Soundbook™

The 2nd generation of our Soundbook acoustics analyzer - now based on the new 24-bit Apollo™ hardware platform

- Sound level measurement
- Frequency analysis
- Signal recording
- Human vibration measurement
- Pass-by noise measurement
- Building acoustics
- Machine vibration measurement
- Modal analysis
- Order tracking analysis
- Operational vibration analysis

Soundbook®

TM

Soundbook

Soundbook_MK2, 8 channel BNC version
Soundbook_MK2, 8 channel LEMO7 version

SINUS Messtechnik GmbH
Soundbook_MK2
2nd generation of our Soundbook universal acoustic measuring system:
Class 1 sound level meter conforming to IEC standards, multi-channel real-time analyzer
and personal computer suited for field applications

Soundbook™, our universal portable measuring system for
acoustic, vibration and engineering measurements in general, is
now available in its 2nd generation on the basis of the innovative
Apollo™ platform.
The powerful 24-bit A/D converters in combination with the
innovative Apollo filter processors provide many channels with
high precision and bandwidth. Naturally, Soundbook_MK2 also
uses the robust Panasonic Toughbook CF-19 as its basis.
The Soundbook allows you to work practically everywhere - in
the office as well as outdoors. Neither heat, cold, rain, dust nor
heavy mechanical shocks have an impact on the device. Having
a weight of only 3 kilograms, a robust magnesium alloy exterior,
a convertible bright TFT display, a moderate power consumption
and many interfaces, the Soundbook unites the performance of
a high-quality measuring device with the possibilities of a PC.
According to your demands you may choose from variants with
2, 4 or 8 measuring channels and with LEMO7 or BNC input
connectors. The Soundbook is particularly suitable for:
• Industrial safety and environmental protection
• Engineering services
• Quality assurance
• Research and development.

Our SAMURAI™ 2.0 software package includes sound level meters
(SLM) according to IEC 61672-1 and third-octave analyzers according
to IEC 61260, with 2, 4 or 8 channels. The PTB certification
of the system has been applied for.
SAMURAI 2.0 provides an even better intuitive user interface and
allows multi-analysis both in real-time and as post-processing.
Saving and loading of created setups, optimized working modes, a
convenient transducer database with sensor calibration, as
well as data export and import (including time signals from other
devices for post-processing) offer a comfortable user experience.
The Easy Operator Mode allows to create setups with restricted
features for less experienced users, in order to avoid operator
errors in field measurements. The REPLAY Mode allows stored
measurements to be replayed at various speeds.
The measured values are displayed independently from the data
acquisition and storage in up to 16 windowpanes. The display set-
tings may be adjusted before, during and after the measurement.
A wide range of auxiliary channels allow for external triggering,
the additional capture of 8 slow process signals, and an extension
of the number of channels by means of an Apollo box working
sample-synchronously.
The two output channels may be used either for signal generators
or for the output of the input signals.

SAMURAI contains the following virtual measuring devices as
basic features for each channel:

Sound level meter
Class 1 SLM according to IEC 61672-1 allowing simultaneous
measurements with the frequency weightings A, C, Z and the
time weightings Fast, Slow, Impulse. The SLM also supports the
processing of percentiles, automatic impulse detection,
measurement of Takt-maximal levels, impulsive and low-
frequency characteristics as well as intelligent markers and
triggers.

Frequency analyzer
Real-time 1/3 octave analysis from 1/3 octave center frequencies
of 0.04 Hz ... 40 kHz (class 1 according to IEC 61260) and FFT
analysis of 100 ... 25600 lines, each feature including freely
adjustable averaging modes and storage intervals. In addition
the sum levels are displayed and stored.

Sound signal storage
Triggered storage of the time signal from DC up to 40 kHz with
freely adjustable decimation option (up to 200 Hz) to reduce
data volumes.

Reverberation time measurement
Measurement of the reverberation time in 1/3 octaves. Excitation
types: switched-off noise, impulse and sine-sweep. The 2 signal
outputs are used for output of the generated signals.

Several sound level meters and frequency analyzers with different
parameters can be applied for each channel.
Soundbook™ or for the output of the input signals. The two output channels may be used either for signal generators sample-synchronously. A wide range of auxiliary channels allow for external triggering, settings may be adjusted before, during and after the measurement. The measured values are displayed independently from the data acquisition and storage in.

The transfer function of a structure is obtained using an impulse excitation with the measurement's geometry. The sound power in 1/3 octaves and as a sum is measured in real-time (filters comply with class 1, IEC 61260).

Option: Multi-Generator
This option additionally provides the signal types: sine, rectangle, triangle, impulse, multi-sine, sine-sweep (lin and log), pseudo-noise and the synchronized output of *.wav files.

Option: NoiseCam
Together with sound signal storage, this webcam-based solution allows video documentation with measurement values blended-in and the export to a multimedia standard format.

