

GM-1000

9th/8th Gen Intel® Xeon®/Core™ Embedded GPU Computer, Supports 1x MXM 3.1 GPU Expansion Socket



Overview

[CONTACT](#)

The GM-1000 is a rugged GPU computing platform supporting embedded MXM GPU expansion. It has all the features required for a compact, reliable, and high-performance computing system for field applications in machine vision, image processing, and artificial intelligence. Based on the latest Intel® Coffee Lake-R platform, GM-1000 is able to equip with 9th/8th generation workstation grade processor up to 8 cores and dual DDR4-2666 SO-DIMM memory up to 64 GB, that can deliver outstanding computing performance for high-end applications. The compact GPU system, sized at 260 mm x 200 mm x 85 mm, can accommodate 1 x standard MXM 3.1 Type A/B form factor GPU module slot. It allows GPU-accelerated technology from NVIDIA® or AMD® to speed up intensive workloads by executing massive parallel processing, delivering an optimized performance for demanding embedded vision computing applications. The unique thermal design is adopted for GM-1000 to maximize the heat dissipation efficiency and allows GM-1000 to thrive in extreme environmental conditions. The thermal solution is made possible with the design of industrial grade components, copper heat pipes, a special aluminum extrusion case, and an optional external fan. This thermal design provides effective heat dissipation and allows high performance GPU applications with reliability. Moreover, the GM-1000 supports extra functionality and I/O expansions. Thru Cincoze's innovative CMI / CFM (Combined Multiple IO / Control Function Module) technologies, the GM-1000 can be extended with PoE, power ignition sensing, and various I/Os such as LAN, M12, DIO, USB, and COM. The technologies provide a customized expansion to fulfill each user's specific needs and applications.

Key Features

- Supports 9th/8th Gen Intel® Xeon®/Core™ Processor up to 8 cores
- Supports 1x MXM 3.1 Type A/B form factor GPU module expansion
- 2x DDR4 SO-DIMM sockets, up to 2666MHz, 64GB
- Supports wide operating temperature (-40°C - 70°C / -40°F - 158°F) and vibration/shock tolerance (5G/50G)
- 260 mm x 200 mm x 85 mm compact footprint
- Flexible functionality expansions:
 - M.2 E key (CNVi), full-size Mini-PCIe and M.2 M Key (NVMe SSD)
 - Proprietary CMI interface for various I/O expandability
 - Proprietary CFM interface for PoE+ or Power Ignition Sensing

Certifications



Superb Performance

The GM-1000 supports the latest 9th-gen Intel® Xeon® E-series / Core processors (up to 8-core). The computing engine supports remarkable features such as Turbo Boost and Hyper-Threading technology and offers a significant improvement in performance.



Embedded GPU Expansion

GM-1000 supports MXM 3.1 socket Type A/B module expansion from NVIDIA® / AMD®. To protect the user's investment, GM-1000 is designed with an outstanding system architecture that allows for future upgradability of the MXM module.

Unique Thermal Design

The GM-1000 features an unique and effective thermal design for maximum heat dissipation efficiency that offers stability to the system during GPU-based operation for the field.



