

**DATARec 4 Series  
 HEAD acoustics Edition**

Modular 24-Bit Data Acquisition System  
 With Signal Conditioning



**Features**

- Modular data acquisition system:
  - Digital and analog signal modules, e.g. with RPM, AES/EBU, ICP®, microphone, voltage, charge, CAN bus and switchable AC/DC inputs (for measuring DC quantities such as brake pressure or steering angle)
  - High-pass and low-pass filters for the signal modules DIC6B, DIC6L, DEBU, CHG6F (CHG6F with low-pass only), MIC6 (MIC6 with high-pass only) and DIC24X
  - Link modules for connecting several subsystems into a complete system
  - Power supply modules with DC (9 - 36 V / 12 - 36 V) or AC inputs (90 - 130 and 180 - 260 V), 47 - 63 Hz
- Operation of DATARec 4 systems with a computer (LMF2, LMF4) or as a stand-alone system (LMF2 record+lemo) with direct storage of data on a SMM128 or SMM256 storage module, a USB stick or an external hard disk
- High flexibility for setting up custom systems
- 32-bit data format
- 600 Mbps system data rate
- Number of channels:
  - 1 - 384 (with link modules LMF2 and LMF2 record+lemo)
  - 1 - 768 (with link module LMF4)
- Interface for a single signal module: USB 2.0
- Interfaces for multiple signal modules and a link module: IEEE 1394b (FireWire®), Gbit Ethernet (10/100/1000 Base T), USB 2.0
- Direct connection of TEDS sensors (DIC24X, DIC24, DIC6B, DIC6L, MIC6 and DEBU)
- Electrical isolation of signal modules
- Rugged design for mobile use
- Easy plug-in connection between individual modules
- Seat mount for mobile use

**Applications**

- Sound and vibration analysis
- Acoustic environment protection
- Trouble shooting
- Sound engineering
- Quality control

**Overview**

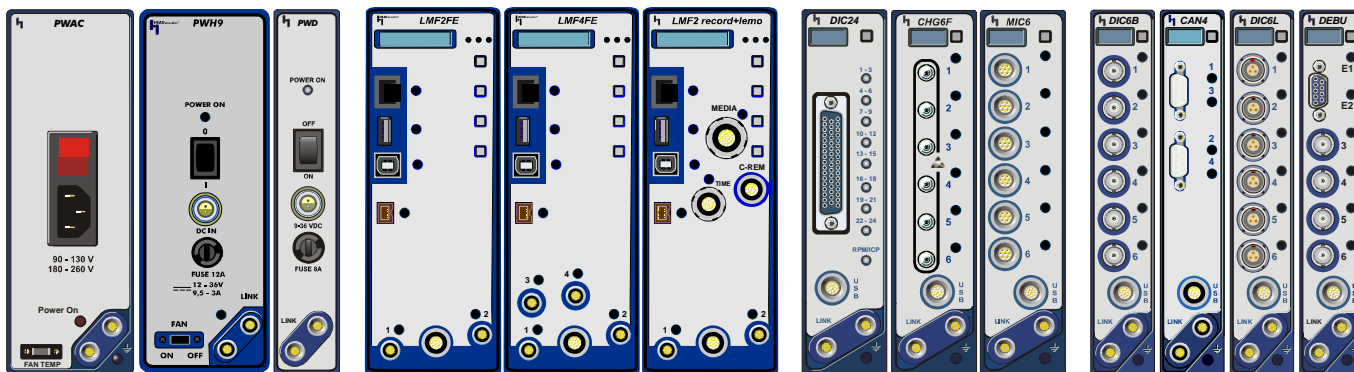
DATARec 4 is a modular 24-bit data acquisition system consisting of various power supply modules, signal modules and link modules, which can be combined into custom solutions.

In a quick and straightforward manner, individual signal modules can be connected to a power supply module and – via USB – to a computer, resulting in a ready-to-use system.

Even entire measurement systems with a large number of channels can be custom-built in a few easy steps. This is achieved with link modules, which connect the signal modules and turn them into a complete compact or decentral system.

Measurements with the link modules LMF2 and LMF4 are controlled by the computer. The modules pass the measurement data to the computer via IEEE 1394b, Gigabit Ethernet or USB 2.0 for further processing. LMF2 record+lemo can also be operated without a computer in stand-alone mode. This module saves the data, via IEEE 1394b, to one of the two SMM storage modules or on a USB stick, for example.

Furthermore, LMF2 record+lemo also features an interface for using the absolute time information of the IRIG Time Code as well as GPS and PPS (pulses per second) data.



