



Features

Flexible artificial head measuring system for uncomplicated performance of aurally accurate measurements

Versatile operation modes

- Stand-alone mode: Control via SAR web interface using network connection via smartphone, tablet, notebook, or PC
- Frontend mode: Connection to a PC via USB/LAN and control, e.g., via the recorder software of ArtemiS SUITE (Data Acquisition Module, ASM 04 – as of version 13.5)
- Module mode: Integration into a HEADlab/HEAD VISOR system or a direct connection to SQuadriga III

Extremely high dynamic range thanks to dual ADC technology

- HD Auto Range of 130 dB_{SPL}: No need of switching between measurement ranges

Memory options

- Internal memory (approx. 60 GByte free)
- Removable USB memory media

Equalization

- Binaural equalization directly during measurements
- ID, FF, DF, LIN

Aurally accurate playback

- Connecting HEAD acoustics headphones for aurally accurate playback/monitoring

Connections

- HEADlink+ /HEADlink: HEADlab family, HEAD VISOR, adapters
- 2 x USB type A for using memory media, WLAN stick, RC X, HMS IV (HMS Remote Control software)
- 1 x USB type C to connect a PC
- LAN: PC/network
- 3.5 mm jack: Headphones
- 6.3 mm jack (lockable): Line out
- BNC: Pulse sensors

Power supply

- Internal battery for 5 hours of stand-alone operation
- Power supply, vehicle on-board power supply, Power Box labPWR 1.2
- HEADlink+ /HEADlink

HMS V (Code 1502)

Binaural artificial head of the latest HMS generation, usable in stand-alone mode, frontend mode, or as a module in a measuring system from HEAD acoustics

Overview

The HMS V artificial head measuring system is a powerful symbiosis of cutting-edge technology, high flexibility, and simple operation.

Thanks to the Dual ADC technology, HMS V offers an extremely high dynamic range. Selecting the measuring range is no longer necessary.

The powerful rechargeable battery ensures a long operating time of several hours. Measurements can be recorded on the internal memory or an external USB memory medium.

In stand-alone mode, HMS V is used without a frontend and thus operates autonomously. The artificial head is controlled via the SAR (stand-alone recording) web interface using a smartphone, tablet, or PC, or directly via the RC X remote control without additional software.

In frontend mode, HMS V is connected to a PC via USB or LAN and controlled via the Recorder of ArtemiS SUITE – as of version 13.5.

In addition, HMS V can be seamlessly integrated, e.g., into HEADlab systems, connected to further artificial heads or other devices to form larger measuring systems, or directly to the mobile frontend SQuadriga III.

More features

- Remote calibration
- Overload detection
- Real-time clock (buffered)
- 22 Hz switchable high-pass filter
- Mechanical connection: cameras, tripods, etc.

At a glance

HMS V artificial head measuring system

The binaural artificial head measuring system HMS V allows sound events to be recorded and played back with a connected headphones from HEAD acoustics just as a person would hear them if the person had been in the same position as the artificial head during the recording.

Applications

- Sound and vibration analyses
- Trouble shooting
- Sound engineering
- Quality control
- Acoustic environmental protection
- ...

Versatile and flexible

HMS V is an extremely flexible artificial head measuring system. The artificial head can be used stand-alone with a smartphone, tablet, or PC, as a frontend with a computer, or as a module in a HEADlab system, a HEADVISOR system, or with SQadriga III. This allows aurally accurate recordings in a variety of recording situations and, thanks to the rechargeable battery and internal memory, a maximum flexibility in use.

