HEAD acoustics

DATA SHEET

Code 3755

labV24 II

24-channel voltage/ICP input module of the second HEAD*lab* generation for connecting analog and ICP sensors for data acquisition with high channel numbers.

OVERVIEW

*lab*V24 II

Code 3755

*lab*V24 II is an input module of the second HEAD*lab* generation for data acquisition. Thanks to the support of the HEAD*link* 2.0 transmission protocol, the input module offers twice the sampling rate with the same number of channels compared to HEAD*link* 1.0.
In combination with the controller of the second HEAD*lab* generation *lab*CTRL II.1, *lab*V24 II achieves a maximum sampling rate of 204.8 kHz.

The ranges can be adjusted flexibly between 10 mV and 30 V. The overload detection and the maximum electric strength of 60 V provide a high level of protection against errors in the measurement setup. At the front of the input module, the interfaces are summarized in two D-Sub sockets to connect the sensors via breakout cables.

KEY FEATURES

Input module of the second HEAD*lab* generation

Data acquisition with 24 analog and ICP sensors

204.8 kHz maximum sampling rate

Dual Link (connecting *lab*V24 II with *lab*CTRL II.1 using two HEAD*link* cables) for measurements with twice the number of channels at higher sampling rates

Switchable coupling: DC, AC, ICP, ICP-DC

Measurement ranges: 0.01 V_P, 0.1 V_P, 1 V_P, 10 V_P, 30 V_P

Favorable lower cutoff frequency: 0.14 Hz

High input impedance: 1 MΩ

Electric strength: maximal 60 V

Analog highpass filters
- 0.14 Hz, 1st order (cannot be switched off in AC mode)
- 22 Hz, 2nd order (switchable channel by channel)

Overload detection for automatic disconnection of effected channels

0 Hz ICP-DC coupling by HEAD acoustics, e.g., for measuring low-frequency signals with seismic sensors

Electrical isolation of the *lab*V24 II inputs from the inputs of other modules of a HEAD*lab* system and the PC interface

Power supply via controller/frontend

Rugged; compact design; noiseless (without fan)

APPLICATIONS

- Data acquisition with high channel numbers

DETAILS

System sampling rate

The system sampling rate of a HEAD*lab* system with one or more *lab*V24 II input modules can be flexibly adjusted. A maximum sampling rate of 204.8 kHz is possible.

- 2.048 kHz up to 131.072 kHz @32.768 (2^n) kHz
- 3 kHz up to 192 kHz @48 kHz
- 3.2 kHz up to 204.8 kHz @51.2 kHz

Dual Link

In Dual-Link mode, *lab*V24 II is connected to the *lab*CTRL II.1 controller with two HEAD*link* cables. Compared to Single Link, this enables measurements with twice the number of channels at higher sampling rates. For each group of 12 channels, one sampling rate can be adjusted.

via *lab*CTRL II.1 at a system sampling rate of	32.768 (2^n) kHz	48 kHz	51.2 kHz
up to 24 channels	≤ 32.768 kHz	≤ 48 kHz	≤ 51.2 kHz
up to 12 channels	≤ 65.536 kHz	≤ 96 kHz	≤ 102.4 kHz
up to 6 channels	≤ 131.072 kHz	≤ 192 kHz	≤ 204.8 kHz

Single Link

In Single-Link mode, *lab*V24 II is connected to a controller or a frontend using a single HEAD*link* cable.

via *lab*CTRL II.1 at a system sampling rate of	32.768 (2^n) kHz	48 kHz	51.2 kHz
up to 24 channels	≤ 16.384 kHz	≤ 24 kHz	≤ 25.6 kHz
up to 12 channels	≤ 32.768 kHz	≤ 48 kHz	≤ 51.2 kHz
up to 6 channels	≤ 65.536 kHz	≤ 96 kHz	≤ 102.4 kHz
up to 3 channels	≤ 131.072 kHz	≤ 192 kHz	≤ 204.8 kHz

Modular HEAD*lab* system

HEAD*lab* systems can be configured individually and customized using controllers, various input, playback, and power supply modules as well as other accessories. With ten *lab*V24 II devices connected, for example, a *lab*CTRL II.1 controller enables measurements with up to 240 channels.

