HEAD acoustics

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HEAD*lab* Compact Modules

Silent single module systems

- *lab*COMPACT12 (Code 3708) for 12 analog/ICP sensors

- *lab*COMPACT24 (Code 3709) for 24 analog/ICP sensors

Overview

The compact modules or single module systems *lab*COMPACT12 and *lab*COMPACT24 combine the basic functions of a controller with 12-channel input modules into a handy device. This makes the compact modules flexible and affordable solutions for multi-channel analysis, particularly in the development of household appliances and office equipment.

The compact modules allow recordings with 12 (*lab*COMPACT12) or 24 (*lab*COMPACT24) channels with up to 48 kHz and 6 or 12 channels up to 96 kHz. They also feature a high phase accuracy of the 24-bit data and a signal-to-noise ratio of 107 dB(A).
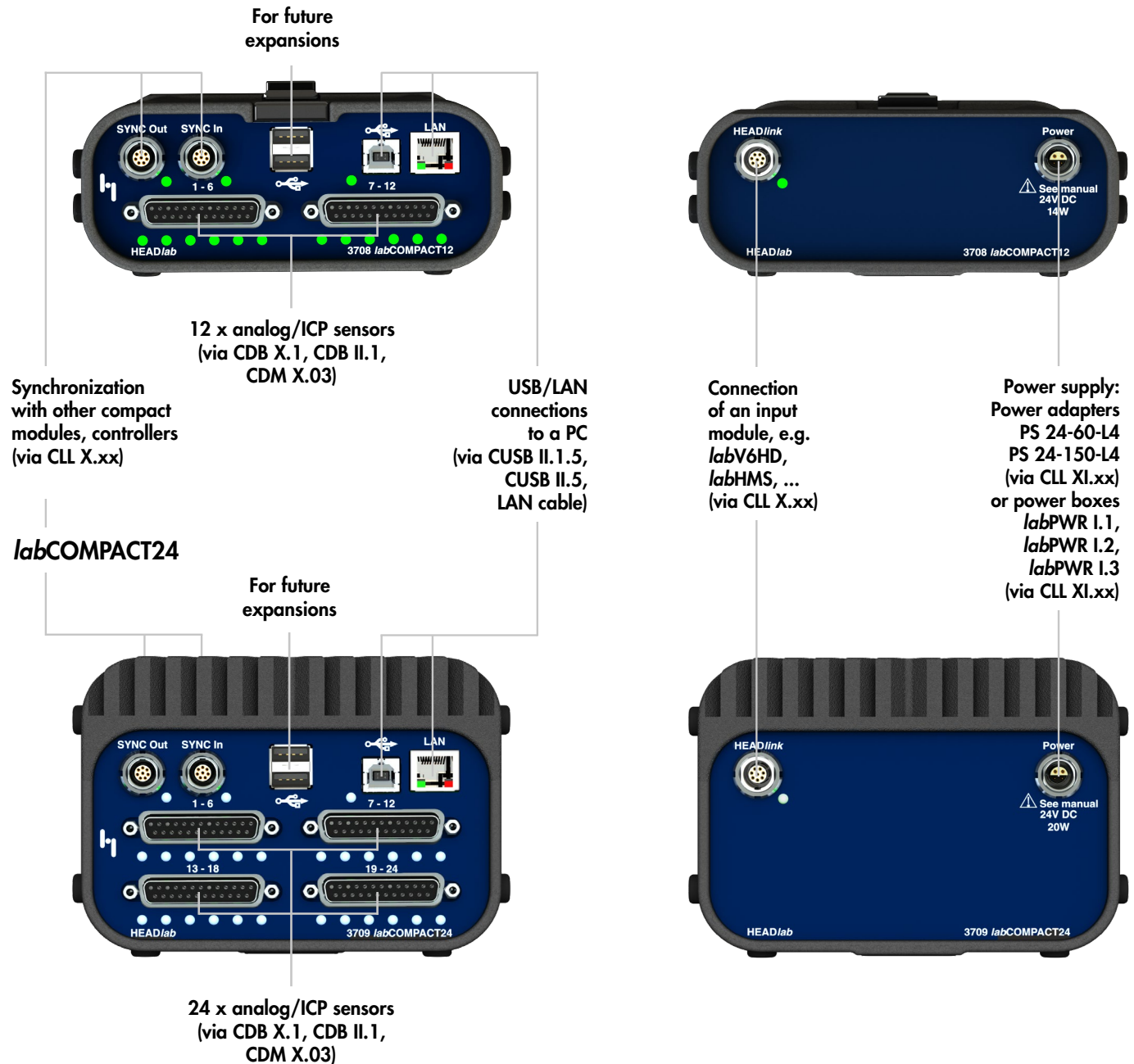
Analog or ICP sensors can be connected to the front side via adapters.

