HEAD acoustics

DATA SHEET

INCLUDING PRACTICE CHAPTER

Code 3302

SQobold

Mobile Four-Channel Recording and Playback System

OVERVIEW

SQobold

Code 3302

Mobile four-channel recording and playback system with psychoacoustic analyses, sound level meter functionality, GPS data logging, and much more.

SQobold is a versatile, highly functional measurement system for mobile data acquisition. Used in combination with the binaural BHS II headset, it enables sound events to be recorded, analyzed, and played back with minimal preparation in an aurally-accurate manner.

Its compact dimensions, long-lasting battery, and intuitive touch-based operation make SQobold the ideal companion for mobile recording. Recordings are stored on the device and can be documented immediately, evaluated using various real-time analyses during or after the recording, and also played back.

KEY FEATURES

Four-channel recording, two-channel playback

Compact and easy to handle

Multiple connection options, including a BHS II connector, up to four analog BNC inputs with ICP, a pulse input, a USB host port, and a GPS antenna connector

Modular functionality enabled by SQobold Packages

Real-time analyses with filtering

Sound level meter functionality for single-channel or dual-channel measurements (e.g., dual-channel measurements using a binaural sensor)

Video function

Battery capacity for up to six hours of autonomous stand-alone operation

64 GB internal memory

APPLICATIONS

Mobile sound and vibration measurements

NVH measurements, e.g., during test drives

Environmental measurement technology, e.g., noise mapping

Soundscape research projects, e.g., sound walks

DETAILS

SQobold is a logical evolution of the binaural recording, analysis, and playback technology pioneered by HEAD acoustics. Despite its compact dimensions, SQobold features multiple interfaces that support a wide range of applications. Especially when used in combination with the binaural BHS II headset, SQobold demonstrates its strengths: compact, highly mobile, versatile in use, and intuitive to operate. In stand-alone mode, SQobold stores recordings in its internal storage or on a connected USB flash drive; in frontend mode, recordings are stored on a computer.

The sound level meter functionality enables users to measure not only classical measurement quantities, but also psychoacoustic quantities such as loudness and sharpness according to standardized procedures. Measurement data are stored internally or on a connected USB flash drive.

Optional SQobold Packages (SQP) enable you to tailor the functional scope to your specific requirements. SQobold Packages can be installed at any time using HEAD Companion, a free companion software that provides a wide range of administrative functions, such as firmware updates.

Connection Options

To perform binaural recordings, connect the BHS II headset to the BHS connector. The BNC connectors of channels 3 and 4 are available for additional ICP sensors. Alternatively, additional binaural sensors—such as the BHM III.3 headset microphone or the HSU III.2 artificial head microphone—can be connected either to the BHS connector (using the CLB I.3 adapter) or to two of the BNC connectors.

In addition, compatible headphones for aurally-accurate and correctly equalized playback (standard equalization) can be connected to the BHS connector. For this purpose, the CLJ I adapter is required.

The GPS connector is designed for connecting a GPS antenna, which enables SQobold to receive and record GPS data.

You can also record signals from other sources. For example, a video camera can be connected to the USB host port to observe the measurement situation. The video is stored as an AVI file in MJPEG format alongside the audio recording and is played back in parallel. The USB host port enables the use of a USB flash drive for storage, the connection of a PCAN-USB FD adapter for CAN FD data recording, and the connection of the BSU Binaural Sensor Unit or SQope, the binaural digital headset.

Operating Modes

The *Stand-Alone* and *Frontend* operating modes enable flexible operation across a wide range of recording scenarios.

In stand-alone mode, the large internal storage and the high-performance battery enable extensive mobile measurements. Intuitive operation via the touch display supports and simplifies daily work processes. Recordings are stored in the internal storage or, alternatively, on a connected USB flash drive. Compact and lightweight, SQobold requires very little space in your bag.

In frontend mode, SQobold connects via USB to a Windows computer running ArtemiS SUITE. Then connect the required sensors, select SQobold as the frontend in ArtemiS SUITE, configure the channels, and start recording immediately.

Comfortable – Intuitive – Efficient

The advantages of binaural recording technology, psychoacoustic analyses, exceptional mobility, and intuitive operation offered by SQobold are particularly evident in soundscape studies and during soundwalks.

Within a few seconds of being powered on, SQobold is ready for operation and is operated and configured via the touch display. Put on BHS II and start recording immediately, e.g., by pressing the record button on the side of the housing with your thumb.

Both the internal storage with nearly 60 GB of capacity and the high-performance battery easily support multi-hour measurement sessions.

