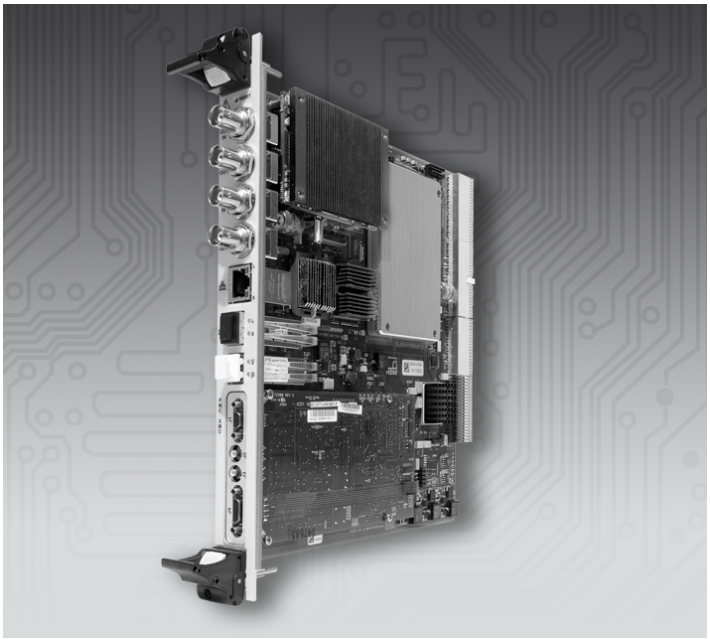


GEN series

IM2 Module and Upgrade Kit

Data sheet

Features and Benefits

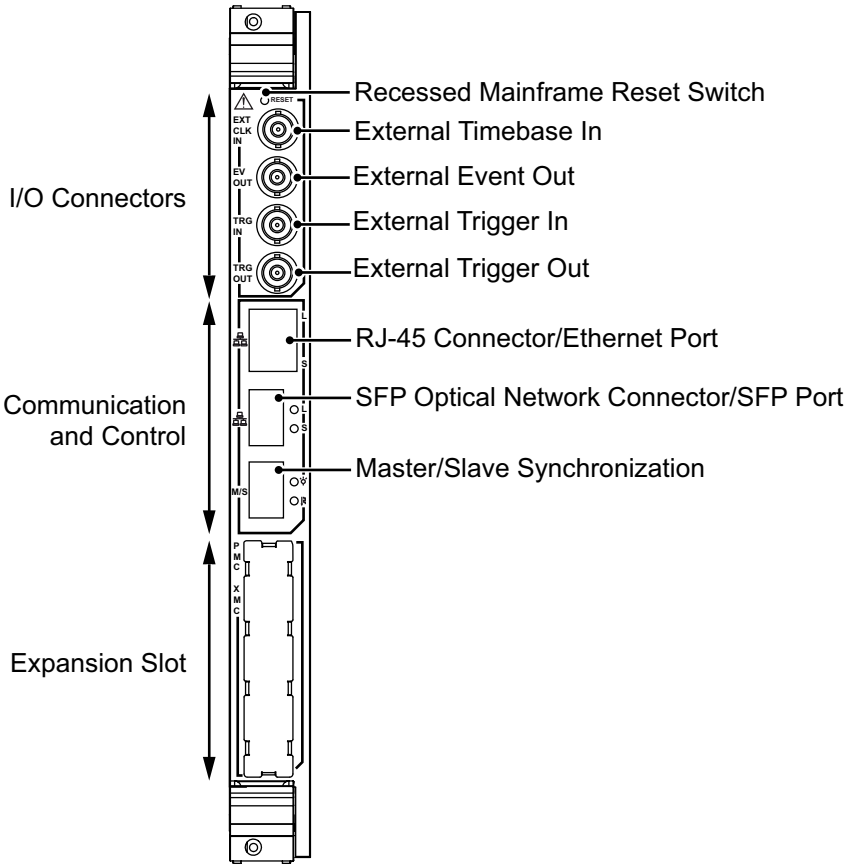
- **100 MB/s streaming rate per mainframe, to an appropriate PC**
- **200 MB/s streaming rate per mainframe when using the 10 Gbit Ethernet option**
- **50 MB/s streaming rate in the GEN2i and GEN5i**
- **On-board optical Ethernet option**
- **Local storage (SATA SSD) and IRIG/GPS option on a single module**
- **On-board Master/Slave connector for Synchronized Recordings with GEN2i**

