ShutAvoid Software for Active and Passive Avoidance

Key Features
- Allows editing protocols for both active and passive avoidance
- Experimental chambers can be controlled independently
- A test mode enables immediate and reliable box checking
- The program runs automatically when the animal is detected in the cage
- Animal position and current data can be visualized online
- Provides integrated data
- Analyze data in user-defined intervals of time

Parameters Measured
- Number and latency of conditioned responses (active avoidance)
- Number and latency of unconditioned responses (active avoidance)
- Number and latency of null responses (active avoidance)
- Number and latency of responses during intertrial (active avoidance)
- Number of compartment crossing during the intertrial interval (active avoidance)
- Mean of the responses latencies (active avoidance)
- Latency to enter into the black compartment (passive avoidance)

Components Included
- Software CD with USB protection key
- Cables and connectors
- Instruction manual
- Free software updates of the acquired system

ShutAvoid Software

SHUTAVOID software is an implemented version of the Panlab/Harvard Apparatus SHUTTLE-8 software offering a user-friendly interface to conduct active and passive avoidance procedures in an automated manner.

The Software SHUTAVOID controls independently up to 8 Shuttle Boxes or Passive Cages. The software detects how many cages are physically present and activates the corresponding windows. The system includes a test mode to enable immediate and reliable checking of the functioning of all the elements of the experimental chamber.

The program controls the presentation of visual and acoustic stimuli and shock duration, at the same time that it records the position of the experimental animal in each compartment of the experimental cage, deciding about stimuli presentation accordingly.

Unlimited number of schedules can be defined and used either by common or different experimental cages. The protocol editor allows the configuration of all the basic parameters necessary to set an active and passive avoidance experiment: habituation period, duration of the inter-trial interval (fixed or randomized), activation and duration of the conditioned stimulus (light, sound or both), activation, latency and duration of the unconditioned stimulus (electrical shock), latency for considering the response as “null”, door status (open/closed), number of trials, cut-off time for response etc…

The program runs automatically when the animal is detected in the cage (independently for each cage). During the acquisition of data, information about the protocol state, animal position and current data can be visualized for each cage on the corresponding control window.

Data related to each of the observed animal responses are stored into result files that pick up the information acquired during the working session. The data files can be open and re-analyzed to generate ASCII-coded reports in which the information is summarized for each trial or groups of trials (user-defined).

Specifications

Computer Requirements 1.5 GHz processor or higher, 256 MB of RAM (512 MB recommended) with PCI 32-bit bus master expansion slot available

System Requirements Windows™ 98, 2000 or XP compatible operating system

Model | Product | Order #
--- | --- | ---
ShutAvoid | PC Software to Control up to 8 Shuttle Boxes or Passive Avoidance Boxes | BH1 76-0202

Citations
Passive Avoidance Box to Assess Working Memory

Key Features
- Weight transducer technology for accurate animal detection
- Very precise and stable intensity of shock delivered into the black compartment
- Neither PC interface nor PC cards are required
- Safety system which guarantees that the shock intensity received by the animal is always the same value independently of the grid bars treaded

Parameters Measured
- Latency to enter into the black compartment

Components Included
- Passive avoidance box
- Control unit with RS-232 communication port
- Motorized door (to be controlled either by LE2708 or ShutAvoid software)
- SeDaCom software
- Cables and connectors
- Instruction manual
- 2 year warranty

Options
- LE2708 avoidance programmer including shocker
- ShutAvoid software to control up to 8 active or passive boxes
- LE10026 shocker unit with scrambler (0-2mA output)

Passive Avoidance Box
Passive avoidance is fear-motivated tests classically used to assess short-term or long-term memory on small laboratory animals (rat, mice). Passive avoidance working protocols involve timing of transitions, i.e. time that the animal takes to move from the white compartment to the black one after a conditioning session. During the conditioning session, entry into the black compartment is punished with a mild inescapable electrical shock.

Our passive avoidance box (LE870/872) is defined by a large white illuminated compartment and a small black dark compartment separated by a guillotine gate. The animal’s position is detected by using high sensitivity weight transducers providing higher effective and reliable detection of animal responses (zones entries) than systems based on photocells beams or on grid floor displacements.

Panlab/Harvard Apparatus Passive Avoidance boxes may be controlled either through LE2708 Programmer or ShutAvoid software. The first option is recommended for one single box set-ups, and may be combined with the included SeDaCom software. SeDaCom enables data transfer from the programmer to a PC through a RS-232 port. The connection is direct between programmer to a PC. No PCI card is needed! The link is carried out by one only cable from one Box to the other. The first Box is connected to PC or Laptop by the port RS-232 or USB. The second option is suitable for controlling a number of boxes simultaneously.

Specifications
- Mouse Box Dimensions: 250 (W) x 250 (D) x 240 (H) mm white compartment; 195 x 108 x 120 mm black compartment
- Rat Box Dimensions: 310 (W) x 310 (D) x 240 (H) mm white compartment; 195 x 108 x 120 mm black compartment
- Minimum Weight Detected: 10 grams (mouse box); 40 grams (rat box)
- Material Composition: Methacrylate, aluminum, stainless steel
- Computer Requirements: PC (Windows 95, 98, ME, NT, 2000 and XP)
- Maximum Number of Stations: 8 stations connected to a PC
- Connection of Several Units to PC: Neither PC interface nor PC card are required. One cable connects all units to the PC
- Certifications: CE compliant
- Power Supply: 110V/220V, 50/60Hz

Model | Product | Order # |
--- | --- | --- |
LE870 | Passive Avoidance Cage, Rats | BH1 76-0199 |
LE872 | Passive Avoidance Cage, Mice | BH1 76-0200 |
LE2708 | Avoidance Programmer with Shock Unit Included | BH1 76-0201 |
SHUTAVOID | Software to Control up to 8 Active/Passive Boxes | BH1 76-0202 |
LE10026 | Shock Generator with Scrambler, 0-2 mA Output | BH1 76-0159 |

