

labVF6 II (Code 3752)

6-channel voltage/ICP input module of the 2nd HEADlab generation with switchable lowpass filters

Overview

labVF6 II is an input module of the 2nd HEADlab generation. Thanks to the support of the HEADlink 2.0 transmission protocol, the input module offers double the sampling rate with the same number of channels compared to HEADlink 1.0. In combination with the Controller of the 2nd HEADlab generation labCTRL II.1, labVF6 II achieves a maximum sampling rate of 204.8 kHz.

The compact and rugged input module has switchable analog lowpass filters in addition to highpass filters. Furthermore, it features a particularly favorable lower cutoff frequency and an input impedance of 1 MΩ.

Users can adjust their ranges flexibly between 10 mV and 30 V and are largely protected against errors in the measurement setup thanks to the overload detection and the maximum electric strength of 60 V.

In addition, labVF6 II provides the ICP-DC coupling developed by HEAD acoustics, e.g., for measuring low-frequency signals with seismic sensors.

Users can connect their sensors directly to the six BNC sockets of the input module.

Connection of sensors

- Voltage/ICP sensors (TEDS)
- Head-shoulder unit HSU III.2
- Binaural headset BHS II
- Head microphones BHM III.3
- High-impedance voltage sources



Features

204.8 kHz maximum sampling rate

- Sampling frequencies:
 - 2.048 kHz up to 131.072 kHz @ 32.768 (2ⁿ) kHz
 - 2.75625 kHz to 176.400 kHz @ 41.1 kHz
 - 3 kHz up to 192 kHz @ 48 kHz
 - 3.2 kHz up to 204.8 kHz @ 51.2 kHz
- A common sampling rate can be set all 6 channels

Transmission protocol HEADlink 2.0

Via labCTRL II.1 with system sampling frequencies of 32.768 (2ⁿ) kHz / 48 kHz / 51.2 kHz

- Up to 6 channels with up to 65.536 kHz / 96 kHz / 102.4 kHz
- Up to 3 channels with up to 131.072 kHz / 192 kHz / 204.8 kHz

Filters

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

Coupling

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

Ranges

- 0.01 V, 0.1 V, 1 V, 10 V, 30 V

Favorable lower cutoff frequency

- 0.14 Hz

High input impedance

- 1 MΩ

0 Hz ICP-DC coupling from HEAD acoustics

- 0 Hz to 86.4 kHz frequency range

Connection to Controllers/front-ends

- Via transmission protocol HEADlink 2.0
 - Controller labCTRL II.1
- Via transmission protocol HEADlink 1.0
 - Controller labCTRL I.2, labCTRL I.1
 - HEADlab high-end dual-channel data acquisition system labHSU
 - Compact systems labCOMPACT12-V1, labCOMPACT24-V1
 - Binaural artificial head of the latest generation HMS V
 - BrakeOBSERVER frontend MMF III.0
 - HEAD VISOR frontend VMA II.1