### Power modules

The power modules PWAC, PWD and PWH9 convert an external supply voltage to the system voltage of 24 V required by the modules.

The PWD and PWH9 modules are fed with DC voltage (e.g. vehicle power supply voltage or PSH II or - for PWD - PHS I.1 from HEAD acoustics). They can be used if the total power consumption of the signal modules to be powered does not exceed 50 W (PWD) respectively 96 W (PWH9).

The PWAC module is fed by a direct mains power connection via a suitable power cable. Thanks to its higher power output, it can be used to supply modules with a total power consumption of up to 150 W.

### Link modules

The link modules LMF2, LMF2 record+lemo and LMF4 serve as a central connection and processing unit if several signal modules and power modules are to be combined into a system. Besides other functions, the link modules "collect" the data streams generated by the individual signal modules and transfer them to the PC or - with LMF2 record+lemo - directly to a memory device in stand-alone mode.

The interfaces IEEE 1394b (FireWire®), Gbit Ethernet (10/100/1000 Base T) and USB 2.0 are available therefor.

In stand-alone operation, LMF2 record+lemo saves the data directly to an SMM128 or SMM256 storage module, a USB stick or an external hard disk. A computer is required for the configuration only, not for recording.

Each of the link modules LMF2 and LMF2 record+lemo is equipped with two link inputs. To each input, up to eight signal modules (subsystems) can be connected. Both LMF2 modules thus allow up to 16 signal modules to be connected. LMF4 has four inputs, allowing up to 36 signal modules with a maximum of 768 channels to be used.

### Signal modules

The signal modules are used for connecting the sensors used for a measurement and for processing the incoming sensor signals. For different sensor types, different corresponding modules are available. All modules can be combined with each other in any possible way.

The signal modules are equipped with an amplifier, a 24-bit A/D converter and an anti-aliasing filter. With MIC6, DIC6B, DIC6L, DIC24X and DEBU two channels can be used as RPM inputs - one channel in the case of DIC24 and CHG6F.

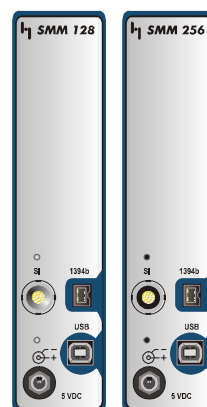
DIC24X provides 24 Line-/ICP® inputs with a sampling frequency of up to 50 kHz per channel. Six inputs are equipped with switchable DC coupling and can be used for classical dynamic measurement, e.g. sound and vibration, and also for more static measurements like brake pressure or steering angle. Four channels are equipped with switchable high-pass and low-pass filters. Two channels are configurable as RPM channels with a 32 x module sampling frequency.



All modules can be easily and firmly connected to each other and can be easily removed again

### Storage modules

For stand-alone operation with the link module LMF2 record+lemo, two storage modules with capacities of 128 and 256 GB are available. For reading the data, the modules can be connected to a computer via USB.



Storage modules SMM128 and SMM256

### Using a single signal module

If only one signal module is used, it can be connected to a computer via USB and powered by a PWD, PWH9 or PWAC power module. A link module is not required.



Example of a system with a single signal module (DIC24X - as of firmware 2.39 - with the power module PWD)

### Combining several signal modules into a system

One of the advantages of DATaRec 4 is the possibility to easily combine several modules into an extensive measurement setup.

Thanks to the two link connectors of each module, wiring several modules together is very simple. The supply power as well as the totality of all received signals are passed through each single module.

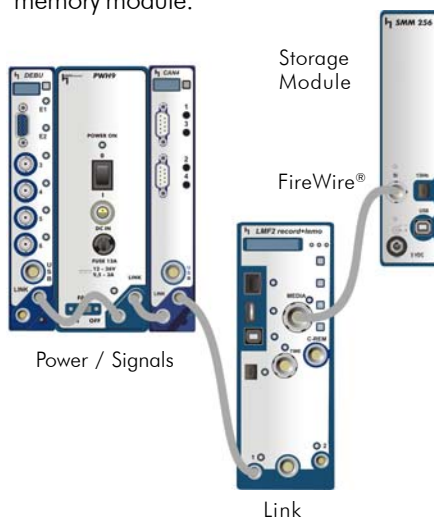
To facilitate wiring, all modules have the connectors located on the front side.

The connection between the modules is made with a serial cable bridge.

Within each subsystem, one power module is mandatory; it is also possible to use several power modules in a subsystem. The number of power modules required depends on the total power consumption of the connected signal modules and the link module, which is fed with supply voltage by the subsystem.