Several controllers can be connected to form larger HEAD*lab* systems. Via LAN, the number of controllers and channels used in a HEAD*lab* system depends on the capacity of the network and the computing power of the PC. A standard PC can record several hundred channels with sampling rates from 2.048 kHz up to 204.8 kHz.

Second and first generation controllers and modules are compatible with each other. First-generation input modules can be combined with a second-generation controller and vice versa. In mixed operation, the HEAD*link* transmission protocol to be used is automatically determined between the controller and module.

CONNECTIONS

CONTROLLING / POWER SUPPLY

CONNECTION TO CONTROLLERS / FRONTEND

HEAD*link* protocol 2.0 via HEAD*link* cable

- Dual Link (HEAD*link* 1 + HEAD*link* 2) or Single Link (HEAD*link* 1)
  - Controller *lab*CTRL II.1
- Single Link (HEAD*link* 1)
  - Compact systems *lab*COMPACT12 II, *lab*COMPACT24 II

HEAD*link* protocol 1.0 via HEAD*link* cable

- Dual Link (HEAD*link* 1 + HEAD*link* 2) oder Single Link (HEAD*link* 1)
  - Controller *lab*CTRL I.2, *lab*CTRL I.1
- Single Link (HEAD*link* 1)
  - High-End 2-channel frontend *lab*HSU
  - Artificial head HMS V
  - Compact system *lab*COMPACT12(-V1), *lab*COMPACT24(-V1)
  - HEAD VISOR frontend VMA V
  - HEAD VISOR frontend VMA II.1
  - BrakeOBSERVER frontend MMF III.0

DATA ACQUISITION

CONNECTION OF SENSORS

Via breakout cables / adapters

- Voltage/ICP sensors (TEDS)
- Triax sensors (Microtech)
- Mobile HEAD microphone for binaural recordings BHM III.3
- Artificial head HSU III.2
- Binaural headset BHS II
- Voltage sources

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TECHNICAL DATA

General	
Connectors data acquisition/ data generation	24 x voltage-in/ICP-in
Communication interfaces	2 x HEAD*link*
Supply connection	HEAD*link* 1 (input)
Supply voltage	10 V_{DC} to 28 V_{DC}
Reverse polarity protection	No
Max. power consumption stand-alone operation	9.6 W
Max. power consumption with sensors connected	12.5 W
System sampling rate	32.768 (2^n) kHz, 44.1 kHz, 48 kHz, 51.2 kHz
Min. to max. sampling rate @32.768 (2^n) kHz	2.048 kHz to 131.072 kHz
Min. to max. sampling rate @44.1 kHz	2.75625 kHz to 176.4 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
Synchronization	HEAD*link*
Max. sampling rate	204.8 kHz
Cooling	Convection (without fan)
Operating temperature	-10 °C to +60 °C
Storage temperature	-20 °C to +70 °C
Dimensions	148 x 48 x 173 mm (WxHxD)
Weight	823 g

HEAD*link*	
Connector	2 x LEMO 8 pin
Number of interfaces	2
Output voltage	10 V_{DC} to 28 V_{DC}
HEAD*link* version	HEAD*link* 1.0, HEAD*link* 2.0
Galvanic isolation	Yes
Synchronization	32.768 (2^n) kHz, 44.1 kHz, 48 kHz, 51.2 kHz
Maximum cable length	60 m

Voltage/ICP (analog inputs)	
Connector	2 x D-Sub 25 pin
Number of channels	24
Quantity	Voltage
Ranges	0.01 V_p, 0.1 V_p, 1 V_p, 10 V_p, 30 V_p
Input impedance	1000 kΩ

Voltage/ICP (analog inputs)

Frequency range	0 Hz to 86.4 kHz
Coupling	DC, AC, ICP, ICP-DC
Analog highpass filter	0.14 Hz, 1st order, ±5% 22 Hz, 2nd order, switchable, ±5%
Digital highpass filter @fs = 48 kHz, proportional to fs	0.1 Hz
Digital lowpass filter @fs = 48 kHz, proportional to fs	21.6 kHz
Resolution	32 bit
Electrical isolation input/output	Yes
Electrical isolation channel by channel	No
Electric strength	±60 V
TEDS (IEEE 1451.4) read	TEDS class 1, shared signal wire (version 0.9 and 1.0)
ICP voltage	22.8 V
ICP current	4 mA (-7.5% / +25%)
Common mode rejection	90 dB