Features

Power Supply

- Power supply by Controller/frontend via HEADlink
- 6.5 W power consumption

More features

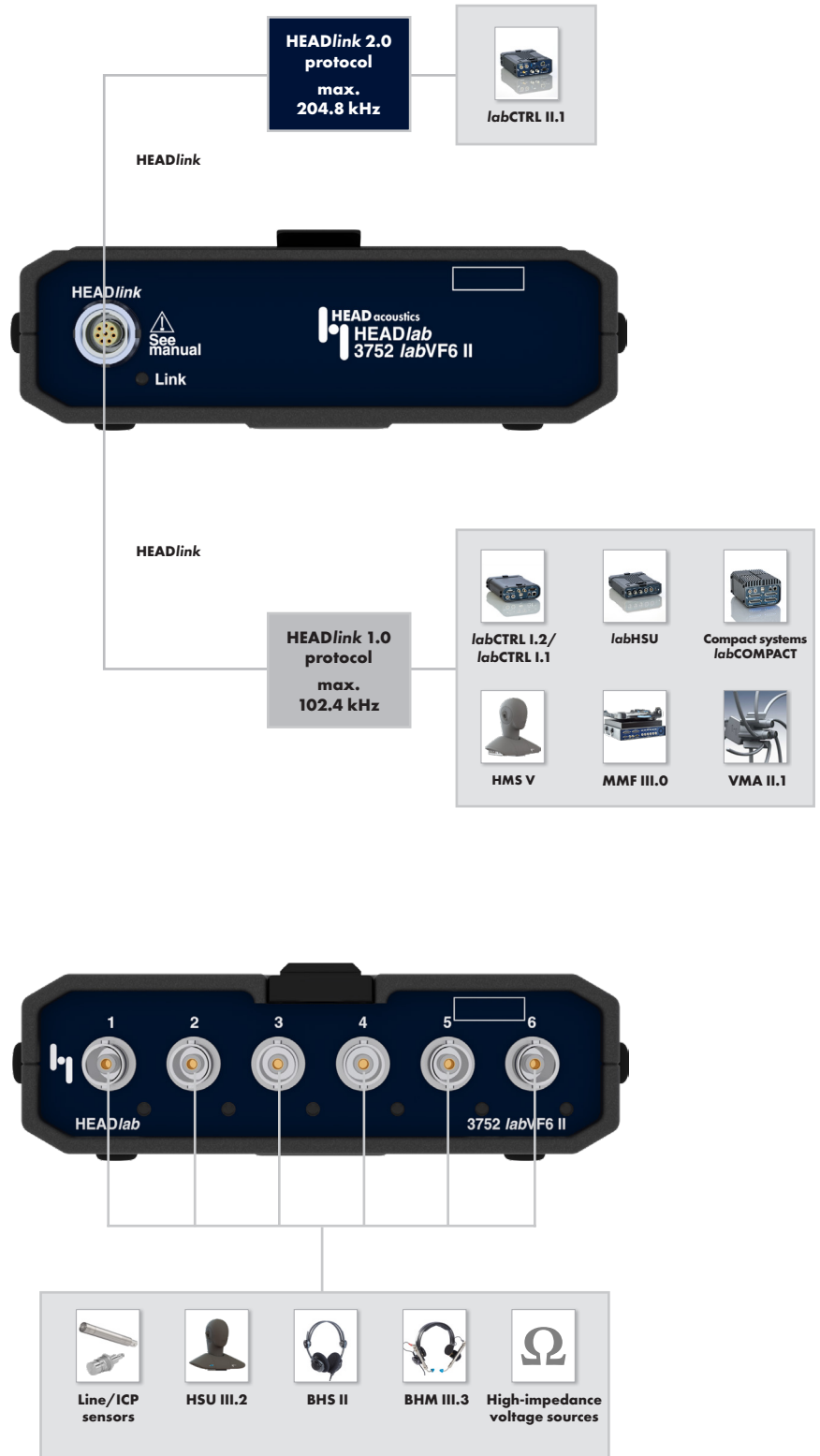
- Silent (no fan)
- Rugged design
- 60 V electric strength
- Overload detection for automatic disconnection of effected channels in case of overvoltages
- Electrical isolation of the *labVF6 II* inputs from the inputs of other modules of a HEADlab system and the PC interface

Handling

- Integrated locking mechanism (the modules can easily be mated to a system)

HEADlab systems

- Systems with a *labCTRL II.1* Controller (and a Power Box *labPWR*) can be equipped with up to 10 input modules *labVF6 II*.
- Depending on the processing power of the PC and the network utilization, larger systems with several Controllers *labCTRL II.1* (and Power Boxes *labPWR*) can record up to 600 channels simultaneously.



