized by make and then by fluid capacity.

- From the Set Infusion Rate view, the user can choose to change the Rate within the Valid Infusion Rate range listed at the bottom of this view in units set in the Select Infusion Units view.

- For user convenience, conversions are pre-programmed into the pump to convert the rate units using either the manually entered or pre-programmed syringes on the Syringe Selection view.

RAZEL®
SCIENTIFIC INSTRUMENTS



SYRINGE PUMP SOFTWARE

INFUSION PUMP CONTROL SOFTWARE
RAZEL-IPC

A Windows® based program used to control the PHM-220 pump remotely via USB, without the use of Med-PC®. The program allows the user to design an infusion protocol and then send the commands to the pump.

- Control for up to 24 infusion pumps simultaneously
- Infusion protocol steps easily added or removed.
- Contains profiles of commonly used syringes organized by manufacturer, type and size

NOTE: If a syringe is not on the list, its cross-sectional area can easily be entered to calculate flow rate

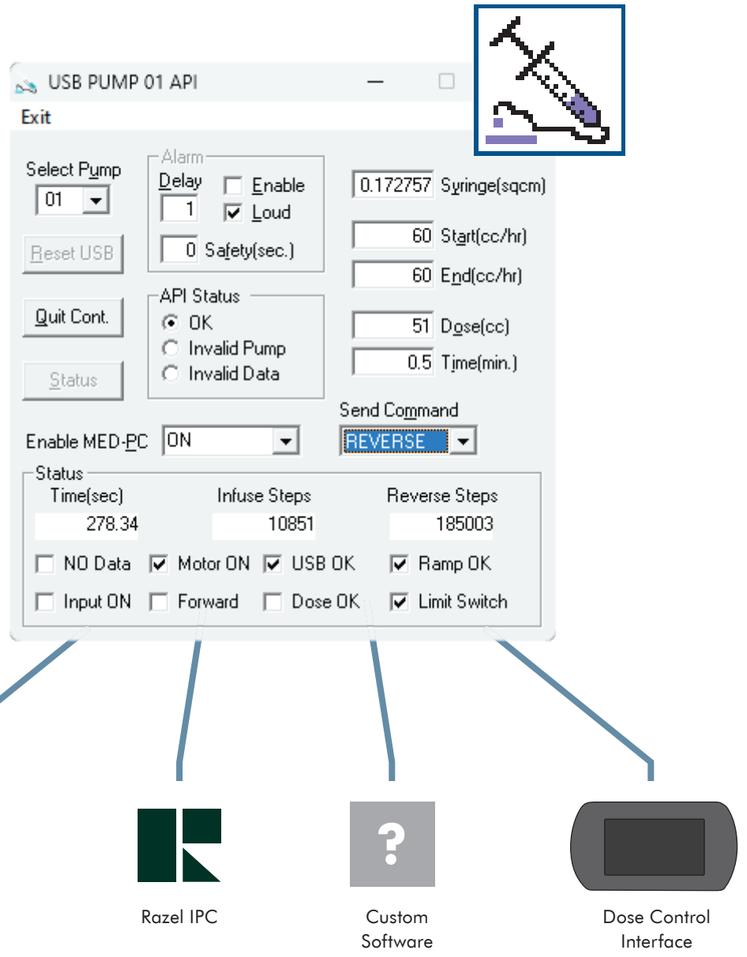
- User defined infusion protocols specify:
  - Infusion specification, withdrawal & pauses, initial flow rates, final flow rates, volume infused, and duration of infusion
- Save the entire protocol, both fixed and variable parameters.
- Multiple variable parameters can be changed via convenient drop-down menus.

"Run" screen displays:

- Real-time graphic of the syringe, protocol being used, syringe size, total volume infused & withdrawn, and current protocol step indicator

Computer Requirements:

- Windows 7 or newer *(64-bit)*
- USB port (for pump)



INCLUDED WITH PHM-220

ADVANCED SYRINGE PUMP SOFTWARE

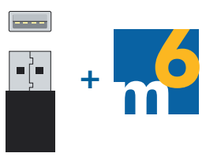
USB SYRINGE PUMP TEST PROGRAM
SOF-111

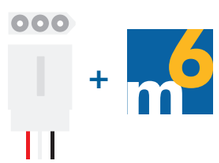
Included with the PHM-220 pump, this program provides a graphic user interface (GUI) to control the PHM-220 syringe pump.

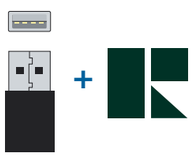
- On its own, it can do everything that the dose control interface does, with the addition of ramp doses and dispensation of a dosed volume.
- Used in conjunction with Med-PC as a graphic user interface to control the pump.

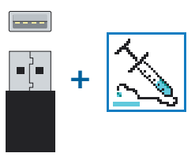
Computer Requirements:

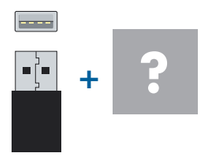
- Windows 7 or newer *(64-bit)*
- USB port (for pump)





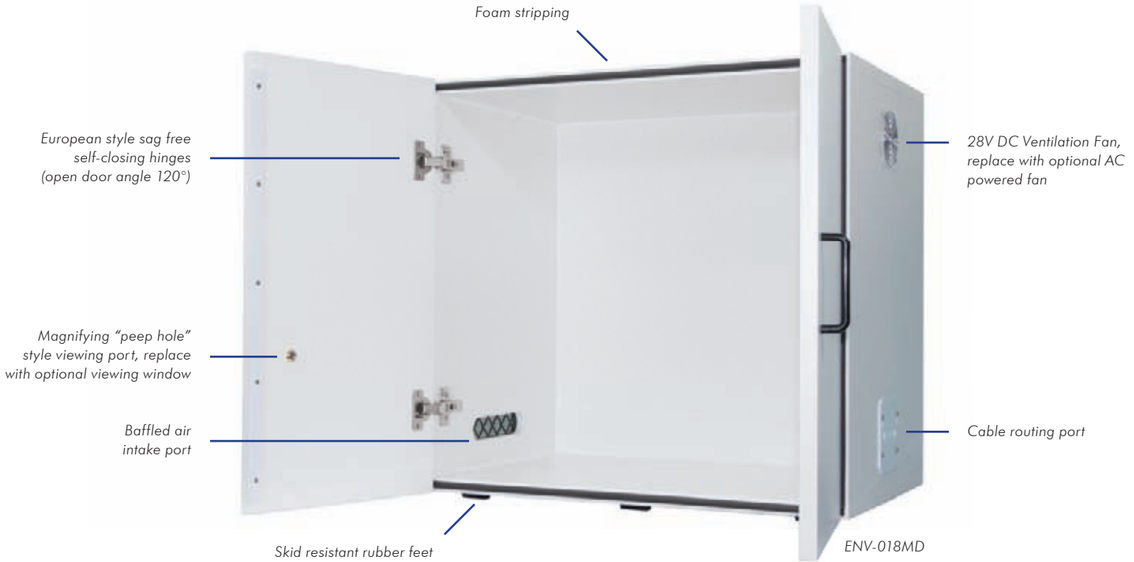






	USB + MED-PC	28V + MED-PC	USB + RAZEL IPC		N/A + DOSE CONTROL INTERFACE	USB + USB SYRINGE PUMP TEST PROGRAM (included w/pump)	USB + 3RD PARTY SOFTWARE
APPLICABLE PUMPS	PHM-220	PHM-200, PHM-210, PHM-220	PHM-220		PHM-220	PHM-220	PHM-220
COMMANDS AVAILABLE	OFF, ON, DOSE, RESET, REVERSE, INPUTOFF, INPUTON, RAMP, RAMPDOSE	OFF, ON	OFF, ON, DOSE, RESET, REVERSE, INPUTOFF, INPUTON, RAMP, RAMPDOSE		OFF, ON, RESET, REVERSE, INPUT-OFF, INPUTON	OFF, ON, DOSE, RESET, REVERSE, INPUTOFF, INPUTON, RAMP, RAMPDOSE	OFF, ON, DOSE, RESET, REVERSE, INPUTOFF, INPUTON, RAMP, RAMPDOSE
MAXIMUM # OF PUMPS	16	16	24		1	16	?
CAPABILITIES	• Best for incorporating the syringe pump into a behavioral experiment. • Trigger various commands dependent upon actions taken by the subject. • Set and save fixed parameters using MedState Notation as part of a protocol, or at the start of a run. • Using the included USB Syringe Pump Test Program provides a GUI for ease of use, and also enables the syringe pump to operate with all of its features.	• Incorporate the syringe pump into a behavioral experiment, but in its most basic form as a standard output device. Only able to control when to run it, and turn it off.	• Best for controlling infusions and planning sophisticated infusion control protocols that track dispensed volume and syringe progress. This is the only control mode/software combination to achieve these capabilities. • Save the entire protocol, both fixed and variable parameters. • Multiple variable parameters can be changed via convenient drop-down menus.		• Specify a syringe from either a list of pre-loaded makes and capacities, or input custom ones, with the ability to save them. • Set the infusion rate in the desired units of volume and time.	• On its own, it can do everything that the dose control interface does, with the addition of ramp doses and dispensation of a dosed volume. • Used in conjunction with Med-PC as a graphic user interface to control the pump.	• To interface with the pump with 3rd party or custom software, the included USB Syringe Pump Test Program will facilitate connection.
DRAWBACKS	• All of these functions are dependent on the complexity of the protocol and thus, the coder's skill level. • Unable to save variable parameters from run to run. • Not pre-programmed to track dispensed volume or syringe progress (coding required).	• Unable to use the USB Syringe Pump Test Program and all of its capabilities, or operate the PHM-220 pump in an advanced way.	• Unable to interface with Med-PC.		• Unable to ramp doses or set a dose to dispense as the USB Syringe Pump Test Program can. • Unable to interface with Med-PC. • Unable to track dispensed volume or syringe progress.	• On its own, it is unable to save either fixed or variable parameters. • Unable to track dispensed volume or syringe progress.	• Requires ability to link a 3rd party program to the pump via DLL file.

STANDARD FEATURES:



SOUND ATTENUATING CUBICLES (SAC)

MDF: Medium density fiberboard + laminate coating

- A high density wood composite with thermally fused white laminate inside and out

PVC: Sintra® expanded foam polyvinyl chloride.

- Lighter weight than MDF cubicles
- All seams are sealed
- Easy to clean, resistant to staining, moisture, and many chemicals
- Equal sound attenuation performance to MDF

EXTRA WIDE SAC MDF
ENV-016MD

Extra width accommodates our full range of modular components on the test chamber without interfering with SAC door operation.

EXTRA LARGE SAC MDF
ENV-017M

Our deepest and widest cubicle, best suited for use with our largest rodent chambers and modular components.

EXTRA TALL SAC MDF OR PVC
ENV-018MD | ENV-018V

Additional height accommodates standard chambers with overhead accessories, such as self administration or optogenetics.

STANDARD CPP SAC MDF
ENV-020M

Use with Conditioned Place Preference Chambers

EXTRA DEEP CPP SAC MDF
ENV-020MD

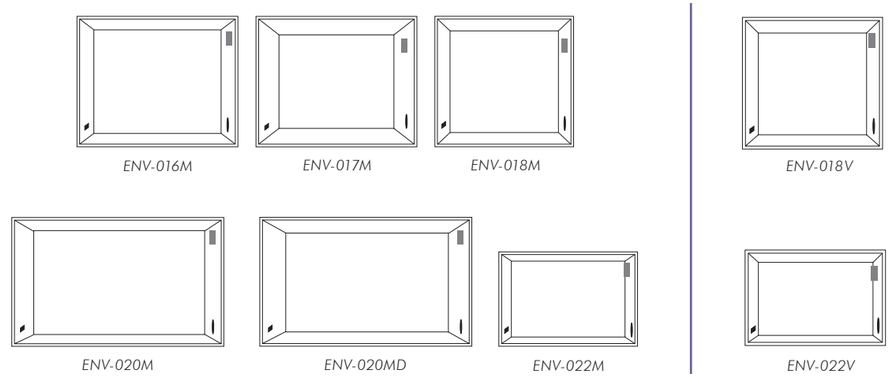
Use with Conditioned Place Preference Chambers

STANDARD SAC MDF OR PVC
ENV-022MD | ENV-022V

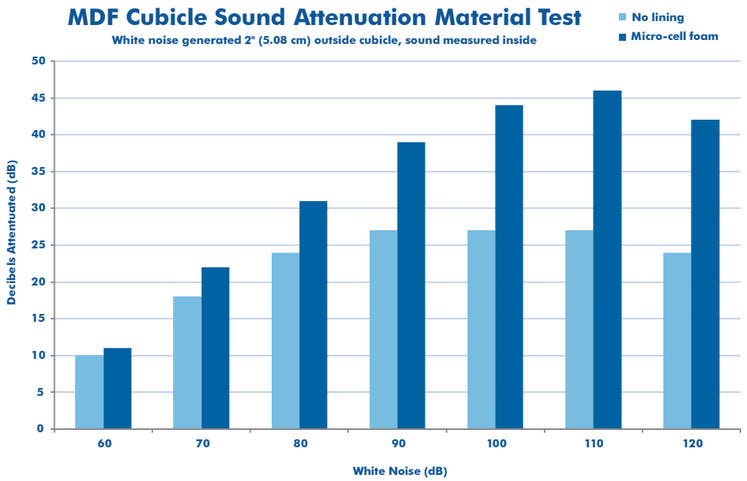
Standard size is suitable for most applications and most modular components.

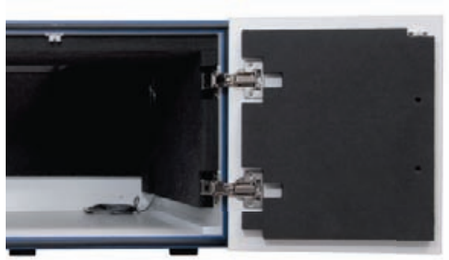
IMAGES

A) ENV-022V



	SOUND ATTENUATING CUBICLE SPECS			
	NAME	MATERIAL	INTERIOR (W×H×D)	EXTERIOR (W×H×D)
ENV-016MD	Extra Wide SAC	MDF	25.8" x 21.9" x 15.9" *(65.5 x 55.6 x 40.5 cm)*	29.9" x 24" x 19" *(76 x 61 x 48.3 cm)*
ENV-017M	Extra Large SAC	MDF	25.8" x 21.9" x 21.9" *(65.5 x 55.6 x 55.7 cm)*	29.9" x 24" x 25" *(76 x 61 x 63.5 cm)*
ENV-018MD	Extra Tall SAC	MDF	21.8" x 21.9" x 15.9" *(55.4 x 55.6 x 40.4 cm)*	25.9" x 24" x 19" *(65.8 x 61 x 48.3 cm)*
ENV-018V	Extra Tall SAC	PVC	21.8" x 21.9" x 13.9" *(55.4 x 55.6 x 35.3 cm)*	25.9" x 24" x 17" *(65.8 x 61 x 43.2 cm)*
ENV-020M	Standard CPP SAC	MDF	36.3" x 21.9" x 13.9" *(92.2 x 55.6 x 35.3 cm)*	39.9" x 23.5" x 15.8" *(101.3 x 59.7 x 40.1 cm)*
ENV-020MD	Extra Deep CPP SAC	MDF	36.3" x 21.9" x 15.9" *(92.2 x 55.6 x 40.4 cm)*	39.9" x 23.5" x 17.8" *(101.3 x 59.7 x 45.2 cm)*
ENV-022MD	Standard SAC	MDF	21.8" x 14.9" x 15.9" *(65.6 x 37.8 x 40.4 cm)*	25.9" x 17" x 19" *(65.8 x 43.2 x 48.3 cm)*
ENV-022V	Standard SAC	PVC	21.8" x 14.9" x 13.9" *(55.4 x 37.8 x 35.3 cm)*	25.9" x 17" x 17" *(65.8 x 43.2 x 43.2 cm)*





ACOUSTICAL FOAM

Add a layer of 1" thick micro-cell foam (crosslink polyethylene) to the inside of the cubicle and doors.

- Increases sound attenuation performance and reduces reverberation
- Refer to the above chart that compares the performance of a lined and un-lined SAC

ELECTRONIC SHIELDING

Electrically continuous layer of conductive carbon paint applied to all interior surfaces.

- Attenuation of ~44dB from 30MHz – 18GHz
- An exterior BNC port for connecting to an available earth ground in your lab, effectively turning the cubicle into a Faraday cage *(see p.83)*
- Ideal for experiments combining electrophysiology with behavioral techniques

VIEWING WINDOW

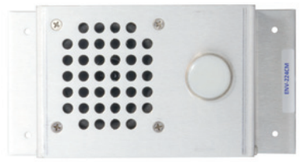
Replace the standard peephole in an MDF cubicle with a single pane polycarbonate window.

- Available in small, large, and full sizes
  - Full windows replace the standard double door with a single door, and is ideal for applications such as group viewing or video taping
- While any window will sacrifice some attenuation in front of the cubicle, it has little effect on neighboring cubicles

NOTE: Not recommended for expanded PVC cubicles. Shown with small window.

OVERHEAD CAMERA MOUNT

Pre-drilled holes for installing a Universal Camera Mount *(ENV-598)*.



SPEAKER + LIGHT

Mount a speaker and LED stimulus light anywhere inside the SAC. Typically positioned directly above the chamber.

NOTE: See the Audio section for more info.

PULL-OUT SHELF

Mount a 0.75"/1.9 cm thick MDF shelf inside the cubicle on drawer slides. Makes the changing out of chambers easier than ever!

NOTE: It is recommended that the back of the cubicle be anchored down for increased stability when sliding the drawer out.

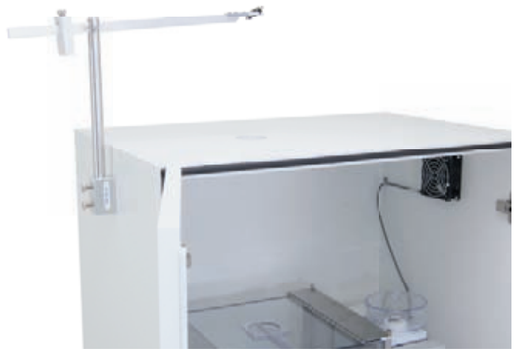
inside

VIDEO DOOR

Mount a camera into the door so it doesn't take up space inside the cubicle.

CONNECTION PANEL MOUNT

Add a plate to the back of your connection panel to mount it on the wall of the SAC. This is helpful in situations where the chamber's base plate gets crowded with devices, making reconfiguration difficult.



TETHER ARM MOUNT

A simple modification to any SAC, add a hole to the top and screw holes to the side for a tether arm to be mounted to the exterior and the line fed through the hole.

CUSTOM SOLUTIONS

Don't see what you're looking for, but have an idea? Contact our Sales team! We'll brainstorm together, and come up with a solution.

sales@med-associates.com
Monday – Friday | 8AM – 4:30PM
+1 (802) 527-2343

ELECTRICAL GROUNDING

EARTH GROUND JUNCTION BOX
SG-220

- Grounds our electronically shielded sound attenuation cubicles using a standard power cable and wall outlet
- Provides eight (8) BNC ports that are continuous with earth ground

NOTE: Do not connect signal outputs or inputs from regular instruments to this junction box using BNC cables

- An additional unit (power supply, computer chassis, etc.) can be plugged into the junction box using the three-pronged plug receptacle

IMAGES

A) Earth Ground Junction Box

A

B

VENTILATION

VENTILATION FAN - 28V DC
ENV-025F28

- Supplied standard with all SACs
- Requires very little current from the control power supply (140 mA)
- Moves up to 46 cfm of air
- Produces background noise reaching 75 dB

I/Os Required: 1 OUT

AC POWER ADAPTER FOR SAC FAN
SG-216B6

Plug the DC powered SAC fan into an AC outlet. 2-pin Male Molex to 2.5mm 28V DC jack.

Power Supply: 0.89A/28V DC

I/Os Required: 1 OUT

IMAGES

B) Ventilation fan - 28V DC

C

SPACE SAVING

STACKING BLOCK KIT
SAC-001

Stack two SACs on each other with space between for hardware and wiring.

Lift Height *(H)*: 3″

Footprint *(LxW)*: 3″ x 0.75″

IMAGES

C) Stacking Block Kit

	ACTIVITY WHEEL SPECS						
	NAME	SPECIES	BASE (W×H×D)	CHAMBER (W×H×D)	WHEEL (W×OD)	RODS (OD)	ROD SPACING
ENV-046	Activity Wheel w/Home Cage	Rat	16″ x 0.5″ x 16″ *(40.6 x 1.3 x 40.6 cm)*	17″ x 7.5″ x 8.5″ *(43.2 x 19 x 21.6 cm)*	4.4″ x 14.5″ *(11.2 x 36.8 cm)*	0.2″ *(4.8 mm)*	0.6″ *(1.5 cm)*
ENV-3046	Activity Wheel w/Home Cage	Mouse	18.2″ x 0.5″ x 12″ *(46.2 x 1.3 x 30.5 cm)*	10.7″ x 6″ x 8.2″ *(27.2 x 15.2 x 20.8 cm)*	2.5″ x 7.3″ *(6.4 x 18.5 cm)*	0.1″ *(3.2 mm)*	0.4″ *(0.9 cm)*
ENV-042A	Activity Wheel w/Modular Chamber	Rat	16″ x 0.5″ x 14.4″ *(40.6 x 1.3 x 36.6 cm)*	10″ x 8.1″x 11.5″ *(25.4 x 20.6 x 29.2 cm)*	4.4″ x 14.5″ *(11.2 x 36.8 cm)*	0.2″ *(4.8 mm)*	0.6″ *(1.5 cm)*
ENV-3042	Activity Wheel w/Modular Chamber	Mouse	21″ x 0.5″ x 13.7″ *(53.3 x 1.3 x 34.8 cm)*	7.9″ x 4.9″ x 8.4″ *(20 x 12.4 x 21.4 cm)*	2.5″ x 7.3″ *(6.4 x 18.5 cm)*	0.1″ *(3.2 mm)*	0.4″ *(0.9 cm)*
ENV-045	Slanted Activity w/Modular Chamber	Rat	18″ x 0.5″ x 24″ *(45.7 x 1.3 x 61 cm)*	15.7″ x 14″ x 8.5″ *(40 x 35.6 x 21.6 cm)*	4″ x 13″ *(10.2 x 33 cm)*	0.2″ *(4.8 mm)*	0.6″ *(1.5 cm)*

ACTIVITY WHEELS

- Manual Brake Control: The manual brake allows the wheel to be disabled without the use of external power
  - To engage the manual brake, pull on the release knob while pressing down on the manual brake. This is also useful for creating a control group with access to the wheel, but are unable to turn it
- Unique features:
  - Mouse models: Magnet & reed switch provide nearly drag and resistance free wheel rotation
  - Rat models: A 90 degree cam and micro-switch, 28V DC electronic drag control with nine preset resistance levels
- Wheels generate four counts per revolution (add Optical Encoder for higher resolution)
- Utilize the LCD revolution counter for manual standalone operation, or connect to a computer for automatic data collection using the Med-PC + an interface system

ACTIVITY WHEEL w/HOME CAGE
ENV-046 | ENV-3046

- Plastic home cage is secured in place alongside the activity wheel for stable transitions

For ease of cleaning, the components can be separated, or the animal can be kept in the cage while the wheel is removed

ACTIVITY WHEEL w/MODULAR CHAMBER
ENV-042A | ENV-3042

- Fits modular response, reward, and stimulus devices
- Modular channels:
  - Mouse: 3 (wide)
  - Rat: 6 (standard)
- Both models feature a fully integrated manual guillotine door to provide access to the wheel area

SLANTED ACTIVITY WHEEL w/MODULAR CHAMBER
ENV-045

- 30° angle of the wheel provides an even running surface for the animal without interfering with a tether
- Modular channels:
  - Rat: 5 (standard)

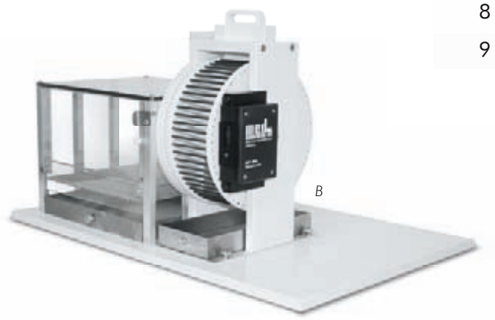
IMAGES

A) Activity Wheel w/Home Cage for rat B) Activity Wheel w/Modular Chamber for mouse C) Slanted Activity Wheel

C

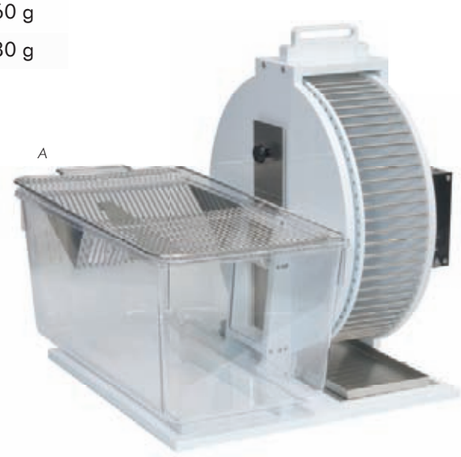
DRAG	
SETTING	TENSION
0	12 g
1	15 g
2	20 g
3	25 g
4	30 g
5	35 g
6	40 g
7	50 g
8	60 g
9	80 g

D



B

A



ACTIVITY WHEEL ACCESSORIES

OPTICAL ENCODER
ENV-042-OE

- Fits activity wheels for rat *(ENV-042A/-046)*
- High resolution counter provides up to 64 counts per revolution, and detects both clockwise and counter-clockwise wheel rotation
- Requires RotoRat™ software (SOF-801) to record revolutions and wheel direction data (not included)
- Output is 5 V TTL compatible

SOLENOID BRAKE ACCESSORY
ENV-042A-SBA

- Replaces the manual brake that comes factory installed on rat activity wheels *(ENV-042A / -046)*
- Can be controlled programmatically by any operating command signal (such as Med-PC), to prevent wheel turning at any time
- Uses a solenoid to depress a lever which places a rubber pad in contact with the rim of the wheel
- Designed to restrain up to 400 grams of load applied directly downward in the middle of the wheel

ACTIVITY WHEEL SOFTWARE

WHEEL COUNTER UTILITY
SOF-700RA-20

- Our wheel counter program tracks the number of revolutions of the wheel over a 24-hour period. The counts are saved to a series of bins, one bin per each hour.

NOTE: There are four counts per revolution (one for every quarter turn), so the number of counts in each bin must be divided by four to get the full turn count.

- Collects and stores data from any activity wheel
- Tracks the total number of revolutions over a user defined time period for analysis
- Session time can be divided into any number of user defined segments (time bins)

IMAGES

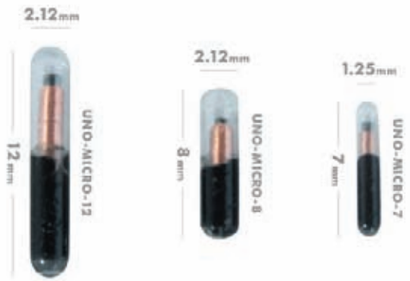
D) Solenoid Brake Accessory shown on rat activity wheel

	UNO ANIMAL ID SPECS			
	TYPE	SPECIES	DIAMETER (OD)	LENGTH (L)
UNO-PICO-7	PICO	Mouse + Fish	1.3 mm	7 mm
UNO-MICRO-8	Micro ID	Mouse + Rat	2.1 mm	8 mm
UNO-MICRO-12	Micro ID	Rat + Larger	2.1 mm	12 mm

COST-EFFECTIVE ANIMAL IDENTIFICATION FOR YOUR LAB

The UNO line of transponders and readers enable facilities large and small to utilize the benefits of RFID microchip identification methods to increase efficiencies and ensure proper animal identification during long term research studies over other methods, such as tattooing and bar-coding.

Available in three sizes, transponders come packaged in a sterile injector needle ready for use. These small passive transponders require no power source and once implanted, remain within the animal for the duration of its life and can be easily detected with a corresponding reader which records the animals information. Once recorded, the information can be downloaded to a PC through a standard USB connection.



UNO TRANSPONDERS

UNO TRANSPONDERS (PICO + MICRO)

UNO-PICO-7 | UNO-MICRO-8 | UNO-MICRO-12

- Passive transponder device with no internal power supply for minimal size
  - Radio frequency from the reader provides just enough power to power up the transponder and transmit a response
- All transponders have a unique and universal identification number
- Sold in packages of 10

Material: Parylene Coated Bioglass

Frequency: 134.2 kHz

Chip: Hitag S256

ISO standard: 11784

ICAR approved: Yes

Readers: Universal ISO readers

Re-writable: No

A

UNO CHIP READERS

UNO LID MULTI READER

UNO-573

- Communicates with infrared communication systems via 9600 baud IrDa infrared serial port
  - Optional Bluetooth module
- Reads:
  - UNO Micro ID + PICO
  - Trovan® Unique & Flex
  - Destron
  - AVID FECAVA, ISO FDX-B, ASK, PSK1, PSK2 and encrypted transponders
- Displays battery voltage on the front panel
- Includes lithium battery backup for clock/calendar
- Pocket/belt clip
- Optional software is available, ask sales for details
- Users that have written their own application for the LID571 can use the LID572 without any modifications, the command summary is identical

UNO PICO READER w/EXTRA LONG ANTENNAE

UNO-572-PICO

- Lengthened antenna reads an animal from inside a home cage or other environment, but otherwise functions the same as the regular multi reader

IMAGES

A) UNO LID Multi Reader

A

9" D
(22.9 cm)

8.25" W (21 cm)

2.75" H
(7 cm)

B

AVERSIVE STIMULATOR/SCRAMBLERS

- Available as an interface card or standalone unit
- Combines a shocker *(ENV-410C)* and scrambler *(ENV-412C)* into one unit
  - Less expensive than buying them individually
  - Provides only scrambled foot aversive stimulation
- Maintains constant current levels even if a connection to a grid rod is lost
- Continuous regulation at a lower voltage *(250 Vrms, 440V max)* eliminates the possibility of tissue damage due to arcing
- Current shown on a digital LED display and indicator during calibration
- Dummy load/subject switch
- Adjust current using a two position range switch and adjustment knob

AVERSIVE STIMULATOR/SCRAMBLER - CARD
ENV-414

- Double-width panel, install in our interface cabinets
  NOTE: DB9 cable connecting the harness to a grid floor scrambler is sold separately (SG-219G-10).

AVERSIVE STIMULATOR/SCRAMBLER - STANDALONE
ENV-414S

- Control via:
  - 28V DC to ground signal
  - 5V TTL signal
  - Remote switch closure

Power Source: 115V AC, 60 Hz *(also available in 230V)*

NOTE: DB9 cable connecting the harness to a grid floor scrambler is sold separately (SG-219G-10).

IMAGES

A) Aversive Stimulator/Scrambler - Standalone B) Aversive Stimulator/Scrambler card

	AVERSIVE STIMULATOR SPECS					
	CURRENT OUTPUT	CURRENT RESOLUTION	CONTROL SWITCHING	REMOTE OPERATION	SHOCK DURATION	CABLES NEEDED
ENV-410C	0 - 1 or 0 - 5 mA	0.01 mA or 0.001 mA	opto-isolator	28V DC	1 ms - 60 s	SG-219SC
ENV-413C	0 - 5 mA	0.01 mA	opto-isolator	28V DC Med-PC	1 ms - 60 s	SG-219SC
ENV-414	0 - 1 or 0 - 5 mA	0.01 mA or 0.001 mA	opto-isolator	28V DC	1 ms - 60 s	SG-216A-10
ENV-414S	0 - 1 or 0 - 5 mA	0.01 mA or 0.001 mA	opto-isolator	28V DC	1 ms - 60 s	SG-219G-10

A

B

CONSTANT CURRENT AVERSIVE STIMULATORS

- Double-width panel, install in our interface cabinets
- Provides a single shock output *(e.g. vogel conflict)*
  - For scrambled shock, use with the scrambler module *(ENV-412C)*
- Maintains constant current levels even if a connection to a grid rod is lost
- Continuous regulation at a lower voltage *(250 Vrms, 440V max)* eliminates the possibility of tissue damage due to arcing
- Current shown on a digital LED display and indicator
- Chain multiple modules in the same cabinet using a DB15 cable *(SG-219D)*.

DUAL RANGE CONSTANT CURRENT AVERSIVE STIMULATOR - CARD
ENV-410C

- Adjust current using a two position range switch and adjustment knob
  - Two ranges: 0–1 or 0–5 mA

COMPUTER CONTROLLED CONSTANT CURRENT AVERSIVE STIMULATOR - CARD
ENV-413C

- Expands control of the Dual Range Stimulator *(ENV-410C)* with the added ability to change current intensity, onset, and duration remotely using Med-PC

IMAGES

A) Dual Range Constant Current Aversive Stimulator - Card B) Computer Controlled Constant Current Aversive Stimulator - Card

A B

AVERSIVE STIMULATION SCRAMBLERS

SOLID STATE GRID FLOOR SCRAMBLER - CARD
ENV-412C

- Single-width panel, install in our interface cabinets
- Use with aversive stimulation modules *(ENV-410C or ENV-413C)*
- Each output is a direct semiconductor switch which keeps the current level the same regardless of the number of grids contacted or in the event a contact is broken
- Current is "scrambled" by cycling down the row of grid rods, jumping back to the first rod in the sequence, and repeating
- Rodent has to be touching more than one bar to receive aversive stimulation

Control Switching: opto-isolator

Shock Duration: 30.8 ms

Repeat Period: 277.2 ms

DUAL A/B SCRAMBLER CONTROLLER - CARD
ENV-415C

- Single-width panel, install in our interface cabinets
- Connects two Solid State Grid Floor Scrambler Cards *(ENV-412C)* to a single constant current aversive stimulation source for shuttle avoidance and some yoked control designs
- Designed for "either/or" aversive stimulation applications
- If concurrent aversive stimulation is required for multiple grids, separate constant current aversive stimulation sources are required to ensure optimal regulation
- Three outputs are required to:
  - Select scrambler "A", select scrambler "B", and control the stimulation

IMAGES

A) Solid State Grid Floor Scrambler Card B) Dual A/B Scrambler Controller Card

B

A

AMMETERS

AVERSIVE STIMULUS TEST PACKAGE
ENV-421-B

Ammeter shows the amount of current produced by an aversive stimulator.

- Module connects two clip leads to the grid rods
- Digital panel reads the RMS current at the grid rods
- Wireless operation with included LI-ion battery

Range: 0.05 – 6.5 mA

NOTE: Currents below 0.05 mA are displayed as 0.0 mA to avoid incorrectly reading noise as a stimulus

IMAGES

A) Aversive Stimulus Test Package

C

SAFETY TIMERS

In the event of a computer crash, an output may be inadvertently kept "on". To prevent an animal from receiving continuous aversive stimulation under such an event, add an in-line timer to automatically shut the aversive stimulator off.

Can also be used with drug infusion pumps to prevent an overdose or to control a stimulus light.

ADJUSTABLE SAFETY SHUTOFF TIMER
PHM-100STV

- Connects to the standard 28V DC output signal
- Operation duration is adjusted and set using a potentiometer (value is approximate)
- Value locked in mechanically

MICROPROCESSOR DIGITAL TIMER
SG-592

- Microprocessor enables more precise duration than the mechanical potentiometer model
- Set timing duration via three-digit push buttons on the front panel
  - Range: 0.1 - 99.9 seconds *(0.1 s increments)*
- Initiate timing cycle by:
  - Pressing the "start" button on the unit
  - Sending an "operate" signal from Med-PC

IMAGES

B) Adjustable Safety Shutoff Timer C) Microprocessor Digital Timer

VIDEO FEAR CONDITIONING INTERFACE

FEAR CONDITIONING INTERFACE PACKAGES
MED-SYST-VFC

Packages Include: SPL Measurement Package, Computer Package, USB Interface Decoder Card, Aversive Stimulation Current Test Package, Interface Cabinet, Video Fear Conditioning Software, and cables

VIDEO FEAR CONDITIONING

FEAR CONDITIONING PACKAGES - GENERAL USE
MED-VFC-USB

Packages Include: Either a low profile or standard chamber, quick disconnect grid floors or contextual grid floors (standard, staggered, alternating), unlined or foam lined SAC, NIR/White Light, Curved Wall, A-Frame, Smooth Floor contextual inserts, Programmable tone generator, speaker, sound calibration packge, monochrome video camera, and cables.

Our video fear conditioning systems are designed to be flexible with numerous stimulation and contextual insert options for your experiments. This system is designed to be flexible. Experiments can be conducted and data collected with or without bright visible lighting; instead utilizing near infrared (NIR) imaging without sacrificing video quality.

While bright visible lighting yields uniform illumination, which is effective for achieving high quality & low noise video recording of animal behavior, it also has the potential to adversely affect it. Our near infrared (NIR) imaging system eliminates the need for visible light and its influence on animal behavior. Each package includes a factory installed high quality digital video camera with an NIR lens mounted on the cubicle door to ensure proper positioning.

FEAR CONDITIONING PACKAGES - OPTOGENETIC
MED-VFC-OPTO

Optogenetics enables the activation of neurons using light by inserting a light-sensitive ion channel from algae into specific neurons, and is completely reversible by simply turning off the light source.

Optometry packages differ from the standard in that they include an extra tall SAC, drug delivery arm, chamber w/ Modified Top, and a TTL adapter

IMAGES

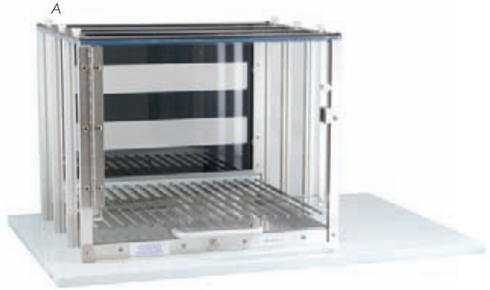
A) Video Fear Conditioning Setup for General Use for Mouse B) Video Fear Conditioning Setup for Optogenetics for Mouse

NOTE: Shown with previous model NIR light control box

A

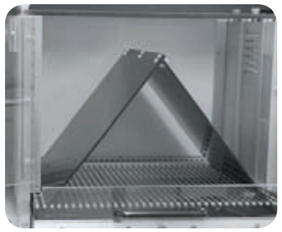
B

A



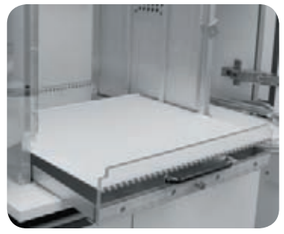
B

C



D

E



VIDEO FEAR CONDITIONING INSERTS

STRIPED WALL & CEILING COVER PANELS*
ENV-008-CS1

Black plastic sheets with cut out stripes to cover the back wall and ceiling.

POLKA-DOTTED WALL & CEILING COVER PANELS*
ENV-008-CS2

Clear plastic sheets with applied polka dots to cover the back wall and ceiling.

BLANK WALL & CEILING COVER PANELS*
ENV-008-CS3

Create custom contextual cues with the use of stickers, drawings, paint, or other media.

A-FRAME INSERT
VFC-008-IRT

Black IRT acrylic insert.

- Allows unhindered transmission of NIR light
- Creates a sloped roof within the chamber from floor to ceiling on two sides
- Shields subjects from white light

CURVED WALL INSERT
VFC-008-CWI

White plastic panel bends to create a curved wall.

- Cutouts to allow unobstructed transmission of both sound and NIR light

SMOOTH FLOOR COVER
ENV-008-CS3

Removes contextual cue created by the grid floor.

IMAGES

A) Striped Wall & Ceiling Cover Panels B) Polka-Dotted Wall & Ceiling Cover Panels* C) A-Frame Insert D) Curved Wall Insert E) Smooth Floor Cover*

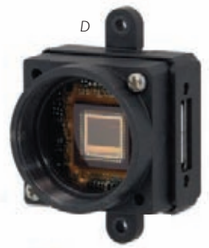
**Optional, not included with any system*

A

B

C

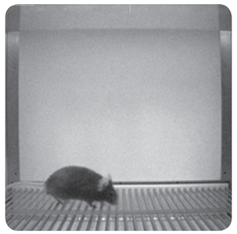
D



E

F

G



H

VIDEO FEAR CONDITIONING COMPONENTS

NIR/WHITE LIGHT CONTROL BOX
NIR-120VR

NIR/WHITE LIGHT UNIT
NIR-120L

Visible Light Temperature: 6000K “cool white”

Visible Light Intensity: Five user-adjustable settings
(illumination levels vary by cubicle size)

NIR wavelength: 940nm

MONOCHROME VIDEO CAMERA - HIGH SPEED
VID-CAM-MONO

- Captures images at up to 30 frames per second (fps) at full resolution
- Can be used for both visible light and near infrared (NIR) recording
- For continuous recording under day/night conditions
- Uses same CS-mount lenses and filter as the FireWire model
- Can run alongside FireWire cameras in a system
- Less expensive than its FireWire predecessor

Functional Frame Rate: 30 fps

Functional Resolution: 320 x 240 px

Interface: USB 3.0

NOTE: Exact model may vary, contact Sales for current offering

8MM C-MOUNT LENS
VID-LENS-8.0C

Provides a moderate viewing angle with very little optical distortion

Focal Length: 8 mm

Lens Mount Type: C

Focus: Varifocal

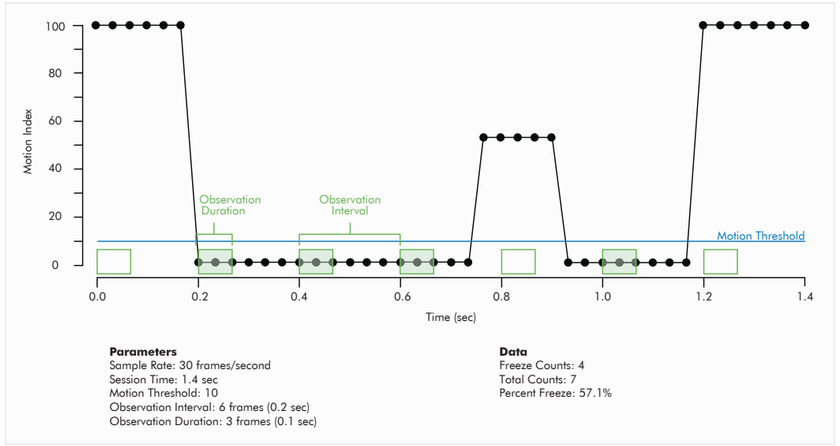
8MM NIR PASS FILTER
VID-LENS-NIR

- NIR lens filter blocks more than 99.9% visible light under 800 nanometers so changes in visible lighting conditions will not effect the recorded video
- Can be used with our NIR sensitive digital cameras when supplemental near infrared light is used for illumination
- Fits our 8 mm C-Mount Lens *(VID-LENS-8.0C)*

IMAGES

A) NIR-120VR B) NIR-120L C) Detail shot of front and back of NIR-120VR D) VID-CAM-MONO E) VID-LENS-8.0C F) VID-LENS-NIR G) Recording under infrared light H) Recording under visible light

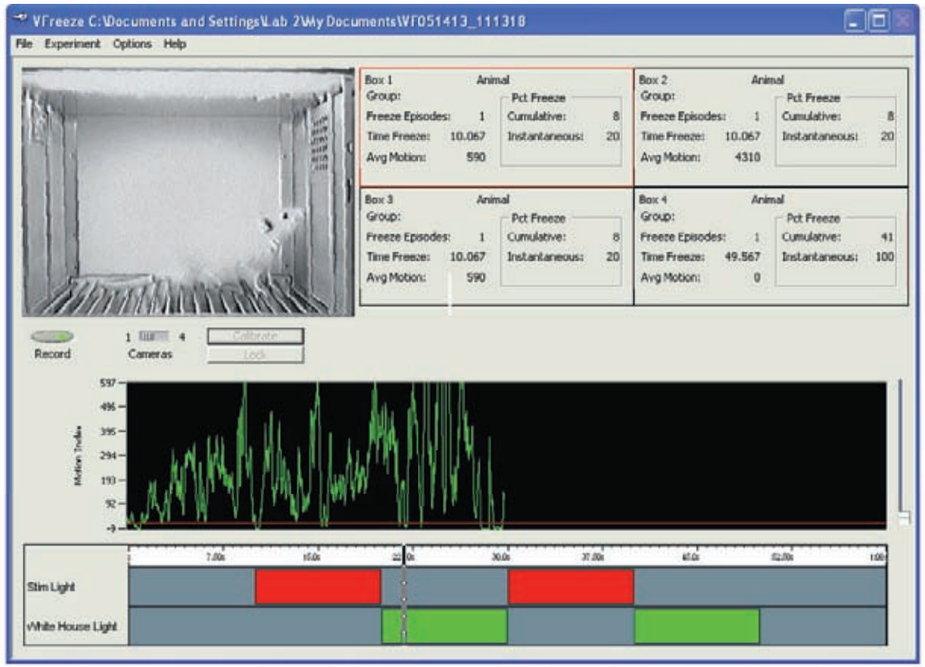
A



Parameters
Sample Rate: 30 frames/second
Session Time: 1.4 sec
Motion Threshold: 10
Observation Interval: 6 frames (0.2 sec)
Observation Duration: 3 frames (0.1 sec)

Data
Freeze Counts: 4
Total Counts: 7
Percent Freeze: 57.1%

B



VIDEO FEAR CONDITIONING SOFTWARE

VIDEOFREEZE™ VIDEO FEAR CONDITIONING SOFTWARE

SOF-843

Our software provides a reliable and automated means to monitor the effects of fear conditioning in rodents.