The compact modules can be quickly and easily extended with an additional HEAD*lab* input module, a compact module, or other HEAD*lab* systems. The direct connection to a laptop or PC via USB or LAN ensures secure and stable data transfer. The compact modules are controlled and configured via the recording software (ASM 04) of ArtemiS SUITE.

When powered by a *lab*PWR power box, the compact modules can be operated without an external power supply for several hours.

Features

Compact single module systems for

- 12 analog/ICP sensors (*lab*COMPACT12)

- 24 analog/ICP sensors (*lab*COMPACT24)

Connections

- Connection to a laptop or PC via USB (up to 5 m) or LAN (up to 100 m)

- Connection of TEDS sensors

- Recordings with the binaural headset BHS II (via adapter)

- Extension with a HEAD*lab* input module, a compact module, or additional HEAD*lab* systems

- Electrical isolation of signal inputs to PC connection (only LAN) and to power supply

Functions

- 24-bit data acquisition with high phase accuracy

- Sampling rate up to 48 kHz; 96 kHz with 6 (*lab*COMPACT12) or 12 channels (*lab*COMPACT24)

- Frequency range: 0 Hz to 43.2 kHz

- Coupling: AC, DC

- ICP supply (4 mA)

- High signal-to-noise ratio of 107 dB(A)

Filters

- Analog high-pass filters, 2.5 Hz in AC mode and 22 Hz (switchable channel by channel)

Power supply

- Power supply via *lab*PWR power boxes or power adapters

- Low energy consumption
  - 14 W (*lab*COMPACT12)
  - 20 W (*lab*COMPACT24)

Handling

- Rugged HEAD*lab* housing with proven mechanical connection mechanism

- Silent (fanless), rugged design

Applications

- Sound quality examination and optimization for technical products
  - Office equipment
  - IT equipment
  - Household appliances
  - and many others

Compact modules: Front and rear side

*lab*COMPACT12

For future
expansions

SYNC Out   SYNC In   LAN

1 - 6

HEAD*lab*   3708 *lab*COMPACT12

HEAD*link*   Power

See manual
24V DC
14W

HEAD*lab*   3708 *lab*COMPACT12

**12 x analog/ICP sensors
(via CDB X.1, CDB II.1,
CDM X.03)**

**Synchronization
with other compact
modules, controllers
(via CLL X.xx)**

**USB/LAN
connections
to a PC
(via CUSB II.1.5,
CUSB II.5,
LAN cable)**

**Connection
of an input
module, e.g.
*lab*V6HD,
*lab*HMS, ...
(via CLL X.xx)**

**Power supply:
Power adapters
PS 24-60-L4
PS 24-150-L4
(via CLL XI.xx)
or power boxes
*lab*PWR I.1,
*lab*PWR I.2,
*lab*PWR I.3
(via CLL XI.xx)**

*lab*COMPACT24

For future
expansions

SYNC Out   SYNC In   LAN

1 - 6

13 - 18   19 - 24

HEAD*lab*   3709 *lab*COMPACT24

HEAD*link*   Power

See manual
24V DC
20W

HEAD*lab*   3709 *lab*COMPACT24

**24 x analog/ICP sensors
(via CDB X.1, CDB II.1,
CDM X.03)**

Scope of supply *lab*COMPACT12

- *lab*COMPACT12 (Code 3708)
  HEAD*lab* compact module for 12
  analog/ICP sensors

- 2 x CDB X.1 (Code 3792)
  Breakout cable D-Sub 25-pin ↔
  6 x BNC female, 1 m

- Power adapter
  PS 24-60-L4 (Code 0617B)
  24 V / 60 W / LEMO 4-pin

- CUSB II.1.5 (Code 5478-1.5)
  Cable USB 2.0, 1.5 m

- Cable LAN, 3 m

Scope of supply *lab*COMPACT24

- *lab*COMPACT24 (Code 3709)
  HEAD*lab* compact module for 24
  analog/ICP sensors