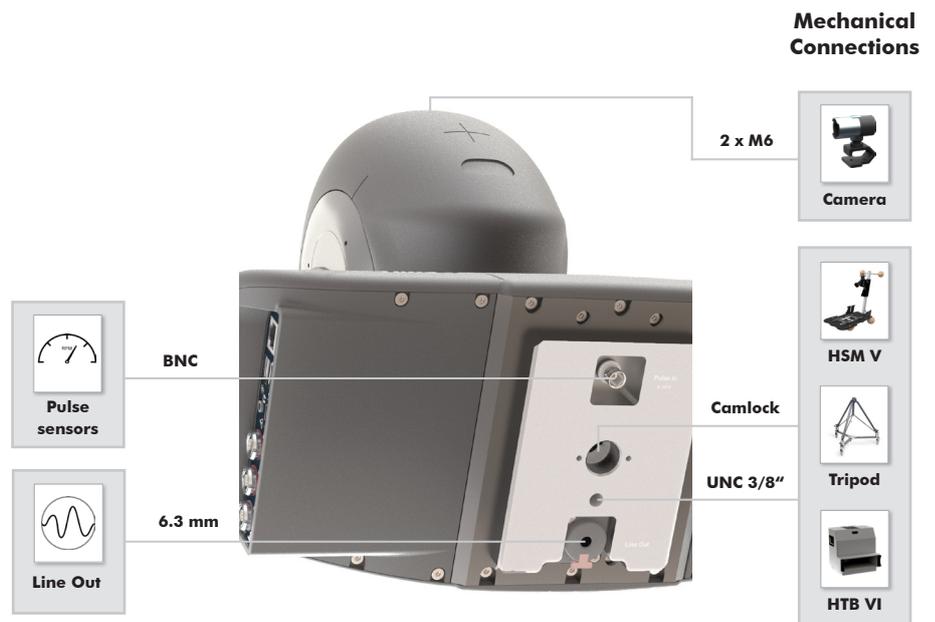
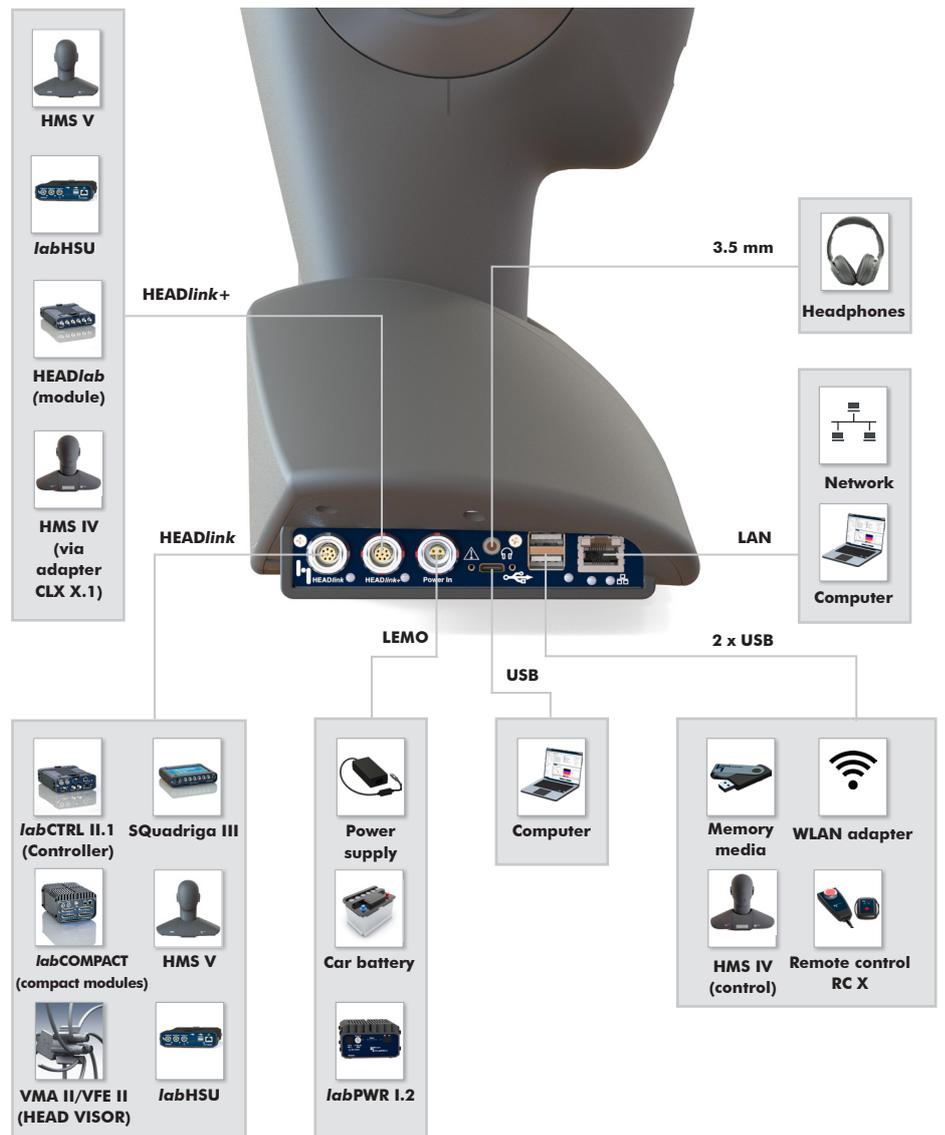
Operating time can be extended by *labPWR 1.2* Power Box. Memory capacity can be further extended with removable USB media.

