Soundbook™ – Expander

General technical specification of Soundbook_Expander

The following data refer to the 8-channel versions Soundbook_Expander_8L (LEMO7) and Soundbook_Expander_8B (BNC).
Other versions on request possible.
The Soundbook_Expander is able to operate with Soundbook_MK2 or any Windows-based PC via USB 2 interface.

Recommended PC data:

Processor	Intel ™ dual core, 2 GHz, 2 GB RAM
Display	TFT 10.4" 1024 x 768
Storage medium	HDD 160 GB
Interface	USB 2
Operating system	Windows XP, Windows 7
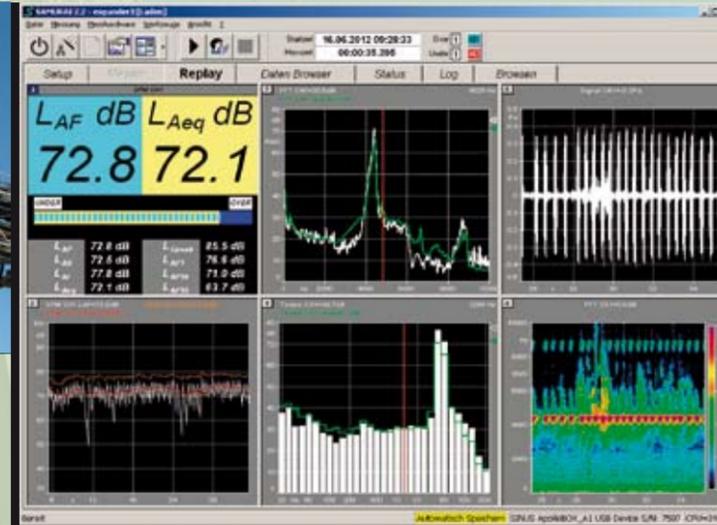
Input channels 1-8

Resolution	24-bit
Real-time bandwidth	DC ... 40 kHz @ 8 channels (80 kHz as software option)
Dynamic range	120 dB
Random noise	< 3 µV(A), < 6 µV(Z) @ 0.1 Hz ... 20 kHz
Sample rates	51.2 / 102.4 kHz (204.8 kHz on request)
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 only)
ICP power supply	2, 4 mA switchable
Support of IEEE 1451.4	yes

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
Sample rate	200 Hz
Input voltage range	-25 V ... +25 V

Output channels 1-2

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

Service channels

Trigger	2x Trigger / Tacho, trigger level settable via software
Synchronization	Sample-synchronous synchronization on external clock (e.g. Soundbook_MK2 or GPS)

Physical characteristics

Dimensions	258 mm x 218 mm x 25 mm
Weight	1250 g
Cable set short	special USB cable and sync cable each 0.1 m
Cable set long	special USB cable and sync cable each 4.8 m
Power supply	via USB (5 V // 1.1 A) or via 230 VAC adapter (included)

Environmental conditions

Protection rating	IP40
Humidity	30 % ... 90 %
Temperature range	-10 °C ... +50 °C
Storage conditions	-20 °C ... +60 °C, max. 95 % humidity

EMC

Emission	conforming with IEC 61000-6-3
Immission	conforming with IEC 61000-6-1

Trade marks and owners

Windows™	Microsoft Corp.
Intel™	Intel Corp.
Toughbook™	Panasonic Corp.
Soundbook™, Apollo™, SAMURAI™	SINUS Messtechnik GmbH
MATLAB™	The MathWorks, Inc.
µREMUS	Caesar

Data acquisition with Soundbook and SAMURAI modular scaleable up to 40 synchronized channels

- Sound level measurement
- Frequency analysis
- Signal recording
- Human vibration measurement
- Building vibration measurement
- Building and room acoustics
- Machine vibration measurement
- Modal analysis
- Order tracking analysis
- Operational vibration analysis

SINUS Messtechnik GmbH

Soundbook_Expander

The new Soundbook_Expander offers 8 fast 24-bit measurement channels as a USB device!
Simply plug-in the Expander start the measurement

The **Soundbook_Expander** extends the Soundbook™ measuring system with 8 additional measurement channels and many additional service channels. In addition to its application as a channel extension for Soundbook, the Expander can also be used as a free-standing data acquisition device with a Windows PC. Up to 4 Expanders (and additionally a Soundbook) can be used together sample-synchronously with the aid of the Sync_Hub. In this way it is possible to configure measurement systems with 8 ... 40 measurement channels for an extremely wide range of applications

This flexible, portable measurement system is, due to its high signal bandwidth, its wide dynamic range and its integrated sensor power supplies, suitable for all professional applications in acoustics and vibration measurement. The Expander hardware is fully compatible with Soundbook_MK2 and is based upon the innovative **Apollo™** platform.