Citations
- Garcia-Calatayud S et al. (2005) Brain Docosahexaenoic Acid Status and Learning in Young Rats Submitted to Dietary Long-Chain Polyunsaturated Fatty Acid Deficiency and Supplementation Limited to Lactation Pediatric Research 57:719-722 (rat, Spain)
- Trabace L et al. (2000) Biochemical and Neurobehavioral Profile of CHF2819, a Novel, Orally Active Acetylcholinesterase Inhibitor for Alzheimer’s Disease JPET 294 (1): 187-194 (rat, Italy)
Shuttle Box for Active and Passive Avoidance

Key Features
- Highly sensitive weight transducer system for accurate animal detection
- Easy to set up different wall shapes and colors
- Optional guillotine door for passive avoidance
- Compartments with independent grid floor
- Frontal and top doors for an easy access inside the box
- Up to 8 active boxes can be controlled at once from a PC
- Neither PC interface nor PC cards are required
- Safety system which guarantees that the shock intensity received by the animal is always the same value independently of the grid bars treaded

Parameters Measured
- Latency to entrance into the black compartment (passive avoidance)
- Number and latency of conditioned responses (active avoidance)
- Number and latency of unconditioned responses (active avoidance)
- Number and latency of null responses (active avoidance)
- Number and latency of none responses (active avoidance)
- Number of compartment changes during the intertrial intervals (active avoidance)
- Latency mean and accumulated responses sorted by interval of time

Components Included
- Active box (shuttle box)
- Control Unit with RS-232 communication port
- SeDaCom software
- Cables and connectors
- Instruction manual
- 2 year warranty

Options
- Motorized door to convert active box into passive box
- Sound attenuating box
- LE2708 avoidance programmer including shocker
- ShutAvoid software to control up to 8 active or passive boxes
- LE10026 shocker unit with scrambler (0-2mA output)

Shuttle Box
Panlab/Harvard Apparatus Shuttle Boxes LE916 (Rats) and LE918 (Mice) provide the ideal environment to carry out conditioned reflexes (Active and Passive Avoidance) in learning and memory studies.

The Shuttle box (LE916-918) consists of two equally sized compartments with two independent grid floors. A front door, in addition to the top ones, allows an easy access inside the box. The cage contains a general sound generator and a visual stimulus (light) for each compartment.

The Animal is detected by two weight transducers located above the static grids, avoiding the problems inherent to photoelectrical or grid tilting systems (high speeds of displacements in mice, tail detection in rats). Our Shuttle box is thought to be easily set up and dismantled. Therefore, reconfiguring it to traditional Passive Box is quite straightforward by adding a sliding door (LE916D for mice or LE918D for rats). It is also possible to set up different wall shapes or colors in order to further condition the subject of study either visually or spatially.

The shuttle boxes can be controlled by Programmer LE2708 or Software (ShutAvoid). SeDaCom software is included for transferring data from the programmer to a PC through a RS-232 port. The connection is direct between the programmer and PC! No PCI card is needed! The link is carried out by one only cable from one Box to the other. The first Box is connected to PC or Laptop by the port RS-232 or USB.

The second option is suitable for controlling a number of boxes simultaneously.
Shuttle Box for Active and Passive Avoidance
(continued)

<table>
<thead>
<tr>
<th>Specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cage Dimensions:</td>
<td></td>
</tr>
<tr>
<td>LE916 Rat</td>
<td>510 (W) x 250 (D) x 240 (H) mm internal; 580 x 380 x 305 mm external</td>
</tr>
<tr>
<td>LE918 Mouse</td>
<td>590 (W) x 190 (D) x 240 (H) mm internal; 580 x 380 x 305 mm external</td>
</tr>
<tr>
<td>Minimum Weight Detected</td>
<td>10 grams (Mouse Box); 40 grams (Rat Box)</td>
</tr>
<tr>
<td>Material Composition</td>
<td>Methacrylate, aluminum, stainless steel</td>
</tr>
<tr>
<td>Computer Requirements</td>
<td>PC (Windows 95, 98, ME, NT, 2000 and XP)</td>
</tr>
<tr>
<td>Maximum Number of Stations (with ShutAvoid)</td>
<td>8 stations connected to a PC</td>
</tr>
<tr>
<td>Connection of Several Units to PC</td>
<td>Neither PC interface nor PC card are required. One cable connects all units to the PC</td>
</tr>
<tr>
<td>Certifications</td>
<td>CE compliant</td>
</tr>
<tr>
<td>Power Supply</td>
<td>110V/220V, 50/60Hz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Product</th>
<th>Order #</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE916</td>
<td>SHUTTLE BOX with Static Floor (Needs Shocker) Rat</td>
<td>BH1 76-0250</td>
</tr>
<tr>
<td>LE918</td>
<td>SHUTTLE BOX with Static Floor (Needs Shocker) Mouse</td>
<td>BH1 76-0251</td>
</tr>
<tr>
<td>LE26</td>
<td>Sound Attenuating Box</td>
<td>BH1 76-0157</td>
</tr>
</tbody>
</table>

Options

<table>
<thead>
<tr>
<th>Model</th>
<th>Product</th>
<th>Order #</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE916D</td>
<td>Guillotine Door for Rat Shuttle Box LE916 and Make it Capable to Room Passive Avoidance Experiments</td>
<td>BH1 76-0252</td>
</tr>
<tr>
<td>LE918D</td>
<td>Guillotine Door for Mouse Shuttle Box LE918 and Make it Capable to Room Passive Avoidance Experiments</td>
<td>BH1 76-0253</td>
</tr>
<tr>
<td>LE2708</td>
<td>AVOIDANCE PROGRAMMER with Shocker</td>
<td>BH1 76-0201</td>
</tr>
<tr>
<td>SHUTAVOID</td>
<td>PC SOFTWARE to Control up to 8 Active/Passive Boxes</td>
<td>BH1 76-0202</td>
</tr>
<tr>
<td>LE10026</td>
<td>Shock Generator with Scrambler, 0-2 mA Output</td>
<td>BH1 76-0159</td>
</tr>
</tbody>
</table>

