GMDR-12

Ground MDR system

HEIM DATaRec® 4 GMDR

Heim

Technical Specifications

The HEIM DATaRec® 4 GMDR-12 Ground data processing systems are data acquisition, recording and playback systems. Functionally, the GMDR fully compares with a MDR mainframe and can be populated with GMDR-/MDR-type interface modules to meet the most different application requirements. A comfortable user interface is provided by two displays on the front.

GMDR-12 (SHS505-32006)

Ground MDR system

Data format	IRIG 106 Chapter 10 compliant
Storage device	
GMDR-12	Internal: SSD media slot (RSM/DSM)
	External: via eSATA.
Module slots	12 slots for GMDR-/MDR-type interface modules; all modules can be exchanged by the user.

Supported signal types for record

- PCM serial
- MIL 1553B buses
- ARINC 429 buses
- STANAG 3910
- CAN buses
- Serial data, asynchronous and synchronous
- IEEE 1394 (Firewire)
- Different bandwidth analog data, voice
- Ethernet network communication
- Video (SD and HD)
- Discrete
- Others on request

Supported signal types for replay

- PCM serial
- MIL 1553B buses
- ARINC 429 buses
- Voice
- Ethernet network communication
- Compressed HD video
- Others on request

Bit rate	800 Mbit/s

SAFRAN

Standard interfaces

Voice

Channels	2 input single ended headset channels
	2 single ended head set monitor, replay outputs
Sampling rate	max. 25 kS/s selectable in steps
Sampling to BW ratio	2.22
High pass filter	300 Hz selectable
Resolution	8 bit / 16 bit
Dynamic range	48 dB / 70 dB
Input Range	1 Vrms, 1 Vpeak
	0.1 Vrms, 0.1 Vpeak
	10 mVrms, 10 mVpeak
Input coupling	AC
Input impedance	10 kΩ
Output Range	max. 1 Vpeak
Output coupling	AC

Ethernet channel

Channels	2 ports
Input format	100 / 1000 Mbit/s Ethernet bus communication
Functions	UDP broadcast, PTP (Precision Time Protocol; time code sync. IEEE 1588-2002 / IEEE 1588-2008), FTP server download function, remote control.

Serial

Channels	1 channel remote
	1 channel GPS (NMEA)
Interface standards	RS232 / RS422
Function	GPS NMEA protocol (time sync) or asynchronous serial line input

Setup/Control/Remote

Interfaces	USB 2.0 (Mini USB), Ethernet, RS232, RS422
Contact Remote (CR)	6 discrete inputs
CR Input level high	4.7 V- 36 V
CR Input level low	0 V - 3.5 V
CR Input impedance	min. 25 kΩ
CR Status output	6 open collector
CR Output current	max. 60 mA, max. 36 V (short circuit protected)

Time coding

Input Standard codes	IRIG A, B, G, 1 pps / 10 pps, GPS time code, PTP (Precision Time Protocol; IEEE 1588-2002 (slave) / IEEE 1588-2008 (slave))

Input accuracy

IRIG A	±5 µs
IRIG B	±20 µs
IRIG G	±2 µs
1 pps / 10 pps	±0.2 µs

Signal level

IRIG A, B, G	0.2 Vpp…20 Vpp
GPS (NMEA)	RS232 / RS422 standard
1 pps / 10 pps	TTL
Input impedance	IRIG A, B, G: 25 kΩ

Output

Standard codes	IRIG A, B, G, 1 pps / 10 pps; GPS replay as RS232, PTP (Precision Time Protocol; IEEE 1588-2002 time master version 1 / IEEE 1588-2008 time master version 2)
Output accuracy	2×10^{-5} s (standard)
Signal level	2 Vpp on 75 Ω (IRIG A, B, G), RS232 (NMEA), TTL (1 pps / 10 pps)
Output impedance	75 Ω (IRIG A, B, G)
Synchronization	1 pps / 10 pps output with 1 µs accuracy

Build-in GPS receiver (optional; SHS505-2041)

Receiver type	72-channel u-blox M8 engineGPS L1C/A, QZSS L1C/A, SBAS L1C/A, GLONASS L1OFBeiDou B1Galileo E1B/C2
Max. speed	< 500 m/s
Max. navigation update rate	5-10 Hz (GPS system dependent)
Velocity accuracy	0.05 m/s
Heading accuracy	0.3 degrees
Dynamics	< 4 g
Horizontal position	< 2.5 m autonomous
Accuracy	> 2.0 m SBAS
Power for active antenna	5.0V/3.3V/Off selctable

Real time clock (RTC) time accuracy

Power on state	±1 ppm (< +25 °C)
	±4 ppm
	10 ppb (with optional High Precision Oscillator)
Power off state	±2 ppm (0 ...+25 °C)
	±4 ppm

Additional Functions

Data integrity	The built-in power supply system allows a clean shut down during recording upon power loss failure, which avoids data corruption.

