



Code 3324

# SQuadriga III

Mobile Recording and Playback System with Sound Level Meter Function

# OVERVIEW

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## SQuadriga III

### Code 3324

Mobile recording and playback system with sound level meter function – as a stand-alone system or as a network or USB frontend

SQuadriga III is a handy and powerful recording and playback system that comes with a sound level meter function and provides a variety of connection options, extensive functionality, high mobility, and variable application possibilities. SQuadriga III operates silently and is ready for use within seconds after being switched on.

In stand-alone mode, recordings are stored on the internal memory or on a connected USB stick, while in frontend mode they are saved on the computer connected via USB or LAN. Operation is via the touchscreen, the Recorder of ArtemiS SUITE (APR 040 — Recorder), or via the web interface (optional package SQ3 TP 06 (Code 3324-6) *Network Access*).

Supported sensors are connected directly to the corresponding connectors. These include ICP microphones, ICP accelerometers, the calibratable BHS II headset, pulse sensors, sensors for bus systems, such as CAN FD, OBD-2, WWH-OBD, and FlexRay, artificial head measurement systems from the HMS family, and HEADlab modules.

Channel and sensor settings can be configured directly on the device, saved to SQuadriga III, and reused at any time. Settings that have been configured using the SQuadriga III Simulator, for example, can be transferred to and used with SQuadriga III.

Thanks to its powerful battery, SQuadriga III offers several hours of operation without requiring an external power supply. In addition, it can also supply power to a connected HEADlab module.

As an alternative, you can use SQuadriga III-V1 (Code 3324-V1), a battery-less variant that can be used in measurement situations where a battery-powered device is not intended.

## KEY FEATURES

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Two application modes: Stand-alone and frontend mode

Several hours of self-sufficient measurements in battery mode or power supply and charging of the battery via the power adapter or a Power Box

Operation via capacitive multi-touch color display

Aurally-accurate recording and playback via the BHS II binaural headset (BHS II is not included in the scope of delivery)

Connection of up to four binaural sensors BHM III.3 and HSU III.2

Equalized playback via headphones

Sound level meter function for up to four channels

FFT, octave, and psychoacoustic real-time analyses with filtering

Connection and real-time decoding of the vehicle bus systems CAN, OBD-2, CAN FD, and FlexRay

Connection of a HEADlab module or integration into a HEADlab system

Real-time decoding and display of up to two pulse sources

Recording of the GPS, Galileo, BeiDou, and GLONASS satellite navigation systems

Optional packages for customizing the functional scope of the firmware

## APPLICATIONS

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Mobile sound and vibration measurement

Mobile real-time analysis

Sound level measurement and analysis

# DETAILS

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## Compact and Powerful

- › Compact dimensions of 193 x 41 x 154 mm
- › Powerful dual-core processor
- › 60 GB internal memory for audio and video recordings
- › Stand-alone mode for mobile working
- › Frontend mode with USB or LAN connection to a computer using the Recorder of ArtemiS SUITE (APR 040 — Recorder)

## Touchscreen

- › Capacitive multi-touch color display (7"/17.8 cm, 1024 x 600 pixels)
- › Supports swipe gestures, zoom, double-tapping

## Power Supply

- › Rechargeable battery for several hours of measurements in stand-alone mode
- › ICP supply for connected sensors
- › Power supply and charging of the battery via the power adapter supplied or a Power Box (*labPWR I.1/labPWR I.2/labPWR I.3*)
- › Power supply to a connected HEAD*lab* module

## Aurally-Accurate Recording and Playback

- › Direct connection of the BHS II binaural headset (BHS II is not included in the scope of delivery)
- › Recording equalization Independent of Direction (ID)
- › Equalized playback via BHS II or compatible headphones
- › Playback equalization Independent of Direction (ID), Free Field (FF), Diffuse Field (DF), and Linear (LIN, no equalization)

## Binaural Sensors

- › Connection and equalization of up to four binaural sensors
  - » BHM III.3 Binaural Head Microphone or HSU III.2 Artificial Head Microphone at the BHS input (CLB I.3 cable adapter is required)
  - » Up to three BHM III.3 or HSU III.2 at the BNC inputs 3 – 8
- › The optional firmware package SQ3 TP 05 (Code 3324-05) SQ*uadriga* III Tool Pack Controller Mode enables additional binaural sensors to be recorded using a connected HEAD*lab* module