Citations

Bura SA et al. (2007) Genetic and pharmacological approaches to evaluate the interaction between the cannabinoid and cholinergic systems in cognitive processes. Br. J. Pharmacol. 150(9): 768-765. (active avoidance, mouse, Spain)

Vicente F et al. (2006) Immunization and facilitation produced by predictable and controllable aversive events alternating with different duration unpredictable and uncontrollable aversive events. Int. J. Psychol. 41(5): 385-396. (learned helplessness, rat, Spain)


Aguilar R et al. (2003) Fearfulness and sex in F2 Roman rats: males display more fear though both sexes share the same fearful traits. Physiol. Behav. 79(4-5):723-32. (fear conditioning, rat, Spain)


Tena-Huerga N et al. (1998) Facilitatory effects of thalamic reticular nucleus lesions on two-way active avoidance in rats Experimental Brain Research, 118(4): 511-516. (active avoidance, rat, Spain)


Circular Pool for Evaluating Learning and Memory

Key Features
- Polypropylene pool
- Complete system, all in one station (water pump, thermostat and tubing all included)
- Control box controlling the water temperature (thermostated between 22-32˚C depending of the environmental conditions)
- Easily adaptable platform size depending of the animal size
- Support with 4 wheels for better displacement
- Ideal environment to carry out the Morris and Aquatic Radial maze studies

Components Included
- Circular pool with support (with wheels for easier displacement)
- Water pump
- Heater, electro valve and level controller
- Set of 2 target islands
- Instruction manual
- 2 year warranty
- Set of 2 spare fuses

Circular Pool
Our Morris water maze is for spatial working memory studies. The circular pool is manufactured in polypropylene and stands on a support with 4 wheels for easier displacement.

Panlab/Harvard Apparatus proposes a complete solution for water maze settings since the heater, the water circulation pump, the level controller and the electro valve for pool filling are containing in a unique control box. The level controller acts directly on the electro valve, turning it off when the liquid arrives to the corresponding height. The water temperature is thermostated between 22 and 32˚C depending on the environmental room temperature. Two easily interchangeable platforms are supplied (80 and 110 mm) that can be located anywhere in the pool. For Aquatic Radial Water Maze, a removable-floating eight radial-arm maze structure and associated platforms can be provided upon request.

Both Morris and Radial Water Mazes may be associated with the SMART Video-Tracking System for detection and analysis of animal displacements and behavior throughout the test.
Circular Pool for Evaluating Learning and Memory

<table>
<thead>
<tr>
<th>Parameter Measured</th>
<th>Video Tracking System Suggested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latency Time to Raise the Target/Platform</td>
<td>SMART and Smart JUNIOR</td>
</tr>
<tr>
<td>Permanence Time and Distance Travelled in Quadrants</td>
<td>SMART and Smart JUNIOR</td>
</tr>
<tr>
<td>Total Distance Traveled</td>
<td>SMART and Smart JUNIOR</td>
</tr>
<tr>
<td>Latency Time to the First Entrance to Target/Platform</td>
<td>SMART and Smart JUNIOR</td>
</tr>
<tr>
<td>Target/Platform Crossings</td>
<td>SMART and Smart JUNIOR</td>
</tr>
<tr>
<td>Resting/Floating Time with User-Defined Threshold</td>
<td>SMART and Smart JUNIOR</td>
</tr>
<tr>
<td>Stopping Time on Target/Platform</td>
<td>SMART</td>
</tr>
<tr>
<td>Wishaw’s Error</td>
<td>SMART</td>
</tr>
<tr>
<td>Mean Directionality</td>
<td>SMART</td>
</tr>
<tr>
<td>Average Distance to Target/Platform</td>
<td>SMART</td>
</tr>
<tr>
<td>Chronological Sequence of the Visits in the Zones</td>
<td>SMART</td>
</tr>
<tr>
<td>Permanence Time in Each Arm</td>
<td>SMART</td>
</tr>
<tr>
<td>Number of Entries Into Each Arm</td>
<td>SMART</td>
</tr>
<tr>
<td>Distance Traveled in Each Arm</td>
<td>SMART</td>
</tr>
<tr>
<td>And Other Integrated Parameters Not Directly Related to Water Maze Experiments…</td>
<td>SMART</td>
</tr>
</tbody>
</table>

Specifications

- Heater Intensity: 3000 W
- Heating Speed: 3 degrees celsius / hour (model LE820-200)
- Temperature: 22-32 degrees celsius (depending on environment)
- Power Requirements: 220V / 50Hz
- Certifications: CE compliant

Model | Product | Order # |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LE820-90*</td>
<td>Circular Pool; 90 cm (D) 50 cm (H)</td>
<td>BH1 76-0020</td>
</tr>
<tr>
<td>LE820-120*</td>
<td>Circular Pool; 120 cm (D) 60 cm (H)</td>
<td>BH1 76-0021</td>
</tr>
<tr>
<td>LE820-140*</td>
<td>Circular Pool; 140 cm (D) 60 cm (H)</td>
<td>BH1 76-0022</td>
</tr>
<tr>
<td>LE820-170*</td>
<td>Circular Pool; 170 cm (D) 60 cm (H)</td>
<td>BH1 76-0023</td>
</tr>
<tr>
<td>LE820-200*</td>
<td>Circular Pool; 200 cm (D) 60 cm (H)</td>
<td>BH1 76-0024</td>
</tr>
</tbody>
</table>

* Including Heater, water pump, level controller, electro valve and LE820-500 Island Set

Options

- LE820-500 Island Set (110 and 80 mm Diameter Platforms) | BH1 76-0025 |
- LE820-300 Automatic Island ‘Atlantis’ (controlled by Smart Video Tracking Software) | BH1 76-0026 |
- LE772 Aquatic Radial Maze | BH1 76-0027 |
- SMART Advanced Video-Tracking Software | BH1 76-0028 |
- SMART JUNIOR Standard Video-Tracking Software | BH1 76-0029 |