Dual ADC technology

Thanks to the Dual ADC technology, HMS V provides an extremely high dynamic range.

In HD mode, it is no longer necessary to switch the measuring ranges. This allows signals with time-varying level ranges or fluctuating signal strengths to be recorded without manual adjustments.

Because there is no need of switching between measuring ranges, the risk of having to repeat cost-intensive measurements due to possible overdriving or underdriving is reduced. Thus, a high level of comfort is achieved.



Stand-alone recording (SAR)

Use as a stand-alone measuring system with the web interface for stand-alone recording (SAR)

Using the web interface for stand-alone recording (SAR), measurements can be controlled via a network connection. The network connection can be established and used both wirelessly and via cable.

The SAR web interface allows the complete configuration of HMS V as well as the connected sensors and modules and can be accessed via smartphone, tablet, PC, or notebook. This allows the artificial head to be used autonomously, making it the ideal measuring instrument for stand-alone applications.

In addition, the RC X remote control is available for starting and stopping recordings.

Frontend mode

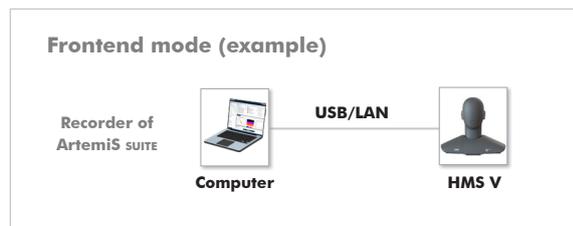
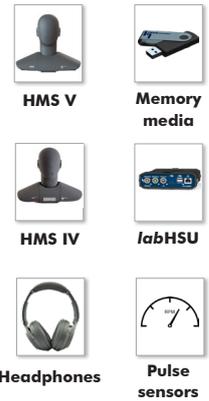
Use as a frontend

In frontend mode, HMS V is connected to a PC via USB or LAN and controlled via the Recorder of ArtemiS SUITE.

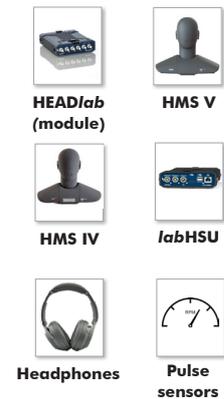
To further increase the functionality of the measuring system, a HEADlab module can be connected directly and supplied with voltage by HMS V. In this case, the artificial head assumes the function of a Controller, communicates with the Recorder of ArtemiS SUITE and delivers its synchronized data as well as that of the connected module, if any, to the PC.



Optional (examples)



Optional (examples)



Module mode

Use in a HEADlab system

HMS V can be connected as a module to a *labCTRL* HEADlab Controller, a *labHSU*, or a *labCOMPACT* compact module. Even larger HEADlab systems with many artificial heads and modules can be quickly arranged in just a few steps.

Up to 10 artificial heads or HEADlab modules may be connected to each Controller. If several Controllers are interconnected, systems with 600 channels are possible. The systems are controlled by the Recorder of ArtemiS SUITE. The measurement data flows via HEADlink to the Controller and from there via LAN or USB to the PC.

Connecting to SQuadriga III

HMS V can be directly connected to and controlled by the mobile recording and playback system SQuadriga III. Because SQuadriga III also has a rechargeable battery and internal memory, this combination is also a stand-alone measuring system.

More features

Equalization

In all operation modes, HMS V equalizes the measurement during recording. This avoids the need for equalization in post-processing.

