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DATA SHEET

SQuare (Code 2420)

Sound Quality Representation and Evaluation Studio

Overview

HEAD SQuare is an extremely flexible modular software for conducting listening tests quickly and easily. All test designs can be created intuitively, and SQuare leaves a lot of room for custom test design. Besides individual tests and group tests, SQuare offers an "Interactive Mode" for presenting and discussing sounds in a group.

In order to meet the users' individual requirements and to ensure a maximum of realism in the listening tests, SQuare can be combined with hardware components from HEAD acoustics in flexible ways. This ensures that reliable and reproducible judgings can be achieved because, for example, for each playback of binaural recordings the range and equalization type are adjusted automatically and correctly.

If vehicle interior noise is to be evaluated in a realistic environment rather than in a listening studio, SQuare can also be used in the SoundCar or in the SoundSeat from HEAD acoustics.

Features

- Central control and user-friendly configuration of test procedures (Playlist) on a Master PC
  - ArtemiS sounds can be easily included in one or several Playlists
  - A wide range of editing possibilities
  - RPM- or time-synchronous switching between several sounds possible (Switch Mode)
  - Network-compatible SQL database
  - Language selection with standard texts (englisch/german) or custom captions for instructions and buttons
  - Expandable statistics - correlation of test results with psychoacoustic analysis etc.
- Subjective judgment in group tests, individual tests and interactive tests (required: Sound Quality Studio Tool Packs [STP] 1 - 3)
- Test types: Category Judgment, Paired Comparison, Semantic Differential (incl. Semantic Differential according to ITU-T P.835), Ranking
- Easy and convenient realisation of the desired test design
- Hardware components for aurally accurate playback in listening studios, in the SoundCar or in the SoundSeat from HEAD acoustics (hardware and software from one source)
  - Quick and uncomplicated setup of all components in a listening studio
  - Binaural headphone equalizer *lab*P2 for playback via high-quality headphones
  - Automatic adjustment of the correct range and equalization type during playback
  - Judgment input via tablet PCs, touchscreens, or mouse
  - 2-channel playback equalizer *lab*O2 for playback in the low-frequency range with subwoofers, loudspeakers, etc.
  - Four-channel playback, e.g. for reproducing sounds and vibrations in the SoundCar or in the SoundSeat (2 x airborne sound and 2 x structure-borne sound)

Scope of supply

- Sound Quality Studio (Code 2420)
  Basic software version
  Creation, control and supervision of the tests (for Master PC)
- Microsoft SQL Server 2012
- Microsoft Access Database Engine 2016

SQuare - software

Test preparation

Assisted by a software wizard, the test supervisor creates a Playlist on the Master PC, which defines and controls the entire testing sequence. The judgment criteria can be freely edited, so Semantic Differentials, Category Judgments etc. can be easily customized. For extensions, such as illustrations or animations, a wide range of possibilities is available. An Import Wizard facilitates the creation of Playlists for common test setups.

Master PC

The Master PC is the control center for all tests. Via the Playlist it controls the test sequence and receives the judgments from the subjects online. The test leader can intervene at any time and makes modifications to the various testing modes. All files and results can be saved in an SQL database. Additionally, the results of the listening tests can be evaluated with Excel and imported from the Excel data again.

Test signals

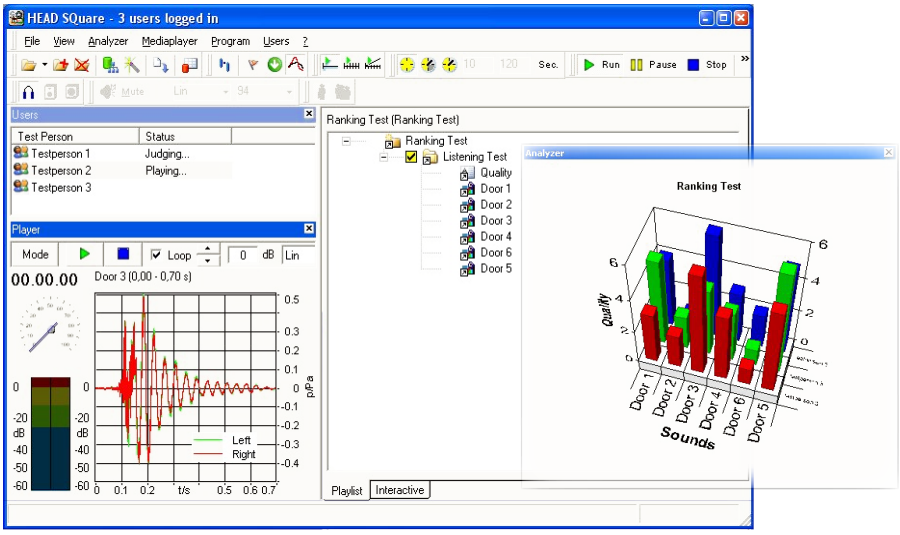
If there is the need to modify the test signals to be judged, SQuare allows, for example, the duration, the volume, the amplitude and – for artificial head recordings – the equalization for the playback to be specified.