Citations


Zhang TY et al. (2006) Impairments in water maze learning of aged rats that received dextromethorphan repeatedly during adolescent period. Psychopharmacol. 5 in process (water maze, rat, South Korea)

Gimenez-Lloret L et al. (2005) Mice lacking the adenosine A1 receptor have normal spatial learning and plasticity in the CA1 region of the hippocampus, but they habituate more slowly. Synapse. 57(1) 8-16. (mouse, Spain, USA, Sweden)

Cela L et al. (2003) Neural stem cells and cholinergic neurons: regulation by immunolesion and treatment with mitogens, retinoic acid, and nerve growth factor. PNAS 100(12): 7235-7330. (rat, Italy)


Aron Test for Screen Anxiolytic Substances

Key Features

- Shock with adjustable intensity
- Computer interface

Parameters Measured

- Number of punished crossings

Components Included

- Aron box
- Control unit footswitch
- SeDaCom software
- Cables and connectors
- Instruction manual
- 2 year warranty

Aron Test

The Aron test or four plates test is an animal model of anxiety in which the exploration of the novel surroundings is suppressed by the delivery of a mild electric foot shock. The PANLAB/Harvard Apparatus system allows an automatic shock counting and recording of the results. A chain of up to 28 Aron four plates cages can be used with the last one linked to a PC (RS-232 port). An elegant and economical solution to screen large numbers of mice!

The apparatus consists of a cage floored by four identical rectangular metal plates (8 x 11 cm) separated from one another by a gap of 4 mm. The plates are connected to a shocker unit that can generate electric footshocks.

Following habituation period, the animal is subjected to an electric shock when crossing (transition) from one plate to another, i.e. two legs on one plate and two legs on another. Boissier et al. 1968 has described this test first. The number of punished crossings is generally calculated for a period of 60 seconds. A substance with anxiolytic properties induces an increase in the number of punished passages.

Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cage Materials</td>
<td>White, transparent plastic and stainless steel</td>
</tr>
<tr>
<td>Dimensions</td>
<td>18 x 25 x 16 cm</td>
</tr>
<tr>
<td>Shock</td>
<td>0-3 mA, timer 0-10 sec, square pulse</td>
</tr>
<tr>
<td>Shock Delivery</td>
<td>Footswitch</td>
</tr>
<tr>
<td>Count</td>
<td>Manual or programmable</td>
</tr>
</tbody>
</table>

Citations


Ripoll N et al. (2006) The four-plate test-retest paradigm to discriminate anxiolytic effects. Psychopharmacol. 180(1): 73-83. (mice, France)


Ripoll N et al. (2005) The four-plate test-retest paradigm to discriminate anxiolytic effects. Psychopharmacol. 180(1): 73-83. (mice, France)
Radial Maze for Evaluating Working and Reference Memory

Key Features
- Allows automated standard experiment
- Different possibilities of control for opening and closing the doors (manual or automated)
- Different possibilities for animal detection (photoelectrical cells, video-tracking...)
- Mounted on a tripod with adjustable height

Components Included
- Radial Maze
- LE766/8 Control unit (except LE760 and LE762)
- PCI interface (only when LE766/8 in combination with MAZESOFT-8 or SMART)
- 8 food baskets (one at each arm’s end)
- Tripod
- 2 year warranty
- Frame board (when sliding doors controlled by video-tracking system)

Options
- SMART Video-Tracking (for LE760/762)

Parameter Measured Monitoring System Suggested
Chronological sequence of animal positioning in the radial maze MAZESOFT-8 and SMART
Time of entry in each zone MAZESOFT-8 and SMART
Current position MAZESOFT-8 and SMART
Total number of entries in each zone MAZESOFT-8 and SMART
Total number of reference and working memory MAZESOFT-8 and SMART
Other integrated parameters: number of visits into the arms, response latency, etc... MAZESOFT-8

Radial Maze

The “Eight Arms Radial Maze” is extensively used in behavioral laboratories for evaluating spatial memory but also non-spatial memory associated with motivational cues (classically food).

The Panlab/Harvard Apparatus radial maze consists in a central area with eight sliding doors giving access to eight equally-sized arms. The maze, made of black Plexiglas, is mounted on a tripod with adjustable height (1m max). Each arm has lateral walls with a height higher in the proximal side of the arm than in the distal side. In the distal extreme of each arm, a detachable recessed cup can be installed or replaced by cover (all included).

The sliding doors can be opened and closed manually or automatically, with two options in both cases.

- Manual doors operation can be made by the user in-site, by means of a mechanical thread system with pulley or off-site, by using a control unit with eight switches, one for each sliding door.
- Automated doors operation can be controlled by the animal position throughout the test using the MAZESOFT-8 software associated with photoelectrical cell mounted on the radial maze and the corresponding control units, or using the SMART Video-Tracking System.

A water version of the radial maze is also available (see our circular pool product page - 32 and 33 - or contact us for more details).

Specifications

Radial Maze Dimensions:
- Rat: (W) x 1690 (D) x 1250/1450 (H) mm
- Mouse: (W) x 867 (D) x 1250/1450 (H) mm

Position Detection Technique
- IR beams in the arms, weight cell in the central island or SMART Video Tracking

Sliding Doors Operation
- Manually or automated with Mazesoft-8 or SMART

Material Composition
- Methacrylate, aluminum, stainless steel

Aquatic Radial Maze Dimensions
- 138 (W) x on request (D) x 250 (H) mm

Power Requirement
- 110/220 V , 50/60 Hz

Certifications
- CE compliant

Model Product Order #
LE760 Standard Radial Maze, Rat BH1 76-0227
LE762 Standard Radial Maze, Mouse BH1 76-0228
LE767* Automated Radial Maze, BH1 76-0229
LE772* Automated Radial Maze, BH1 76-0230
LE769* Automated Radial Maze, BH1 76-0231
LE766 Automated Radial Maze, Rat with MAZESOFT-8 (Includes PCI7200) BH1 76-0232
LE788 Automated Radial Maze, Mouse with MAZESOFT-8 (Includes PCI7200) BH1 76-0233

