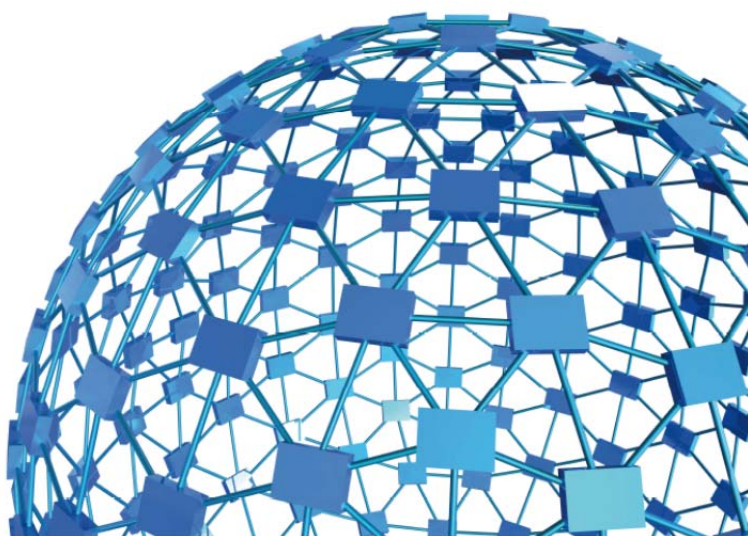




instruction manual

Hole Board
Cat. No. 6650 - 46653



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instruction manual

Hole Board
Cat. No. 6650 - 46653

Serial No.

SAFETY CONSIDERATIONS

ALTHOUGH THIS INSTRUMENT HAS BEEN DESIGNED WITH INTERNATIONAL SAFETY STANDARD, THIS MANUAL CONTAINS INFORMATION, CAUTIONS AND WARNINGS WHICH MUST BE FOLLOWED TO ENSURE SAFE OPERATION AND TO RETAIN THE INSTRUMENT IN SAFE CONDITIONS.

SERVICE AND ADJUSTMENTS SHOULD BE CARRIED OUT BY QUALIFIED PERSONNEL, AUTHORIZED BY UGO BASILE ORGANIZATION.

ANY ADJUSTMENT, MAINTENANCE AND REPAIR OF THE OPENED INSTRUMENT UNDER VOLTAGE SHOULD BE AVOIDED AS MUCH AS POSSIBLE AND, WHEN INEVITABLE, SHOULD BE CARRIED OUT BY A SKILLED PERSON WHO IS AWARE OF THE HAZARD INVOLVED.

CAPACITORS INSIDE THE INSTRUMENT MAY STILL BE CHARGED EVEN IF THE INSTRUMENT HAS BEEN DISCONNECTED FROM ITS SOURCE OF SUPPLY.

Hole Board

Cat. No. 6650

Cat. No. 46653 for Videotracking

General

The Hole-Board 6650 has been conceived to study the innate **exploratory behavior** of the mouse confronted with a new environment (head plunging stereotype), according to the classic method devised by Boissier-Simon.

The normal mouse of either gender, when confronted with a new environment, will explore holes in the substrate of its environment by **poking its nose** in and out of the hole a few times, then moving on to the next hole.

The initial exploration activity of the animal and its variations brought about by psychotropic drugs are unmistakably assessed. The nose poke frequency provides an indicator of exploratory behavior.

The test lasts few minutes and does not require any previous training/conditioning of the animal.

A model with no recording unit is also available; the non-reflecting surface makes it particularly suitable for Videotracking. Ask for Cat. No. 46653.



- Quick Test for Exploratory Behavior in Mice

- The classical "Planche à Trous" Test by Boissier & Simon

Main Features

- The recording of the "nose poking" stereotype takes place automatically
- A few minute test is sufficient for most screenings
- No previous training/conditioning required
- A specific model for Videotracking is available



CHECK-LIST

- ☐ **6650** Hole Board, complete
☐ **46652** Hole Board for videotracking, rat
☐ **46653** Hole Board for videotracking, mouse

