



DATA SHEET

Square (Code 2420)

Sound Quality Representation und 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.

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 from HEAD acoustics.

Applications

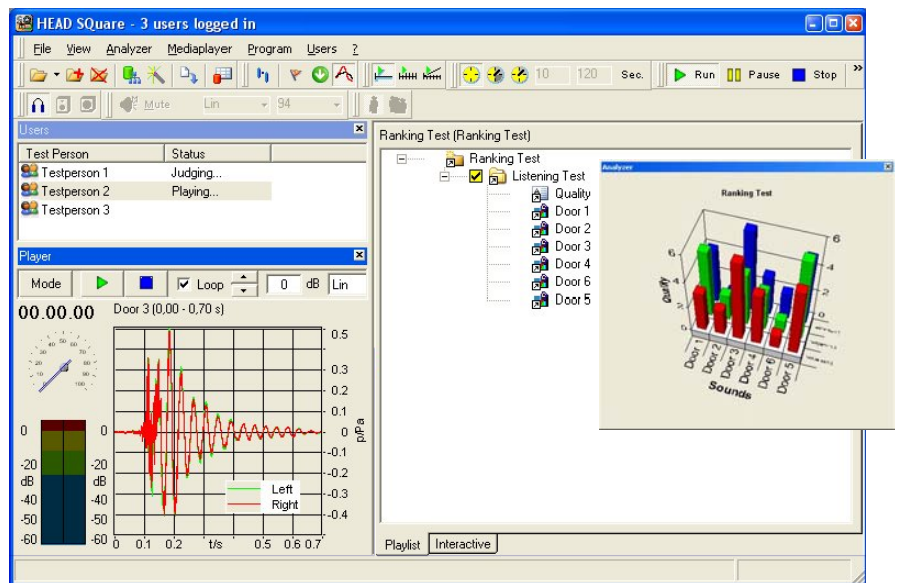
- Sound Design
- Product development
- Research
- Benchmark tests
- Specific product enhancement

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 (English/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)
 - A/B comparisons, semantic differentials, categorical judgment and ranking tests

Hardware (not included)

- Hardware components for aurally accurate playback in listening studios or in the SoundCar from HEAD acoustics (hardware and software from one source)
- Judgment input via tablet PCs, touchscreens, or mouse
- Four-channel playback, e.g. for reproducing sounds and vibrations in the SoundCar (2 x airborne sound and 2 x structure-borne sound)



Example of a playlist provided at the PC

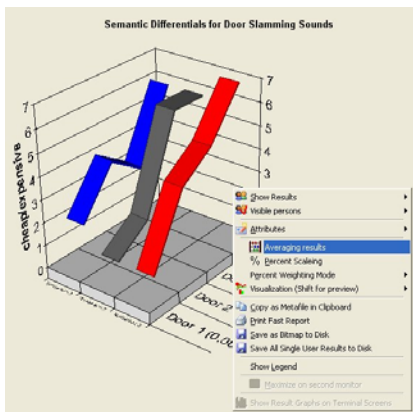
Test Design and Evaluation

Test Preparation

Assisted by a software wizard, the user 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, categorial comparisons 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 exported into Excel or other statistics programs for further evaluation.



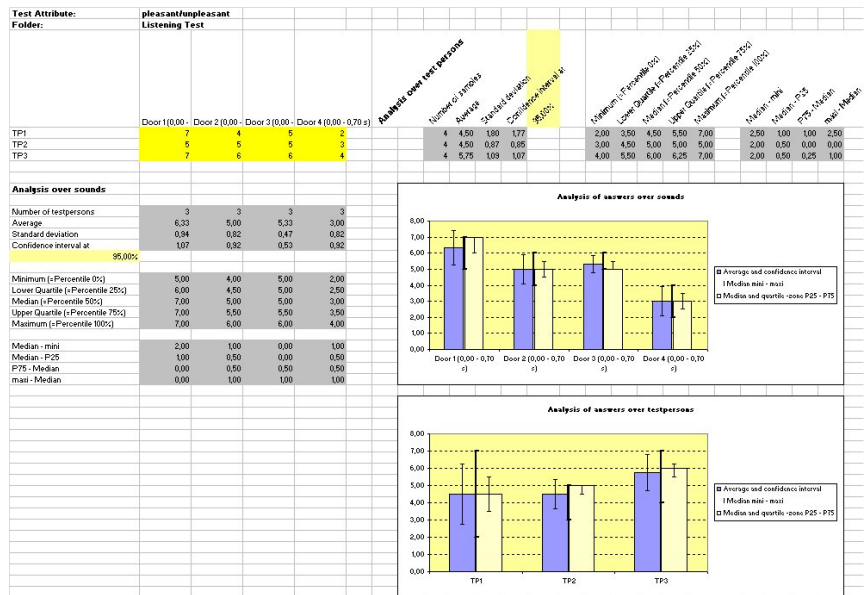
The test leader at the master PC receives via an online display the judgments from the subjects during the test procedure.