Display

All functions and menus are accessible via the large display. During a measurement, you can display relevant information using level indicators, diagrams, or a tachometer. You can also display a video preview from a connected video camera, enabling you to monitor the measurement situation.

Wide Variety of Sensor Types

In addition to binaural sensors, SQobold supports ICP microphones, accelerometers, DC sensors, and much more. This enables you to meet the requirements of a wide variety of measurement tasks. Simply select the required sensor from the Sensor Library, connect it to a compatible input, and start measuring immediately.

Binaural Recordings Using BHS II

The combination of SQobold and the binaural BHS II headset enables you to perform precise and reliable sound analyses and evaluations. SQobold and BHS II are perfectly attuned to each other and record sound events just as a person would perceive them. BHS II is easily connected to the specific BHS connector. The configuration of the two channels in use is then adjusted automatically, and the correct recording equalization is applied.

Thanks to its low weight and high wearing comfort, you can wear BHS II comfortably even during prolonged use.

This makes the combination of SQobold and BHS II the ideal tool for measurements in which human auditory perception is the determining factor in evaluating acoustic sound events. Furthermore, this setup enables you to capture and analyze both environmental noise in the field and disturbing noises in laboratory environments, on test benches, or in a vehicle while driving.

Binaural Playback Using BHS II

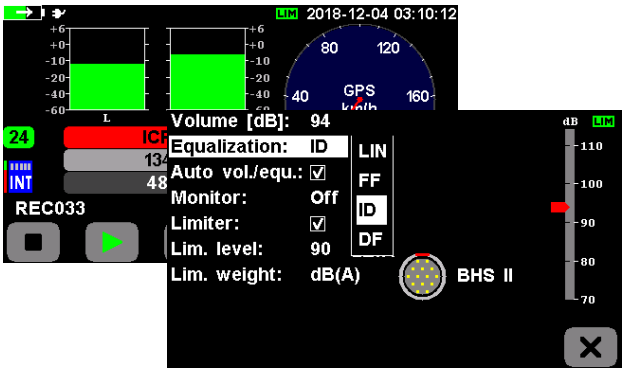
In contrast to stereo recordings made with conventional microphones, binaural recordings convey not only timbre and level faithfully during playback, but also the full spatial representation of the recorded sound field.

Recordings with multiple different sound sources occurring simultaneously—as is typical in road traffic—preserve all relevant information during playback, enabling you to separate and localize individual sound sources.

Comparable Analysis Results Through Equalization

To ensure comparable analysis results when binaural and conventional recordings are analyzed together, SQobod records acoustic signals in an equalized form. To this end, SQobold, in combination with BHS II, applies our proprietary ID equalization, which is suitable for most sound-field environments. Further equalizations, such as Free Field (FF) and Diffuse Field (DF), are available for measurement situations with other sensors (HSU III.2).

When you play back a recording made with SQobold using a binaural playback device such as BHS II, the playback produces the same auditory impression as the original sound field.



HARDWARE COMPATIBILITY

Artificial Head Microphones

1391	HSU III.2	✓	

Headset Microphones

1303	BHM III.3	✓	

Binaural Sensors

1508	BSU	✓	*Analog, pulse, and GPS inputs are deactivated*
3300	SQope	✓	*Analog/pulse inputs are deactivated*
3322	BHS II	✓	

USB Devices

0271	USB Video Camera	✓	*LifeCam Studio*
0272	USB Video Camera	✓	*LifeCam HD-3000*
0274	PCAN-USB FD adapter	✓	

Headphones (with CLJ I.1)

2380	HD IV.1	✓	*No longer available*
2481	HD IV.2	✓	*No longer available*
2511.1	HD OP I.1	✓	
2512.1	HD OP II.1	✓	
2521.1	HD CL I.1	✓	
2522.1	HD CL II.1	✓	

Remote Controls

9850	RC X.1	✓	*as of SQobold version B*
9851	RC X.2	✓	

SCOPE OF DELIVERY

SQobold (Code 3302)
- Mobile four-channel recording and playback system with sound level meter functionality

CSB VII.0
- SMB-to-SMB cable with BNC adapter for pulse input

CUSB III.1
- USB-A to Micro-USB cable, 1 m

HSC V.2
- Bag for SQobold and accessories

DPF
- Protection film for the display, clear

Power adapter

Manual

Data medium with setup package

SQOBOLD PACKAGES

The functions of SQobold are grouped into SQobold Packages, some of which are enabled through optional licenses. These optional SQobold Packages provide task-specific functionality.