CLIENTE / CUSTOMER _____

Ordine No. / Order No. _____ Data / Date ____/____/____

UB code	CAT.No.	✓	Q.ty	DESCRIPTION	DESCRIZIONE
	6651		1	CONTROL UNIT	UNITÀ ELETTRONICA
	6652		1	BOARD	PIASTRA A BUCHI
E-WP 008			1	MAINS CORD	EUROPE
E-WP 008-1					U.S.A.
E-FT 003-1			2	FUSES FOR 115V (T 250 mA)	FUSIBILI PER 115V (T 250 mA)
E-FT 001-1			2	FUSES FOR 230V (T 125 mA)	FUSIBILI PER 230V (T 125 mA)
E-AU 041 USB pen-drive	6650-302		1	INSTRUCTION MANUAL	MANUALE DI ISTRUZIONE

Optional Models for Videotracking:					
46652	46652-002		1	BOARD (VIDEOTRACKING), FOR RAT	PIASTRA A BUCHI (VIDEOTRACKING) PER RATTO
	46652-005		1	ENCLOSURE FOR RAT BOARD, GREY	CONTENITORE PER PIASTRA RATTO, GRIGIA
	46652-015		1	ENCLOSURE FOR RAT BOARD, TRANSPARENT - <i>OPTIONAL</i>	CONTENITORE PER PIASTRA RATTO, TRASPARENTE - <i>OPTIONAL</i>
46653	46653-003		1	BOARD (VIDEOTRACKING), FOR MOUSE	PIASTRA A BUCHI (VIDEOTRACKING) PER TOPO
	46653-005		1	ENCLOSURE FOR MOUSE BOARD, GREY	CONTENITORE PER PIASTRA TOPO, GRIGIA
	46653-015		1	ENCLOSURE FOR MOUSE BOARD, TRANSPARENT - <i>OPTIONAL</i>	CONTENITORE PER PIASTRA TOPO, TRASPARENTE - <i>OPTIONAL</i>

DATE / /	Serial No.	IMBALLATO DA / PACKED BY
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Universal Input 85-264 VAC, 50-60Hz

IMPORTANT/IMPORTANTE:

Check the shipment for completeness immediately after receipt: should you find any discrepancy, please fill in the following part and transmit it to our fax no. +39 0332 745488

Al ricevimento della merce controllate che la spedizione sia completa: in caso di discrepanza, completate il formulario di seguito riportato ed inviatelo al nostro fax no. 0332 745488

FROM: Name	Company/Institution
DATE	REF.

NOTE

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Hole Board

Cat. 6 6 5 0

1 GENERAL

The Hole-Board 6650 has been conceived to study the innate **exploratory behavior** of the mouse confronted with a new environment (head plunging stereotype), according to the classic method devised by Boissier-Simon.

The test can be easily performed; it lasts few minutes and does not require any previous training/conditioning of the animal.

The Hole-Board method (*“Méthode de la Planche à Trous”*) devised by Boissier & Simon (see paragraph 9.1-Method Paper) can be performed under optimum conditions: the recording of the **“head plunging”** stereotype takes place automatically, via miniature I.R. emitters/receivers embodied in the “holes”.

Models with no recording unit are also available; the non-reflecting surface makes it particularly suitable for Videotracking. See paragraph 2.3.

1.1 Principle of Operation

The exploratory behavior of laboratory rodents is of interest in a number of areas of behavioral pharmacology. The normal mouse of either gender, when confronted with a new environment, will explore holes in the substrate of its environment by poking its nose in and out of the hole a few times, then moving on to the next hole.

Many unconditioned tests, such as the open field, potentially confound general locomotor activity with exploration. The hole-board apparatus appears to avoid this inconvenience, as **head-dipping** into holes in the floor represents a **valid measure of the subject's attraction towards novelty**.

The initial exploration activity of the animal and its variations brought about by psychotropic drugs are unmistakably assessed. The nose poke frequency provides an indicator of exploratory behavior.

2 INSTRUMENT DESCRIPTION

The 6650 Hole Board basically consists of the following elements:

- A. the **Hole Board 6652**, see paragraph 2.1
- B. an **Electronic Unit 6651**, see paragraph 2.2

connected by a cable of convenient length.

2.1 Board 6652

The Board 6652, made of grey Perspex panels, has the size of a large chocolate box (40x40cm, 2.2cm thick), see picture. The matt finishing avoids reflections which may alter the animal behavior.