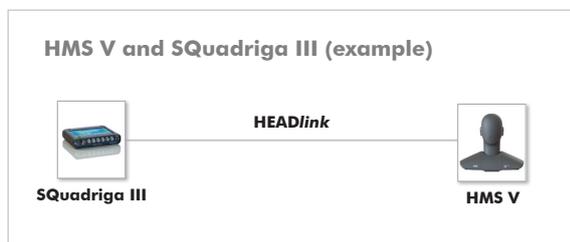
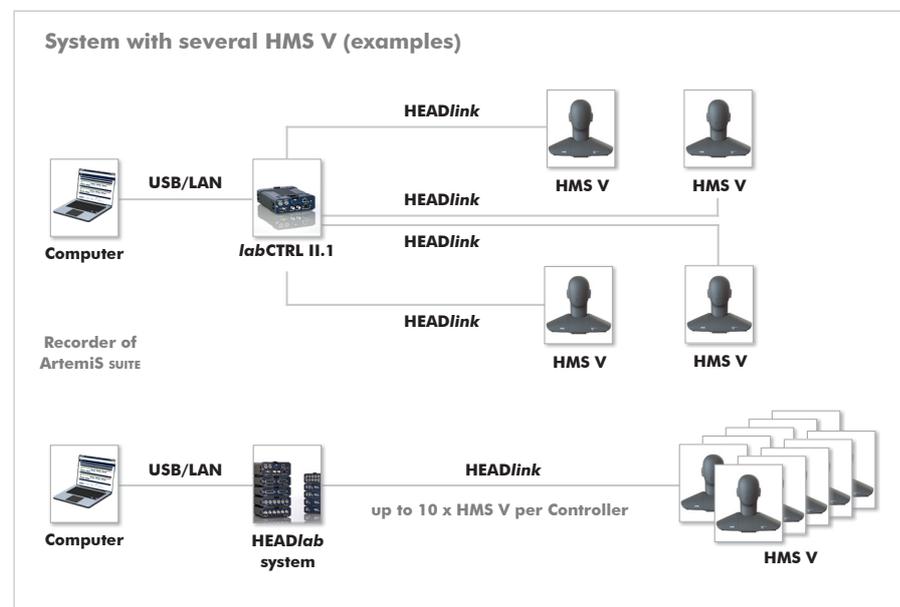
Power supply

The internal battery allows HMS V to operate in stand-alone mode for about 5 hours.

In a HEADlab system, HMS V can be supplied via the HEADlink connection, e.g., from a Controller.

HMS V can be connected directly to the on-board power supply of a vehicle.

To enlarge operating time, HMS V can also be supplied by the *labPWR* 1.2 Power Box.



Headphones out

Using HEAD acoustics headphones, aurally accurate playback or monitoring is possible. A limiter prevents damage to the hearing caused by high levels.

Line out

If no headphones are connected, the line output at the bottom of the head (6.3 mm jack) can be used, for example, to output an equalized signal.

Pulse in

The galvanically isolated pulse input has an adjustable trigger threshold and a selectable circuit for sensors with push-pull or open-collector output.

AES/EBU adapter

The adapter CLX X.1 can be used to connect an HMS IV artificial head, for example.

Real-time clock (RTC)

The RTC, buffered for several weeks, provides the necessary time information in stand-alone operation.

Web interface for stand-alone recording (SAR)

Configuration

Stand-alone recording is possible via the SAR web interface. Only a web browser is required. The SAR web interface can be accessed via an individual URL for each HMS V.

With the optional WLAN adapter, configuration and control can be performed wirelessly with a PC/notebook or a tablet/smartphone. To do this, the artificial head establishes its own wireless network to which the desired end device is connected. Via web browser, users get full access to all functions and configuration options.

The SAR web interface automatically adapts to the screen format and offers great clearness and comfort.

Using presets

The SAR web interface offers the use of presets to efficiently perform changing measuring tasks. Detailed configurations can be saved and recalled with a single click.