- User defined:
  - Stimulus intensities and durations
  - Inter-trial intervals
  - Inter-stimulus intervals
  - Session durations
  - Number of trials per session
- Freezing is represented in the data file by:
  - Total time spent motionless during the session
  - Percent of time motionless
  - Number of freezing episodes or occurrences
  - Average index of motion

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*

PRIZMATIX FIXED RATIO PROTOCOL*

SOF-732-6

- For pulsing LEDs, lasers and shutters in Optogenetics experiments using Med-PC® protocols and our hardware, while simultaneously collecting experimental data.
- Requires a TTL output from the Med Associates interface to operate at 1ms resolution
  - Pulser can be triggered with MedState Notation commands via USB cable connection (~0.007 s), or with a TTL trigger signal for faster response times (~0.001 s)
- Enables Med-PC® to:
  - Program trains of pulses
  - Create groups of trains
  - Add various triggering conditions
- Includes sample code that may be added to any protocol, as well as a Fixed Ratio protocol
- Simplified control of pulse interval, duration, and train duration
- Converts calculations automatically
- Control stimulus parameters mid-session: stimulus duration, frequency, and pulse width

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*

**NOTE: Requires a Prizmatix USB Pulser or PulserPlus unit, available from Prizmatix via Goldstone Scientific*

IMAGES

A) Sample Data B) VideoFreeze Video Fear Conditioning Software

A

ICSS STIMULATORS

ICSS STARTER PACKAGE
MED-ICSS

Everything you need to add ICSS to your setup.

Packages Include: USB High Speed Serial Microcontroller, Dual Programmable ICSS Stimulator, Constant Current Stimulation Software, and cables

NOTE: Commutator and balance arm not included (see next page)

ICSS ADD-ON PACKAGE
MED-ICSS-ADD

For the addition of multiple stimulators in one system.

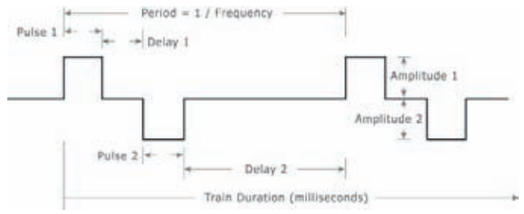
NOTE: Up to 16 stimulators from one interface

PROGRAMMABLE ICSS STIMULATOR w/MONITOR OUTPUT
SG-152

- User defined parameters:
  - Pulse amplitude, duration, and frequency
  - Train duration
- BNC connectors to provide an optically isolated output
- Constant current square wave stimulator
- Higher voltage and improved regulation circuitry produces reliable wave forms with higher impedence electrodes
  - Maximum current is related to the impedance of the electrode
  - 250 µA with a 160k ohm electrode
- Output may be connected to a conventional or storage oscilloscope or analog to digital converter to validate programmed settings as well as monitor actual subject stimulation
- When inputs are turned "off", an internal electrical shunt is automatically placed across the output connectors, preventing any static electricity buildup to the attached intracranial electrodes
- Interfaces with Med-PC
- Dual isolated +/- 45V power supply built-in
- Up to 16 stimulators can be daisy chained to a single interface
- An "electrode fault" alarm alerts the user of a cable or electrode failure

IMAGES

A) Balance arm + commutator



	ICSS STIMULATOR SPECS		
INDEPENDENT VARIABLE	**DESCRIPTION**	**DEFAULT VALUE**	**RANGE**
Step Size	Amount the current will be changed during testing	10 µA	N/A
Pulse Width 1	Duration of Pulse 1	500 µs	60 – 32,000 µs
Pulse Amplitude 1	Intensity of Pulse 1	200 µA	1 – 1,000 µA
Pulse Delay 1	Delay between Pulse 1 and 2	500 µs	60 – 32,000 µs
Pulse Width 2	Duration of Pulse 2	500 µs	60 – 32,000 µs
Pulse Amplitude 2	Intensity of Pulse 2	200 µA	1 – 1,000 µA
Pulse Delay 2	Time between the end of pulse and start of another	(*1)	60 – 500,000 µs
Frequency	Frequency of stimulations	100 Hz	1 – 2,000 Hz (*2)
Pulse Train Duration	Entire duration of stimulations	5,000 ms	(*3)
Pulse Amplitude Stim 2	Used for Detection.MPC only	80 µA	N/A
Starting Block Type	Start with descending (0) or ascending (1) trial blocks	0	N/A
Response Time	Time window for response to Stim 1	7.5 s	N/A

Notes:

1) Not directly adjustable, automatically set by the formula: (1,000,000 / Frequency) – (Pulse 1 + Delay 1 + Pulse 2)

2) Limited by the pulse and delay parameters

3) Must permit a minimum of one cycle

4) Must correspond with module setting

ICSS COMPONENTS

COMMUTATOR BALANCE ARM
PHM-110P1

- Installation options:
  - Walls of modified top chambers that are pre-drilled *(ENV-007-CT, ENV-008-CT)*
  - Mounted on 1/4 standard rat panel

  NOTE: For use with mouse chambers, contact our Sales department for mounting options
- Modified for use with commutators (PHY-015-X) to position it over the center of the chamber
- Adjustable post with a pivot arm and dual action gimbals
- Adjustable counter-balance weight maintains sufficient tension to keep the leash assembly away from the animal

Post height: 0" - 8" *(0 - 20.3 cm)* above chamber

COMMUTATOR
PHY-015-2 | PHY-015-6

- Also known as "electric swivels" or "slip rings"
- Models available:
  - PHY-015-2 | 2 channel
  - PHY-015-6 | 6 channel
- Opening through the center for tubing from a leash assembly to pass through
- Designed to be low current, low voltage, low noise, and environmentally safe
- Tested to levels of 100 V and 0.08 A
- All single plug commutators are supplied with a live plug (red) and a dummy plug (white) for even rotation of the rotor
- Electrical signal conduction mechanism consists of brushes and rings
  - Double brushes for unbroken continuity

  NOTE: Single brush can be requested to reduce torque for mice applications

Resistive Load: < 150 ohms/channel

Contact Resistance: < 10 ohms

Insulation Resistance: > 2000 ohms

Through-Signal Distortion: 0.02%

Insertion Loss: -47 dBm @ 500 KHz

Parallel Channel Cross Talk: -68 dB induced

Mechanical Break Away Torque (BAT):

2 channel: 0.35 in oz.

6 channel: 1.06 in oz.

NOTE: Running torque is ~80% of BAT

BNC OUTPUT CABLE (BNC)
PHM-155A | PHM-155B | PHM-155D | PHM-155E

Noise free RG-58 coaxial cable with male BNC connectors on each end.

Connects the stimulator sites to either:

- BNC Adapter *(PHM-155C/CAB)*
- Isolated monitor output to an oscilloscope input

BNC TO BANANA ADAPTER
PHM-155C

Connects electrode leads with male banana plugs to a BNC Output Cable *(PHM-155A / -155B)*. For use with electrode leads that are (or can be) terminated in a standard banana plug connector.

ICSS SUBSTITUTION CABLE (BNC)
PHM-152SC-10K

Use to verify output by mimicking animal resistance.

CONTROL CABLE (DB9 TO DB15)
SG-219ST

Connects the microcrontroller *(DIG-729USB)* to the first programmable stimulator cabinet *(PHM-152).*

SHOCK OUTPUT CABLE (DB9)
SG-219G-10

Use to daisy-chain programmable stimulator cabinets together.

IMAGES

A) Balance arm + commutator B) BNC Adapter

A

B

ICSS STIMULATOR COMPONENT SPECS

	NAME	CABLE TYPE	ENDS	LENGTH (L)
PHM-155A	Output Cable	BNC	M-M	5 ft
PHM-155B	Output Cable	BNC	M-M	10 ft
PHM-155D	Output Cable	BNC	M-M	2 ft
PHM-155E	Output Cable	BNC	M-M	15 ft
PHM-152SC-10K	ICSS Substitution Cable	BNC	M-F	25 ft
SG-219ST	Control Cable	DB9 to DB15	M-F	25 ft
SG-219G-10	Shock Output Cable	DB9	M-F	10 ft

ICSS SOFTWARE

ICSS UTILITY
SOF-700RA-5

- User defined parameters:
  - Pulse amplitude, pulse duration, delay duration, frequency, train duration
- This source code may be used as is, or modified by the user to meet specific research demands

Core Procedures

REWARD.mpc*

- ICSS threshold measurement
- Five trial blocks are presented in descending order until the animal meets an established criteria followed by five trial blocks in ascending order. The default number of columns run in this manner is four, contingent and non-contingent stimulations are equal.
- *NOTE: Written originally for Dr. Conan Kornetsky, Boston University, School of Medicine.*

DETECTION.mpc*

- Holds the rewarding or response-contingent stimulation constant.

**NOTE: Kornetsky, Conan and Bain, George, Modern Methods in Pharmacology, Vol. 6, Testing and Evaluation of Drugs of Abuse, Brain-Stimulation Reward: A Model for Drug-Induced Euphoria, pp. 211–231.*

Variant Procedures

1. Stepwise titration of frequency
   - Similar to the FR1 schedule described by J.L. Moreau[1] (et al)
   - Holds current constant while frequency steps from 70 Hz to 30 Hz and back again in 10 Hz steps every two minutes.
   - *[1] J.L. Moreau, F. Jenck, J.R. Martin, P. Mortas and W.E. Haefely, European Neuropsychopharmacology, 2, (1992), pp. 43–49*
2. Autotitration of current
   - Similar to what was described by Mumford[2] (et al).
   - Holds frequency constant
   - This procedure requires two active levers. Starting current is set individually for each animal. One lever delivers stimulation that decreases 3 μA following every fifth reinforcement. The second lever resets the amplitude value back to the original starting current.
   - *[2] Geoffrey K. Mumford, Darryl B. Neill, and Stephen G. Holtzman, Brain Research, 459 (1988), pp. 163–167*

medtouch

Visual Response Screen for OmniCtrl™

MedTouch is a visual response component for behavioral experiments and training. Display images on the built-in monitor that relays to Med-PC which region(s) of the monitor are interacted with. Medstate Notation (MSN) commands control which images appear where, registers "touch-events" from the device, and determines the actions that occur as a result.

This setup enables the design of custom protocols to suit your research needs.

- Controlled using Med-PC 6 and OmniCtrl interface for comprehensive experimental control and data collection using our dependable hardware and software
- Convert your standard modular chamber (ENV-007/-008/-307W) into a MedTouch chamber with 4 screws and minimal effort *NOTE: Talk to our Sales or Support team members for more info*

- MedTouch requires:
  - OmniCtrl connection panel *(OSC-112)*
  - OmniCard interface card *(IC-124)*
  - Decode interface card *(DIG-705)*
  - Smart interface cabinet *(SG-7000 series)*
  - Power supply *(built-in to cabinet or standalone)*
  - Med-PC 6 Behavioral Control Suite *(SOF-737)*
  - 12 I/O connections *NOTE: Cannot be daisy-chained*

IMAGES

A OmniCtrl Connection Panel w/Sound (OSC-112) B) Med-PC 6 Behavioral Control Software Suite (SOF-737) C) Smart Interface Cabinet w/Power Supply (SG-7000 series), Decode Card (DIG-705) and OmniCtrl Card (IC-124) D) Close-up of MedTouch screen installed on Wide Mouse Modular Chamber (ENV-307W)

MEDTOUCH PACKAGES

MEDTOUCH PACKAGES

MED-TOUCH

Packages Include: MDF SAC, Modular Chamber w/ Modified Top + waste pan, Grid Floor, OmniCtrl card and connection panel, speaker, LED house light, 2 + 5 Window Aperture Plates, MedTouch screen, MedTouch Image File Manager Utility, and cables.

- Add an interface package *(MED-SYST-8-USB or MED-SYST-16-USB)*
- Add reward device (liquid or pellet) and appropriate receptacle w/ head entry

C

MEDTOUCH COMPONENTS

APERTURE PLATES

ENV-150R-A001 | ENV-150R-A002 | ENV-150R-A003 | ENV-150R-A004 | ENV-150R-A005 | ENV-150M-A101 | ENV-150M-A102 | ENV-150M-A103 | ENV-150M-A104 | ENV-150M-A105 | ENV-150M-A106

- A variety of aperture plates are available
  - Plates fit between the screen and test subject to block in/delineate sections of interest physically
    NOTE: Contact our Sales team for custom aperture plate designs

NOTE: See next page for illustration and specs for each aperture plate.

MEDTOUCH SCREENS

ENV-150M | ENV-150R

- MedTouch unit is powered by a standard AC outlet, while the rest of the chamber components use the power supplied to the connection panel
- Up to eight independently operated MedTouch chambers per computer
- Up to 256 JPEG images can be accessed by the device
  - Automates display of custom images
  - An assortment of pre-made image files included
  - Simultaneous presentation of up to 24 touch inputs

Touch Response: USB controlled, zero-force, glass-backed infrared (IR) array

Image Formats: JPG/JPEG

Max Image size: 150 x 220 mm (Rat)
80 x 120 mm (Mouse)

A

B

The K-Limbic system began as the Kestrel Control System, (used by SmithKline Beecham) and developed in association with Med Associates' partner, Conclusive Solutions in 1993.

Five years later the software was renamed "K-Limbic" and made commercially available. It was an effective system, however, the processing demands on the computer were cumbersome, requiring multiple video cards installed in a custom-built PC, and support was handled by Conclusive Solutions.

Med Associates purchases K-Limbic from Conclusive Solutions in 2019, then went to work developing its next iteration, the MedTouch.

MedTouch, the new & improved touchscreen system from Med Associates, introduces multiple improvements over its predecessor. Most notably, decentralized computing to take the load off of the user's PC. It's now so lightweight that experiments can be run on a laptop, because it only uses Med-PC and a small accessory program.

It also comes with the lifetime free support from our support team that we provide all of our products.

C

	APERTURE PLATE SPECS		
	PATTERN + SIZE	SPECIES	DRAWING
ENV-150R-A001	2 x 1 *(60 x 60 mm)*	Rat	
ENV-150R-A002	2 x 1 *(100 x 100 mm)*	Rat	
ENV-150R-A003	3 x 1 *(60 x 90 mm)*	Rat	
ENV-150R-A004	5 x 1 *(30 x 55 mm)*	Rat	
ENV-150R-A005	5 x 2 *(30 x 30 mm)*	Rat	
ENV-150M-A101	2 x 1 *(75 x 60 mm)*	Mouse	
ENV-150M-A102	2 x 1 *(25 x 25 mm)*	Mouse	
ENV-150M-A103	3 x 1 *(50 x 60 mm)*	Mouse	
ENV-150M-A104	3 x 1 *(25 x 25 mm)*	Mouse	
ENV-150M-A105	5 x 1 *(25 x 25 mm)*	Mouse	
ENV-150M-A106	5 x 2 *(25 x 25 mm)*	Mouse	

MEDTOUCH SOFTWARE

MedTouch doesn't require specialized software, only Med-PC 6!

MEDTOUCH IMAGE FILE MANAGER UTILITY

SOF-708

An included program for naming and organizing image files in a way that can be used with Med-PC.

- Images are transported off the computer with a portable memory "flash" drive (USB type A, included)

MEDTOUCH IMAGE DISCRIMINATION PROTOCOL

SOF-732-8

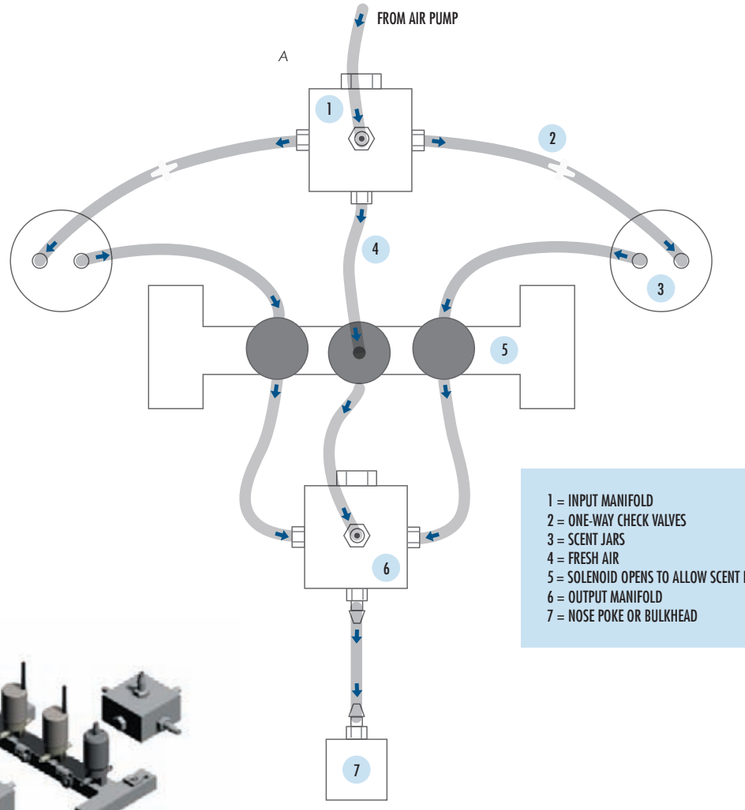
Pre-written protocol for Med-PC 6 Behavioral Control Software as a starting point, modify it to suit your needs.

Medstate Notation (MSN) commands include:

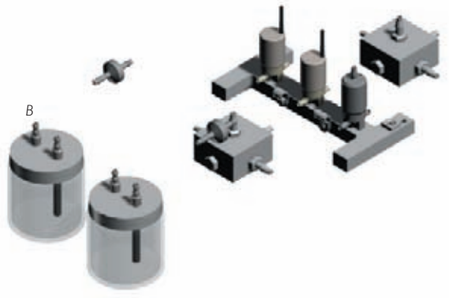
- MEDTouch_SetPort/SetRack
  - Informs the driver which port to use for the interface card, and which rack holds it.
  - *NOTE: Command should be sent before the MEDTouch_Init() command and is only needed when the IC-124 cards are not in Rack 1 or the IC-124 ports are not set to the default Port.*
- MEDTouch_Init/MEDTouchRPO_Init
  - Informs the device which aperture plate to use.
- MEDTouch_DisplayImage
  - Informs the device which location/slot to display the specified image in.
- MEDTouch_CLEARImage
  - Informs the device to clear the image that is displayed at the specified slot #.
  - *NOTE: This command is the same as MEDTouch_DisplayImage(MG, BOX, Slot#, 0) or MEDTouchRPO_DisplayImage(MG, Rack, Port, Offset, BOX, Slot#, 0).*
- MEDTouch_SHOW
  - Used to update the Med-PC SHOW fields with information about which images are being displayed in each location on the device.

IMAGES

A) Standard K-Limbic computer w/five video cards B) Typical K-Limbic setup
C) MedTouch Chamber setup for Mouse



1 = INPUT MANIFOLD
2 = ONE-WAY CHECK VALVES
3 = SCENT JARS
4 = FRESH AIR
5 = SOLENOID OPENS TO ALLOW SCENT INTO SYSTEM
6 = OUTPUT MANIFOLD
7 = NOSE POKE OR BULKHEAD



OLFACTORY DISTRIBUTORS

OLFACTORY DISTRIBUTOR - TWO CHANNEL
ENV-275

Uses normally closed valves for odor lines and a normally open valve with fresh air for continuous air flow to a single output.

NOTE: Pumps, nose poke, and 28V DC operating equipment sold separately.

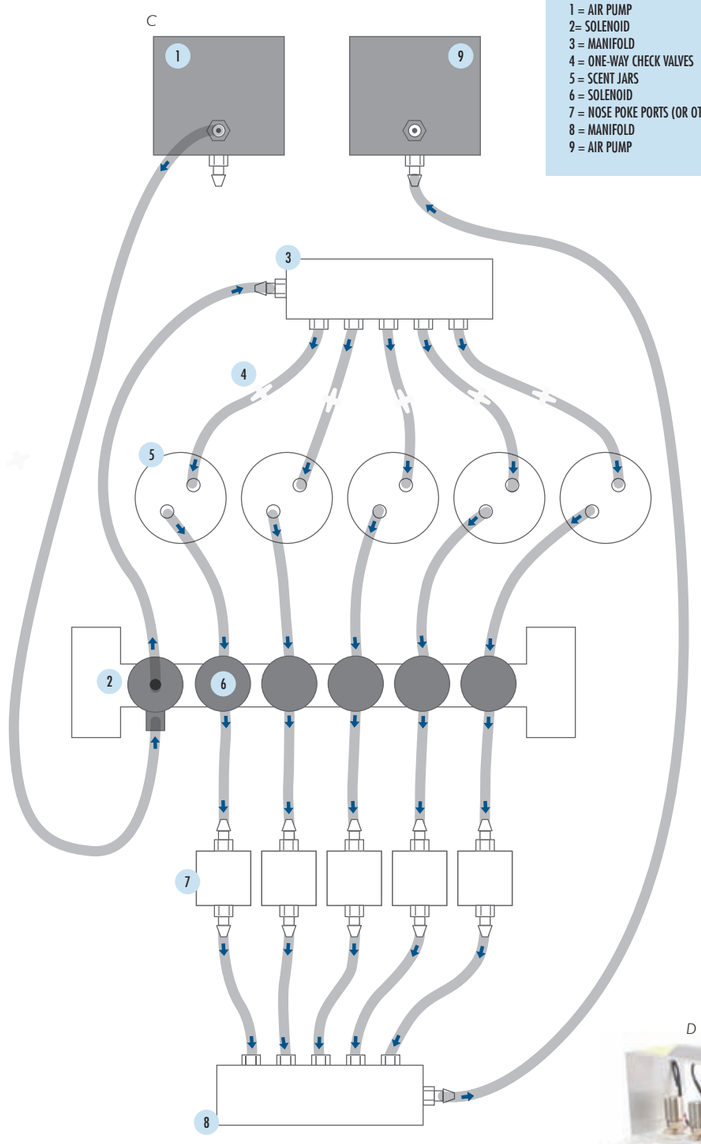
OLFACTORY DISTRIBUTOR - FIVE CHANNEL
ENV-275-5

Uses five normally closed valves for odor lines and a normally open valve with fresh air for continuous air flow to five outputs.

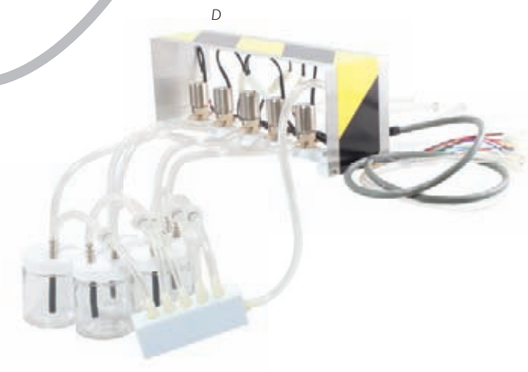
NOTE: Pumps, nose poke and 28V DC operating equipment sold separately.

IMAGES

A) Two Channel Olfactory Distributor air flow diagram B) Two Channel Olfactory Distributor digital model C) Five Channel Olfactory Distributor air flow diagram B) Five Channel Olfactory Distributor photo



1 = AIR PUMP
2= SOLENOID
3 = MANIFOLD
4 = ONE-WAY CHECK VALVES
5 = SCENT JARS
6 = SOLENOID
7 = NOSE POKE PORTS (OR OTHER OLFACTORY DEVICE)
8 = MANIFOLD
9 = AIR PUMP



OLFACTORY DISTRIBUTION COMPONENTS

FIVE HOLE NOSE POKE WALL w/OLFACTORY STIMULUS
ENV-115A-OF | ENV-115C-OF

Designed for use with our modular operant behavioral test chambers.

- Individual olfactory stimulus in each nose poke
- Check valves eliminate backflow of scents
- Olfactory stimulus is removed from all five nose pokes via an exhaust port *(vacuum source required)*

I/Os Required: 5 IN

NOTE: A pressurized lab air supply or air pump and vacuum pump are required, sold separately.

NOSE POKE PORT
ENV-275-NPP | ENV-375A-NPP | ENV-375W-NPP

- Two barbed fittings
- Infrared detection
- Available with or without stimulus light
- To confine the odor to the nose poke, attach the second port to a suitable vacuum pump

I/Os Required: 1 IN

BULKHEAD PORT
ENV-275-BP | ENV-375A-BP | ENV-375W-BP

Consists of an air port and barbed fitting for presenting odors into the chamber.

- Place above or below a modular device such as a lever or food receptacle

EXHAUST FAN
ENV-275-F | ENV-375A-F | ENV-375W-F

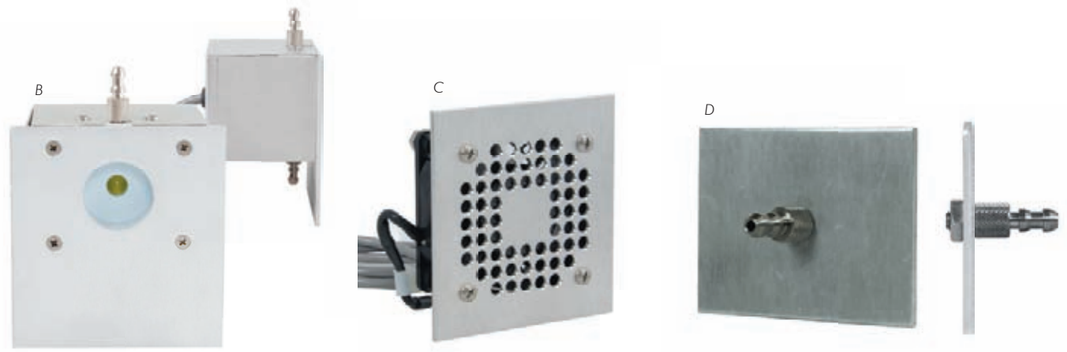
Increase air flow through a modular operant test chamber to clean out odors quickly and bring in fresh air.

I/Os Required: 1 OUT

NOTE: 28V DC power source required to operate, sold separately

IMAGES

A) Five Hole Nose Poke Wall w/Olfactory Stimulus B) Nose Poke Port C) Exhaust Fan D) Bulkhead Port



OLFACTORY DISTRIBUTION COMPONENT SPECS

	NAME	SPECIES	PANEL	LIGHT (OD)	IR PLACEMENT (FROM FRONT)	ACCESS OPENING (OD×D)	FITS CHAMBER
ENV-275-NPP	Nose Poke Port	Rat	1/4 Standard	0.3″ *(0.8 cm)*	0.6″ *(1.5 cm)*	1″ x 0.8″ *(2.5 x 2.1 cm)*	ENV-007/ -008/-009
ENV-375A-NPP	Nose Poke Port	Mouse	1/2 Classic	0.3″ *(0.8 cm)*	0.3″ *(0.8 cm)*	0.5″ x 0.4″ *(1.3 x 1 cm)*	ENV-307A
ENV-375W-NPP	Nose Poke Port	Mouse	1/2 Wide	0.3″ *(0.8 cm)*	0.3″ *(0.8 cm)*	0.5″ x 0.4″ *(1.3 x 1 cm)*	ENV-307W
ENV-115A-OF	Five Hole Nose Poke Wall w/Olfactory Stimulus	Rat	N/A	0.3″ *(0.8 cm)*	0.6″ *(1.5 cm)*	1″ x 0.8″ *(2.5 x 2 cm)*	ENV-007
ENV-115C-OF	Five Hole Nose Poke Wall w/Olfactory Stimulus	Mouse	N/A	0.3″ *(0.8 cm)*	0.3″ *(0.8 cm)*	0.5″ x 0.4″ *(1.3 x 1 cm)*	ENV-307W
ENV-275-BP	Bulkhead Port	Rat	1/8 Standard	N/A	N/A	N/A	ENV-007/ -008/-009
ENV-375A-BP	Bulkhead Port	Mouse	1/4 Classic	N/A	N/A	N/A	ENV-307A
ENV-375W-BP	Bulkhead Port	Mouse	1/4 Wide	N/A	N/A	N/A	ENV-307W
ENV-275-F	Exhaust Fan	Rat	1/4 Standard	N/A	N/A	N/A	ENV-007/ -008/-009
ENV-375A-F	Exhaust Fan	Mouse	1/4 Classic	N/A	N/A	N/A	ENV-307A
ENV-375W-F	Exhaust Fan	Mouse	1/4 Wide	N/A	N/A	N/A	ENV-307W

A

B

DILUTION OLFACTOMETER

DILUTION OLFACTOMETER

PHM-275

Designed to generate precise concentrations of up to eight separate odors and route them into a chamber.

- Ideal for odor discrimination tasks where flow control is critical, such as olfactory coding or any behavioral or neurophysiological study that uses odor as a stimulus
- Conditions incoming air and controls the presentation of either a single scent or a mixture
  - Incoming air is plumbed to a large central chamber that houses the desiccant
  - Then, air is routed to one that contains activated charcoal as a filter
  - Then into distilled water to rehydrate the air
- Airflow to each vertical column saturator is controlled by a sensitive needle valve, and monitored by a calibrated flow meter

I/Os Required: 1-8 OUT

NOTE: Pumps, nose pokes and 28V DC power supplies and operating equipment are sold separately.

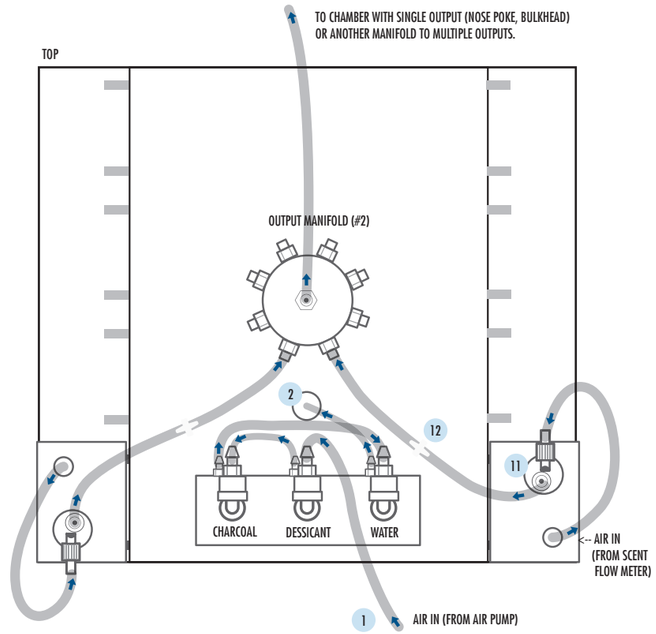
OLFACTORY COLUMN SATURATOR

PHM-276

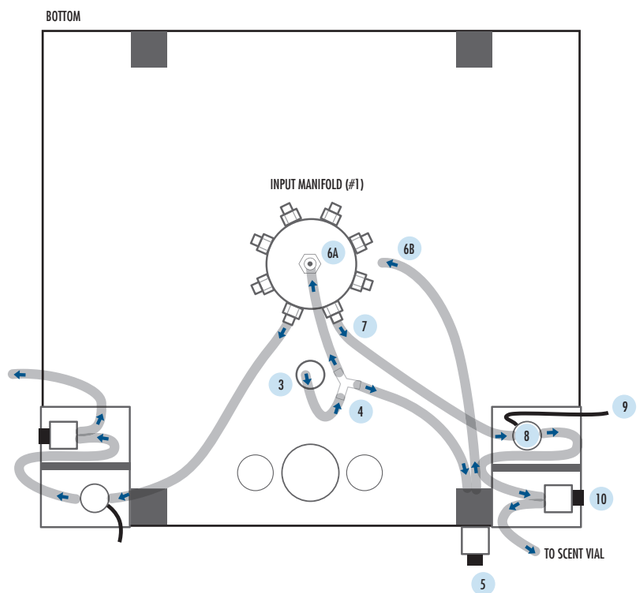
Add to the dilution olfactometer for additional channels (up to 8)

IMAGES

A) Dilution Olfactometer B) Olfactory Column Saturator

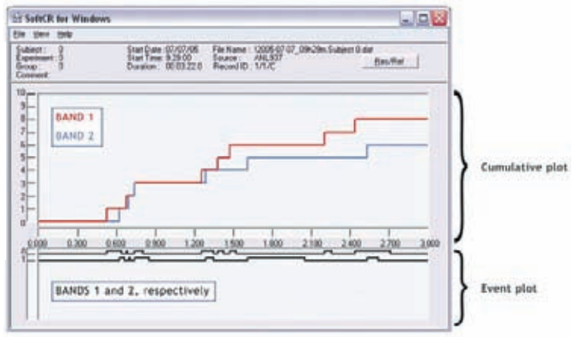


1 = AIR IN (FROM AIR PUMP)	6A = TO INPUT MANIFOLD	10 = SCENT FLOW METER
2 = TO LOWER LEVEL	6B = TO BOTTOM PORT OF OUTPUT MANIFOLD	11 = SCENT VIAL
3 = AIR FROM UPPER LEVEL	7 = TO SOLENOID	12 = CHECK VALVE
4 = Y TUBE FITTING	8 = SOLENOID	
5 = BYPASS AIR FLOW METER	9 = MOLEX TO CONNECTION PANEL	



A

B



C

D

ULTRASONIC VOCALIZATION DETECTION

ULTRASONIC VOCALIZATION DETECTION PACKAGE

MED-USV

Add USV detection to either a modular chamber system or home cage.

Packages Include: USV detector, USB cable, 3-pin molex extension cable, USV software

NOTE: Home cages and modular chambers sold separately. Interface and 28V power supply also sold separately.

ULTRASONIC VOCALIZATION DETECTOR

ANL-937-1A-M | ANL-937-1A-R | ANL-937-1B

Compact design provides all the benefits of professional sound recording equipment in an easy to use and affordable unit.

- Actual frequency (KHz) and amplitude (dB) measurements for advanced digital signal processing
- Detect ultrasonic vocalizations in any two user-defined bands ranging from 20 – 100 KHz, for example:
  - Band 1 captures events between 20 – 40 KHz above 60 dB
  - Band 2 captures events between 30 – 100 KHz above 40 dB

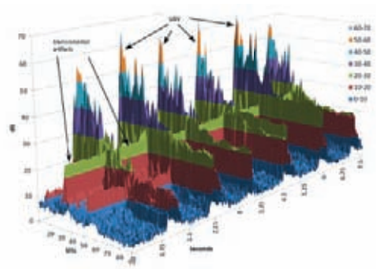
  NOTE: Bands can overlap in frequencies or amplitudes
- Scans the environment every 30 milliseconds
- Up to 16 USV detectors on a single computer

NOTE 2: Power Supply (SG-501) will be required when using the USV detector without a Med Associates interface system.

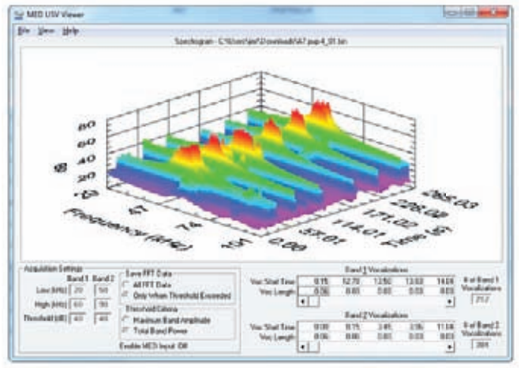
IMAGES

A) USV Detector front and back B) SoftCR cumulative record of ultrasonic events C) USV Detector shown in ENV-008 Chamber D) USV Detector shown on a standard wire-top home cage

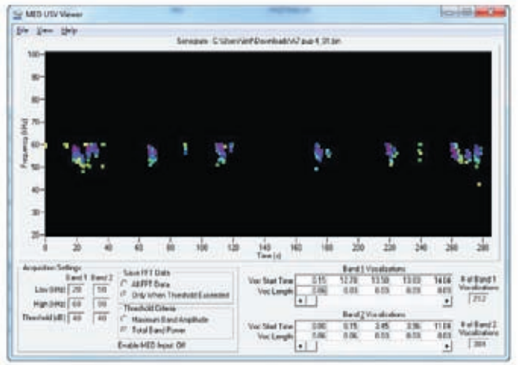
A



B



C



ULTRASONIC VOCALIZATION SOFTWARE

ULTRASONIC VOCALIZATION SOFTWARE

SOF-937-1

- Med-PC® can be used to turn on the detector, and correlate events such as food or shock delivery with data acquisition
- Data can be viewed as an event plot or in a cumulative fashion to represent the rate of USV occurrences as a method of estimating the rate of USV occurrences. Each occurrence of an ultrasonic vocalization causes an increase on the SoftCR Pro® cumulative plot.
- Software has graphing utilities for:
  - Spectrograms (KHz x Time x dB) are three-dimensional surface plots, often used to reveal ultrasonic artifacts in the testing environment, such as ultrasonic vibrations created by some fluorescent lamps or computer monitors. Once artifacts are recognized, the bandwidth can be adjusted to isolate USVs from other ultrasonic events.
  - Sonograms (KHz x Time) provide information on the duration and frequency of a USV, as well as relative changes in pitch.
- Text data file includes a vocalization's:
  - Time of onset
  - Duration
  - Quantity *(in each band)*

DATA COLLECTION OPTIONS

Low: (20 - 100 kHz) vocalization frequencies below cut-off value will be disregarded

High: (20 - 100 kHz) vocalization frequencies above cut-off value will be disregarded

Threshold: (10 - 150 dB) Vocalizations must be an amplitude greater than this value to be recorded

Band 1: The first frequency range of interest

Band 2: The second frequency range of interest

NOTE 1: To represent the data as a cumulative or event plot, use in conjunction with Med-PC (SOF-736) and SoftCR Cumulative Recorder (SOF-721) software.

IMAGES

A) MBA, 40 dB threshold, all FFT data recorded B) Spectrogram C) Sonogram

APPROXIMATELY $^{2}/_{3}$ OF RESEARCH ARTICLES IN LEADING BEHAVIORAL RESEARCH JOURNALS FEATURE THE USE OF MED-PC® SOFTWARE FOR EXPERIMENTAL CONTROL.

- Compiled results from the Journal of Experimental Analysis of Behavior (2006 to 2019)

THE BEST IN SHOW.

Although some manufacturers may try, it's difficult to compare any other system to Med-PC®. It has been the leading behavioral experimental control software for over three decades. Med-PC® and MedState Notation™ (MSN) continue to be the preferred choice for more laboratories than any other programming language or system.

Over the last decade, our software has been used for experimental control in more JEAB behavioral research articles than any other software.

- Med-PC®: 228
- Other commercial software: 37
- Other non-commercial software: 73

\\ THE POWER OF WORDS.

The simple fact is that MedState Notation (MSN) works. Users determine exactly what is desired for experimental flow and data collection,encoded in simple text commands. Reviewing countless tables is no longer necessary to determine which options apply under given circumstances. MSN uses simple commands whose functions are inherently recognizable and easy to learn (e.g. ON, OFF, SHOW, ADD, IF, SET, etc.).

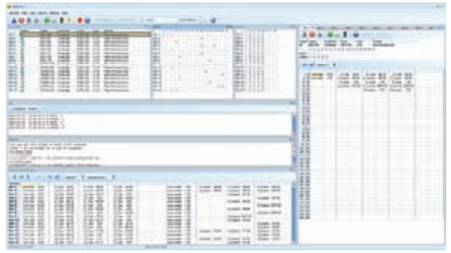
```
S5,
  #R1: ADD R; IF R >= 10 [@NextBlock, @ContBlock]
               @NextBlock: OFF ^LeftLight;
                           ADD B; SHOW 4,Block #,B;
                           SET T = 1 ---> S1
               @ContBlock: ON ^LeftLight;
                           ADD T; SHOW 5,Trial #,T ---> S2
```

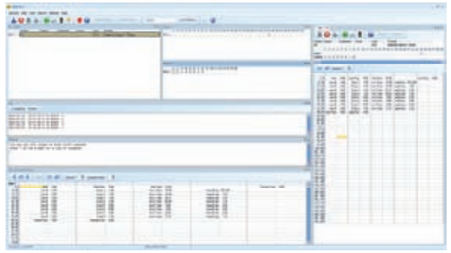
Placing these commands into logically ordered text gives you total flexibility in the control of chamber components, stimuli, reinforcement mechanisms, data storage, and display. MSN is a state-based programming language with blocks of states called state sets. If it can be drawn as a state diagram or a flow chart, it can be coded in MSN.

To write your own protocol, use the included Trans™ editor and execute it in multiple chambers with Med-PC. Extensive tutorials and syntax documentation to learn MSN programming and concepts are included.

Many standard pre-written procedures are available for purchase to suit many common applications such as: Fixed Ratio Training, Elevated Maze Data Collection, Delayed Match to Position, Five Choice Serial Reaction Time Task, and many more.

In addition, we offer custom coding solutions. Whether simple or complex, just provide us with your specifications and we will develop the program for you so you can focus on getting your experiment up-and-running quickly.





INTRODUCED IN MED-PC *5*

The features highlighted were introduced in Med-PC 5. Since then, we released Med-PC 6. The only difference from 5 to 6 is the addition of OmniCtrl capability.

Improved User Experience:

- Native 64-bit application *(Windows 7 or newer)*
- All screens and dialogs have been completely redesigned, with an emphasis on reducing key strokes required for routine tasks
- Tool buttons placed on moveable panels
- New terminal panel for expert users to rapidly enter commands without using the menu system
- Macro parameter panels can be used to create highly customized data entry dialogs in macros
- Each Windows user can have a separate procedure list so that it is easier to find one's own programs when loading boxes
- The new load box screen makes loading multiple boxes with various programs a snap
- Ability to drag & drop or resize the panes and panels in almost any configuration you desire; which can then be saved and easily accessed at any time using the "Saved Desktops" drop-down list
- Graphical Hardware Configuration Utility provides representation of the interface cabinet for easy and intuitive input/output card installation and setup

Med-PC, Simplified:

- Data file options are now defined within Med-PC®, and the schemes for naming files have been simplified and otherwise improved
- Data filenames now have a ".TXT" extension so they can be easily opened in text editors
- Saving data has been simplified:
  - Use STOPSAVE to end the session and save the data
  - Use STOPDISCARD to end the session and discard the data
- Options for defining print layout and specifying the printer have been simplified

MED-PC SOFTWARE

MED-PC 6 BEHAVIORAL CONTROL SOFTWARE SUITE

SOF-737

The suite is comprised of four applications:

- *Hardware Configuration Utility (HCU)* is used to build a configuration file that informs Med-PC® how many boxes are connected, how many inputs and outputs are available to each box, and how they are identified. Includes on-screen guides that walk the user step-by-step through the setup procedure.
- *Med Test* helps verify hardware functionality independently of Med-PC®. This includes tests for interface cards, Programmable Audio Generators *(e.g. ANL-926)*, and more.
- *Trans* is used to compile MedState Notation™ (MSN) procedures into DLL files to be executed by Med-PC®. Trans also serves as a text editor for writing MSN procedures and includes a detailed help file for programming in MedState Notation.
- *Med-PC* is the runtime or operating system in which MSN procedures are executed. It allows for the use of up to 16 test chambers with up to one million data elements per chamber. A single test chamber may have up to 80 inputs and 80 outputs.

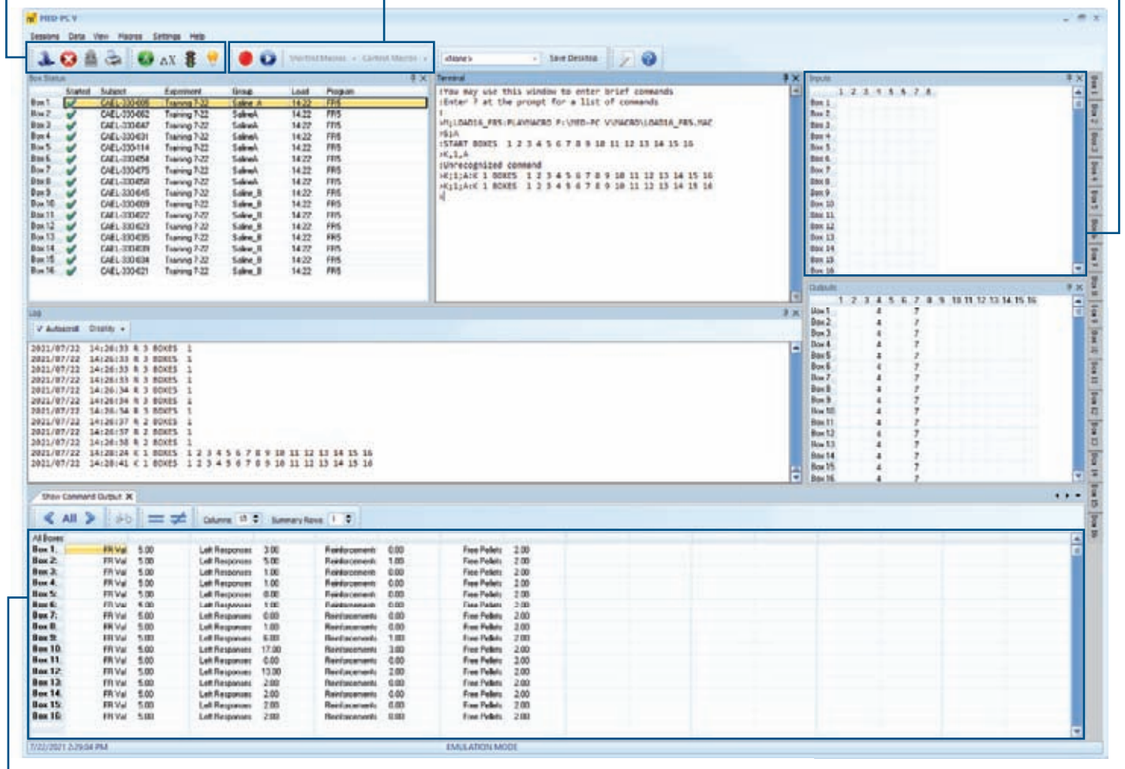
MED-PC

The new & improved toolbar greatly reduces the clicks and keystrokes needed to start & stop boxes, issue start signals, k-pulses, as well as changing variable & array values.

The macro toolbar is conveniently positioned for adding commonly used macros to the shortlist for quick and easy access.

Context macros allow the user to assign macros to the shortlist so they are available when specified programs are loaded or running.

The new live inputs panel makes coding, testing and debugging programs a breeze. Simply double click the desired input square to simulate a single input, or right click for a level mode input.



Improved SHOW fields feature easily adjustable column widths and number of rows. The SHOW toolbar allows the user to view all boxes, manually cycle through them, or automatically cycle through each running box.