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.



Example of a statistical evaluation in MS Excel®

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	someGF	1,67	6,00	4,00	6,33
Door 2 (0,00 - 0,70 s)	5,54	someGF	4,00	4,67	3,67	5,00
Door 3 (0,00 - 0,70 s)	4,08	someGF	3,67	3,67	3,67	5,33
Door 4 (0,00 - 0,70 s)	3,90	someGF	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

A comparison between the subjective judgments from the subjects and the analysis results (such as sharpness, roughness or loudness) with ArtemiS shows a high correlation of the results.

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 projects.

Test Modes

Group Test Mode

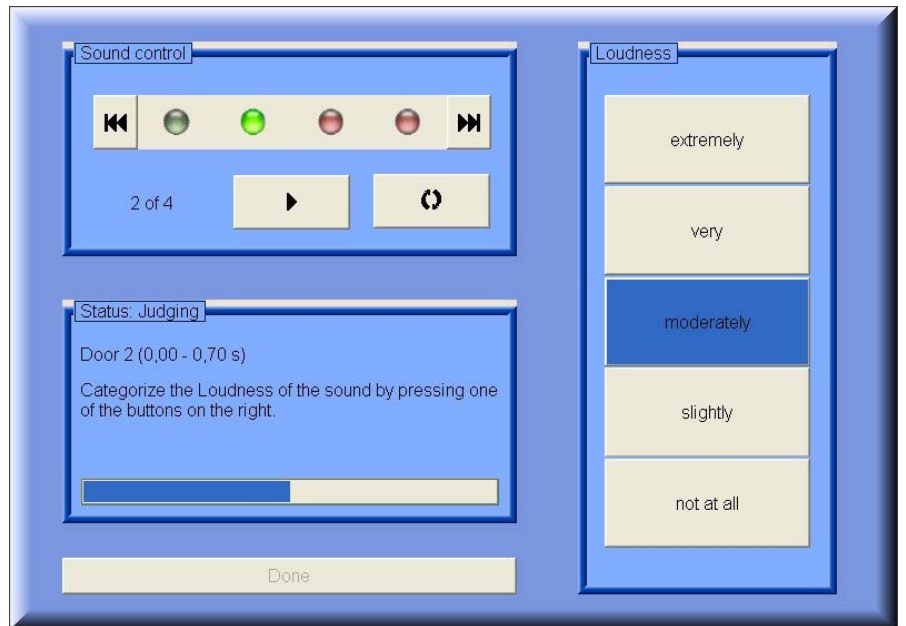
In this setup the test participants make their judgments simultaneously. The test sequence is predefined and can only be changed by the test leader, but not by the subjects.

(required: STP 01)

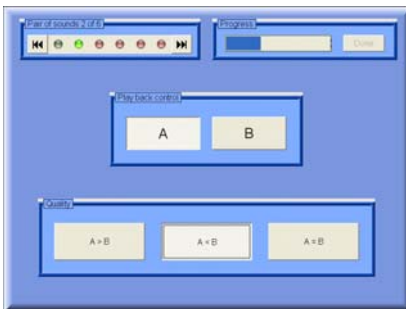
Individual Test Mode

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.