## Playback via Headphones

- › 3.5 mm headphone socket at the front to connect compatible headphones, e.g., HD OP I.1 or HD CL I.1
- › Model-specific standard equalization for compatible headphones
- › Additional headphones at the BHS connector with the CU I cable adapter

## Sound Level Meter Function

- › Using the optional package SQ3 TP 02 (Code 3324-02) Level Meter
- › Measurements with up to four channels
- › Simultaneous time and frequency weighting (F, S, I time weighting/A, C, Z frequency weighting)
- › Momentary, peak, and maximum sound pressure level, equivalent continuous sound level, sound exposure level, level over time with time and frequency weighting
- › Averaging, minimum and maximum short-term level
- › Third-octave, octave, and FFT spectra
- › Loudness (ISO 532-1, DIN 45631/A1):
- › Sharpness (DIN 45692): momentary, maximum, percentile, and stationary sharpness
- › Percentiles (exceedance level)

## HEADlink

- › Connection to a HEADlab controller
- › Integration of six analog channels of SQuadriga III in a HEADlab system
- › Electrical isolation between the HEADlab system and SQuadriga III
- › Connection to a second SQuadriga III configured as a controller

## HEADlink+

- › Connection to a second SQuadriga III configured as a module
- › Connection and power supply of compatible HEADlab modules
- › Electrical isolation between the HEADlab module and SQuadriga III
- › Connection to an HMS V artificial head

## FFT-Based Real-Time Analyses with Filtering

- › Time signal/FFT/octave/third octave/level over time/specific loudness/order spectrum/order spectrum over time
- › Loudness over time/sharpness over time
- › Articulation index/extended articulation index (e.g., for speech intelligibility)
- › Transfer function, coherence, impulse response, cross spectrum, cross correlation
- › Triggered operation mode for impact measurements (most recent impulse as time signal or spectrum)
- › Real-time filtering with individual frequency, quality, and attenuation adjustment
- › Sound intensity measurement (using a PP probe)

## Vehicle Bus Systems

- › CAN FD, CAN, OBD, WWH-OBD, FlexRay
- › Real-time decoding and display of up to four CAN FD, OBD, or FlexRay quantities per channel during recording
- › Support of AUTOSAR sensors
- › Data stream recording in a separate channel
- › Simultaneous recording of several supported bus systems using the CMD 0.12 adapter (optional accessory)

## Pulse

- › Real-time decoding and display of up to two pulse sources
- › Pulse source recording in a separate channel
- › Pulse source sampling with up to 3 MHz (32 x 96 kHz)
- › Built-in signal conditioning to amplify or clean signals
- › High sensitivity
- › Adjustable trigger thresholds

## Trigger

- › Multiple trigger sources for starting/stopping a recording
  - › Decoded quantity from a Pulse, CAN, FlexRay channel
  - › Longitude/latitude, speed, altitude determined via satellite
  - › Sensor value on an analog channel (1 – 8)
  - › Time
- › Pretrigger and posttrigger: additional signal recording before or after the trigger conditions occur
- › Multiple triggered recordings in one common or in individual files
- › Trigger based on a rising/falling signal edge
- › Time trigger for starting up SQuadriga III with subsequent recording and automatic shutdown via device configuration

## Satellite Navigation Systems

- › Connector for the external, active antenna (included in the scope of delivery)
- › Real-time decoding and display of quantities, such as speed or altitude
- › PPS (pulses per second) for later synchronization and merging of spatially separated, non-synchronized recordings made with SQuadriga III or SQobold
- › Support of the GPS, Galileo, BeiDou, GLONASS satellite navigation systems
- › Combined use of several supported satellite navigation systems

## SQuadriga III-V1 (Code 3324-V1)

- › Battery-less variant for measurement situations that do not allow battery-powered devices
- › Identical range of functions as SQuadriga III
- › Lower maximum power consumption (30 W)
- › Capacitor-buffered real-time clock (capacitor is charged via the power supply)

# CONNECTORS ON THE FRONT

## Headphone Output



HD OP I.1

You can connect one of our compatible headphones to the headphone output and use it to play back correctly equalized recordings.



HD CL I.1

The following equalizations are available: Independent of Direction (ID), Free Field (FF), Diffuse Field (DF), and Linear (LIN, no equalization).