* Includes PCI7200 when SMART is to control the sliding doors

Options

SMART Video-Tracking Software BH1 76-0228
MAZESOFT-8 Software for Learning and Memory

Key Features
- Complete and easy to use for standard experiment
- Use of photoelectrical cell technology for animal position detection
- Manual or automatic control of the doors
- Provides integrated parameters (number of errors, number of distinct arms visited, etc)
- Data reports can be reorganized according to factors entered in the trial header (animal, groups, etc)
- Data exportation to Excel

Parameters Measured
- Duration of the experiment
- Current position of the animal
- Number of working memory errors (repeated “visit” in the baited arms)
- Number of reference memory (number of “visit” in the unbaited arms)
- Total number of visited arms
- Response latency (total duration of the experiment / total number of visited arms)
- Number of different arms visited during the experiment (between 0 and 8)
- Number of arms visited until an ‘error’ (last arm visited included)
- List table showing the chronological order of the visited arms
- List table showing the chronological order of the entries into the arms
- List table showing the chronological order of the entries into the different zones of the radial maze

Components Included
- Software CD and USB protection key
- PCI-7200
- Cables and connectors
- Instruction manual

Mazesoft-8 Software

MAZESOFT-8 is complete and easy-to-use software for monitoring radial maze experiments. It has been specially designed to work with the Panlab/Harvard Apparatus radial maze apparatus equipped with rows of infrared photocells for the automated detection of animal position.

The software allows for the full control of the arm doors either manually (by means of a button panel in the computer screen) or automatically, when a trained subject is being tested.

MAZESOFT-8 allows the user setting any of the standard protocols for the study of working and reference memory in laboratory animals. The protocols are easy to configure, the user only have to enter some important parameters: designation of the baited arms, conditions to stop the experiments, time-interval between each trial, doors monitoring mode, criterion for considering the arm visited... Each protocol configuration can be saved and opened for use when necessary. A “trial header” can be use for recording all the necessary information associated with the current experiment (code of trial, experimenter, challenge, dose, subject identification, comments).

In MAZESOFT-8, the maze is virtually divided into 17 sections: 8 equally sized arms (each one divided into proximal and distal section) and a central area. One experiment can be composed of several trials, depending on the number of experimental groups and animals per group used in the study. The system considers an arm being visited when the subject has been detected in the distal part of the arm. During each trial, the elapsed time, permanence time in each area and current position of the animal can be visualized in real-time. Real-time information about the animal position and the number of visits made are also graphically shown on the screen. A Runtime data panel shows the cumulated number of working and reference memory errors together with other important data (response latency, number and list of visits and entries into the arms etc...)

MAZESOFT-8 provides a summary data table containing the complete information about each session (subject name, group, date) together with all the integrated data of interest. The tables of session can be reorganized before exportation according to parameters previously entered in the trial header (by subjects, by groups, by experimenter, etc). Data from the summary database as well as the detailed chronological listing of the animal positions for each session can be easily exported to Excel.

This Mazesoft-8 Software is not available as a separate product. It is included with the following systems, LE 766 Automated Radial Maze for Rats and LE 768 Automated Radial Maze for Mice. See page 35 for complete descriptions.

Specifications

<table>
<thead>
<tr>
<th>Computer Requirements</th>
<th>1 GHz processor or higher (CELERON excluded), 128 MB of RAM (256 MB recommended) with PCI 32-bit bus master expansion slot available, need installed printer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software Requirements</td>
<td>Windows™ 98, ME, 2000, NT or XP compatible operating system</td>
</tr>
</tbody>
</table>
FREEZING Software for Automated Fear Conditioning

Key Features
- Combined system for startle/freezing
- Combined system for mice/rats
- Weight transducer sensitivity optimized
- Easily removable tray
- Different spacial context configurations available for fear conditioning paradigms
- Accurate and traceable data

Parameters Measured
- Time of experiment at which each inactivity event has occurred (FREEZING)
- Duration of each inactivity event (FREEZING)
- Maximum amplitude of startle response (STARTLE)
- Latency until the maximum amplitude of startle response (STARTLE)
- Duration of the startle response (STARTLE)
- Latency until the beginning of the startle response (STARTLE)
- Average of the startle response (STARTLE)

Components Included
- Experimental Chamber
- Sound Proof Box
- Load cell amplifier
- Station interface
- Instruction manual
- 2 year warranty

Options
- Shock Generator
- Air Puff Unit
- STARTLE Software
- FREEZING Software

FREEZING Software
The StartFear Combined system is a polyvalent system for conducting both fear conditioning and startle reflex experiments in one same enclosure, regardless if the animal is a rat or a mouse (from 15gr to 500 gr).

The StartFear system allows recording and analysis of the signal generated by the animal movement through a high sensitivity weight transducer system.

The analogical signal is transmitted to the FREEZING and STARTLE software modules through the load cell unit for recording purposes and posterior analysis in terms of activity/immobility (FREEZING) or startle response characterization (STARTLE).

An additional interface associated with corresponding hardware allows controlling the stimuli (light, sounds, shock, air puff) from the STARTLE and FREEZING software modules.

The StartFear cage is made with black methacrylate walls and a transparent front door. In fear conditioning experiment, the walls, cover and floor can be of different materials or colors. Moreover, a transparent cylinder can be placed into the experimental chamber in order to modify the contextual spatial perception of the subject during the test phase.