### Using a stand-alone system without a computer

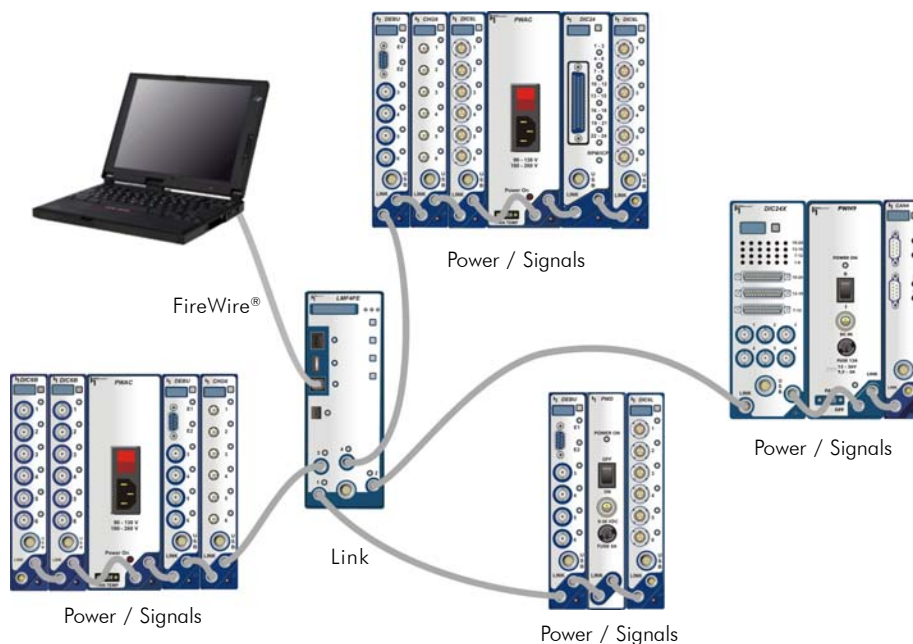
In this constellation, the measurements are controlled directly by the link module LMF2 record+lemo and recorded by the memory module.



Example of a stand-alone application with the Link module LMF2 record+lemo

### Using a system with a computer

For using DATaRec4 as a classic front end system, the modules LMF2 and LMF4 are available. The measurements are controlled by the computer and stored on its hard disk.



Example of a DATaRec 4 system with the link module LMF4 and four subsystems

### Seat mount DSM

Several modules connected to each other can be transported safely and easily in the seat mount. The seat belt connector ensures the safe mounting when using the system in a vehicle.



Seat mount DSM

### Software

The recording software HEAD Recorder and the analysis software ArtemiS SUITE from HEAD acoustics are the ideal software companions for DATaRec 4.

Together, they form a perfectly matched, complete system from a single supplier, which helps to solve every-day tasks – from data acquisition to analysis and to the documentation of results – quickly and successfully.

## Power Modules

- PWAC (code 3650)  
AC power supply  
90 - 130 V / 180 - 260 V  
(up to 150 W)
- PWD (code 3651)  
9 - 36 V DC power supply  
(up to 50 W)
- PWH9 (code 3652)  
12 - 36 V DC power supply  
(up to 96 W)

## Signal Modules

- DIC6B (code 3610)  
6-channel ICP® module with BNC,  
200 kS/s per channel
- DIC6B filter (code 3611)  
6-channel ICP® module with BNC,  
200 kS/s per channel, HP and LP  
filter
- DIC6L (code 3612)  
6-channel ICP® module with LEMO,  
200 kS/s per channel
- DIC6L filter (code 3613)  
6-channel ICP® module with LEMO,  
200 kS/s per channel, HP and LP  
filter
- CHG6F (code 3614F)  
6-channel charge input module  
with micro-dot connectors, 200 kS/s  
per channel
- CHG6F filter (code 3615F)  
6-channel charge input module  
with micro-dot connectors, 200 kS/s  
per channel, LP filter
- DEBU (code 3616)  
4-channel ICP® module with a  
2-channel digital AES/EBU input,  
200 kS/s per channel
- DEBU filter (code 3617)  
4-channel ICP® module with a  
2-channel digital AES/EBU input,  
200kS/s per channel, HP and LP  
filter
- MIC6 (code 3618)  
6-channel microphone module  
(ICP®/condenser)
- DIC24 (code 3630)  
24-channel ICP® module with  
D-Subconnector, 50 kS/s per  
channel
- DIC24X (code 3631)  
24-channel ICP®/voltage data  
acquisition system  
(as of firmware 2.39)
- CAN4 (code 3640)  
4-channel CAN bus (2.0A and  
2.0B) record module, 1000 kBit per  
CAN bus