SQobold Base Version (Code 3302)

- Four-channel measurements
- Interfaces
  - Two-channel BHS input
  - Two analog BNC inputs (two additional BNC inputs via the CLB I.3 adapter at the BHS input)
  - Pulse-In input
  - GPS connector
  - USB host port (Type-A)
  - USB device port (Micro-USB), Windows mass-storage mode for downloading data
- Binaural recording
  - Connection of a BHS II headset (accessories)
  - Connection of a BHM III.3 headset microphone or the HSU III.2 artificial head microphone (both accessories)
  - ID equalization (for HSU III.2: ID/FF/DF)
  - Equalization for BHS II, BHM III.3, and HSU III.2 via SQobold
- Binaural Playback
  - Playback of two channels
  - ID, DF, and FF playback equalization for BHS II
  - CLJ I adapter for aurally-accurate playback using recommended headphones (standard equalization)
- Trigger
  - Adjustable pretrigger and posttrigger
  - Pulse, CAN, GPS, clock (date/time), and input channels as trigger sources
  - Available modes for the input channels:
    Amplitude, level, and A-weighted level (each with time weighting *fast* and *slow*)
- Pulses
  - 32-fold oversampling
- GPS
  - Real-time GPS speed shown as a tachometer or as a single value
  - Supported GPS modes:
    Portable, Stationary, Pedestrian, Automotive, At sea, Airborne
  - Sample-accurate determination of the recording time stamp
  - Active GPS antennas available as optional accessories:
    CGA I.0: wired antenna (5 m)
    CGA I.1: rod antenna
    CGA I.1-V1: angled rod antenna
- Documentation
  - Support of ArtemiS SUITE documentation templates
  - Optional or mandatory input before or after recording
- Sound level meter functionality
  - Parallel measurement of up to two channels
  - Multiple simultaneous time and frequency weightings
  - A, C, and Z weighting of the sound pressure level
  - *Fast, Slow,* and *Impulse* time weightings
  - Time-weighted instantaneous and maximum sound pressure levels as well as sound exposure level, shown as single values
  - Level vs. Time with adjustable averaging time (time-weighted instantaneous and equivalent continuous sound pressure level)

SQP 01 FFT – Online Analysis (Code 3303)

- Real-time analysis of the incoming signal from up to two channels
- Analysis during recording
- Playback analysis
- Available real-time analyses:
  - FFT/FFT vs. Time / Octave / 3rd Octave / Time Signal / Level vs. Time / Articulation Index vs. Time / Order Spectrum / Order Spectrum vs. Time
  - FFT-based analyses Loudness vs. Time / Spec. Loudness / Sharpness vs. Time
  - Sound intensity (with P-P probe)
  - System analyses Transfer Function / Impulse Response / Coherence
  - Display in dB or rms (linear or logarithmic)
  - Averaging function with storage of results in HDF format
  - Adjustable analysis parameters
  - FFT size (1024, 2048, 4096, 8192, 16384) / Window (Hanning, rectangular, flat-top) / Show freq / Freq. weighting (Z(lin), A, C) / Order resolution (0.1 – 1st order) / Articulation index / Extended Articulation index / Sound field (FF, DF) / Rec. time signal / A, V, D conversion (acceleration, velocity, displacement)
- Use of tolerance schemes (created with ArtemiS SUITE)
- Playback analyzer for analysis during playback
- Online monitoring or playback with real-time filtering: Signal analysis (filtered or unfiltered signal)
  - Bandstop, bandpass, parameterized bandpass
  - Adjustable quality, frequency, attenuation, and amplification

SQP 02 – Advanced Level Meter (Code 3304)

- Loudness (ISO 532-1, DIN 45631/A1) N, N_{max}, N_{5}, ...
- Sharpness (DIN 45692) S, S_{max}, S_{5}, ...
- Sound field types: *Free Field* and *Diffuse Field*
- Third-octave, octave, and FFT spectra
  - Average band level, maximum level, instantaneous level with parallel frequency weightings
  - Parallel calculation of the average level over time within an adjustable interval
  - Takt-maximal levels
  - Level vs. Time, L_{AFT}, L_{AFTeq}, ...
  - Percentiles (exceedance level)

SQP 03 – Video (Code 3305)

- Operation of a USB video camera (Code 0271 or Code 0272) on the USB host port
- AVI recording with two-channel audio track
- Parallel playback to the audio data recorded with SQobold
- Zoom function
- Up to 30 frames/s
- Resolution up to 1280 x 720 pixels

SQP 04 – CAN Bus Support (Code 3306)

- CAN FD and OBD-2 recording via PCAN-USB FD adapter
- Real-time decoding and display of data
- Use of the decoded data for triggers