Statistic evaluation

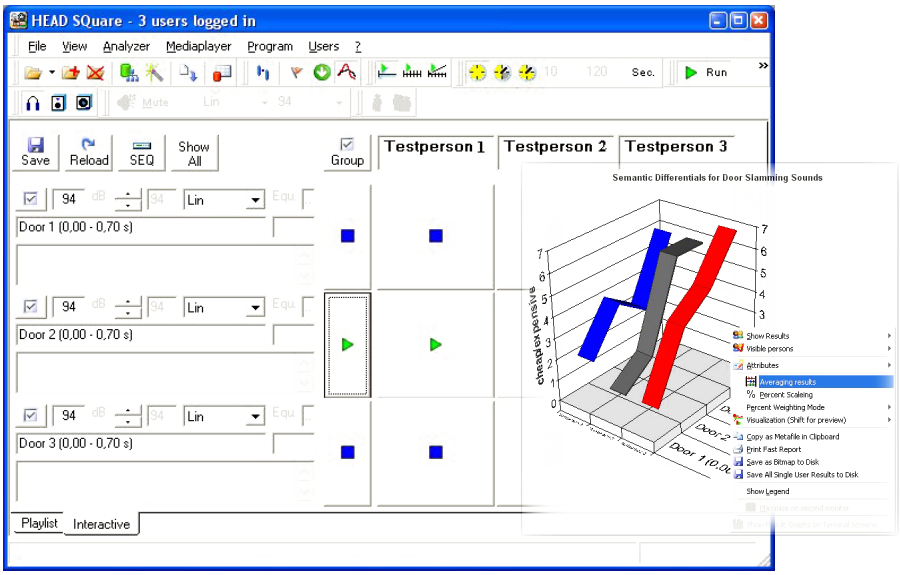
Among the statistic evaluation options is the possibility to evaluate test results about the sound examples or the test participants. In Excel, macros can be programmed for the calculations and the presentation of the results, thus the statistic evaluation can be customized to meet the users' needs.

Correlation of test results with ArtemiS analysis results

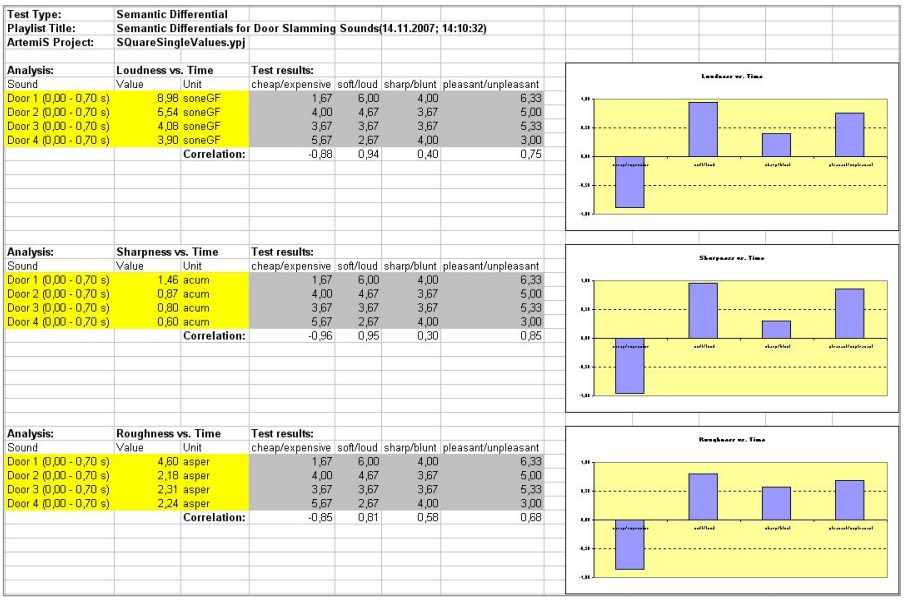
For a comparison between analysis results (such as sharpness, roughness or loudness) and the subjective judgments from the subjects, the test results can be compared with the results of user-defined ArtemiS



Example for a Playlist created by the Master PC.