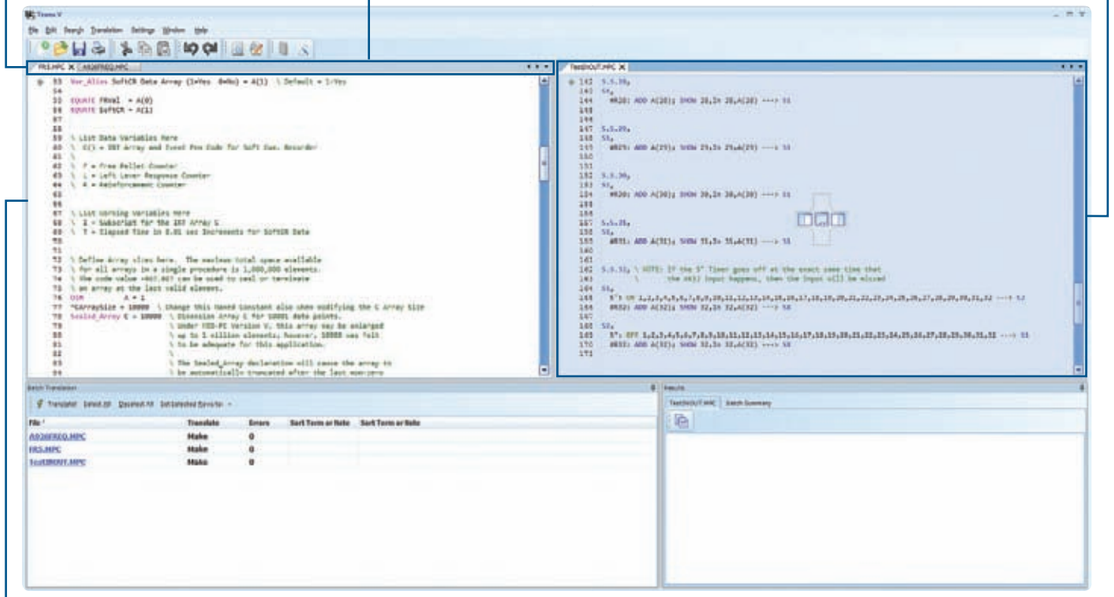
TRANS

A tabbed editor with features like keyword completion, keyword help, keyword highlighting, and automatic highlighting of syntax elements.

Simplified commands such as the "Time of Day" command. Now, coordinating commands with specific dates and times takes approximately half the amount of code to execute than before.

Flexibly re-arrange your workspace with new docking panels.

Easily move a panel using the directional pad shaped icon.



Equated variables make it easier to navigate your code, and also make it immediately understandable to anyone viewing the code by substituting the variable with plain English.

For example:

```
S.S.1,
S1,
  #R1: ADD L ---> SX
```

...can now be written as:

```
EQUATE LeftLeverPresses = L

S.S.1,
S1,
  #R1: ADD LeftLeverPresses ---> SX
```


Customizable text coloring to improve both the readability and organization of your code. Choose from a plethora of color and text style options to indicate comments, state numbers, and custom keywords to visually define protocol flow while coding.

Completely redesigned environment:

- Editor bookmarks make it easier to navigate to specified sections of code, the user can now use "Ctrl+#" to create a bookmark, and "Alt+#" to navigate to an existing bookmark
- Support for drag & drop of MSN files into the editor has been added

New MSN commands:

- FOR-NEXT loops
- SHOWEX to display data with control over the number of decimal digits
- SEALED_ARRAY will cause the array to be automatically truncated after the last non-zero value so that only those elements used during the running of the procedure are saved to the data file

Language changes from Trans IV:

- STOPKILL has been renamed STOPDISCARD
  - STOPKILL will continue to function as expected (no need to change existing code)
- STOPABORT and STOPABORTFLUSH are obsolete and will be interpreted as STOPSAVE, which ends the session and writes the data to disk
  - Saving data to memory and writing to disk have been condensed into a single operation (no need to change existing code)
- The FLUSH command has been renamed WRITE
  - FLUSH will be interpreted as WRITE (no need to change existing code)

SCHEDULE MANAGER SOFTWARE

SCHEDULE MANAGER SOFTWARE

SOF-706

Designed for non-programmers running standard schedules with structured data collection. Like other closed-ended programming systems, there is a limit to what can be accomplished with Schedule Manager. However, the advantage of selecting a Med Associates system is that should your needs ever demand an open programming language such as Med-PC, the hardware purchased from us will always be 100% compatible.

- Compatible with all Med Associates equipment
- Collect, display, and analyze data gathered from up to 8 chambers at a resolution of 10 ms or better
- Enables the design of protocols such as:
  - Fixed Ratio *(FR)*, Variable Ratio *(VR)*, Random Ratio *(RR)*, Fixed Interval *(FI)*, Variable Interval *(VI)*, Random Interval *(RI)*, Fixed Time *(FT)*, Variable Time *(VT)*, Differential Reinforcement High Level *(DRH)*, Differential Reinforcement Low Level *(DRL)*, Extinction *(EXT)*

Experiment Design

- Build procedures with up to 100 individual components each
- The number of components is unlimited by means of repeat loops and timed blocks
- A "populate chambers" button allows common information to be loaded to all chambers at one time to greatly reduce setup time
- Monitor all component details or simulate responses to test procedure logic

Chamber Control

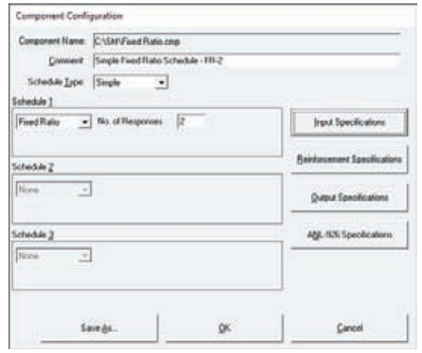
- User defined labels for all inputs and outputs to easily identify test modules and what procedure is being run in them
- Pause or stop a running chamber at any time during the experiment, save or abandon the data, and reload any existing procedure from the directory without affecting other tests in progress

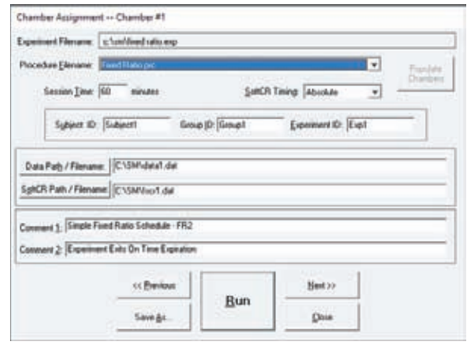
Analyze

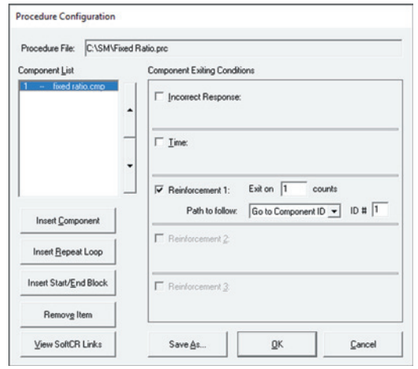
- Automatically creates data files for use in the SoftCR Cumulative Recorder software *(SOF-721/-722)* for graphical printouts, independent of the component data file
- Summary data is automatically saved in an individual, fully annotated, ASCII file, and may be organized: chronologically, by component with full detail, or by component detail only *(optional time stamps in SoftCR format can be saved in a separate file)*

Required Hardware:

- Med Associates operant chamber
- Input *(lever, nose poke, etc.)*
- Stimulus *(light, tone generator, etc.)*
- Reward delivery *(pellet dispenser/receptacle, liquid dipper, etc)*







SCHEDULE TYPES

Simple: A component using this type will only have one schedule operating. Only the "Schedule 1" block of the Component Configuration dialog will be active.

Concurrent: Two or more simple schedules operating simultaneously. These schedules operate on different inputs and can use the same or different reinforcements.

Tandem: Produces two linked simple schedules beginning with Schedule A. Once completed, Schedule A links to Schedule B without reinforcement. Reinforcement occurs only after both schedules have been completed.

DATA COLLECTION ELEMENTS

Hardware Configuration: A mapping of the test chambers' inputs and outputs to physical electronic channels on the interface cards in the interface cabinet. This enables the software to interact with the appropriate hardware.

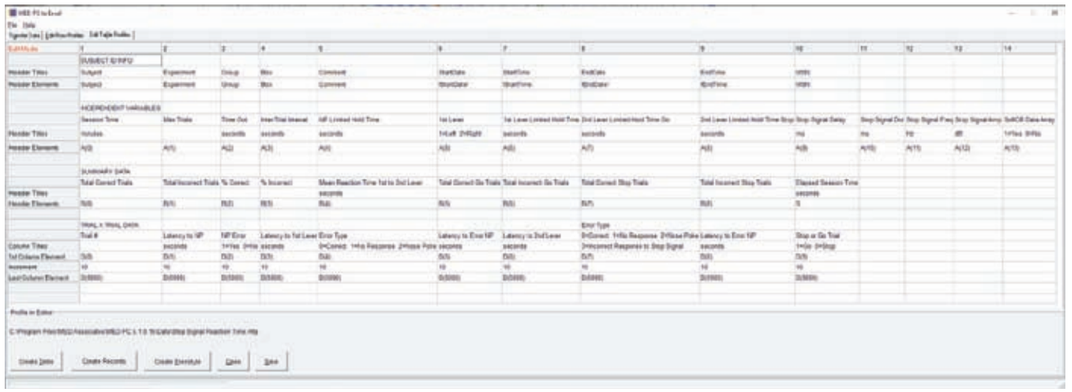
For example, in order for the software to illuminate the house light in chamber 3, a specific circuit on an output card must be activated.

Component: The basic building block of procedures and experiments. A component may have a simple, concurrent, or tandem schedule type to perform one or multiple schedules per component.

Procedure: A list of one or more components, with a user-definable exit condition between each component.

Experiment: The running of a single procedure on a single subject in a single chamber. The experiment contains definitions of the procedure, and the test subject is defined by identifier, group, and experiment.

MPC2XL



MPC2XL UTILITY

MED-PC TO EXCEL DATA TRANSFER UTILITY

SOF-731

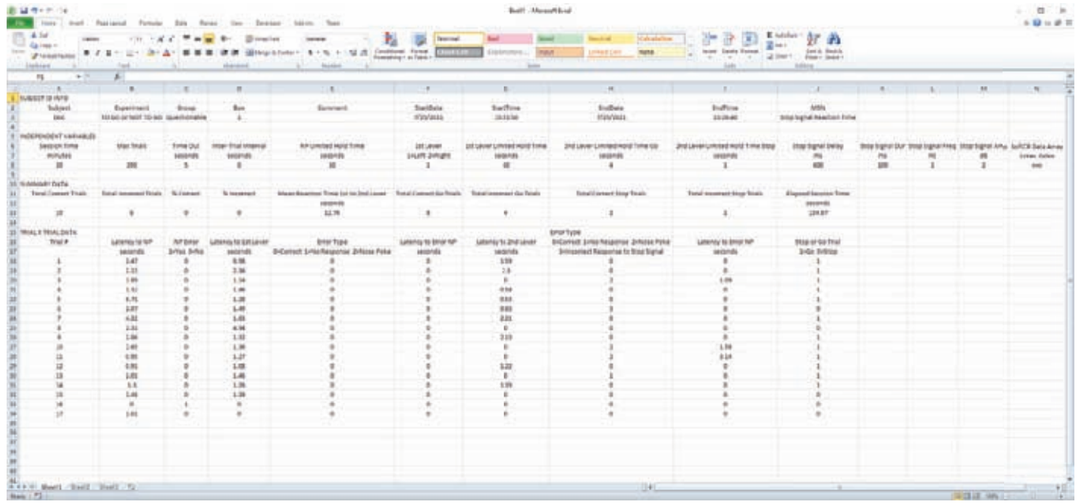
Creates a fast and easy system for transferring the contents of Med-PC® data files to Microsoft Excel spreadsheets, Microsoft Access databases, Quattro Pro, statistical programs, or virtually any other program that can read comma separated data sets (CSV)

- Any Med-PC data file can be transferred, regardless of the file naming scheme or the internal file format
- Create "profiles", a template for the layout of transferred data
  - After a profile is created, it can then be used to automatically transfer data to Excel or other targets
  - The creation of profiles is highly automated, yet very flexible
- There are two basic types of profiles that can be created:
  - Row profiles organize the data from a session into a single spreadsheet row or column
  - Table profiles create multiple rows and columns, available in freestyle, table, and record styles

NOTE: Although the program is able to transfer data files containing more than one session, it works by transferring all data that matches the profile, so we recommend a single file for each subject, for each session

Required Hardware & Software:

- Med Associates operant chamber
- Med-PC Behavioral Software Suite or Schedule Manager *(SOF-706)*
- Microsoft Excel, Libre Office Calc, or other similar spreadsheet program



Row Profile

A row profile transfers data to Excel on a row-by-row basis. Every session that is transferred to Excel becomes a row in the spreadsheet. Excel spreadsheets are limited to 256 columns, but the number of rows is practically unlimited. The profile generator automatically creates a sample profile that can be easily edited.

This format is useful for organizing data from many sessions so summary statistics can be organized for analysis. Formulas can be placed directly in the profile so the results are present the instant the data are transferred.

Table Profiles

Table profiles transfer data in a tabular format to Excel. They provide a great deal of flexibility, but are not created automatically from sample Med-PC® data files in the same fashion as row profiles are.

There are three basic types of tables that can be created using the table editor:

Table profile Type 1: Freestyle

The simplest table report, it starts with a blank table. Right click to paste special identifiers into profiles.

Table profile Type 2: Table

Designed to present trial-oriented data along with session identifying information. Session identifiers, as well as data, can be placed in the "Header Titles" and "Header Elements" rows.

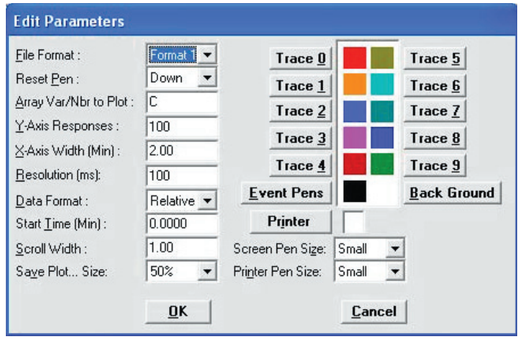
A key aspect of data tables is the ability to systematically extract data from an array variable without the need to explicitly type in every data element that should appear in the table. Ideal for creating tables displaying the results of trial-oriented sessions.

Table profile Type 3: Record

Designed to transfer trial-oriented data to Excel with adequate descriptive information in each row so that the data in each row stands as an independent record.

For example, including subject and date information in each row with trial data allows one to sort or analyze all of the data for an entire experiment by these elements, perhaps broken down by ranges of dates or by subject subgroups. The key to producing this type of data structure is to place session identifiers, such as "Subject," in the first few columns of the table, leaving the "Increment" and "Last Column Element" fields blank. The remaining columns contain data elements for each trial. This results in the identifier and data information being present in every row.

SOFTCR



SOFTCR CUMULATIVE RECORD SOFTWARE

SOFTCR CUMULATIVE RECORD SOFTWARE

SOF-721

Display and/or print partial or complete cumulative records from IRT data files created by Med-PC® or Schedule Manager™ *(SOF-706)*. However, any properly formatted ASCII file can be used with SoftCR™.

- Permanent data files are created with inter-response times and event marks
- Produces cumulative records to be used as publication-quality figures
- Compatible with four data formats:
  1) Annotated *(use with Med-PC or Schedule Manager)*
  2) Stripped *(use with Med-PC)*
  3) Stripped, C Array Only *(use with Med-PC)*
  4) Stripped with Variable ID *(use with Med-PC)*

Printing/Exporting:

- At any time while reviewing a record, the user can print the screen or the entire record
- Because the printing of large graphics files can be time consuming, SoftCR™ includes a user-friendly batch print utility, create a tag list file from which multiple files can be printed
- Screen shots can be saved as either a Windows Meta File (WMF) or a Portable Document Format (PDF) file along with the original Bitmap (BMP) option
  - *NOTE: The WMF and PDF options allow the user to zoom in or out of the document without a loss in resolution.*

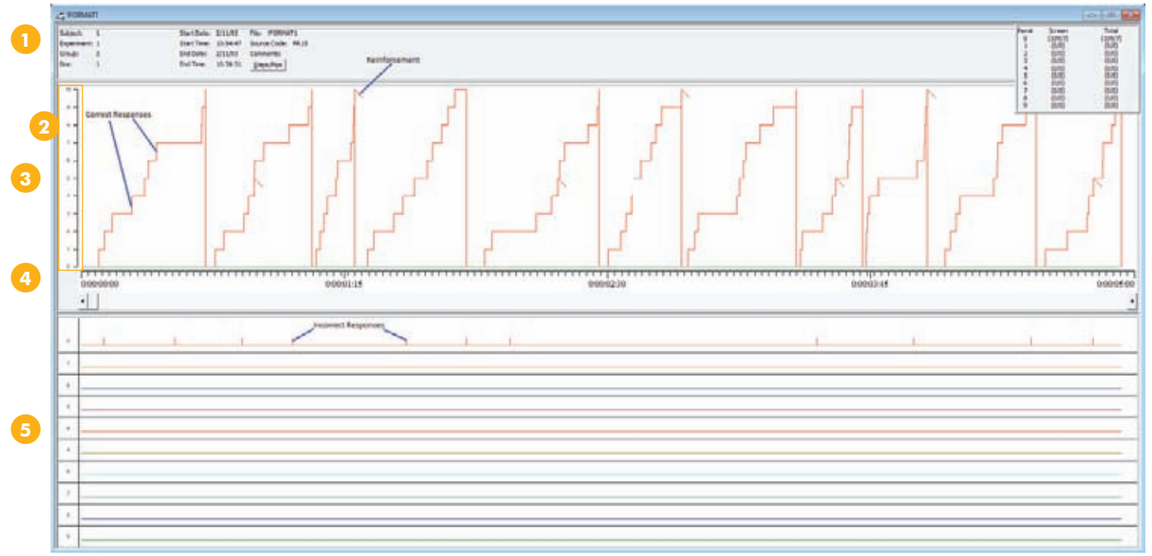
User Interface:

- Dynamic, on-screen scaling of the Y-axis and scrolling along the X-axis to focus on critical time periods
- Easy-to-use menus respond to keyboard entries, function keys, and mouse point-and-click commands
- The X and Y axis can be set to either the standard axis with tick marks or to a scale that defines a specific time interval
- Toggle trace lines and event pens on or off to focus on different areas of the data
  - Display up to 10 event pens to independently track responses and reinforcing events by marking a response, the beginning and end of code segments, or stimulus durations
  - Up to ten individual trace lines on the same X-Y axis
- Edit parameters to customize the display to best represent the features of the experiment:
  - Start time
  - Scroll width
  - Reset pen status
  - Number of responses on the y-axis
  - Elapsed time on the x-axis

Required Hardware & Software:

- Med-PC Behavioral Software Suite or Schedule Manager

1) Header Information 2) Response Axis 3) Pens Plot Window 4) Time Axis 5) Events Plot Window



SOFTCR PRO CUMULATIVE RECORD SOFTWARE

SOFTCR PRO CUMULATIVE RECORD SOFTWARE

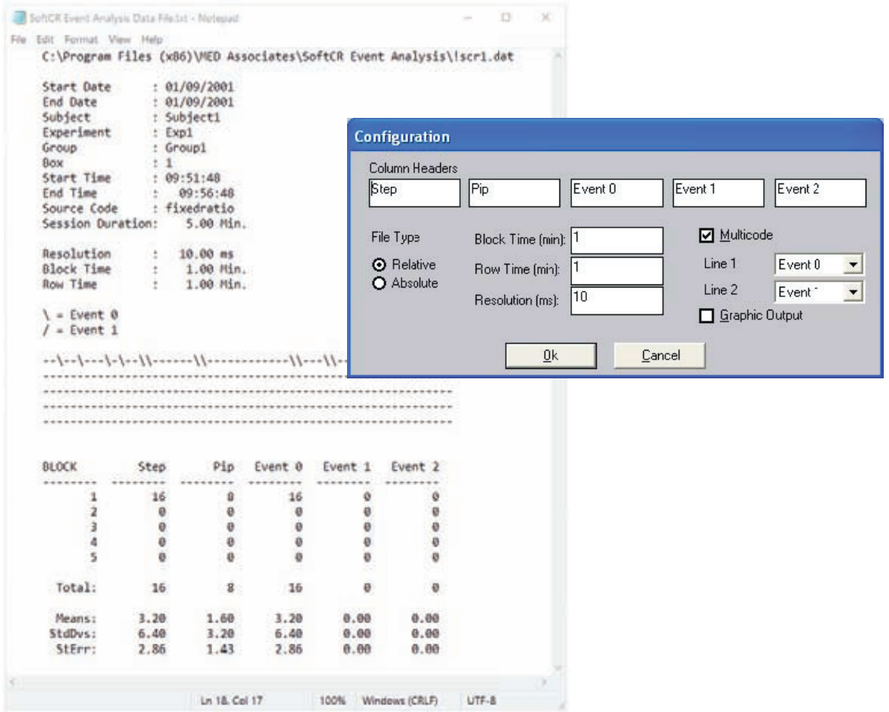
SOF-722

Enables either real-time or offline access of Med-PC cumulative record (CR) data, and enables the user to produce screen and printer plots of Med-PC data files.

- Produces cumulative records in real-time on the same computer that is running Med-PC
  - Can be set up to generate records on networked computers to watch an active experiment in the lab, from the computer in your office
- Create an online standalone system providing up to 24 cumulative records with a single computer and up to eight optional remote monitors
  - One, two, or four records can be displayed simultaneously on the screen in real-time
  - Easily switch between any of the possible 24 records
  - Each "recorder" can be tagged by experiment, subject, and group
  - A hard copy of any cumulative record can be printed at any time, even while other "recorders" are collecting data
- Parameters of the plot may be varied to generate multiple plots of the same data with different scaling:
  - Vertical resolution in response
  - Horizontal resolution in seconds per division (for hard copy) or seconds per screen (for screen plots)
  - Start time for the plot to begin
  - Duration of the plot
- Includes two programs, SoftCR™ Pro and a Windows service called MedNetService
  - MedNetService facilitates the communication between SoftCR™ Pro and Med-PC
  - Both MedNetService and Med-PC must be installed on the same computer
- Easy on-line help screens

Required Hardware & Software:

- Med-PC Behavioral Software Suite or Schedule Manager



SOFTCR EVENT ANALYSIS UTILITY

SOFTCR EVENT ANALYSIS UTILITY

SOF-720E

Designed for use with SoftCR data files that were generated using Schedule Manager or with Med-PC format 1 data files.

- Creates an output file with the same filename and ".OUT" extension and displayed in notepad
- The file can be printed from the SoftCR Event Analysis program or from Notepad
- Configure the analysis file with the following:
  - Column Headers: Titles for the five columns
  - File Type: Select "Relative" or "Absolute", depending on which method was used to generate the data file
  - Block Time (min): Length of time to segment data for calculating the mean, standard deviation, and standard error of the mean
  - Row Time (min): Length of time represented by each row of the data display
  - Resolution (ms): Resolution that was used to generate the data file
  - Multicode: Display two events simultaneously
  - Line 1*: SoftCR event, causes a back slash to be drawn in the data display
  - Line 2*: SoftCR event, causes a forward slash to be drawn in the data display
  - Vertical Line*: SoftCR event, causes a vertical line to be drawn in the data display
  - Graphic Output: Writes directly to the printer, which creates a much higher detail graph

** NOTE: Enabled only if mulitcode is deselected*

MEDLAB 8 PROTOCOL PACKAGE

MEDLAB 8 PROTOCOL PKG

SOF-700LA-1

Set of eight complete, ready to run MedState Notation™ (MSN) programs to be used in Med-PC®:

- Fixed Ratio *(FR)*, Fixed Interval *(FI)*, Variable Ratio *(VR)*, Variable Interval *(VI)*, Random Ratio *(RR)*, Random Interval *(RI)*, Chain *(CHAIN)*, Discrimination *(DISC)*
- Procedures designed by noted psychology professor Dr. Steven Dworkin
- Can be used as a starting point for writing custom MSN programs, as each procedure can be modified by the user to meet specific hardware or research requirements
- The trial data are conveniently stored in an array that prints out in a one row per trial format
  - Stores IRT data in array C that can be used by our SoftCR Cumulative Recorder software *(SOF-721/-722)* to generate a graphical record on screen or to print a cumulative record after the data has been collected

Protocol Summaries

Fixed Ratio (FR):

- A response is reinforced only after a specified number of responses *(default = 1)*
- Produces a high, steady rate of responding with only a brief pause after the delivery of the reinforcer

Fixed Interval (FI):

- The first response is rewarded only after a specified amount of time has elapsed *(default = 1 sec)*
- Causes high amounts of responding near the end of the interval, but much slower responding immediately after the delivery of the reinforcer

Variable Ratio (VR):

- A response is reinforced after an unpredictable number of responses *(mean of 5, ranging from 1 to 20)*
- Gambling and lottery games are good examples of a reward based on a variable ratio schedule
- Creates a high steady rate of responding

Variable Interval (VI):

- A response is rewarded after an unpredictable amount of time has passed *(mean of 10 sec, ranging from 0.25 to 39.96 sec)*
- Produces a slow, steady rate of response

Random Ratio (RR):

- The random ratio value specifies the probability with which a response will be reinforced
- 20% chance of reinforcement on each response

Random Interval (RI):

- Each passing of the interval time has a possibility that the program will move onto the next step. If it doesn't, the program will go back and time the interval time again, thus obtaining a random interval
- A "timer" has a 20% chance of timing out every 2 seconds

Chain (CHAIN):

- "Chains" two responses together
- Typically run in test chambers with two standard response levers and stimulus lights
- The stimulus light for the first correct lever turns on, then the animal must press that lever enough times to meet the first user defined FR value, then the light turns off
- Then, the stimulus light for the second correct lever turns on, the animal must now press that lever enough times to meet the second FR, then a reinforcement is issued
- Two part chain where the first FR = 1 and the left lever is the correct lever
- The second FR = 5 and the right lever is correct

Discrimination (DISC):

- Stimulus light breaks the session time into alternating periods of extinction (no light) and fixed ratio (light on)
- GO/NO-GO The default procedure switches S+ and S- every 30 seconds for the duration of the procedure

Required Hardware:

- Med Associates operant chamber
- Input *(lever, nose poke, etc.)*
- Stimulus *(light, tone generator, etc.)*
- Reward delivery *(pellet dispenser/receptacle, liquid dipper, etc.)*

OPERANT CONDITIONING LAB PROTOCOL PACKAGE

OPERANT CONDITIONING LAB PROTOCOL PKG

SOF-700LA-2

Consists of five MedState Notation™ (MSN) procedures that are well suited for a research or student lab:

- Fixed Ratio *(FR-X)*, Fixed Interval *(FI-X)*, Differential Reinforcement of Zero Responding *(DRO)*, Inter-Response Time Less *(IRT < X)*, Inter-Response Time Greater *(IRT > X)*

- The procedures all make use of Med-PC® named variables to make running and modifying the schedules
- The trial data are conveniently stored in an array that prints out in a one row per trial format
  - Stores IRT data in array C that may be used by the SoftCR Cumulative Recorder program *(SOF-721/-722)* to generate a graphical record on screen or to print a cumulative record after the data has been collected

Protocol Summaries

Fixed Ratio (FR)

House light and stimulus light above the correct lever turn on. Once the FR has been satisfied, a reward is issued, followed by a Time Out (TO). Both levers are inactive during the TO, but still count as incorrect if pressed during TO.

Fixed Interval (FI)

Reward is delivered only when a single response has occurred after the fixed interval value has expired.

The house light and stimulus light above the correct lever turn on. Once the FI has been satisfied, a reward is issued, followed by a Time Out (TO). Both levers are inactive during the TO, but still count as incorrect if pressed during TO

Differential Reinforcement of Zero Responding (DRO)

Reinforces nonresponse. A time-out interval follows reinforcement and/or the occurrence of a response. The DRO Time is user defined, with a default of 20 seconds.

Inter-Response Time Greater Than

Used to modify the rate of responding within an operant chamber. The independent variables define the interval between responses.

The IRT is the minimum interval between responses required before reinforcement will be delivered.

Example: if the IRT = 5 seconds, the first and second responses need to be separated by a minimum of 5 seconds to receive reinforcement.

Inter-Response Time Less Than

Used to modify the rate of responding within an operant chamber. The independent variables define the interval between responses.

The IRT is the maximum interval separating responses.

Example: if the IRT = 5 seconds, then the inter-response interval must not exceed 5 seconds in order for the reward to be delivered.

Required Hardware:

- Med Associates operant chamber
- Input *(lever, nose poke, etc.)*
- Stimulus *(light, tone generator, etc.)*
- Reward delivery *(pellet dispenser/receptacle, liquid dipper, etc.)*

CONTEXTUAL CONDITIONING PROTOCOL PACKAGE

CONTEXTUAL CONDITIONING PROTOCOL PKG

SOF-700RA-16

Contains five protocols: Mag Train, Bar Press Shape, VI-90 Training, VI-90 Test, Pavlovian Variable Interval

Protocol Summaries

Mag Train:

A magazine training program for a Pavlovian Variable Interval schedule.

Program dispenses a pellet every 10 seconds for 18 minutes. Keeps track of the number of pellets dispensed and the number of presses on the lever.

Program ends when either the session time or the maximum number of pellets has been reached.

Bar Press Shape:

Starts off by running a Continuous Reinforcement (CRF) schedule where every response on the Lever is rewarded.

- To change schedules, issue a:
  - K2 pulse for Variable Interval-30
  - K3 pulse for Variable Interval-60
  - K4 pulse for Variable Interval-90
  - K1 pulse for CRF

VI-90 Training:

VI-90 schedule with fear conditioning to a 60 second Tone. The trial starts with an ITI and it counts responses for 60 seconds in the pre-stimulus period. The program then turns on the tone and it counts responses for 60 seconds in the stimulus period. After the 60 second tone finishes the animal receives a 500 ms shock.

The animal is rewarded on a VI-90 schedule that runs independent of the Tone stimulus.

VI-90 Test:

VI-90 schedule with fear conditioning to a 60 second Tone. The trial starts with an ITI and counts responses for 60 seconds in the pre-stimulus period. The program then turns on the tone and counts responses for 60 seconds in the stimulus period. Animal receives no shock

The animal is rewarded on a VI-90 schedule that runs independent of the tone stimulus.

Pavlovian Variable interval:

The trial starts with an ITI, and counts responses for 10 seconds in the pre-stimulus period. The program then turns on the tone and it counts responses for 10 seconds in the stimulus period. The animal is rewarded in every other trial.

Required Hardware:

- Med Associates operant chamber
- Input *(lever, nose poke, etc.)*
- Stimulus *(light, tone generator, etc.)*
- Reward delivery *(pellet dispenser/receptacle, liquid dipper, etc.)*

VARIABLE SCHEDULE PROTOCOL PACKAGE

VARIABLE SCHEDULE PROTOCOL PKG

SOF-700RA-18

Through a series of LIST statements the user may select between the following schedules to run:

- Fixed Ratio *(FR)*, Fixed Interval *(FI)*, Variable Ratio *(VR)*, Variable Interval *(VI)*

- For each trial there is a preCS and a CS (conditioned stimulus) period
  - Both periods are always the same length
  - The correct response(s) on the correct lever during either period gives a reward
  - There is no reward given during the Inter-Trial Interval (ITI) or the pre/post adapt periods
  - Any responses during the preCS period are discarded when the CS period starts
  - Example: If the program is running an FR-10 schedule and the animal has four responses when the program switches to the CS period, the four responses are discarded and the animal must start over to meet the FR-10 schedule. The same schedule is run during the preCS and CS periods

Variable Defaults:

Reward (1 = pellet / 2 = dipper / 3 = drug)

Reward Time: 0.05 sec

Number of Trials: 10

Pre Adapt Period: 240 sec

Post Adapt Period: 180 sec

Data Collected:

- Total responses, total correct / incorrect responses, number of rewards

Protocol Summaries

Fixed Ratio (FR):

- A response is reinforced only after a specified number of responses
- Produces a high, steady rate of responding with only a brief pause after the delivery of the reinforcer

Fixed Interval (FI):

- The first response is rewarded only after a specified amount of time has elapsed
- Causes high amounts of responding near the end of the interval, but much slower responding immediately after the delivery of the reinforcer

Variable Ratio (VR):

- Gambling and lottery games are good examples of a reward based on a variable ratio schedule
- Creates a high steady rate of responding
- A response is reinforced after an unpredictable number of responses
- Mean of 5 with a range from 1 to 10 responses

Variable Interval (VI):

- A response is rewarded after an unpredictable amount of time has passed
- Produces a slow, steady rate of response
- Mean of 7 seconds and a range from 3 to 10 seconds

FIXED RATIO TRAINING PROTOCOL

FIXED RATIO TRAINING PROTOCOL

SOF-700RA-1

The test animal is required to respond on the specified lever on a user defined fixed ratio and is rewarded when the ratio is met.

- A time out (TO) following the reward can be implemented
- The session ends based on time
- Correct and incorrect lever presses are counted
  - *NOTE: Percent correct/incorrect are calculated at the end of the session*
- Reward is typically a pellet, dipper presentation, or drug infusion

Required Hardware:

- Med Associates operant chamber
- Input *(lever, nose poke, etc.)*
- Stimulus *(light, tone generator, etc.)*
- Reward delivery *(pellet dispenser/receptacle, liquid dipper, etc.)*

PROGRESSIVE RATIO PROTOCOL

PROGRESSIVE RATIO PROTOCOL

SOF-700RA-2

The test animal is required to respond using the specified lever on a progressively increasing ratio schedule, which may be set to increase after each reward or after multiple rewards, and the subject is rewarded when the ratio is met.

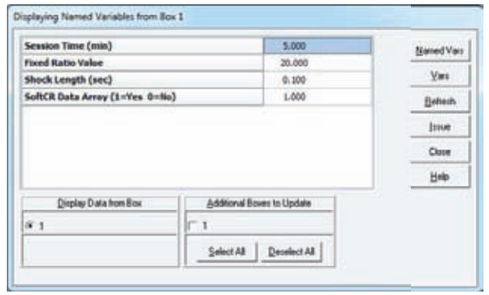
- A time out (TO) following the reward can be implemented
- The session ends based on time
- Correct and incorrect lever presses are counted
  - *NOTE: Percent correct/incorrect are calculated at the end of the session*
- Reward is typically a pellet, dipper presentation, or drug infusion
- The type of progressive ratio (PR) may be specified as:

  Step: The ratio starts with the start PR value and is incremented by the step value each time the PR frequency is met

  List: Pulls the ratio values from the "X" list, which can be in any sequence

Required Hardware:

- Med Associates operant chamber
- Input *(lever, nose poke, etc.)*
- Stimulus *(light, tone generator, etc.)*
- Reward delivery *(pellet dispenser/receptacle, liquid dipper, etc.)*



LICK SUPPRESSION PROTOCOL

LICK SUPPRESSION PROTOCOL

SOF-700RA-22

Allows the animal to freely lick from the sipper tube. After a certain number of licks (defined by the variable fixed ratio value) the animal is given an aversive stimulus.

- Also known as Vogel Conflict
- The duration of the aversive stimulus is defined by the variable shock length
- The variable SoftCR data array determines whether or not an array containing SoftCR data is included in the data file

Required Hardware:

- Aversive stimulator
- Sipper w/lick detection *(IR beam, c ontact lickometer, etc.)*

DRUG DISCRIMINATION PROTOCOL

DRUG DISCRIMINATION PROTOCOL

SOF-700RA-24

Includes three (3) protocols: food shaping, training, and testing

- Starts by turning on the left & right stimulus lights and house light
- Trial requires the animal to correctly respond with a lever to receive a reward, then time-out
- The program ends when the maximum number of rewards are earned or when the session time ends
- Totals for the whole program, as well as all data during each trial are collected *NOTE: SoftCR is also recorded*

Food Shaping

- Mimics a Fixed Ratio schedule
- The program starts by turning on the house light and both the left and right stimulus lights
- A trial consists of correctly responding on a lever to receive a reward, followed by a time-out
- The program ends when the maximum number of rewards are earned or when the session time ends, whichever comes first

Training

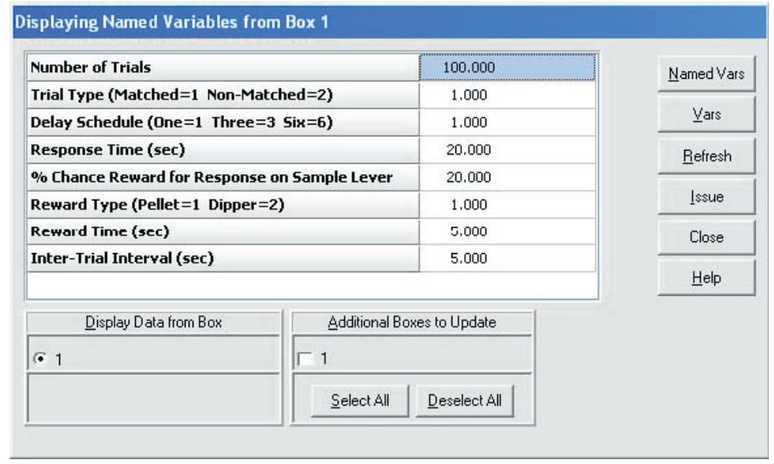
- Following an acclimation period, the program turns on the house light and both the left and right stimulus lights
- Responses on the correct lever result in a reward and turn off all lights, followed by an inter-trial interval
- Responses on the incorrect lever will reset the current fixed ratio
- The program ends when maximum number of rewards are earned or when the session time ends

Testing

- Following an acclimation period, the program turns on the house light and both the left and right stimulus lights
- Responses on either lever will result in a reward and turn off all lights, followed by an inter-trial interval
- The program ends when maximum number of rewards are earned or when the session time ends

Required Hardware:

- Med Associates operant chamber
- Input *(e.g. lever)*
- Stimulus *(e.g. light, tone generator, etc.)*



DELAYED MATCHED + NON-MATCHED TO POSITION PROTOCOL

DELAYED MATCHED + NON-MATCHED TO POSITION PROTOCOL

SOF-700RA-27

Designed for use in standard Delayed Match to Position (DMTP) studies.

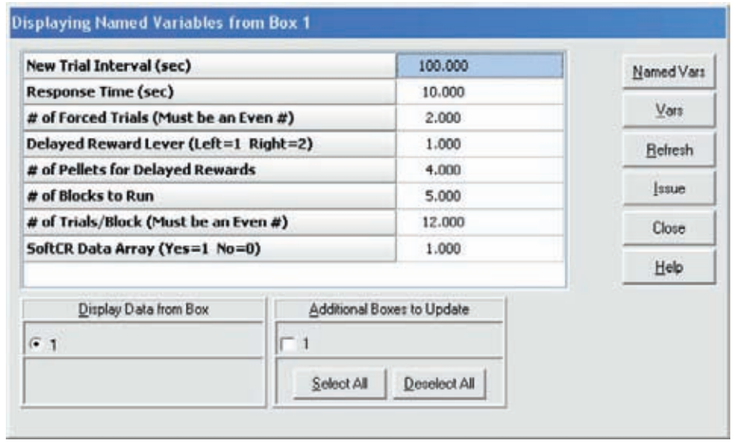
1. Sample lever presented with the stimulus light, to be pressed by the subject. If they fail to select one or choose incorrectly, then an omission is recorded, the house light is turned off, then the ITI is initiated.
2. Once the subject presses the lever, a head entry into the pellet dispenser must be detected. If it's not, then an omission is recorded, the house light turns off, then the ITI is initiated.
3. After a head entry has been detected, the program waits for a set time that is chosen from the list. After the delay is over, the program presents both levers and both stimulus lights. The subject must then either select the same lever (matched) or the opposite lever (non-matched).
4. Correct lever chosen: Reward is presented for a specified amount of time, when the reward time runs out, the program goes to the ITI state, and the next trial begins

   No lever press: An omission is recorded, the house light is turned off, and the program goes to the ITI

   Incorrect lever chosen: Action is recorded, the house light is turned off, and the program goes to the ITI

Required Hardware:

- Med Associates operant chamber
- Input *(lever, nose poke, etc.)*
- Stimulus *(light, tone generator, etc.)*
- Reward delivery *(pellet dispenser/receptacle, liquid dipper, etc.)*



DELAYED VS. IMMEDIATE REWARD PROTOCOL

DELAYED VS. IMMEDIATE REWARD PROTOCOL

SOF-700RA-31

Initialization

After a timed inter-trial interval (ITI), the program draws the first delay for the large reward, the pellet light turns on to signal the animal to nose poke within the defined response time.

- If a nose poke is not detected, the pellet light is turned off, a Type 1 omission is recorded, and the trial ends.
- If a nose poke is detected, the pellet light is turned off, and the program checks if this is to be a forced trial or a free choice trial.

Trial Types:

- *Forced Trials:* The immediate and delayed levers are presented in an alternating pattern. The animal must respond to the presented lever within the response time. If the animal fails, then the lever is retracted, a type 2 omission is recorded, and the trial ends.
- *Free Choice Trials:* Both the immediate and delayed levers are presented at the same time. The animal must respond to either lever within the response time. If the animal fails, then the lever is retracted, a type 2 omission is recorded, and the trial ends.

Lever Choices:

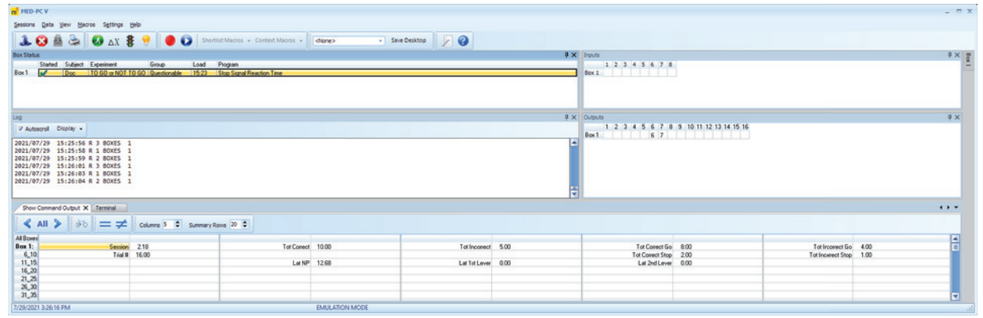
- If the delayed lever is chosen: Lever(s) are retracted and the cue light is turned on for the delay. At the end of the delay, the cue light is turned off, the pellet light is turned on, and the number of pellets for the large reward is given. If there is no nose poke in the food tray within the response time, then a type 3 omission is recorded.
- If the immediate lever is chosen: Levers are retracted, the pellet light is turned on, and 1 pellet reward is given. There is no delay before the reward is dispensed when the immediate lever is chosen. If there is no nose poke in the food tray within the response time, then a type 4 omission is recorded.

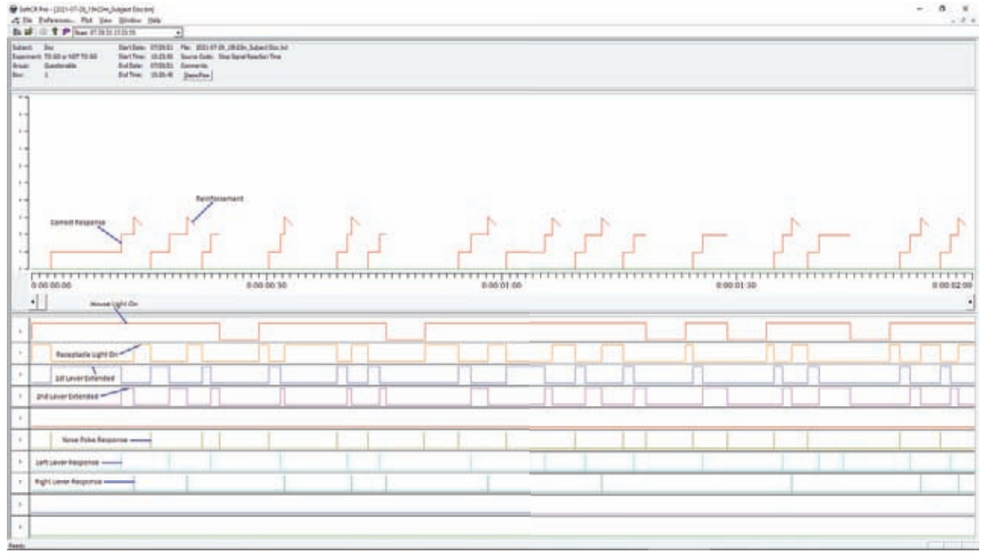
Conclusion:

At the end of the trial, the program will wait for the signal for the next trial to begin (new trial interval). At the beginning of each new block, the next delay for the large reward is drawn from the list. When all trial blocks have been completed the program will end.

Required Hardware:

- Med Associates operant chamber
- Input *(lever, nose poke, etc.)*
- Stimulus *(light, tone generator, etc.)*
- Reward delivery *(pellet dispenser/receptacle, liquid dipper, etc.)*





STOP SIGNAL REACTION TIME PROTOCOL

STOP SIGNAL REACTION TIME PROTOCOL

SOF-700RA-34

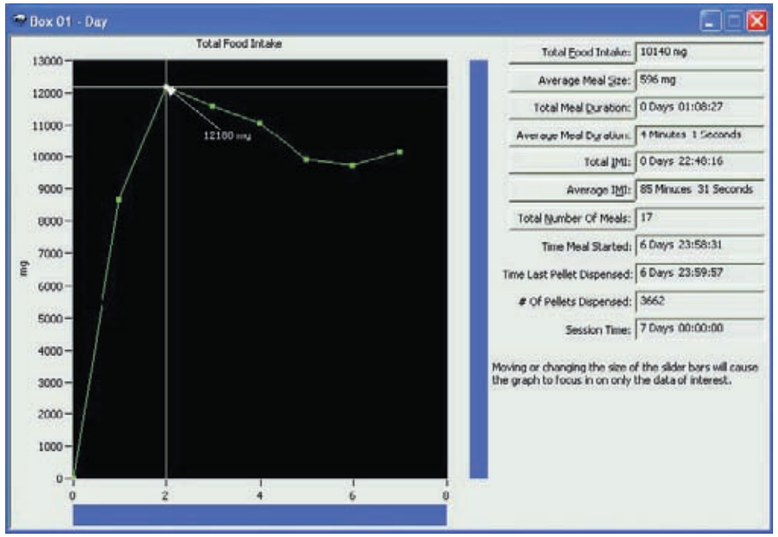
Training Procedures:

- Nose Poke Training
- Correct Lever Training
- Two Lever Training
- Stop Signal Reaction Time

These are intended to progressively train the subject for the SSRT procedure (Go/No-Go) in which the subject is supposed to either respond or not respond depending on the stimuli.