Scope of supply

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Optional

- *CLL X.xx* (Code 3780-xx)
Cable *HEADlink*
Lemo 8-pin ↔ Lemo 8-pin
- *CLB I.2* (Code 9847)
Adapter for connecting *BHS II* (via *CDB X.1*)

Technical data

General

Connectors data acquisition/data generation	6 x voltage-in/ICP-in
Communication interfaces	1 x <i>HEADlink</i>
Supply connection	<i>HEADlink</i>
Supply voltage	10 V _{DC} to 28 V _{DC}
Max. power consumption stand-alone operation	5.5 W
Max. power consumption with sensors connected	6.5 W
System sampling frequency	32.768 (2 ⁿ) kHz (with <i>labCTRL II.1</i>), 44.1 kHz (with <i>labHSU/HMS V</i>), 48 kHz, 51.2 kHz
Min. to max. sampling frequency @ 32.768 (2 ⁿ) kHz	2.048 kHz to 131.072 kHz
Min. to max. sampling frequency @ 44.1 kHz	2.75625 kHz to 176.400 kHz
Min. to max. sampling frequency @ 48 kHz	3 kHz to 192 kHz
Min. to max. sampling frequency @ 51.2 kHz	3.2 kHz to 204.8 kHz
Synchronization	<i>HEADlink</i>
Max. sampling frequency	204.8 kHz
Cooling	Convection, no fan
Operating temperature	-10 °C to +60 °C
Storage temperature	-20 °C to +70 °C
Dimensions	148 x 173 x 48 mm (W x D x H)
Weight	669 g

Digital *HEADlink*

Connector	1 x Lemo 8-pin
Number of interfaces	1
Supply voltage	10 V _{DC} to 28 V _{DC}
<i>HEADlink</i> version	<i>HEADlink 1.0</i> , <i>HEADlink 2.0</i>
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/ICP

Number of channels	6
Connector	6 x BNC
Quantity	Voltage
Ranges	0.01 V _p , 0.1 V _p , 1 V _p , 10 V _p , 30 V _p
Input impedance	1000 kΩ
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%
Analog lowpass filter	1 kHz, 2nd order, switchable, ±5% 5 kHz, 2nd order, switchable, ±5%
Digital highpass filter @ f _s = 48 kHz, proportional to f _s	0.1 Hz
Digital lowpass filter @ f _s = 48 kHz, proportional to f _s	21.6 kHz
Resolution	32 bit
Electrical isolation input/output	Yes
Electrical isolation channel by channel	No
Max. input voltage	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%)
Common mode rejection	90 dB

Analog input voltage/ICP – ranges

Range	0.01 V _p	0.1 V _p	1 V _p	10 V _p	30 V _p
S/N	84 dB(A)	103 dB(A)	109 dB(A)	109 dB(A)	108 dB(A)
Crosstalk	-104 dB	-115 dB	-131 dB	-129 dB	-127 dB
THD+N	-81 dB	-99 dB	-108 dB	-105 dB	-83 dB
Dynamic 5 Hz analysis bandwidth	121 dB	139 dB	145 dB	145 dB	144 dB
Input related noise (24 kHz bandwidth)	0.65 μV	0.75 μV	3.6 μV	36 μV	120 μV
AC accuracy @ 1 kHz	2.5%	0.4%	0.4%	0.4%	0.4%
DC accuracy	1.5%	0.25%	0.1%	0.1%	0.1%
Frequency response 20 Hz to 20 kHz @ f _s = 48 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, -0.78 dB
Frequency response 20 Hz to 40 kHz @ f _s = 96 kHz	+0.05 dB, -0.05 dB	+0.07 dB, -0.02 dB	+0.11 dB, -0.02 dB	+0.08 dB, -0.02 dB	+0.04 dB, -2.54 dB
Frequency response 20 Hz to 80 kHz @ f _s = 192 kHz	+0.05 dB, -0.3 dB	+0.05 dB, -0.02 dB	+0.15 dB, -0.02 dB	+0.08 dB, -0.02 dB	+0.05 dB, -6.17 dB
Linearity 0 to 80 dB below full scale	0.28 dB	0.05 dB	0.03 dB	0.03 dB	0.03 dB
Linearity 80 to 100 dB below full scale	2 dB	0.35 dB	0.08 dB	0.08 dB	0.11 dB

ICP is a registered trademark of the PCB Piezotronics Inc. Lemo is a registered trademark of the Lemo SA.