OPTIONAL ACCESSORIES

Hardware

Binaural recording and playback

- BHS II (Code 3322)
  Binaural headset for recording and playback
- BSU (Code 1508)[1]
  Binaural Sensor Unit for aurally-accurate recording
- SQope (Code 3300)[1]
  Digital, binaural headset

Binaural recording

- BHM III.3 (Code 1303)
  Headset microphone
- HSU III.2 (Code 1391)
  Artificial head microphone with ICP microphones

CGA I.0 (Code 9855)
Active GPS antenna with cable, 5 m

CGA I.1 (Code 9856)
Active GPS rod antenna

CGA I.1-V1 (Code 9856-V1)
Active GPS rod antenna, angulated

DPF-V1 (Code 9857-V1)
Protective film for the display, matte

USB video camera (Code 0271)
available from HEAD acoustics; HD 720 resolution; frame rate 30 fps; autofocus 0.1 m to10 m; with tripod mount

USB video camera (Code 0272)
available from HEAD acoustics; HD 720 resolution; frame rate 30 fps; autofocus 0.3 m to 1.5 m

PCAN-USB FD adapter (Code 0274)
CAN FD interface; electrically isolated

RC X.1 (Code 9850, from version B)
USB remote control for starting and stopping recordings

RC X.2 (Code 9851)
Wireless handheld transmitter for RC X.1 (RC X.1 is required)

CLB I.3 (Code 9848)
Adapter, LEMO 14-pin to two BNC (female, 20 cm); two additional BNC connectors at the BHS interface

CLB IV.1 (Code 9826)
Adapter, LEMO 14-pin to tow BNC (male, 40 cm); for analog outputs via the BHS interface

CLJ I (Code 9858)
Adapter, LEMO 14-pin to 3.5 mm jack plug for connecting recommended headphones:

- HD CL I.1
  Premium closed-back headphones; balanced timbre with particularly neutral voice reproduction.
- HD CL II.1
  High-end closed-back headphones; very clear analytic timbre with a high level of detail.
- HD OP I.1
  Premium open-back headphones; natural and accurate sound with good spatial sound characteristics.
- HD OP II.1
  High end open-back headphones; particularly accurate playback with vivid sound colors.

CLB I.2 (Code 9847)
Adapter cable, LEMO 14-pin to two BNC (male) for recordings made with BHS II via BNC

SCA II.2 (Code 3345)
Adapter for power supply in a vehicle; you also need one of the following cables:

- CLO VII.9 (Code 3359)
  Adapter cable, SCA II.2 to passenger-car power supply
- CXO I.1 (Code 5176), XLR 4-pin to cable lugs (2 m) combined with CLX III xx (Code 3676-xx), XLR 4-pin to SCA II.2

1 Analog, pulse, and GPS inputs are deactivated.

Software

ArtemiS SUITE (Code 50000ff)

- Software platform for sound and vibration analysis
- Recording in frontend mode using APR 040 Recorder (Code 50040). Live decoding of bus data using ASP 801 Basic Decoder (Code 51801)
- Creation of tolerance schemes, Sensor Libraries (SENX), and documentation templates using APR 000 APR Framework (Code 50000)
- Synchronous video and audio playback with GPS map display using APR 000 APR Framework (Code 50000)
- Report, e.g., for sound level meter results, using APR 020 Report (Code 50020)
- ASP 801 Basic Decoder (Code 51801) for decoding data, such as GPS, CAN FD, FlexRay

HEAD Companion / SQobold Simulator
(included in the basic version's scope of delivery)

HEAD Companion (Code 4906)

- Firmware update
- Transferring equalization filters and calibration to SQobold
- Managing Sensor Libraries
- Merging GPS-synchronized, temporally overlapping recordings
- Decoding GPS channels
- Installing SQobold Packages

SQobold Simulator

- Windows application with SQobold functionality
- Configurations created with SQobold Simulator can be saved and transferred to a device.