IM2 Module

The new IM2 Interface/Controller Module replaces the existing IM1 Interface/Controller Module in the GEN DAQ systems and offers the following new features:

- Streaming rate per mainframe to an appropriate PC is 100 MB/s and 200 MB/s with the 10 Gbit Ethernet option installed. The “Fast streaming” is now always on-board. In a GEN2i and GEN5i the streaming rate is 50 MB/s.
- An on-board SATA Solid State Disk (SSD) can be installed as an option. The SSD option does not occupy the expansion slot, and therefore offers the possibility of maximizing on-board storage together with IRIG/GPS option.
- The IM2 offers optional optical Ethernet interfaces (at 850 or 1310 nm) specifically for long distances between GEN DAQ mainframes and the control PC. Furthermore this option eliminates any possible ground loops by isolating the GEN DAQ system with respect to the control PC.
- For Synchronized Recordings with the GEN2i the IM2 comes with the Master/ Slave connector. This feature allows the synchronization of two GEN2i systems.

IM2 Interface/Controller Module



Communication and Control	
Network Interface	
Standard	1 Gbit/s, Ethernet, Cat 5e UTP (RJ-45 connector)
Optional 1 Gbit/s Optical	1 Gbit/s, optical SFP module using LC connector 850 nm optical wavelength, MultiMode fiber cable, 500 m max length 1310 nm optical wavelength, SingleMode fiber cable, 10 km max length Uses dedicated SFP port
Optional 10 Gbit/s Ethernet	Maximum 2 ports of 10 Gbit/s SFP+ modules using LC connectors 850 nm optical wavelength, MultiMode fiber cable, 500 m max length 1310 nm optical wavelength, SingleMode fiber cable, 10 km max length Uses the XMC/PMC expansion slot
TCP/IP	
Protocol	IPV4
Address setup	DHCP/Auto IP or fixed IP
DHCP setup	When DHCP fails Auto IP setup is used similar to Windows® PC's
Gateway setup	Gateway setup supported for control through VPN and/or Internet
Maximum Transfer Speed	
GEN2i or GEN5i	50 MB/s(1)(2)
1 Gbit/s network to an appropriate PC	100 MB/s(1)
10 Gbit/s network to an appropriate PC	200 MB/s (1)
CPU and Software	
CPU	ATOM based
Operating System	Linux(3)

Communication and Control

Local Control	
Supported mainframes	GEN7t and GEN16t
Display	2 lines of 20 characters of information and status
Control	Network, iSCSI and general System setup
Status	Timebase synchronisation, Disk Size, Mainframe name, Current time etc.
Warnings/Alerts	Ethernet/Disk/software version conflicts
Diagnostics	Disk speed, Health and formatting, Memory checks, Thermal errors

(1) Tested using several combinations of acquisition modules.

(2) When upgrading older GEN2i systems the internal SSD disk will limit the transfer speed to 20 MB/s.

(3) Linux GPL open source code can be downloaded on HBM website.

