

MOBES® – Technical Specification

The Complete and Portable Brake Squeal Recording System for Automobile Research and Development

MOBES®

Basic System



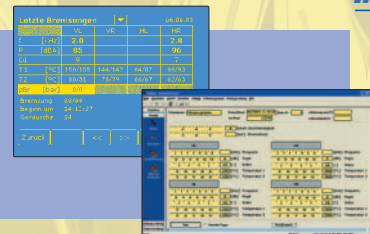
- Aluminum enclosure with plastic handles
 - All operating controls on one side
 - 2 ventilators for convection to the card slots
 - 1 ventilator for the power supply
 - 4 batteries in the upper casing
 - Passive backplane with 7 slots; 1 x CPU, 1 x ISA, 4 x PCI
 - Intel® Pentium CPU card
 - PCMCIA type 2/3 drive with front access
 - 20 GB 2.5" shock proof hard drive
 - LAN, USB, Serial ports
 - LEDs for battery condition
 - Anti-jump-clips for PC cards
 - Size: 7.1 x 15.2 x 17.5 in (182 x 385 x 445 mm)
 - Weight: 26.5 lb (- 12 kg)
 - Temperature range: 40°F to 120°F (5°C to 50°C)
- Power supply: 9 – 30 V DC; 90 – 230 V AC; Lead-gel battery with approx. 10 mins. running time (dependant upon initial charge); battery control including monitoring and barring via MOBES® software; shut-down when charge < 40 % via software. When running on DC power the battery will only be charged when MOBES® DE is switched on
 - Minimal current usage (< 2 mA) when system switched off)
 - System power up supervised by active temperature monitoring
 - System power down software controlled
 - Override to switch system on despite battery condition or under-/over-temperature (this at owners' risk!)
 - Reset switch (bump protected)
 - Power usage: 70 Watt (including all measurement technology)
 - Operating system: Windows® XP Professional

Measurement System Hardware



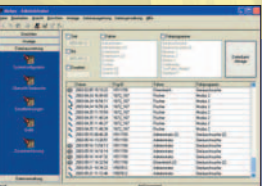
- 1 x recording card 16 A/D channels, 16 Bit, 500 kHz sample rate
 - 1 x recording card 16 A/D channels, 16 Bit, 100 kHz sample rate
 - 2 CAN-Bus inputs with galvanic isolation
 - 1 x 24 Bit digital I/O for computer monitoring and control
 - 1 x 24 Bit timer/counter
 - 2 x 8 slot backplane for 5B modules including power supplies
 - 8 x thermal-amplifiers (5B) with galvanic isolation, type K
 - 8 x microphone-amplifiers (5B) with galvanic isolation, ICP supply, digital 10 pole low-pass filter with 16 kHz frequency limit
- Connectors
 - 8 x BNC for microphones/acceleration sensors, with ICP supply and LED display
 - 8 x thermal-sockets type K with compensation
 - 8 x Lemo sockets for analog and digital inputs, including sensor supply
 - 2 x CAN-Bus: 9 pole DB9 sockets, 1 x 2 pole Lemo socket, 1 x 6 pole Lemo socket
 - 1 x 25 pole DB25 socket for further channels

MOBES® Software: Data Acquisition and Online Analysis



- Integrated acquisition software
- Acquisition and storage of fast (48 kHz) and slow (10 – 100 Hz) recording channels
- Online analysis of noise data through recognition and localization algorithms
- 3 recording modes:
 - Mode 1: records recognized noise data
 - Mode 2: additional storage of data from accompanying acquisition channels
 - Manual recording: loss-free compressed noise data for offline analysis
- Monitoring of the relevant operating parameters:
 - Temperature 32 ... 120°F (0 ... 50°C)
 - External power supply, battery charge
 - Inserting and removal of the flashcards
- Real time display via operating unit or laptop
- Operation via operating unit and/or laptop
- Acquisitions saved automatically to flashdisk
- System test: live display from all recording channels
- Microphone calibration function

MOBES® Software: Data Base

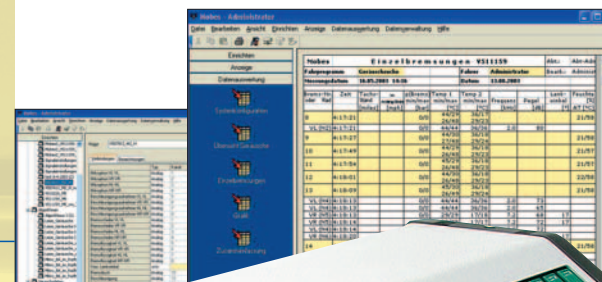
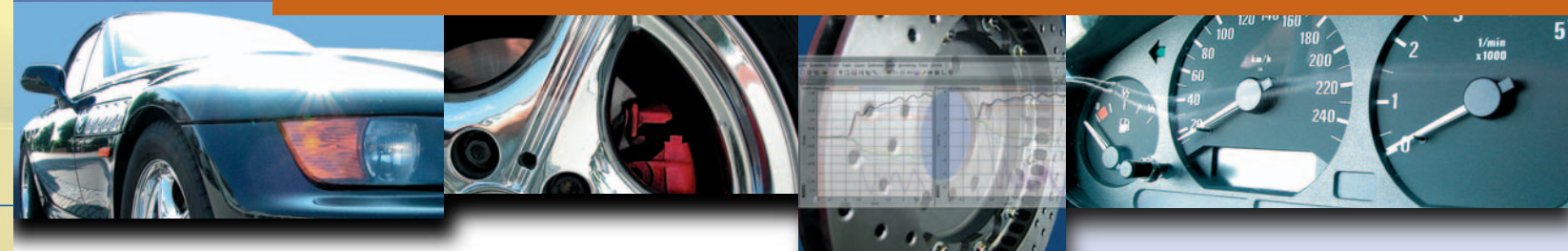