TECHNICAL DATA

General Information	
Number of channels	4 (two-channel BHS input/output, two analog inputs with ICP)
Connectors	LEMO 14-pin, two BNC connectors, SMB, USB Type-A, Micro-USB, SMA (GPS antenna), DC power jack; with CLB I.3 adapter: two analog inputs at the BHS input, e.g., for HSU III.2 or BHM III.3
Resolution	Up to 24-bit delta-sigma audio A/D and D/A converter
Oversampling	128-fold (at single speed)
Power supply	5 V DC (±5%), reverse polarity protection
Power consumption Quick charge (device off) Quick charge (operation) Battery operation	 2.7 A (max.) / 13.5 W (max.) 1 A / 5 W 8 W (max.) / 5 W (typ.)
Power consumption USB	500 mA (max.); no charging; operation as a bus-powered-device
Sampling frequencies	32 kHz; 44.1 kHz; 48 kHz; 51.2 kHz
Jitter (averaged)	141 ps at 48 kHz sampling rate
Equalization Recording Playback	 ID with BHS II and BHM III.3; ID/FF/DF with HSU III.2 ID, FF, DF, LIN (no equalization)
TFT touchscreen Type Resolution	 LCD color display ,10.9 cm / 4.3", capacitive multi-touch 480 x 272 pixels
Dimensions	143 x 34 x 78 mm (W x H x D overall); version B[1]: 143 x 35 x 78 mm (W x H x D overall)
Rechargeable battery Type Operating time Charging time ext. power supply	 LiPo, 3.7 V, 6000 mAh typ. 6 h (stand-alone operation; 2 channels at a sampling rate of 48 kHz; 2 x ICP; writing to internal storage, display in power-save mode) 7.5 h (max.) with 1000 mA
Weight	490 g
Operating temperature	-20 °C–+50 °C / -4 °F–+122 °F (0%–90% rel. humidity, non-condensing)
Storage temperature	-20 °C–+70 °C / -4 °F–+158 °F

1 The device version is specified on the type plate located on the underside.

BHS Input[1]					
Number of channels	2 (LEMO 14-pin)				
Input impedance	20 kΩ				
Equivalent noise level with BHS II	28 dB_{SPL}(A) (ID equalization)				
ICP supply	18 V / 4 mA, ±20% for BHS II (no TEDS)				
Equalization	ID (recording) / ID, FF, DF, LIN (playback)				
Frequency range	0 Hz–20 kHz				
Measurement ranges	-29 dB(V)	-19 dB(V)	-9 dB(V)	1 dB(V)	11 dB(V)
Accuracy[2] DC (% of full scale) AC (% of full scale at 1 kHz) For frequencies 20 Hz..20 kHz at fs=48 kHz re 1 kHz	 0.3% 0.6% +0.0 dB; -0.24 dB	 0.2% 0.8% +0.0 dB; -0.24 dB	 0.2% 0.6% +0.0 dB; -0.24 dB	 0.2% 0.8% +0.0 dB; -0.24 dB	 0.2% 0.6% +0.0 dB; -0.24 dB
Level F_S (V_{SS})	0.2 V_{SS}	0.63 V_{SS}	2 V_{SS}	6.3 V_{SS}	20 V_{SS}
S/N_{FS}, electrical	84 dB	92 dB	96 dB	97 dB	97 dB
Noise, SPL, electrical	14 $dB(A)_{SPL}$	16 $dB(A)_{SPL}$	22 $dB(A)_{SPL}$	31 $dB(A)_{SPL}$	41 $dB(A)_{SPL}$
THD+N at 1 kHz, -8 dB_{FS}	-77 dB 0.014%	-80 dB 0.01%	-81 dB 0.09%	-79 dB 0.01%	-78 dB 0.01%
Crosstalk attenuation	>100 dB 1 kHz sine, same measurement range, adjacent channels	>100 dB	>100 dB	>100 dB	>100 dB
Analog highpass filters	Switchable: DC / 2 Hz / 36 Hz (1st order, ±10%)				

BNC Inputs[1]						
Number of channels	2 (BNC)					
Electric strength	30 V_{SS}					
ICP supply	18 V / 4 mA, ±20% for BHS II (no TEDS)					
Coupling	DC, AC, ICP, ICP/DC					
Frequency range	0 Hz–20 kHz					
Measurement ranges dB(V) $dB(V)_{FS}$	 -36 dB(V) -30 $dB(V)_{FS}$	 -26 dB(V) -20 $dB(V)_{FS}$	 -16 dB(V) -10 $dB(V)_{FS}$	 -6 dB(V) 0 $dB(V)_{FS}$	 4 dB(V) 10 $dB(V)_{FS}$	 14 dB(V) 20 $dB(V)_{FS}$
Accuracy[2] DC (% of full scale) AC (% of full scale at 1 kHz) For frequencies 20 Hz..20 kHz	 0.4% 1% +0.0 dB; -0.4 dB At f_s=48 kHz re 1 kHz	 0.3% 0.5% +0.0 dB; -0.25 dB	 0.2% 0.7% +0.0 dB; -0.25 dB	 0.2% 0.5% +0.0 dB; -0.25 dB	 0.2% 0.7% +0.0 dB; -0.25 dB	 0.2% 0.5% +0.0 dB; -0.25 dB
Level F_S	89 mV_{SS}	283 mV_{SS}	894 mV_{SS}	2.83 V_{SS}	8.94 V_{SS}	28.3 V_{SS}
S/N_{FS}	77 dB 79 dB(A)	86 dB 88 dB(A)	93 dB 95 dB(A)	96 dB 98 dB(A)	96 dB 98 dB(A)	97 dB 99 dB(A)
THD+N at 1 kHz, -6 dB_{FS}	-72 dB 0.03%	-79 dB 0.01%	-81 dB 0.009%	-82 dB 0.008%	-83 dB 0.008%	-83 dB 0.008%
Crosstalk attenuation	>100 dB 1 kHz sine, same measurement range, adjacent channels	>100 dB	>100 dB	>100 dB	>100 dB	>100 dB
Linearity (1 kHz sine, HP, AC)	98 dB	103 dB	114 dB	118 dB	117 dB	117 dB
Analog highpass filter	Switchable DC / 2 Hz / 22 Hz (1st order, ±10%)					
Digital highpass filter	Higher-order, scaled with f_S					
Analog lowpass filter	30 kHz (1st order, anti-aliasing)					
Digital lowpass filter	Higher-order, scaled with f_S					

