SAMURAI

S	*SINUS*
A	*Acoustic*
M	*Multi-channel*
U	*Universal*
R	*Real-time*
A	*Analysis*
I	*Instrument*

Video-Demos of SAMURAI Software

Description:

SAMURAI is our universal software package for noise and vibration measurements as well as real-time analysis with our **Soundbook**, **Apollo,** **HARMONIE,** **SWING,** **HURRICANE** and **NoiseLOG** systems.

SAMURAI contains 2-, 4- or 8-channel sound level meters conforming to the IEC60651 / IEC 60804 / IEC 61672-1, IEC 651 and IEC 804 standards. In Germany the Soundbook system is officially calibratable using the **siNoise** program version (fixed setup). Additionally, we have obtained the type approval according to IEC 61672-1 and IEC 60260 (for 1/3 octaves) in Austria and Hungary.

Because of the high system performance the user benefits from a wide range of functions simultaneously available on all measurement channels. SAMURAI features excellent display capabilities not only during the measurements but also during the post-processing of the measurement results. The basic principle of the software is that virtual measurement instruments provide data for activated measurement channels. There are various types of virtual measurement instruments, differing in the types of data provided (e.g. sound levels, spectra, time signals, speed, RPM, transfer values, video, slow channels...). These virtual measurement instruments can be freely allocated to the activated measurement channels. Simultaneously with the measurement and analysis, the data provided is stored in synchronous data streams.

SAMURAI features a powerful Windows user interface enabling intuitive touch screen operation. The storage of user-defined setups supports the user in the performance of recurring measurement tasks. The setup of a measurement previously performed can be used or modified for a new measurement task. The "**Easy Operator Mode**" simplifies recurring measurement tasks, allowing individual setups to be created and used whose operator interface is reduced to a minimum (e.g. Start/Pause/Stop). This enables even inexperienced users to perform complex measurements without the corresponding expert knowledge.

The measurement values can be displayed in up to 16 graph windows. The display properties may be set before, during and after the measurement. The data acquisition and storage takes place in the background, independent of the choice of measurement values currently shown in the graphs.

The integrated **REPLAY Mode** allows the replay of stored measurements license-free on several computers. The zoom function of the data browser allows sections of a measurement to be selected, replayed and saved as new SAMURAI measurements. Furthermore, the **POST PROCESSING** option allows the subsequent analysis of stored time signals.

Depending on the device type, apart from the acoustic measurement channels, additional output and auxiliary channels are available. The output channels allow either the reproduction of the input signals during the measurement or the output of generated signals, such as white or pink noise. The auxiliary channels (where available on the device) allow the acquisition of slowly-changing signals. The digital inputs and outputs may be used as triggers, as tachometers or for GPS synchronization.
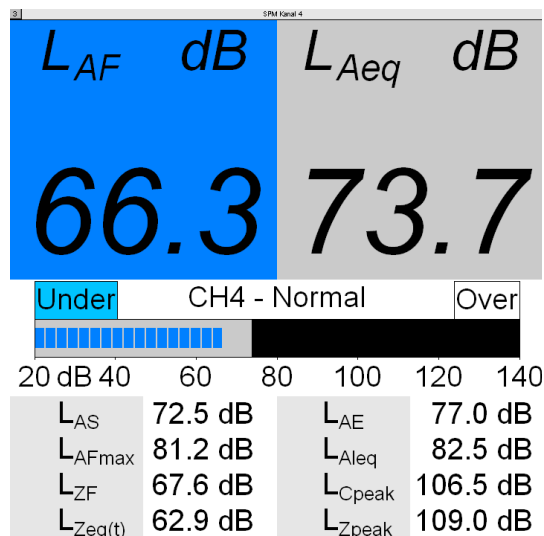
The measurement situation is documentable via text and audio commentaries.

SAMURAI contains many **innovative functions**:

- Integration of a transducer database for common transducer types (microphones, accelerometers, voltmeters, tachometers, thermometers and hygrometers, as well as sensors for velocity, displacement, force, torque and pressure)

- Multi-analysis function including signal recording, octave analyzer (1/1, 1/3), FFT analyzer, sound level meter, tachometer, auxiliary channels

- Graph types for display of measurement data: sound level meter (numeric), level history, spectrum, sonogram, waterfall diagram, time signal, vsXref (level versus RPM), tachometer and further windows (see also Options)

- Convenient adjustment of the display properties by the user

- Administration of measurements via internal browser

- Measurement data visualization via internal data browser

- Data storage directly on external USB drives possible

- Convenient calibration check

- Comprehensive triggers and markers functionality

- Display of 1/3-octave and FFT spectra in the same window

- Display of the measurement data versus time or versus RPM

- SAMURAI can make use of the PC sleep mode in order to switch the computer on and off for measurements at defined points in time

- Import and export of weighting curves

- Curve editor for reference spectra and weighting curves

- Data export to the following formats : MS Excel, ASCII, wav, Universal File Format (UFF), Noise & Vibration Works

- Sensor error detection (detects cable breaks for ICP sensors)

- Level indicator

SAMURAI includes the following virtual instruments as basic functions for each channel:

Sound level meter

|			
L_{AS}	72.5 dB	L_{AE}	77.0 dB
L_{AFmax}	81.2 dB	L_{Aleq}	82.5 dB
L_{ZF}	67.6 dB	L_{Cpeak}	106.5 dB
$L_{Zeq(t)}$	62.9 dB	L_{Zpeak}	109.0 dB