Specifications
- Chamber Dimensions 670 (W) x 530 (D) x 550 (H) mm
- Material Composition Methacrylate, aluminum, stainless steel
- Maximum Number of Stations 8 stations connected to a PC
- Sounds Frequency and Amplitude PrePulse/pulse: adjustable from 200 to 20000 Hz - max 120 dB; white noise: from 60 to 100 dB
- Certifications CE compliant
- Power Supply 110V/220V , 50/60Hz

Model | Product | Order #
--- | --- | ---
LE116 | FREEZING AND STARTLE Threshold Sensor including Sound Attenuating Box | BH1 76-0280
LE117M | Mouse Holder for Startle Reflex (Animal Weight Required) | BH1 76-0235
LE117R | Rat Holder for Startle Reflex (Animal Weight Required) | BH1 76-0236
LE111 | Load Cell Amplifier (One for Each Chamber) | BH1 76-0281
LE118 | Stimuli Interface Unit (1 Chamber) | BH1 76-0282
LE1188 | Stimuli Interface Unit (up to 8 Chambers) | BH1 76-0283
STARTLE | Software to Control up to 8 Stations for Startle Reflex Studies | BH1 76-0284
FREEZING | Software to Control up to 8 Stations for Fear Conditioning Studies | BH1 76-0099

Options
- LE10026 | Shock Generator with Scrambler, 0-2 mA Output | BH1 76-0159
- LE119 | Air Puff Unit | BH1 76-0286
- LE115 | Contextual Kit for Fear Conditioning | BH1 76-0328

Citations
STARTLE Software for Automated Startle Reflex Studies

Key Features
• Optimized animal movement detection for mice!
• Versatile software allowing the configuration of a wide variety of different protocols
• Sound frequency and amplitude controlled by software
• Synchronized running
• Provides a subject database as an alternative to manually managing subject information
• Provides traceable data for GPL compliance
• Records and stores the analogical signals for further analysis

Parameters Measured
• Maximum amplitude of startle response
• Latency until the maximum amplitude of startle response
• Duration of startle response
• Latency until the beginning of startle response
• Average of the startle response

Components Included
• Software CD
• PCI 1712 interface card for PC (for up to 8 stations)
• Cables and connectors
• Instruction manual
• Free software updates of the acquired system

Options
• Tailor-made experimental configuration setups upon request
• PCI bridges for laptop

STARTLE Software
STARTLE software is a powerful and user-friendly tool which protocol editor allows the experimenter to build a wide variety of different protocols enabling the configuration of both standard (startle reflex habituation, prepulse inhibition of startle reflex, fear-potentiated startle reflex) and unusual user-defined protocols.

The software can run up to 8 chambers simultaneously and in a synchronized manner. Provide standardized data (maximum amplitude and latency to maximum) in an automated manner. Two activity thresholds can also be set for an accurate user-controlled evaluation of additional parameters such as duration, average or latency to the onset response. The run window shows the signal chart and corresponding raw data table on-line for every chamber. In each table, information about the status of the protocol is shown, together with the important parameters of the execution. Both signal chart and raw data table can be saved and reloaded for recalculating parameters using different activity thresholds.

As required in the Good Practices of Laboratory (GPL) directives and instruction, STARTLE has been built in order to obtain traceable data: i.e. each session recorded can be linked to the corresponding experimental data (date, experimenter, animal data, protocol used, etc.).

Specifications
- Computer Requirements: 1.5 GHz processor or higher, 256 MB of RAM (512 MB recommended) with PCI 32-bit bus master expansion slot available
- System Requirements: Windows™ 98, 2000 or XP compatible operating system - PC integrated standard sound card (DirectX compatible)

<table>
<thead>
<tr>
<th>Model</th>
<th>Product</th>
<th>Order #</th>
</tr>
</thead>
<tbody>
<tr>
<td>STARTLE</td>
<td>Software to Control up to 8 Stations for Startle Reflex Studies</td>
<td>BH1 76-0284</td>
</tr>
</tbody>
</table>

related hardware
> Combined Startle and Freezing System, see page 37
FREEZING Software for Automated Fear Conditioning

Key Features

- Optimized animal movement detection for mice
- Versatile software allowing the configuration of a wide variety of different protocols
- Sound frequency and amplitude controlled by software
- Synchronized running
- Provides a subject database as an alternative to manually managing subject information
- Provides traceable data for GPL compliance
- Records and stores the analogical signals for further analysis

Parameters Measured

- Onset time each freezing event has occurred
- Duration of each freezing event

Components Included

- Software CD
- PCI 1712 interface card for PC (for up to 8 stations)
- Cables and connectors
- Instruction manual
- Free software updates of the acquired system

Options

- Tailor-made experimental configuration setups upon request
- PCI bridge for laptop

FREEZING Software

FREEZING is a powerful and user-friendly tool for conducting fear conditioning experiments in rodents.

The FREEZING protocol editor allows the experimenter to build a wide variety of different protocols enabling the configuration of both standard (context-dependent fear conditioning, tone-dependent fear conditioning) and unusual user-defined protocols.

The software can run up to 8 chambers simultaneously and in a synchronized manner. Two thresholds can be set for the detection of the animal freezing behavior: activity (for differentiating immobility from activity) and time (for eliminating any non-specific freezing episode which duration is lower than an user-defined duration).

The run window shows the signal chart and corresponding raw data table on-line for every chamber. In each table, information about the status of the protocol is shown, together with the important parameters of the execution. Both signal chart and raw data table can be saved and reloaded for recalculating parameters using different activity and time thresholds.

As required in the Good Practices of Laboratory (GPL) directives and instruction, FREEZING has been built in order to obtain traceable data: i.e. each session recorded can be linked to the corresponding experimental data (date, experimenter, animal data, protocol used, etc.).

