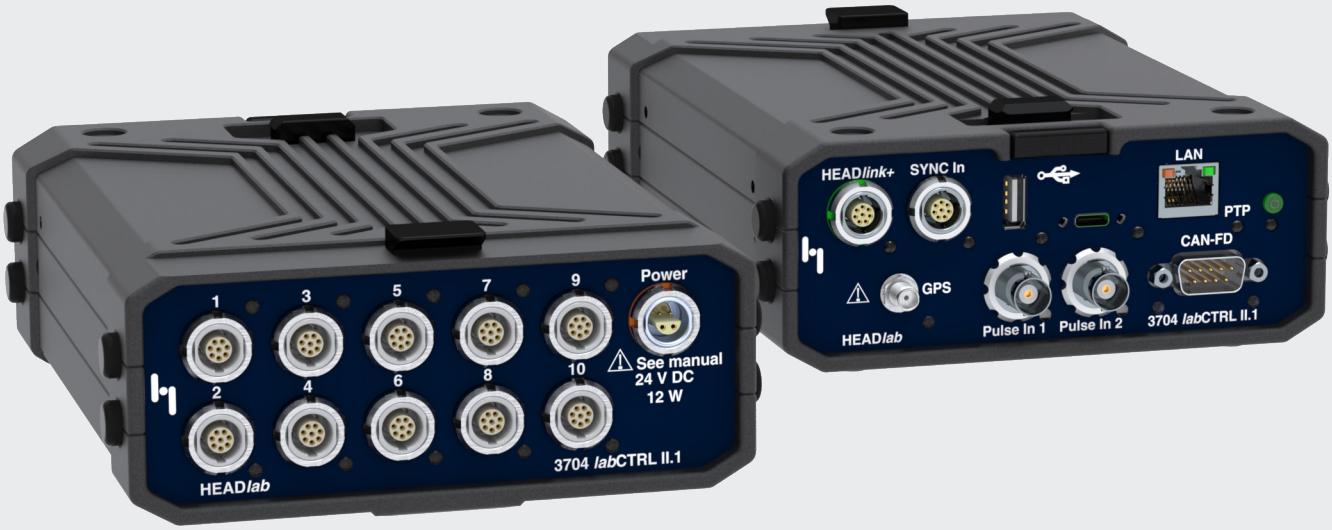
HEAD acoustics

DATA SHEET



Code 3704

labCTRL II.1

Second-generation HEAD*lab* controller with HEAD*link* 2.0

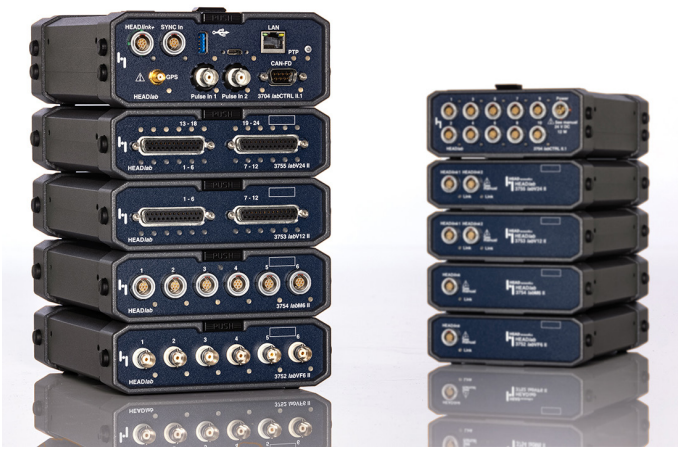
OVERVIEW

*lab*CTRL II.1

Code 3704

Second-generation HEAD*lab* controller with HEAD*link* 2.0

*lab*CTRL II.1 forms the core of the HEAD*lab* system, it handles data concentration and synchronization of input and playback modules. A HEAD*lab* system is configured and controled via *lab*CTRL II.1 from a Windows computer equipped with the ArtemiS SUITE Recorder or a *lab*SAR system. Representing the second generation of HEAD*lab* controllers, *lab*CTRL II.1 offers expanded capabilities for deploying the HEAD*lab* system effectively.