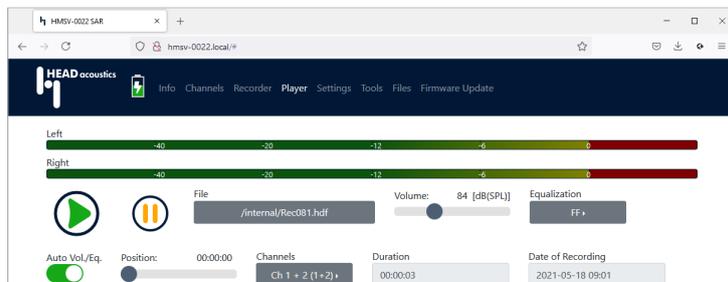
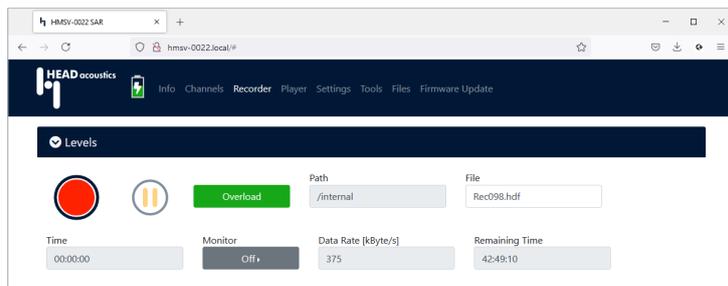
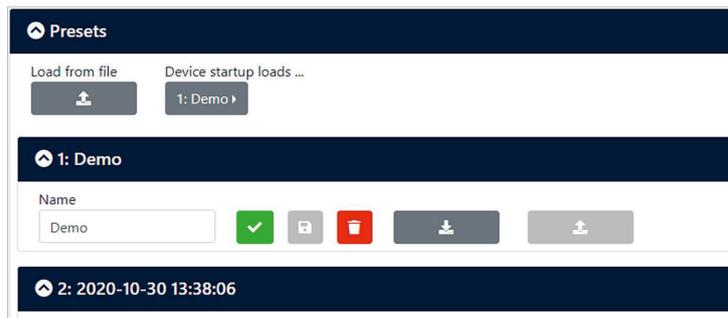
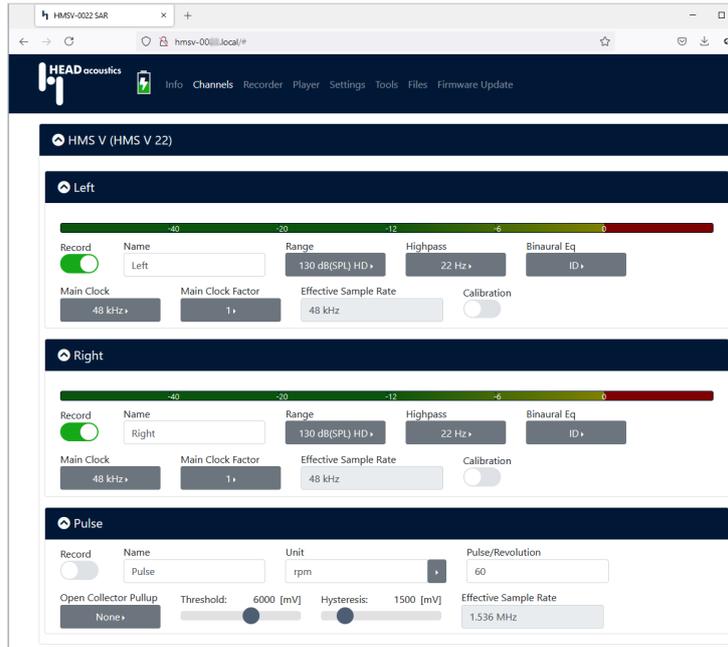
In addition, the configuration that is loaded at system startup can be specified.

Clearly arranged recording

In particular, the controls for the recording function have been designed to be straightforward and easy to use. This means that all important controls are in view even while using a smartphone so that recordings can be made seamlessly even under difficult conditions.

Aurally accurate playback and monitoring

Using HEAD acoustics headphones (e.g., HD IV.2), both aurally accurate playback of stored recordings with the integrated player as well as monitoring during ongoing recordings (single channel or both channels) are possible.