Specifications

<table>
<thead>
<tr>
<th>Computer Requirements</th>
<th>1.5 GHz processor or higher, 256 MB of RAM (512 MB recommended) with PCI 32-bit bus master expansion slot available</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Requirements</td>
<td>Windows™ 98, 2000 or XP compatible operating system - PC integrated standard sound card (DirectX compatible)</td>
</tr>
</tbody>
</table>

Model | Product | Order # |
---|---|---|
FREEZING | Software to Control up to 8 Stations for Fear Conditioning Studies | BHI 76-0099 |

Citations


Markram K et al. (200/) Abnormal Fear Conditioning and Amygdala Processing in an Animal Model of Autism. Neuropsychopharmacol. In Press (rat, Switzerland)
Modular Operant Box for Operant Conditioning

Key Features
• Entirely modular system
• Easily transformed between rat and mice chamber
• Reduced number of cables
• Possibility of customization
• Up to 8 stations can be connected at once to PC through a single cable

Parameters Measured
• Number of responses (LE 85XCT)
• Number of reinforcements (LE 85XCT)
• Many user-defined parameters (see PackWin software)

Components Included
• Operant Chamber (mice or rat)
• Instruction manual
• Cables and connectors
• 2 year warranty

Options
• Link Box (power connection box for up to 8 modules)
• Wide range of modules
• Sound attenuating box
• MPS push button
• Experiment progamation unit (with ratio and interval schedules and shocker)
• PackWin software

Our Modular Operant Chamber is an entirely modular experimental enclosure designed to conduct operant conditioning procedures (e.g. food reinforcement, DMTS, conflict tests, self-administration, etc).

The operant chamber is made in an entirely modular structure which allows complete disassembling or rearrangement to build a new space of different dimensions/components or to enable storage in the minimum space. It can be easily transformed from rat chamber to mice chamber (or vice versa) with a reduced cost.

A frontal door offers a total accessibility inside the chamber. Walls and cover can be of different material or color, since they are totally removable.

Each chamber is associated with a Link Box which provides power to up to 8 (expandable to 16) Operant Modules (levers, lights, sound, dispensers, electrical shock) conferring to the chambers a full autonomy.

Special accessories are provided for self-administration procedures. Only one cable connects the Link Box to the LE85XCT Programmer or PC (PackWin Software), this last for advanced protocol configuration and running.

The Cages can be equipped with a weigh transducer in order to record activity or freezing.

Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Dimensions</td>
<td>440 (W) x 360 (D) x 35 (H) mm</td>
</tr>
<tr>
<td>Working Area (Mouse)</td>
<td>200 (W) x 200 (D) x 250 (H) mm</td>
</tr>
<tr>
<td>Working Area (Rat)</td>
<td>250 (W) x 250 (D) x 250 (H) mm</td>
</tr>
<tr>
<td>Material Composition</td>
<td>Stainless steel, aluminum and methacrylate</td>
</tr>
<tr>
<td>Power Supply</td>
<td>110V/220V, 50/60Hz</td>
</tr>
<tr>
<td>Maximum Number of Stations</td>
<td>8 stations connected to a PC</td>
</tr>
<tr>
<td>(When Working with PC)</td>
<td></td>
</tr>
<tr>
<td>Connection of Several Units to PC</td>
<td>No need of PC interfaces! Direct connection through one cable!</td>
</tr>
<tr>
<td>Certifications</td>
<td>CE compliant</td>
</tr>
</tbody>
</table>
memory & attention

Modular Operant Box for Operant Conditioning (continued)

<table>
<thead>
<tr>
<th>Model</th>
<th>Product</th>
<th>Order #</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE1002CP</td>
<td>Operant Chamber Setup for Mice Including Pellets Dispenser, Lever, Light Stimuli, Mice Shock Grid and LINK BOX 01</td>
<td>BH1 76-0146</td>
</tr>
<tr>
<td>LE1005CP</td>
<td>Operant Chamber Setup for Rats Including Pellets Dispenser, Lever, Light Stimuli, Rat Shock Grid and LINK BOX 01</td>
<td>BH1 76-0148</td>
</tr>
<tr>
<td>LE1002CL</td>
<td>Operant Chamber Setup for Mice Including Drop Liquid Dispenser, Lever, Light Stimuli, Mice Shock Grid and LINK BOX 01</td>
<td>BH1 76-0147</td>
</tr>
<tr>
<td>LE1005CL</td>
<td>Operant Chamber Setup for Rats Including Drop Liquid Dispenser, Lever, Light Stimuli, Rat Shock Grid and LINK BOX 01</td>
<td>BH1 76-0149</td>
</tr>
</tbody>
</table>

Contact Technical Support for the Broad List of Additional Modules for our Modular Operant Chambers!

Options

<table>
<thead>
<tr>
<th>Model</th>
<th>Product</th>
<th>Order #</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE1002</td>
<td>Modular Mice Operant Chamber</td>
<td>BH1 76-0151</td>
</tr>
<tr>
<td>LE1005</td>
<td>Modular Rats Operant Chamber</td>
<td>BH1 76-0152</td>
</tr>
<tr>
<td>LE100201</td>
<td>Mice Shockable Grid</td>
<td>BH1 76-0153</td>
</tr>
<tr>
<td>LE100501</td>
<td>Rats Shockable Grid</td>
<td>BH1 76-0154</td>
</tr>
<tr>
<td>LE1050</td>
<td>MPS Push Button</td>
<td>BH1 76-0155</td>
</tr>
<tr>
<td>LINKBOX01</td>
<td>Link &amp; Power for up to 8 Modules</td>
<td>BH1 76-0156</td>
</tr>
<tr>
<td>LE26</td>
<td>Sound Attenuating Box</td>
<td>BH1 76-0157</td>
</tr>
<tr>
<td>LE85XCT</td>
<td>PROGRAMMER with Ratio &amp; Interval Schedules and Shocker</td>
<td>BH1 76-0158</td>
</tr>
<tr>
<td>LE10026</td>
<td>Shock Generator with Scrambler, 0 - 2 mA Output</td>
<td>BH1 76-0159</td>
</tr>
<tr>
<td>PACKWIN</td>
<td>PC software to Control up to 8 Operant Chambers</td>
<td>BH1 76-0002</td>
</tr>
<tr>
<td>LE1010</td>
<td>Harness Set for Electrical Stimulation</td>
<td>BH1 76-0160</td>
</tr>
<tr>
<td>LE12605</td>
<td>Electrical Stimulator</td>
<td>BH1 76-0161</td>
</tr>
<tr>
<td></td>
<td>Pump 11 Plus</td>
<td>BH1 70-2208</td>
</tr>
</tbody>
</table>