A HEADlab system featuring labCTRL II.1 and four signal modules (front and rear view)

KEY FEATURES

The second generation of the HEAD*lab* controller brings numerous enhancements and expansions compared to its predecessor:

- Advanced data protocol HEAD*link* 2.0
- Doubled data rate in comparison to the previous protocol and 32 bits per sample
- Maximum sampling rate of 204.8 kHz with second-generation HEAD*lab* modules
- USB 3.1 Gen. 1 interface for connection to the measuring computer
- Synchronization of multiple *lab*CTRL II.1 units with PTP via LAN
- Synchronization of multiple, spatially distributed *lab*CTRL II.1 units via GPS
- Two CAN FD interfaces with programmable termination
- Integrated GPS receiver compatible with GPS, Galileo, GLONASS, and BeiDou
- Two extensively configurable pulse inputs
- Full compatibility with existing first-generation HEAD*lab* systems

APPLICATIONS

Central control module for measurements in the fields of

- sound and vibration analysis
- troubleshooting
- sound engineering
- quality control
- acoustic environmental protection

DETAILS

*lab*CTRL II.1 represents the new generation of the HEAD*lab* controller, introducing numerous enhancements and innovations. The evolved transmission protocol, HEAD*link* 2.0, enables double the data rate compared to the previous protocol, providing 32 bits per sample. With second-generation HEAD*lab* modules, sampling rates of up to 204.8 kHz are achievable.

Versatile

Numerous signal modules, accessories, and adapters allow for measurement setups tailored to nearly any application. HEAD*lab* systems are optimized for quick and straightforward mechanical assembly and user-friendly wiring, connecting to a PC or notebook with just a single cable via USB or LAN.

Connected

The integrated GPS receiver in *lab*CTRL II.1 not only facilitates location data recording but also synchronization of recordings from spatially distributed systems, such as in environmental measurements. Alternatively, multiple spatially distributed HEAD*lab* systems can be precisely synchronized over a LAN network using the Precision Time Protocol (PTP) through the *lab*CTRL II.1 controller.

Effortless

The binaural recording systems *lab*HSU and HMS V can be directly connected to and operated with *lab*CTRL II.1 via HEAD*link* 2.0 without the need for adapters.

Self-sufficient

With the available Power Boxes as accessories, you can operate *lab*CTRL II.1 and connected HEAD*lab* modules independently of the power grid. The battery in the Power Boxes supplies voltage to HEAD*lab* systems for several hours, depending on the configuration. Both modules and the controller are optimized for minimal power consumption.

Fast

Through the HEAD*link* 2.0 interface, *lab*CTRL II.1, in conjunction with second-generation HEAD*lab* modules, achieves a sampling rate of up to 204.8 kHz. First-generation HEAD*lab* modules remain fully compatible (max sampling rate 102.4 kHz). Measurement data is transferred to the connected computer via a fast USB 3.1 Gen. 1 connection or GBit LAN.

User-friendly

Configuration and operation of the HEAD*lab* systems with *lab*CTRL II.1 can be done through the user interface of ArtemiS SUITE or via the web interface of a *lab*SAR system.

INTERFACES

Front

FLEXIBLE CONNECTIONS

The HEAD*link*+ interface and SYNC In input enable:
- The setup of extensive systems by cascading multiple HEAD*lab* controllers, even from different generations
- The connection of an HMS IV or HMS III artificial head measurement system (with an adapter)
- Monitoring during recording with a playback module from HEAD acoustics

SWIFT CONNECTIVITY

Connection to the measuring PC via:
- USB 3.1 Gen.1
- Gigabit LAN

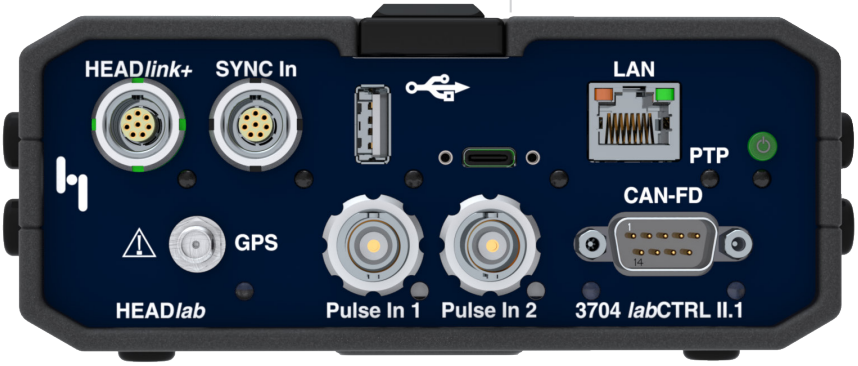
USB host port (3.1 Gen.1) for configuring an HMS IV or HMS III artificial head measurement system