Specifications

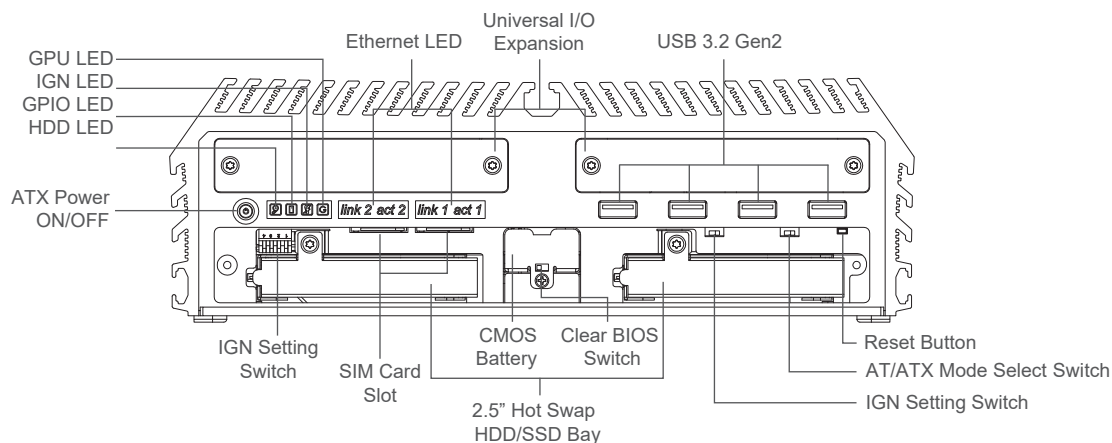
Model Name	GM-1000
System	
Processor	9th Generation Intel® Coffee Lake-R CPU: - Intel® Xeon® E-2278GE 8 Cores Up to 4.7 GHz, TDP 80W - Intel® Xeon® E-2278GEL 8 Cores Up to 3.9 GHz, TDP 35W - Intel® Core™ i7-9700E 8 Cores Up to 4.4 GHz, TDP 65W - Intel® Core™ i5-9500E 6 Cores Up to 4.2 GHz, TDP 65W - Intel® Core™ i3-9100E 4 Cores Up to 3.7 GHz, TDP 65W - Intel® Core™ i7-9700TE 8 Cores Up to 3.8 GHz, TDP 35W - Intel® Core™ i5-9500TE 6 Cores Up to 3.6 GHz, TDP 35W - Intel® Core™ i3-9100TE 4 Cores Up to 3.2 GHz, TDP 35W 8th Generation Intel® Coffee Lake CPU: - Intel® Xeon® E-2176G 6 Cores up to 4.7 GHz, TDP 80W - Intel® Xeon® E-2124G 4 Cores up to 4.5 GHz, TDP 71W - Intel® Core™ i7-8700 6 Cores up to 4.6 GHz, TDP 65W - Intel® Core™ i5-8500 6 Cores, up to 4.1 GHz, TDP 65W - Intel® Core™ i3-8100 4 Cores 3.6 GHz, TDP 65W - Intel® Core™ i7-8700T 6 Cores up to 4.0 GHz, TDP 35W - Intel® Core™ i5-8500T 6 Cores up to 3.5 GHz, TDP 35W - Intel® Core™ i3-8100T 4 Cores 3.1 GHz, TDP 35W - Intel® Pentium® G5400 2 Cores 3.7 GHz, TDP 58W - Intel® Pentium® G5400T 2 Cores 3.1 GHz, TDP 35W - Intel® Celeron® G4900 2 Cores 3.1 GHz, TDP 54W - Intel® Celeron® G4900T 2 Cores 2.9 GHz, TDP 35W
Chipset	Intel® C246
BIOS	AMI BIOS
Memory	2x DDR4-2666/2400 MHz SO-DIMM Sockets - Support up to 64 GB (Un-buffered and non-ECC type) - Xeon/i7/i5: Up to DDR4 2666MHz - i3/Pentium/Celeron: Up to DDR4 2400 MHz
Graphics	
Graphics Engine	- Integrated Intel® UHD Graphics (Xeon/i7/i5/i3: UHD 630; Pentium/Celeron: UHD 610) - Supports Triple Independent Display (DVI-I/DisplayPort/HDMI)
Audio	
Audio Codec	Realtek® ALC888, High Definition Audio
I/O	
Connector	1x DVI-I Connector (VGA: 1920 x1080 @ 60 Hz; DVI-D: 1920 x1200 @ 60 Hz)
DisplayPort	1x DisplayPort Connector (4096 x 2304 @ 60Hz, According to CPU Specifications) * Verified maximum resolution: 3840x2160.
HDMI	1x HDMI Connector (4096 x 2160 @ 30Hz)
LAN	2x GbE LAN Ports (Supports WoL, Teaming, Jumbo Frame & PXE), RJ45 - GbE1: Intel® I219-LM - GbE2: Intel® I210
Flow Control	4x RS-232/422/485 Ports with Auto Flow Control (Support 5V/12V), DB9
USB	4x 10Gbps USB3.2 Gen2 Ports, Type-A 4x 5Gbps USB3.2 Gen1 Ports, Type-A
Mic-in	1x Line-out & 1x Mic-in, Phone Jack 3.5mm
Power On/Off Switch Button	1x ATX Power On/Off Button
Reset Button	1x Reset Button
Mode Switch	1x AT/ATX Mode Switch