Option: Room acoustics
Measurement of the room-acoustics parameters Clarity, Distinctness (C30 / C50 / C80 / D50 / D80), RASTI, STIPA and STITEL according to ISO 3382 and ISO 18233 on the basis of sine-sweep.

Option: Sound power measurement
The sound power in 1/3 octaves and as a sum is measured in real-time or sequentially using various geometries and numbers of microphones.

Option: Transfer FRF
The transfer function of a structure is obtained using an impulse hammer and a triax accelerometer. The data storage corresponds with the measurement's geometry.

Option: Vibration Meter
Double integration of the time signal as well as filtering according to the standards ISO 2954, ISO 7919 and DIN ISO 10816.

Option: Order tracking
This option allows measurement and display of spectra versus order of a basic frequency or RPM of a rotating machine.

Scope of Software options for SAMURAI 2.0:

Option: Post-Processing
This option offers a new analysis from stored or imported samples. The data browser allows a comfortable selection and cut of the time signals which have to be analyzed in post process.

Option: Automation
Automatic comparison of a frequency analysis with reference spectra and their management as well as automatic detection by the device and start of an application (e.g. to send an email).

Option: Building acoustics (SAMBA)
The whole acoustic testing of airborne noise and impact sound insulation is organized according to ISO 717 and ISO 140. The measurements are prepared (rooms, partitions, measuring tasks) and performed; the results are then provided in printable form.

Option: Building vibration
Measurement of building vibration according to DIN 4150 with the 3D-Seismometer and assessment of the vibration impacts on people in buildings with the KB (t) value

Option: Fractional octaves
This option provides 1/1 to 1/48 octaves up to 40 kHz in real-time (filters comply with class 1, IEC 61260).

Option: Human Vibration Multi Analyzer
The HVMA allows the 3-channel measurements according to all filter curves of the ISO 8041 and the calculation of the resultant vectors for hand-arm or whole body vibrations.

Option: Monitoring
Transfer of Sound Level Meter & 1/3 octave values with selectable time intervals and MP3-export of sound during a running measurement.

Option: Order tracking
This option allows measurement and display of spectra versus order of a basic frequency or RPM of a rotating machine.

Option: Remote client and TCP/IP interface
These options allow all features of SAMURAI to be controlled via network and integrated into a complex measuring system.

Option: Room acoustics
Measurement of the room-acoustics parameters Clarity, Distinctness (C30 / C50 / C80 / D50 / D80), RASTI, STIPA and STITEL according to ISO 3382 and ISO 18233 on the basis of sine-sweep.

Option: Sound intensity 1 and 2
Sound pressure and intensity measurements according to ISO 9614 parts 1 and 2 with sound mapping on digital photos.

Option: Sound power measurement
The sound power in 1/3 octaves and as a sum is measured in real-time or sequentially using various geometries and numbers of microphones.

Option: Transfer FRF
The transfer function of a structure is obtained using an impulse hammer and a triax accelerometer. The data storage corresponds with the measurement’s geometry.

Option: Vibration Meter
Double integration of the time signal as well as filtering according to the standards ISO 2954, ISO 7919 and DIN ISO 10816.

Option: Weather Station
Measurement of weather data with the DFTWR sensor.

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Option: Weather Station
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General technical specification of Soundbook_MK2

The following data refer to the 8 channel versions Soundbook_MK2_8L (LEMO7) and Soundbook_MK2_8B (BNC). Soundbook versions with 2 or 4 input channels (expandable to 8 channels) are also available. Alternative we offer the Apollo_box with 4 input channels for operation with a Windows-PC and USB 2.0 interface.

Soundbook base device

- Processor: Intel™ Core i5 1.2 GHz, 2 GB RAM
- Display: TFT 10.4" 1024 x 768
- Storage medium: HDD 160 GByte, SSD optional
- Interface: Bluetooth, LAN, WLAN, Modem, Cardbus, VGA, Bluetoot, SD-Card
- Operating system: Windows 7 multi lingual
- Processor: Intel ™ Core i5 1.2 GHz, 2 GB RAM
- Display: TFT 10.4" 1024 x 768
- Storage medium: HDD 160 GByte, SSD optional
- Interface: Bluetooth, LAN, WLAN, Modem, Cardbus, VGA, Bluetoot, SD-Card
- Operating system: Windows 7 multi lingual

