

Multi Conditioning

The ALL-IN-ONE Solution for Mice & Rats



Passive Avoidance
Light/Dark Test



Fear Conditioning
Panic Response



Active Avoidance
Latent Inhibition
Learned Helplessness

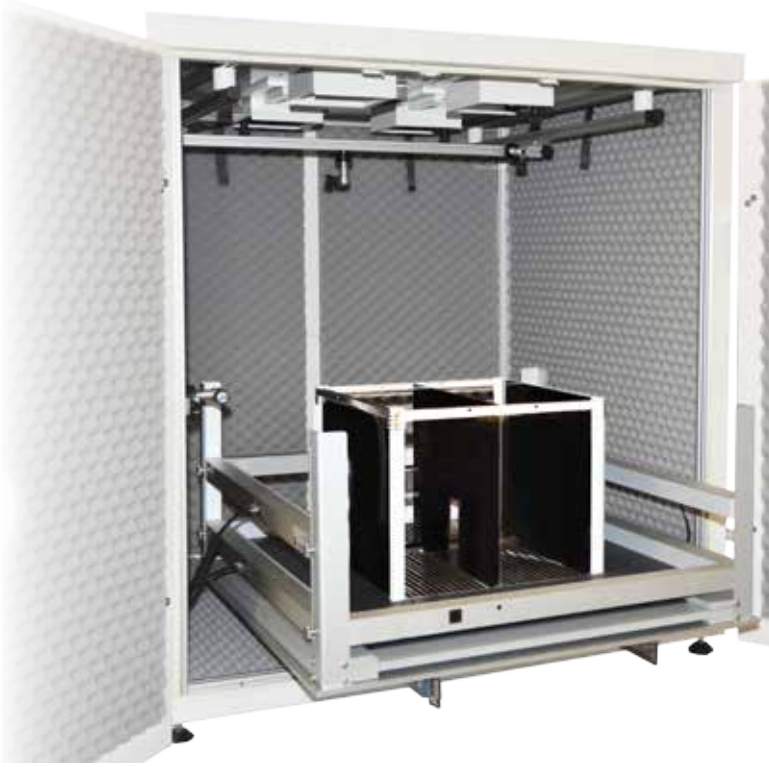


Place Preference

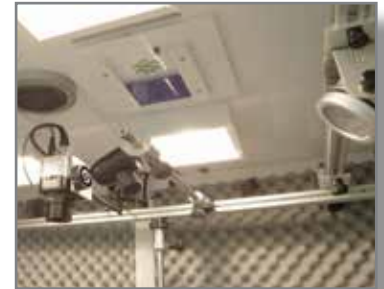


Open Field





Stimulus elements



Flexible camera installation on sliding metal bars

Multi Conditioning: Hardware

One system - nine paradigms. The TSE Multi Conditioning System (MCS) is the first and only multi-purpose modular test platform on today's market that can accommodate nine paradigms to evaluate learning and memory, as well as emotion and stress-related behaviors in mice (Art.-No.: 256060-S) and rats (Art.-No.: 256060-L). According to customer needs, the universal base unit can be equipped with modular components including a variety of arenas and accessories and the corresponding software package, thus offering maximal flexibility.

Universal Base Unit

- Housing with new sound attenuation & ventilator
- White house lights of variable intensity with integrated covers for red light conditions
- LEDs for stimulus presentation, individually controlled and of variable intensity (max 1000 lux) with integrated blue covers (covers of different colors optionally available)
- Background white noise generator
- Stimulus sine sound & noise generator with variable intensity (max 100dB) and frequency (2 – 22 kHz), for constant or pulsating sounds
- Ultrasound (22kHz) for panic response tests in rats
- High-resolution infrared light beam frame for fast (100Hz) movement detection in 3 dimensions
- Species-specific shock grid, usable in two orientations, with 8-rod pattern for guaranteed shock delivery
- The sliding floor facilitates accessing/ changing the arena
- Accessories of 3rd party products can be integrated into the experimental procedure via TTL signaling, controlled by the MCS Software
- Testing under any lighting condition and in complete darkness

Modular Arenas & Accessories

- Arenas of various sizes, designs, materials & colors, incl. home cages
- Arenas can be used with the shock grid, a grid cover plate, or a litter/sand tray
- Grid cover plates are available with different surface structures for tactile discrimination
- Special arenas with visual wall cues
- Various dividers for two-compartment paradigms with/ without gate, optionally automated
- Simultaneous video monitoring from up to 2 angles
- Flexible aluminum bars allow camera installation anywhere within the housing

ADVANTAGES

- Cost effective, especially for several paradigms
- Saves space, only one base unit is required
- Flexible, applicable to many animal models
- Common hardware guarantees comparability across paradigms
- Common software basis/logic grants high user-friendliness
- LARGE (mice & rats combined, 256060-L), or SMALL (mice only, 256060-S) system

Multi Conditioning: Dedicated Software

Three specialized packages – one underlying logic. The Multi Conditioning System can be operated with either one or a combination of three specialized software packages, depending on the paradigms needed. User surface and procedures are intuitive and follow the same logic in all three packages, which makes switching between packages very simple. Existing systems can be retrofitted with any package at later time points. The software is equipped with highly flexible trial parameter selection windows, which guide the user through a step-by-step definition of stimulus properties and experimental procedures for up to four test boxes.

