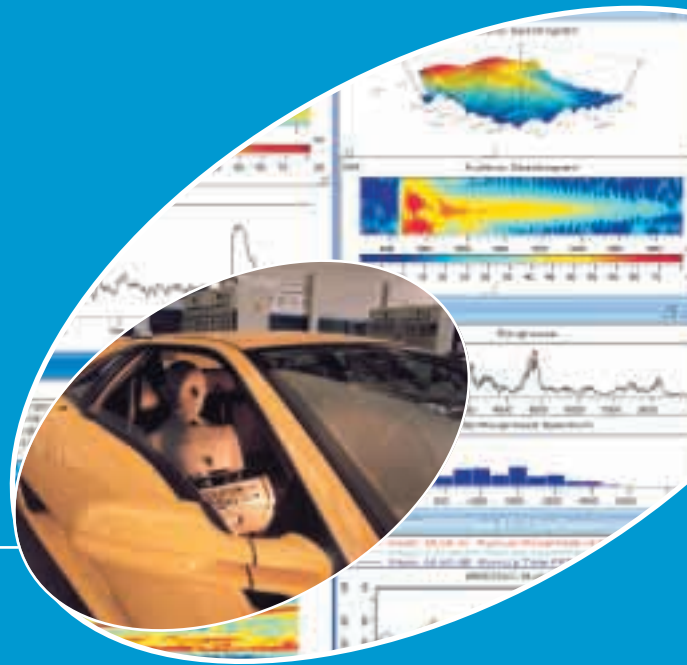


dB Sonic

**Build sound quality into
your products !**



01dB *acoustics
& vibration*
METRAVIB technologies

dB Sonic

dB Sonic is an off-line sound analysis software designed to fulfill the various needs of technical centers, laboratories and industrial engineering offices for performing efficient sound quality analysis.

dB Sonic benefits from the long experience acquired with the CORTEX Acoustic Workstation which started in 1989 as the first digital psychoacoustics measurement system with real-time loudness analysis worldwide and the first digitally equalized Binaural Recording Head MKI in 1996. Leading-edge technology in Sound Quality has been continuously developed at CORTEX (now part of the O1dB group) resulting in **dB Sonic** strongest features:

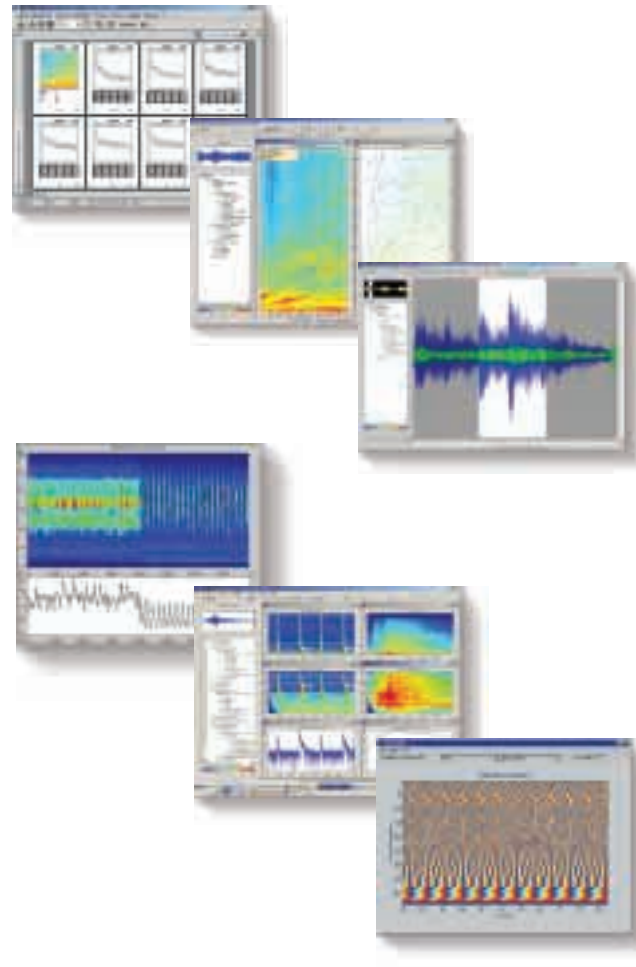
- Ergonomic and innovative sound design
- Precise psychoacoustics and standardized measurements (IEC, DIN EN, ANSI, ...)
- Easy and intuitive operation
- Fast and flexible documentation