The board embodies 16 “head-plunging detectors”, black flush-mounted tubes (1) of 3cm I.D., connecting the upper (4) to the bottom (5) panel, at the same time acting as structural elements.

Each hole embodies an I.R. emitter (3) and a diametrically opposed receiver (2), flush mounted 1cm below the upper panel.

The dimensioning of the board and holes has been optimized for mice in the 15-30 g range, to provide negligible false recordings.

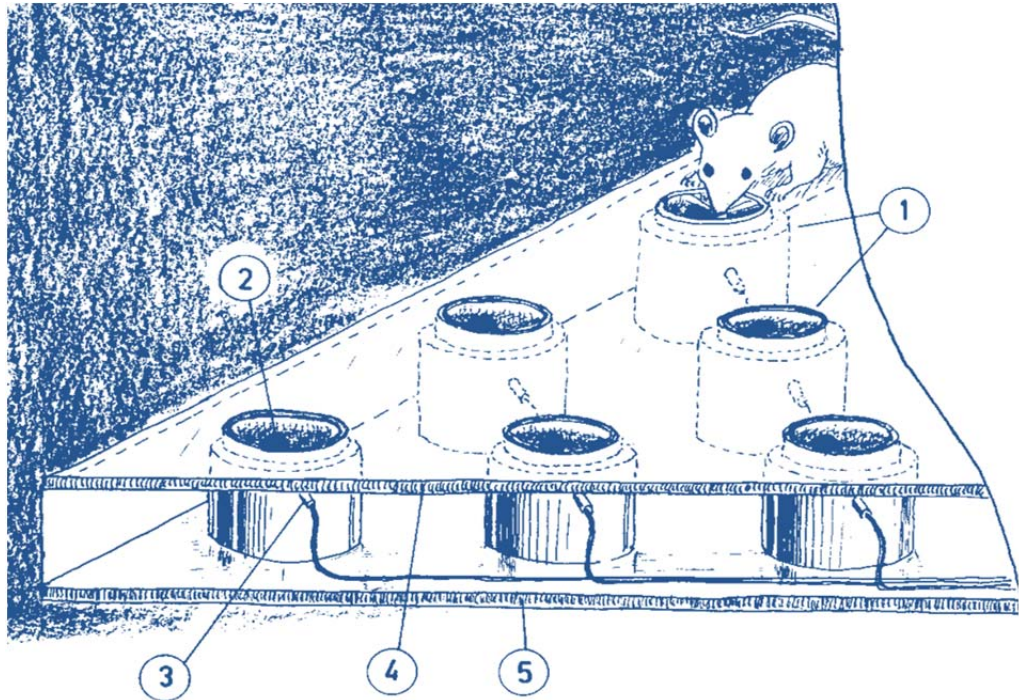


Figure 1 “Board 6652”

The board is supported by two adjustable brackets, hinged to the bottom panel. The “walking platform” can be thus positioned from 7 to 18 cm over the table level.

2.2 Electronic Unit 6651

The Control Unit 6651 is lodged into a resilient cabinet provided with splash-proof side slots for ventilation.

The cabinet front and back panels of anodized aluminium feature extremely durable engraved indications.

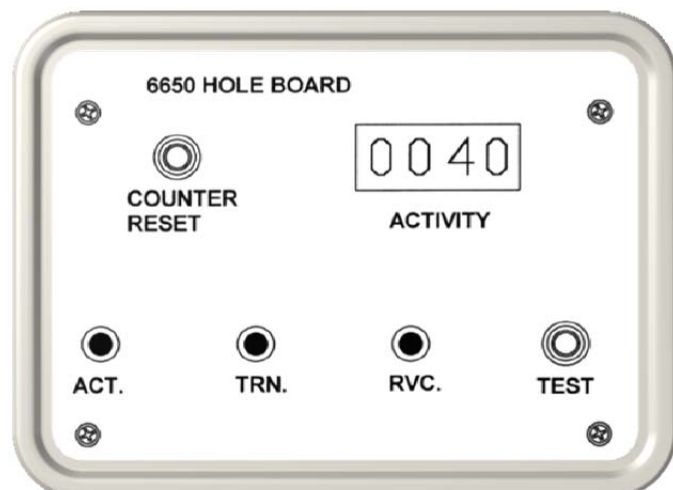


Figure 2 “Electronic Unit 6651”

The **front panel**, see figure above, embodies:

- A. the **ACTIVITY** display
- B. the **COUNTER RESET** key
- C. the **TEST** key
- D. the **LED** visual indicators

At every head plunging, the ACT (activity) LED blinks and the read-out increases by one digit. A time-constant has been provided to inhibit recording a rapid up & down nose poking as it were a multiple event.