General

Supply voltage

Nominal input voltage	100 … 240 V AC
Input voltage range	90 … 264 V AC
Input voltage frequency	48 … 62 Hz
Input current	2.4 ... 1.0A max.

Power consumption

Standby	max. 1W
Power on	max. 40W (without signal modules and without storage media)

Connectors

Power	AC power
Time, voice, synch	HD-D-Sub 26 pin female
Remote	HD-D-Sub 26 pin female
GPS antenna	SMA (with optional GPS receiver)
eSATA (front)	Host (e. g. for external storage media)
Mini USB (front, for setup/control only)	
	USB 2.0 (Target device)
LAN1 (front)	RJ45
LAN2 (rear; GMDR-12)	RJ45

Communication interfaces

Displays	2 x 3.2" LCD color active matrix;
Status indicators	3 x LED, for system, time and media status
Buttons	9 lighting buttons for basic functions and menu navigation

Dimensions

all variants	482.6 x 88.8 x 342.5 mm (w x h x d)
Weight	7 kg

Enviromental specifications

Temperature	in accordance with standard IEC DIN EN60068-2-14Nb
	operating -15°C … +55°C
	storage -20°C … +70°C
Humidity	0 … 93% relative, non-condensing
EMC	EU-Directive 2014/30/EU (EMV)
	IEC DIN EN61000-6-4
	IEC DIN EN61326-1
	IEC DIN EN61000-6-2
	IEC DIN EN61000-4-3
	DIN EN55011

Notes

Performance varies depending on the installation environment. The values shown were measured using an appropriately designed test system with a default setup under nominal conditions of temperature, voltage, … Performance is significantly influenced by storage medium type, signal module configuration, power supplies and cabling. The bit rate of a MMRG8/MMRG8A module in a GMDR-12 is up to 150 Mbit/s. For higher bit rates an appropriate hybrid module can be used (e. g. MMMMM-7777-AAAA). The max. burst bit rate of the limited Chapter 10 Data channels of a METH2A and METH2A-RP module in a GMDR-12 is up to 80 Mbit/s.

The features and capabilities of the MDR product line as well as the range of its pertaining items are continuously evolving. Before being able to utilize new features, functions or modules the firmware of the MDR system has to be updated to the latest firmware version.

Take ESD precautions when handling MDR modules. Always ensure to use only cables with the correct pin out for the interface module! The use of cables with wrong pin assignment may result in damage to the connected hardware.

Definitions
Specifications with limiting symbols (<, >, $\leq$, $\geq$, $\pm$, min, max, etc.) or a domain (…) represent performance within a range of values. Specifications named as "typical" represent performance met by approximately more than 80% of the specification basis (channels, produced devices, …). Specifications without limits are nominal values or values within standard tolerances (e. g. dimensions, …).

Connector Pin out

Time/voice/synch (D-Sub type, HD 26-pin female)

Pin	Description
	IRIG interface
8	IRIG analog time code input
7	IRIG analog time code output
9	IRIG analog signal ground
	PPS interface
17	1/10 PPS input
16	1/10 PPS output
18	1/10 PPS signal ground
	Serial GPS (NMEA) interface
22	GPS RS422 serial data receiver input -, symmetrical signal
21	GPS RS422 serial data receiver input +, symmetrical signal
20	GPS RS422 transmitter output +
19	GPS RS422 transmitter output -
25	GPS RS232 receiver input
24	GPS RS232 transmitter output
23	GPS RS232/RS422 common signal ground
	Voice interface
2	Voice line input 1
3	Voice line input 2
1	Voice line input ground
11	Voice line output 1
12	Voice line output 2
10	Voice line output ground
	Synchronisation interface
15	Synchronous 1 I/O+
6	Synchronous 1 I/O-
13	Synchronous 2 I/O+
4	Synchronous 2 I/O-
5	Synchronous configuration input
14	Synchronous common ground
26	Common cable shield (case)
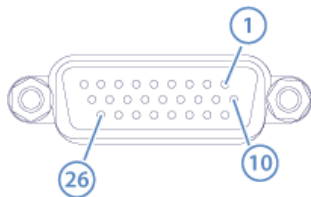
Remote/media (D-Sub type, HD 26-pin female)