Package 1 - Fear conditioning

- Suitable for trace and delay fear conditioning
- Multiple test boxes are started simultaneously
- Variable shock amplitude, with constant or pulsating current
- Comprehensive freezing analysis
- Parameters include number, time, duration, chronological list of freezing events according to user-defined thresholds, and more
- Detailed movement & activity analysis, incl. rearing
- Automated shock response (jumping and freezing) analysis
- Panic response analysis in rats

Package 2 - Two-Compartment Paradigms

- Paradigms: Active & Passive Avoidance, Place Preference, Learned Helplessness, Latent Inhibition, Light/Dark Test
- Multiple test boxes are started / stopped independently
- Software-driven transfer gate for Passive Avoidance, Place Preference, and Light / Dark Test
- Independent shock delivery in both compartments
- Variable shock amplitude, constant or pulsating current
- Automated shock response (jumping) analysis
- Compartment-specific movement & activity analysis

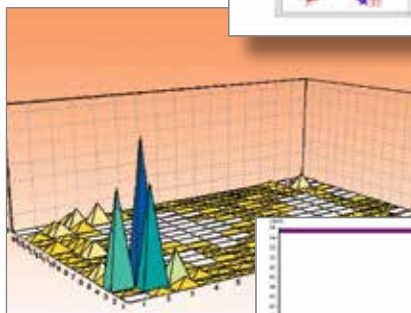
Package 3 – Locomotor Activity / Open Field

- User-defined regions of interest
- Around 100 parameters related to movement type, timing and path
- User-defined detection thresholds e.g., for hypo/hyperactivity
- Various graphical display options for activity/exploratory patterns incl. movement tracks
- Multiple test boxes can optionally be started / stopped simultaneously or independently

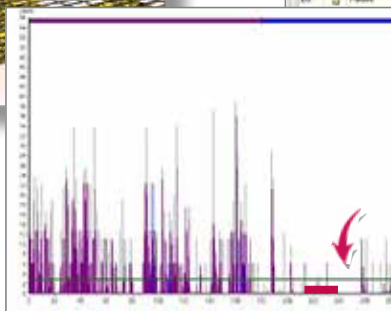
Selected Publications

- **Gräff J et al.**, Cell 156(1-2): 261-76, 2014
Fear Conditioning
- **Tucci V et al.**, J Clin Invest 124(4):1468-82, 2014
Fear Conditioning
- **Spinelli S et al.**, Front Behav Neurosci 7: 215, 2013
Adolescent Stress
- **Pryce DCR et al.**, Neuropharmacology 62(1): 358-372, 2012
Learned Helplessness

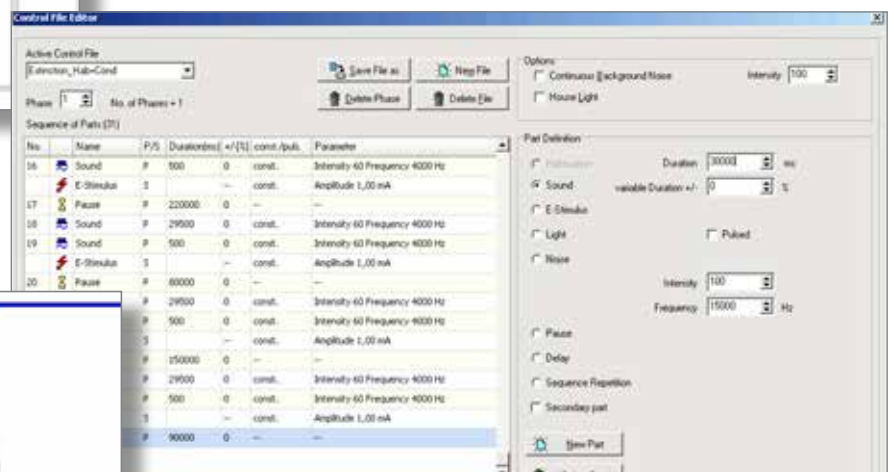
2-compartment movement track



3-D spatio-temporal activity map



Activity graph - inactivity indicates freezing episode



Control file editor - Fear Conditioning



Service & Warranty

TSE Systems offers a Two (2) Years ALL-IN Premium Warranty with all new products, including:

- 24/7 technical hotline
- Remote maintenance and update function
- On-site visits upon necessity
- Free replacement parts during warranty

After the expiry of the warranty period, TSE Systems offers comprehensive extensions of the warranty or economical maintenance and repair contracts to ensure the continued smooth running of your instruments. Please contact us for further details.