Interactive test mode – from the test leader's point of view (Master PC). The test leader at the Master PC receives via an online display the judgments from the subjects during the test procedure.



Test Type:	Semantic Differential					
Playlist Title:	Semantic Differentials for Door Slamming Sounds(14.11.2007; 14:10:32)					
ArtemiS Project:	SQuareSingleValues.ypj					
Analysis:	Loudness vs. Time		Test results:			
Sound	Value	Unit	cheap/expensive	soft/loud	sharp/blunt	pleasant/unpleasant
Door 1 (0,00 - 0,70 s)	8,98	soneGF	1,67	6,00	4,00	6,33
Door 2 (0,00 - 0,70 s)	5,54	soneGF	4,00	4,67	3,67	5,00
Door 3 (0,00 - 0,70 s)	4,08	soneGF	3,67	3,67	3,67	5,33
Door 4 (0,00 - 0,70 s)	3,90	soneGF	5,67	2,67	4,00	3,00
		Correlation:	-0,88	0,94	0,40	0,75
Analysis:	Sharpness vs. Time		Test results:			
Sound	Value	Unit	cheap/expensive	soft/loud	sharp/blunt	pleasant/unpleasant
Door 1 (0,00 - 0,70 s)	1,46	acum	1,67	6,00	4,00	6,33
Door 2 (0,00 - 0,70 s)	0,87	acum	4,00	4,67	3,67	5,00
Door 3 (0,00 - 0,70 s)	0,80	acum	3,67	3,67	3,67	5,33
Door 4 (0,00 - 0,70 s)	0,60	acum	5,67	2,67	4,00	3,00
		Correlation:	-0,96	0,95	0,30	0,85
Analysis:	Roughness vs. Time		Test results:			
Sound	Value	Unit	cheap/expensive	soft/loud	sharp/blunt	pleasant/unpleasant
Door 1 (0,00 - 0,70 s)	4,60	asper	1,67	6,00	4,00	6,33
Door 2 (0,00 - 0,70 s)	2,18	asper	4,00	4,67	3,67	5,00
Door 3 (0,00 - 0,70 s)	2,31	asper	3,67	3,67	3,67	5,33
Door 4 (0,00 - 0,70 s)	2,24	asper	5,67	2,67	4,00	3,00
		Correlation:	-0,85	0,81	0,58	0,68

Examples: Statistical evaluation in Excel.

projects.

SQuare - Tool Packs
(not included)

Group test mode

In this setup the test participants make their judgments simultaneously. The test sequence is predefined and can only be changed by the test leader, but not by the subjects.
(required: STP 01)

Individual test mode

In this setup, each subject is equipped with a PC containing all information required for the entire listening test. The master only specifies the basic conditions and leaves it up to the subjects to choose the order in which the sounds are played, repeat individual sounds or sequences etc.
(required: STP 02)

Interactive test mode

The interactive test can be used for sound presentations in discussion meetings.

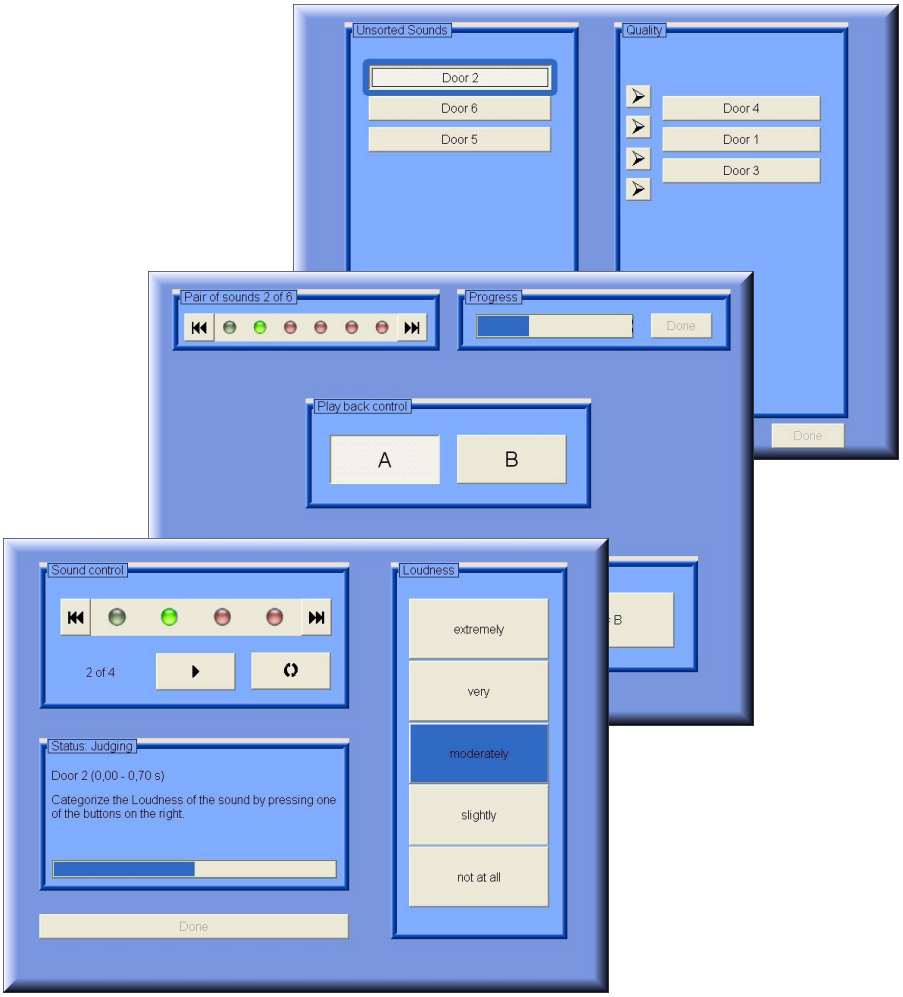
The leader of the test or discussion can interactively manage the sequence, order, volume, equalization etc. on the Master PC. He can also provide the subjects with a selection of sounds for an individual test.
(required: STP 03)