CMOS Switch	1x Clear CMOS Switch
Remote Power On/Off Connector	1x Remote Power On/Off Connector, 2-Pin Terminal Block
Terminal Block	2x External Fan Connectors, 4-pin Terminal Block (Supports Smart Fan by BIOS)
Storage	
SSD / HDD	2x SATA III (6Gbps) Front Accessible 2.5" HDD/SSD Trays (up to 15mm in Height)
mSATA	3x mSATA Sockets (Shared by Mini-PCle Socket)
RAID	Supports S/W RAID 0, 1, 5 & 10
NVMe SSD	1x PCIe x4 M.2 Key M 2280 Socket, Supports NVMe SSD
Expansion	
CMI (Combined Multiple I/O) Interface	- CMI (Combine Multiple I/O) Interface 1x High Speed CMI Interface for I/O Expansion - CMI-10GLAN01 : 2x 10G Intel® X550 RJ45 LAN - CMI-LAN01 : 4x 1G Intel® I210 RJ45 LAN - CMI-M12LAN01 : 4x 1G Intel® I210 M12 LAN 1x Low Speed CMI Interface - CMI-COM01 : 2x RS232/422/485, Support 5V/12V - CMI-DIO01 : 16x DIO (8 in, 8 out)
CFM (Control Function Module) Interface	1x CFM IGN Interface - CFM-IGN01: Ignition Sensing Function
MXM GPU Module Expansion	1x MXM Carrier Board Interface for MXM GPU Module Expansion
M.2 Key E Socket	1x M.2 Key E Type 2230 Socket, Support Wireless/Intel CNVi Module Expansion
Mini-PCle Sockets	3x Full-size Mini-PCle Sockets
SIM Sockets	2x SIM Sockets
Antenna Holes	2x Antenna Holes
Other Function	
Instant Reboot	Support 0.2 sec. Instant Reboot Technology
CMOS Battery	SuperCap Integrated for CMOS Battery Maintenance-free Operation
WatchDog Timer	Software Programmable Supports 256 Levels System Reset
Power Requirement	
Power Type	AT / ATX
Total Power Budget	360W
Power Supply Voltage	9~48VDC, Single Power Source
Connector Type	2x 3-pin Terminal Block, Each Terminal Block Current Limitation is 15A
Power input voltage	Power input voltage from 9V to 23V must use dual power connectors, power input voltage from 24V to 48V can use single power connector
Power Adaptor	Optional AC/DC 24V Power Adapter, 220W
Physical	
Dimension (W x D x H)	260 x 200 x 85 mm
Weight	4.6kg
Construction	Extruded Aluminum with Heavy Duty Metal
Mounting	Wall Mount/VESA Mount/DIN Rail/Side Mount