- 4 x CDB X.1 (Code 3792)
  Breakout cable D-Sub 25-pin ↔
  6 x BNC female, 1 m

- Power adapter
  PS 24-60-L4 (Code 0617B)
  24 V / 60 W / LEMO 4-pin

- CUSB II.1.5 (Code 5478-1.5)
  Cable USB 2.0 1.5 m

- Cable LAN, 3 m

Required
(not included)

Software

- ArtemiS SUITE Data Acquisition
  Module, ASM 04 (Code 5004)

- ArtemiS SUITE Basic Framework
  (Code 5000)

ICP is a registered trademark of thePCB
Piezotronics, Inc.; LEMO is a registered trade-
mark of the LEMO SA.

Optional

Power supply

- 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
    [only for systems with more than
    40 W total power consumption]

- Power boxes
  - *lab*PWR I.1 (Code 3711)
    Power box for compact modules
    (up to max. 40 W)
  - *lab*PWR I.2 (Code 3712)
    Power box for compact modules
    (up to max. 100 W)
  - *lab*PWR I.3 (Code 3713)
    Power box for compact modules
    (up to max. 35 W)

- Power adapters for power boxes
  - PS 24-60-L2 (Code 0623B)
    24 V, 60 W, LEMO 2-pin
  - PS 24-150-L2 (Code 0621B)
    24 V, 150 W, LEMO 2-pin

Adapter / adapter cables / cables

- CDB II.1 (Code 3556)
  Breakout cable D-Sub 25-pin ↔
  6 x BNC male, 1 m

- CDM X.03 (Code 3793-03)
  Breakout cable D-Sub 25-pin ↔
  6 x Microdot, 30 cm

- CUSB II.5 (Code 5478-5)
  Cable USB (USB type A → B), 5 m

- CLL X.xx (Code 3780-xx)
  Cable HEAD*link*
  LEMO 8-pin ↔ LEMO 8-pin

- *lab*RFC (Code 3789)
  Active adapter for loss-free
  extension of HEAD*link* connections
  up to 180 m max.

- *lab*SPA (Code 3715)
  Safe Power Adapter
  DC voltage source 18 to 35 V
  [via adapter cable CSL X.3]

- *lab*OA (Code 3785)
  Optical adaptor (optical / electrical)
  Data transmission between compact
  module and input module across
  a distance of up to 1000 m max.
  using two *lab*OA devices

- Optical Cable
  LWL-patch cable multimode
  Duplex, SC/PC ↔ SC/PC

- CLL XI.xx (Code 3781-xx)
  Power supply cable
  LEMO 4-pin ↔ LEMO 4-pin
  [PS 24-60-L4 / PS 24-150-L4 ↔
  compact module; PS 24-60-L2 /
  PS 24-150-L2 ↔ *lab*PWR]
  - CLL XII.10 (Code 3795-10)
    Extension cable
    LEMO 4-pin ↔ LEMO 4-pin,
    10 m

- CLO X.3 (Code 3782-3)
  Power supply cable
  2 x cable lug ↔ LEMO 2-pin,
  3 m
  [DC power source ↔ *lab*PWR /
  *lab*SPA]

- Cable CAT5
  Standard network cable CAT5e,
  5 m

- CLAN I.xx (Code 9864-xx)
  Network cable CAT6a
  [for use in harsh environmental
  conditions]