Required Hardware:

- Retractable Levers (x2)
- Nose Poke
- Pellet Dispenser
- Stimulus Lights (x2)
- Receptacle Light
- House Light
- Tone Generator



ANIMAL FOOD INTAKE MONITOR SOFTWARE

ANIMAL FOOD INTAKE MONITOR SOFTWARE
SOF-710

Quantitatively measure the food intake of singly housed mice or rats using a standard pellet dispenser equipped with infrared beam for pellet detection. A pellet is delivered at the start of the experiment. Every time the pellet is retrieved, another is delivered until the end of the experiment.

- Break the data down into multiple phases.
  - For example, if the experiment will last for one week, one could have a phase for each day, every 12 hours, and the entire week
  - The program requires that there be one phase named "Day", which is used to determine when the house light should be turned on or off
  - The number of hours in the day phase is user defined, to experiment with how either a longer or shorter day cycle might effect an animal's eating patterns

Meal Definition:

In order for the beginning of a meal to be recognized, the animal must take enough pellets to meet the "Minimum Meal Size" and the animal must do this in less than the "Meal Period End Criteria".

In order for a meal to end, the "Meal Period End Criteria" must pass with no pellets having been taken.

In the below example, the following settings are used:

- Pellet Size: 20 mg
- Minimum Meal Size: 3 pellets
- Meal Period End Criteria: 10 minutes
- Count All Pellets: Not Selected

Example:

0:00 The program is started

3:00 Animal takes the first pellet

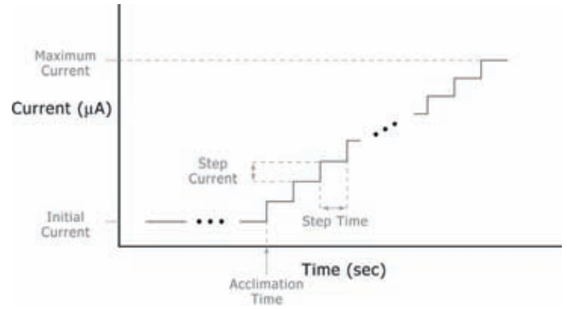
11:00 Animal takes another pellet

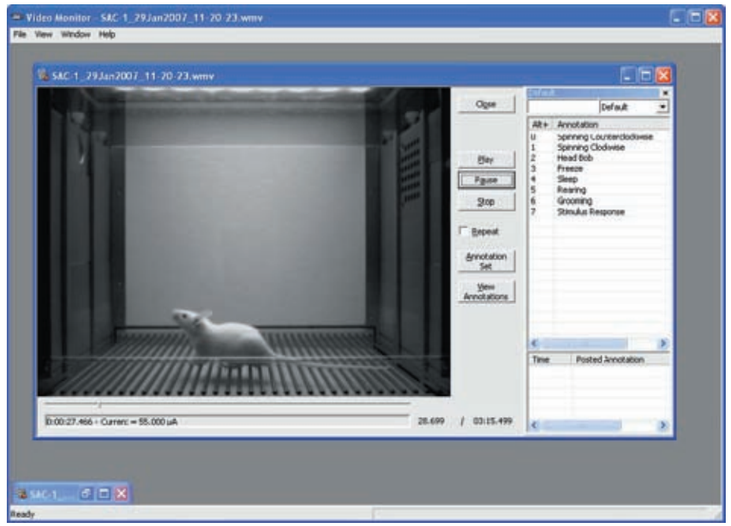
13:00 Animal doesn't take any more pellets

In this example only 2 pellets were taken within the ten minute time span, therefore a meal is not started and the pellets are not counted.

Required Hardware:

- Med Associates operant chamber or home cage
- House light
- Pellet dispenser
- Pellet receptacle w/IR beam





AVERSIVE STIMULATION w/VIDEO MONITORING PROTOCOL

AVERSIVE STIMULATION w/VIDEO MONITORING PROTOCOL
SOF-732-4

Use Med-PC, Video Monitor *(SOF-842)*, and Aversive Stimulation testing equipment to record aversive reaction in lab animals.

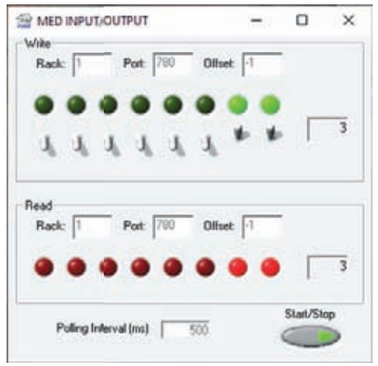
- A MedState Notation protocol to:
  - Control the current going to the grid floor
  - Communicate with Video Monitor software *(SOF-842)*
- Determine the average minimum current necessary to cause an aversive reaction in mice
  - Maintain consistent current increase using Med-PC to control an Aversive Stimulator *(ENV-413C)* and Scrambler *(ENV-412C)*
- Use a video camera in place of a human eye for a more comfortable testing situation
  - Multiple researchers can confer over the subject animal's reactions
  - Ability to rewind and review the animal's reactions

Required Hardware & Software:

- Med Associates operant chamber
- Med-PC Behavioral Software Suite
- Video Monitor *(SOF-842)*

VISUAL BASIC
DELPHI
C++

SOF-732-3



CONTROL OF MED I/O MODULES FROM OTHER LANGUAGES SOFTWARE

CONTROL OF MED I/O MODULES FROM OTHER LANGUAGES SOFTWARE

SOF-732-3

For users who desire the power and flexibility of our interface modules and other hardware, but do not want to use Med-PC® as a programming environment.

- API provides the user with the ability to communicate with the interface using any programming language
  - Turns on outputs, receives inputs
  - Log input data either manually or through other means
- Modules and header files provided for use with:
  - Visual Basic 6.0
  - Delphi
  - C++
- Full documentation is provided, including function declarations and programming syntax
- A sample Visual Basic 6.0 project is also included to demonstrate a simple I/O control user interface

A

B

C

PRIZMATIX FIXED RATIO PROTOCOL

PRIZMATIX FIXED RATIO PROTOCOL

SOF-732-6

For pulsing LEDs, lasers and shutters in Optogenetics experiments using Med-PC® protocols and our hardware, while simultaneously collecting experimental data.

- Enables Med-PC® to:
  - Program trains of pulses
  - Create groups of trains
  - Add various triggering conditions
- Includes sample code that may be added to any protocol, as well as a Fixed Ratio protocol
- Requires a TTL output from the Med Associates interface to operate at 1ms resolution

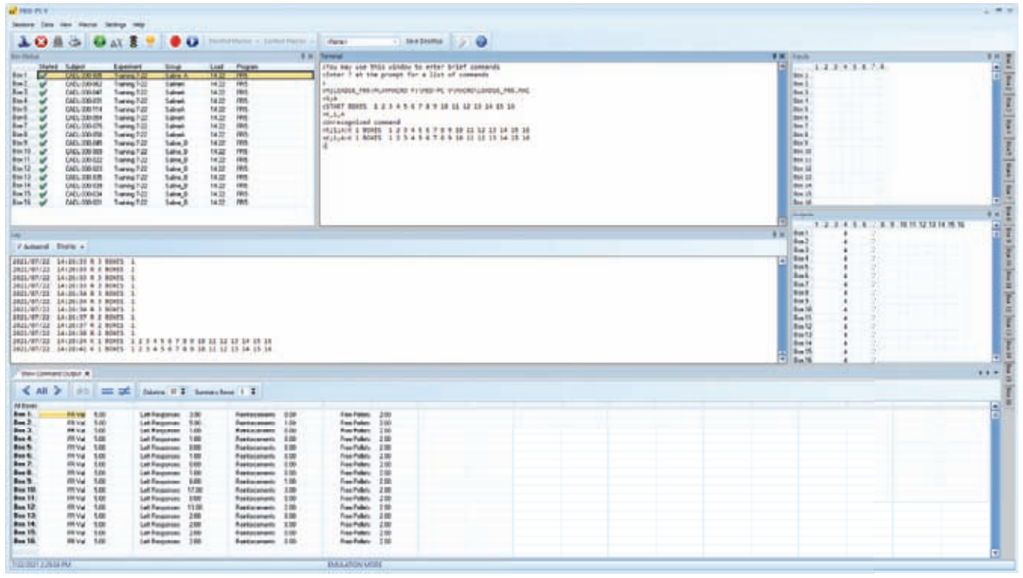
Required Hardware & Software:

- Med Associates Operant Chamber w/Modified Top
- Prizmatix Pulser or Pulser Plus
- Med-PC Behavioral Software Suite

IMAGES

A) MED-VFC-OPTO-R B) Prizmatix Pulser C) Med-PC 6

Med-PC V Behavioral Control Software Suite (SOF-736) controlling and gathering input & output data from devices, using a fixed ratio protocol



IT'S ALL ABOUT INPUTS AND OUTPUTS. Devices with input lines send response data *to* the computer, while output lines are for signals sent *from* the computer that cause the device to operate.

To send and receive these signals, the computer is connected to a decode card housed in an interface cabinet. In this interface cabinet, there are slots for housing input/output cards, which are wired to connection panels. These panels are paired with a chamber that has devices installed.

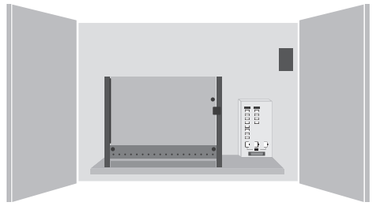
For an illustration of a basic setup, see p. 154.

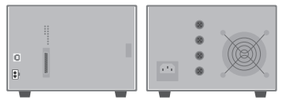
OUTPUTS

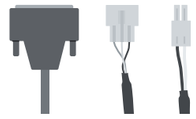
- Aversive Stimulators
- Clickers
- Fans
- House Lights
- Liquid Sippers + Dippers
- Pellet Dispensers
- Retractable Levers (Retraction)
- Stimulus Lights
- Sonalerts
- Syringe Pumps
- Tone Generators
- White Noise Generators

INPUTS

- Ceiling Rods
- IR Detectors
- Levers
- Lickometers
- Nose Pokes
- Response Wheels
- Retractable Levers (Presses)







STEP 1: CHOOSE A TEST CHAMBER OR PACKAGE

- Operant Conditioning & General Behavior
- Self-administration
- Shuttle Box
- Activity Wheel
- Five & Nine Hole Nose Poke
- Olfactory
- Mazes

...and more!

STEP 2: CHOOSE AN INTERFACE CABINET

- Standalone Interface (USB)
- Tabletop Interface Cabinet (USB)

STEP 3: CHOOSE AN EXPERIMENTAL CONTROL SOFTWARE

- Med-PC Behavioral Software Suite
- Schedule Manager

...or other specialized software

STEP 4: CHOOSE A POWER SUPPLY

- Tabletop Power Supply (built-in)
- Standalone Power Supply

STEP 5: CHOOSE YOUR WIRING

- For the wires you need to connect everything together, contact our sales team. We will work with you to get the cables and adapters you need for your setup.

STEP 6: CHOOSE A COMPUTER

- Your own computer*
  - *As long as it meets the minimum requirements, contact our sales team to confirm*
- Our computer package or NUC

...YOUR SYSTEM IS COMPLETE!

LET'S GET STARTED

Interface packages are typically all you'll need for a basic system, but can also act as a great starting point. We offer many components that can be combined in a multitude of ways, cables of various lengths, modules of different capabilities, etc.

This is intended to provide an overview to aid in your understanding of how these components fit together. Due to the complex nature, we recommend contacting our Sales team, who will ensure you will get everything you need to accomplish your research and data acquisition goals.

A

SMART INTERFACE CABINET SPECS				
	NAME	SLOTS	POWER OUT	OVERALL (W×H×D)
SG-7308	Small Smart Interface Cabinet w/Power Supply	9*	10 A	9.3" x 6.1" x 15" *(23.6 x 15.5 x 38.1 cm)*
SG-7316	Large Smart Interface Cabinet w/Power Supply	17*	20 A	19" x 6.1" x 15" *(48.3 x 15.5 x 38.1 cm)*

** one slot needed for decode card*

POWER + CONTROL INTERFACE CABINET + DECODE CARD

USB INTERFACE PACKAGE
MED-SYST-USB-8 | MED-SYST-USB-16

Packages Include: USB Interface Decode Card, small or large Power + Control Interface Cabinet, SoftCR software, Med-PC software, MPC2XL utility, and cables.

Order the small cabinet package to control up to 8 chambers, and the large cabinet for up to 16.

SMART INTERFACE CABINET
SG-7108

SMART INTERFACE CABINET w/POWER SUPPLY
SG-7308 | SG-7316

The interface cabinet is the heart of our interface system. It has remained consistent for over thirty years, and has withstood several software and component upgrades without becoming obsolete.

The control computer connects to the decode card in the interface cabinet via USB. From a single unit, multiple chambers can draw from its 28V DC power source, and channel all of their data into it. See pages 147-149 for an illustration of a basic setup.

The most current system we offer consists of a PC, a USB decode card, smart interface cabinet, OmniCard, and Omni connection panels.

- Convert most older power and control interface cabinets to a modern framework by swapping out the decode card

  NOTE: For those not ready to upgrade all of their systems to OmniCtrl, the USB Decode Card (DIG-705) is compatible with SmartCtrl and SuperPort cards made since 2010 as well. Talk to your Med Associates representative to see if your legacy system can be upgraded.

- Thermal shutdown
- Built-in electromagnetic interference (EMI) filter
- Short circuit protection
- Compatible with our OmniCtrl™, SmartCtrl™, SuperPort™, or standard I/O cards

  NOTE: Requires an adapter (SG-210CP-M12-4M) when used with SmartCtrl™ Cards

- Each cabinet has a maximum amount of modules, and it should be noted that some optional modules may limit the total number of chambers supported
- 28V DC power is accessed via the back panel using M12 connectors
  - SG-7308 = 4
  - SG-7316 = 8

Power In: 120/230V

USB INTERFACE DECODE CARD
DIG-705

- Single-width module
- Connects the computer to the interface cabinet via USB cable
- Front panel indicator LEDs to easily monitor the status of the output, input, its power, and USB connection

NOTE: Requires one USB Type A-B cable (CAB-USB-AM-BM-10) to connect the card to the computer, and a 2-pin Molex cable (SG-210CP-2) to power the card

IMAGES

A) Smart Interface Cabinet + Power Supply (SG-7308) shown with Decode Card (DIG-705) and SmartCtrl™ Card (DIG-716)

B

POWER SUPPLY SPECS				
	NAME	POWER IN	POWER OUT	OVERALL (W×H×D)
SG-500T	28V DC Power Supply - 2-pin Molex	100-250V AC, 50-60Hz, 4A	3 A	8.4" x 2.5" x 9" *(21 x 6.4 x 22.9 cm)*
SG-505	28V DC Power Supply - M12	100-250V AC, 50-60 Hz, 3A	10 A	7.5" x 3.1" x 9.4" *(19.1 x 7.9 x 23.9 cm)*

C

POWER SUPPLIES

28V DC POWER SUPPLY - 3A
SG-500T

Ideal for standalone interfaces connected to a single chamber, and when current requirements are minimal.

- Four (4) 2-pin Molex ports
- Includes:
  - Two *switched outputs (*can be turned on and off)
  - Two *unswitched outputs* (always on)

28V DC POWER SUPPLY - 10A
SG-505

A flexible power solution.

- Four (4) unswitched M12 ports for connecting up to 8 devices (via daisy-chaining)
  - Each M12 connector is limited to 2.5A, the same power connectors as on the SG-7308 PCIC

    NOTE: Each OmniCtrl connection panel is limited to 1.25A

Adding this power supply is required when a user:

- Has a small smart power + control interface cabinet with 8 OmniCtrl Cards installed, operating 8 chambers with a single OmniCtrl connection panel per chamber and:
  - Adds an additional 8 chambers via daisy-chaining (for a total of 16 chambers)
  - Adds many high power-draw components (levers, feeders, doors, etc.) to each chamber with two OmniCtrl connection panels per chamber daisy-chained together (for a total of 16 connection panels in 8 chambers)

    NOTE: If sound generation via OmniSound (OSC-112) isn't desired, and the setup requires mostly low power-draw components, then the OC-124 would be a better choice for daisy-chained setups requiring an above average I/O count.

- Adds additional devices (up to 8) that require 28V power

  NOTE: Use in this way with any interface system type

- Adds additional items to a system when using an older power + control interface cabinet (SG-6080D) which supplies 4A less power than the SG-505

IMAGES

B) Standalone Power Supply - 3A C) Standalone Power Supply - 10A

	COMPUTER PACKAGE SPECS		
	NAME	PC TYPE	APPLICATIONS
COM-106	Computer Package	Desktop	Video
COM-106-NV	Computer Package	Desktop	Non-video
COM-201	Computer Package	NUC	Non-video
COM-202	Computer Package	NUC	Video

A

COMPUTER PACKAGES

COMPUTER PACKAGES

COM-106 | COM-201 | COM-202

Complete your system with a computer that's ready out of the box. We will install all necessary software and hardware to simplify the setup process.

NUCs and Laptops used with the DIG-705 USB decode card only

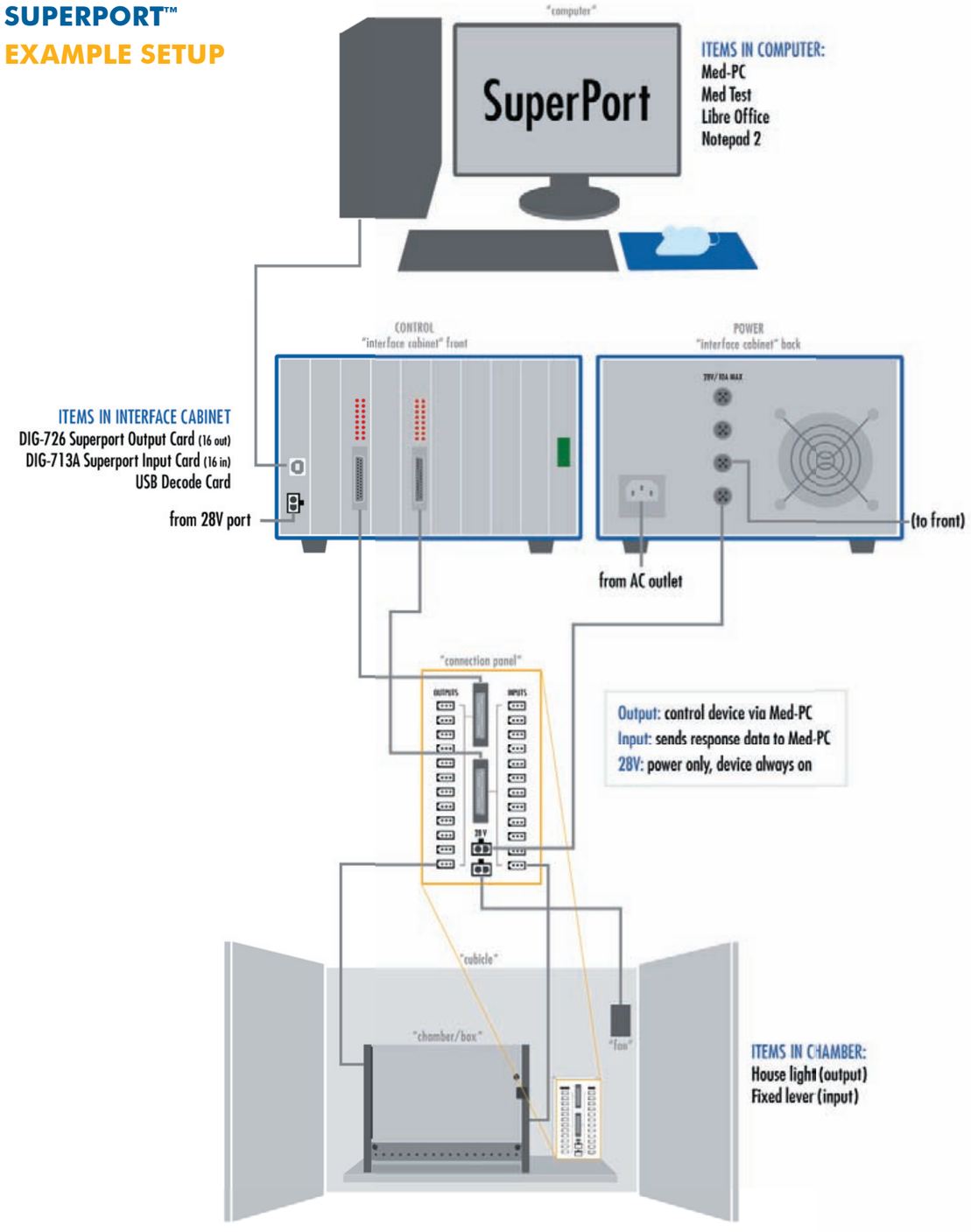
Contact our Sales team for the most up-to-date components, model, and specifications

NOTE: NUC model does not have a disk drive.

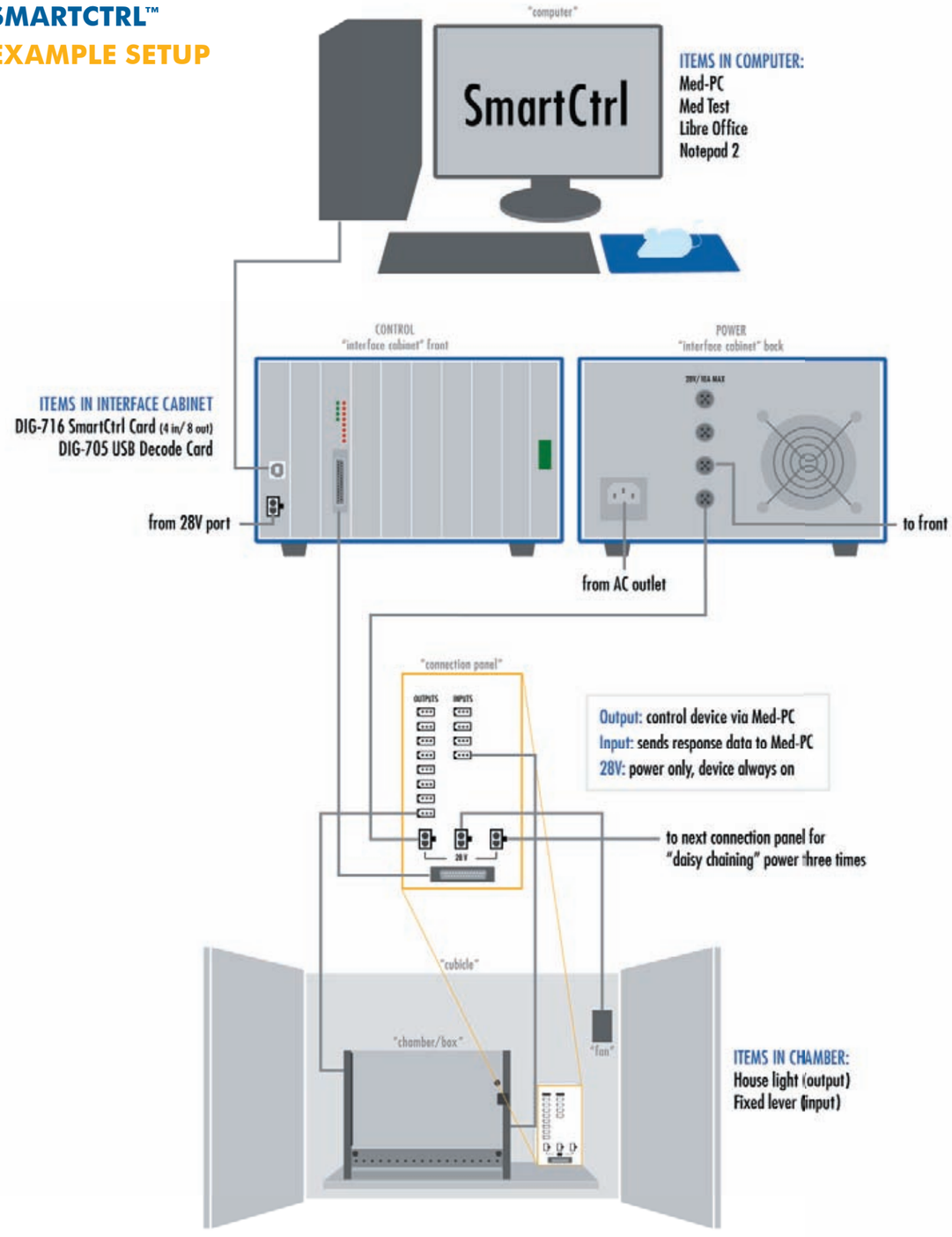
IMAGES

A) COM-202 shown mounted on monitor, can also operate freestanding

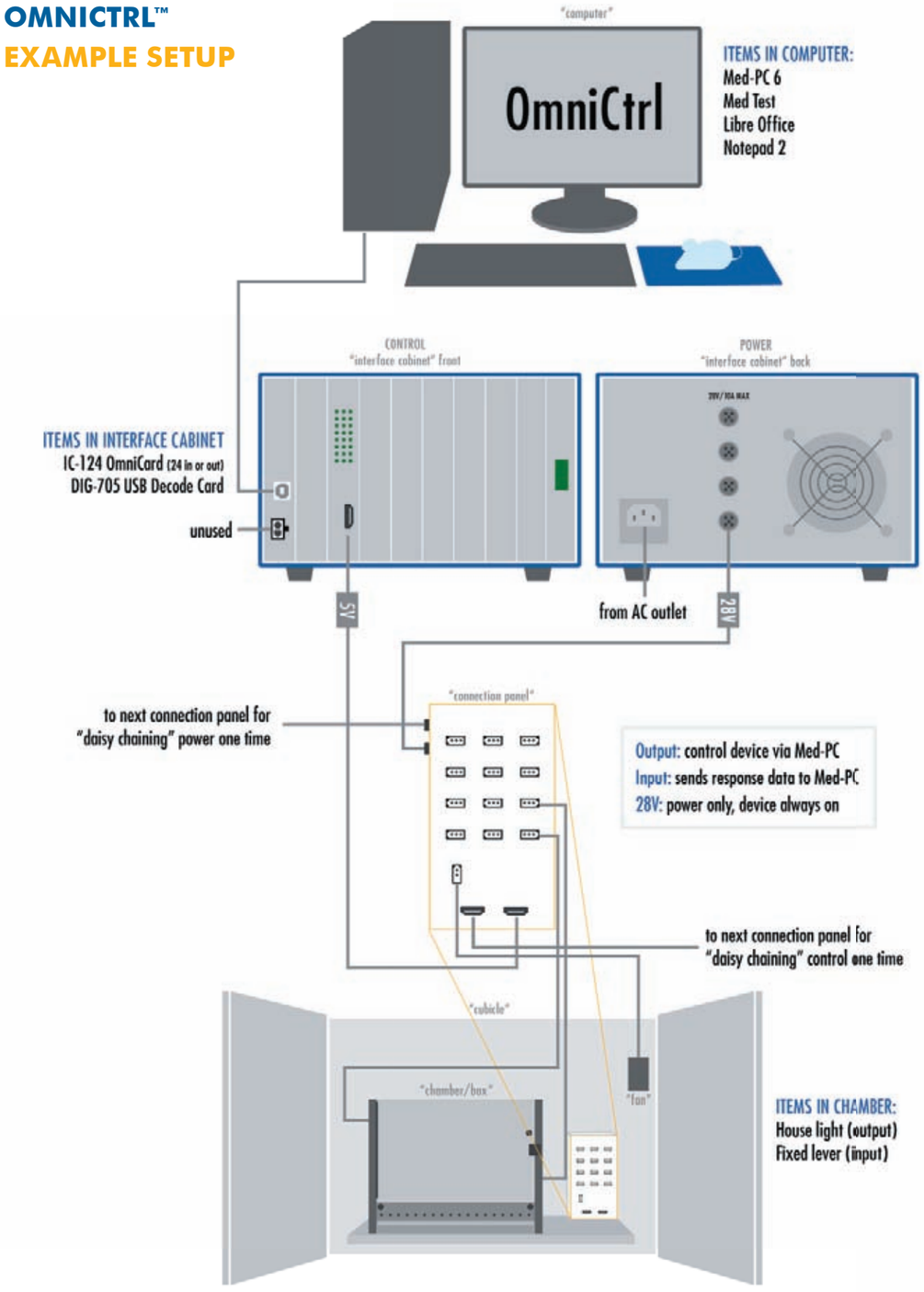
SUPERPORT™
EXAMPLE SETUP



SMARTCTRL™
EXAMPLE SETUP



OMNICTRL™
EXAMPLE SETUP



REQUIRES MED-PC 6

Ask our sales team about upgrading!

OMNICTRL™

Our I/O system is now plug & play!

Interface cards are now self addressing, that means no more flipping switches on the board, just insert the card into your smart cabinet (SG-7308/-7316), and the system does the rest.

One interface card can configure 24 ports with any combination of inputs or outputs.

Enables Med-PC to respond to the:

- State of inputs
- Number of inputs
- Duration of inputs
- Time between inputs

- I/O's now switch on command to operate as:
  - *Level* to directly reflect the state of the input
  - *Toggle* to reflect the change of the input
- Inputs can also be set in software to:
  - Accommodate normally open or closed switches
  - Adjust for active low or active high devices
- 3-pin Molex cables are used for both inputs and outputs, each identified by the I/O number assigned in Med-PC 6 *(SOF-737, sold separately)*.
  - *NOTE: Refer to the manual for more details*

NOTE: Some adjustment to mounting or placement may be needed as connection panels are not the same size as older models.

OMNICARD™ INTERFACE CARD
IC-124

One card, a multitude of I/O's! Easily expand your system for future paradigms and chamber configurations, without worrying about how many inputs or outputs your system can handle.

- Can control up to two 12 I/O control panels
- Both inputs and outputs on a single width module
- Front panel indicator LEDs to easily monitor the status of each control line: inputs (green), outputs (orange), and incomplete signals (red)
- Use up to 16 modules in an interface cabinet to control 16 independent chambers, modular design makes it easy to add chambers

NOTE: Requires one HDMI cable (CAB-HDMI-X) to connect the card to the connection panel, or from previous daisy chained panel.

OMNICTRL™ CONNECTION PANEL
OC-112 | OC-124

The next generation connection panel!

The standard OmniCtrl Connection Panels have 12 I/O's. The double sized 24 I/O panel is useful for more port-intensive configurations like the Response Key w/LCD Stimulus Display (ENV-131M).

- Use with OmniCard™ interface modules (IC-124)
- 3-pin Molex ports for both inputs and outputs, to one HDMI port
- 28V DC power required via M12 port and pass-through via an M12 port to power one additional panel
- Requires HDMI interface cables *(CAB-HDMI-X)*

NOTE: The 24 I/O model takes up both control panels.

OMNICTRL™ CONNECTION PANEL w/SOUND AMP
OSC-112

The same features as the OmniCtrl 12 I/O Connection Panel, with the addition of a built-in programmable audio generator! Capable of producing pure tones, white noise, clicks, and playing WAV files.

Output Offset Range: -20 to +5 dB *(per channel)*

Output Sound Pressure Level (SPL): 20 – 100 dB**

Pure Tone Frequency Range: 100 – 70,000 Hz

Click Output Frequency Range: 1 – 100 Hz

*** In 1 dB increments. SPL obtainable with ENV-228AM or ENV-328BM/BW speakers. Measured at 7.5 cm, 0° axial offset with ANL-930 SPL Meter.*

IMAGES

A) OmniCard B) OmniCtrl Connection Panel w/Sound Amp detail C) Omnictrl™ Connection Panel w/12 IOs D) Omnictrl™ Connection Panel w/Sound Amp + 12 IOs E) Omnictrl™ Connection Panel w/24 IOs

A

B

CTRL SPECS		
NAME		**I/O CAPACITY**
IC-124	OmniCard™ Interface Module	24 IN/OUT
OC-112	OmniCtrl™ Connection Panel	12 IN/OUT
OC-124	OmniCtrl™ Connection Panel	24 IN/OUT
OSC-112	OmniCtrl™ Connection Panel w/Sound Amplifier	12 IN/OUT

C

D

E

E

SMARTCTRL™

Enables Med-PC to respond to the:

- State of inputs
- Number of inputs
- Duration of inputs
- Time between inputs
- Input sensitivity can be set to:
  - *Level* to directly reflect the state of the input
  - *Toggle* to reflect the change of the input
- Inputs can also be inverted to:
  - Accommodate normally open or closed switches
  - Adjust for active low or active high devices
- Fixed number of inputs and outputs on a single width module
- Modular design for easy addition of chambers to an existing system
- 3-pin Molex cables are used for both inputs and outputs, each identified by the I/O number assigned in Med-PC® *(SOF-736, sold separately) NOTE: Refer to the manual for more details*
- SmartCtrl generations + compatibility:
  - New SmartCtrl card boards are surface mount, which are compatible with the current decode card (DIG-705)
  - Older models of SmartCtrl card boards are through hole, which are not compatible with the current decode card (DIG-705)
  - Newly purchased SmartCtrl cards are not compatible with the DIG-700F

NOTE: Contact our Sales or Support team for more info

SMARTCTRL™ INTERFACE CARDS

DIG-716 | DIG-716B

- Single-width module
- Optically isolated inputs and outputs
- Front panel indicator LEDs to easily monitor the status of each control line, both inputs (green) and outputs (red)
- Outputs operate in level mode only, however, pulsed outputs are easily generated in the software

NOTE: Requires one DB25 cable (SG-210CB-X) to connect the card to the connection panel, which also requires a power cable (SG-210CP-X)

SMARTCTRL™ CONNECTION PANELS

SG-716 | SG-716B

- Use with SmartCtrl™ interface modules
- 3-pin Molex ports for both inputs and outputs, to one DB25 port
- 28V DC power supplied via three (3) 2-pin Molex ports
- Use with DB25 interface cables *(SG-210CB)*

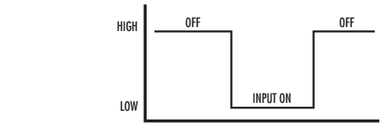
STANDALONE INTERFACE (SMARTCTRL)

DIG-705

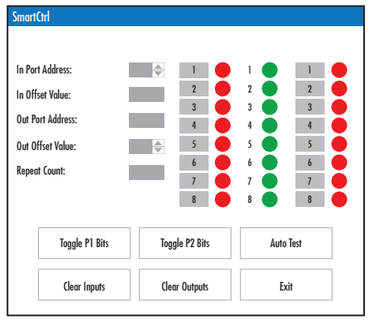
Contains a USB interface decode card and an 8 in / 16 out SmartCtrl Card in a self-contained unit.

IMAGES

A) Med Test screen B) SmartCtrl Interface Card 4 IN - 8 OUT C) SG-716 D) SG-716B E) Standalone Interface



A

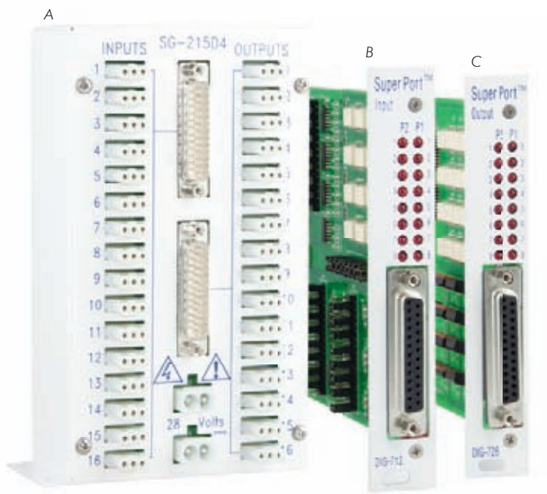


B

C

D

SMARTCTRL SPECS		
	NAME	I/O CAPACITY
DIG-716	SmartCtrl™ Interface Module	4 IN - 8 OUT
DIG-716B	SmartCtrl™ Interface Module	8 IN - 16 OUT
SG-716	SmartCtrl™ Connection Panel	4 IN - 8 OUT
SG-716B	SmartCtrl™ Connection Panel	8 IN - 16 OUT



	SUPERPORT SPECS	
	NAME	I/O CAPACITY
DIG-712	SuperPort™ Input Card	16 IN
DIG-712F	SuperPort™ Input Card 10 ms Time Constant	16 IN
DIG-726	SuperPort™ Output Card	16 OUT
SG-215D3	Passive Connection Panel	8 IN/OUT
SG-215D4	Passive Connection Panel	16 IN - 16 OUT

SUPERPORT™

SuperPorts serve the same purpose as SmartCtrl™ cards: sending and receiving signals from devices in the chamber to the computer. They function similarly, except each card can only function for inputs or outputs (not both) and only work with passive connection panels.

- Connect to a passive panel using a DB25 cable

Signals are transmitted based on the jumper settings of the card *(see manual for more info)*

SUPERPORT™ INPUT CARD
DIG-712 | DIG-712F

Receive signals from devices in the chamber to the computer (via Med-PC for example)

- Single-width module
- Sixteen (16) optically isolated input lines
- Input sensitivity can be set to:
  - *Level* to directly reflect the state of the input
  - *Toggle* to reflect the change of the input
- Inputs can also be inverted to:
  - Accommodate normally open (NO) or normally closed (NC) switches
  - Adjust for active low or active high devices

SUPERPORT™ OUTPUT CARD
DIG-726

Send signals from the computer to devices in the chamber (via Med-PC for example.)

- Single-width module
- Sixteen (16) optically isolated output lines

PASSIVE CONNECTION PANEL
SG-215D3 | SG-215D4

- Use with Standard or SuperPort™ interface cards
- Use with universal and interface cables *(SG-210CB/-211F/-210A)* and power cables *(SG-210CP-25/-210CP-8)*

SG-215D3: Eight (8) 3-pin Molex to one DB25 port

SG-215D4: Sixteen (16) inputs and sixteen (16) outputs via 3-pin Molex each to their own DB25 port

- Typically used with one SuperPort™ 16 input card and one SuperPort™ 16 output card

IMAGES

A) Passive Connection Panel 16 IN - 16 OUT B) SuperPort™ Input Module 16 IN
C) SuperPort™ Output Module 16 OUT

	SUPERPORT TTL SPECS	
	NAME	I/O CAPACITY
DIG-713A	SuperPort™ TTL Input Card	16 IN
DIG-726TTL-G	SuperPort™ TTL Output Card	16 OUT
SG-726-TTL	SuperPort™ TTL Passive Connection Panel	16 OUT

SUPERPORT™ TTL

SUPERPORT™ TTL INPUT CARD
DIG-713A

Receive signals from third party devices using our interface and software. Commonly used with optogenetics or physiological equipment.

- Single-width module
- Sixteen (16) TTL logic inputs

SUPERPORT™ TTL PASSIVE CONNECTION PANEL
SG-726-TTL

Sixteen (16) BNC port breakout box connects to the digital acquisition channels on third party devices. It functions similarly to the passive connection panel *(SG-215D4)*, except it uses BNC ports instead of 3-pin Molex, and is for outputs only.

- Reduces the need for custom cable adapters or complicated wiring
- Commonly used with laser or LED light controllers for optogenetics and electrophysiology systems
- Male DB25 port connects to the SuperPort™ TTL Output Card *(DIG-726-TTL)* installed in the interface cabinet

SUPERPORT™ TTL OUTPUT CARD
DIG-726TTL-G

Send signals from the computer to third party devices using our interface and software.

- Single-width module
- Sixteen (16) TTL logic outputs

NOTE: This module operates with active low logic only.

IMAGES

A) SuperPort™ TTL Output Card 16 Out B) SuperPort™ TTL Input Card 16 In
C) SuperPort™ TTL Passive Connection Panel 16 Out

	TTL ADAPTER SPECS		
	NAME	**TTL-28V CAPACITY**	**TTL CONNECTION**
SG-230R	TTL » 28V DC Power Inverter	I IN / 1 OUT	Terminal strip
SG-230RC	TTL » 28V DC Adapter	1 IN / 1 OUT	BNC
SG-231	28V DC » TTL Adapter	1 IN / 1 OUT	Terminal strip or BNC
SG-233	TTL » 28V I/O Adapter	2 IN / 2 OUT	RJ-45 (Noldus)
SG-233-48	TTL » 28V I/O Adapter	24 IN / 24 OUT	RJ-45 (Noldus)

A

B

C

TTL / 28V DC ADAPTERS

28V DC / TTL ADAPTERS
SG-230R | SG-230RC | SG-231

- Use to control:
  - 28V DC device (e.g. pellet dispenser) from a 5V TTL output
  - 5V TTL device (e.g. optogentics laser) from a 28V DC Med output
- Internal jumper for user-selection of:
  - Active high: turn on the device when the TTL signal transitions from 0 to 5V (default)
  - Active low: turn on the device when the TTL signal transitions from 5 to 0V
- Inputs use 2-pin Molex, outputs use 3-pin

NOTE: Some applications will require a 28V DC power supply, contact Sales for recommended power supply.

TTL » 28V DC I/O ADAPTER
SG-233 | SG-233-48

Standard 28V DC outputs and inputs (3-pin Mini-Molex), to a standard Noldus RJ-45 connection.

An additional 28V DC output (2-pin Molex) can provide power to an additional adapter or any other Med Associates device via "daisy chaining".

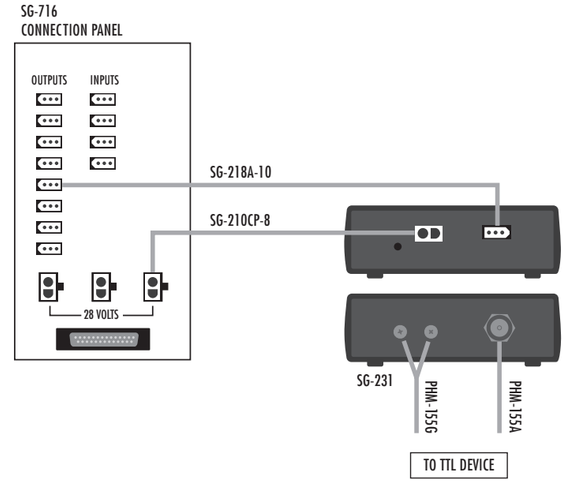
- TTL expansion port for connecting a Noldus Mini-USB I/O box via ribbon cable *(SG-233-48 only)*

NOTE: SG-233 requires 28V DC power source, see page 143

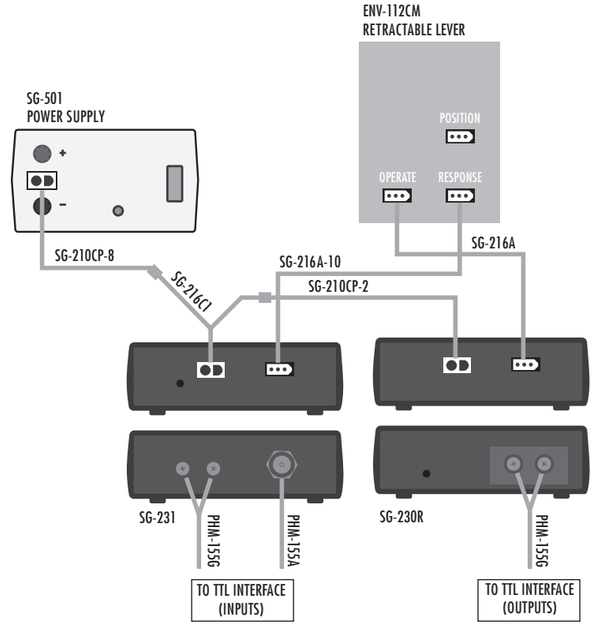
IMAGES

A) SG-233 B) SG-231 C) SG-233-48

A



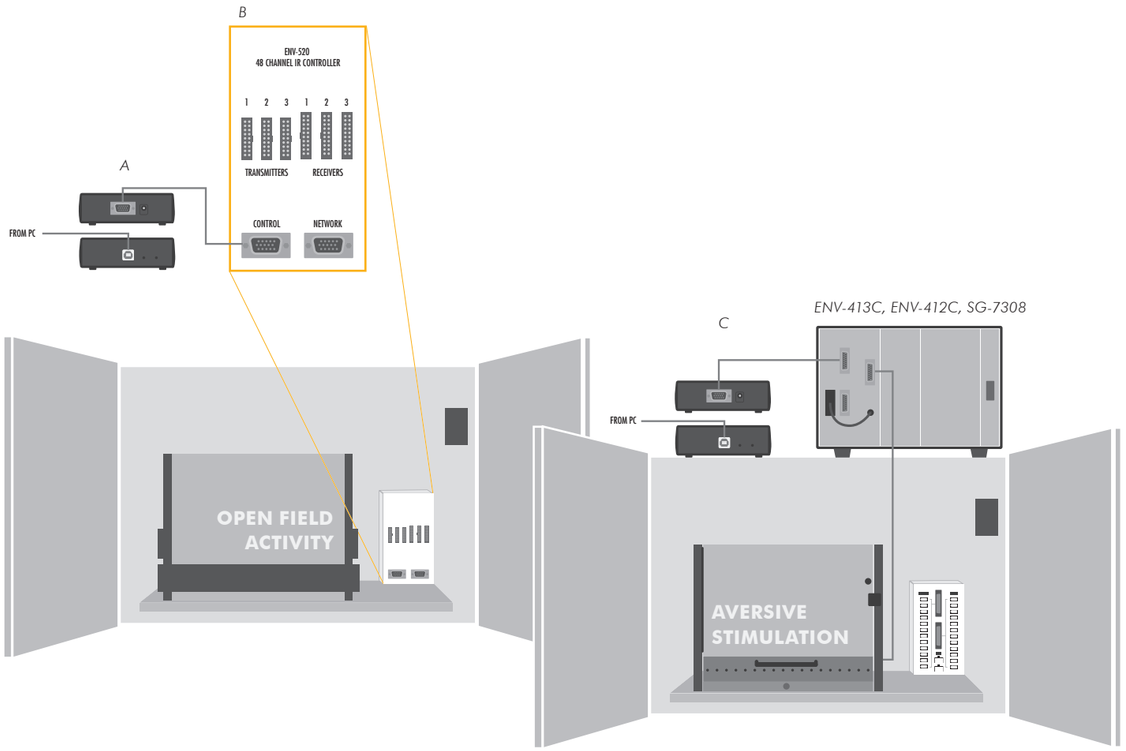
B



28V DC TO TTL ADAPTER EXAMPLE SETUPS

A) For sending TTL inputs to a third party device such as an optogenetics laser for electro physiology data acquisition.