The figure remains frozen until the reset key is pressed again, when placing a fresh mouse on the board.

A **self-diagnosis** function reassures the operator, by a visual LED configuration, that all the 16 I.R. emitters/receivers are operating and no I.R. path is accidentally obstructed, see also paragraph 5.2-Self-Diagnosis.

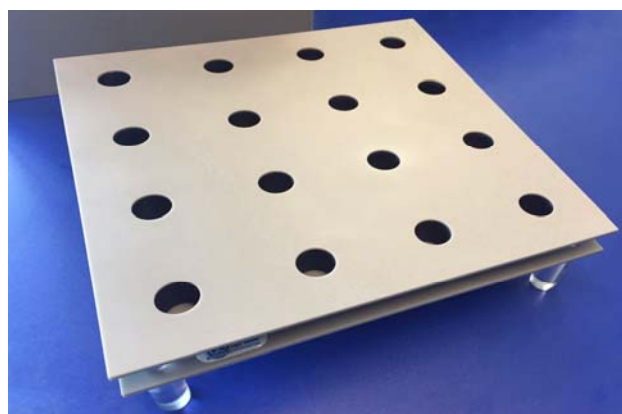
The **back panel**, see figure 3, embodies the power module, the delta 15-pin connector for branching the unit to the multifunction printer, see paragraph 3-DATA ACQUISITION, and the socket of the cable connecting the control unit to the hole-board.

2.3 Hole Board for Videotracking

The standard 6650 can be connected to a PC parallel port, via the optional cable 46650-330, to acquire the number of pokes via ANY-maze and combine them with data collected by videotracking.

In alternative, a Mouse Hole-Board **specific for videotracking**, with no recording unit, is also available.

The **46653** is a simple open field, dimensioned 40x40cm, with 16 holes diam. 3cm, spaced 10cm apart (from center to center). The non-reflecting surface makes it particularly suitable for Videotracking.



The 46653 is provided as standard with an enclosure, with opaque (grey) walls.

As an optional, the enclosure can have transparent walls.

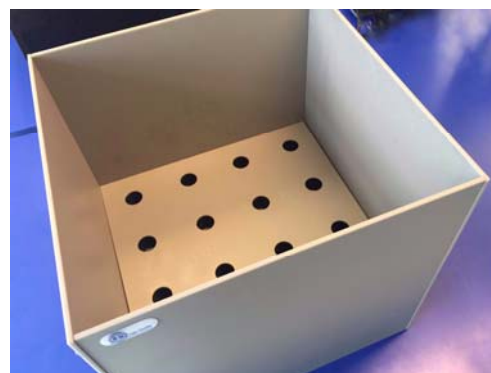


Figure 3 "Hole Board for Videotracking"

A similar model, the 46652, is also available, dimensioned 1mx1m, 35cm high, 16 holes diameter 3.8cm, to test rats.

For assembly instruction, see paragraph 4.7.

3 DATA ACQUISITION

The 6650 is provided with a cable connection to the **Multifunction Printer Cat. 2600**.

The Multifunction Printer is a microprocessor controlled device, designed to acquire data from 6 independent channels (each Hole Board requires 1 channel).

The data, stored in the 2600 internal memory and shown on its graphic display, can be printed in real time and/or routed to the PC, via the **52050-01** CUB Software provided with the Multifunction Printer standard package.

The 52050 is a Windows® based Data Acquisition Software Package, which enables the research worker to store the data into individual files, ready to be easily managed by most statistical analysis packages available on the market.

4 INSTALLATION

4.1 Unpacking & Preliminary Check

Check the contents of the shipment for completeness, packing list to hand, and visually inspect the instrument as soon you take it out of the packaging. Use the **Check List** supplied.