Local Storage options

Solid State Disk(1) Build inside the GEN DAQ series mainframes to optimally secure data storage. Recorded data can be copied to permanent archive using Perception software.	
Size	300 GByte
Maximum continuous storage speed	50 MB/s(2)
Maximum sweep storage speed	Depends on sweep length and number of channels used
File system	Linux EXT4
Connection	SATA300
Location	Built-in not removable, qualified by HBM
iSCSI Storage Ethernet based SCSI connections to external disks supporting iSCSI; Supports external NAS disks (Network Attached Storage). Disk can be far away from GEN series systems while still directly controlled without Windows® interactions.	
Protocols used	RFC 3720 iSCSI initiator RFC 3721 naming and discovery
Name format structure	iqn.yyyy-mm.domain:device.ID
Authorization used	CHAP, username and password negotiation
Maximum continuous storage speed	40 MB/s(2)(3)
Maximum sweep storage speed	Depends on sweep length and number of channels used
File system	Linux EXT4 EXT4 not directly readable by Windows® without using 3rd party tools
Disk partition size	Max 8 TB disk volume
GEN DAQ series access	Exclusive iSCSI access required
Windows® access	Create network share by using Linux SAMBA server

(1) Denotes an option that requires factory installation

(2) Tested using several combinations of acquisition modules.

(3) Appropriate NAS server required to keep up with maximum data rate.
Tested using Synology DS212 and RS3412 using 1 Gbit/s or 10 Gbit/s Ethernet links.

I/O Specifications (Connectors)

External Timebase In	TTL compatible
Pulse width	100 ns min.
Maximum frequency	5 MHz
Edge active	Rising
Resolution	4.01 µs, 250 kS/s and 20 KS/s Modules
	1.01 µs, 1 MS/s and 200 kS/s Modules
	60 ns, 100 MS/s and 25 MS/s Modules
Delay	350 – 400 ns, from BNC connector to sample moment
Input overvoltage protection	± 30 V DC

I/O Specifications (Connectors)	
External Trigger In	TTL compatible
Resolution	50 ns
Minimum pulse width	500 ns
Edge active	Selectable rising or falling
Input overvoltage protection	± 30 V DC
Delay(2)	0 ± 1 µs + maximum 1 sample period
Top Dead Center Rotational input	Used to indicate top dead center in rotational external timebase
External Trigger Out(1)	TTL compatible
Level active	Selectable High/Low/Hold High
Pulse width	High or Low selected: 12.8 µs Hold High selected : Active from first trigger to end of recording
Output impedance	50 Ω
Short circuit protected	Continuous
Delay(2)	516 ± 1 µs + maximum 1 Sample period, Clock base: decimal, Filter(3) wideband
	504 ± 1 µs + maximum 1 Sample period, Clock base: binary, Filter(3) wideband
External Event Out	TTL compatible
Function	Selectable Alarm or Recording Active output
Active level	Selectable High/Low for Alarm output Recording active High output
Output impedance	50 Ω
Short circuit protected	Continuous
Delay(2)	515 ± 1 µs + maximum 1 Sample period, Clock base: decimal, Filter(3) wideband
	503 ± 1 µs + maximum 1 Sample period, Clock base: binary, Filter(3) wideband

(1) Trigger-Out will not show a trigger when Trigger-In is used at the same time. This option is software selectable.

(2) Delays are equal for all acquisition modules.

(3) If analog and/or digital filter is used extra delay will be added depending on type of filter and signal frequency.

XMC/PMC add on options (1 Slot available)	
IRIG	IRIG A and B, AM modulate or DCLS (DC level shifted)
IRIG/GPS	IRIG A and B, AM modulate or DCLS (DC level shifted) GPS, comes with GPS antenna (used for time synchronization only)
10 Gbit/s Ethernet	Maximum 2 ports of 10 Gbit/s SFP+ modules using LC connectors

Timebase and Master/Slave Synchronization	
Timebase(1)	
Accuracy	± 3.5 ppm; aging after 10 years ± 10 ppm
Base	Binary, Decimal or External
Master/Slave Synchronization(2)	
Supported mainframes	GEN2i (disabled on all other mainframes)
Maximum number of GEN2i mainframes	2
Mainframe to mainframe phase shift	± 100 ns
LED signaling	Optical link synchronized, not connected, function disabled
Basic Synchronization	
First sample	Synchronizes the first sample in the recording for each mainframe
Synchronized timebase	Prevents frequency drift of the sample rates within each mainframe
Channel trigger exchange	Synchronously exchanges every channel trigger connected to the Master/Slave trigger bus to/from each connected mainframe
Extended Synchronization(3)	
Synchronous recording actions	Start/Single Shot/Stop and Pause of a recording across multiple mainframes each controlled by a separate Perception
Synchronous manual trigger	User software action to trigger all mainframes synchronously

(1) The GEN DAQ series mainframes provide a central timebase for all acquisition modules.