- Class 1 according to IEC 60561, 60804, 61672

- Simultaneous A, C, Z frequency weightings

- Time weightings Fast, Slow, Impulse

- L_p, L_{max}, L_{min}, L_{eq}, L_{peak} of all level values

- L_E, $L_{Atm1/3/5}$, L_n

- 10 Percentiles

- Acquisition of "Taktmaximal" levels as well as impulse and low-frequency content

- Parallel storage of up to 5 sound level meters per channel with 61 measurement values for selectable levels at freely adjustable time intervals

- Triggered storage possible

### 1/3 octave and octave analyzer
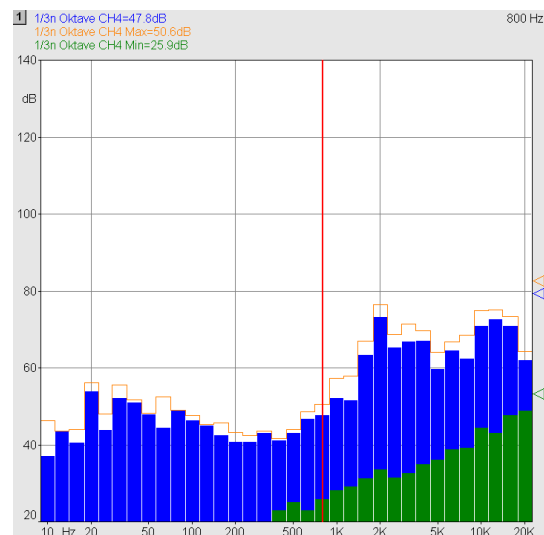
- 1/3 octave filter according to IEC 61260 Class 0

- Third-octave and octave band analysis in real time

- Third-octave middle frequencies from 0.04 Hz … 80 kHz

- Selectable third-octave band ranges (acoustics, vibration and user-defined)

- Selectable averaging modes: linear, Fast, Slow, exponential

- Simultaneous display of momentary, max, min and L_{eq} spectra

- Display and storage of total level

- Display as bar, contour or line graph

- Up to 5 third-octave and octave band analyzers per channel

- Triggered storage possible

FFT analyzer
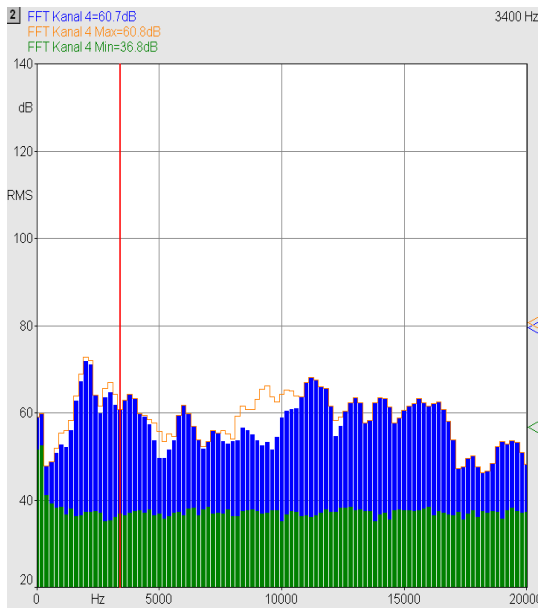
- Bandwidth selectable in steps of 19Hz, 39Hz, ... 80kHz with 101, 201, 401, ... 25601 lines

- FFT windows: Rectangular, Hanning, Hamming, Kaiser-Bessel, Blackman, Flat-Top, Bartlett, Welch, Gauss, Cosine N/4, Cosine N/8, Cosine N/16, Cosine N/32

- Window overlap: 25, 50, 75, 87, 93, 97 %

- Averaging modes: Linear, Fast, Slow, general exponential

- Simultaneous display of momentary, max, min and SEL spectra

- Display and storage of total level

- Bar, contour and line graph display; band values as RMS, Peak, Peak-Peak, EU^2 or PSD value in dB or physical units

- Up to 5 FFT analyzers per channel

- Triggered storage possible

Time signal
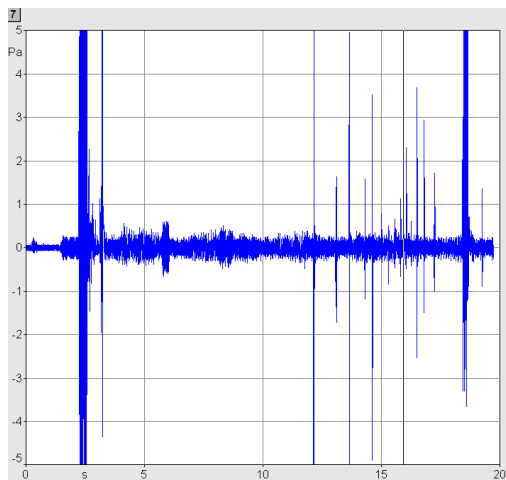
- Selectable signal bandwidths, DC...80 kHz

- Triggered storage of time signal possible

The measurement values of these virtual measurement instruments can be visualized with the aid of the graph types listed above. The following example shows a possible visualization of sound level, third-octave, FFT and time data.