If the instrument is damaged, inform the shipping agent or carrier immediately, notifying our company.

Inspect the instrument for damages such as scratches, broken or loose parts. If after having tested it, the instrument fails to meet rated performances, contact our company immediately, see paragraph 6.4-Customer Support.



Protect the environment!

Dispose of packaging properly, according to existing and applicable waste management rules and regulations.

4.2 Notes on the Instruction Manual

The 6650-302 Instruction Manual, can be found on the USB Key provided. We recommend reading the manual with attention, as it is essential for the correct installation and operation of the instrument.

Please save the manual, ready to be consulted by the qualified personnel who use the instrument. Print it, only if necessary.

Our Instruction Manuals are available as free download on our web. For any additional information and/or assistance, you are welcome to contact our Service Department (see paragraph 6.4-Customer Support), specifying the serial number of the instrument.

4.3 Environment

Select for the Hole-Board test a room which is acoustically isolated or at least free from intense or sudden noise.

The room should not be too brightly illuminated. Avoid direct light on the board, e.g., from a table lamp.

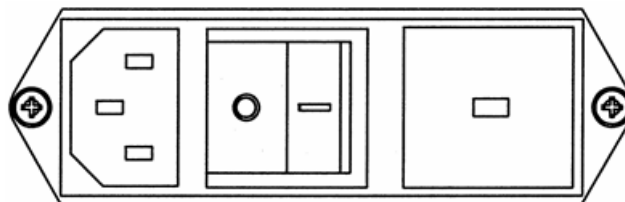
An intense light upsets the animal and channels to the I.R. receivers a strong background radiation which may cause, in the extreme case, some spurious head plunging detection.

4.4 Intended Use

The Hole Board is intended for investigation use on laboratory animals only.

4.5 Before Applying Power

Take a look at the Power Module, on the control unit back-panel which encompasses the inlet connection of the mains cord, the mains switch and the fuse holder/voltage selector.



4.5.1 Mains Cord

Connect the instrument via its power cord to a **suitable power outtake provided with a reliable earth connection.**

4.5.2 Main Switch

This two-pole toggle switch, which complies with international safety standards, provides visual cue, to signal the:

- **OFF** when pressed to the right (“O” side)
- **ON** when pressed to the left (“I” side)

4.5.3 Fuse Holder

The fuse holder comprises two fuses, one on the live, and the other on the neutral. For operation at 220-230 Volts, we recommend 125 mA timed fuses (type T125). Use 250 mA fuses (type T250) for operation at 115 Volts.

The fuse holder also embodies the Voltage Selector. Make sure that the flag indicates the correct voltage (i.e., the voltage of your mains).

To replace the fuses or to change the selected voltage, see paragraph 6.1-Electrical.

4.6 Assembling the Hole Board 6650

Assemble the instrument on a stable and reasonably flat, bench or table surface. Make sure that the edges of the board are at least 30-40 cm from the walls or any other object placed at the same level.

Slacken the knurled knobs of the adjustable support brackets and position the board horizontally, the upper panel at least 15 cm over the table level; this is high enough to suggest the mouse that an escaping jump is an hazardous proposition.

Also, avoid any striking “*spatial reference*” on the table below the board; the mouse should be puzzled by each hole at the same degree!

4.6.1 Back Panel

The **back panel**, see figure 3, embodies the power module, the delta 15-pin connector for branching the unit to the multi-function printer, see paragraph 3-DATA ACQUISITION, and the socket of the cable connecting the control unit to the hole-board.

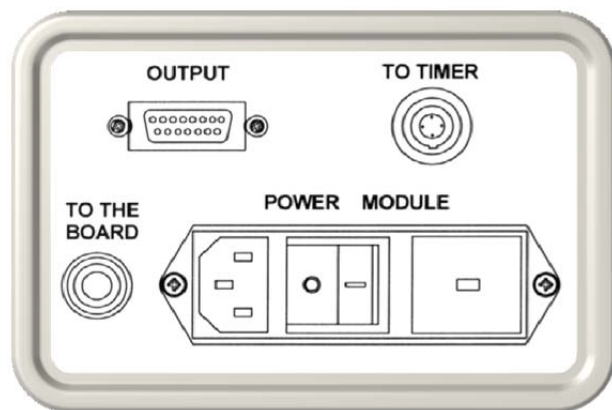


Figure 4 “Back Panel”

4.6.2 Connections

Branch the control unit to the board.