Scope of supply

- HMS V (Code 1502)
Binaural artificial head of the latest HMS generation
- Power supply
PS 24-60-L4 (Code 0617B)
24 V / 60 W / LEMO 4-pin
- CUSB IV.3 (Code 5476-3)
Cable USB (USB type A → C (with screw connection), 3 m
- HSC V (Code 1525)
Carrying case
- SBH I (Code 1315)
Stand Base
- Manual
- Individual HMS V equalization

Optional

- WLAN Adapter (Code 0275)
- CJB III.03 (Code 9862-03)
Analog Out for HMS V
Adapter 6.3 mm jack → 2 x BNC, 30 cm

Accessories

Power supply

- Power Box
labPWR I.2 (Code 3712)
Power Box for HEAD*lab* systems (up to max. 100 W)
- CLL XII.10 (Code 3795-10)
Power supply extension cable
LEMO 4-pin ↔ LEMO 4-pin, 10 m

USB stick

- HUSB III.64 (Code 3334)
USB memory stick, 64 GByte

WLAN

- WLAN stick (Code 0275)
Operation temperature 0 to 40 °C

Cables and adapters

- LAN
 - Cable CAT5e
Network cable CAT5e
 - CLAN I.xx (Code 9864-xx)
Network cable CAT6a
- BNC
 - CBB I.xx (Code 1175-xx)
Cable BNC (50 Ohm)
- HEAD*link*
 - CLL X.xx (Code 3780-xx)
Cable HEAD*link*
LEMO 8-pin ↔ LEMO 8-pin
 - *labRFC* (Code 3789)
Active adapter for loss-free extension of HEAD*link* connections with a CAT5 cable; the total length of the cable can be up to 180 m long
- AES/EBU
 - CLX X.1 (Code 3797-1)
AES/EBU adapter cable
LEMO 8-pin ↔ XLR 3-pin, male / XLR 3-pin, female, 1 m

Headphones

- HD IV.1 (Code 2380)
Dynamic, open headphone
- HD IV.2 (Code 2481)
Dynamic, open headphone

Attachment

- HSM V (Code 1520)
HEAD seat mount adapter for HMS V, HMS IV, HEAD*lab* etc.
- HTB VI (Code 1574)
HEAD Torso Box
- SBH I (Code 1315)
Stand base for HMS
- HMT II (Code 1962)
Tripod

Accessories

- HWS (Code 1960)
Windshield for outdoor recordings
- TLP (Code 1967)
Triaxial laser pointer

Remote control RC X

- RC X.1 (Code 9850)
Remote control
- RC X.2 (Code 9851)
Radio module for controlling RC X.1

Technical data

General

| | |
|----------------------------------------------------------------|--------------------------------------------------------------------|
| Communication interfaces | 1 x HEADlink, 1 x HEADlink+, 1 x USB device, 2 x USB host, 1 x LAN |
| Supply connection | Lemo 4-pin, HEADlink (input), HEADlink+ (output) |
| Supply voltage | 10 V _{DC} to 28 V _{DC} |
| Max. power consumption stand-alone operation | 55 W |
| System sampling frequency | 32.768 (2 ⁿ) kHz, 44.1 kHz, 48 kHz, 51.2 kHz |
| Min. to max. sampling frequency @ 32.768 (2 ⁿ) kHz | 32.768 kHz to 131.072 kHz |
| Min. to max. sampling frequency @ 44.1 kHz | 44.1 kHz to 176.4 kHz |
| Min. to max. sampling frequency @ 48 kHz | 48 kHz to 192 kHz |
| Min. to max. sampling frequency @ 51.2 kHz | 51.2 kHz to 204.8 kHz |
| Synchronization | Internal, external HEADlink |
| Max. sampling frequency | 204.8 kHz |
| Cooling | Convection, no fan |
| Operating temperature | -10 °C to +50 °C |
| Storage temperature | -20 °C to +70 °C |
| Tripod thread | 3/8" |
| Dimensions | 450 mm x 400 mm x 180 mm (W x H x D) |
| Weight | 5500 g |
| Memory capacity | 64 GB internal, approx. 60 GB for recordings and configurations |

Battery power

| | |
|-------------------------------------------------------|----------------------------|
| Max. power consumption incl. charge | 55 W |
| Max. power consumption charge only | 55 W |
| Electrical isolation input/output | Yes |
| Seamless switching external/battery | Yes |
| Battery type | Li-Ion |
| Battery capacity | 4 Ah |
| Battery voltage | 14.8 V |
| Battery power | 59.2 Wh |
| Battery operating time | 5 h |
| Battery discharging time through self-discharge | 200 d |
| Battery charging time with ext. supply (device off) | 2.75 h |
| Battery charging time with ext. supply (standby mode) | 4 h |
| Battery charging cycles | 500 |
| Battery charge status display on device | LEDs, display in 20% steps |
| Battery charging status query via software | Yes, in 1% steps |