REMOTE CONTROL

Stand-alone operation with *lab*SAR

Convenient configuration via a web browser

Extensively configurable auto-power-on function for remote activation



COMPACT AND HIGH-PERFORMING

Compact dimensions: 193 x 41 x 154 mm

HEAD*link* 2.0 protocol with double data rate and 32 bits per sample

Maximum 204.8 kHz sampling rate with second-generation HEAD*lab* signal modules

Robust housing with integrated connection elements for easy stacking of multiple modules

GPS RECEIVER

The integrated GPS receiver enables:
- Recording of location data during measurements
- Subsequent synchronization of recordings from spatially distributed systems

Compatible with GPS, Galileo, GLONASS, and BeiDou

2 X PULSE IN

Two integrated, extensively configurable inputs for pulse signals

Maximum pulse frequency of 1 MHz

Digital adjustment of threshold and hysteresis

Switchable current source (substitute for pull-up)

2 X CAN FD

Two integrated, extensively configurable CAN FD interfaces

Switchable termination

INTERFACES

Rear (10 x HEAD*link* 2.0)

MODULES FOR ANALOG AND ICP® SENSORS

- *lab*VF6 II — 6 channels for analog and ICP sensors (TEDS)
- *lab*V12 II — 12 channels for analog and ICP sensors (TEDS)
- *lab*V24 II — 24 channels for analog and ICP sensors (TEDS)
- *lab*V6HD — 6 channels for analog and ICP sensors with wideband input

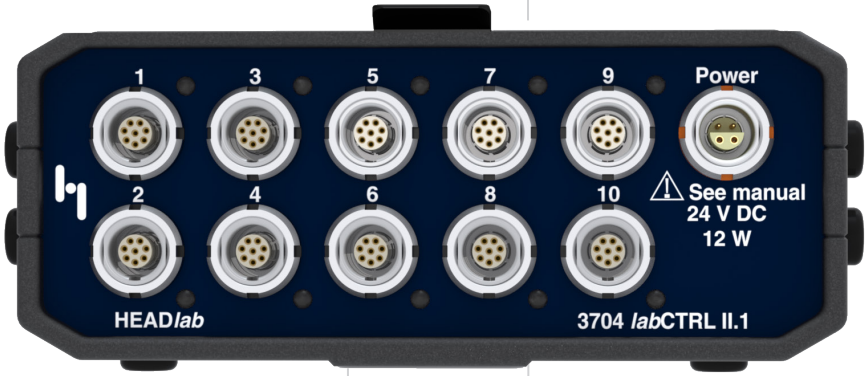
BINAURAL RECORDING SYSTEMS

Without adapter:
- *lab*HSU
- HMS V

With *lab*DX:
- HMS IV
- HMS III

FLEXIBLE POWER SUPPLY

*lab*CTRL II.1 can be powered in various ways:
- Power adapter
- Power Boxes
- Vehicle onboard power supply
- DC sources from 18 V to 28 V with *lab*SPA



MODULE FOR CAPACITOR MICROPHONES

*lab*M6 II — 6 channels for capacitor microphones, analog, and ICP sensors (TEDS)

MODULE FOR THERMOCOUPLES

*lab*T6 — 6 channels for Type K thermocouples or RTD

MODULE FOR STRAIN GAUGES

*lab*SG6 — 6 channels for resistive strain gauges or sensors with symmetrical or asymmetrical outputs and unipolar or bipolar supply

MODULES FOR CHARGE AND ICP SENSORS

*lab*CF6 — 6 channels for charge or ICP sensors

MODULE FOR CAN, CAN FD, AND FLEXRAY

*lab*DX B — 6 channels for RPM, CAN FD, CAN, OBD, FlexRay, HMS IV, HMS III, satellite navigation systems

MODULE FOR RPM

*lab*HRT6 — 6 channels for high-resolution RPM measurement

FULL COMPATIBILITY

*lab*CTRL II.1 is fully compatible with first-generation HEAD*lab* modules and controllers (HEAD*link* 1.0).

