



Code 3754

labM6 II

6-channel voltage/microphone input module of the second HEADlab generation with HD wide range input (high dynamics)

OVERVIEW

labM6 II

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labM6 II is a second-generation *HEADlab* input module that, thanks to the *HEADlink 2.0* transmission protocol, provides twice the sampling rate with the same number of channels compared to *HEADlink 1.0*. In conjunction with *labCTRL II.1*, the second-generation *HEADlab* controller, *labM6 II* delivers a maximum sampling rate of 204.8 kHz.

A maximum of six condenser microphones can be connected directly to *labM6 II*. The supply voltage of the module's impedance converter is switchable between 15 V and 60 V, thus enabling even low-noise microphones to be used, for example. BNC adapters can also be connected to the LEMO sockets, enabling the use of ICP® sensors (AC or DC).

All channels can be used either as HD wide-range inputs or conventionally with fixed measurement ranges from 30 mV to 30 V. The HD wide-range input enables the measurement of signals with high dynamic ranges and strongly fluctuating levels. No changes to the settings are necessary due to overload or recordings at extremely low volume.

Another special feature is the "0 Hz ICP-DC coupling" developed by HEAD acoustics that can be used, for example, to measure low-frequency signals using seismic sensors.

KEY FEATURES

Second-generation *HEADlab* input module

- › *HEADlink 2.0* transmission protocol

Connection of up to six condenser microphones to use all channels either as HD wide-range inputs or conventionally with fixed measurement ranges from 30 mV to 30 V.

Overload detection for automatic switch-off of affected channels in the event of overload

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

Conventional measurement ranges: 0.03 V, 0.3 V, 3 V, 30 V

Maximum sampling rate: 204.8 kHz

Favorable lower cut-off frequency: 1.58 Hz

"0 Hz ICP-DC coupling" from HEAD acoustics

Analog highpass filters

- › 1.58 Hz, 1st order (cannot be switched off in AC mode)
- › 22 Hz, 2nd order (switchable per channel)

Electrical isolation of the inputs from those of other modules in a *HEADlab* system and from the PC interface

Noiseless (without fan), rugged design

Integrated locking mechanism (the modules can be easily connected to form a system)

APPLICATIONS

Data acquisition with up to 6 condenser microphones (low-noise, sound power) and a maximum sampling rate of 204.8 kHz

Scope of Delivery

3754	labM6 II	6-channel voltage/microphone input module of the second HEADlab generation with HD wide-range input (high dynamics)
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Hardware Accessories

Required (one of the controllers/frontends listed below)

3701	labCTRL I.1	Controller	HEADlink 1.0	No longer available
3702	labCTRL I.2	Controller	HEADlink 1.0	No longer available
3704	labCTRL II.1	Controller	HEADlink 2.0	Available

3708	labCOMPACT12	Compact system	HEADlink 1.0	No longer available
3708-VI	labCOMPACT12-V1	Compact system	HEADlink 1.0	No longer available
3709	labCOMPACT24	Compact system	HEADlink 1.0	No longer available
3709-V1	labCOMPACT24-V1	Compact system	HEADlink 1.0	No longer available
31020	labCOMPACT12 II	Compact system	HEADlink 2.0	Available
31021	labCOMPACT24 II	Compact system	HEADlink 2.0	Available

1502	HMS V	Digital artificial head measurement system	HEADlink 2.0 (from firmware 2.1; up to firmware 2.1: only HEADlink 1.0)	Available
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3313	MMF III.0	Mobile measurement frontend (BrakeOBSERVER)	HEADlink 1.0 (from firmware 2.5)	Available
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3324	SQuadriga III	Mobile recording and playback system	HEADlink 1.0 (from firmware 2.5)	Available
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3710	labHSU	2-channel frontend	HEADlink 2.0 (from firmware 2.1; up to firmware 2.1: only HEADlink 1.0)	Available
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7522	VMA II.1	HEAD VISOR microphone array	HEADlink 1.0	No longer available
7526	VMA III.0	HEAD VISOR microphone array (Ø 3 m)	HEADlink 1.0	No longer available
7528	VMA V	HEAD VISOR microphone array	HEADlink 1.0	Available