The Sound Quality system **dB Sonic** is optimized for use with a manikin. Several other front ends are supported (Symphonie, Orchestra, ...) as well as Windows™ measurement systems.

The Sound Quality software package **dB Sonic** offers a wide range of solutions to fit with general and specific customers requirements according to their application fields:

- Multipurpose sound analysis
- Engine noise analysis
- Acoustic design of industrial products
- Squeak and rattle
- Psychoacoustics R&D activities
- Musical acoustics
- Speech analysis and synthesis
- Education and training

With **dB Sonic**, annoying sound components are easily analyzed, identified, documented and removed by creating targets sounds with its most innovative sound design tools *PerceptualXplorer* and *FilterXplorer*.



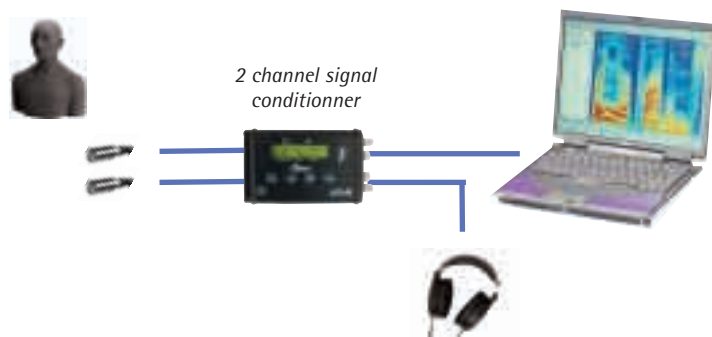
“See what you hear...”

System components

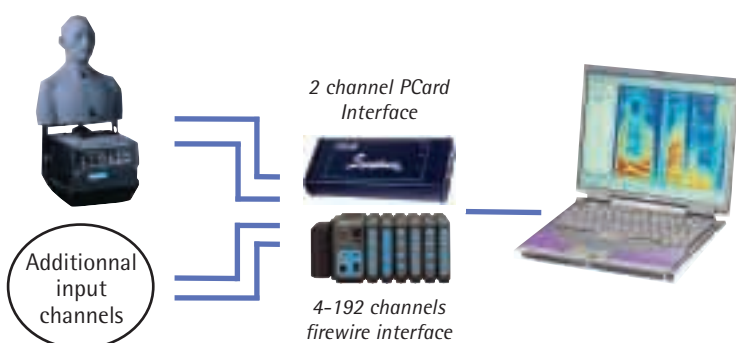
With artificial head: AES/EBU digital format



With Opus and digital sound conditioner



With multichannel front-end



With USB front-end



Easy calibration without adapter !
100 % repeatable calibration

Detailed ear and head shape
Provides excellent sound perception and most accurate directivity (according to IEC 951 standard)

Digital processor units with :
24 bits AD converters - DSP for equalization
Built-in calibration signal generator

Optimal seat positioning
Safety belt holder - Robust and designed for drive test conditions

Double tilting mechanism
Enables a realistic posture for correct measurement results