B) For controlling our devices with a third party TTL interface.



MICROCONTROLLER

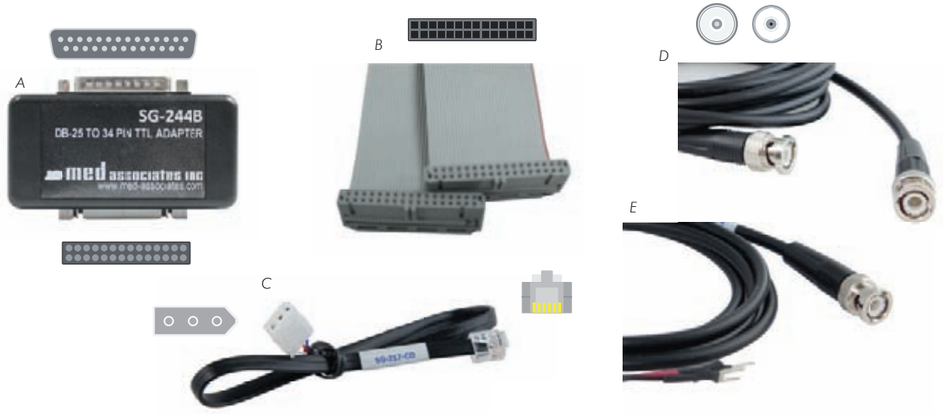
HIGH SPEED SERIAL MICROCONTROLLER USB
DIG-729USB

- Easy to install USB design can be used with either a desktop or laptop PC
- Requires a DB15 cable: *(sold separately)*
  - SG-219C for legacy open field activity *(ENV-520)*
  - SG-219D for aversive stimulation and ICSS
- Can be programmed to control equipment with Med-PC, such as:
  - Aversive stimulation modules
  - ICSS stimulator
  - Open field activity (legacy models)

IMAGES

A) Microcontroller B) Open Field Connection Panel C) Microcontroller D) Computer Controlled Constant Current Aversive Stimulator Card, Solid State Grid Floor Scrambler Card, in an interface cabinet

3RD PARTY CONNECTION CABLE SPECS			
	NAME	ENDS	LENGTH
SG-217-CI	Phone Jack (RJ12) ➡ 3-Pin Molex for Input/Response	M/M	7 in
SG-217-CO	Phone Jack (RJ12) ➡ 3-Pin Molex for Output/Signal	M/M	7 in
SG-244B	DB25 ➡ 34-Pin TTL Adapter	M/M	N/A
SG-244B-C	34-pin Ribbon Cable	F/F	2 ft
PHM-155A	BNC ➡ BNC Output Cable	M/M	5 ft
PHM-155B	BNC ➡ BNC Output Cable	M/M	10 ft
PHM-155G	BNC ➡ Fork Lug Output Cable	M/Fork Lug	5 ft



3RD PARTY CONNECTION CABLES

PHONE JACK RJ12 ➡ 3-PIN MOLEX M/M
SG-217-CI | SG-217-CO

Adapter cables to use Coulbourn equipment with Med Associates control interface, for both inputs/responses and outputs/signals.

DB25 ➡ 34 PIN TTL ADAPTER M/M
SG-244B

Use to go from the DB25 port on our SuperPort™ TTL Output Card *(DIG-726TTL-G)* to the 34-pin TTL I/O Port connection on a Neuralynx Digital Lynx SX card.

- Use with:
  - DB25 Cable M/F *(SG-210TTL-20)*
  - 34 Conductor Ribbon Cable F/F *(SG-244B-C)*

34 PIN RIBBON CABLE F/F
SG-244B -C

- Use to go from the DB25 to 34-pin Adapter *(SG-244B)* to a Neuralynx Digital Lynx SX card.
- Transmits parallel data

BNC ➡ BNC OUTPUT CABLE M/M
PHM-155A | PHM-155B

Shielded coaxial signal cable used to transmit high or low signals to be read as data.

Use with:

- TTL Connection Panel *(SG-726-TTL)*
- 28V DC to TTL Adapter *(SG-231)*
- TTL to 28V DC Adapter *(SG-230RC)*

BNC ➡ FORK LUG OUTPUT CABLE M/FORK LUG
PHM-155G

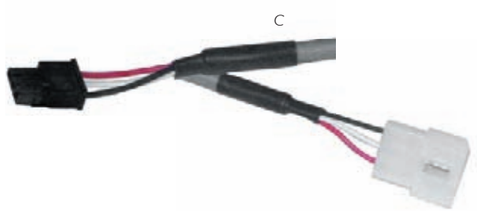
Use the fork lug end to go from the terminal strip on the SG-230R or SG-231 to a BNC device.

IMAGES

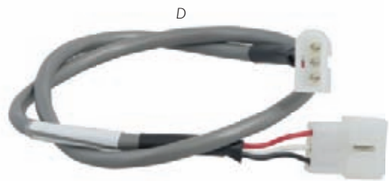
A) DB25 to 34-pin TTL Adapter B) 34-pin Ribbon Cable C) Phone Jack RJ12 to 3-Pin Molex for Output/Signal D) BNC to BNC Output Cable E) BNC to Fork Lug Output Cable

	2-PIN MOLEX CABLE SPECS			
	NAME	TYPE	ENDS	LENGTH
SG-210CP-2	Molex Power Cable	2-Pin Molex	F/F	2 ft
SG-210CP-8	Molex Power Cable	2-Pin Molex	F/F	8 ft
SG-210CP-25	Molex Power Cable	2-Pin Molex	F/F	25 ft
SG-210CP-50	Molex Power Cable	2-Pin Molex	F/F	50 ft
SG-235DC	Molex Daisy Chain Power Cable	2-Pin Molex	FF/M	8 in
SG-235DC-3	Molex Daisy Chain Power Cable	2-Pin Molex	FF/M	3 ft
SG-235DC-6	Molex Daisy Chain Power Cable	2-Pin Molex	FF/M	6 ft


A


C


B


D

2-PIN MOLEX® CABLES

Provides power to devices (no data).

MOLEX® POWER CABLE F/F

SG-210CP-2 | SG-210CP-8 | SG-210CP-25 | SG-210CP-50

- Meets the current demands of all chamber accessories and provides 28V DC power to the connection panels
- Longer cables are generally used for the first test station, while the shorter ones are best suited for daisy chaining stations

MOLEX® DAISY CHAIN POWER CABLE FF/M

SG-235DC | SG-235DC-3 | SG-235DC-6

Typically used in conjunction with a standalone 28V DC Power Supply *(SG-500T)* or other power supplies.

- Used to power both TTL to 28V and 28V to TTL converters from a power supply

IMAGES

A) Molex Daisy Chain Power Cable B) Molex Power Cable

	3-PIN MOLEX CABLE SPECS			
	NAME	TYPE	ENDS	LENGTH
SG-222	Mini Molex ➡ Micro Fit	3-Pin Molex to Micro Fit Molex	M/F	30 in
SG-222-6	Mini Molex ➡ Micro Fit	3-Pin Molex to Micro Fit Molex	M/F	6 ft
SG-216C1	Mini-Molex Y Cable	3-Pin Molex	FF/M	3 in
SG-216C	Mini-Molex Y Cable	3-Pin Molex	MM/F	3 in
SG-216A	Mini-Molex Extension Cable	3-Pin Molex	M/F	18 in
SG-216A-2	Mini-Molex Extension Cable	3-Pin Molex	M/F	2 ft
SG-216A-3	Mini-Molex Extension Cable	3-Pin Molex	M/F	3 ft
SG-216A-6	Mini-Molex Extension Cable	3-Pin Molex	M/F	6 ft
SG-216A-10	Mini-Molex Extension Cable	3-Pin Molex	M/F	10 ft
SG-216A-20	Mini-Molex Extension Cable	3-Pin Molex	M/F	20 ft
SG-218A	Mini-Molex Extension Cable	3-Pin Molex	F/F	18 in
SG-218A-10	Mini-Molex Extension Cable	3-Pin Molex	F/F	10 ft
SG-218A-6	Mini-Molex Extension Cable	3-Pin Molex	F/F	6 ft

3-PIN MOLEX® CABLES

Provides both power and data to and from devices.

MINI-MOLEX® Y CABLE FF/M

SG-216C1

- Connects one device to two inputs
- Typical applications:
  - Connecting a response device (such as a lever or nose poke) to two inputs for measuring the duration of the input
  - Connecting two photobeam inputs together in systems looking at broad movements

MINI-MOLEX® Y CABLE MM/F

SG-216C

- Connects two devices to one output
- Typical applications:
  - Stimulus devices that are always used simultaneously (house light & fan, stimulus light & retractable lever, etc.)
  - Manually operate a device when used with a hand-held push button or foot switch for reward shaping with a pellet dispenser

MINI-MOLEX® EXTENSION CABLE M/F

SG-216A | SG-216A-2 | SG-216A-3 | SG-216A-6 | SG-216A-10 | SG-216A-20

- Extends the length of a 3-pin mini-Molex cable

  NOTE: Most accessories have a 30" L (76.2 cm) cable
- Typically useful in systems that share one connection panel between multiple chambers

MINI-MOLEX® EXTENSION CABLE F/F

SG-218A | SG-218A-10 | SG-218A-6

Use with:

- 28V DC to TTL Adapter *(SG-231)*
- TTL to 28V DC Adapter *(SG-230RC)*

MINI MOLEX® ➡ MICRO FIT M/F

SG-222 | SG-222-6

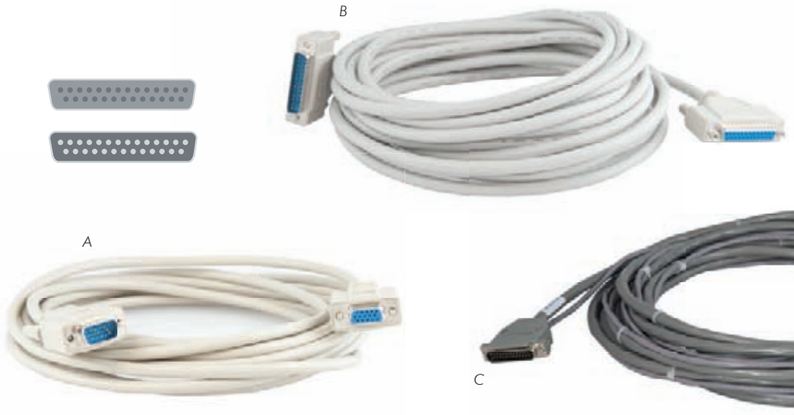
Commonly used with many of our syringe pumps, liquid dippers, response keys w/LCD stimulus displays, receptacle lights, house lights, stimulus lights, pellet dispensers, retractable sippers, auto doors... and more.

NOTE: Included with applicable product. Order to either replace a broken cable or have extra on hand.

IMAGES

A) Mini Molex to Micro Fit B) Mini-Molex Extension Cable

	D-SUB CABLE SPECS			
	NAME	TYPE	ENDS	LENGTH
SG-219C-6	DB15 Control Cable	15-Pin (DB15)	M/F	6 ft
SG-219C-15	DB15 Control Cable	15-Pin (DB15)	M/F	15 ft
SG-219D	DB15 Control Cable	15-Pin (DB15)	M/F	12 in
SG-219D-10	DB15 Control Cable	15-Pin (DB15)	M/F	10 ft
SG-210CB	DB25 Interface Cable	25-Pin (DB25)	M/F	25 ft
SG-210CB-50	DB25 Interface Cable	25-Pin (DB25)	M/F	50 ft
SG-210TTL-5	DB25 TTL Cable	25-Pin (DB25)	M/F	5 ft
SG-210TTL-20	DB25 TTL Cable	25-Pin (DB25)	M/F	20 ft



D-SUB CONNECTOR CABLES

Connects an interface module in an interface cabinet with a connection panel.

DB15 CONTROL CABLE M/F

SG-219C-6 | SG-219C-15 | SG-219D | SG-219D-10

Use to connect the USB High Speed Serial Microcontroller *(DIG-729USB)* to specific equipment.

- Use the:
  - SG-219C for Open Field Activity
  - SG-219D for Aversive Stimulation and ICSS

DB25 INTERFACE CABLE M/F

SG-210CB | SG-210CB-50

Use to connect a SmartCtrl™ or Superport™ interface module to its connection panel.

DB25 TTL CABLE M/F

SG-210TTL-5 | SG-210TTL-20

Use to connect a TTL input or output module to a TTL Passive Connection Panel.

- Shielded power leads

IMAGES

A) DB15 Control Cable B) DB25 Interface Cable C) DB25 TTL Cable

	HDMI CABLE SPECS			
	NAME	TYPE	ENDS	LENGTH
CAB-HDMI-1	HDMI Cable	HDMI	M/M	1 ft
CAB-HDMI-6	HDMI Cable	HDMI	M/M	6 ft
CAB-HDMI-30	HDMI Cable	HDMI	M/M	30 ft

	M12 CABLE SPECS			
	NAME	TYPE	ENDS	LENGTH
CAB-M12-4FM-3M	M12 Cable	M12	F/M	3 m
CAB-M12-4FM-10M	M12 Cable	M12	F/M	10 m
SG-210CP-M12-4F	M12 Cable Adapter	M12 to 2-Pin Molex	M/F	1 ft
SG-210CP-M12-4M	M12 Cable Adapter	M12 to 2-Pin Molex	M/M	1 ft

HDMI CABLES

Connects an OmniCard interface module in an interface cabinet with an OmniCtrl connection panel

HDMI CABLE M/M

CAB-HDMI-1 | CAB-HDMI-6 | CAB-HDMI-30

Use with:

- OmniCard *(OC-124)*
- USB Decode Card *(DIG-705)*

M12 CABLES

Used to supply 28V DC power to equipment from smart interface cabinets (SG-7308/-7316)

M12 CABLE F/M

CAB-M12-4FM-3M | CAB-M12-4FM-10M

Use with:

- OC-112, OC-124, and OSC-112 Omni Connection Panel to connect to 28V DC power ports.

M12 ADAPTER CABLE M/F + M/M

SG-210CP-M12-4F | SG-210CP-M12-4M

Male 2-pin Molex to either Male or Female M12.

Use SG-210CP-M12-4F (Female M12) with:

- OC-124 Omni Connection Panel and IC-124 OmniCard when using an old SG-6000 series interface cabinet

Use SG-210CP-M12-4M (Male M12) with:

- DIG-716 SmartCtrl card when used in an SG-7000 series smart interface cabinet

CONDITIONED PLACE PREFERENCE SPECS						
	NAME	SPECIES	OPEN HEIGHT (MANUAL DOOR)	OPEN HEIGHT (AUTO DOOR)	CHOICE COMPARTMENTS (L×W×H)	MIDDLE COMPARTMENT (L×W×H)
ENV-013C	Two Compartment CPP Chamber	Rat	13.8″ H *(35 cm)*	17.7″ H *(45 cm)*	12″ x 8.3″ x 8.3″ *(30.5 x 21.1 x 21.1 cm)*	N/A
ENV-3013-2	Two Compartment CPP Chamber	Mouse	9.8″ H *(24.9 cm)*	13.7″ H *(34.8 cm)*	6.9″ x 5" x 5″ *(17.5 x 12.7 x 12.7 cm)*	N/A
ENV-013	Three Compartment CPP Chamber	Rat	13.8″ H *(35 cm)*	17.7″ H *(45 cm)*	12″ x 8.3″ x 8.3″ *(30.5 x 21.1 x 21.1 cm)*	4.8″ x 8.3″x 8.3" *(12.2 x 21.1 x 21.1 cm)*
ENV-3013	Three Compartment CPP Chamber	Mouse	9.8″ H *(24.9 cm)*	13.7″ H *(34.8 cm)*	6.9″ x 5" x 5″ *(17.5 x 12.7 x 12.7 cm)*	3.9″ x 5″ x 5″ *(9.9 x 12.7 x 12.7 cm)*

CONDITIONED PLACE PREFERENCE (CPP)

TWO COMPARTMENT CPP PACKAGES
MED-CPP2

THREE COMPARTMENT CPP PACKAGES
MED-CPP

Packages Include: Conditioned Place Preference Chamber, Auto or Manual door, SuperPort input and output cards, Passive Connection Panel, IR Detector + Controller, LED stimulus Light, 3 Channel Light Fader Controller, and cables

- Clear flip-top lids with ventilation holes
- Light sources are LED for long lasting and low-heat emitting performance
- Holes for stimulus lights *(ENV-221-LED)*
- A black grid rod floor and white mesh floor are included
  - Each are available in both black or white for variable context *(sold separately)*
- The standard configuration includes a grid rod style floor in the black compartment and a mesh style floor in the white compartment. Available with your choice of a manual or auto guillotine door.
- Animal position is tracked by IR photobeam detectors eliminating issues found with video tracking methods such as varying light levels or obstructed views of the animal
  - 2 compartment: 12 beam
  - 3 compartment: 15 beam
- A maximum of eight (8) chambers can be operated from one interface (not included), and is expandable to sixteen (16) with the addition of another interface cabinet

TWO COMPARTMENT CPP CHAMBERS
ENV-013C | ENV-3013-2

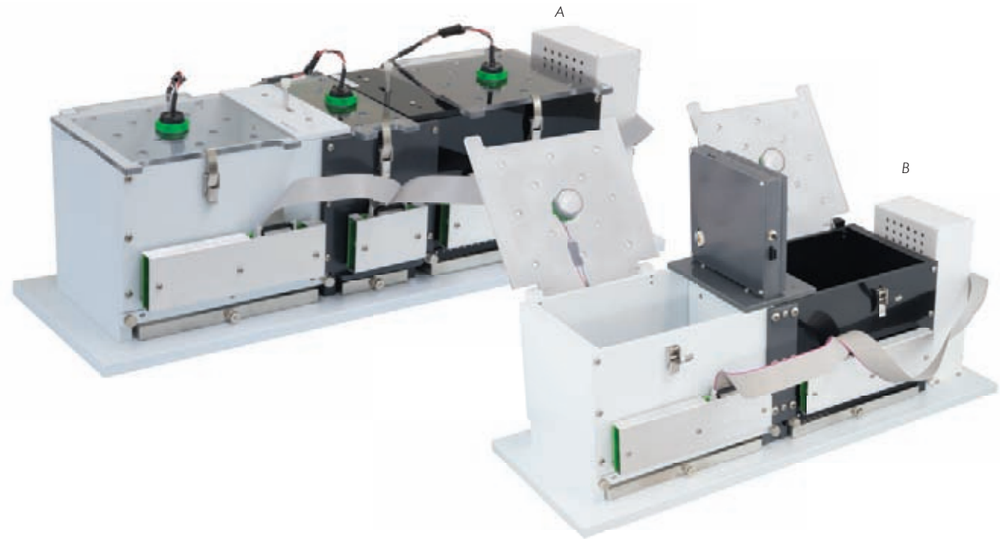
Two compartment set-up eliminates interpretational difficulties caused by test animals spending excess time in a center compartment.

THREE COMPARTMENT CPP CHAMBERS
ENV-013 | ENV-3013

Doors on either side of the neutral gray center compartment for controlling access to both ends of the chamber.

IMAGES

A) Three Compartment CPP setup with manual doors for mouse B) Two Compartment CPP setup with an automatic door for mouse



CPP INTERFACE

CPP INTERFACE PACKAGE
MED-SYST-CPP | MED-SYST-CPP2

Packages Include: USB Interface Decode Card, Small or Large Interface CAbinet, 2 or 3 Compartment CPP Data Collection Utility, Med-PC Software, and cables

CPP SOFTWARE

TWO COMPARTMENT DATA COLLECTION UTILITY
SOF-700RA-25

THREE COMPARTMENT DATA COLLECTION UTILITY
SOF-700RA-4

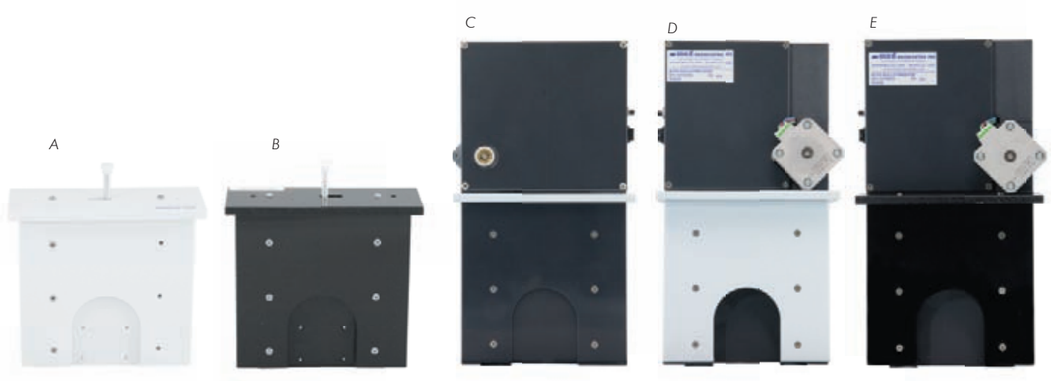
Both data collection utilites include procedures designed for use with our place preference chambers with either manual or auto doors.

Use in conjunction with Med-PC and Med-PC to Excel Data Transfer "MPC2XL" Utility *(SOF-731)* to export the data to Microsoft Excel or other similar software for analysis.

- Generate data files that contain values for:
  - Activity: Any beam break within the current zone
  - Movement: A change in the beam broken in the current zone
  - Exploration: Breaking of the first beam in a zone
  - Entrance: Breaking of any beam beyond the first in a zone
  - Zone Time: The amount of time (in seconds) spent in the zone

NOTE: Procedure code can also be easily modified to suit specific research needs. These programs are designed to be easy to use for researchers who don't have the time to devote to programming and hardware design.

	CPP DOOR SPECS				
	NAME	COLOR	SPECIES	FITS CHAMBER	ARCH HEIGHT
ENV-3015BW2	Auto Door	Black + White	Mouse	Two (2)	2.25" H *(5.72 cm)*
ENV-3014MDBW	Manual Door	Black + White	Mouse	Two (2)	2.25" H *(5.72 cm)*
ENV-013ADBW2	Auto Door	Black + White	Rat	Two (2)	3.75" H *(9.53 cm)*
ENV-3015BW2	Manual Door	Black + White	Rat	Two (2)	3.75" H *(9.53 cm)*
ENV-3015BD2	Auto Door	Black	Mouse	Three (3)	2.25" H *(5.72 cm)*
ENV-3015WD2	Auto Door	White	Mouse	Three (3)	2.25" H *(5.72 cm)*
ENV-3014MDB	Manual Door	Black	Mouse	Three (3)	2.25" H *(5.72 cm)*
ENV-3014MDW	Manual Door	White	Mouse	Three (3)	2.25" H *(5.72 cm)*
ENV-013BD2	Auto Door	Black	Rat	Three (3)	3.75" H *(9.53 cm)*
ENV-013WD2	Auto Door	White	Rat	Three (3)	3.75" H *(9.53 cm)*
ENV-013MDB	Manual Door	Black	Rat	Three (3)	3.75" H *(9.53 cm)*
ENV-013MDW	Manual Door	White	Rat	Three (3)	3.75" H *(9.53 cm)*



CPP DOORS

Doors for three compartment chambers are gray on one side and colored on the other side to match the choice compartment that it faces; while doors for two compartment are black on one side and white on the other.

AUTO DOOR *for two compartment*
ENV-013ADBW2 | ENV-3015BW2

AUTO DOOR *for three compartment*
ENV-013BD2 | ENV-013WD2 | ENV-3015BD2 | ENV-3015WD2

Turn the door control line ON (ground) to open the door. Turning the control line OFF allows the door to free fall to the "closed" position.

I/Os Required: 1 OUT

MANUAL DOOR *for two compartment*
ENV-013MDBW | ENV-3014MDBW

MANUAL DOOR *for three compartment*
ENV-013MDB | ENV-013MDW | ENV-3014MDB | ENV-3014MDW

A small arm extends from the top that allows the door to be lifted and locked in the open position.

IMAGES

A) White Manual Door B) Black Manual Door C) Gray side of auto door D) White side of auto door E) Black side of auto door

	CPP FLOOR SPECS				
	NAME	COLOR	SPECIES	ROD (OD)	SPACING
ENV-3013BM	Mesh Floor	Black	Mouse	0.03" *(0.08 cm)*	0.25" *(0.64 cm)*
ENV-3013WM	Mesh Floor	White	Mouse	0.03" *(0.08 cm)*	0.25" *(0.64 cm)*
ENV-3013BR	Grid Rod Floor	Black	Mouse	0.13" *(0.318 cm)*	0.3" *(0.76 cm)*
ENV-3013WR	Grid Rod Floor	White	Mouse	0.13" *(0.318 cm)*	0.3" *(0.76 cm)*
ENV-013BM	Mesh Floor	Black	Rat	0.06" *(0.16 cm)*	0.5" *(1.27 cm)*
ENV-013WM	Mesh Floor	White	Rat	0.06" *(0.16 cm)*	0.5" *(1.27 cm)*
ENV-013BR	Grid Rod Floor	Black	Rat	0.19" *(0.478 cm)*	0.61" *(1.55 cm)*
ENV-013WR	Grid Rod Floor	White	Rat	0.19" *(0.478 cm)*	0.61" *(1.55 cm)*

CPP FLOORS

CONTEXTUAL FLOOR

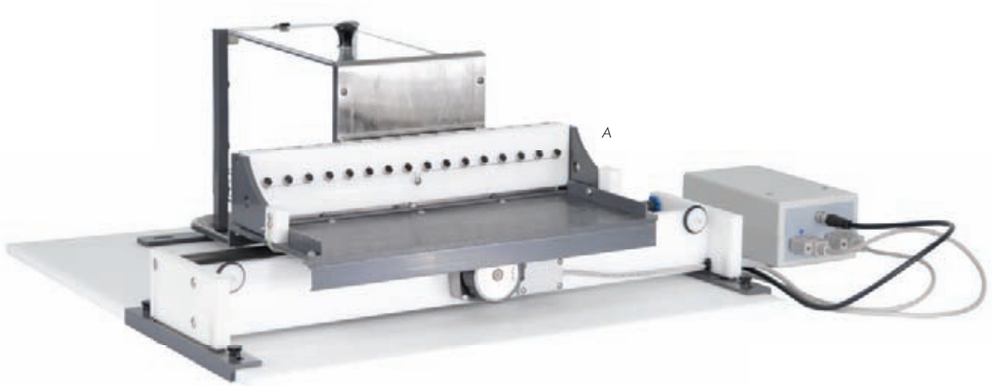
ENV-013BM | ENV-013WM | ENV-013BR | ENV-013WR | ENV-3013BM | ENV-3013WM | ENV-3013BR | ENV-3013WR

- Fit both 2 and 3 compartment chambers
- Grid floor presents a non-preferred walking surface, while the mesh floor presents a preferred walking surface
- Typically, the white side is non-preferred, while the black side is preferred
- Floor can be easily removed for cleaning
- Stainless steel rods and mesh are corrosion resistant

NOTE: Order both floors to reverse the standard floor context provided with the ENV-013 (rat) or ENV-3013 (mouse) test chamber.

IMAGES

A) Black Grid Rod Floor for rat B) Black Mesh Floor for mouse


A

Founded in 1991, DiLog Instruments pioneered the way in making a reliable and cost-effective apparatus for taste research studies. This device, known as the Davis Rig, has been used in by researchers all over the world.

We have acquired the Davis Rig product line from DiLog Instruments, and are very excited to carry on its legacy at Med Associates. We look forward to serving your needs in the field of taste research! This transition brings the customer service, breadth of animal behavior expertise, resources, and manufacturing efficiency that comes with being a Med Associates product to the familiar Davis Rig hardware.

In adopting the design to fit into our manufacturing standards and practices, many aesthetic changes took place from the DiLog Instruments version (photo above). However, maintaining as much of the original user experience as possible was paramount in our re-engineering process, and the end result accomplishes that goal. In the course of our development, two notable changes occurred in the shutter and sipper bottle assemblies.

The original shutter mechanism was motor-driven, and would occasionally shut (with force) down on the snout of the rodent test subject. This created the possibility of the animal forming an aversion to normal sipping behavior, negatively impacting the data. In our updated version, we replaced the original motor with a stepper motor driving a cam. The two position spring-loaded cam lifts the shutter arm and cycles back to the start. The spring tension is set so that the shutter would only rest on the top of their nose, allowing the rodent to back out of the port.

IMAGES

A) The original DiLog Instruments Davis Rig (discontinued)


B

LEGACY "DAVIS RIG" BRIEF ACCESS LICKOMETER

LEGACY "DAVIS RIG" BRIEF ACCESS LICKOMETER - 16 BOTTLE

MED-DAV

Packages Include: All Components of Davis Rig, Either Rat or Mose Cage Floor, Both Mouse and Rat Lick Plates, Control Box, PCIe Interface Card, Davis Rig Software, and cables

Prior to the 16 bottle setup, the most common taste response setup was the two bottle preference test, where two bottles of fluid are placed in an animal's cage with one of taste solution (or water) and the other a different taste solution. This test is simple, doesn't require much in the way of additional equipment, and is relatively straightforward to administer.

However, such simplicity comes at the price of interpretive ability. Although taste plays a sizable role in influencing the amount and type of foods/fluids ingested (as in a 2-bottle test), other factors such as post-ingestive events can influence behavior.

Our brief access lickometer is designed to:

- Deliver taste samples and measure responses, increasing likelihood that the behavior of the animal is under orosensory control
- Assess taste preference, ingestive behavior, and chemotransduction pathways in a rapid, efficient manner as there is no dead space in stimulus delivery lines to make fluid volumes consistent across trials
- Track licking behavior without passing electrical current through the animal
- Measure both unconditioned and conditioned licking behavior to stimuli
- Train the animal with various stimuli to obtain a reward and/or avoid punishment

IMAGES

B) The Davis Rig Brief Access Lickometer

	DAVIS RIG SIPPER BOTTLE SPECS			
	NAME	LICK BLOCK	SPECIES	SIPPER
DAV-250BT	Bottle + Sipper	Med	Rat	1/8 in
DAV-250BT-A	Bottle	Med	Mouse + Rat	N/A
DAV-250BT-B	Sipper	Med	Rat	1/8 in
DAV-250BT-BM	Sipper	Med	Mouse	1/16 in
DAV-250BT-M	Bottle + Sipper	Med	Mouse	1/16 in
DL-250BT	Bottle + Sipper	DiLog	Rat	1/8 in
DL-250BT-B	Sipper	DiLog	Rat	1/8 in
DL-250BT-BM	Sipper	DiLog	Mouse	1/16 in

SIPPER BOTTLES

Glass vial for the tastant solution, and a stainless steel sipper tube. A rubber stopper holds the tube in the sample vial, and a plastic ring is located at a precise position so that the sipper tube sits at the correct depth in the lick block.

Order extra bottles and sippers to have on hand to minimize contamination of solutions from one session to another, make tastant switch-out quicker

SIPPER BOTTLE FOR MED LICK BLOCK

DAV-250BT | DAV-250BT-A | DAV-250BT-B | DAV-250BT-BM | DAV-250BT-M

- Fits the new Med Associates version of the Davis Rig

SIPPER BOTTLE FOR DILOG LICK BLOCK

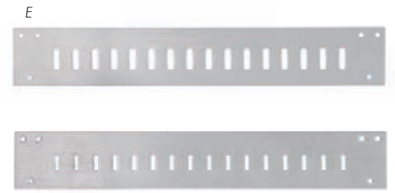
DL-250BT | DL-250BT-B | DL-250BT-BM

Fits the original DiLog Instruments Davis Rig (pre-2017)

NOTE: The original DiLog Instruments sipper bottle design uses the same vial and stainless steel sipper tube as the new design, except for the rubber stopper and plastic ring, which have changed

IMAGES

A) Sipper Bottle For Med Lick Block B) Sipper Bottle for dilog Lick Block C) Shutter (DAV-210) shown installed on a cage (DAV-008) D) Modified Top E) Lick Block Plates for Rat and Mouse



	DAVIS RIG COMPONENT SPECS	
	NAME	SPECIES
DAV-001	Base Plate	Mouse + Rat
DAV-008	Davis Rig Cage	Mouse + Rat
DAV-008T	Standard Cage Top	Mouse + Rat
DAV-008CT	Modified Cage Top	Mouse + Rat
DAV-210	Sipper Tube Access Shutter	Mouse + Rat
DAV-005	Mesh Cage Floor	Rat
DAV-005A	Mesh Cage Floor	Mouse
DAV-007	Floor Pan	Mouse + Rat
DAV-250	Lick Bar Carriage	Mouse + Rat
DAV-251	Lick Block Plate - 16 Bottle	Rat
DAV-252	Lick Block Plate - 16 Bottle	Mouse

DAVIS RIG COMPONENTS

BASE PLATE

DAV-001

Surface to mount the test apparatus on.

- Locator pins and cable management accessories are provided for reliable and consistent placement of the lick block, cage, and floor unit

Overall *(LxWxH)*: 25" x 25" x 0.5" *(63.5 x 63.5 x 1.27 cm)*

DAVIS RIG CAGE

DAV-008

An aperture with an automated shutter door controls access to the sipper tube presented in each trial.

- Removable top for easy access to the animal

STANDARD CAGE TOP

DAV-008T

Solid plastic cover with a convenient handle.

NOTE: Included with the Davis Rig Cage (DAV-008)

MODIFIED CAGE TOP

DAV-008CT

Slot for routing tethered assemblies such as:

- LED cables for optogentetics
- Electrode leads for electrophysiology
- Catheters implanted for chronic infusions

MESH CAGE FLOOR

DAV-005 | DAV-005A

Stainless steel wire mesh allows droppings to pass freely from the animal through to the waste pan.

FLOOR PAN

DAV-007

Metal pan situated beneath the cage, for clean accumulation of waste from the animal during a test session.

SIPPER TUBE ACCESS SHUTTER

DAV-210

Automated device for controlling access to the sipper tube being presented to the animal during each trial.

The closed position can be adjusted by the user to determine if the shutter will completely block the sipper access port when it is closed, or allow for a small air space to facilitate passage of odorants into the chamber

LICK BAR CARRIAGE

DAV-250

Motorized positioning device supports the lick block and enables the user to control which sipper tube is presented to the test subject on a trial-by-trial basis

- Carriage movement is smooth, fast, and quiet, minimizing disturbances and audible cues that can signal the animal which tube is being presented

LICK BLOCK PLATE 16 BOTTLE

DAV-251 | DAV-252

The sipper tube is positioned centrally in the access slot, and is located behind the face plate of the lick block, facilitating normal drinking motions.

Mounted magnetically, makes the swapping of block plates quick & easy

Access Slots (HxW):

- Mouse (DAV-251): 1" x 0.3" *(2.5 x 0.8 cm)*
- Rat (DAV-252): 1" x 0.2" *(2.5 x 0.5 cm)*

A

DAVIS RIG INTERFACE

CONTROL BOX
DAV-770

- Electronically control:
  - Position of the lick block
  - Shutter door for accessing to sipper tube
  - Capacitive lickometer circuit *(with sensitivity adjustment)*
- Connects to an interface card in the control computer via a data cable *(SG-770)*

INTERFACE CABLE
SG-770

Connects the computer to the Control Box. *(DAV-770)*

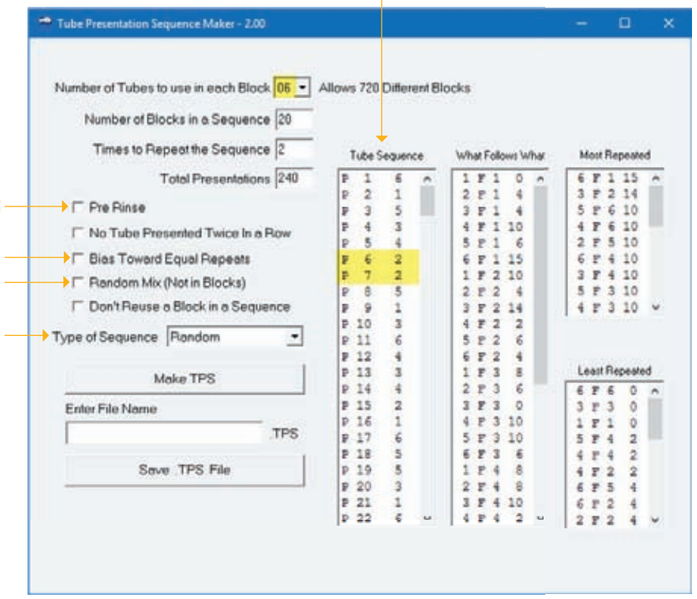
PCIe INTERFACE CARD
DIG-770e

Control a single Davis Rig from one computer.

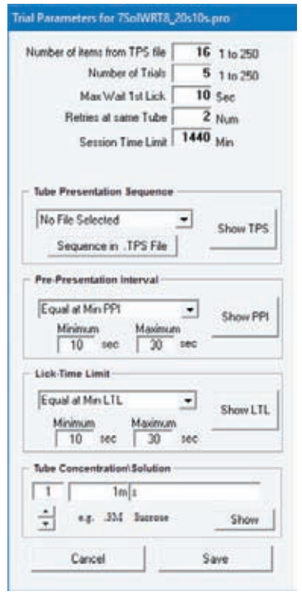
IMAGES

A) Control Box

C



D



DAVIS RIG SOFTWARE

LEGACY SOFTWARE FOR DAVIS RIG
SOF-770

User-friendly interface helps keep track of each experiment using "project" files, which include identifying information such as trial number and group title.

- Set tube presentation sequence, either fixed or random
- Control presentation times, interstimulus intervals, maximum response latencies, etc.
- Introduce rinse trials between presentation of tastants

Tube Presentation Sequence Maker

1. Tube Sequence:

"P" for "Presentation", the following columns show the presentation number, then tube number.

2. Pre Rinse:

Place a rinse trial before each tastant presentation.

3. Bias Toward Equal Repeats:

Effect an overall bias in the TPS construction so each tube sequence is equally likely. A bias sensitivity of Lo, Med, or Hi can be selected.

4. Random Mix (Not in Blocks):

Completely randomize the tube presentations. When selected, the system will take the Total Presentations and randomize all presentations throughout the entire sequence. Otherwise, the sequence randomization is done block by block.

5. Types of Sequences:

Random: Initiate a random number generator algorithm. The seed of the random number generator is a high speed timer, and will result in a different (random) TPS every time.

Pseudo Random 1-4: Four different preset seed values are available for the random number generator. If all other TPS settings are the same, and a pseudo random sequence type is chosen, you will always get the same TPS. This can be useful if you want to get back to the same sequence at a later time without saving an additional TPS file.

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*

IMAGES

B) Main Screen C) Tube Presentation Sequence Maker D) Example of Trial Parameters in a TPS

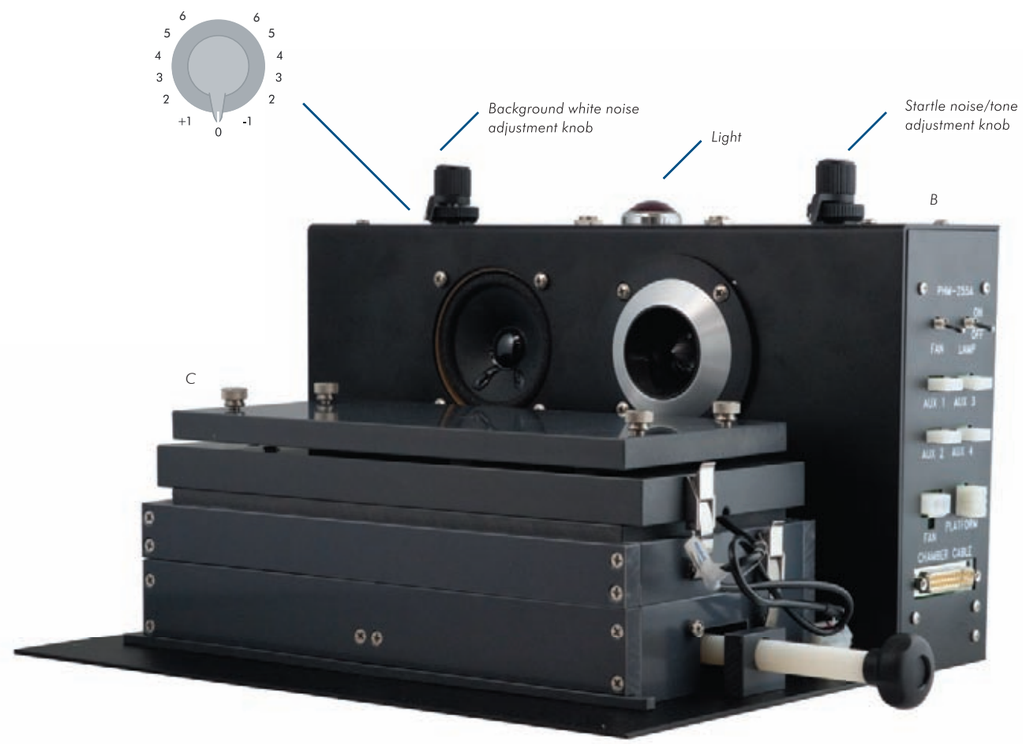
STARTLE SPEAKER SPECS		
DESCRIPTION	**FREQ RANGE**	**SENSITIVITY**
Full range	1–7 KHz	10 dB down @ 700 Hz and 7.5 KHz
Super tweeter	5–35 KHz	10 dB down @ 3 KHz and 45 KHz

The paradigm is used to study fear and anxiety in laboratory animals. Although the underlying circuits and systems controlling fear and anxiety are complex, the startle paradigm itself is relatively simple: a form of Pavlovian conditioning where a central state of fear is inferred from an animal's behavioral response. This is done by measuring the amplitude of a simple brainstem reflex (acoustic startle reflex) in the presence of a cue (conditioned stimulus) previously paired with a mild foot shock (unconditioned stimulus).

For example, when animals are repeatedly presented with a neutral stimulus (light flash, tone, odor, etc.) followed by a brief foot shock, the animal comes to associate the presentation of the cue with an impending aversive event (the shock). Eventually, presentation of the cue in the absence of the shock comes to elicit a state of fear.

The cages are positioned on a sensitive load-cell device that transduces movement in the cage into an electrical signal that is amplified and quantified in arbitrary startle units.

- Set up programs for:
  - Prepulse inhibition of startle (PPI)
  - Fear-potentiated startle (FPS)
- Run up to eight test stations from a single computer
- Flexible stimulus presentation – auditory, visual, aversive stimulation, or any auxiliary device controllable by 28V DC
  - Four outputs to control a startle stimulus light and/or aversive stimulus (such as air puff)
- Designed to require minimal cabling between the connection panel, programmable audio generator, and audio amplifier
- Designed to be economical & easy to expand, as each chamber has its own audio amplifier
- Data collected during the experiment is collected by the included Startle Reflex, PPI, and FPS software
- Sound level calibration from the animal's position in the holder



ACOUSTIC STARTLE REFLEX

ACOUSTIC STARTLE PACKAGE
MED-ASR-PRO1

Packages Include: MDF SAC, Startle Platform, Amplifier, Stimulus Connection Panel, Audio Stimulator, Sound Pressure Level Measurement Pkg, Weights, PCIe Data Acquisition Card, Startle Interface Cabinet w/Power Supply, Analog-Digital Interface, Power Amplifier, Startle Reflex or Startle Reflex Pro Software, Pre-pulse Inhibition Utility, Fear Potentiated Startle Utility, and cables.

ACOUSTIC STARTLE PACKAGE ADD-ON
MED-ASR-PRO1-ADD

Packages Include: MDF SAC, Startle Platform, Amplifier, Stimulus Connection Panel, Power Amplifier, and cables

FEAR POTENTIATED STARTLE PACKAGE
MED-ASR-FPS

Packages Include: Standalone Aversive Stimulator/scrambler, aversive stimulation current test package, stimulus light package w/Fader control, and cables

STARTLE PLATFORM
PHM-250

Load cell contains multiple strain gauges configured in a bridge, and change in resistance when a load is applied to the load cell.

- Designed to minimize pickup of extraneous vibrations while maximizing sensitivity to the startle reflex
- In addition to signal specific filtering, a 60Hz line noise filter is included
- Animal holders are secured in place to ensure consistent measurements
- Attenuation controls to properly calibrate both stimulus and background noise levels

NOTE: Use the amplifier output control to obtain the desired level in the first cubicle (when attenuation control in that cubicle is set to mid level), each subsequent cubicle in the system can then be adjusted to match the first

IMAGES

A) Acoustic startle setup B) Stimulus Connection Panel C) Startle Platform

STARTLE LIGHT STIMULUS COMPONENTS

STIMULUS LIGHT PACKAGE w/FADER CONTROL
PHM-256

- Combines two devices into a single unit:
  - Stimulus Light *(ENV-221M-LED)*
  - Light Fader Controller, 1 channel/2 level *(ENV-226)*
- Lens is mounted flush with the metal rim to minimize animal chewing
- Colored lens covers: *(sold separately)*
  - Available colors: amber, green, white, red
- Creates a second stimulus of either full or reduced intensity
  - Precision screwdriver adjustable control and power regulator circuit

I/Os Required: 2

FLUORESCENT LIGHT CONTROLLER
PHM-258

- Controls up to four light sources *(PHM-258L)*
- Plugs into our standard auxiliary port and fits in our rack mount enclosure *(SG-6500)*
- Operate with compatible startle software or manually using the front panel switch

Operating Line: 115 / 220V AC *(factory selectable)*

Operating Line Current (max): 0.2 A

RAPID ONSET FLUORESCENT STIMULATOR
PHM-258L

- Use with our Fluorescent Light Controller *(PHM-258)* and startle reflex software

Light Intensity (max): 107 lux

Onset: 15 microseconds (μs)

Bulb: 8W fluorescent, miniature bi-pin T5

Color Rendering Index (CRI): 87

Light Temperature: 4100 K "Cool White"

Light Intensity: ~6 lumens *(6" from lamp)*

Normalized Spectral Power: 0.05 @ 435 nm
(W/nm per 1000 lm)

IMAGES

A) Fluorescent Light Controller B) Rapid Onset Fluorescent Stimulator C) Stimulus Light Package w/Fader Control

STARTLE MEASUREMENT COMPONENTS

POWER AMPLIFIER - TWO CHANNEL
ANL-925D

- Double-width panel, install in our interface cabinets
- Powers one Stimulus Connection Panel *(PHM-255A)*

ANALOG/DIGITAL CONVERTER
ANL-729

Resolution: 12 bits, 1 in 4,096

Noise: 1LSB @ +/- 5V range

Accuracy: 0.8% +/- 1 LSB

A/D conversion time: 8.5μS

A/D type: Self-calibrating successive approximation

A/D ranges: +/- 5 V, 0.5 V, 50 mV, 10 mV

STIMULUS CONNECTION PANEL
PHM-255A

- Controls the fan and light
- Supplies power to the fan and platform
- Provides connections for four (4) auxiliary devices
- Houses the full range and super tweeter speakers

LOAD CELL AMPLIFIER
PHM-250B

Measures the resistance of the strain gauges in the load cell and converts it into a voltage that represents the force (or by means of gravity, weight) on the load cell. This voltage can then be read by the data acquisition system.