SQuare Tool Packs

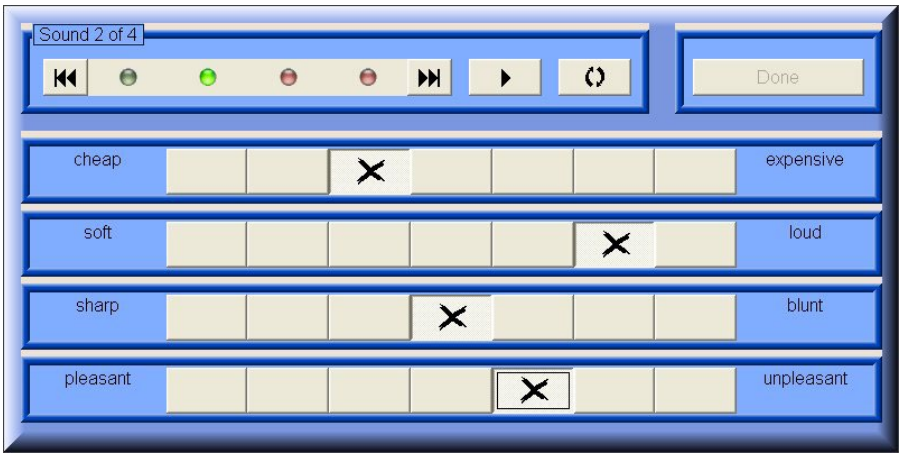
- STP 01 (Code 2421)
  Tool Pack for group tests
- STP 02 (Code 2422)
  Tool Pack for individual tests
- STP 03 (Code 2423)
  Tool Pack for interactive tests

System requirements
(Master PC)

- Windows 7 (x86 or x64): Professional, Enterprise, Ultimate; languages: US / Western European, Service Pack 1
- ≥ Microsoft SQL Server 2012
- Microsoft Access Database Engine 2016
- ≥ Core2Duo processor 2 GHz
- ≥ 2 GB (RAM)
- Microsoft Excel



Test types: (Preference Test, Category Test, Ranking Test) for individual listening tests.



Semantic Differential for individual listening tests.

Semantic Differential according to ITU-T P.835 for individual listening tests.

SQuare - hardware
(not included)

The listening stations

In a listening studio all subjects are equipped with either the playback unit *lab*P2 e.g. with the dynamic headphone HD IV.1 for aurally accurate playback and tablet PC or touchscreen.

Using the playback equalizer *lab*O2 playback via headphones can be complemented by subwoofers, loudspeakers, shakers, etc. in the low-frequency range.