Required (HEADlink cables)

3780-xx	CLL X.xx	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
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Optional Adapter Cables

3791-01	CBL X0.1	Adapter cable 7-pin LEMO ↔ BNC, 0.1 m
9847	CLB I.2	Adapter cable for connecting BHS II and HSU III.2

Software Accessories

Required (when Connecting a Controller, ... to a Computer)

50000	APR 000	APR Framework	Basis of ArtemiS SUITE	Prerequisite
50040	APR 040	Recorder	Universal recorder	Data Acquisition

DETAILS

CONNECTIONS

Control/Power Supply



Connection to Controller / Frontend

HEADlink protocol 2.0 (max. 204.8 kHz)

- › Controller *labCTRL II.1*
- › Compact systems *labCOMPACT12 II*, *labCOMPACT24 II*
- › High-end 2-channel frontend *labHSU*
- › Artificial head *HMS V*

HEADlink protocol 1.0 (max. 102.4 kHz)

- › Mobile 8-channel recording and playback system *SQadriga III*
- › HEAD VISOR microphone array *VMA V*

Power supply

- › Via HEADlink
- › Energy consumption: 12 W

Data Acquisition



Connecting Sensors

Condenser microphones

Head-shoulder units *HSU III.2*, *HSU III.3*

Binaural headset *BHS II*

Voltage/ICP sensors

TECHNICAL DATA

General

Data acquisition/data generation connections	6 x voltage/Mic In
Communication interfaces	1 x HEADlink
Connections via adapters or adapter cables	6 x voltage/ICP In using CBL X.01 adapter
Supply connection	HEADlink
Supply voltage	10 V _{DC} to 28 V _{DC}
Max. power consumption during operation – device only	7 W
Max. power consumption with sensors connected	12 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 176.400 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	HEADlink
Max. sampling rate	204.8 kHz
Cooling	Convection (without fan)
Operating temperature	-10 °C to +60 °C, +14 °F to +140 °F
Storage temperature	-20 °C to +70 °C, -4 °F to +158 °F
Dimensions (W x H x D)	148 mm x 48 mm x 173 mm
Weight	758 g
Protection class according to EN61140	III
Shock according to EN 60068-2-27	Sawtooth, 26 g (260 m/s ²), 11 ms, 18 shocks (3 in each direction of the X, Y, Z axis)
Vibration according to EN 60068-2-6	Sine, 4.5 g (45 m/s ²), 10 Hz – 2 kHz
Sound level meter according to EN 61672	Validation of the measurement chain in accordance with Class 1 of IEC 61672 is possible in the measurement ranges 30 mV, 300 mV, 3 V

Digital HEADlink

Plug connector	1 x LEMO 8-pin
Number of interfaces	1
HEADlink version	HEADlink 1.0, HEADlink 2.0
Supply voltage	10 V _{DC} to 28 V _{DC}
Electrical isolation	Yes
Synchronization	32.768 (2 ⁿ) kHz, 44.1 kHz, 48 kHz, 51.2 kHz
Maximum cable length	60 m

Analog input, voltage/MIC

Plug connector	6 x LEMO 7-pin
Measurement quantity	Voltage
Measurement ranges	0.03 V _p , 0.3 V _p , 3 V _p , 30 V _p
Measurement range HD mode	10 V _p
Input impedance	100 kΩ
Coupling	DC, AC, ICP, ICP-DC
Analog highpass filter	1.58 Hz, 1st order ±5%; 22 Hz, 2nd order, switchable ±5%
Digital highpass filter @ fs = 48 kHz, proportional to fs	1 Hz
Digital lowpass filter @ fs = 48 kHz, proportional to fs	21.6 kHz
Resolution	32 bits
Electrical isolation input/output	Yes
Electric strength	±60 V
Microphone voltage (switchable)	±15 V ±60 V
Microphone current	10 mA @ ±15 V 3.5 mA ±60 V
Polarization voltage	200 V
Polarization current	0.2 mA
TEDS (IEEE 1451.4) read	TEDS class 1, shared return wire (versions 0.9 and 1.0)
DC cancellation	90 dB