According to your requirements you may choose from variants having 8x LEMO7 or 8x BNC input connectors. The additional 8 slow channels, 2 Tacho & Trigger channels, Synchronization port and AUX port allow for universal application of the device

The connection between Soundbook_MK2 and the Expander is via a special USB cable for the data together with a separate synchronization cable. These cables are included in the scope of delivery with a length of 10 cm for direct device mounting and 5 m for separated use. When a Sync-Hub is used, the system is provided with power via the mains adapter supplied.

Our universal **SAMURAI™** software offers all functions necessary for measurement and analysis of sound and vibration according to standards, both in **real-time and as post-processing**. The intuitive user interface, high flexibility and many options of SAMURAI 2.2 make Soundbook, the Soundbook_Expander and the Apollo_Box into extremely robust and popular tools for:
• Engineering Services
• Quality Assurance
• Research and Development.

In particular for raw signal acquisition in many-channel applications, all devices based upon the new Apollo™ platform with SAMURAI 2.2 provide the advantage of a drastic reduction of the data volume via:
• channel-specific sample rates and
• the possibility of low-loss compression (OggVorbis).

For applications in machine diagnosis and for custom programming of the devices on the basis of our unified Windows device driver we also offer the following **alternative software solutions**:
• **μREMUS** for mechanical investigations
• **SMT** (SINUS Matlab Toolbox) for custom programming
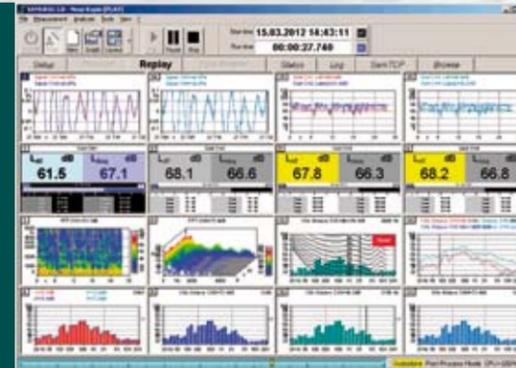
SAMURAI contains the following virtual measuring devices as basic features for each channel:

■ Sound level meter
Class 1 Sound Level Meter according to IEC 61672-1 allowing simultaneous measurements with the frequency weightings A, C, Z and the time weightings Fast, Slow, Impulse.
The Sound Level Meter also supports the processing of statistical values, 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.

■ Raw signal storage
Storage of the time signal from DC up to 80 kHz with **freely adjustable decimation option per each channel and selectable data compression** into OggVorbis format 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.
All types of virtual instruments can operate with individual trgger and storage conditions.

Scope of Software options for SAMURAI 2.2:

- ■ Option: Post-Processing
- ■ Option: Automation
- ■ Option: Building Acoustics
- ■ Option: Building Vibration
- ■ Option: Fractional Octaves
- ■ Option: **H**uman **Vi**bration **M**ulti **A**nalyzer
- ■ Option: Monitoring
- ■ Option: Multi-Generator
- ■ Option: NoiseCam
- ■ Option: Order Tracking
- ■ Option: Remote Client
- ■ Option: Room Acoustics
- ■ Option: Sound Intensity
- ■ Option: Sound Power
- ■ Option: TCP/IP Interface
- ■ Option: Transfer FRF
- ■ Option: Vibration Meter
- ■ Option: Virtual Tacho
- ■ Option: Weather Station
- ■ Option: Zoom-FFT

Other SAMURAI software options on request
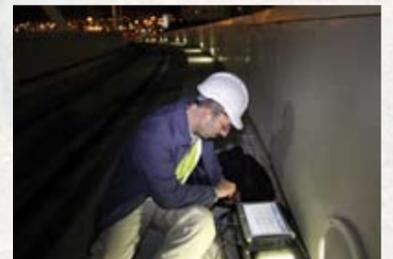
Overview Soundbook + 4x Expander:

PC with USB — USB
Soundbook_MK2 — USB + SYNC
PC with USB
SYNC_Hub
USB + SYNC → MK2_Expander
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