Digital USB host

| | |
|------------------------------|----------------|
| Connector | 2 x USB type A |
| Number of interfaces | 2 |
| USB specification | USB 2.0 |
| Data rate (gross) | 480 Mbit/s |
| Output voltage | 5 V |
| Total output current | 0.65 A |
| Output current per interface | 0.5 A |
| Max. output power | 3.2 W |
| Electrical isolation | No |

Digital USB device

| | |
|----------------------|----------------------------------------|
| Connector | 1 x USB type C (with screw connection) |
| Number of interfaces | 1 |
| USB specification | USB 2.0 |
| Data rate (gross) | 480 Mbit/s |
| Electrical isolation | No |

Digital LAN

| | |
|----------------------|-------------------------------------|
| Standard | IEEE 802.3ab |
| Connector | 1 x RJ45 |
| Number of interfaces | 1 |
| Data rate (gross) | 1000 Mbit/s |
| Electrical isolation | Yes, when using an unshielded cable |
| Power over Ethernet | No |

Digital HEADlink

| | |
|----------------------|----------------------------------------------------------|
| Connector | 1 x Lemo 8-pin |
| Number of interfaces | 1 |
| Supply voltage | 10 V _{DC} to 28 V _{DC} |
| HEADlink version | HEADlink 1.0 |
| Electrical isolation | No |
| Synchronization | 32.768 (2 ⁿ) kHz, 44.1 kHz, 48 kHz, 51.2 kHz |
| Maximum cable length | 60 m |

Digital HEADlink+

| | |
|----------------------|----------------------------------------------------------|
| Connector | 1 x Lemo 8-pin |
| Number of interfaces | 1 |
| Output voltage | 10 V _{DC} to 28 V _{DC} |
| Max. output power | 10 W |
| Standard | HEADlink 1.0 |
| Electrical isolation | No |
| Synchronization | 32.768 (2 ⁿ) kHz, 44.1 kHz, 48 kHz, 51.2 kHz |
| Maximum cable length | 60 m |

Analog output voltage

| | |
|-----------------------------------------|---------------------------------------------------------------------------|
| Number of channels | 2 |
| Connector | 1 x Jack 6.3 mm |
| Output impedance | 10 Ohm |
| DC-capable | No |
| Frequency range | 20 Hz to 20 kHz |
| S/N | 111 dB |
| THD+N | -105 dB |
| Crosstalk | -100 dB |
| Electrical isolation input/output | No |
| Electrical isolation channel by channel | No |
| Resolution | 24 bit |
| Equalization | Yes, recording-equalized signal, no playback equalization |
| Max. voltage | 6.3 V _p |
| Max. level | 13 dB(V) |
| Nominal voltage | 1 V _{eff} at 50% level of measuring range incl. (-6 dB) headroom |
| Max. output power per channel | 0.45 W |

Analog output headphones

| | |
|-----------------------------------------|------------------------------------------------------|
| Number of channels | 2 |
| Connector | 1 x Jack 3.5 mm |
| Output impedance | 10 Ohm |
| DC-capable | No |
| Frequency range | 20 Hz to 20 kHz |
| S/N | 114 dB(A) |
| THD+N | -105 dB |
| Crosstalk | -95 dB |
| Electrical isolation input/output | Yes |
| Electrical isolation channel by channel | No |
| Resolution | 24 bit (DA converter) |
| Equalization | Default equalization for HD IV.2 headphones |
| Max. voltage | 9.6 V _p |
| Max. level | 16.6 dB(V) |
| Nominal level | 0 dB(V) |
| Nominal level | 116 dB _{SPL} (using the HD IV.2 headphones) |
| Max. output power per channel | 0.45 W |