Citations


Conejo NM et al. (2005) Brain metabolism after extended training in fear conditioning task. Psicothema. 17(4): 563-569 (disruption of lever pressing in fear conditioning task, Rat, Spain)


Toro JM et al. (2005) Backward Speech and Speaker Variability in Language Discrimination by Rats. J. Exp. Psychol. 31(1): 95–100. (rat, Spain)


PackWin Software

Key Features
- Entirely modular system
- User friendly interface
- Maximal flexibility
- Subject database
- Result traceability
- Personalized scientific support

Parameters Measured
- Number of response (nose-spoke, lever pressing etc.)
- Latency of response
- Number of reinforcement given (food, drug, drink, shock etc.)
- Number of trials made
- Total duration of the experiment

Components Included
- Software CD
- Cables and connectors
- Instruction manual
- Free software updates of the acquired system

Options
- Tailor-made experimental configuration setups upon request

PackWin Software

PackWin is a user-friendly and versatile Software developed for the Windows platform with the aim of offering a powerful tool for developing a wide range of experiments in different types of behavior chambers. It typically controls the Panlab/Harvard Apparatus chamber for operant conditioning, self-administration and procedures using the nine-hole box, but it can also monitor any type of chambers provided that the electronic interface of the chamber is TTL compatible.

The PackWin protocol editor allows the experimenter to build a wide variety of different protocols enabling the configuration of basic programs for operant procedure (fixed and variable ratio, fixed or variable interval, fixed or variable DRL, positive and negative reinforcement, extinction, probability to obtain a reinforcement, etc.) with or without discriminative stimuli (light, sound) as well as more specific and complex user-defined protocols (conflict, DMTS, 5 choice serial reaction task etc.). The raw data table is entirely configurable depending on the parameters to be reported. Under request, the Software can also be supplied with already edited protocols (customization).

The software can run up to 8 chambers depending on the characteristics of the associated chamber. Each chamber can run independently from the rest of the selected chambers or in a synchronized manner. Desired protocols can be selected separately for each chamber. Raw data tables can be stored in DOC, XLS, HTML and CSV formats for report and further analysis.

The system includes a test program to enable immediate and reliable checking of the functioning of all the elements of the chamber.

As required in the Good Practices of Laboratory (GPL) directives and instruction, PackWin has been built in order to obtain traceable data: i.e. each session recorded can be linked to the corresponding experimental data (date, experimenter, animal data, protocol used, etc.).

At any moment, the user can make use of the Panlab/Harvard Apparatus Technical Department for personalized help with configuration and the use of the PackWin software.

Specifications

Computer Requirements: 1.5 GHz processor or higher, 256 MB of RAM (512 MB recommended) with PCI 32-bit bus master expansion slot available

System Requirements: Windows™ 98, 2000 or XP compatible operating system

Connection of Several Units to PC: One cable connects all units to the PC through RS-232 port

Model: PACKWIN
Product: PC Software to Control up to 8 Experimental Chambers
Order #: BH1 76-0002

Citation
(ethanol self-administration, rat, Spain)
5/9 Holes for Attention Performance

5/9 Holes

The nine-hole box is commonly used to evaluate attention performance using a visual discrimination task in laboratory animals. The nine-hole box is composed of a test chamber, food or drink dispenser, a Link Box to connect it to the PC and the PackWin software.

The nine-hole box is assembled with black aluminum walls and a transparent front door. The box is equipped with an arc of 9 contiguous apertures set into the rear wall, a house light, a food pellet dispenser and a ‘pusher’ to detect the nose-pokes into the food holder. The holes not used in the experiment may be blocked up using a metal insert. Each hole is equipped with photocell beams and internal LED providing visual cues specific to each hole. The intensity of the LED can be adjusted in Link Box using the digital selector. The box is placed on a stainless-steel platform and the associated tray is easily removable to clean.

Panlab/Harvard Apparatus also offers an optimized nine-holes box for performing test in mice. This new box is supplied with 9 pellet dispensers in order to give the reward directly into the right stimulus hole when a correct response is fulfilled.

All Panlab/Harvard Apparatus nine-hole boxes are associated with the potent and versatile PackWin software in order to control the experiment (protocol configuration, experiment running) and obtain relevant data such as correct responses, incorrect responses, omissions, premature responses, perseverant responses, time out responses, total receptacle head entries, etc.

Different experimental paradigms for sustained attention, animal models of impulsive behavior and lateralized-discrimination task can be conducted using the nine-hole box.

As an example, in the 5-choice serial reaction time task, short-lasting stimuli are given in pseudo-randomized order in one of the holes of the cage (commonly, hole 1, 3, 5, 7 or 9). If the animal nose-pokes into the correct hole, a reinforcement (pellet) is given. If the animal nose-pokes into an incorrect hole, a time-out period (no light) is given and next trial begins. The choice accuracy (% of correct responses) gives an idea of the functional integrity of the attention as well as learning processes. These parameters are mostly altered in animal models of Schizophrenia and Alzheimer diseases.

Specifications

Cage Dimensions:
- LE509 Rat Cage: 252 (W) x 280 (D) x 240 (H) mm internal; 440 x 360 x 315 mm external
- LE507 Mouse Cage: 190 (W) x 220 (D) x 240 (H) mm internal; 440 x 360 x 315 mm external

Holes Dimensions:
- Rat: 23mm hole diameter; 14mm hole deep
- Mouse: 13mm hole diameter; 10mm hole deep

Material Composition: Plexiglass, aluminum, stainless steel

Maximum Number of Stations: 8 stations connected to a PC

Power Supply: 110V/220V, 50/60Hz

Certifications: CE compliant

Model | Product | Order #
--- | --- | ---
LE509 | Rats 5/9 Holes Cage with PC Interface | BH1 76-0000
LE507 | Mice 5/9 Holes Cage with PC Interface | BH1 76-0001
PACKWIN | PC Software to Control up to 8 Cages | BH1 76-0002

Panlab/Harvard Apparatus | Spain +34934190709 | international +34934750697 | fax +34934750699 | www.panlab.com