1 Valid for: Ambient temperature +23 °C / +73.4 °F (±3 °C / ±5.4 °F), operating time ≥1 h. Vibration excitation of the device may cause deviations.

2 All measurement ranges receive factory calibration and can additionally be calibrated in our calibration laboratory (accredited to DIN EN ISO 17025).

Pulse Input	
Number of channels	1 (SMB connector)
Pulse frequency	Max. 600 kHz at f_S = 48 kHz
Pulse sampling rate	32 x oversampling
Input voltage range low-level high-level	0 V–+5 V (max.) 0 V–+0.8 V +2.5–+5 V (max.)
Input impedance U_{IH} = 2.5 V U_{IH} = 5 V	 830 Ω 400 Ω
Electrical isolation	Yes
Isolation resistance	>1 GΩ

BHS Output with BHS II	
Number of channels	2 (LEMO 14-pin)
Equalization	ID, FF, DF, LIN
Nominal level	110 dB_{SPL} (accuracy at 1 kHz: ±0,1 dB, electrical)
Inherent noise	<23 dB_{SPL}(A)
THD+N	-57 dB (sine-wave playback at 104 dB_{SPL}, 1 kHz into R = 110 Ω)
THD+N, electrical	-73 dB (unloaded)

BHS Connector as an Analog Output	
Number of channels	2 (LEMO 14-pin, 2 x BNC with CLB IV.1 adapter)
Nominal level	±0.1 dB at 1 kHz
Output voltage	-10 dB(V) (+6 dB headroom)
S/N	74 dB
Crosstalk attenuation	100 dB at 1 kHz

USB Device	
Connector	Micro-USB (connection SQobold to PC)
Data transfer	480 Mbit/s (max. 10 MB/s)
Power supply	5 V, 500 mA

USB Host	
Connector	USB Type-A (for USB storage medium, video camera, PCAN-USB FD adapter)
Data transfer	480 Mbit/s
Read/write data rate	up to 17 MB/s; up to 3 MB/s
Power supply	5 V / 500 mA

GPS	
Number of channels	1 (SMA connector)
Power supply for the active antenna	3 V, max. 20 mA
Receiver module	56 channels, -160 dBm, PPS signal
Update rate	max. 10 Hz

IN PRACTICE

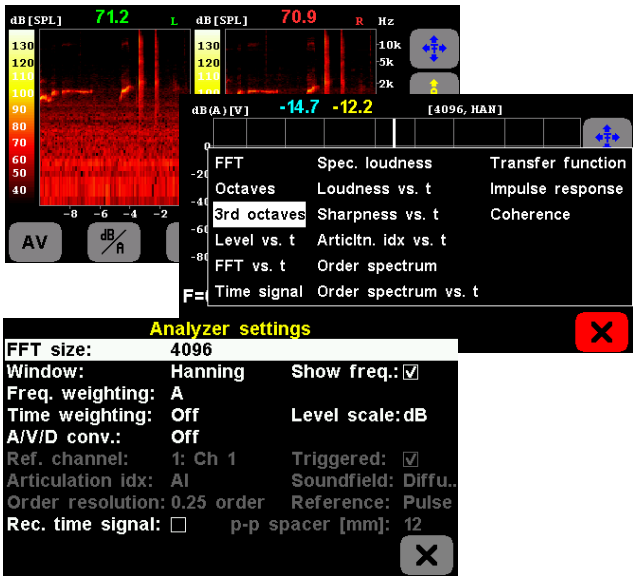
Sound Level Meter Functionality

SQobold provides basic sound-level-meter functionality that can be extended with the *SQP 02 – Advanced Level Meter* license (Code 3304) to add additional features. Using SQobold as a two-channel sound level meter enables you to measure a range of physical and psychoacoustic quantities, such as instantaneous and maximum sound pressure levels, loudness, and sharpness. In this way, you can determine sound pressure levels and quantify noises for reliable assessment of environmental and workplace noise, for example.