The connection cable, originating from the back panel of the control unit is fitted with a male connector.

Rotate the cable connector while exerting a slight pressure, until its bayonet glides into the connector seat fastened to the bottom panel of the board. Then snap in the black knurled ring.

To remove the connector, push back the knurled ring and then pull.

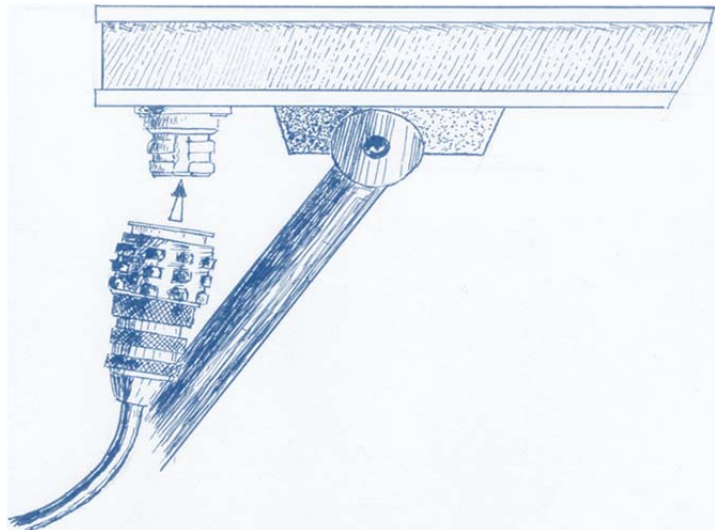


Figure 5 “Hole-Board Connection”

4.7 Assembling/Disassembling Hole Board 46653

The 46653 is shipped assembled. Carefully remove the assembly from the box, and position it on a stable and reasonably flat, bench or table surface.

For cleaning purpose, the board can be totally disassembled:

The upper panel is attached to the supporting columns by magnets.

Lift it with one hand, while keeping the bottom panel with the other hand.



The “holes” are actually black PVC tubes, which can all be removed for cleaning.



To detach the bottom panel from the supporting columns, simply lift it.



To reassemble the board, repeat the procedure in reverse order.



Pay attention while moving the assembled unit, always holding it from the bottom panel.

4.8 General Safety Instructions

The following guidelines must be followed to ensure safe operation.

- ! DO NOT** attempt to open or perform any service work
- ! DO NOT** connect up human subjects



4.9 Additional Safety Consideration

- a. Place the instrument on a steady and flat surface
- b. Use original accessories and spare parts only, see also paragraph 8-ORDERING INFORMATION.
- c. Immediately disconnect and replace a damaged mains cable.
- d. Do not operate in hazardous environments or outside prescribed environmental limitations (i.e. +10C° / +40C°, 95% relative humidity, non-condensing).
- e. Do not spray any liquid on the connectors



Ugo Basile does not accept any responsibility for problems or harm caused to things or persons arising from:

- incorrect electrical supply;
- incorrect installation procedure;
- incorrect or improper operation or, in any case, not in accordance with the purpose for which the instrument has been designed and the warnings stated in the instruction manual supplied with the instrument;
- replacement of original components, accessories or parts with others not approved by the manufacturer;
- servicing carried out by unauthorized personnel.

5 OPERATION

5.1 Switching On

Switch on the 6650 by acting on the Mains Switch placed on the back side of the control unit, see paragraph 4.5.2.

5.2 Self-Diagnosis

Before any session, it is recommended to test the status of the instrument. Traces of the animals' droppings or, other particles of dirt previous run, etc., may have accidentally obstructed the I.R. path in one or more holes.

To make sure that all the holes are operating, hence the results are consistent, the 6650 hole board has been equipped with a self-diagnosis circuit.

With no animal on the board, the **TRN** (transmitter) LED only should be lighted. An obstruction would light even the **ACT** (activity) LED.



If this is the case, visually inspect the “holes”. As soon you clear the obstruction, the **ACT** LED is dead again.