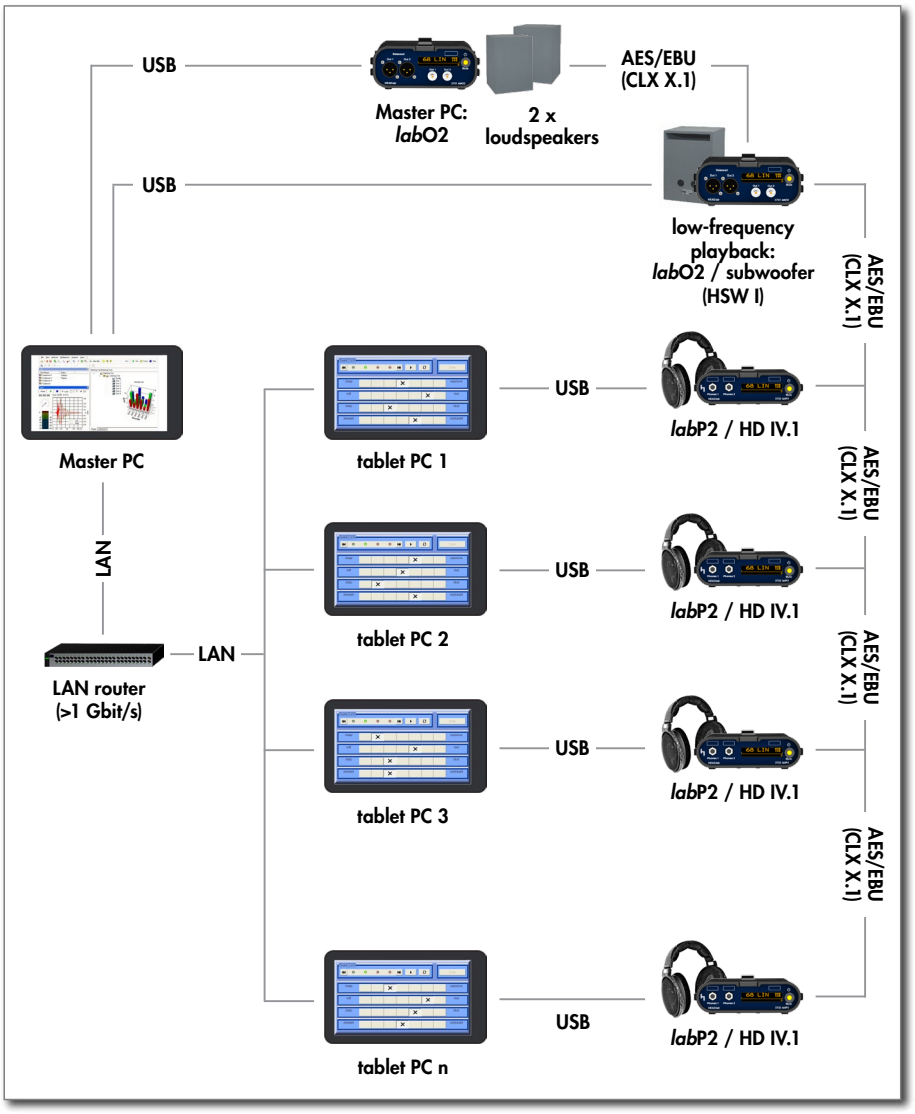
Hardware components

- *lab*P2 (Code 3732)
  Binaural headphone equalizer
- Power supply
  24 V, 60 W, LEMO 4-pin
- HD IV.1 (Code 2380)
  Dynamic headphone for *lab*P2
- CLX X.1 (Code 3797-1)
  AES/EBU adapter, 1 m (39.4")
- CXX II.3 (Code 5177-3)
  Cable AES/EBU XLR 3-pin, male ↔ XLR 3-pin, female
- *lab*O2 (Code 3731)
  2-channel playback equalizer with Line outputs
- *lab*O2-V1 (Code 3731-V1)
  2-channel playback equalizer with Line outputs, headphone connector
- *lab*P2-V1 (Code 3732-V1)
  Binaural headphone equalizer
- HPL (Code 2968)
  2 x High Precision Loudspeaker
- HSW I (Code 2950)
  HEAD subwoofer
- *lab*OA (Code 3785)
  Optical/electrical adaptor
- Fiber optics patch cable (for *lab*OA)

For up-to-date information about other hardware components recommended by HEAD acoustics (e.g. tablet PC, notebook, SoundCar), please contact your sales engineer at HEAD acoustics.

Listening tests in the SoundCar or in the SoundSeat from HEAD acoustics

SoundCar and SoundSeat are real car bodies with a built-in sound and vibration playback system, which immerses the subject in a very realistic driving situation. In addition to the acoustic signals the subject perceives through a headphone, the matching vibrations can be created by shakers connected to the seat and the steering wheel (4-channel playback).



Example of a hardware configuration in a listening studio.

Using SQuare, listening tests can be quickly and easily performed in the SoundSeat from HEAD acoustics.

Thanks to the four-channel playback of SQuare, listening tests can be easily conducted in the SoundCar from HEAD acoustics and thus in an extremely realistic environment.