Input channels 1-2/4/8

- Resolution: 24 bit
- Real-time bandwidth: DC ... 40 kHz @ 8 channels (80 kHz optional)
- Dynamic range: 120 dB
- Random noise: > 1 µV(A), < 2 µV(Z) @ 0.1 Hz ... 40 kHz
- Sample rates: 51.2 kHz / 102.4 kHz (204.8 kHz optional)
- Decimation: down to 200 Hz sample rate, selectable per channel
- Anti-aliasing filter: yes
- Max. input voltage: ± 10 V peak
- Amplification: 0 dB, 20 dB
- Overload detection: yes
- Phase mismatch: < 0.1° @ 20 Hz ... 20 kHz
- Offset adjust: yes, automatically with self-calibration
- Input coupling: DC, AC 0 15 Hz, HP 10 Hz, LP 2 kHz
- Microphone power supply: ± 14 V, ± 20 / 63 / 200 V switchable (with BNC versions on AUX)
- ICP power supply: 2 / 4 mA switchable
- Cable error detection: yes, with ICP sensors
- Support of IEEE 1451.4

AUX channels

- Digital Input: 2x TTL
- Digital Output: 2x TTL
- Microphone power supply: ± 14 V, ± 20 / 63 / 200 V switchable

Slow channels 1-8

- Resolution: 24 bit
- Real-time bandwidth: DC ... 80 Hz @ 8 channels
- Input voltage range: -25 V ... +25 V

Output channels 1-2

- Resolution: 24 bit
- Real-time bandwidth: DC ... 20 / 40 / 80 kHz
- Max. output voltage: ± 3.16 Vpeak

Service channels

- Trigger: 2x Trigger / Tacho, trigger level setable via software
- Synchronization: Sample-synchronous synchronization on external clock (e.g. GPS 1 Hz)

Physical characteristics

- Dimensions: 280 mm x 220 mm x 65 mm
- Weight: 3100 gr
- Battery: Lithium Ion battery pack, capacity 4 h measurement
- External power supply: 100 ... 240 VAC or 10 ... 36 VDC with adapters

Environmental conditions

- Protection rating: IP54
- Shock resistance: according to MIL-STD 810F
- Humidity: 30 % ... 90 %
- Temperature range: -10 °C ... +50 °C
- Temperature range: -20 °C ... +60 °C, max. 95 % humidity

EMC

- Emission: conforming with EN50081-1
- Immision: conforming with EN50082-1

Trade marks and owners

- Microsoft Corp.
- Intel Corp.
- Panasonic Corp.
- SINUS Messtechnik GmbH
- The MathWorks, Inc.
- Vibrant Technologies
- Windows™
- Centrino™
- Toughbook™
- Soundbook™, Apollo™, SAMURAI™
- MATLAB™
- ME’scope VES™
### SAMURAI 2.0™

General-purpose acoustics software package for real-time & post-processing use

Detailed description of all SAMURAI options see [www.soundbook.de/download.htm](http://www.soundbook.de/download.htm)

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#### SAMURAI control windowpane:
- device status information
- device control buttons
- time information
- overload/underflow indicators

#### Human Vibration Multi Analyzer:
- 3 axial window with sum vector
- filter curves according ISO 2631
- digital and bar graph display
- 3 selectable values per axis

#### Signal:
- multi channel window
- scrolling & scaleable x-axis
- time signals from all channels
- quick scaling for y-axis

#### Sonogram:
- single channel window
- FFT- or 1/n octaves spectra
- scrolling & scaleable x-axis
- quick scaling for y- and z-axis

#### Frequency Analyzer:
- multi channel window
- FFT- or 1/n octaves parallel
- additional sum levels
- linear or log x-axis

### Other display types:
- History, 3D Waterfall, RPM ...
- measurement video documentation
- flexible resolution and frame rate
- values of one channel blended-in
- time stamp

- single channel window with 10 values
- 2 main values additional as bar graphs
- alarm level indicator in one bar graph
- table or level history below bar graphs
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Order tracking analysis
Operational vibration analysis

The 2nd generation of our Soundbook acoustics analyzer
- now based on the new 24 bit Apollo™ hardware platform

PTB type approval
as sound level meter coming soon

Scope:
Microphones: MM210, MK221, WM205
2 / 4 / 8 input channels
1/3 octave analyzer: type 1 according to IEC 61260
SLM, 1/3 octaves, level recorder
25 dB(A)...135 dB(A) @ crest factor 10
A, C, Z (simultaneously)
Fast, Slow, Impulse, Peak (simultaneously)
L_A, L_N, L_T, L_max, L_p, L_imp, LE, L_Aeq, L_Zpeak, L_Zpeak
1/3 octaves 20 Hz...20 kHz, level recorder, time
freely adjustable via Start / Stop
2x audio signals of measuring channels
control of measurement via LAN

Soundbook + siNoise Version 2.0

• high brightness TFT display with Touchscreen
• magnesium case with protection rating IP54
• interface: Bluetooth, LAN, WLAN, USB, RS232, VGA,
  Modem, CardBus, ExpressCard, SD-Card, Firewire
• battery and HDD detachable without tools
• HDD with heating / shock protection or SSD
• 2-8 input channels with BNC or LEMO7 connectors
• channel expansion through Apollo_box

Soundbook_MK2, 8 channel BNC version

Soundbook_MK2, 8 channel LEMO7 version