The output offset (similar to "tare" on a scale) and sensitivity (1V or 2V output per kg) can be adjusted.

CALIBRATION WEIGHTS
HAR-WEIGHT-20-G | HAR-WEIGHT-100-G

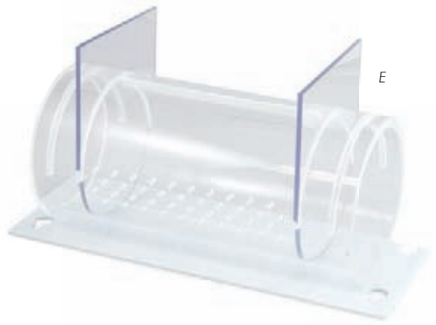
- Used to calibrate the load cell platform using a control weight

HAR-WEIGHT-20-G: 20g

HAR-WEIGHT-100-G: 100g

IMAGES

A) Interface cabinet B) Programmable Audio Stimulator C) Analog/Digital Converter D) Power Amplifier - Two Channel E) Calibration Weights F) Load Cell Amplifier G) Startle Platform



	STARTLE ACRYLIC ANIMAL HOLDER SPECS					
	NAME	WORKING AREA (OD×L)	SHORTENED LENGTH	ROD SIZE (OD)	ROD SPACING	ANIMAL SIZE
ENV-262B	Acrylic Animal Holder	3″ x 5.6″ *(7.6 x 14.2 cm)*	3.9″ *(9.9 cm)*	0.125″ *(0.32 cm)*	0.372″ *(0.94 cm)*	250-500 g
ENV-262C	Acrylic Animal Holder	3.5″ x 7.1″ *(8.9 x 18 cm)*	5.5″ *(14 cm)*	0.125″ *(0.32 cm)*	0.437″ *(1.11 cm)*	400-700 g
ENV-263A	Acrylic Animal Holder	1.3″ x 3.4″ *(3.3 x 8.6 cm)*	2.6″ *(6.6 cm)*	N/A	N/A	50-125 g
ENV-263B	Acrylic Animal Holder	1.8″ x 3.9″ *(4.6 x 9.9 cm)*	3.1″ *(7.9 cm)*	0.125″ *(0.32 cm)*	0.139″ *(0.35 cm)*	< 50 g

STARTLE ANIMAL HOLDERS

STANDARD ANIMAL HOLDERS
ENV-264A | ENV-264B | ENV-264C

- Built-in grid rods
- Available in small, medium, and large
- Grid rod style back wall of the holder does not interfere with sound or other stimulus and provides plenty of ventilation
- Waste collection tray keeps the animal cleaner and more comfortable than in traditional acrylic holders
- Clear top and front loading door for easy insertion or removal of the animal
- Design permits some movement while still exposing the animal to the full intensity of the startle stimulus

HARNESS FOR STANDARD ANIMAL HOLDERS
ENV-406SM-8 | ENV-406SR

Attaches the grid floor to an aversive stimulus generator.

- Terminates in DB9 connector

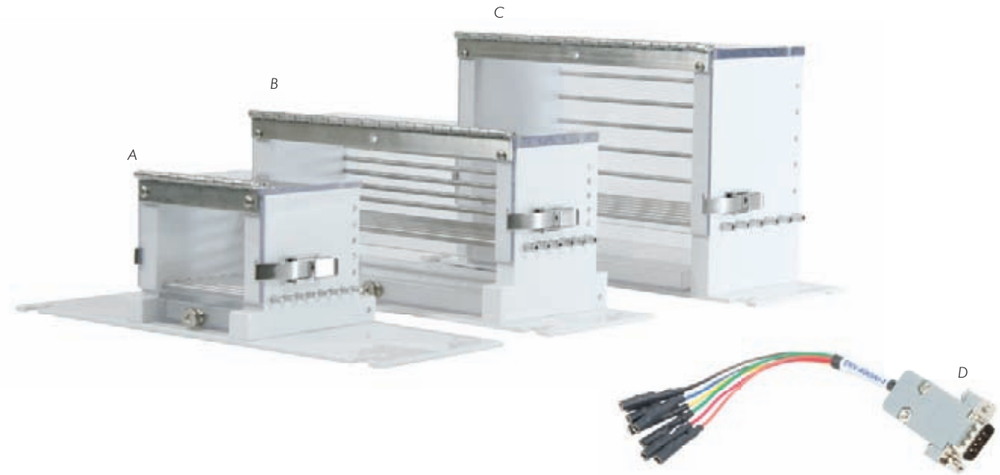
ACRYLIC ANIMAL HOLDERS
ENV-262B | ENV-262C | ENV-263A | ENV-263b

- Increased response sensitivity
- Ventilation holes
- Two slots on either end of the tube for closing the animal in, and for shortening the length of the working area available to the animal
  - Barrier: 1/8″ thick

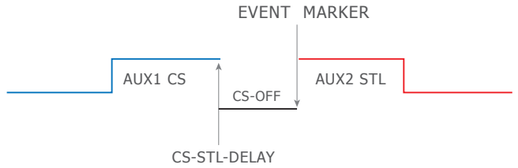
NOTE: Acrylic animal holders do not have a grid floor & harness, and therefore cannot be used for applications requiring shock stimulation

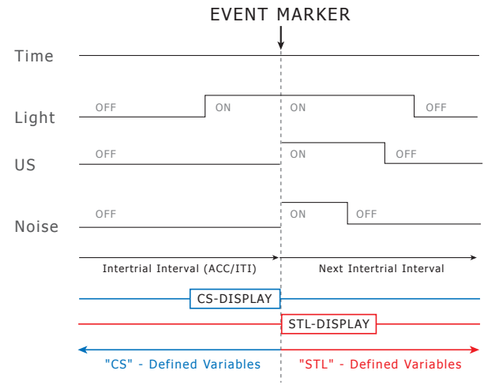
IMAGES

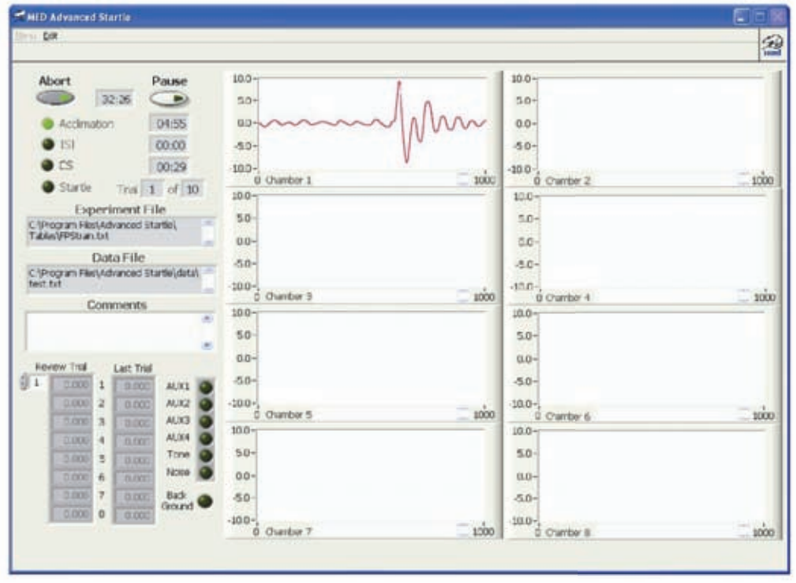
A) Standard Animal Holder < 50 g B) Standard Animal Holder 125-250 g C) Standard Animal Holder 250-500 g D) Grid Harness E) Acrylic Animal Holder 400-700 g



	STARTLE STANDARD ANIMAL HOLDER SPECS						
	NAME	WORKING AREA (W×H×D)	ROD SIZE, FLOOR (OD)	ROD SIZE, WALL (OD)	ROD SPACING	ANIMAL SIZE	HARNESS
ENV-264A	Standard Animal Holder	6.5″ x 3.6″ x 3.2″ *(16.5 x 9.1 x 8.1 cm)*	0.185″ *(0.47 cm)*	0.125″ *(0.32 cm)*	0.55″ *(1.4 cm)*	250-500 g	ENV-406SR
ENV-264B	Standard Animal Holder	6.5″ x 2″ x 2.4″ *(16.5 x 5.1 x 6.1 cm)*	0.185″ *(0.47 cm)*	0.125″ *(0.32 cm)*	0.385″ *(0.978 cm)*	125-250 g	ENV-406SR
ENV-264C	Standard Animal Holder	2.4″ x 1.9″ x 2.4″ *(6.1 x 4.8 x 6.1 cm)*	0.125″ *(0.318 cm)*	0.125″ *(0.32 cm)*	0.313″ *(0.795 cm)*	< 50 g	ENV-406SM-8







STARTLE REFLEX SOFTWARE

STARTLE REFLEX SOFTWARE
SOF-825

- Included in the Startle Reflex Package *(MED-ASR-PRO1)*
- Streamlined setup with:
  - User defined file name for data storage
  - Comments saved with the session data
  - Animal number/identifier for each test chamber
- Run up to eight (8) test stations in two groups of four (4) on a single computer
- User defined:
  - Frequency, rise/fall time, amplitude, duration
- Automatically change levels for pre-pulse and/or startle stimuli
- Maximum peak-to-peak values saved
- Run up to 99 trials divided into three blocks using:
  - Fixed or variable inter-trial intervals (ITI)
  - Random table of trials
- Replay any part of any experiment to view digital values or graphic display as a line, bar, or scatter plot
  - Data graphs can be overlaid to easily identify differences between trials
- Save time in dose/response studies by storing:
  - Information for each test animal
    (e.g. study number, animal number, technician)
  - Data for up to two drugs
- Pertinent and peripheral data can be viewed graphically in real time and is exportable in ASCII text format for further analysis in MS Excel or similar programs

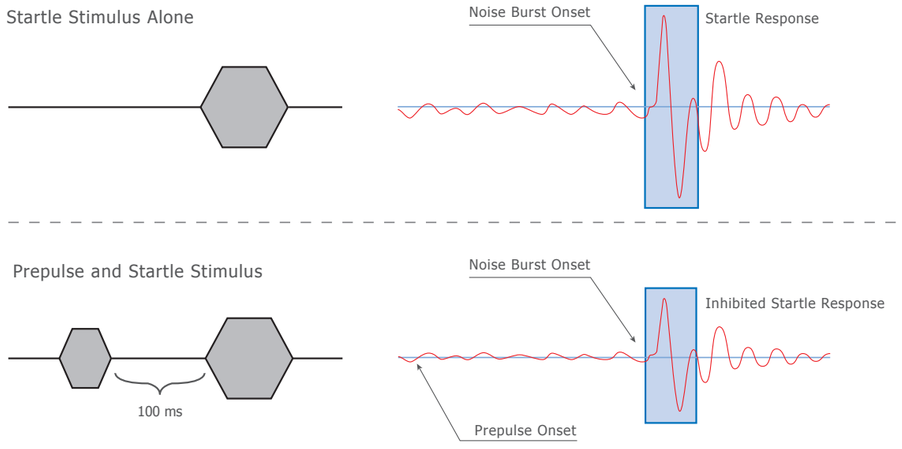
  NOTE: For increased throughput, a single file with information on all animals per run is available as an option.
- Startle Viewer
  - Examine the details of the reflex and manually adjust the scale of the primary dependent measure
  - Use the voltage graph to quantify the amplitudes of the response
- Data Collected:
  - Startle latency (in milliseconds), time period in between the white-noise (startle stimulus) presentation, and maximal startle response

STARTLE REFLEX PRO SOFTWARE
SOF-828

- Included in the Advanced Startle Reflex Package *(MED-ASR-PRO1-ADV)*
- Same features and capabilities as the Startle Reflex Software *(SOF-825)* with the added ability to write custom protocol code for extensive flexibility
- Create custom experiments and protocols in plain text ".txt" files, and written in a tab-delimited table
  - Write and import code from a spreadsheet program (like Excel)
  - Initialize both control and trial variables that the software uses to execute an experiment

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*
- One USB port
- Two PCI slots



STARTLE REFLEX SOFTWARE CONTINUED

PRE-PULSE INHIBITION STARTLE PROTOCOL
SOF-826

Prepulse Inhibition of Startle (PPI) is a behavioral phenomenon in which a short tone presented just prior to an acoustic startle stimulus (a sound presented at a fairly high amplitude) will serve to dampen the subsequent startle response.

PPI has been observed in mice, rats, Rhesus Macaques, and humans. Rodent testing of PPI is used in the testing of therapeutic compounds, and has been used as a screening technique for transgenic/knock-out mice.

- Included in the Startle Reflex Package *(MED-ASR-PRO1)*
- Specify frequency (Hz) and amplitude (dB)

NOTE: Protocol code cannot be edited, for custom experiment design use the Startle Reflex Pro software *(SOF-828)*

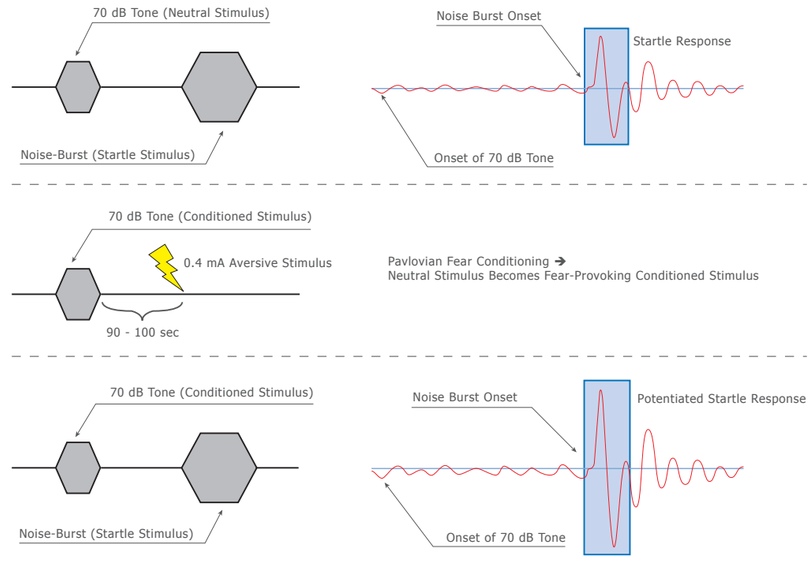
Protocol Summary:

Pre-pulse
- Eight (8) trials @ 20 KHz / 70 dB
- Eight (8) trials @ 12 KHz / 70 dB
- Eight (8) trials @ 4 KHz / 70 dB

Noise Burst Only:
- Acclimation period of one (1) minute
- Twenty-four (24) PPI trials consisting of:
  - Eight (8) trials @ 20 KHz / 70 dB
  - Eight (8) trials @ 12 KHz / 70 dB
  - Eight (8) trials @ 4 KHz / 70 dB
- PPI trials have sixteen (16) randomly interspersed noise burst only trials @ 100 dB

Noise Burst:
- Fifteen (15) trials randomly presented
- Each trial separated by a variable ITI range of 3 – 8 seconds
- Intensity: 70, 80, or 90 dB

Computer Requirements:
- Windows 7 or newer *(32 or 64-bit)*



STARTLE REFLEX SOFTWARE CONTINUED

FEAR-POTENTIATED STARTLE PROTOCOL
SOF-827

Fear-potentiated startle (FPS) occurs when the startle response to an acoustic stimulus is increased relative to baseline startle responding via Pavlovian conditioning. The general procedure for producing FPS involves preceding an aversive stimulus (such as a shock or air puff) with a tone (or other neutral stimulus). After several presentations of this stimulus pairing, the presentation of the tone elicits a fear response.

Once conditioning has occurred, the tone is then presented before an acoustic startle stimulus, increasing the intensity of the startle response. FPS is a typical reflex that has been observed in a variety of species, thus making it a useful tool for investigating many learning and memory processes.

NOTE: Designed to specifications provided by Dr. William Falls of the University of Vermont. A method reprint for Fear-Potentiated Startle in mice is available on Dr. Falls' site.

- Included in the Startle Reflex Package *(MED-ASR-PRO1)*
- Specify frequency (Hz) and amplitude (dB)

NOTE: Protocol code cannot be edited, for custom experiment design use the Startle Reflex Pro software *(SOF-828)*

Protocol Summary:

Train
- Acclimation period of five (5) minutes
- Ten (10) trials each, 30 second pre-pulse tone @ 12 KHz / 70 dB
- Tone followed by a foot shock stimulus for the last 0.25 seconds
- Each trial separated by a variable ITI range of 2 – 4 minutes

Test
- Acclimation period of five (5) minute
- Nine (9) noise-burst trials @ 12 KHz / 100, 105, 110 dB
- Nine (9) randomly presented noise burst trials of noise-bursts @ 12 KHz / 70 dB
- Nine (9) randomly presented noise burst & pre-pulse tone trials @ 12 KHz / 70 dB

Computer Requirements:
- Windows 7 or newer *(32 or 64-bit)*

	ELEVATED PLUS MAZE SPECS					
	NAME	SPECIES	OVERALL (L×W×H)	ARMS (L×W)	CENTER (L×W)	WALLS (L×W)
ENV-560	Elevated Plus Maze	Rat	42″ x 42″ x 42.3″ *(106.7 x 106.7 x 107.4 cm)*	20″ x 4″ *(50.8 x 10.2 cm)*	4″ x 4″ *(10.2 x 10.2 cm)*	15.9″ *(40.4 cm)*
ENV-560A	Elevated Plus Maze	Mouse	29″ x 29″ x 36.9″ *(73.7 x 73.7 x 93.7 cm)*	13.8″ x 2.4″ *(35.1 x 6.1 cm)*	2.4″ x 2.4″ *(6.1 x 6.1 cm)*	7.5″ *(19.1 cm)*
ENV-564	Elevated Plus Maze - NIR Backlit	Rat	42″ x 42″ x 42.3″ *(106.7 x 106.7 x 107.4 cm)*	20″ x 4″ *(50.8 x 10.2 cm)*	4″ x 4″ *(10.2 x 10.2 m)*	15.9″ *(40.4 cm)*
ENV-564A	Elevated Plus Maze - NIR Backlit	Mouse	29″ x 29″ x 36.9″ *(73.7 x 73.7 x 93.7 cm)*	13.8″ x 2.4″ *(35.1 x 6.1 cm)*	2.4″ x 2.4″ *(6.1 x 6.1 cm)*	7.5″ *(19.1 cm)*

ELEVATED PLUS MAZES

ELEVATED PLUS MAZE - STANDARD
ENV-560 | ENV-560A

Without IR sensors, this maze is for use for manual scoring or with third party video tracking software.

- Interface and software packages sold separately
- Standard maze has black walls with white plastic runways *(other colors available upon request)*
- Sturdy support stand is held together with quick connect pins for easy disassembly
- Runways easily snap on and off for cleaning
- IR control box is detachable for simpler cable management

ELEVATED PLUS MAZE - IR PHOTOBEAM
MED-ELVM

Packages Include: SuperPort TTL Card, IR Source/Detector/Controller, Junction Box, and cables

With the addition of IR sensors, this maze package is for use with Med-PC software.

- Dual IR photobeam sensors at the entrance to each runway distinguishes between exploration & entrances for accurate position detection
- Multiple mazes can share some interface components, contact our sales team for cost saving options

ELEVATED PLUS MAZE - NIR BACKLIT
ENV-564 | ENV-564A

ELEVATED PLUS MAZE - NIR BACKLIT PACKAGE
MED-NIRPMN

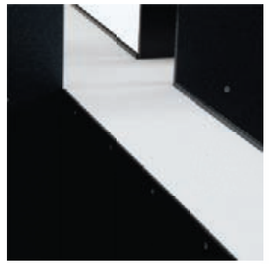
Packages Include: NIR Backlit Maze, Control Box, and cables

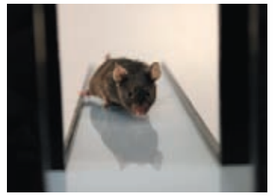
Without IR sensors, this maze is for use for manual scoring or with third party video tracking software.

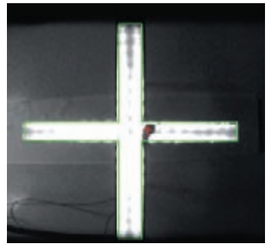
- NIR lighting is invisible to the animal, which eliminates distractions caused by bright overhead visible lighting such as shadows, glare, and reflections
- Evenly illuminated translucent polypropylene floor silhouettes the animal creating an easy to track, high contrast video image
- Track animals of various coat colors without worrying about ambient light or maze color
  - *NOTE: Requires monochrome video camera with an NIR filter*
- Control the lights manually when connected to a wall outlet, or remotely via a 28V Med output

IMAGES

A) Elevated Plus Maze w/IR Photobeam setup for mouse







A

EPM ACCESSORIES

BLUE FLOOR INSERTS
ENV-560-RC | ENV-560A-RC

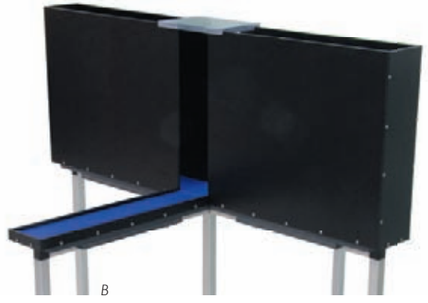
- Use this blue PVC for high contrast color to improve video tracking performance using light colored animals
- Thin material will not interfere with IR photobeams

Rat | ENV-560-RC

Mouse | ENV-560A-RC

IMAGES

B) Blue Floor Inserts



B

ZERO MAZE SPECS				
NAME	SPECIES	OVERALL (H×OD)	WALL HEIGHT	FALL HEIGHT
ENV-561	Rat	34″ x 24″ *(86.4 x 61 cm)*	3.2″ *(8.1 cm)*	30.5″ *(77.5 cm)*
ENV-561-BL	Rat	34″ x 24″ *(86.4 x 61 cm)*	3.2″ *(8.1 cm)*	30.5″ *(77.5 cm)*
ENV-561A	Mouse	34″ x 24″ *(86.4 x 61 cm)*	3.2″ *(8.1 cm)*	30.5″ *(77.5 cm)*
ENV-561A-BL	Mouse	34″ x 24″ *(86.4 x 61 cm)*	3.2″ *(8.1 cm)*	30.5″ *(77.5 cm)*

A

B

ZERO MAZES

ZERO MAZE - STANDARD

ENV-561 | ENV-560A

Without IR sensors, this maze is for use for manual scoring or with third party video tracking software.

- Interface and software packages sold separately
- Standard maze has black walls with white plastic runways *(other colors available upon request)*
- Sturdy support stand is held together with quick connect pins for easy disassembly
- Runways easily snap on and off for cleaning
- IR control box is detachable for cable management

ZERO MAZE - NIR BACKLIT

ENV-561-BL | ENV-561A-BL

- NIR lighting is invisible to the animal, which eliminates distractions caused by bright overhead visible lighting such as shadows, glare, and reflections
- Evenly illuminated maze floor silhouettes the animal creating an easy to track, high contrast video image
- Track animals of various coat colors without worrying about ambient light or maze color
  - *NOTE: Requires monochrome video camera equipped with an NIR filter, sold separately*
- Closed runways feature hinged covers to prevent the animal climbing out of the maze

IMAGES

A) Zero Maze - Standard B) Zero Maze - NIR Backlit

A

B

BARNES MAZE SAFE BOX SPECS		
	WORKING AREA (L×W×H)	STEP (H)
ENV-562-M-GB	5.3″ x 2.1″ x 1.3″ *(13.5 x 5.3 x 3.3 cm)*	0.69″ *(1.76 cm)*
ENV-562-R-GB	15.3″ x 4.8″ x 5.6″ *(38.9 x 12.2 x 14.2 cm)*	1.8″ *(4.6 cm)*

BARNES MAZES

BARNES MAZE - STANDARD

ENV-562-M | ENV-562-M-S | ENV-562-R | ENV-562-R-S

Packages Include: Barnes Maze w/Safe Box, and either a 35" or 55" tall stand

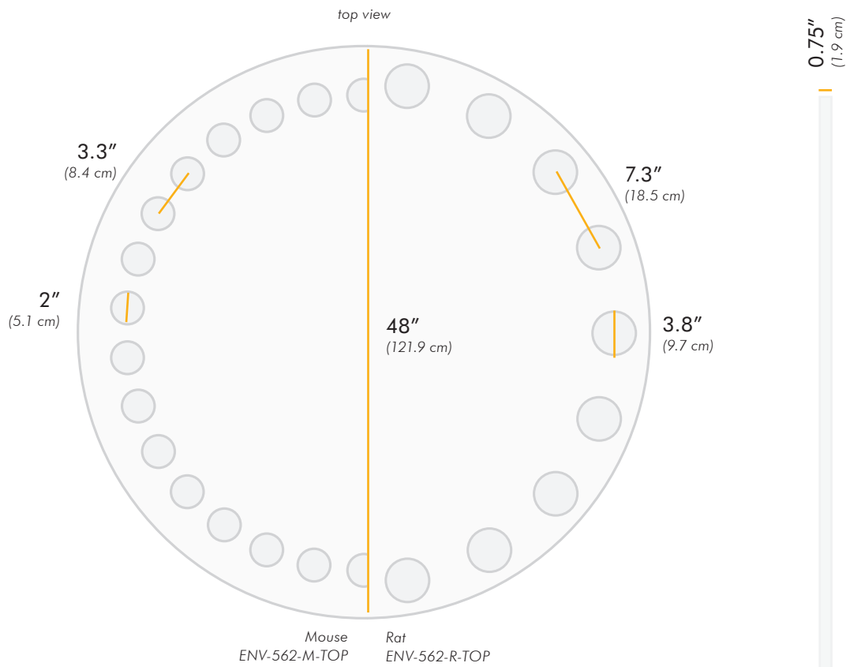
Without IR sensors, this maze is for use for manual scoring or with third party video tracking software.

- Modular design allows the same base to be used for rats and mice, simply switch maze platforms
- Safe box features:
  - Cage washable black polypropylene
  - Removable steps to facilitate entry and decrease hesitation by the test animal to escape from the aversive environment *(the maze top)*
  - Removable, and can be placed below any hole
- Maze surface features:
  - Constructed from bright white or blue expanded PVC to ensure proper light distribution and reduce glare
  - Material is also easy to clean
  - Standard colors are white or blue, but custom colors are available
  - Custom sizes available

IMAGES

A) Barnes Maze - Standard for rat B) Safe Box

	BARNES MAZE SPECS				
	NAME	SPECIES	TOP	SAFE BOX	STAND
ENV-562-M	Barnes Maze	Mouse	ENV-562-M-TOP	ENV-562-M-GB	MSUB-ENV-562 (55" H)
ENV-562-M-S	Barnes Maze	Mouse	ENV-562-M-TOP	ENV-562-M-GB	MSUB-ENV-562-S (35" H)
ENV-562-R	Barnes Maze	Rat	ENV-562-R-TOP	ENV-562-R-GB	MSUB-ENV-562 (55" H)
ENV-562-R-S	Barnes Maze	Rat	ENV-562-R-TOP	ENV-562-R-GB	MSUB-ENV-562-S (35" H)



BARNES MAZE COMPONENTS

BARNES MAZE TOP
ENV-562-M-TOP | ENV-562-R-TOP

- Holes evenly spaced *(see illustration)*
- Drawer-style tracks under each hole for easy installation of a safe box
- Platform surface made of bright white expanded PVC for proper light distribution and reduced glare
- Durable & easy to clean material

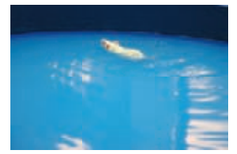
BARNES MAZE SAFE BOX
ENV-562-M-GB | ENV-562-R-GB

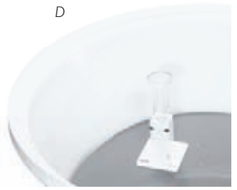
- Black polypropylene box provides an escape from the aversive white maze-top environment
- Easily installed under the maze in drawer-style tracks below any hole of the maze
- Removable step for easier transition between maze surface and safe box decreases hesitation by the test animal
- Cage washable

BARNES MAZE STAND
MSUB-ENV-562 | MSUB-ENV-562-S

- Compatible with both mouse and rat maze tops
- Either 35″ *(88.9 cm)* or 55″ *(139.7 cm)* heights

	WATER MAZE POOL SPECS			
	NAME	SPECIES	OVERALL OD×H)	CAPACITY
ENV-594M	Water Maze Pool	Mouse	54″ x 30″ *(137.2 x 76.2 cm)*	200 gal
ENV-594R	Water Maze Pool	Rat	80″ x 30″ *(203.2 x 76.2 cm)*	500 gal





WATER MAZES

WATER MAZE - STANDARD
MED-WMN

Packages Include: Water Maze Pool, Floor insert, and Pool heater (optional)

"False bottom" insert for stowing away the heater, and provides a smooth surface for placement of platforms or other accessories anywhere on the maze floor

- Constructed of chemical resistant polyethylene material
- White is the default color, black or blue are also available
- We recommend emptying the pool using a submersible pump *(ENV-599)*, but a drain can be installed by request
- Three basic strategies to escape the maze:
  - Praxic: remembering the movements needed to get to the platform
  - Taxic: uses visual cues to reach their destination
  - Spatial: using distal cues as points of reference to locate themselves

WATER MAZE POOL
ENV-594M | ENV-594R

- Polyethylene plastic is easy to clean
- White is the default, also available in blue or black
  - Use bluefor high contrast video with no added dye
- A hard cover is also available *(sold separately)*

POOL SUPPORT STAND w/CASTERS
ENV-593M-C | ENV-593R-C

- Powder coated to prevent corrosion
- Industrial swivel casters with built-in leveling pads to easily adjust and move the pool

SUBMERSIBLE POOL HEATER
ENV-597

- Controlled by an external thermostat to maintain consistent temperature

NOTE: Model may vary due to supplier availability

ADJUSTABLE WATER MAZE PLATFORM
ENV-596M | ENV-596R

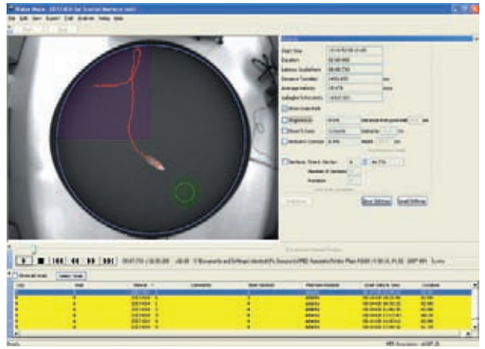
- Provides a textured surface on which the animal can escape the water
- Weighted base ensures that the platform will not drift from position after placement
- Telescoping design for adjusting the platform height as needed

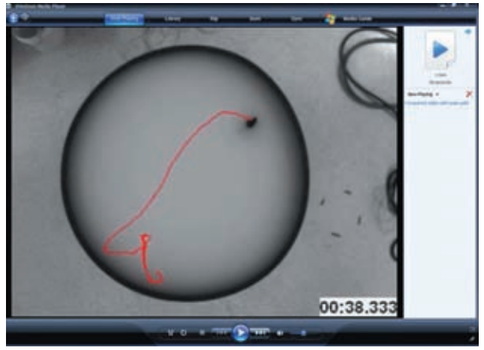
IMAGES

A) Pool color choices B) Pool on support stand w/.casters C) Mouse swimming D) Adjustable water maze platform shown on pool floor

	WATER MAZE SUPPORT STAND SPECS		
	NAME	SPECIES	OVERALL (LxWxH)
ENV-593M-C	Maze Platform w/Castors	Mouse	47.3″ x 47.3″ x 6.6″ *(120.1 x 120.1 x 16.8 cm)*
ENV-593R-C	Maze Platform w/Castors	Rat	64.8″ x 64.8″ x 16.4″ *(164.6 x 164.6 x 41.7 cm)*

	WATER MAZE PLATFORM SPECS				
	NAME	SPECIES	PLATFORM (OD)	MIN/MAX HEIGHT	BASE (LxWxH)
ENV-596M	Adjustable Water Maze Platform	Mouse	4″ *(10.2 cm)*	9″ / 14.3″ *(22.9 / 36.3 cm)*	7″ x 7″ x 0.5″ *(17.8 x 17.8 x 1.3 cm)*
ENV-596R	Adjustable Water Maze Platform	Rat	6″ *(15.2 cm)*	9″ / 14.3″ *(22.9 / 36.3 cm)*	7″ x 7″ x 0.5″ *(17.8 x 17.8 x 1.3 cm)*





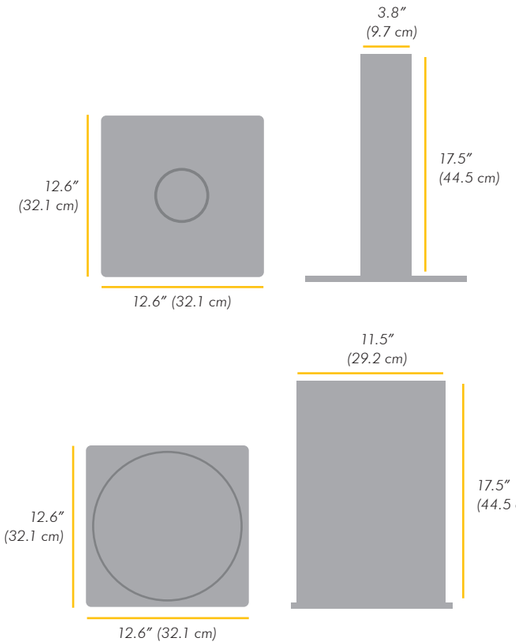
WATER MAZE SOFTWARE

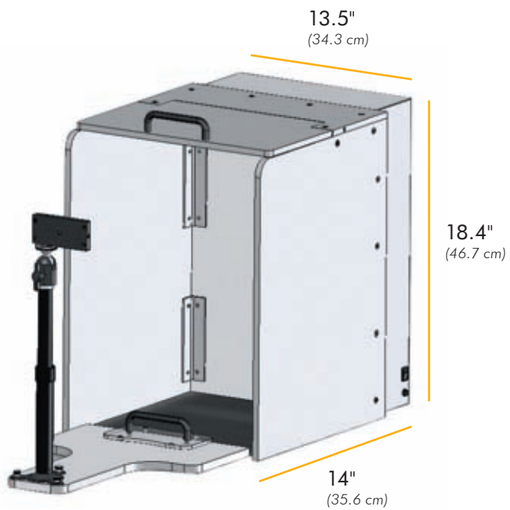
WATER MAZE TRACKING SOFTWARE
SOF-845

- Full control of study design, organize study by:
  - Day of session, animal ID, platform location, start position, maximum total duration
- Simple graphical interface
- User defined:
  - Size, platform location, start location
- Track & analyze animals swimming in real time
- Data Collected:
  - Latency to platform, average velocity, and other swim path information
- Control an on-demand "Atlantis" platform

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*





FORCED SWIM

FORCED SWIM PACKAGES
MED-FSN

Package includes: Cubicle, NIR Light Box, Light Control Box, and cables (test cylinder sold separately)

Typically used to conduct the Porsolt forced swim test, a screening method for assessing antidepressant activity. Porsolt pioneered the use of rodents in depressive models, and the efficacy of anti-depressive compounds in them.

Rodents are put into the cylindrical container filled with water. By forcing a mouse to swim in this aversive/restrictive space it will actively struggle for a few minutes, but eventually stop moving and become noticeably weary, making only small movements to keep their head above water.

Porsolt (et al) called this state of hopelessness "behavioral despair" and compared it to a human experiencing depressive symptoms. It was noted that anti-depressants appeared to increase the latency to this immobile state, and that the time exhibiting immobile behaviors decreases while active behavior increases.

The immobility time is generally measured for a short time, e.g. 5 or 10 min, and can be measured by manual observation with a stopwatch or with a video analyzing software.

The video images are generally best handled as binary (monochrome) images so the rodent is detected as a silhouette.

- A white noise generator can be used to mask sudden loud noises that might startle the animals and affect their behavior within the tank
- LED backlighting increases contrast to silhouette the animal, resulting in a clearer image for the software to analyze its movement
- Typical behaviors:
  - Escape/struggle, climb, full/passive dive, immobility/floating, passive dive, swimming

TEST CYLINDER
ENV-590M | ENV-590R

- Sturdy clear acrylic construction

CUBICLE
ENV-591

- Provides a frame for the light box and camera to mount onto
- Lid lifts for easy insertion/removal of the test cylinder

NOTE: Camera not included

IMAGES

A) MED-FSN with test cylinder for rat

A

12.5"
(31.8 cm)

13"
(33 cm)

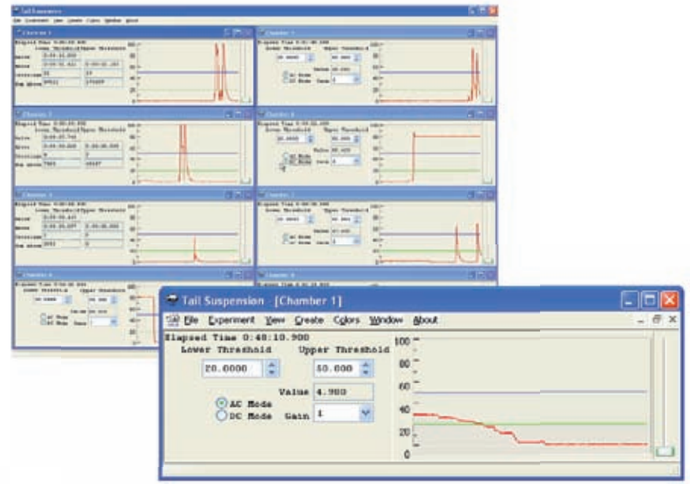
B

13"
(33 cm)

C

D

E



TAIL SUSPENSION

TAIL SUSPENSION
MED-TSS-MS | MED-TSS-300

Packages Include: Cubicle, both a hook style catch and a suspension paddle, Load Cell Amplifier, USB High Speed Serial Microcontroller, Rack Mount Interface Chassis + Enclosure, Interface Card, Junction Card, PCIe Data Acquisition Card, Tail suspension Software, and cables

First reported in Psychopharmacology *(1985(85): 367 - 370)*, the tail suspension test continues to be used for a range of antidepressant compounds including SSRI's, benzodiazepines, typical and atypical antipsychotics, etc.

The primary dependent measure is the time to relative immobility; therefore, the duration and vigor of activity is inferred to be an index of escape persistence.

To measure this activity, a precision linear load cell interfaces with the tail suspension software (SOF-821) which records the load cell output as both quantitative and graphic data.

- Package includes all hardware and software needed to set-up a single tail suspension station, and the add-on package *(MED-TSS-300)* includes everything needed to expand upon the starter package
- System can support up to seven add-on test stations (eight total)
- Mice are unable to touch the walls

IMAGES

A) Paddle shown installed B) Hook shown installed C) Load Cell + Amplifier D) Interface Card E) Tail Suspension Software

TAIL SUSPENSION COMPONENTS

CUBICLE
PHM-300

Prevents adjacent animals from seeing one another, and provides a mount for the load cell.

TAIL PADDLE
MSUB-PHM-300-1

TAIL "CATCH" HOOK
MSUB-PHM-300-2

- Stainless steel
- Use to suspend a mouse by its tail with adhesive tape
- Attaches securely to load cell *(ENV-505TS)*

INTERFACE CARD
DIG-735

Provides signal conditioning from load cell amplifier to data acquisition software, filtering the load cell signal to meet user requirements.

- Double-width panel, install in our interface cabinets

NOTE: One card needed per test station.

LOAD CELL + AMPLIFIER
ENV-505TS

- Precision linear load cell includes amplifier
- Used to record animal movement

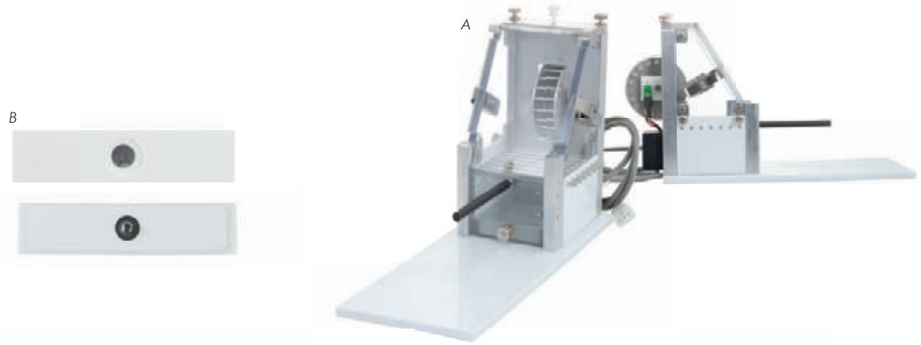
TAIL SUSPENSION SOFTWARE

TAIL SUSPENSION SOFTWARE
SOF-821

- Start trigger automatically begins data collection when the animal is attached to the load cell and appends each animal's data to a separate file
- Simultaneous recording of up to eight stations
- Choose between:
  - DC mode: precise calibration
  - AC mode: eliminate drift while running animals
- Set upper and lower threshold levels to distinguish between three distinct movement zones:
  - Immobile / low activity / high activity
- Generate ASCII text summary files containing:
  - Time above & below threshold, number of crossings, and sum of activity above threshold
- Export the raw analog data for analysis in Microsoft® Excel or other spreadsheet software

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*



TRIADIC WHEEL TURN

TRIADIC WHEEL TURN PACKAGES
MED-TLH

Packages Include: Triadic SACs, Wheel Turn Chambers, SmartCtrl Package 4in/8out, Aversive Stimulator, Tail Electrode Strips, tube of Electrode Gel, Small Interface Cabinet, and cables

This triadic design has been used for over 30 years to study the impact of stress controllability on a variety of behavioral as well as physiological indices *(Current Protocols in Neuroscience, Feb 2001, Supplement 14)*.

Designed to run three animals at the same time. Subjects in the "escape" condition learn to turn the response wheel to terminate the aversive stimulus for themselves and a "yoked" partner. The "control" subject is not stimulated.

- Escape *(controllable aversive stimulation)*
- Yoked *(uncontrollable aversive stimulation)*
- Yoked Control *(no aversive stimulation)*

- Each of the three wheel turn chambers is housed in its own sound isolation cubicle for optimal acoustic, visual, and olfactory isolation between subjects
- Extending out the back of each chamber is a tail holder with curved aversive stimulation electrodes, and a soft velcro strap to hold the tail in place
- Chambers can be easily removed for cleaning

NOTE: Aversive stimulators, a Med-PC® interface package, and software must be ordered separately. The programming flexibility of Med-PC® software permits any programmed contingency across animals.

IMAGES

A) Wheel Turn Chamber B) Electrode Strip

	TRIADIC WHEEL TURN CHAMBER SPECS						
	NAME	BASE (L×W×H)	OVERALL (L×W×H)	RODS (OD)	SPACING	FLOOR (L×W)	ANIMAL SIZE
ENV-586B	Wheel Turn Chamber	9.1″ x 3.6″ x 0.3″ *(23.1 x 9.2 x 0.64 cm)*	10″ x 3.6″ x 7.3″ *(25.4 x 9.1 x 18.5 cm)*	0.19″ *(0.47 cm)*	0.62″ *(1.56 cm)*	6.1″ x 3″ *(15.6 x 7.5 cm)*	< 300 g
ENV-586C	Wheel Turn Chamber	9.1″ x 4.9″ x 0.5″ *(23.1 x 12.4 x 1.3 cm)*	11.1″ x 4.9″ x 24″ *(28.2 x 12.5 x 14.5 cm)*	0.19″ *(0.47 cm)*	0.62″ *(1.56 cm)*	7.2″ x 4.5″ *(18.3 x 11.4 cm)*	< 500 g
ENV-588B	Wheel Turn Chamber	9.1″ x 3.6″ x 0.3″ *(23.1 x 9.2 x 0.6 cm)*	9.1″ x 3.6″ x 5.7″ *(23.2 x 9.2 x 14.5 cm)*	0.12″ *(0.31 cm)*	0.35″ *(0.89 cm)*	2.5″ x 2.4″ *(6.4 x 6.1 cm)*	N/A

TRIADIC COMPONENTS

WHEEL TURN CHAMBER
ENV-586B | ENV-586C | ENV-588B

- Includes stainless steel grid floor & removable polycarbonate waste pan
- Tail holder for aversive stimulus application
- Sloped back wall and ceiling constrain animal and helps them keep focus on the wheel
- Wheel uses an infrared sensor to report a response for every 90 degrees of rotation

SOUND ATTENUATING CUBICLE
SAC-081515

- Use with any of our wheel turn chambers
- Built-in 28V DC ventilation fan
- Stimulus light can be used as a conditioned stimulus or as a house light *NOTE: 28V DC power required*
- Viewing port enables unobtrusive observation of animal during testing

ELECTRODE GEL 10% CHLORIDE
TD-40

- Highly conductive gel for improved conductivity between the animal's tail and electrodes
- Recommended for short term recording
- 8 oz. tube

TAIL ELECTRODE STRIP
TDE-401 | TDE-402

- Adhesive foam with embedded electrode wraps around tail like a bandage for easy application
- "Snap" style electrode for fast & easy connection
- Recessed "cup" around electrode for conductive gel
- Disposable, eliminating the need for cleaning
- Sold in packs of 50

Overall: 3.86″ x 0.87″ *(9.8 x 2.2 cm)*

Electrode Cup: 16 mm OD

TRIADIC SOFTWARE

TRIADIC LEARNED HELPLESSNESS PROTOCOL
SOF-700RA-12

- Designed to simultaneously run three animals in individual boxes
- On load:
  - Left: escape
  - Center: yoked
  - Right: yoked control

NOTE: If your system has aversive stimulators in all three positions, the code may be modified to randomly select conditions

- Subjects in the escape condition learn to turn the response wheel to terminate the aversive stimulation for themselves and a yoked partner (control subject is not shocked)

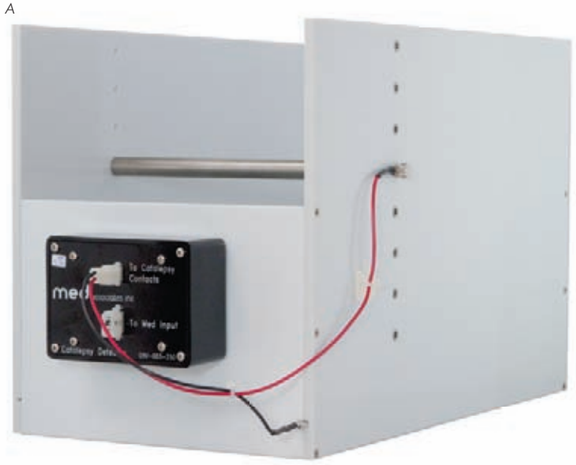
User Defined:

- Trials to run, session time, maximum aversive stimulation time

Data Collected:

- Trial number, left response counts, center response counts, right response counts, time to meet FR, FR value, ITI value

A



8.5″ *(21.6 cm)*

10″
(25.4 cm)

14.5″ *(36.8 cm)*

CATALEPSY

CATALEPSY TEST CHAMBER w/CONTACT CIRCUIT

ENV-003-B

Conduct automated catalepsy measurements with rodents...***without a stopwatch!*** The system automatically records the amount of time that the rat maintains at least one forelimb holding onto the bar.