By depressing a **TEST** key, see paragraph 2.2-Electronic Unit 6651 and front-panel picture, the instrument undergoes a self-diagnosis, reassuring the operator, by a visual LED configuration, that all the 16 I.R. emitters/receivers are operating and no I.R. path is accidentally obstructed.

Depress the **TEST** key. This will

- switch **off** the **TRN** (transmitter) LED
- switch **on** the **ACT** (activity) & **RCV** (receiver) LEDS
- increase the displayed figure of **one digit**.

Beside the clearance of the holes, this manoeuvre ensures that

- all the transmitters are operating
- all receivers are operating
- the display works.

In the case the TEST is unsuccessful, this means there is a fault in the I.R. network or in the electronic circuit and consequently the instruments should be serviced, see paragraph 6.4-Customer Support.

5.3 Carrying-out the Test on the Animal

Gently place a mouse at the centre of the board and depress the COUNTER RESET key, see paragraph 2.2-Electronic Unit 6651 and front-panel picture. **At every head-plunging, the ACT (activity) LED blinks and the read-out increases by one digit.**

A time-constant has been provided to inhibit the circuit to record a rapid up & down nose poking as it were a multiple event, i.e., two or more head plunging.

A fresh “exploration”, we read on the original paper of Boissier & Simon, see paragraph 9.1-Method Paper, takes place when the animal has **neatly** interrupted the previous one and does something else in-between, grooming, taking a short walk, etc.

After the desired time interval (the literature suggests five minutes), remove the animal and read the display.

The figure remains frozen until the operator depresses the RESET key again, when placing a fresh mouse on the board.

Provision is made to connect the 6650 to the Multifunction printer, see paragraph 3-DATA ACQUISITION.

6 MAINTENANCE

While service of any instrument is to be carried out by Ugo Basile personnel or by qualified personnel, authorized by UGO BASILE organization, this section of the instruction manuals describes normal maintenance procedures which can be carried out at the customer's facility.



UNPLUG THE MAINS CORD BEFORE CARRYING OUT ANY MAINTENANCE JOB!

6.1 Electrical

To inspect and/or replace the fuses, **disconnect the mains cable first!** Insert a miniature screwdriver in the slot indentation, see paragraph 4.5.3, and snap out the slide which houses the fuses.

For operation at 220-230 Volts, we recommend 125 mA timed fuses (type T125). Use 250 mA fuses (type T250) for operation at 115 Volts.

Having extracted the fuse slide, the voltage selector becomes accessible. The same miniature screwdriver will help you to pry out the cross jumper on which the operation voltage is engraved. Place the jumper upside down if you have to shift from 115 to 230V or vice versa.

Snap in the fuse slide: the mechanical “click” ensures that it is locked. Check the voltage flag before applying electrical power.

6.2 Cleaning

The Hole-Boards do not require any maintenance apart from normal cleaning.



Do not use organic solutions, liable to impair the Perspex surface.

Cotton wool and water, or a mild detergent can be used for cleaning purposes. For disinfection, use a non-alcoholic disinfectant, or H₂O₂.

Model **46653** can be totally disassembled for cleaning: see paragraph 4.7-Assembling/Disassembling Hole Board 46653.

6.3 Long Inactivity

The instrument does not require any particular maintenance after long inactivity, except cleaning. Protect the board from dust when not in use.

6.4 Customer Support

For any further information you may desire concerning the use and/or maintenance of the Hole Board and accessories, please do not hesitate to contact our **service department** (or our local distributor) either directly or via our support page <http://www.ugobasile.com/support.html>:



UGO BASILE s.r.l.

Via G. Di Vittorio 2
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service@ugobasile.com
logistics@ugobasile.com
sales@ugobasile.com

Before sending any instrument to our factory for repair, please contact our logistics department to obtain a return authorization number (RMA) and shipping/packing instructions.

We may not be held responsible for damages during transport due to poor packing; whenever possible, please use the original packing.