Remote control
For MK1 and optional DAT with RPM display



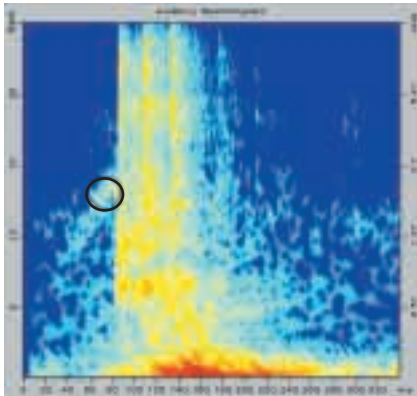
Optional DAT recorder

Front panel
Digital and analog outputs available simultaneously - RPM input and output

...Hear what you see"

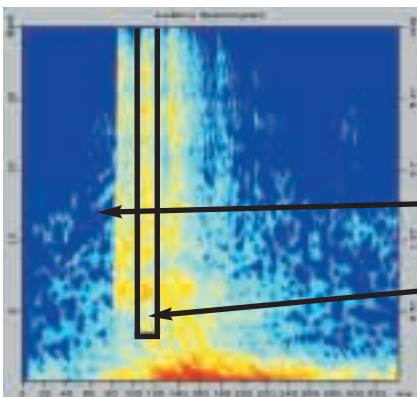
Powerful tools for the exploration of critical time variant and transient sounds.

Easy Creation of target sounds by intuitive editing and resynthesis of auditory spectrograms.



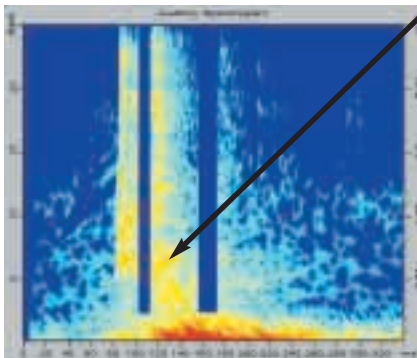
Auditory Analysis

- Whistling identification (circle)
- Clattering is caused by the fact that the sound consists of 3 single "events" within a short time



Synthesis of a target sound

1. Reduce level of whistling (arrow) by 18 dB (i.e. becomes less audible!)
2. Delete the second "event". After re-synthesis: the clattering has disappeared, but the sound is still too "hard".
3. Move the third event in the time domain (nearer to event 1).



Resynthesis:

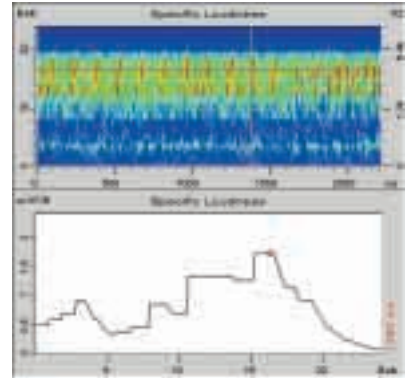
The sound is softer, the two remaining events are not perceived separately any more. The door sound provides a solid and quality impression.

Example: Modifying a Car Door-Slam-Noise

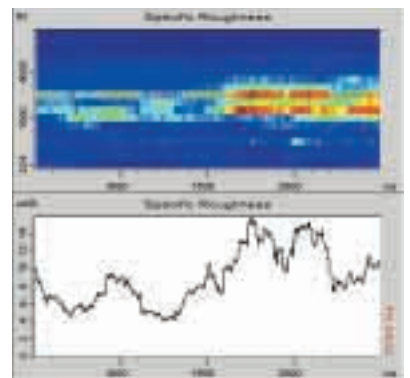
Hearing perception: weak initial whistling and clattering results in a poor quality sounding door slam

Standardized analysis capability order analysis, ...).

Accurate psychoacoustic metrics



The time history of the loudness band at 2 kHz shows strong modulations, which are much more regular and distinct in the second part (diesel engine) of the recording.



The Roughness analysis shows that the modulations in the second part of the recording cause an increase in perceived roughness.