At the same time, SQobold can record the time signal during the measurement. This enables direct monitoring of the measurement and also provides the option of performing further analyses on the recording at a later stage.

Real-Time Analyses

With the *SQP 01 – FFT Online Analysis* license (Code 3303), SQobold provides both FFT and octave analyses as well as the psychoacoustic analyses of loudness and sharpness. Psychoacoustic analyses consider the differences between human perception and the measurement results obtained from an instrument. These analyses are adapted to the characteristics of human hearing.



All analyses can be used during recording, monitoring, and playback to evaluate sound events and sound scenarios. This enables you to quickly identify well-founded starting points in any given situation, such as for improving noise quality. In addition, real-time filters are available whose quality factor, frequency, and attenuation can be configured to enable even more targeted analyses.

Besides airborne-sound recording, SQobold can also measure the vibration behavior of components and assemblies. *Transfer Function, Impulse Response,* and *Coherence* analyses are especially suited for analyzing and evaluating structure-borne measurements performed with an impact hammer, for example.

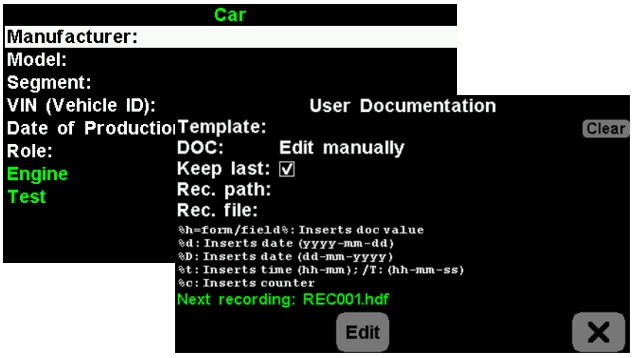
Documentation

In order to manage a large number of recordings efficiently, descriptive information on each recording is essential. To this end, SQobold provides a user-friendly documentation function that enables template-based documentation to be entered and saved prior or following the recording.

The Documentation Templates can be created with ArtemiS SUITE and transferred to SQobold via USB. Using the Documentation Templates, you define which information is to be entered for a recording. This information is then stored in the recording.

To make entering information as convenient as possible, you can use familiar form elements—such as input fields, checkboxes, and lists—in your Documentation Templates. In this way, product details, a description of the product configuration, or information on the measurement conditions can be stored as documentation within a recording.

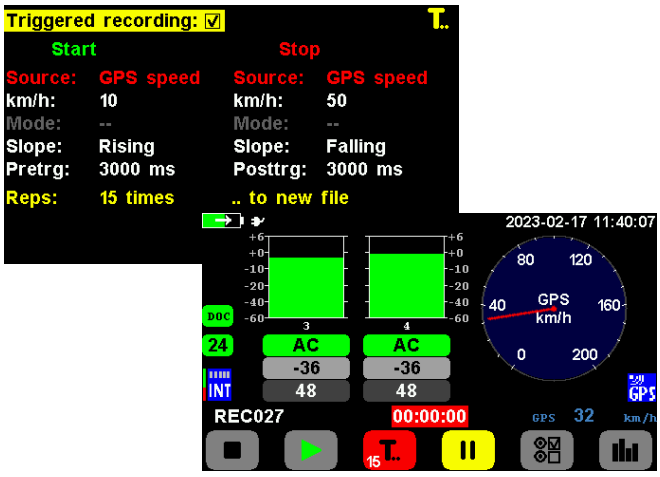
This documentation can later be used in ArtemiS , for instance to generate reports.



Triggers

It is often useful to start or stop a recording based on specific conditions of the measurement object or the measurement situation. For this purpose, SQobold provides triggers that respond to incoming signals of the pulse, GPS, CAN, and audio channels or a defined time.

Triggers can respond to rising or falling signal slopes. In addition, SQobold can record signals that were present before (pretrigger) or after (posttrigger) the start or stop trigger condition was met.