HD OP II.1



HD CL II.1

## Pulse In



CSB VII.0

The two pulse inputs Pulse In 1 and Pulse In 2 are available for direct connection of pulse sources. The pulse signals are sampled at 32 times the main sampling rate. At a main sampling rate of 48 kHz, a maximum pulse frequency of 600 kHz is available; at 96 kHz, the maximum pulse frequency is 1 MHz.



## BHS



BHS II

The BHS connector is intended for the BHS II headset that can be used for binaural and aurally-accurate recording and playback of noise events. The connector has its own A/D and D/A converters, switchable highpass filters, and a calibration function for the two ICP microphones of BHS II.



CLB I.3

Using the CLB I.3 cable adapter, you can use the two BHS channels as inputs with selectable ICP supply for sensors with BNC connectors, e.g., for the BHM III.3 Head Microphone and the HSU III.2 Artificial Head Microphone. The two channels may also serve as analog outputs. Using the CLJ I cable adapter, you can connect another pair of headphones.

## Analog Inputs (3 – 8)



Analog In with ICP



Analog Out



BHM III.3



HSU III.2



CLB I.2

The six AC and DC enabled BNC inputs can be used as analog inputs or inputs with selectable ICP supply. They are each equipped with switchable HP filters (2 Hz and 22 Hz), and adjustable input sensitivity.

In addition, they can each be configured as analog outputs, e.g., as a monitoring channel or for the Play & Record function.

ICP/DC coupling is also available, enabling you to measure signals below 2 Hz using ICP sensors.

# CONNECTORS ON THE BACK

## HEADlink



labCTRL II.1



SQadriga III (controller)

Use this connector to connect SQadriga III to a HEADlab controller and integrate it into a HEADlab system. SQadriga III then operates like a HEADlab module.

You also have the option of connecting another SQadriga III which will then operate as a controller, configuring and recording the sensors connected to both SQadriga III devices.

## HEADlink+



HMS V



SQadriga III (module)



HEADlab module

Use this connector to connect a HEADlab module (optional package SQ3 TP 05 is required) and supply it with power via SQadriga III.

There is also the option of connecting an HMS V artificial head or another SQadriga III.

The channels from the device connected to the HEADlink+ connector are configured and recorded by SQadriga III.

## CAN - FlexRay



FlexRay



CAN FD

This connector enables you to connect SQadriga III to the CAN and FlexRay vehicle field buses. There are two channels for CAN, CAN FD, and OBD as well as a FlexRay channel.

SQadriga III decodes up to four variables per CAN or FlexRay channel and displays them as numerical values in real time. Six of these decoded variables can also be displayed in the form of tachometers.

## Power



labPWR I.x



Power adapter



On-board power supply

Use this connector to connect the power adapter or a compatible Power Box (labPWR I.x).

You can use the CLO VIII.3 (Code 3364-3) cable to supply SQadriga III via the on-board power supply of a vehicle.

## GPS



GPS

Satellite navigation

Use the GPS connector to connect the CGA I.1 active rod antenna (included in the scope of delivery; CGA I.0 (Code 9855)

is available as a wired alternative), to record data from the satellite-based GPS, Galileo, GLONASS, and BeiDou navigation systems. With an active connection, the position, speed information, and determined altitude are stored in a separate channel in the recording. The system time of SQadriga III is synchronized with the satellite navigation time if necessary.

## USB Host (Type A)



Video camera



Storage location



Remote Control RC X



SQope

There are three connectors for USB devices, such as the video camera (Code 0271), a USB storage device, the RC X.1 Remote Control (with the optional RC X.2 wireless handheld transmitter), or USB audio devices such as the digital binaural headset SQope.

Connected devices are supplied with power via the USB port. When recording with a USB audio device, you can also record the GPS channel and the signal from the video camera.

## USB (Type C)



Computer

This screw-on connector is used to connect SQadriga III to a computer that has our USB driver installed. This connection enables frontend mode for recordings on the computer using the ArtemiS SUITE Recorder (APR 040 - Recorder).

You can also use this connection to operate SQadriga III as a mass storage device and download recordings from the internal memory or transfer files, e.g., sensor libraries, documentation templates, or configuration settings.

## LAN



Network

The LAN connector can be used to operate SQadriga III in frontend mode in a network, with signals being recorded on a computer (using APR 040 - Recorder).

You also have the option of controlling SQadriga III remotely via the network using the optional package SQ3 TP 06 - Network Access (Code 3324-06) and accessing the internal memory from a computer.