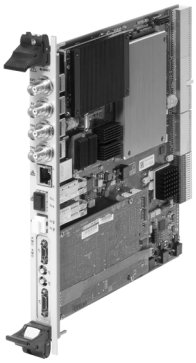
(2) When the Master/Slave extension module is installed the Master/Slave Synchronization connector is disabled.

(3) Extended synchronization not supported by the optional Master/Slave module.

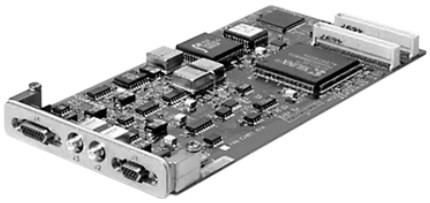
Environmental Specifications	
Temperature Range	
Operational	0 °C to +40 °C (+32 °F to +104 °F)
Non-Operational (Storage)	-25 °C to +70 °C (-13 °F to +158 °F)
Thermal protection	Automatic thermal shutdown at 85 °C (+185 °F) internal temperature User warning notifications at 75 °C (+167 °F) internal temperature (1)
Relative humidity	0 % to 80 %; non-condensing; operational
Protection class	IP20
Altitude	Maximum 2000 m; (6562 feet) operational
Shock: Acc. IEC 60068-2-27	
Operational	Half-sine 10 g/11 ms; 3-axis, tested in positive and negative direction
Non-Operational	Half-sine 25 g/6 ms; 3-axis, tested in positive and negative direction
Vibration: Acc. IEC 60068-2-34	
Operational	1 g RMS, ½ h; 3-axis, random 5 to 500 Hz
Non-Operational	2 g RMS, 1 h; 3-axis, random 5 to 500 Hz
Operational Environmental Tests	
Cold test IEC60068-2-1 Test Ad	-5 °C (+23 °F) for 2 hours
Dry heat test IEC-60068-2-2 Test Bd	+40 °C (+104 °F) for 2 hours
Damp heat test IEC60068-2-3 Test Ca	+40 °C (+104 °F), humidity >93 % RH for 4 days
Non-Operational (Storage) Environmental Tests	
Cold test IEC-60068-2-1 Test Ab	-25 °C (-13 °F) for 72 hours
Dry Heat test IEC-60068-2-2 Test Bd	+70 °C (+158 °F) humidity <50 % RH for 96 hours
Change of temperature test IEC60068-2-14 Test Na	-25 °C to +70 °C (-13 °F to +158 °F), 5 Cycles Rate 2 to 3 minutes, Dwell time 3 hours
Damp heat cyclic test IEC60068-2-30 Test Db variant 1	+25 °C/+40 °C (+77 °F/+104 °F), humidity >95/90 % RH 6 Cycles, cycle duration 24 hours

(1) Specified for Perception V6.22 or higher.

Ordering Information(1)

Article		Description	Order No.
IM2 Upgrade		Upgrade kit for mainframes with Controller/ Interface Module version 1(IM1) to Controller/ Interface Module version 2 (IM2). The IM2 offers the following features: ● 100 MB/s streaming rate to appropriate PC ● 50 MB/s streaming rate to internal (optional) SSD ● 200 MB/s streaming rate using (optional) 10 GBit Ethernet	Factory installation required

(1) IM2 Upgrade needs to be handled as a service case; please contact HBM Service Center (service@hbm.com).