Example: Comparison of Otto and Diesel

MAIN REFERENCES

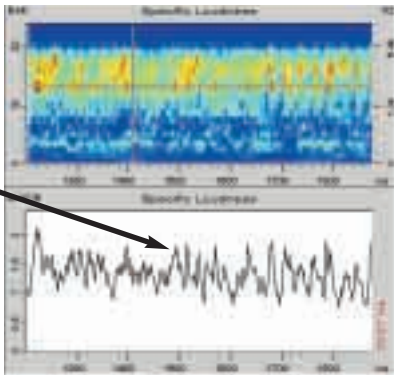
Industrials:

- Bosch, Daimler Chrysler
- Kia Automotive, Rucker
- Siemens VDO, Tyco, Valeo
- Lufthansa, Blaupunkt, ...

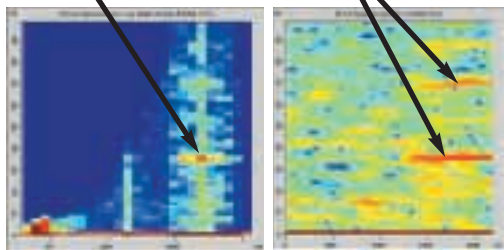
(FFT, third-octave analysis,

and indicators.

Both engines show high Loudness values in the range of 2 - 3 kHz (13 - 16 Bark), but the diesel engine sounds much rougher.



The Modulation analysis shows the strongest modulations in the frequency range around 2 kHz, with high modulations in the second part at 35 Hz and 70 Hz.

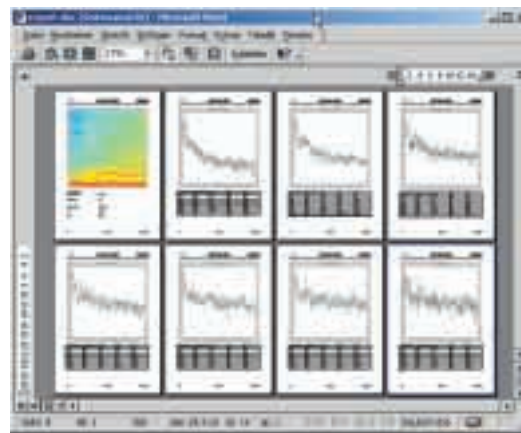
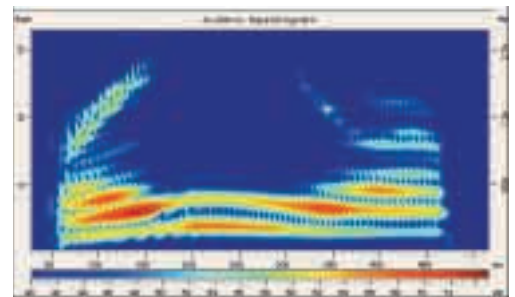
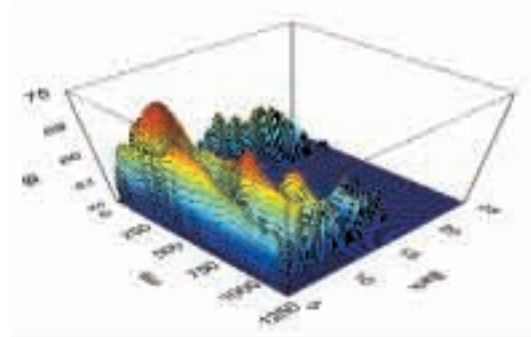


engine with identical third-octave spectra

Results inspection using Waterfall, Spectrogram, Spectrum/Slice Displays.

Ergonomic comparison of different results by dragging and dropping into the multiscalar and multispectra window.

Easy numerical export and adjustment of graphical features according to your individual needs.



Fast calibrated recording, automated analysis, archiving of results in workspaces and projects, combined with fast and flexible documentation and recordings enables you to make immediate measurements and complete reports.

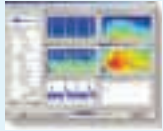
Report Wizard:

Step-by-step set-up of automatic reports for the selected workspace or project. Can be linked to MS WORD templates in order to create standardized reports.