- Eliminate the need for hand scoring, this automated system removes ambiguity and user-bias that confound human observer scores of catalepsy
- Simple, straight-forward design minimizes complications
- Data are collected into a table that can be analyzed in a spreadsheet or database application
- Electronic contacts are established using quick-disconnect type fixtures
- Easily add chambers to increase throughput
- Easy to clean and sanitize
  - The electric interface box can be removed so the entire chamber can be sanitized, and is cage washer safe *(tested at 180° F with acid detergent)*
- Includes stainless steel rod sizes
  - 1/2″, 3/8″, 1/4″, and 3/16″
- Rod mount height:
  - Holes every 1″, from 1.6″ – 8.6″ *(4.1 – 21.8 cm)*
- Custom chamber sizes are available

IMAGES

A) Catalepsy test chamber w/contact circuit

CATALEPSY SOFTWARE

CATALEPSY PROTOCOL

SOF-700RA-19

- This Med-PC protocol accurately measures the time, in seconds, that a test subject maintains contact between the bar and the floor of our catalepsy box
  - Records total time that one or both forelimbs remain holding onto the elevated bar
- No stopwatches! A timer starts automatically when the animal grasps the bar to begin the trial, and stops when the animal breaks contact
- Define the number of subjects to be tested, number of trials per subject, and the maximum time allowed per trial
- Data file is automatically created and saved for statistical analysis
- Sort data by subject number and trial number
  - *EXAMPLE: from the data table you can calculate the average catalepsy score in each subject over three trials per subject using a program like Microsoft® Excel*

User defined:

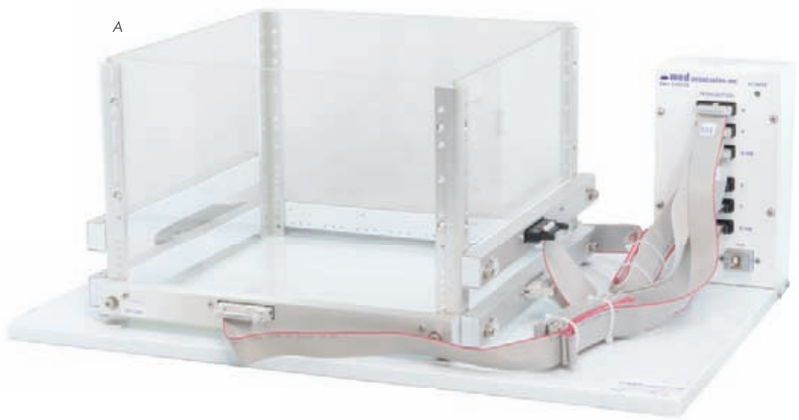
- Number of subjects to run in a given session, maximum trial time, number of trials to run per subject

Summary:

- Select the box that the program is loaded in and issue the START command
- The trial will begin when it detects that the animal has made a connection between the bar and the floor with its feet
- Once the animal is detected, the program will run until the animal lets go of the bar or until the Max Trial Duration has been reached, whichever happens first
- Start the next trial, or save data in text file format of your choice

	OPEN FIELD ARENA SPECS		
	NAME	SPECIES	OVERALL (L×W×H)
ENV-510S-A	Additional Seamless Open Field Arena	Mouse	10.75″ x 10.75″ x 8″ *(27.3 x 27.3 x 20.3 cm)*
ENV-515S-A	Additional Seamless Open Field Arena	Rat	17″ x 17″ x 12″ *(43.2 x 43.2 x 30.5 cm)*

A



OPEN FIELD ACTIVITY

OPEN FIELD ACTIVITY STARTER PACKAGE
MED-OFAS

Packages Include: Seamless open field arena, IR Strips + Controller, 4 port USB Hub, Power Supply, Activity Monitor 7 Software, and cables

These starter packages provide everything you need to get your experiments up and running, and offer flexibility not seen in competing systems. Our easy-to-install accessories and components open up the possibility of running different protocols in the future (such as place preference or light/dark) without the expense of purchasing new systems.

- Animal movement tracking using three 16-beam IR arrays located on both the X and Y axes for positional tracking and Z axis for rearing detection
- Easily expandable design for accommodating up to 16 chambers for increased throughput from one PC
- USB connection on 48 channel IR controller for connection to PC or USB hub
- Accessories include ventilated covers, two chamber place preferences, dark boxes, hole board inserts, sound attenuating cubicles, and more
- Seamless design is both easy to clean and swap out with spare arenas

FULL ADDITIONAL TEST CHAMBER
MED-OFAS-U

For expanding your system to up to 16 chambers for increased throughput from one PC.

- SAC sold separately, see Sound Attenuating Cubicle Package w/Pullout Shelf *(MED-OFA-017 / -022)*

NOTE: Includes all necessary cables.

SOUND ATTENUATING CUBICLE PACKAGE
MED-OFA

Packages Include: SAC w/pullout shelf, house light, and cables

- Two ceiling lights with power cables are included
- Some applications, such as light/dark boxes, may require additional lighting

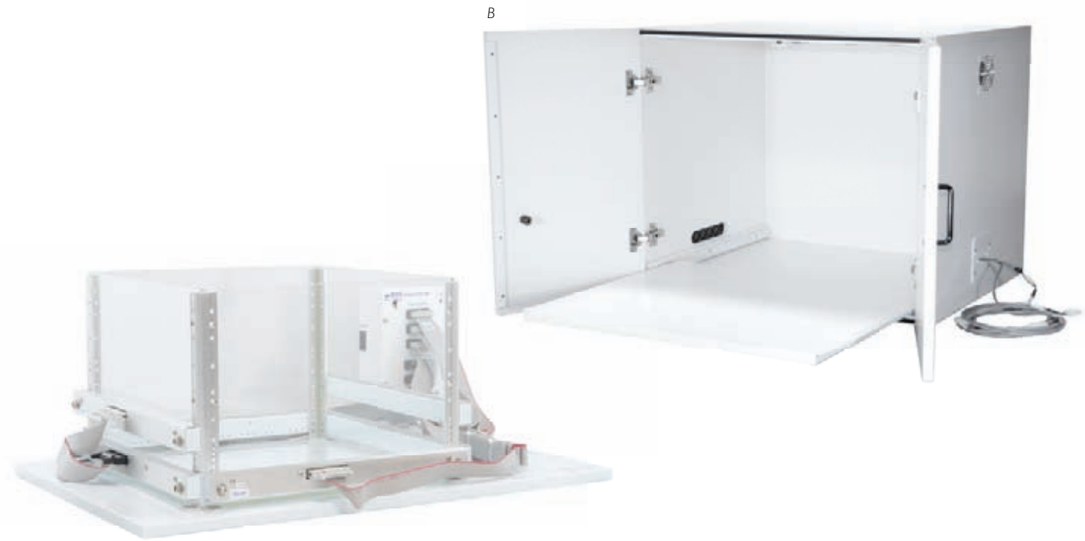
NOTE: A 28V DC power supply (SG-500T) is required to operate lights and fan; and is recommended to support up to four cubicles.

NOTE: Anchoring of cubicle is recommended

IMAGES

A) Seamless Open Field Starter Package B) Sound Attenuating Cubicle Package

B



OPEN FIELD COMPONENTS

INFRARED SOURCE + DETECTOR STRIPS
ENV-256 | ENV-258

Detects lateral and vertical movement within the open field test chamber.

- Connects to the IR controller for data collection *(ENV-520USB)*
- 16 beam array
  - Mouse spacing: 0.625″ *(1.59 cm)*
  - Rat spacing: 1″ *(2.54 cm)*

SPARE RIBBON CABLES
CAB-ENV-256R | CAB-ENV-256T | CAB-ENV-258R | CAB-ENV-258T

Connects the IR strips to the IR controller.

- Mouse (CAB-ENV-256) Rat (CAB-ENV-258)

ADDITIONAL SEAMLESS OPEN FIELD ARENA
ENV-510S-A | ENV-515S-A

Having spare arenas makes for a quick and easy change between experiments or between animals for cleaning, sanitation, and increased throughput.

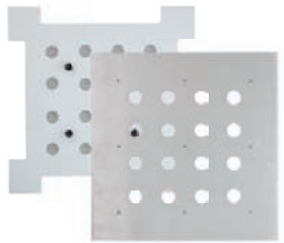
IR CONTROLLER 48 CHANNEL
ENV-520USB

Controls up to three pairs of infrared strips (one transmitter + one receiver strip in each pair) with 16 photo beams on each.


B


C


D


A

OPEN FIELD ACCESSORY SPECS

	NAME	SPECIES	USE WITH
ENV-510HB	Hole Board Floor Insert	Mouse	ENV-510S
ENV-515HBM	Hole Board Floor Insert	Mouse	ENV-515S
ENV-515HB	Hole Board Floor Insert	Rat	ENV-515S
ENV-512	Two Chamber Place Preference Insert	Mouse	ENV-510S
ENV-517	Two Chamber Place Preference Insert	Rat	ENV-515S
ENV-511	Dark Box Insert	Mouse	ENV-510S
ENV-516	Dark Box Insert	Rat	ENV-515S
ENV-510T	Ventilated Cover	Mouse	ENV-510S
ENV-515T	Ventilated Cover	Rat	ENV-515S

OPEN FIELD ACCESSORIES

INFRARED SOURCE + DETECTOR STRIPS FOR HOLE BOARD FLOOR
ENV-256HB | ENV-258HB

- Emits IR beams beneath a hole board insert to detect when a test animal has explored a hole
- Connects to the IR Controller *(ENV-520USB)* in place of the Z-axis strips for data collection

HOLE BOARD FLOOR INSERT
ENV-510HB | ENV-515HBM | ENV-515HB

Consists of an aluminum floor with five standoffs, two polypropylene plates, and one stainless steel screen.

- Sixteen equally spaced holes with bait wells below the floor
  - Screen can be sandwiched between the polypropylene plates under the floor to deny access to bait
- By placing the IR arrays in the lowest available spot, the photo-beams are positioned between the floor and the tray to detect entries into the holes

Mouse Holes: 0.875″ *(2.2 cm)* or 0.625″ *(1.6 cm)*

Rat Holes: 1.25″ *(3.2 cm)*

VENTILATED COVER
ENV-510T | ENV-515T

Clear vented polycarbonate top for the arena provides extra assurance that the animal cannot escape

DARK BOX INSERT
ENV-511 | ENV-516

- Dark compartment is made of black IRT acrylic as to not interfere with IR beams, allowing tracking in both the light and dark compartments
- Hinged lid for easy animal insertion & removal
- Ideal for using an open field arena for a light/dark test, similar to a shuttle box

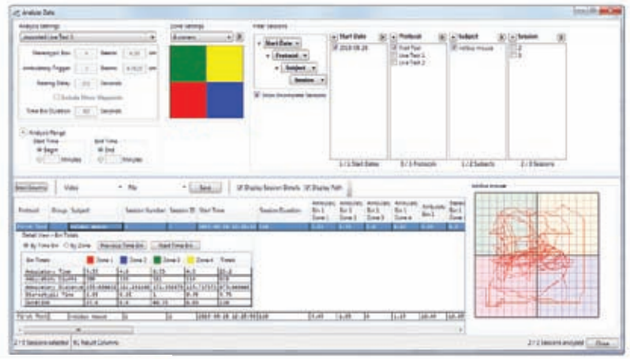
TWO CHAMBER PLACE PREFERENCE INSERT
ENV-512 | ENV-517

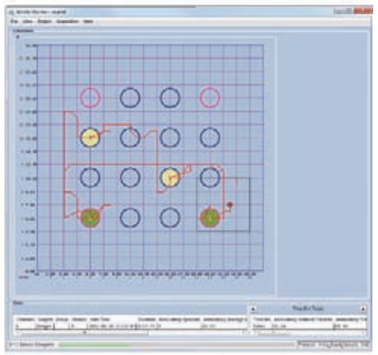
- A wire mesh and grid floor provide distinct tactile environments to maximize contextual differences
- The walls are clear, allowing the user to apply different color and design patterns between the insert and the test arena

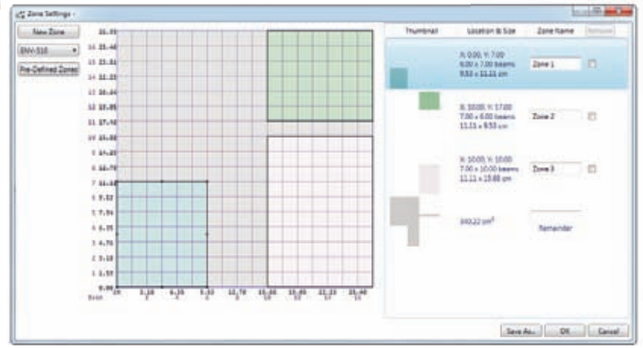
  NOTE: Custom contextual additions cannot block the photobeams
- Hinged lid allows easy subject insertion and removal, and a black IRT acrylic wall with manual door separates the two compartments

IMAGES

A) Hole Board Floor Insert B) Two Chamber Place Preference Insert C) Dark Box Insert D) Ventilated Cover







OPEN FIELD SOFTWARE

ACTIVITY MONITOR 7 SOFTWARE
SOF-812

Written for open field activity test chambers, it allows for flexible protocol configuration and repeated data analysis. Data may be expressed as totals or parsed into user defined time bins.

- Easy on-screen data analysis, any protocol parameter may be used to sort and filter the data.
- Data is displayed in real time, along with a cumulative plot of the subjects' activity for all chambers during acquisition
- Live, easy to use data analysis with settings, filters and time ranges that can be adjusted on the fly — from one screen
- Easily export data to text, Excel®, video, or legacy data file formats
- Customize zones to create definable, drag-and-drop adjustable zones, or select from a list of common configurations

Data Collected:

- Ambulatory counts, distance, time and episodes
- Stereotypic counts and time
- Resting time
- Jump counts and time
- Rearing time
- Average speed
- Hole board scoring*
- User defined zone analysis*
- Standard run time data

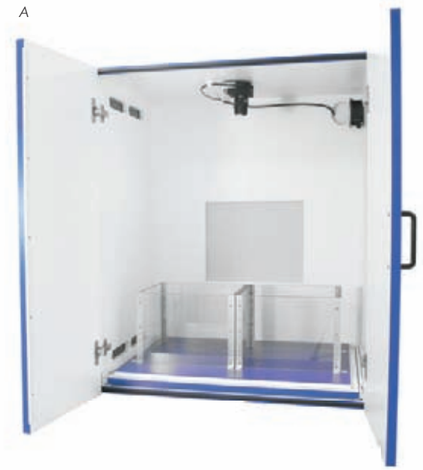
**when appropriate*

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*
- One USB 2.0 Port *(for ENV-520USB)*

FOR USE WITH THIRD PARTY VIDEO TRACKING SOFTWARE

A



B

HOME CAGE + OPEN FIELD VIDEO TRACKING

- Extra tall sound attenuation cubicle accommodates a ceiling mounted video camera *(camera not included)*
- NIR lighting for video recording in the dark
- Pull-out blue base enables tracking of rodents of many colors
- SAC features a 28V DC fan and camera mount

VIDEO HOME CAGE PKG w/NIR LIGHTING

MED-VHCN

Packages Include: MDF SAC w/Shelf, Home Cages, and NIR/White Light Package

- Mouse (4 cages), Rat (2 cages)
- Ad-lib food + water receptacles are located on the side for an unobstructed view for top-mounted video monitoring equipment
- Clear polycarbonate lid securely attaches to the home cage with four key hole slots

NOTE: There is an opening in the back panel of cubicle for the NIR-100 Light System (sold separately). Power supply to operate fan also sold separately.

VIDEO OPEN FIELD PKG w/NIR LIGHTING

MED-VOFN

Packages Include: MDF SAC w/Shelf, Open Field arenas, and NIR/White Light Package

- Mouse (2 arenas), Rat (1 arena)

NOTE: There is an opening in the back panel of cubicle for the NIR-100 Light System (sold separately). Power supply to operate fan also sold separately.

NOTE: Shown with camera, not included

IMAGES

A) Video Open Field setup for mouse B) Video Open Field setup for rat
C) Video Home Cage setup for mouse D) Video Home Cage setup for rat

	VIDEO TRACKING SPECS		
	NAME	SPECIES	INTERIOR (L×W×H)
PHM-125H	Specialized Home Cage	Mouse	10.7″ x 8.1″ x 6.2″ *(27.2 x 20.5 x 15.7 cm)*
PHM-126H	Specialized Home Cage	Rat	19″ x 10.5″ x 8″ *(48.2 x 26.6 x 20.3 cm)*
SAC-283422-NIR	MDF SAC For Video Tracking	Mouse + Rat	28″ x 34″ x 22″ *(71.1 x 86.4 x 55.9 cm)*

NOTE: Open field arenas are same size as normal

C

D

	ROTA-ROD SPECS							
	NAME	SPECIES	LANES	DRUM DIAMETER	FALL HEIGHT	WEIGHT	LANE WIDTH	OVERALL (W×H×D)
ENV-571M	Rota-Rod	Mouse	1	1.25″ *(3.2 cm)*	12″ *(30 cm)*	24 lbs *(11 kg)*	3″ *(8 cm)*	13″ x 18″ x 13.5″ *(33 x 45.7 x 34.3 cm)*
ENV-571R	Rota-Rod	Rat	1	2.75″ *(7 cm)*	17″ *(43 cm)*	42 lbs *(19 kg)*	4.5″ *(11.5 cm)*	16″ x 29″ x 18.5″ *(40.6 x 73.7 x 47 cm)*
ENV-574M	Rota-Rod	Mouse	5	1.25″ *(3.2 cm)*	12″ *(30 cm)*	38 lbs *(17.1 kg)*	3″ *(8 cm)*	25.5″ x 18″ x 13.5″ *(64.8 x 45.7 x 34.3 cm)*
ENV-574R	Rota-Rod	Rat	4	2.75″ *(7 cm)*	17″ *(43 cm)*	67 lbs *(30.4 kg)*	4.5″ *(11.5 cm)*	33.5″ x 29″ x 19.5″ *(85.1 x 73.7 x 49.5 cm)*

ROTA-ROD

ROTA-ROD TREADMILL

ENV-571M | ENV-571R | ENV-574M | ENV-574R

- Each testing lane's fall area is enclosed, preventing animals who have fallen from the rod from escaping
- Textured rod for better traction without being able to grip onto it, and is more comfortable than previous versions
- Infrared photobeam fall detection beam in the front, aimed at the back of each lane, just above the waste collection pan for independent animal measurement
- Completely encased in the motor housing, the direct drive motor delivers quiet operation
  - Noise production has been reduced from our previous model by 30% (from 64 to 48 dB @ 40 RPM)
    NOTE: Noise produced remains constant up to the top speed of 100 RPM.
- Easy-to-clean design with a removable waste pan
- Individual digital timers with a readout of test time
- Includes Rota-Rod 2 Software *(SOF-571)* and USB cable

Manual/Standalone Control Mode:

When the USB cable is not attached to the device.

- 5 constant speed profiles + 5 accelerating profiles
- Running time for each lane displayed on LCD
- Limited speed capability, up to 40 RPM

USB Control Mode:

Use the Rota-Rod 2 software with the ENV-571 and ENV-574 series of Rota-Rods.

Enables features such as:

- Expanded speed capability, up to 100 RPM in both forward and reverse directions
- Data is automatically recorded via the software
- User defined protocols utilize speeds from -100 to +100 RPM
- Change from any speed to another in 1 second
- Ramp, step, interval, accelerating, and decelerating profiles possible

- Operate up to four Rota-Rods simultaneously on a single computer

IMAGES

A) Four Lane Rota-Rod for rat B) Five Lane Rota-Rod for mouse

A

RAT PRESET SPEEDS

FIXED		ACCELERATING	
Setting	RPM	Setting	RPM
0	8	5	2 → 20
1	10	6	2.5 → 25
2	12	7	3 → 30
3	14	8	3.5 → 35
4	16	9	4 → 40

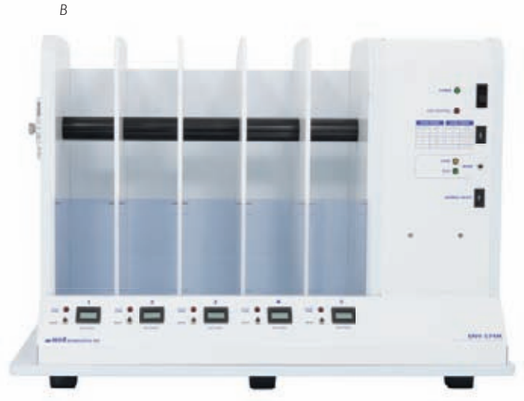
NOTE: Speeds of up to 100 RPM and reversed direction are achievable with the use of the Rota-Rod 2 Software (SOF-571).

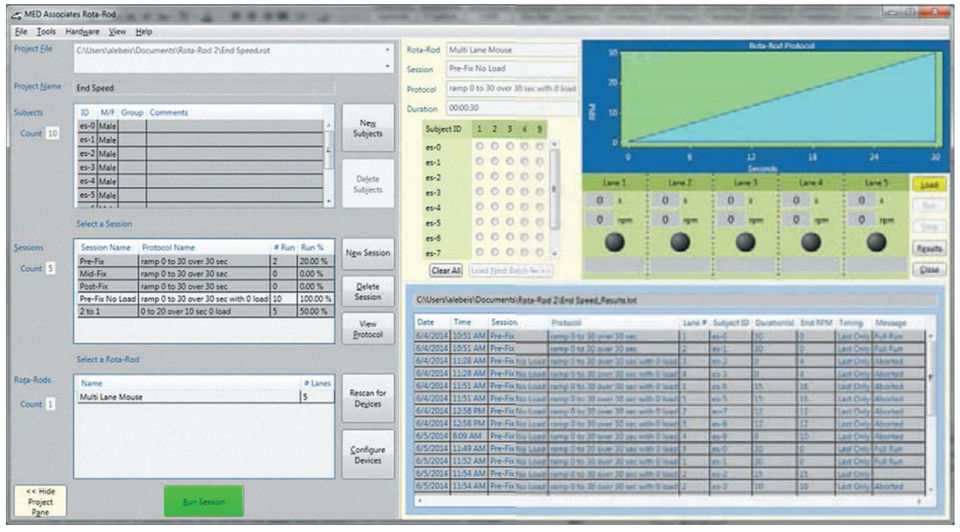
MOUSE PRESET SPEEDS

FIXED		ACCELERATING	
Setting	RPM	Setting	RPM
0	16	5	2 → 20
1	20	6	2.5 → 25
2	24	7	3 → 30
3	28	8	3.5 → 35
4	32	9	4 → 40

NOTE: Speeds of up to 100 RPM and reversed direction are achievable with the use of the Rota-Rod 2 Software (SOF-571).

B





ROTA-ROD SOFTWARE

INCLUDED WITH PURCHASE OF UNIT

ROTA-ROD 2 SOFTWARE

SOF-571

- Organize test subjects
- Create Rota-Rod rotation protocols
- Control Rota-Rod via USB
- Store results in easily exportable text file formats
- Enables -100 to +100 RPM speeds with 1 RPM resolution and one second speed changes
- Use either a desktop or laptop PC

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*
- One USB 2.0 Port

NOTE: This program does not control the legacy model rota-rods (ENV-575/-575M or ENV-576/-576M)

ROTORAT BOWL SPECS				
	NAME	TOP (OD)	BOTTOM (OD)	DEPTH (D)	OVERALL (LxWxH)
ENV-500	Rotational Activity Bowl	18" *(45.7 cm)*	6" *(15.2 cm)*	6" *(15.2 cm)*	21.5" x 15.8" x 19.1" *(54.6 x 40.1 x 48.5 cm)*

ROTORAT

ROTORAT ROTOMETER PACKAGES

MED-RRS-USB | MED-RRS-A

Packages Include: Rotational Activity Test Station, Bowl Enclosure, 8 station junction box, USB Interface Decoder Card, Superport 16 input card, Small tabletop interface cabinet, RotoRat Software, and cables

- Stainless steel leash extends from the sensitive optical encoder to an animal jacket
  - Detects both clockwise and counterclockwise rotations
  - Reports movements with a sensitivity of 3.6° or 100 increments for one full rotation of 360 degrees
  - Enables measurement of ipsillateral and contralateral rotations following unilateral ablation or micro-injection
- Starter package includes everything needed to run one station of rotational activity in medium sized rats (250-350 grams)
  - Alternative or additional jacket sizes are available, we carry a full range of jacket sizes to accommodate animals from 100 to 500 grams
- Built for years of trouble free use, constructed of sturdy materials including a solid polypropylene base and stainless steel leash and bowl
- System is expandable to 16 or 24 units by adding an Interface Expansion Package *(MED-RRS-EXP)* for every eight (8) stations
  - Up to seven (7) additional stations *(MED-RSS-A)* can be added to the starter package *(MED-RSS)* for a total of eight (8) on one interface unit
  - Operate a maximum of 24 rotometry units per computer using Interface Expansion Packages *(MED-RRS-EXP)*
- Provides a graphical representation of the animals position at all times

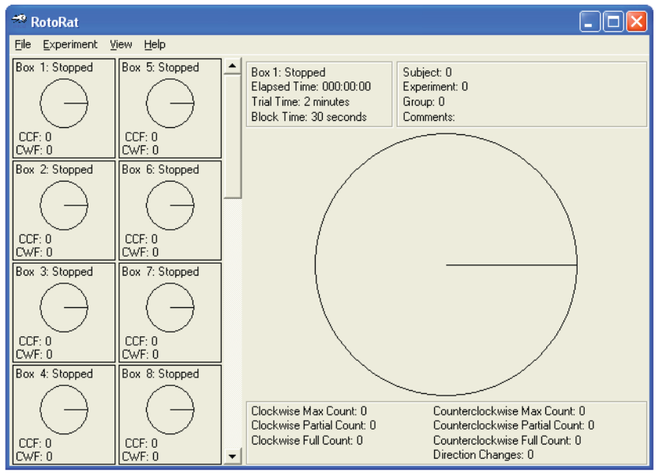
IMAGES

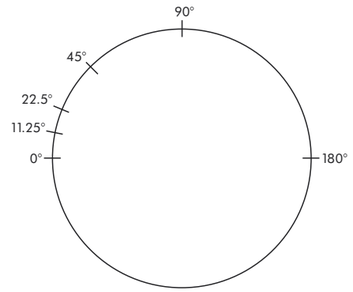
A) Rotorat Rotometer package

ROTORAT JACKET SPECS		
	NAME	ANIMAL SIZE
ENV-500JL	Jacket - L	350-500g
ENV-500JM	Jacket - M	250-350g
ENV-500JS	Jacket - S	150-250g
ENV-500JXS	Jacket - XS	100-150g
ENV-500JXXS	Jacket - XXS	50-150g
ENV-500JXXXS	Jacket - XXXS	25-30g

A

B





ROTORAT COMPONENTS

INTERFACE EXPANSION PACKAGE
MED-RRS-EXP

Adds another SuperPort TTL Input Card, Junction Box, and cables .

- Expand to 16 or 24 units in a system

ROTATIONAL ACTIVITY TEST STATION
ENV-500

Includes the bowl with optical encoder and mount.

BOWL ENCLOSURE
ENV-500B

Clear acrylic sheet with three white PVC supports that snap onto the test bowl

- Prevents animals climbing out

NOTE: If ordering for an existing system please include the outside diameter of the top ridge of the bowl to ensure a proper fit

REPLACEMENT JACKET
ENV-500JL | ENV-500JM | ENV-500JS | ENV-500JXS | ENV-500JXXS | ENV-500JXXXS

- Flexible fabric jacket designed to fit the torso of a rodent
- A complete tether assembly with coupler, spring tether, and jacket
- The "medium" size jacket *(ENV-500JM)* is supplied with the system by default

NOTE: When ordering these parts, it will be necessary to sew the old tether in place

ROTORAT JUNCTION BOX
ENV-500A

- Use one junction box and one cable to connect up to eight Roto-Rat test stations to the superport TTL input Card
  - All connections are made with DB9 connector
- An interface cabinet and interface connection package are also required*

**NOTE: Cables, modules, and cabinets sold separately*

IMAGES

A) Interface cabinet shown with a USB decode card and two SuperPort input cards B) RotoRat Junction Box

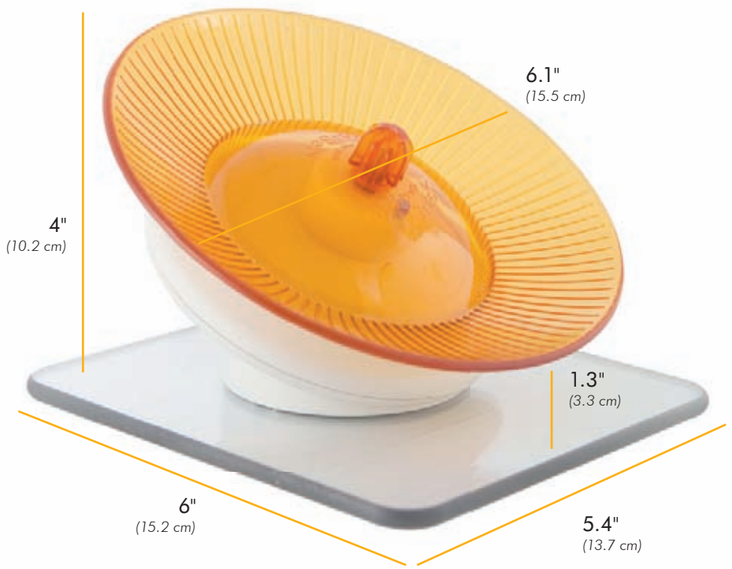
ROTORAT SOFTWARE

ROTORAT SOFTWARE
SOF-801

- User Defined:
  - Time bins
  - Session time
  - Screen display
  - Automated data collection
- Data Collected:
  - Full revolutions clockwise *(CW)*
  - Full revolutions counter-clockwise *(CCW)*
  - User set partial counts *(CW and CCW)*
  - Maximum movement (counts/rev) *(CW and CCW)*
  - Direction changes
- Select individual or group control of all stations
- Save data to disk without stopping experiments
- Save and load previously defined experiment configurations
- Monitor and record activity
  - Display up to twenty four boxes simultaneously
  - Start and stop test stations independently
- Tag each box by Experiment, Subject, and Group
- Summary data saved in an ASCII and comma-separated values (CSV) file for use with most spreadsheet program

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*
- One USB 2.0 Port *(for ENV-520USB)*
- CD ROM drive *(for installation media)*



LOW-PROFILE WIRELESS RUNNING WHEEL

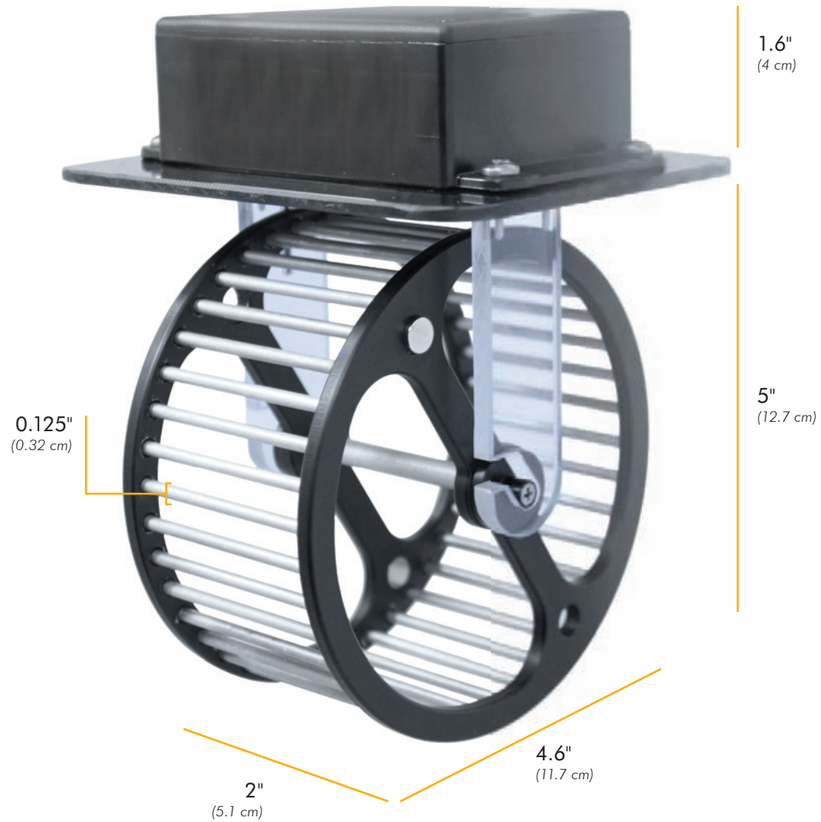
LOW-PROFILE WIRELESS RUNNING WHEEL

ENV-047

The current trend of housing mouse colonies in individually ventilated cages (IVCs) has allowed for dramatic increases in housing density, improved environmental control, and better biosecurity. However, the low profile configuration of many mouse IVCs has made it more difficult to add enrichment devices, such as a running wheel, to the mouse home cage. Our wireless low-profile mouse running wheel (ENV-047) represents a state-of-the-art device that enables quantitative measurements of mouse running levels in most standard IVCs. We use the popular Fast Trac™ running wheel surface from BioServ® along with our proprietary wireless transmitter to get running data from the home cage to a computer without any wires or cables.

NOTE: New wheels (ENV-047 & -047V) are compatible with new hub (DIG-807) only. The ENV-047 series wheels will not work with legacy hub (DIG-804).

- Measure circadian rhythms while adding environmental enrichment
- Quantify running levels to determine how they correlate with behavioral changes
- Fits easily into most standard mouse ventilated rack cages
- Open running surface enables wheel running studies on mice that are instrumented or tethered
- Each hub monitors up to 40 wheels, with four hubs per computer
- Energy efficient and nearly maintenance-free *(powered by three AAA batteries)*
- Affordable and economical
- Easy to clean: hand wash wheel surface and plastic support base, wipe wheel transmitter with sanitation cloths
- Having spare wheels *(ENV-044-01)* on hand increases efficiency of cage changes
- Non-counting model available *(ENV-044-02)*



VERTICAL WIRELESS RUNNING WHEEL

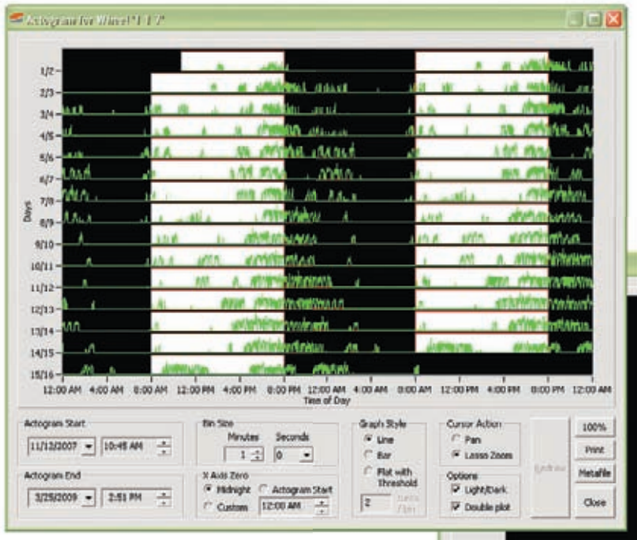
VERTICAL WIRELESS RUNNING WHEEL

ENV-047V

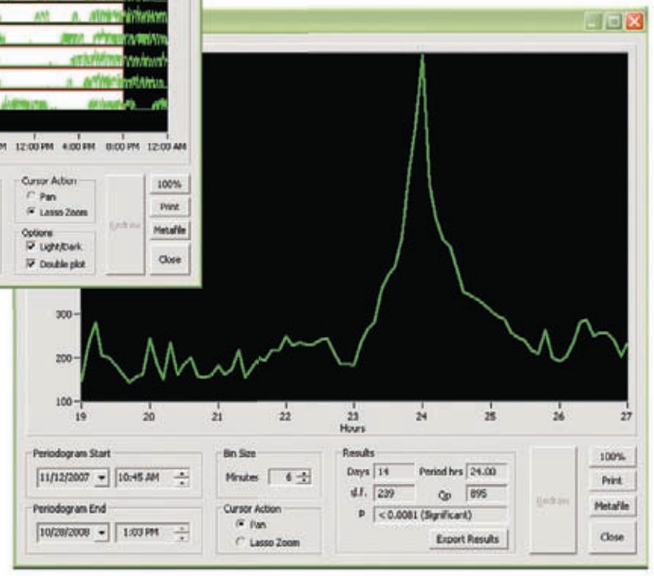
Our easy to use & lightweight anodized aluminum wheels fit on any standard wire-topped home cage, and require no tricky set-up or configuration. Perfect for long-term circadian rhythm studies, these wheels are an affordable option for your lab. These wheels are also compatible with our low profile wireless running wheel interface system.

NOTE: New wheels (ENV-047 / -047V) are compatible with new hub (DIG-807) only. The ENV-047 series wheels will not work with legacy hub (DIG-804).

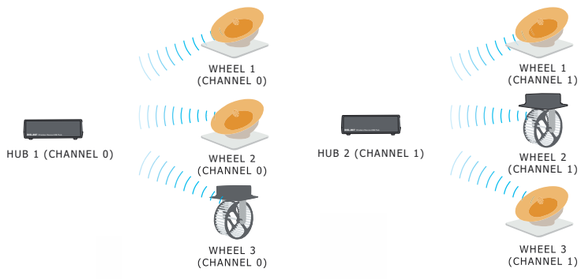
- Fits onto conventional wire-topped cages
- Measure circadian rhythms with 30 second resolution while adding environmental enrichment
- Enables quantification of running levels and how they correlate with behavioral changes
- Lightweight but heavy duty aluminum vertical wheel revolves on a smooth frame which protrudes through the wire cage top
- Easy-to-clean design
- Designed to be affordable, economical, energy efficient, and nearly maintenance free
- Having spare wheels *(ENV-044V-01)* on hand increases efficiency of cage changes



A



B

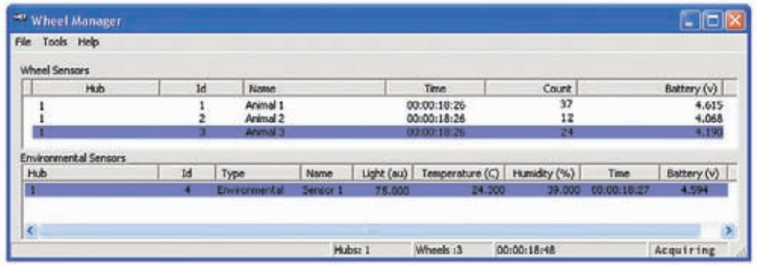


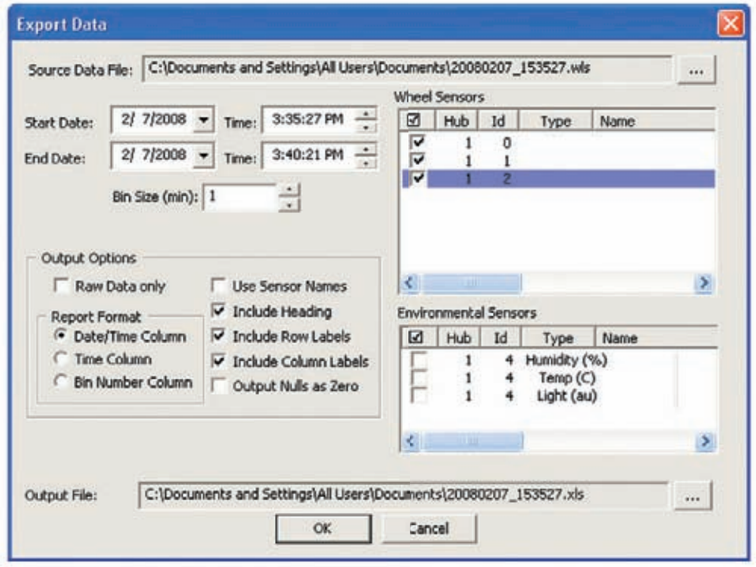
WIRELESS WHEEL COMPONENTS

WIRELESS DEVICE USB HUB
SOF-807

This device connects to the data acquisition computer via a USB cable. The hub must be set to one of eight available addresses and all sensors must be set to the same address as the hub with which they communicate.

- Manage up to 40 wheels per hub, with four hubs per computer
- Hub receives messages once every 30 seconds from the wireless wheels
- Hub relays data to Wheel Manager Software *(SOF-860)* for data storage and retrieval
- Can be used with both vertical and low-profile wireless running wheels





C

WIRELESS WHEEL SOFTWARE

WHEEL MANAGER DATA ACQUISITION SOFTWARE
SOF-860

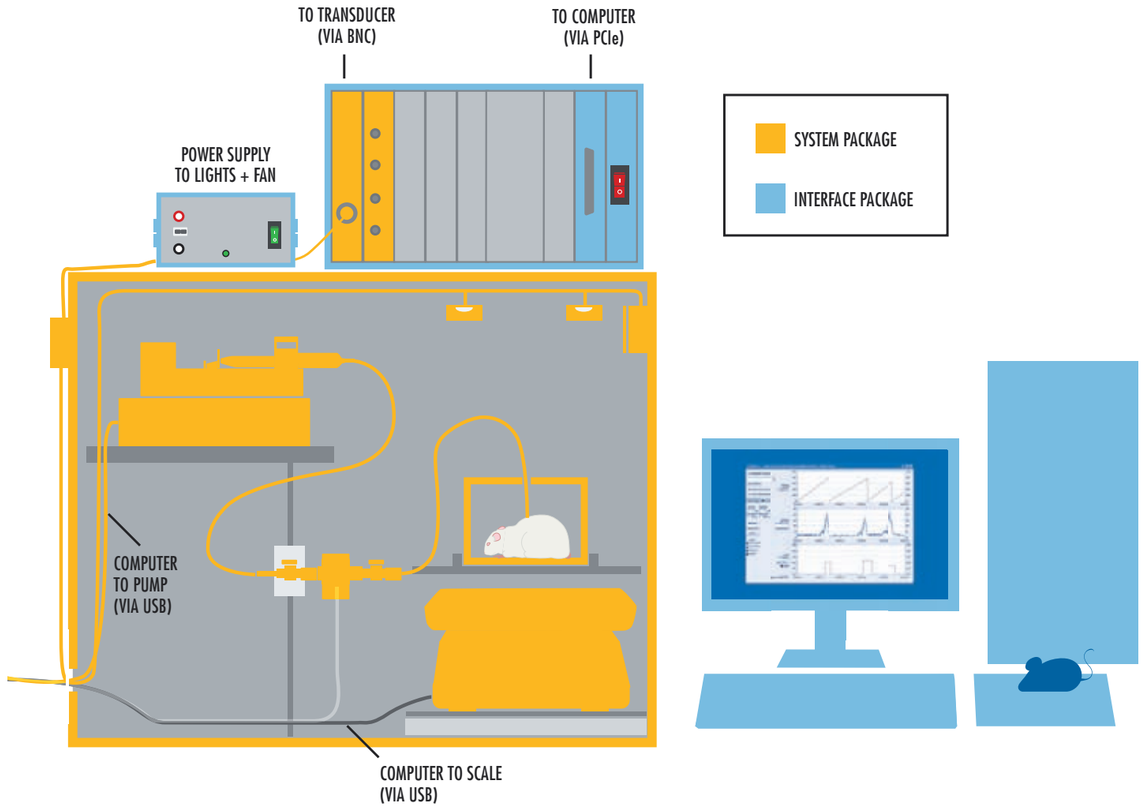
- Record running wheel data from wireless running wheels to your computer
- Seamlessly export wheel manager data to Microsoft® Excel or other data analysis software to generate actograms and periodograms
- Export either the entire file or a user-definable time bin/selected time range

WHEEL MANAGER DATA ACQUISITION SOFTWARE
SOF-861

- Complements our mouse wireless running wheels and Wheel Manager software to analyze circadian rhythms
- Designed for circadian rhythm analysis in real-time during acquisition or offline from saved data
- Generates actograms and periodograms

IMAGES

A) Actogram B) Periodogram C) Export data screen with source data selected



CYSTOMETRY

SMALL ANIMAL CYSTOMETRY
CAT-CYT

Packages Include: Cystometry MDF SAC, Cage w/Connectors, Switch Box for Fan + Lights, Scale, USB Infusion Pump Kit, Pressure Transducer, Bridge Amplifier Card, Direct Input Module, and cables.

The small animal cystometry lab station is designed for performing in-vivo measurements of bladder function in mice and rats. It is ideal for physiological assessment of bladder function in "knock-out" and transgenic mice.