Options, to be ordered separately			
Article		**Description**	**Order No.**
IRIG PMC card(1)		GEN DAQ IRIG Interface fits into open XMC/ PMC slot of GEN DAQ Interface/Controller Module. Cannot be used in combination with 10 Gbit Ethernet XMC card.	1-G001-1
IRIG/GPS PMC card(1)		GEN DAQ IRIG/GPS Interface fits into open XMC/PMC slot of GEN DAQ Interface/Controller Module, comes with antenna and 15 m cable. Cannot be used in combination with 10 Gbit Ethernet XMC card.	1-G002-2
Solid State Disk(1)		GEN DAQ Internal SSD drive in GEN DAQ mainframe, 300 GB capacity, 50 MB/s continuous streaming rate. Sweep storage rate depending on sweep length and number of channels. Short sweeps store slower due to administration overhead.	1-G061-2
1 Gbit Optical Network SFP module 850 nm		GEN DAQ 1GBit Ethernet SFP, 850 nm Multi Mode, up to 500 m optical cable length supported, LC connector support 1 Gbit SFP modules are not compatible with the 10 Gbit SFP+ modules.	1-G062-2
1 Gbit Optical Network SFP module 1310 nm		GEN DAQ 1Gbit Ethernet SFP, 1310 nm Single Mode, up to 10 km optical cable length supported, LC connector support 1 Gbit SFP modules are not compatible with the 10 Gbit SFP+ modules.	1-G063-2
10 Gbit Ethernet XMC card(1)		GEN DAQ 10 Gbit Ethernet XMC card adds up to 2 extra 10 Gbit Ethernet network connections to a GEN DAQ series mainframe. Supports up to 200 MB/s continuous data transfer from the GEN DAQ mainframe to an appropriate PC. Requires a 10 Gbit optical network SFP+ module. Cannot be used in combination with IRIG/GPS PMC card.	1-G064-2
10 Gbit Optical Network SFP+ module 850 nm		GEN DAQ 10Gbit Ethernet SFP+, 850 nm Multi Mode, up to 500 m optical cable length supported, LC connector support 10 Gbit SFP+ modules are not compatible with the 1 Gbit SFP modules.	1-G065-2
10 Gbit Optical Network SFP+ module 1310 nm		GEN DAQ 10Gbit Ethernet SFP+, 1310 nm Single Mode, up to 10 km optical cable length supported, LC connector support 10 Gbit SFP+ modules are not compatible with the 1 Gbit SFP modules.	1-G066-2

(1) Denotes an option that requires factory installation.

Accessories, to be ordered separately			
Article		**Description**	**Order No.**
KAB280		GEN DAQ Standard Zipcord fiber optic Multi Mode cable, 3.0 dB/km loss, LC-LC connectors, orange. Used with 850 nm optical 1 Gbit or 10 Gbit Ethernet. (1-G062-2 and 1-G065-2) and Master/ Slave synchronizations. Lengths 3, 10, 20 and 50 meter (10, 33, 66 and 164 feet)	1-KAB280-3 1-KAB280-10 1-KAB280-20 1-KAB280-50
KAB288		GEN DAQ Standard Zipcord fiber optic Single Mode cable, 0.5 dB/km loss, LC-LC connectors, yellow. Used with 1310 nm optical 1 Gbit or 10 Gbit Ethernet. (1-G063-2 and 1-G066-2). Lengths 2, 10, 20, 50 and 100 meter (6.5, 33, 66, 164 and 328 feet)	1-KAB288-2 1-KAB288-10 1-KAB288-20 1-KAB288-50 1-KAB288-100
KAB289		GEN DAQ Heavy Duty Indoor/Outdoor fiber optic Single Mode cable, 0.5 dB/km loss, LC-LC connectors, black. Used with 1310 nm optical 1 Gbit or 10 Gbit Ethernet. (1-G063-2 and 1-G066-2). Lengths 10, 20, 50, 100, 150 and 300 meter (33, 66, 164, 328, 492 and 984 feet)	1-KAB289-10 1-KAB289-20 1-KAB289-50 1-KAB289-100 1-KAB289-150 1-KAB289-300

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