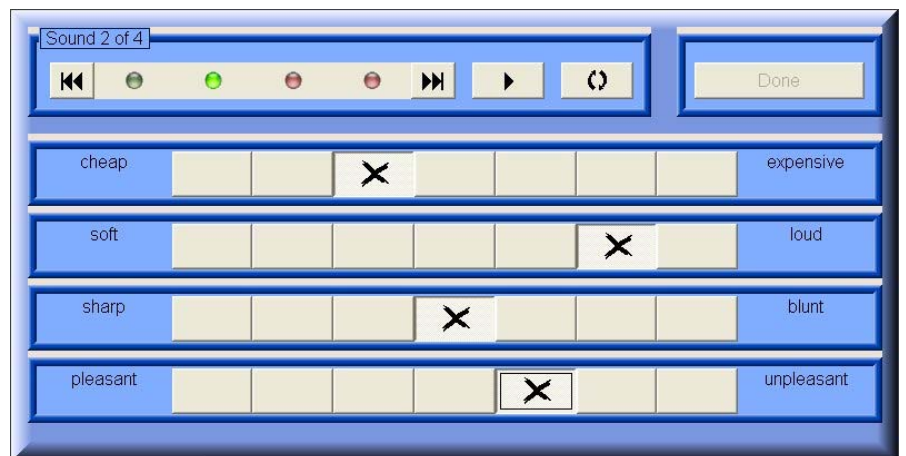
(required: STP 02)



Category test for individual listening tests



Preference test for individual listening tests



Semantic differential for individual listening tests



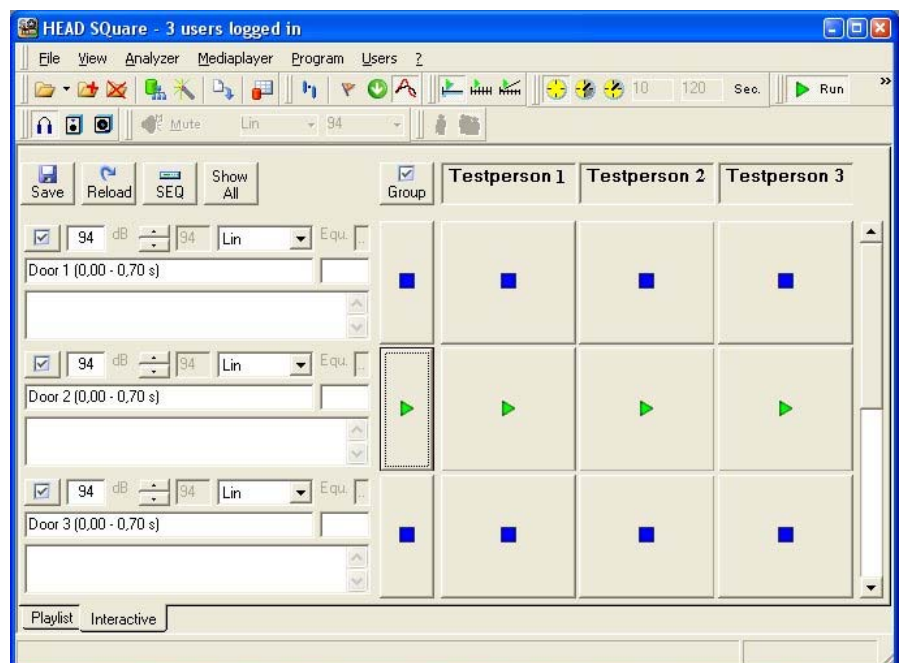
Ranking test for individual listening tests