Analog input, voltage/ICP

Plug connector	6 x BNC with CBL X.01 adapter
Number of channels	6
Measurement quantity	Voltage
Measurement ranges	0.03 V _p , 0.3 V _p , 3 V _p , 30 V _p
Measurement range HD mode	10 V _p
Input impedance	100 kΩ
Frequency range	0 Hz to 86.4 kHz
Coupling	DC, AC, ICP, ICP-DC
Analog highpass filter	1.58 Hz, 1st order ±5%; 22 Hz, 2nd order, switchable ±5%
Digital highpass filter @ fs = 48 kHz, proportional to fs	1 Hz
Digital lowpass filter @ fs = 48 kHz, proportional to fs	21.6 kHz
Resolution	32 bits
Electrical isolation input/output	Yes
Electric strength	±60 V
TEDS (IEEE 1451.4) read	TEDS class 1, shared signal wire (versions 0.9 and 1.0)
ICP voltage	22.8 V
ICP current	4 mA (-7.5% / +25%)
Common mode rejection	90 dB

Analog input, voltage/Mic measurement ranges¹

Measurement range	0.03 V _p	0.3 V _p	3 V _p	30 V _p	10 V _p (HD)
S/N	94 dB(A)	108 dB(A)	109 dB(A)	108 dB(A)	136 dB(A)
Crosstalk	-114 dB	-127 dB	-132 dB	-127 dB	-127 dB
THD+N	-90 dB	-101 dB	-102 dB	-90 dB	-99 dB
Dynamics 5 Hz analysis bandwidth	131 dB	145 dB	146 dB	145 dB	173 dB
Input-related noise (24 kHz bandwidth)	0.84 µV	1.69 µV	15.1 µV	168.7 µV	2.3 µV
DC accuracy	1.5%	0.25%	0.15%	0.1%	0.1%
AC accuracy @ 1 kHz	1.5%	1.1%	1.1%	0.4%	0.4%
Frequency response 20 Hz to 20 kHz @ f _s = 48 kHz referenced to 1 kHz	+0.05 dB, -0.05 dB	+0.05 dB, -0.05 dB	+0.07 dB, -0.05 dB	+0.06 dB, -0.05 dB	+0.06 dB, -0.05 dB
Frequency response 20 Hz to 40 kHz @ f _s = 96 kHz referenced to 1 kHz	+0.02 dB, -0.05 dB	+0.05 dB, -0.05 dB	+0.07 dB, -0.05 dB	+0.05 dB, -0.05 dB	+0.05 dB, -0.05 dB
Frequency response 20 Hz to 80 kHz @ f _s = 192 kHz referenced to 1 kHz	+0.02 dB, -0.28 dB	+0.02 dB, -0.05 dB	+0.07 dB, -0.05 dB	+0.02 dB, -0.05 dB	+0.02 dB, -0.05 dB
Linearity: 0 dB to 80 dB under full scale	0.08 dB	0.04 dB	0.03 dB	0.04 dB	0.02 dB
Linearity: 0 dB to 100 dB under full scale	0.6 dB	0.15 dB	0.13 dB	0.1 dB	0.13 dB

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

Dynamics

There is no standardized calculation method for the term "dynamics".

This is why the signal-to-noise ratio value (SNR or S/N) is stated for *labM6 II*. It is calculated based on the level of a sinusoidal tone with maximum modulation in relation to the full bandwidth noise floor level of the *labM6 II* module, measured over the entire relevant frequency range.

In some literature, the term "dynamics" is used by analogy with the S/N value, however, this is often based on a narrow-band calculation of the inherent noise. Depending on the analysis bandwidth, *labM6* will then have a significantly higher "dynamic" value.

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