| Pin	Description
	Power supply interface
10	Power supply output (24 V DC / 400 mA)
1	Power supply ground (isolated from signal ground)
19	Power supply shield (case)
	Serial remote interface
20	RS422 receive input pair +
21	RS422 receive input pair -
11	RS422 transmit output pair +
12	RS422 transmit output pair -
2	RS232 receive input
3	RS232 transmit output
13	RS232/RS422 common signal ground
4	RS232/RS422 common cable shield (case)
	Contact remote interface
5	C-REM input 1 (record)
6	C-REM input 2 (erase)
7	C-REM input 3 (declassify)
8	C-REM input 4 (self-test)
16	C-REM input 5 (enable)
17	C-REM input 6 (event)
14	C-REM open collector output 1 (record status)
15	C-REM open collector output 2 (erase status)
22	C-REM open collector output 3 (declassify status)
23	C-REM open collector output 4 (self-test status)
24	C-REM open collector output 5 (critical error status)
25	C-REM open collector output 6
18	C-REM Power output +5 V DC / 1 A
9	C-REM I/O common signal ground
26	C-REM I/O cable shield (case)
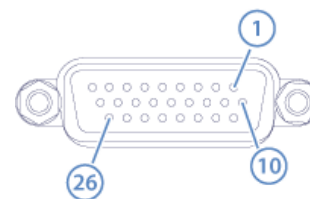
Specification of the contact remote interface

All outputs are open drain signals, active low. For example when record is running, the record output will be pulled to ground with a current limit of 90 mA. When record is not running the pin is floating. An external pullup resister should be provided with a maximum voltage of 50V.

The input pins are also low active and should be pulled to GND to activate them. When left open, an internal current source (0.5 mA limit) will pull the pins to 5.0 V. The function will be activated if the corresponding pin is pulled below 3.0 V. This should be done using a switch, relay, open drain FET or similar. The inputs can also tolerate higher voltages of up to 35 V (direct connection to 28 V aircraft power is possible).

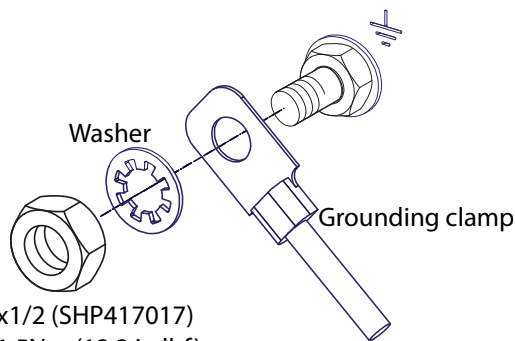Example for contact remote wiring
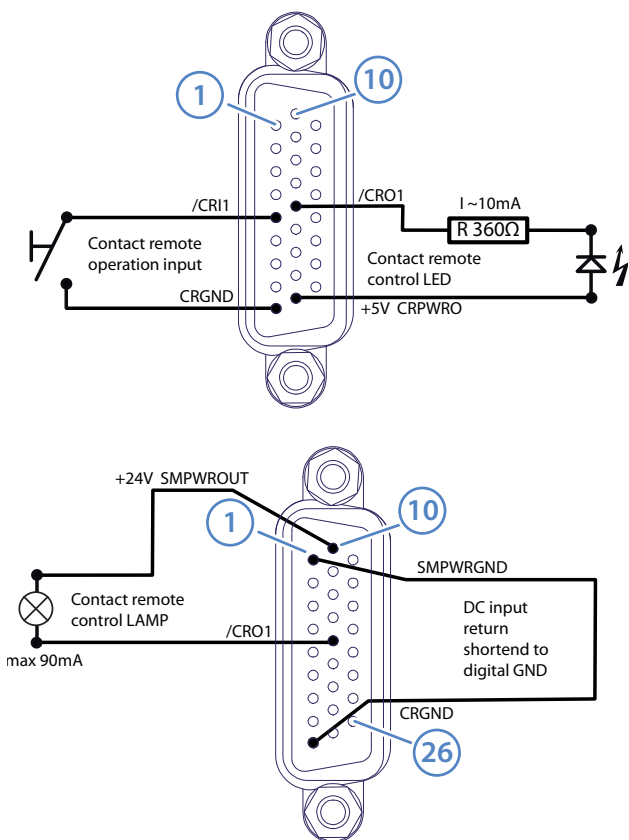
LAN2

Pin	Gigabit/10BaseT, 100BaseT
1	GigE 2+
2	GigE 2-
3	GigE 1- / RX-
4	GigE 0- / TX-
5	GigE 0+ / TX+
6	GigE 3+
7	GigE 3-
8	GigE 1+ / RX+
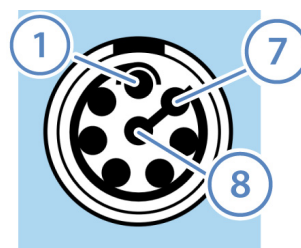
Grounding screw on GMDR rear panel

Grounding screw on GMDR

Washer

Grounding clamp

UNC 8-32x1/2 (SHP417017)
Torque = 1.5Nm (13.3 in lbf)

GPS (Optional for GMDR-12; SMA female)

Pin	Description
1	Signal input (inner contact)
2	Signal ground (outer contact)