Research centers and Universities:

- DLR Köln, Uni Oldenburg, Uni Hamburg
- FH Stuttgart, FH Regensburg, TU Cottbus
- Musik Hochschule Hannover, PTB Braunschweig
- Juseong College Korea, ...

Technical specifications



dBsonic Sound Analysis Package (SAP)

- Sound signal recording and playback
- SPL-analysis according to IEC651 (DIN EN 60651) and ANSI S1.4-1983
- FFT and 1/3 octave analysis (IEC 1260 class 0 and ANSI S1.11-1986)
- Tonality and prominence analysis according to E DIN 45681-2002 and ANSI S1.13-1995
- Basic editing and filtering functions
- Workspace and Project management for multi-channel recordings
- Import of various data formats



dBsonic PerceptualXplorer (PXP)

The acoustic contribution of the individual components of a sound is not a secret any more! Intuitive exploration, editing, resynthesis of time and frequency components "millisecond by millisecond" or "Hertz by Hertz".
Includes: auditory spectrogram (ASP), spectral editor, time and frequency contours, detection of time varying tonal components (tracks), resynthesis.



dBsonic Psychoacoustics Analysis (PSY)

Audible differences between sound signals that you could not even measure in the past can now be expressed in numbers, displayed as spectra and compared exactly by means of psychoacoustics measurement methods.
Includes: "classical" psychoacoustic metrics loudness, sharpness, roughness, fluctuation strength, tonality in proven CORTEX quality, ...



dBsonic Sound Editor and FilterXplorer (SED)

- Cut, copy, paste, delete, trim, fade (in,out), change level, calibrated and hearing-based play back, resampling, import of various sound file formats.
- Graphical and numerical design of real-time and off-line filters. (up to 20 individual filters can be combined to a filter setup, each individual filter can be designed as equalizer, highpass, lowpass, bandpass, bandstop filter with Butterworth or Chebychev characteristics).
- Includes display of transfer functions (magnitude, phase, group delay for individual filters and for filter set) and influence on a reference spectrum.



dBsonic Extended Frequency Analysis (FXA)

- Modulation Analysis with display of modulation depth or level of the envelope versus time and versus modulation frequency for one frequency band or averaged over a time section for several frequency bands (with octave, 1/3 octave, Bark, ERB or freely selectable filter bandwidth)
- Includes Wavelet Analysis.



dBsonic RPM Module (RPM)

- Order analysis based on resampling and order extraction
- RPM depending display for all analysis results (FFT, 1/3 octave, ASP, tracks)
- Simultaneous display of frequency vs. time/rpm or order vs. rpm with order cursor (scaled lin, log or in Bark)
- Multi-RPM/Order display for fast and effective comparison of orders from different recordings. RPM related A/B comparison
- Automatic recognition of a tacho signal in the LSB (16th bit) of a recording.
- Post-processing for tacho signal (smoothing, adjustment of prescaler)



dBsonic Documentation Module (DOC)

- Fast and easy documentation of selectable metrics by means of multiscale and multispectra display
- Percentile calculation
- Workspace report and Report Wizard



dBsonic Difference Analysis (DIF)

Differences between two samples can be visualized in distance spectrograms for any analysis method of dBSONIC.
A/B Comparison of samples or marked sections, automatic sorting of the cliplist according to given categorical judgements.
Includes MEAN function and intuitive "clip-list" music box capability (jury)



dBsonic MATLAB® Interface (MAT)

- MATLAB® routines for importing dBSONIC files into MATLAB®
- Includes graphical user interface

MATLAB is a registered trademark of The MATHWorks Inc.

Benefits

- Leading-edge Sound Quality package resulting from more than 15 years of experience
- Easy and intuitive to operate
- Auditory spectrograms with high time and frequency resolution according to the human ear
- Accurate psychoacoustic metrics
- Innovative PerceptualXplorer enabling intuitive Sound design
- Fast and flexible documentation

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