Analog input microphone

| | |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Microphone sensitivity | 50 mV/Pa |
| Ranges | 84 dB _{SPL} , 94 dB _{SPL} , 104 dB _{SPL} , 114 dB _{SPL} , 124 dB _{SPL} , 134 dB _{SPL} , 144 dB _{SPL} |
| Ranges HD mode | 130 dB _{SPL} |
| Inherent noise | 15 dB _{SPL} (A) |
| Frequency range | 3.5 Hz to 20 kHz |
| Max. sound pressure level | 146 dB _{SPL} |
| Microphone voltage | ±60 V |
| Polarization voltage | 200 V |
| Polarization current | 0.2 mA |
| Analog highpass filter | 1.75 Hz, 2nd order, ±10%; 22 Hz, 2nd order, switchable, ±5% |
| TEDS (IEEE 1451.4) | TEDS class 1, shared return wire (version 0.9 and 1.0). |

Digital input pulse

| | |
|---------------------------------------------|------------------------|
| Number of channels | 1 |
| Connector | 1 x BNC |
| Switchable power source (pullup equivalent) | 5 mA (± 1 mA)/5 V |
| Max. pulse frequency | 1000 kHz |
| Threshold digitally adjustable | Yes |
| Hysteresis digitally adjustable | Yes |
| Resolution threshold/hysteresis | 40 mV |
| Input impedance | 36 kOhm |
| Input voltage | 0 V to 10 V |
| Electric strength | ± 50 V |
| Electrical isolation | Yes |

Analog input microphone ranges

| Range | 84 dB _{SPL} | 94 dB _{SPL} | 104 dB _{SPL} | 114 dB _{SPL} | 124 dB _{SPL} | 134 dB _{SPL} | 144 dB _{SPL} | 130 dB _{SPL} HD |
|------------------------------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Inherent noise (acoustic) | 15 dB _{SPL} (A) | 15dB _{SPL} (A) | 15 dB _{SPL} (A) | 15 dB _{SPL} (A) | 16 dB _{SPL} (A) | 32 dB _{SPL} (A) | 34 dB _{SPL} (A) | 15 dB _{SPL} (A) |
| S/N (acoustic) | 75 dB _{SPL} (A) | 85 dB _{SPL} (A) | 95 dB _{SPL} (A) | 105 dB _{SPL} (A) | 114 dB _{SPL} (A) | 108 dB _{SPL} (A) | 116 dB _{SPL} (A) | 121 dB _{SPL} (A) |
| THD+N (electrical) | -82 dB | -92 dB | -100 dB | -106 dB | -108 dB | -96 dB | -87 dB | -102 dB |
| Crosstalk (electrical) | -100 dB | -108 dB | -116 dB | -121 dB | -121 dB | -120 dB | -118 dB | -128 dB |
| Dynamic range 5 Hz analysis bandwidth | 111 dB _{SPL} (A) | 121 dB _{SPL} (A) | 131 dB _{SPL} (A) | 141 dB _{SPL} (A) | 150 dB _{SPL} (A) | 144 dB _{SPL} (A) | 152 dB _{SPL} (A) | 157 dB _{SPL} (A) |
| Linearity (electrical) 0 to 80 dB below full scale | 0.03 dB | 0.03 dB | 0.04 dB | 0.03 dB | 0.03 dB | 0.03 dB | 0.03 dB | 0.02 dB |
| Linearity (electrical) 80 to 100 dB below full scale | 0.3 dB | 0.3 dB | 0.08 dB | 0.07 dB | 0.06 dB | 0.08 dB | 0.12 dB | 0.05 dB |

There is no standardized definition of „dynamic range“.

Therefore, the **signal-to-noise ratio** (SNR or S/N) value is given as a value for all HEAD products. This is based on the level of a sinusoidal tone with maximum modulation in relation to the full relevant bandwidth noise floor level of the system, measured with the entire relevant frequency range.

Sometimes in the literature, the term „**dynamic range**“ is used identically to the S/N, but this „dynamic range“ value is often based on a narrow-band calculation of the inherent noise.

Depending on the analysis bandwidth, HMS V will then have a much higher „dynamic range“ value.

ITU P.58

Physical dimensions of the head designed according to ITU P.58, table 1 and comparable to ANSI 3.36, table 1.

Please note: without HEAD Torso Box, some dimensions in P.58, table 1 are not applicable.

The monaural frequency responses comply with ITU P.58, table 4 and to those that can be derived from ANSI 3.36, table 3.