SCOPE OF SUPPLY

*lab*CTRL II.1 (code 3704)
› LAN/USB controller

CUSB IV.3 (code 5476)
› USB cable type A to type C with fitting, 3 m

LAN cable
› 3 m

OPTIONAL ACCESSORIES

Software (required)
› ArtemiS SUITE APR Framework
APR 000 (code 50000)
› ArtemiS SUITE Recorder
APR 040 (code 50040)

Recommended software
› ArtemiS SUITE Basic Decoder
ASP 801 (code 51801)
› ArtemiS SUITE (code 50000 — 51801)
Further ArtemiS SUITE modules

Optional accessories

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

CGA I.0 (code 9855)
Active GPS antenna with cable

Power supply

Power Boxes
› *lab*PWR I.1 (code 3711)
Power Box for HEAD*lab* systems (up to max. 40 W)
› *lab*PWR I.2 (code 3712)
Power Box for HEAD*lab* systems (up to max. 100 W)
› *lab*PWR I.3 (code 3713)
Power Box for HEAD*lab* systems (up to max. 35 W)

Power adapters
› PS 24-60-L4 (code 0617B)
24 V/60 W/LEMO 4-pin
› PS 24-150-L4 (code 0620B)
24 V/150 W/LEMO 4-pin (for systems with more than 40 W total current draw only)
› PS 24-160-L4 (code 0616)
24 V/160 W/LEMO 4-pin
› PS 24-60-L2 (code 0623B)
24 V, 60 W, LEMO 2-pin
[for *lab*PWR I.1/labPWR I.3]
› PS 24-150-L2 (code 0621B)
24 V, 150 W, LEMO 2-pin
[for *lab*PWR I.1/labPWR I.2/ *lab*PWR I.3]

Adapter/adapter cables/cables

Connecting to a PC
› CUSB IV.1 (code 5476-1)
USB cable Type A → Type C, with fitting, 1 m

Connection between modules and controller
› CLL X.xx (code 3780-xx)
HEAD*link* cable LEMO 8-pin [input/playback module → controller; synchronization controller → controller], available cable lengths: 0.17 m, 0.26 m, 0.36 m, 0.5 m, 1 m, 1.5 m, 2.5 m, 5 m, 10 m, 20 m, 25 m, 30 m, 40 m, 50 m, 60 m
› *lab*RFC (code 3789)
Active adapter for lossless extension of HEAD*link* connections, max 180 m
› *lab*OA (code 3785)
Optical adapter (optical/electrical) for data transmission between the controller and input module over a distance of up to 1000 m using two *lab*OA optical adapters
› Optical cable, fiber optic patch cable multimode, duplex, SC/PC → SC/PC [→ *lab*OA]

Power supply

› CLL XI.xx (code 3781-xx)
  Power supply cable LEMO 4-pin → LEMO 4-pin [power adapters/Power Boxes → *lab*CTRL II.1], available cable lengths: 0.19 m, 0.42 m, 1 m, 5 m, 10 m, 15 m
› CLL XII.10 (code 3795-xx)
  Extension cable LEMO 4-pin → LEMO 4-pin, available cable lengths: 1 m, 2.5 m, 10 m
› *lab*SPA (code 3715)
  Safe Power Adapter [DC power source 18 V to 28 V (adapter cable CSL X.3) → *lab*CTRL II.1]
› CLO X.3 (code 3782-3)
  Power supply cable 2 x cable lug → LEMO 2-pin, 3 m [DC power source → Power Boxes/labSPA]

Connection of HMS IV/HMS III

› CLX X.xx (code 3797-1)
  AES/EBU adapter cable for connecting HMS IV to HEAD*link*+, 1 m
› CUSB II.xx (code 5478-xx)
  USB cable Type A → Type B HMS IV control, available cable lengths: 1.5 m, 3 m, 5 m

Connection cables for CAN/CAN FD

› CDO X.3 (code 3786-3)
  OBD-2 connection cable OBD plug, Type B → D-Sub 9-pin, 3 m [→ *lab*CTRL II.1/labDX (additional user-specific CAN or OBD-2 cable required)]
› CMD II.0 (code 3788.2)
  Cable adapter D-Sub 9-pin 2 x D-Sub 9-pin (CAN FD) for *lab*CTRL II.1