Voltage/ICP – ranges (analog inputs)[1]

Range	0.01 V_P	0.1 V_P	1 V_P	10 V_P	30 V_P
S/N	79 dB(A)	99 dB(A)	109 dB(A)	109 dB(A)	108 dB(A)
Crosstalk at 1 kHz	-93 dB	-101 dB	-121 dB	-120 dB	-98 dB
THD+N	-77 dB	-87 dB	-101 dB	-103 dB	-78 dB
Dynamic 5 Hz analysis bandwidth	115 dB	135 dB	145 dB	145 dB	144 dB
Input related noise (24 kHz bandwidth)	1.59 µV	1.59 µV	5 µV	50.1 µV	168.7 µV
DC accuracy	1.5 %	0.25 %	0.1 %	0.1 %	0.1 %
AC accuracy at 1 kHz	2.5 %	0.4 %	0.4 %	0.4 %	0.4 %
Frequency response 20 Hz to 20 kHz @fs = 48 kHz re 1 kHz	+0.05 dB, -0.02 dB	+0.07 dB, -0.02 dB	+0.09 dB, -0.02 dB	+0.08 dB, -0.02 dB	+0.02 dB, -1.2 dB
Frequency response 20 Hz to 40 kHz @fs = 96 kHz re 1 kHz	+0.05 dB, -0.21 dB	+0.07 d, -0.02 dB	+0.11 dB, -0.02 dB	+0.08 dB, -0.02 dB	+0.04 dB, -3.5 dB
Frequency response 20 Hz to 80 kHz @fs = 192 kHz re 1 kHz	+0.05 dB, -0.88 dB	+0.05 dB, -0.1 dB	+0.15 dB, -0.02 dB	+0.08 dB, -0.02 dB	+0.05 dB, -7.8 dB
Linearity 0 to 80 dB below full scale	0.34 dB	0.05 dB	0.03 dB	0.03 dB	0.03 dB
Linearity 0 to 100 dB below full scale	2.7 dB	0.35 dB	0.15 dB	0.08 dB	0.11 dB

[1] Valid for: ambient temperature 23 °C/73 °F (±3 °C/37 °F), operating duration ≥1 h. Vibration excitation of the device can cause deviations.

All measurement ranges receive a calibration by the factory. The measurement ranges 100 mV_P to 30 V_P can additionally be calibrated in the calibration laboratory of HEAD acoustics GmbH accredited according to DIN EN ISO 17025.

Dynamics

There is no standardized definition of „dynamics“.

Therefore, the Signal to Noise Ratio (SNR or S/N) value is given for *lab*V24 II. This is calculated based on the level of a sinusoidal tone with maximum modulation in relation to the full relevant bandwidth noise floor level of the module, measured in the entire relevant frequency range.

Sometimes in the literature, the term „dynamics“ is used identically to the S/N, but this „dynamic“ value is often based on a narrow-band calculation of the inherent noise. Depending on the analysis bandwidth, *lab*V24 II will then have a much higher „dynamic“ value.

ACCESSORIES

CDB XII-V1.1 (Code 9894-V1-1)
- Breakout cable
- D-Sub 25 pin → 12 x BNC, female, 1 m (channels 1 to 6 and 13 to 18)

CDB XII-V2.1 (Code 9894-V2-1)
- Breakout cable
- D-Sub 25 pin → 12 x BNC, female, 1 m (channels 7 to 12 and 19 to 24)

CDB XI-V1.1 (9893-V1-1)
- Breakout cable
- D-Sub 25 pin → 12 x BNC, male, 1 m (channels 1 to 6 and 13 to 18)

CDB XI-V2.1 (9893-V2-1)
- Breakout cable
- D-Sub 25 pin → 12 x BNC, male, 1 m (channels 7 to 12 and 19 to 24)

CDM II.1 (Code 3571-1)
- Adapter cable
- D-Sub 25 pin → 4 x Microtech, 1 m

CLB I.2 (Code 9847)
- Adapter for connecting BHS II

CLL X.xx (Code 3780-xx)
- HEAD*link* cable
- LEMO 8 pin → LEMO 8 pin
- 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

SCOPE OF SUPPLY

*lab*V24 II (Code 3755)
24-channel voltage/ICP input module of the second HEAD*lab* generation

HEAD acoustics

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