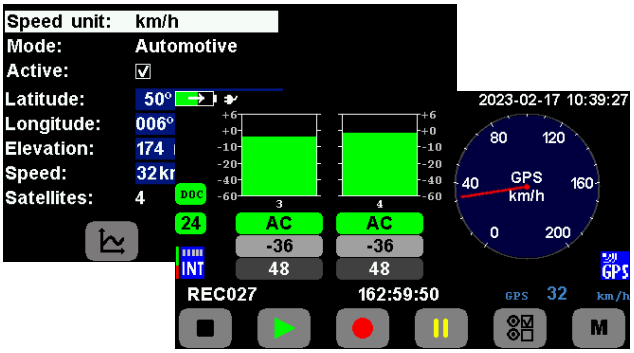


GPS

SQobold supports GPS and can be equipped with an appropriate GPS antenna via the GPS connector. This enables SQobold not only to determine the exact location based on the GPS data, but also to compute and decode the velocity. This data can then be displayed on the screen in real time, either as a tachometer or as a single value.

You can use the recorded GPS data in ArtemiS SUITE, for example, to display the distance traveled during the recording on a map.

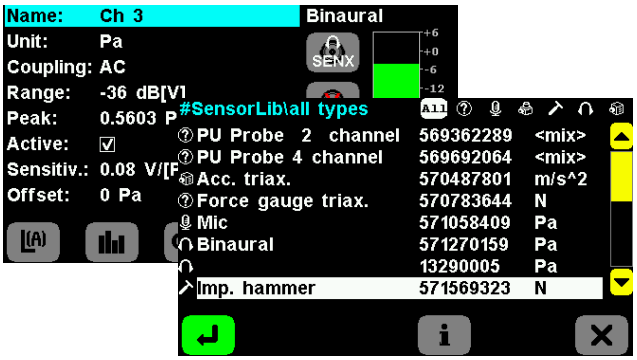
You can also synchronize recordings that were made with several SQobold units at the same time by using the GPS time stamp, for example in HEAD Companion.



Sensor Library

If you manage your sensors using a Sensor Library in HEAD Companion or ArtemiS SUITE, you can also use this library with SQobold. Simply copy the Sensor Library to the internal memory; afterwards, you can select the fully configured sensors stored in it during channel configuration.

Sensor information—such as sensor type, sensitivity, calibration date, and calibration factors—are automatically applied in the respective channel, without requiring you to enter this data manually. This information is also stored in the recording and is later available for post-processing and analysis in ArtemiS SUITE.

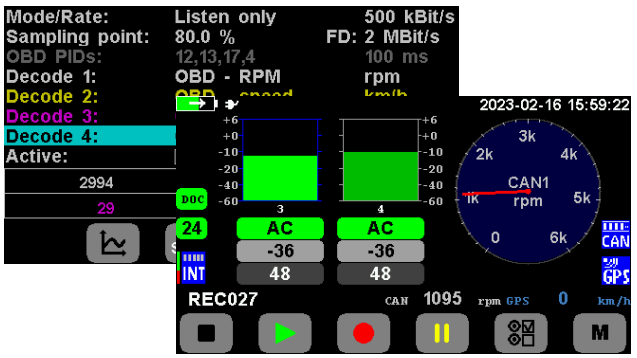


CAN, CAN FD and OBD-2

If you have the *SQP 04 – CAN Bus Support* license (Code 3306) and connect the PCAN-USB FD adapter to the USB host port of SQobold, you can record CAN, CAN FD, OBD-2, and WWH-OBD-2 parameters.

Using an appropriate DBC file or a Sensor Library, SQobold can decode up to four of these parameters in real time and display them on the screen during recording as a tachometer or numerical value. Decoded parameters can also serve as the basis for triggers.

Using the PCAN-USB FD adapter, SQobold records the entire data stream of the CAN bus. You can later extract these data in the context of a Decoder Project in ArtemiS SUITE for further analysis and store them as additional analog channels.

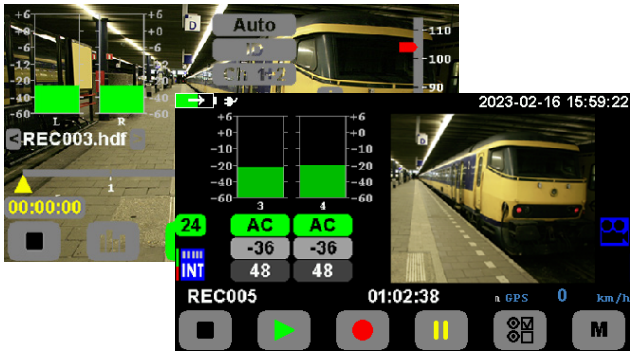


Video

To document the measurement setup as a video or single frame, you can connect a video camera to the USB host port. You can even take pictures while recording is in progress.

This requires the *SQP 03 – Video* license (Code 3305). Videos and single frames are then saved along the corresponding audio recording.

When playing back a recording that includes a video, this video is shown on the display at the same time.



HEAD acoustics

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