Network cable

› CLAN I.xx (code 9864B-xx)
  Network cable (RJ45), CAT 6a

Transport

› *lab*CASE I.1 (code 3770)
  Transport case for HEAD*lab*

*lab*SAR

› *lab*SAR I.1 (code 3705.1)
  Industrial PC with web interface

TECHNICAL SPECIFICATIONS

General	
Communication interfaces	10 x HEAD*link*, 1 x HEAD*link*+, 1 x Sync In, 1 x USB Device, 1 x USB Host, 1 x LAN (RJ45)
Data acquisition/generation connections	1 x GPS, 2 x CAN (CAN/CAN FD/OBD-2), 2 x Pulse In
Supply voltage connection	LEMO 4-pin
Reverse polarity protection	Yes
Supply voltage	18 V_{DC} – 28 V_{DC}
Max. power draw in operation	8 W
Max. power draw in standby mode	0.083 W
System sampling rate	32.768 (2^n) kHz; 48 kHz; 51.2 kHz
Min. to max. sampling rate @ 32,768 kHz (2^n)	2.048 kHz to 131.072 kHz
Min. to max. sampling rate @ 48 kHz	3 kHz to 192 kHz
Min. to max. sampling rate @ 51.2 kHz	3.2 kHz to 204.8 kHz
Maximum sampling rate	204.8 kHz
Synchronization	Internal, external HEAD*link*, external GPS, external PTP
Cooling	Convection, without fan
Housing dimensions	148 x 63 x 183 mm (WxHxD; overall)
Weight	1010 g
Operating temperature	-10°C – +60°C
Storage temperature	-20°C – +85°C

Pulse In	
Plug connector	2 x BNC
Number of channels	2
Switchable current source (substitute for pull-up)	5.6 mA (-0.6/+0.9 mA)/5 V
Maximum pulse frequency	1 MHz (at F_S ≥96 kHz)
Threshold value digitally adjustable	Yes
Hysteresis digitally adjustable	Yes
Resolution of threshold/hysteresis	40 mV
Input impedance	36 kΩ
Input voltage range	0 V – +10 V (operation)
Dielectric strength	±50 V (abs. max.)
Electrical isolation	Yes
Electrical isolation (per channel)	No

CAN FD

Plug connector	1 x D-Sub 9-pin
Number of interfaces	2
Data rate (gross)	5 Mbit/s
Dielectric strength	±18 V
Electrical isolation	Yes
Electrical isolation (per channel)	No
Identifier	11 bit (CAN 2.0A) and 29 bit (CAN 2.0B)
Standards	ISO 11898-2:2015; ISO 15765-4
Termination	120 Ω, switchable

USB device (data and configuration)

Plug connector	1 USB Type C (with fitting at side)
Number of interfaces	1
USB specification	USB 3.1 Gen 1
Data rate (gross)	5000 Mbit/s
Electrical isolation	No

USB host

Plug connector	1 x USB Type A
Number of interfaces	1
USB specification	USB 3.1 Gen 1
Data rate (gross)	5000 Mbit/s
Output voltage	5 V
Total output current	0.5 A
Maximum output power	2.5 W
Electrical isolation	No

LAN

Plug connector	1 x RJ45
Number of interfaces	1
Standard	IEEE 802.3ab
Data rate (gross)	1000 Mbit/s
Electrical isolation	Yes
Power over Ethernet	No

HEAD*link*	
Plug connector	10 x LEMO 8-pin
Number of interfaces	10
Output voltage	10 – 28 V_{DC} (identical to input voltage of *lab*CTRL II.1)
Maximum output power	15 W
HEAD*link* version	HEAD*link* 1.0, HEAD*link* 2.0
Synchronization	32,768 (2^n) kHz; 48 kHz; 51.2 kHz
Electrical isolation	No
Maximum cable length	60 m

HEAD*link*+ (connection for HMS IV with adapter)	
Plug connector	1 x LEMO 8-pin
Number of interfaces	1
Output voltage	10 V – 28 V DC (identical to input voltage of *lab*CTRL II.1)
Maximum output power	15 W
Standard	HEAD*link* 1.0, HEAD*link* 2.0, AES (with adapter CLX X)
Electrical isolation	No
Synchronization	32.768 (2^n) kHz; 48 kHz; 51.2 kHz
Maximum cable length	60 m

Satellite systems	
Plug connector	1 x SMA
Supply voltage active antenna	2.9 V
Supply current active antenna	50 mA
Maximum repetition rate	10 Hz
Satellite systems	GPS, Galileo, GLONASS, BeiDou
PPS synchronization	Yes
Number of receivers	2

HEAD acoustics

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