Technical Data

Number of channels	
*lab*COMPACT12:	12
*lab*COMPACT24:	24
Interfaces	
*lab*COMPACT12:	2 x D-Sub 25-pin, 3 x LEMO 8-pin (1 x HEAD*link*, 2 x Sync), 3 x USB, 1 x LAN
*lab*COMPACT24:	4 x D-Sub 25-pin, 3 x LEMO 8-pin (1 x HEAD*link*, 2 x Sync), 3 x USB, 1 x LAN
Sampling frequencies (F_S)	
*lab*COMPACT12:	2, 3, 4, 6, 8, 12, 24, 48, 96 kHz (6 channels at 96 kHz)
*lab*COMPACT24:	2, 3, 4, 6, 8, 12, 24, 48, 96 kHz (12 channels at 96 kHz)
Coupling:	DC, AC, ICP
Power consumption at 24 V and 25 °C	
*lab*COMPACT12:	14 W
*lab*COMPACT24:	20 W
Input voltage:	18 to 28 V, nominal 24 V
Cooling:	Convection, no fan
Dimensions (WxDxH)	
*lab*COMPACT12:	148 x 174 x 63 mm
*lab*COMPACT24:	148 x 174 x 101 mm
Weight	
*lab*COMPACT12:	1172 g
*lab*COMPACT24:	2050 g
Operating temperature:	-10 °C to 60 °C
Storage temperature:	-20 °C to 70 °C

Analog/ICP Inputs

Number of channels				
*lab*COMPACT12:	12			
*lab*COMPACT24:	24			
Interfaces				
*lab*COMPACT12:	2 x D-Sub 25-pin			
*lab*COMPACT24:	4 x D-Sub 25-pin			
ICP voltage supply:	22 V			
ICP current supply:	4 mA ($\pm$35 %)			
Electric strength:	Max. $\pm$35 V			
Resolution:	24 bit			
Frequency range:	0 Hz to 43.2 kHz at F_S = 96 kHz			
Input impedance:	30.3 kOhm			
Ranges (AC & DC, inputs are TEDS-compliant):	$\pm$10 mV$_{PEAK}$	$\pm$100 mV$_{PEAK}$	$\pm$1 V$_{PEAK}$	$\pm$10 V$_{PEAK}$
S/N, 20 Hz to 20 kHz incl. 2.5 Hz filter in AC mode:	79.8 dB(A)	97 dB(A)	107 dB(A)	106 dB(A)
THD+N, 20 Hz to 20 kHz incl. 2.5 Hz filter in AC mode:	-74 dB(A)	-93 dB(A)	-97 dB(A)	-92 dB(A)
Crosstalk measurement, termination $\leq$75 Ω at F_S = 48 kHz:	>100 dB(A)	>120 dB(A)	>130 dB(A)	>130 dB(A)
Frequency response (accuracy final value), 20 Hz to 20 kHz incl. 2.5 Hz filter in AC mode:	<0.13 dB	<0.052 dB	<0.052 dB	<0.052 dB
Tolerance:	1.5 %	0.6 %	0.6 %	0.6 %
DC accuracy (DC mode at 0 Hz):	<0.13 dB	<0.017 dB	<0.009 dB	<0.009 dB
Tolerance:	1.5 %	0.2 %	0.1 %	0.1 %
Filters (analog)				
HP filter (not defeatable in AC mode):	2.5 Hz			
HP filter 2nd order (switchable):	22 Hz			
LP filter:	22.5 kHz at 48 kHz; 43.2 kHz at 96 kHz			
TEDS (IEEE 1451.4), read:	TEDS class 1, shared signal wire (Version 0.9 and 1.0)			

HEAD*link* Input (HEAD acoustics standard)

Connecting HEAD*lab* modules:	e.g. *lab*V6HD, *lab*V12, *lab*HMS, *lab*DX, *lab*M6, etc.
Synchronization of the channels:	Sample-accurate
Sampling frequencies (F_S)	
*lab*COMPACT12:	2, 3, 4, 6, 8, 12, 24, 48, 96 kHz (6 channels at 96 kHz)
*lab*COMPACT24:	2, 3, 4, 6, 8, 12, 24, 48, 96 kHz (12 channels at 96 kHz)

Sync Interfaces

Connection and synchronization of several compact modules and controllers:	2 x LEMO 8-pin (HEAD*link*)

USB Interface (USB 2.0 highspeed)

Data rate:	480 Mbit/s
Net data rate at maximum number of channels	
*lab*COMPACT12:	Approx. 21 Mbit/s
*lab*COMPACT24:	Approx. 35 Mbit/s
Cable length USB:	5 m (max.)

LAN Interface (Gigabit Ethernet)

Data rate:	1 Gigabit
Net data rate at maximum number of channels	
*lab*COMPACT12:	Approx. 21 Mbit/s
*lab*COMPACT24:	Approx. 35 Mbit/s
Cable length LAN:	100 m (max.)