Interactive Test Mode

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

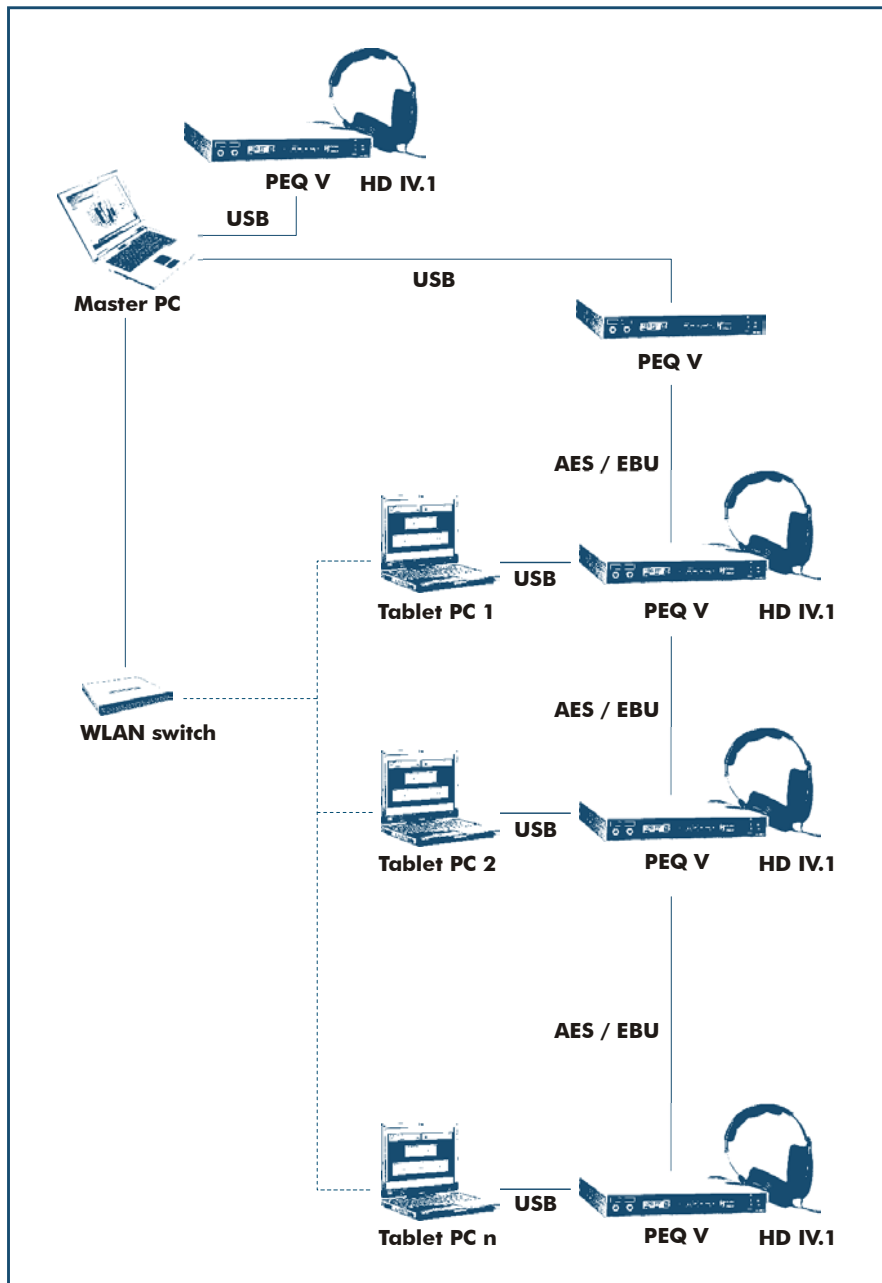
The leader of the test or discussion can interactively manage the sequence, order, volume, equalization etc. on the master PC. He can also provide the subjects with a selection of sounds for an individual test.

(required: STP 03)



Interactive test mode – from the test leader's point of view (master PC)

Recommended Hardware



Example of a hardware configuration in a listening studio. The wireless connection between the master PC and the tablet PCs allows a quick and uncomplicated setup of all components in a listening studio.

Standard Delivery Items and Tool Packs

Sound Quality Studio Software Basis-Version (Code 2420)

Tool Pack for the creation, control and supervision of the tests (for the master PC)

System requirements:

Windows® 2000 / Windows® XP
(Speeches: US / Western European)

Microsoft® Excel®

STP 01 Sound Quality Studio Tool Pack (Code 2421)

Tool Pack for group tests

STP 02 Sound Quality Studio Tool Pack (Code 2422)

Tool Pack for individual tests

STP 03 Sound Quality Studio Tool Pack (Code 2423)

Tool Pack for interactive tests

The Listening Stations

In a listening studio all subjects are equipped with either tablet PC or touchscreens and the aurally accurate playback unit PEQ V with the dynamic headphone HD IV.1.

Optionally, subwoofers or loudspeakers can be used as well.

Listening Tests in the SoundCar from HEAD acoustics

The SoundCar is a real car body 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 are created by shakers connected to the seat and the steering wheel (4-channel playback).

This system provides the subjects with an authentic environment, which vastly improves the validity of the judgments compared to tests conducted in listening studios.

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.

Recommended Hardware Components

- PEQ V (Code 2492)
Programmable, digital Equalizer
- HD IV.1 (Code 2380)
Dynamic headphone for PEQ V
- HSW II.1 (Code 2952)
HEAD Subwoofer

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.