## Link Modules

- LMF2 (code 3602)  
Link module for 2 subsystems with  
USB 2.0, IEEE 1394b (FireWire®)  
and Gbit Ethernet (10/100/1000  
Base T)
- LMF2 record+lemo (code 3603)  
Link module for 2 subsystems, with  
USB 2.0, IEEE 1394b (FireWire®),  
Gbit Ethernet (10/100/1000 Base  
T) and GPS for stand-alone  
operation or use with a computer
- LMF4 (code 3604)  
Link module for 4 subsystems with

USB 2.0, IEEE 1394b (FireWire®)  
and Gbit Ethernet (10/100/1000  
Base T)

## Storage Modules

- SMM128 (code 3660)  
DATaRec 4 storage module  
with 128 GB flash memory
- SMM256 (code 3661)  
DATaRec 4 storage module  
with 256 GB flash memory

## Cables

- CDB II.1 (Code 3556)  
Breakout cable 6 x BNC > D-sub  
25-pin (DIC24X)
- LBR I.01 (code 3670-01)  
Link connection cable between  
2 modules, for compact systems
- LBR I.1 (code 3670-1)  
Link connection cable between  
2 modules, for compact systems,  
1 m (39.37")
- LBR I.2 (code 3670-2)  
Link connection cable between  
2 modules, for compact systems,  
2 m (78.74")
- LBR I.3 (code 3670-3)  
Link connection cable between  
2 modules, for compact systems,  
3 m (118.11")
- LBR I.5 (code 3670-5)  
Link connection cable between  
2 modules, for compact systems,  
5 m (196.85")
- LBR I.10 (code 3670-10)  
Link connection cable between  
2 modules, for compact systems,  
10 m (393.7")
- CDB IV.1 (code 3671)  
Cable D-Sub > BNC female

- CLU IV.2 (code 3673-2)  
LEMO 17-pin > USB plug,  
connection cable input module to  
PC (w/o link module), 2 m (78.74")
- CLO III.1.5 (code 3674-1.5)  
Power cable for PWD9D, LEMO 2-  
pin > banana plugs, 1.5 m (59")
- CLO IV.1 (code 3675-1)  
Power cable for power supply input  
directly on signal modules (without  
PWD), LEMO 9-pin > banana  
plugs, 1 m (39.37")
- CLX III.X (code 3676)  
Cable PSH I.1 > PWD
- CMD V.3 (code 9835-3)  
Connection HMS III and HMS IV to  
DEBU  
DSUB9 > DSUB9 + XLR3, 3 m  
(118.11")

## Accessories

- DSM (code 3690)  
DATaRec 4 Seat Mount  
Seat Mount for DATaRec 4 systems
- PSH II (code 1317)  
Power Supply 90 V - 264 V (50 Hz)
- PSH I.1 (code 1364)  
Power Supply (for PWD)  
100 - 240 V (47 - 63 Hz)
- PSH I.3 (Code 3719)  
Power Supply (for PWD)  
100 - 240 V (50 - 60 Hz)
- PSH I.6 (Code 3659)  
Power Supply (single operation  
module)  
100 - 240 V (50 - 60 Hz)

## Software

- HEAD Recorder (code 4630)  
Programmable recording software
- ArtemiS SUITE (code 5000ff)  
Multi-channel analysis software

## Power Consumption: Link, Signal, Storage Modules

LMF2:	30 W (max.)
LMF2 record+lemo:	30 W (max.)
LMF4:	30 W (max.)
MIC6:	12 W (typ.), + 3 W pre-amp power or + 1 W ICP® power)
DIC6B:	10 W (typ.), 11.6 W with filter (typ.)
DIC6B filter:	10 W (typ.), 11.6 W with filter (typ.)
DIC6L:	10 W (typ.), 11.6 W with filter (typ.)
DIC6L filter:	10 W (typ.), 11.6 W with filter (typ.)
CHG6F:	11,5 W (typ.), 13 W with filter (typ.)
CHG6F filter:	11,5 W (typ.), 13 W with filter (typ.)
DEBU:	9 W (typ.), 10.2 W with filter (typ.)
DEBU filter:	9 W (typ.), 10.2 W with filter (typ.)
DIC24:	15 W (typ.)
DIC24X:	18 W (typ.)
CAN4:	10 W (max.)
SMM 128:	10 W (max.)
SMM 256:	10 W (max.)

## Maximal Power: Power Modules

PWAC:	150 W
PWH9:	96 W
PWD:	50 W