7 SPECIFICATIONS - 6650

Operation

Power Requirement	115 or 230V, 50/60Hz, 15W max.
Starting	Via RESET switch located on the front panel
Activity counter	4-digit LED display
Self-Diagnosis	By test-key and 2-LED configuration
Connection to PC	via multifunction Printer/ WinDAS Software, see paragraph 3
Operating Temperature	10° to 30° C
Sound Level	negligible

Physical

Total Weight	5.5Kg
Shipping Weight	10.5Kg approx.
Dimensions	Board: 40x40x18(h)cm (maximum height) Electronic Unit : 15x26x25(h)cm
Packing Dimensions	67x42x53cm

Warranty

Warranty 6650 is covered by 24-month warranty.

8 ORDERING INFORMATION

6650 **Hole Board**, standard configuration, including following components and accessories:

6651 Control Unit

6652 Board

E-WP 008 Mains Cord

E-AU 041 USB Pen drive, including:
6650-302 Instruction Manual (on USB pen drive)

Set of 2 fuses for either 115 VAC or 230 VAC mains

8.1 Model for Videotracking

46652 **Hole Board for Videotracking**, model for Rat, including:

46652-002 Board (videotracking), for Rat

46652-005 Enclosure for Rat Board, grey

46652-015 Enclosure for Rat Board, transparent - *OPTIONAL*

46653 **Hole Board for Videotracking**, model for Mouse, including:

46653-003 Board (videotracking), for Mouse

46653-005 Enclosure for Mouse Board, grey

46653-015 Enclosure for Mouse Board, transparent - *OPTIONAL*

9 BIBLIOGRAPHY

9.1 Method Paper

- J.R. Boissier et P. Simon: “**Dissociation de Deux Composantes dans le Comportement d’Investigation de la souris**” Arch Int. Pharmacodyn. 147, No. 3-4, **1964**.
- J.R. Boissier et P. Simon: “**L’Utilisation d’une Réaction Particulière de la Souris (Méthode de la Planche à Trous) pour l’Étude des Médicaments Psychotropes**” Thérapie XIX : 571-589, **1964**.
- S.E. File and A.G. Wardill : “**The reliability of the Hole-Board Apparatus**” Psychopharmacologia (Berl.): 47-51, **1975**

9.2 Papers Mentioning Model 6650

- E.D. de Oliveira et alia: **“Mechanisms Involved in the Antinociception Induced by Spinal Administration of Inosine or Guanine in Mice”** Eur. J. Pharmacol. 775: 71-82, **2016**
- P. Santos et alia: **“Anxiolytic Properties of N-acetylcysteine in Mice”** Behav. Brain . J. Pharmacol. 317: 461-469, **2016**®
- M. A. Yrbas et alia: **“Pharmacological Mechanism Underlying the Antinociceptive Activity of Vanillic Acid”** Pharmacol Biochem. And Behav. 132: 88-95, **2015**
- O.D. Can et alia: **“Anti-depressant-like Effect of Vitexin in BALB/c Mice and Evidence for the Involvement of Monoaminergic Mechanisms”** Eur. J. Pharmacol. 699 (1-3): 250-257, **2013**
- M.G. Blake et alia: **“Scopolamine Prevents Retrograde Memory Interference Between Two Different Learning Tasks”** Physiology & Behavior. 102 (3-4): 332-337, **2011**
- P.B. Gomes et alia: **“Anxiolytic-like effect of the monoterpene 1,4-cineole in mice”** Pharmacology, Biochemistry & Behavior 96: 287-293, **2010**
- S.W. Zhu et alia: **“Influence of Environmental Manipulation on Exploratory Behaviour in Male BDNF Knockout Mice”** Behavioral Brain Res. 197, 339-346, **2009**

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CE CONFORMITY STATEMENT

Manufacturer **UGO BASILE srl**
Address Via G. di Vittorio, 2 – 21036 Gemonio, VA, ITALY
Phone n. +39 0332 744574
Fax n. +39 0332 745488

We hereby declare that

Instrument. **HOLE BOARD**
Catalog number **6650**

*It is manufactured in compliance with the following European Union Directives
and relevant harmonized standards*

- *2006/95/CE relating to electrical equipment designed for use within certain voltage limits*
- *2004/108/CE relating to electromagnetic compatibility*
- *2011/65/UE on the restriction of the use of certain hazardous substances in electrical and electronic equipment*

Account Manager

Adriano Basile

Nome / Name

April 2014 2012

Date

Firma / Signature