This system allows standard urological tests and cystometrograms to be performed in conscious, unrestrained mice and rats while measuring bladder capacity, filling pressure, micturition pressure, and voided urine volume. The experimental animal is chronically instrumented with an intra-bladder catheter, which is routed underneath the skin and exteriorized at the base of the animal's neck.*

A computer-controlled syringe pump infuses saline into the bladder, and an in-line pressure transducer records intra-bladder pressure during the infusion. When bladder capacity is reached, the transducer records pressure during the urination event (micturition). An analytical balance is located beneath the animal cage, which records the weight of urine to provide an index of voided urine volume.

** This technique requires familiarity with small animal survival surgery.*

TUBING + FITTING KIT
CYT-M-FIT-KIT | CYT-R-FIT-KIT

Packages Include: Catheters, Luer 3-way stopcocks, Male Luer Slip Coupler, Needle Stubs (18,23,30 gauge), Syringes (10 or 20mL), and Tygon Tubing

	CYSTOMETRY COMPONENT SPECS			
	NAME	FLOOR	SPECIES	WORKING AREA (W×H×D)
ENV-272	Cystometry Cage	Mesh	Rat	5.8″ x 4.2″ x 8.8″ *(12.7 x 10.7 x 22.4 cm)*
ENV-273	Cystometry Cage	Mesh	Mouse	3.3″ x 2.5″ x 5.2″ *(8.4 x 6.4 x 13.2 cm)*
ENV-273-GR	Cystometry Cage	Grid Rod	Mouse	3.3″ x 2.5″ x 5.2″ *(8.4 x 6.4 x 13.2 cm)*

CYSTOMETRY COMPONENTS

SOUND ATTENUATING CUBICLE
ENV-016M-CYT

- Built-in structures for syringe pump, cage, and scale
- Provides isolation of the animal from environment
- Windows for convenient viewing

CYSTOMETRY CAGE
ENV-272 | ENV-272A | ENV-273 | ENV-273A | ENV-273-GR | ENV-273A-GR

- Modified top for routing catheter to the animal
- Cages for both rat and mouse fit in the same SAC without modification
- Mouse models are also available with a grid rod floor (-GR models)
- Food and water models are modified to accommodate an ad-lib food cup and a volumetric drinking tube with Lixit valve (ENV-272A / -273A / -273A-GR)


G

Readability: 1 mg
Repeatability: 1 mg
Linearity: ± 0.002 g
Stabilization Time (typical): 3 s
Tare Range: -520g
Accuracy Class: II

NOTE: Exact model may vary, contact Sales to confirm current model specifications

CYSTOMETRY COMPONENTS CONTINUED

ANALOG OUTPUT MODULE - CARD
IO-200-4

Four BNC ports take analog signals from the system and outputs them to a third-party data collection system.

Especially useful for recording bladder pressure simultaneously with other physiological signals, such as EMG or EEG electrophysiological recordings.

- Channels available for output:
  - Bladder pressure
  - Event marks

PRESSURE TRANSDUCER SIGNAL CONDITIONER MODULE - CARD
CANL-430A

Used for recording bladder pressure

A second module can be added for recording of an additional pressure (blood, abdominal, etc.)

PUSH BUTTON DIRECT INPUT MODULE - CARD
IO-206

NOTE: All of the following functions are also able to be executed via MED-CMG software.

- Four push buttons to manually:
  - Start the infusion pump
  - Stop the infusion pump
  - Annotate a micturition event

    Infused volume trace is reset to zero and counting begins again for the next micturition cycle
  - Annotate a recording artifact

    Adds an event mark to the data denoting that something other than urine has disturbed the scale

ANALYTICAL BALANCE
SCALE

Analytical balance for recording voided urine volume.

Includes a USB cable for easy connection to data acquisition computer.

PRESSURE TRANSDUCER
TDR-100-1

- Records intra-bladder pressures
- Disposable/reusable

PRESSURE TRANSDUCER CALIBRATION KIT
CAL-PRESSURE-TRANS

Inflate the manometer by squeezing the bulb to both reach and hold the desired pressure.

Package Includes: Manometer (reads in units of mmHg), Stopcock, Luer connector to easily hook up to the Pressure Transducer (TDR-100-1) for calibration

NOTE: Includes conversion table with units of cmH2O for reference.

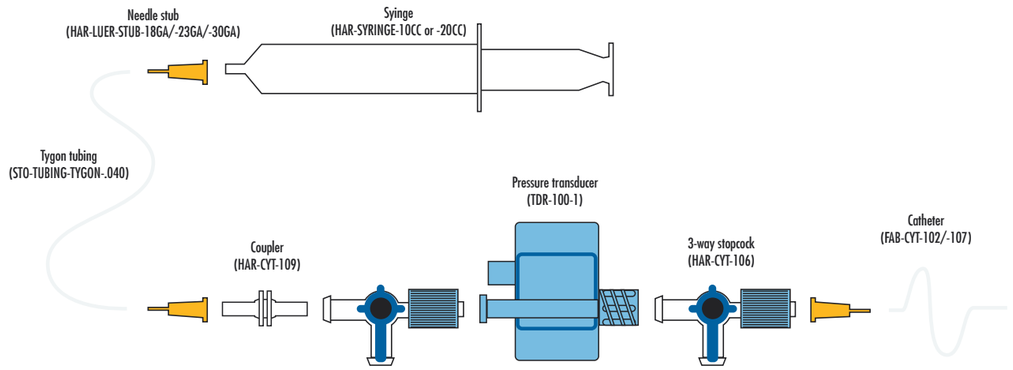
INTERFACE CONNECTION MODULE - CARD
IO-115

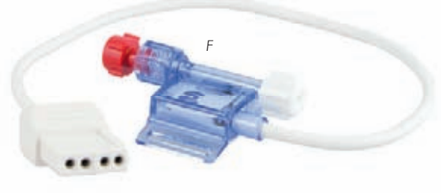
For connecting the interface cabinet to the data acquisition computer via a 68-pin cable.

Used for recording bladder pressure.

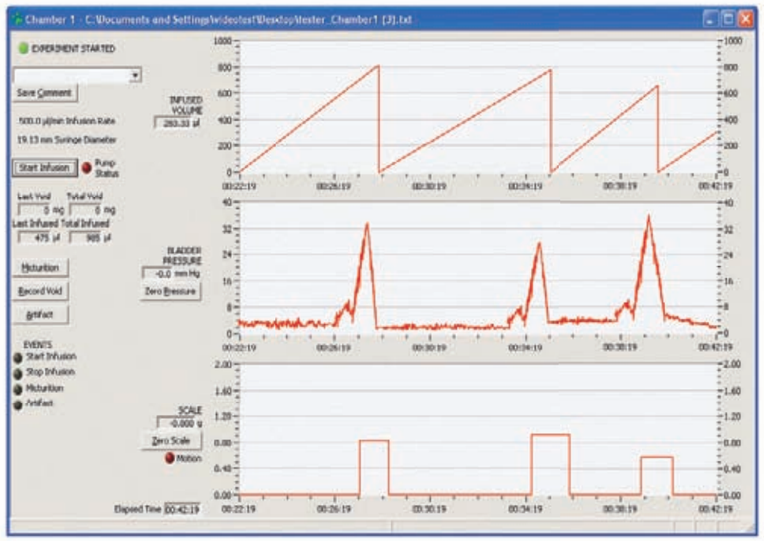
IMAGES

A) Interface Connection Card B) Analog Output Module C) Push Button Direct Input Module D) Pressure Transducer Signal Conditioner Module E) Pressure Transducer Calibration Kit F) Pressure Transducer G) Analytical Balance




F


E



CYSTOMETRY SOFTWARE

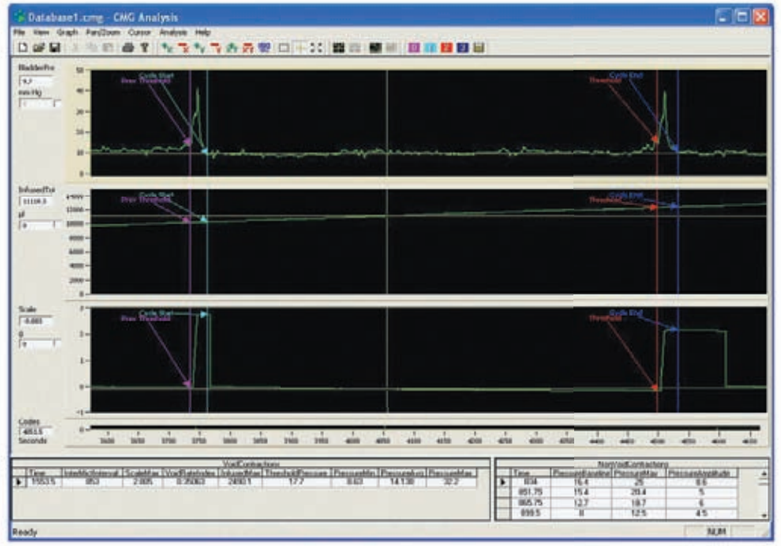
MED-CMG SOFTWARE
SOF-551

Our powerful data acquisition software for recording cystometrograms (CMGs) from small laboratory animals, such as rats or mice.

- Acquire data from up to four cystometry stations per computer
- Enables control of:
  - Bladder filling infusion pump
  - Recording bladder pressure
  - Pressure transducer calibration
  - Annotating event comments during an experiment

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*
- One PCIe slot
- Two USB ports per cystometry station



CYSTOMETRY SOFTWARE CONTINUED

CYSTOMETRY DATA ANALYSIS SOFTWARE
SOF-552

Automatically create a graph of the cystometrogram of the exported data from MED-CMG. Analysis of the data is made possible with readouts of bladder pressure, infusion pump, and scale traces to identify void and non-void contractions.

X-axis = volume of liquid

Y-axis = intraluminal pressure of the bladder

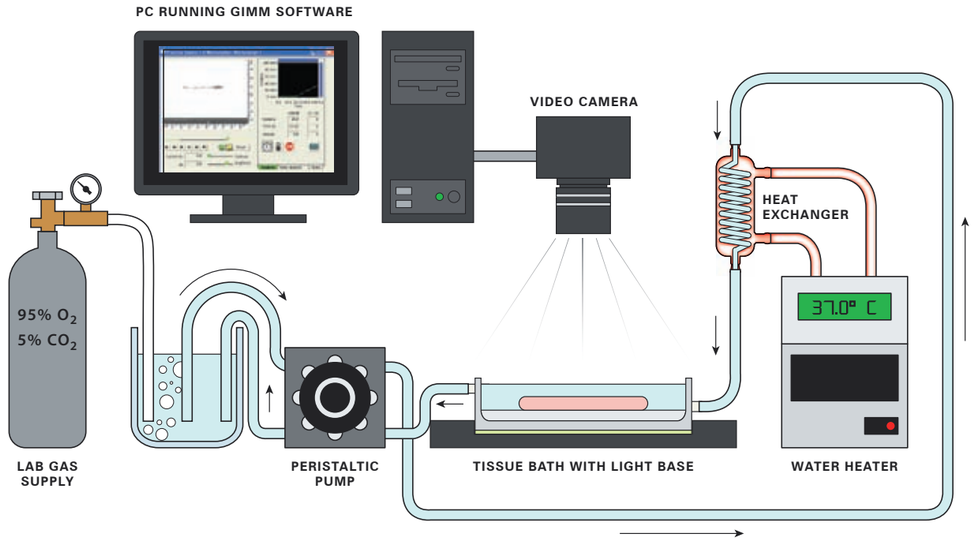
- Spikes correspond to the bladder contractions associated with the micturition reflex
- Curve formed by the bottom of the plot reflects the level of pressure necessary to void
- Displays up to four data traces in the main window in an easy-to-view “strip chart”
- Tab delimited text file spreadsheets can either be printed or saved
- Calculate key urodynamic parameters:
  - Bladder Pressures:
    - Minimum, average, threshold, maximum, inter-micturition interval, infused volume, voided volume, void rate index, non-void contractions
- Isolate & analyze each micturition cycle within a region of interest independently by placing the:
  - Green cursor at the beginning of a cycle,
  - Blue cursor at the threshold of micturition, where the bladder pressure begins to rise sharply
  - Red cursor at the end of the cycle
  - Once cursors are in position, the data can exported to a spreadsheet in one click

Data Collected:

- Voided urine volume, bladder capacity, bladder threshold pressure, minimum bladder pressure during filling, average bladder pressure prior to micturition, maximum micturition pressure

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*



GASTROINTESTINAL MOTILITY MONITOR (GIMM)

GIMM is a complete software/hardware package that is the result of research & development efforts aimed at making a powerful and easy-to-use setup for in-vitro measurements of motility patterns (such as the peristaltic reflex). It enables continuous and quantitative evaluation of motility, and creates spatio-temporal maps in isolated segments of a laboratory animals' gastrointestinal tract.

GIMM also enables accurate quantification of GI motility patterns in an experimental setting under resting conditions or with the presence of pharmacological test compounds.

It can also be used in the pharmacological evaluation of the effects of receptor agonists and antagonists on propulsive motility, and even patho-physiological conditions such as inflammation or stress.

GIMM PACKAGES
GIMM

Packages Include: Large Gas Dispersion Tube, Organ Bath, Camera Support, Bath Light, Heat Exchanger, Light Controller, Ambient Light Cover, Tubing Kit, Monochrome NIR Video Camera w/8mm C-mount Lens

- Combine with the appropriate interface package *(pg 10-11)* for a fully functional system
- Single or four bath packages

Example applications:

- Monitor fecal pellet propulsion in distal colon
- Examining motility patterns in various gut regions using spatio-temporal mapping
- State-of-the-art recording of the peristaltic reflex in laboratory species (e.g. guinea pig) distal colon using fecal pellet propulsion assay as well as general motor patterns in small or large intestine using spatio-temporal mapping (motor maps).
- Versatile import/export capability, raw data can be ported into any spreadsheet program for graphing & analysis.
- The motor analysis screen is used to generate spatio-temporal maps, which can be saved and analyzed using the included "Image J" plugin.
- The easy-to-use computer interface makes organizing experimental data simple, using project files for each experiment which include identifying information (e.g. trial number, group title).
- Ideal for tracking fecal pellet propulsion in guinea pig distal colon. The analysis screen provides a cumulative record of velocity (distance x time) during video playback

GIMM INTERFACE

GIMM INTERFACE PACKAGE - BASIC
GIMM-SYST-BASIC

Does not include superfusion pump, computer, or heat bath. Intended for operating the system with your own computer, superfusion pump, and heater.

For use with up to two GIMM stations.

Package Includes: Firewire card w/cables and hub, GIMM software, tubing + fittings

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*
- 1 free PCIe slot

GIMM INTERFACE PACKAGE
GIMM-SYST

Includes everything else you'll need to operate your GIMM system, either 2 *(GIMM-SYST)* or 4 *(GIMM-SYST-4)* stations.

Package Includes: Circulating heater bath (w/tubing), computer (w/firewire card, cable, and hub), GIMM software, four channel peristaltic pump(s) (w/tubing), and Large Gas Dispersion Tube

Porosity: 25 – 50 micron
Length (LxOD): 135 mm x 7 mm
Porous Tip: ~ 5 – 7 mm

D

GIMM FLOW COMPONENTS

CIRCULATING HEATER BATH w/TUBING
BATH-CIRC-HEAT

Heats the water to a specified temperature, and then pumps the water to a heat exchanger where it warms the saline solution to physiological temperature.

- Able to heat up to four heat exchangers, so only one unit is needed for a four station GIMM setup
- Economical, reliable, and easy to operate

NOTE: Includes tubing (TUB-WATBTH-TYGON-1/4")

GLASS HEAT EXCHANGER
GIM-110

Our precision-blown glass heat exchanger warms the vessel bath superfusate solution. It is designed to pack the maximum number of coils in the minimum amount of space to ensure optimal heat exchange, preventing problems associated with maintaining pH levels in physiological buffers.

A water circulator pump is plumbed to the water jacket, then the superfusate is plumbed directly to the heat exchanger coil. This warmed superfusate is then delivered directly to the tissue bath.

NOTE: Includes tubing with snap valve connectors

SUPERFUSION PERISTALTIC PUMP FOUR CHANNEL
SP-4CH-IT-115V

- For superfusion of vessel and tissue baths, organ perfusion, and general purpose fluid delivery applications.
- Four (4) flow heads can be configured as:
  - Four inflow lines
  - Four outflow lines
  - Two inflow & two outflow lines

INFLOW TUBING 2-STOP
INFLOW-IT-44-PKG4

OUTFLOW TUBING 2-STOP
OUTFLOW-IT-48-PKG4

PharMed BPT tubing fits our SP-2C-IT and SP-4C-IT peristaltic pumps. The outflow tube is larger than on the inflow so that the bath doesn't overflow. Contains one pack of four tube-sets.

Inflow (ID): 0.09" / 2.29 mm

Outflow (ID): 0.11" / 2.79 mm

LARGE GAS DISPERSION TUBE
GD-L

Provides a fine bubble size to optimize gas exchange, aerating the saline solution used to superfuse a specimen in the organ bath.

NOTE: Includes 2" of 0.25" ID Tygon Tubing

SUPERFUSION TUBING KIT
TUB-GIMM-SUPERFUSE

Contains all tubing and fittings needed for plumbing a single GIMM workstation.

- Included with GIMM system packages

Packages Include: Tygon Tubing, Female Luer to 500 series Barb, Male Locking Luer to Barb, Male Luer to 500 series Barb, Female Luer Lug Style Tee, and 2-stop inflow tubing

IMAGES

A) Circulating Heat Bath B) Four Channel Superfusion Pump C) Superfusion Heat Exchanger D) Gas Dispersion Tube

Max Flow Rate: 75 mL/min
Flow Range: 0.0075 – 75 mL/min
Inflow Rate Range: 0.6 – 60 mL/min
Outflow Rate Range: 0.75 – 75 mL/min

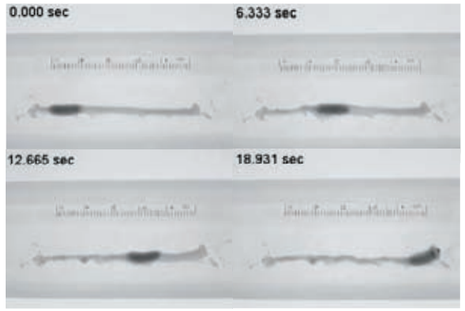
B

A

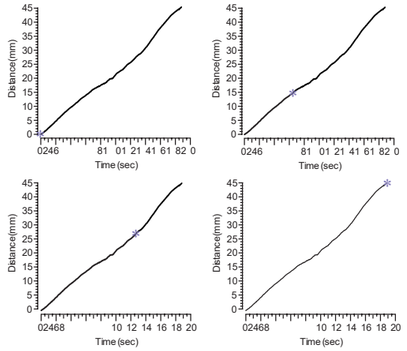
Pressure Flow Rate: 15 L/min
Temperature Range: Ambient +5 to 150° C
Capacity: 6 L *(202.88 oz)*

Coil Volume: 4 mL
Coil Inlet/Outlet: Slip Luer Connection
Coil Barbs (WxL): 0.25" x 0.5" *(0.635 x 1.27 cm)*
Water Jacket Volume: 45 mL
Water Jacket Barbed Inlet/Outlet: 0.3125" *(0.79 cm)*

C



H



I

GIMM VIDEO COMPONENTS

MONOCHROME/NIR VIDEO CAMERA
VID-CAM-MONO

An economical digital video camera, well-suited for general recording situations when monochrome video is sufficient.

8MM C-MOUNT LENS
VID-LENS-8.0C

This varifocal lens provides a moderate viewing angle with very little optical distortion.

CAMERA BASE & STAND
GIM-103

Provides a sturdy structural support for the GIMM organ bath, backlight unit, and camera.

- Camera support can be positioned at various heights, depending on desired field of view
- Upper and lower ring stops can be positioned to quickly and easily change the camera from one height to another for multiple applications
- Makes for reliable and sturdy positioning of GIMM organ bath, light base, and camera for consistent results

ORGAN BATH
GIM-101

The GIMM organ (or tissue) bath is coated with a layer of Sylgard for pinning down the preparation for stability and a millimeter (mm) scale ruler for easy spatial calibration of imaging systems.

The entire bath is transparent, which allows for various illumination configurations, including backlighting for optimal contrast.

Tubing with luer connectors and clamps simplifies adding the organ bath to plumbing system

Dimensions *(WxHxD)*: 5.2" x 1.5" x 1.4"
(13.2 x 3.8 x 3.6 cm)

Inflow/Outflow Port (ID): 0.0625"

ORGAN BATH BACKLIGHT
GIM-105

Designed to deliver uniform illumination for the GIMM tissue bath. By backlighting the specimen, a high contrast image between the specimen and background is achieved to for optimal results in tracking gut motility

VARIABLE INTENSITY LIGHT CONTROLLER
GIMM-100

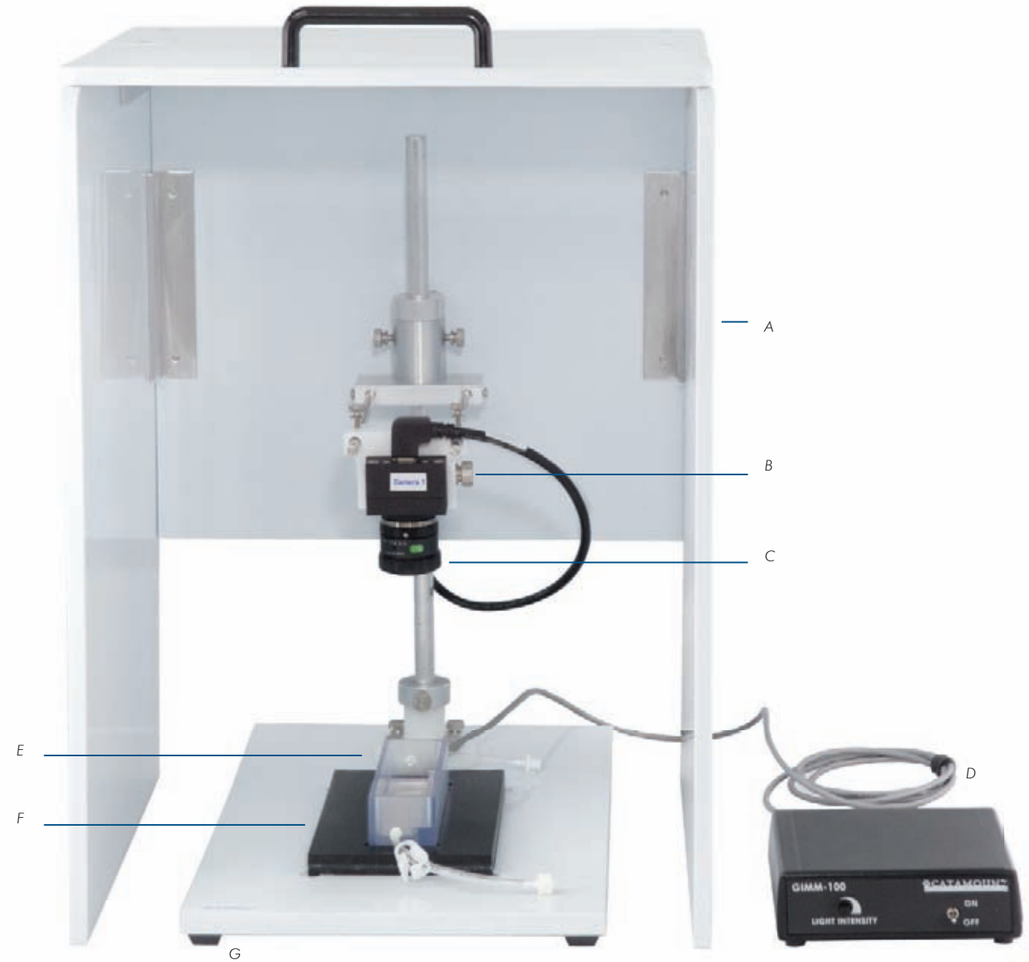
Adjust the amount of light (brightness) from the backlight to achieve the desired amount of contrast in your image.

AMBIENT LIGHT COVER
SAC-081717

- Minimizes effects of ambient lighting on your workstation including glare, reflections, and shadows — all of which impact imaging and video quality
- The hinged top can also be opened for easier access to tissue bath.

IMAGES

A) Ambient Light Cover B) Monochrome video camera w/CS lens mount, capable of filming in visible and near infrared light C) 8 mm lens D) Light Controller E) Organ Bath F) Backlight G) Camera Support H) Video frames showing a fecal pellet in a segment of guinea pig distal colon I) Asterisks mark the time in each frame to show the distance/time "velocity" plot for the trial.



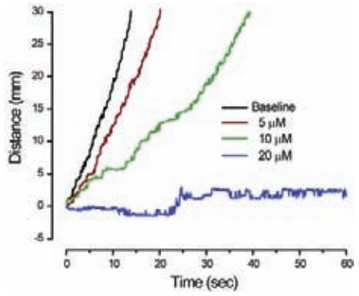


Figure 1

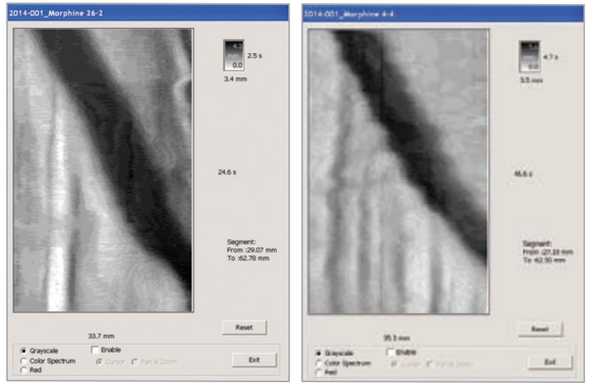


Figure 2

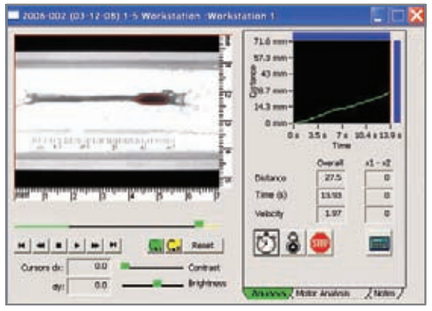


Figure 3

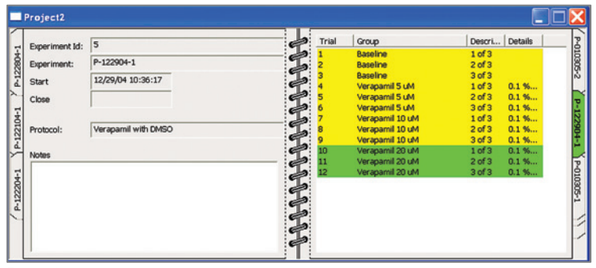


Figure 4

GIMM SOFTWARE

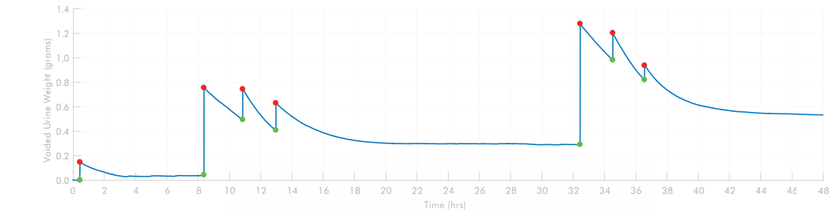
GIMM SOFTWARE
SOF-570

Record & analyze peristaltic reflex in distal colon using fecal pellet propulsion assay, and study general motor patterns in small or large intestine using spatio-temporal mapping (motor maps).

- Records in 320x240 resolution @15 frames per second
- Versatile import/export capability, as the raw data can be imported into any spreadsheet program for graphing and analysis *(figure 1)*
- Generate spatio-temporal maps using the motor analysis screen. The maps can be saved and analyzed using the included "Image J" plugin *(figure 2)*
- The analysis screen is used during spatially calibrated video playback, and provides a cumulative record of velocity (distance x time)
  - The raw data can be examined to determine if the motility rate was consistent (a linear graph), or changes over time (a curved graph) *(figure 3)*
- Easily organize experimental data, keep track of each experiment using "project" files which act like a notebook
  - Include identifying information such as trial number and group title *(figure 4)*

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*
- 1 free firewire port
- 1 free PCIe slot



MODULAR UROVOID™ VOIDING FREQUENCY QUANTIFICATION

Non-invasive measurement of bladder function in conscious rats and mice

- Monitor up to twelve (12) cages simultaneously
- Collect data for up to forty (40) days
- Cage designed for the mouse to live in for 24-48 hours or longer

MODULAR UROVOID - SINGLE
UROS-M-MOD

Packages Include: Urovoid Cage, Isolation enclosure, separation filter + Frame , food hopper, water bottle, urine collection pan + support, and scale

MODULAR UROVOID PACKAGES
UROP-M-MOD-2 | UROP-M-MOD-4 | UROP-M-MOD-6 | UROP-M-MOD-8 | UROP-M-MOD-12

Packages Include: Cage Package, horizontal + vertical + pedestal complexing kits, and pedestal mobility kit

- Each station is equipped with a precision analytical balance for accurate void mass quantification and USB connectivity for easy & reliable data acquisition
- Ad-lib access to food and water
- Food hopper and water bottle designed to contain spilled matter and minimize caching behavior
- Isolation enclosure protects the scale from ambient noise and air currents
- The cage is designed for the mouse to live in for prolonged periods of time (24-48 hours or longer)
- Optional modified cage top for accommodating optogenetics, IV self-administration, or cystometry equipment

IMAGES

A) Single Modular UroVoid shown with pedestal and castors. Alternative configurations (such as this side-by-side) can be assembled, contact Sales for more info.

MODULAR UROVOID™ CAGE COMPONENTS

WASTE SEPARATION FILTER + FRAME
URO-M-FILTER

Our research-driven design uses finely spaced stainless steel wire for optimal urine/solid waste separation.

- Rigid frame to protect & support the mesh
- Clean by hand-washing with warm soapy water, wipe gently to prevent damaging the separator

SCALE ISOLATION ENCLOSURE
URO-M-MODENC

Holds cage, scale, waste separation filter + frame, and urine collection pan + support.

- Protects the scale from ambient noise and air currents
- Clear polycarbonate door for viewing

URINE COLLECTION PAN
URO-M-PAN

- Lightweight, inexpensive, easily cleaned aluminum

URINE COLLECTION PAN SCALE SUPPORT
URO-PSP

- Lightweight rigid support for urine collection pan
- Correctly positions pan under the cage

MOUSE UROVOID™ CAGE
URO-M-CAGE-001

Additional cages increase experimental throughput by eliminating the time lost cleaning between mice *NOTE: Food hopper and water bottle sold separately*

- Cage size and ventilation optimal for long term housing requirements, and is large enough to accommodate certain enrichment devices
- Door opens from the front for easy placement and removal of mouse, with water and food on the backside for an unobstructed view
- The floor of the cage is made up of stainless steel rods to allow urine and feces to drop down

MOUSE UROVOID™ CAGE w/MODIFIED TOP
URO-M-CAGE-001-CT

Add a slit in the top to accommodate tethered animals, ideal for optogenetics, IV self administration, or cystometry

Slit: 0.19″ W / 0.48 cm

FOOD HOPPER
URO-M-FOOD

- Size discourages nesting behavior
- Feed storage bin and separate spillage bin
- Design minimizes contamination of urine from spilled food.
  - If the mouse gets food crumbs on itself, the crumbs go into the spillage bin, not down onto the pan
- We recommend powdered feed (not pelletized)

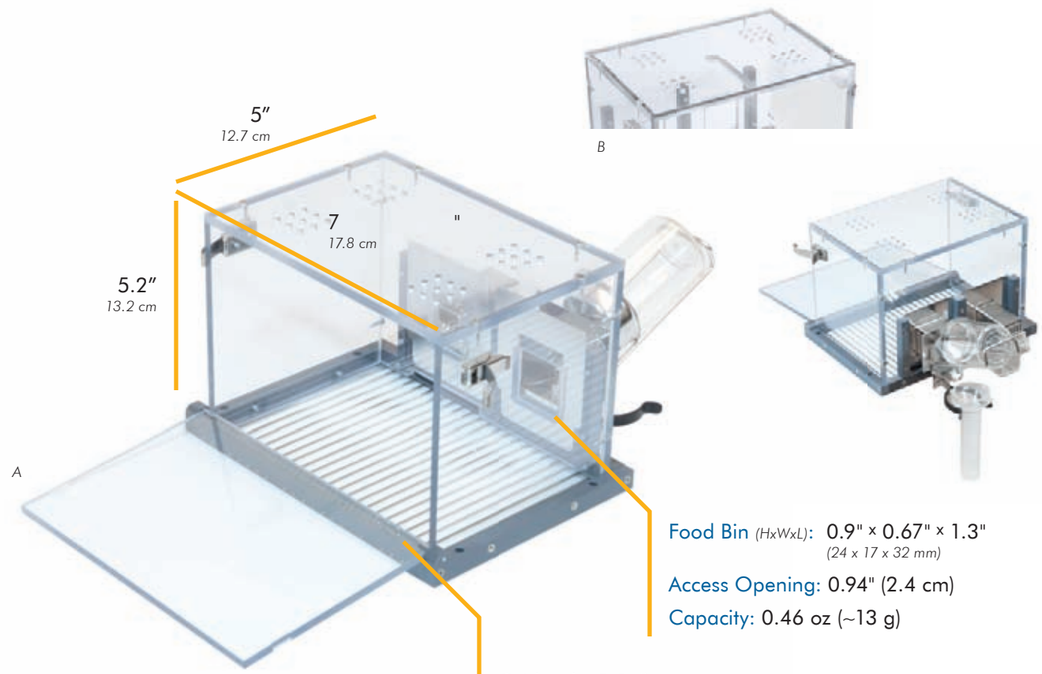
WATER BOTTLE
URO-M-WATER

- Recessed receptacle for accessing sipper tube
- Receptacle has a sloped base to prevent water from dripping onto collection pan, and instead gets collected in a spill cup below the sipper

Liquid capacity: ~3 fl. oz *(90 mL)*

IMAGES

A) Mouse UroVoid Cage shown with food + water receptacles B) modified cage top for tethered animals C) Waste Separation Filter + Frame D) Urine Collection Pan E) Urine Collection Pan Scale Support



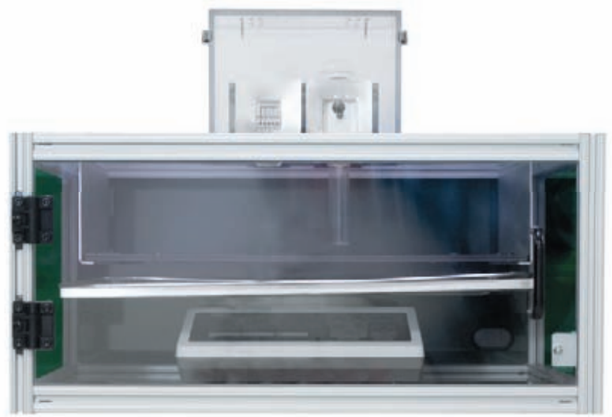
Food Bin *(HxWxL)*: 0.9" x 0.67" x 1.3"
(24 x 17 x 32 mm)

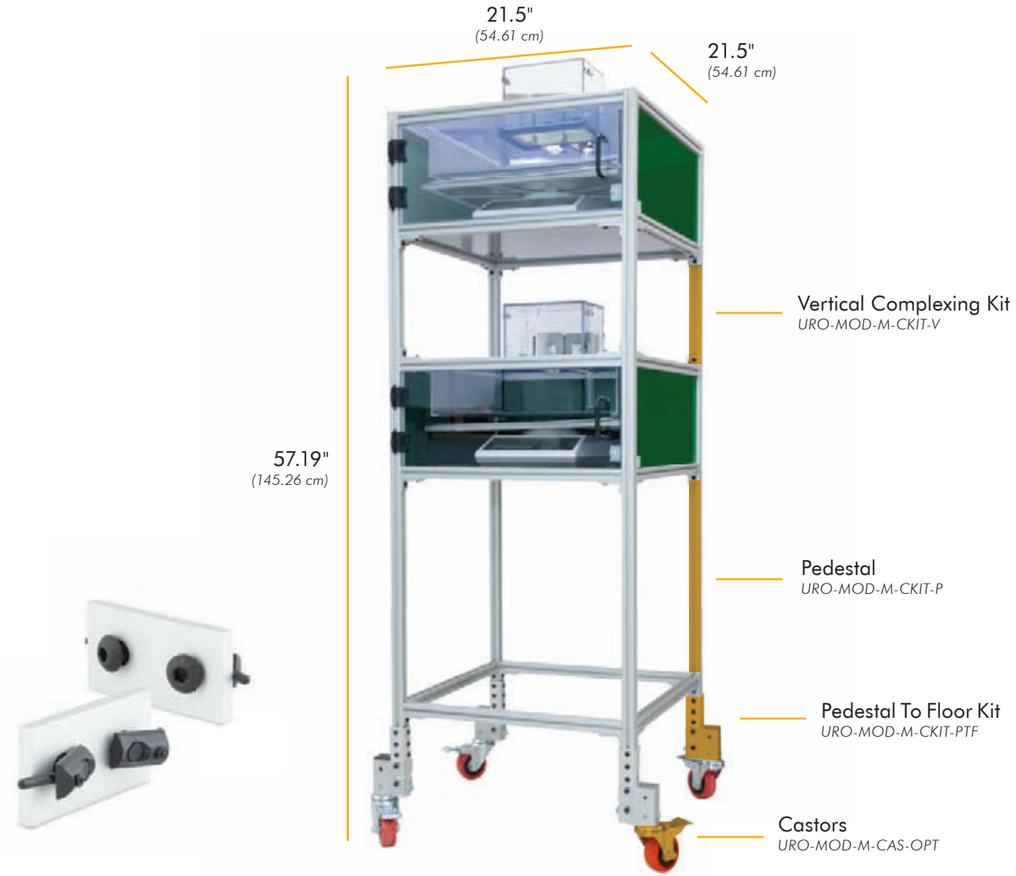
Access Opening: 0.94" (2.4 cm)

Capacity: 0.46 oz (~13 g)

Grid rods: 0.06″ *(0.15 cm)*

Rod spacing: 0.25″ *(0.64 cm)*





MODULAR UROVOID™ FRAME COMPONENTS

PEDESTAL MOBILITY KIT
URO-MOD-M-CKIT-M

Consists of the Pedestal To Floor Kit *(URO-MOD-M-CKIT-PTF)* and Castors *(URO-MOD-M-CAS-OPT).*

- Pedestal To Floor Kit
  - Steel brackets for connecting the pedestal to the castor wheel
- Castors
  - Double brake locks both wheel and swivel rotation
  - Polyurethane tires will not form a "flat spot" or marks on the floor

LEVELING FEET*
*URO-MOD-M-LVFT-OPT**

- Use in place of Castors *(URO-MOD-M-CAS-OPT)*
- Zinc-plated steel is corrosion resistant
- Ball-and-socket design swivels to compensate for uneven floors up to 7.5 degrees in any direction
- Non-skid cushion for stability

**NOTE: Not included in any package*

VERTICAL COMPLEXING KIT
URO-MOD-M-CKIT-V

Steel brackets and slide-in tabs to stack a unit one on top of another.

HORIZONTAL COMPLEXING KIT
URO-MOD-M-CKIT-H

Steel brackets and slide-in tabs to connect units side-by-side.

PEDESTAL
URO-MOD-M-CKIT-P

Four steel legs that connect to the modular enclosure via brackets.

Capacity: 4.23 fl. oz *(125 mL)*

UROVOID™ METABOLIC CAGE

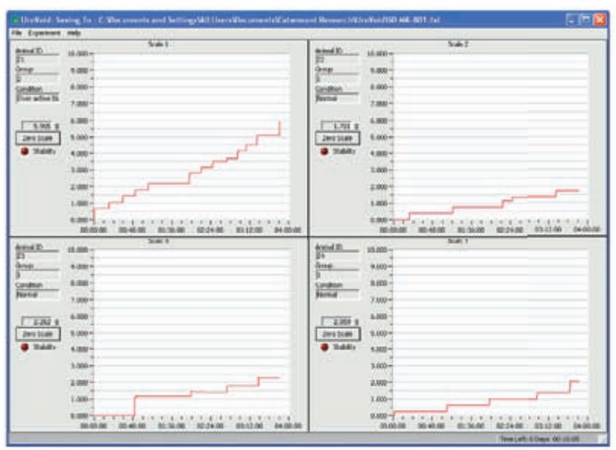
UROVOID PACKAGES
MET-UROS-R | MET-UROS-R-L

Packages Include: Table Top Stand, Urine Collection Flask, Scale, and Metabolic Cage

- Each metabolic cage is equipped with a precision analytical balance with USB connectivity for easy and accurate void mass quantification
- Specially designed urine collection flask minimizes evaporative loss while maximizing collection volume using a funnel-style mouth
- Urine/feces separation funnel maximizes collection of urine from each void and prevents feces from interfering with void mass quantification
- Nonwetting polymethylpentene (PMP) funnel and separating cone separates waste to collect in separate collection tubes for accurate metabolic monitoring without urine wash-over
- Ad-lib access to food and water
  - Food hopper designed to contain spilled food and minimize caching behavior and sleeping in the dish
  - Water bottle designed to minimize water spillage into cage area
- Designed to reduce instances where the animal would normally be disturbed
  - Refilling the feeder*
  - Removing components *(below the cage floor)*

IMAGES

A) UroVoid Metabolic Cage setup



Readability: 1 mg
Repeatability (typical): 0.7 mg
Minimum Weight (USP), Typical: 1.4 g
Linearity: ± 0.002 g
Linearity: 50 g
Settling Time: 1.5 s
Linearity (typical): 0.6 mg
Resolution: 1 mg

NOTE: Exact model may vary, contact sales to confirm current model specifications

UROVOID COMPONENT SPECS				
	NAME	SPECIES	ANIMAL SIZE	CAGE
MET-UROS-R	UroVoid™ Metabolic Cage Pkg	Rat	150-300g	MET-CAGE-R150-300
MET-UROS-R-L	UroVoid™ Metabolic Cage Pkg	Rat	>300g	MET-CAGE-R300

UROVOID™ METABOLIC CAGE COMPONENTS

ANALYTICAL BALANCE
SCALE

- Analytical balance for recording voided urine volume
- USB connection for data acquisition

TABLETOP STAND
MET-STAND

- Stainless steel stand securely holds one cage above the collection flask and scale.

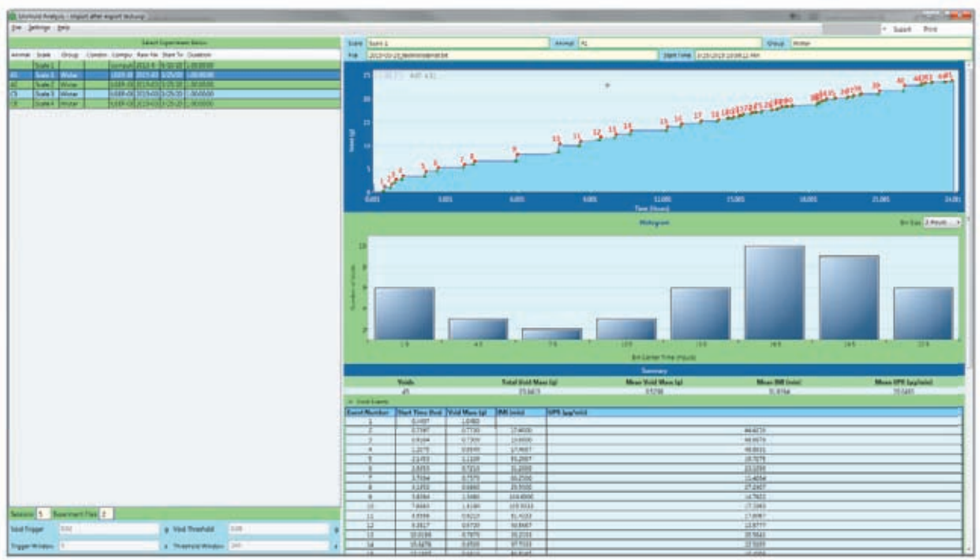
URINE COLLECTION FLASK
MET-VOID-001

- Specially designed with a narrow mouth and wide base to minimize evaporative loss, and a funnel top to facilitate urine collection
- High quality Pyrex® glass

METABOLIC CAGE FOR RATS
MET-CAGE-R150-300 | MET-CAGE-R300

- High quality Techniplast cage provides ad-lib food & water access
- Constructed of smooth, transparent polycarbonate to prevent gnawing and noise
- All components are easily cleaned and autoclavable, and the two-part polycarbonate cage body cleans easily with soap and water
- Two-chamber design provides a safe and sanitary environment for acquisition of untainted urine and feces

**NOTE: Designed for use with slurries, powders, or liquids — not pellets*



UROVOID INTERFACE

UROVOID INTERFACE PACKAGES
MED-URO-INT

For both mouse and rat urovoid systems.

Packages Include: Laptop or NUC PC, UroVoid and Urovoid Data Analysis Software

UROVOID™ METABOLIC CAGE SOFTWARE

UROVOID™ DATA ACQUISITION SOFTWARE
SOF-580

- Real-time display of urine mass
- Simultaneously record from up to 12 cages
- Record data for up to 40 consecutive days
- Keep track of animal ID, group, and condition

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*

UROVOID™ DATA ANALYSIS SOFTWARE
SOF-581

- Detects void mass and frequency based on user defined parameters
- The Voiding Micturogram™ (VMG) graphically displays void events, identified by a number, with the baseline and peak indicated
- Void histogram with user defined bin times
- Event log summarizes for each void:
  - Start time, void mass, intermicturition interval (IMI), and urine production rate (UPR)
- Data can be exported to Excel (or other similar programs) for further analysis and graphing

Computer Requirements:

- Windows 7 or newer *(32 or 64-bit)*

PDF VERSION

WEBSITE

REQUEST A QUOTE | READ MANUALS | EXPLORE CITATIONS | CONTACT US

www.MED-ASSOCIATES.com

This catalog is a companion to our website. Request a quote by navigating our online catalog, add items to your cart, and submit it - no user account required! Once received, a member of our team will review it, check in with you to ensure you're getting everything you need, and send you a quote!

sales@med-associates.com | +1 (802) 527-2343