- Data base supported definitions for:
 - Signal configuration
 - Detection algorithms
 - Test descriptions
 - Driver and drive programs
 - User rights allocation through system administrator
- Import/export of acquisitions
- Search function to complex criteria
- Analysis of selected acquisitions using the many filter options
 - Table containing single braking operations and noises
 - Overview table per wheel and occurring frequency
 - Summary (global assessment of acquisition series)
 - Variable graphical representation of results

MOBES® Operating Unit



- 5.7" 2 color, high intensity LCD display with touch controller, 320 x 240 pixels resolution
- Infineon C167 CPU
- Serial transfer rate (56 Kbaud)
- Power supply from MOBES® (or external 9 – 30 V DC)
- Brightness control
- On-/off switch for complete system
- Reset switch for complete system
- Displays for system power status, temperature monitoring and noise detection
- Active temperature monitoring
- Weight: 1.8 lb (~ 800 g)
- Size: 6.9 x 6.3 x 2.4/2.8 in (175 x 160 x 62/72 mm)
- Power usage: ~ 3,8 W
- 15 pole DP15 connection plug (5 m cable included, other lengths available)



- Fully integrated system, developed specifically for mobile use
- Records, analyses and reports brake squeal in real time
- For use in
 - Test and research journeys
 - Squeal investigation
 - Long term testing
- Background noise recognition
- Scalable hardware and software



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The Complete and Portable Brake Squeal Recording System for Automobile Research and Development

Specially Developed Hardware Consisting of an Integrated Data Acquisition Unit and Operating System

All PC components are carefully selected for optimum performance, they are mounted in a rugged aluminium chassis which produces a highly stable package ideal for both laboratory or field use.

Quality engineering, based on 18 years of experience, assures that the system will meet all demands required for work in the field.

The system operates using either AC or DC power and is supplied with a UPS unit. Ventilation and temperature monitoring assure operation in extreme conditions.

Integrated Signal Processing

The data acquisition unit contains complete signal conditioning for 8 noise channels (amplifier, analog filters, power supply, ICP supply, etc.). Up to 8 additional channels are available for optional inputs and may be configured to measure temperature, strain-bridge, analog signals or for CAN connection.

Rugged Enclosure

- Aluminum profile enclosure with 6 mounting bolts (M5)
- 3 vent fans
- Software integrated temperature monitoring
- Software integrated UPS

Forward Thinking Computer Performance

- Latest Intel® processor technology
- Further improvements immediately available for MOBES® (computing performance, power use, heat conduction)
- Standard components allow easy replacement/repair

Practically Orientated Operating Concept

- Operation via touch screen
- Real time display of noise and journey conditions
 - Frequency, level, excession and assessment per wheel
 - Brake pressure and all temperatures at once glance
 - All other acquired data easily accessible via scroll function
 - Presentation of captured squeal events
- Immediate analysis during the acquisition
- Flexible user rights system

Custom Made Measurement System Hardware

- Preamplifier with ICP supply and galvanic isolation, digital 10 pole low-pass filter and function display (LED)
- 8 temperature inputs with galvanic isolation
- analog and digital inputs for the acquisition of vehicle conditions, with sensor supply
- 2 CAN-Bus inputs with galvanic isolation
- optional: analog and digital inputs for other uses

Flexible System Configuration

- Scalable software
 - 2 or 4 microphones
 - With or without acceleration sensors
 - 0, 2, 4 or 8 temperature sensors
 - Further channels
- Made to measure recording modes
 - Mode 1: low storage requirement, only critical noise data
 - Mode 2: stores acquisition data for recognized noises
 - Manual recording: loss-free compressed noise data for refined analysis
- Data base supported system configuration
- Password protected operator concept

Analysis

- Analysis methods specified for brake squeal evaluation, with flexible filter conditions
 - Single braking operations
 - Overview table
 - Graphical evaluation
 - Assessment summary
- Detailed analysis
 - Noise data
 - Accompanying recording channels
 - Data export into other binary formats or text files
- Access to all acquisitions/system configurations from the data base

Development

- Reliable noise recognition and localization with real time display
- Elimination of background noise through use of acceleration sensors
- Recording of relevant information from journey conditions and noise data
- Use in long term tests

Database

- Configurable database model
- All measurements results saved in the database
- Import/export between databases
- Central data pool organisation
 - Simplified browsing
 - Statistical analysis
- Operation concept for definition and analysis can be password protected

Data acquisition

- Configuration on flashdisk (simple slot-in technology)
- Simplified operation via operating unit touch screen
- Online display for
 - Frequency, level and assessment per wheel
 - Brake pressure and all temperatures at one glance
 - Visualization of noises recognized through on-screen emphasis and LED indicators
- Automatic storage of all relevant data to flashdisk
- Interruption and continuation of acquisitions during a test possible, also initialized via the ignition switch (long term testing)
- Last braking operations/noises and overview tables can be displayed while current tests are running
- Software control and monitoring of all relevant conditions such as system temperature, storage space, power supply, system shut down

Analysis

- Analysis methods specified for brake squeal evaluation, with flexible filter conditions, and referenced to the accompanying recording channels:
 - Single braking operations with squeal (including "listen" function)
 - Overview table for a number of acquisitions
 - Graphical evaluation of a number of acquisitions
 - Summarized assessment for a number of acquisitions
 - Documentation of the test conditions
- Detailed evaluation using the TurboLab signal analysis software:
 - Noise data (frequency analysis, flexible calculations)
 - Accompanying recording channels
 - Data export into other binary formats or text files