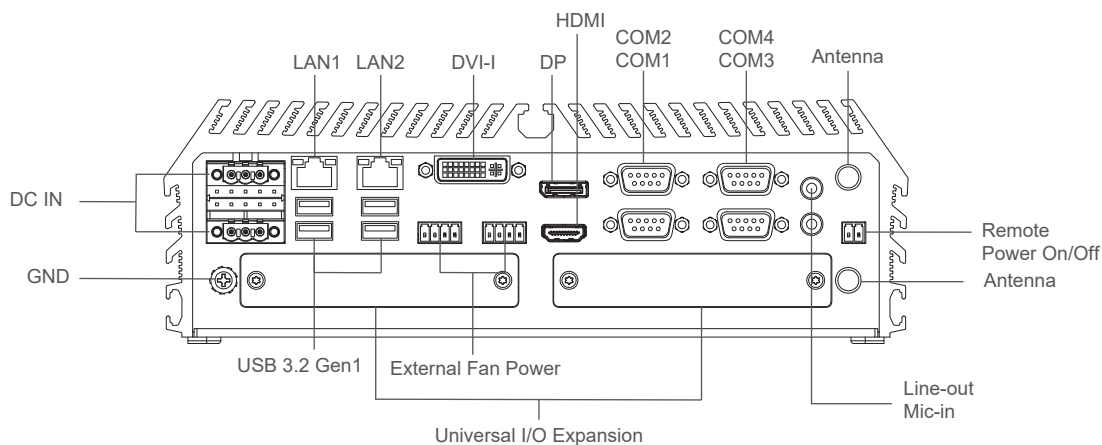
Physical Design	• Unibody Chassis • Fanless Design • Jumper-less Design • Cable-less Design
Protection	
Reverse Power Input Protection	• Yes
Over Voltage Protection	• Protection Range: 51~58V • Protection Type: shut down operating voltage, re-power on at the preset level to recover
Over Current Protection	• 30A
Operating System	
Windows	• Windows® 10
Linux	• Supports by Project
Environment	
Operating Temperature	• CPU 35W, Operating Temp. -40°C - 70°C (-40°F to 158°F) • CPU 65W with FAN module, Operating Temp. -40°C - 60°C (-40°F to 140°F) • CPU 80W with FAN module, Operating Temp. -40°C - 55°C (-40°F to 131°F) * PassMark BurnInTest: 100% CPU, 2D Graphics (without thermal throttling) * For GM-1000 + MXM GPU Module operating temperature, please refer to the last page – Operating Temperature Matrix Table for more information * With extended temperature peripherals; Ambient with air flow * According to IEC60068-2-1, IEC60068-2-2, IEC60068-2-14
Storage Temperature	• -40°C to 85°C (-40°F to 185°F)
Relative Humidity	• 95% RH @ 70°C (Non-condensing)
Shock	• Operating, 50 Grms, Half-sine 11 ms Duration * w/ SSD, according to IEC60068-2-27
Vibration	• Operating, 5 Grms, 5-500 Hz, 3 Axes * w/ SSD, according to IEC60068-2-64
MTBF	• 331,596 Hours, Database: Telcordia SR-332 Issue 3, Method 1, Case 3
EMC	• CE, UKCA, FCC, ICES-003 Class A • EN 50155 (EN 50121-3-2 Only) • E-mark
EMI	• CISPR 32 Conducted & Radiated: Class A • EN/BS EN 50121-3-2 Conducted & Radiated: Class A • EN/BS EN IEC 61000-3-2 Harmonic current emissions: Class A • EN/BS EN61000-3-3 Voltage fluctuations & flicker • FCC 47 CFR Part 15B, ICES-003 Conducted & Radiated: Class A
EMS	• EN/IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV • EN/IEC 61000-4-3 RS: 80 MHz to 1000 MHz: 20 V/m • EN/IEC 61000-4-4 EFT (with optional PPM module): AC Power: 2 kV; DC Power: 1 kV; Signal: 2 kV • EN/IEC 61000-4-5 Surges: AC Power: 2 kV • EN/IEC 61000-4-6 CS: 10V • EN/IEC 61000-4-8 PFMF: 50 Hz, 1A/m • EN/IEC 61000-4-11 Voltage Dips & Voltage Interruptions: 0.5 cycles at 50 Hz
Safety	• LVD IEC/EN 62368-1

External Layout

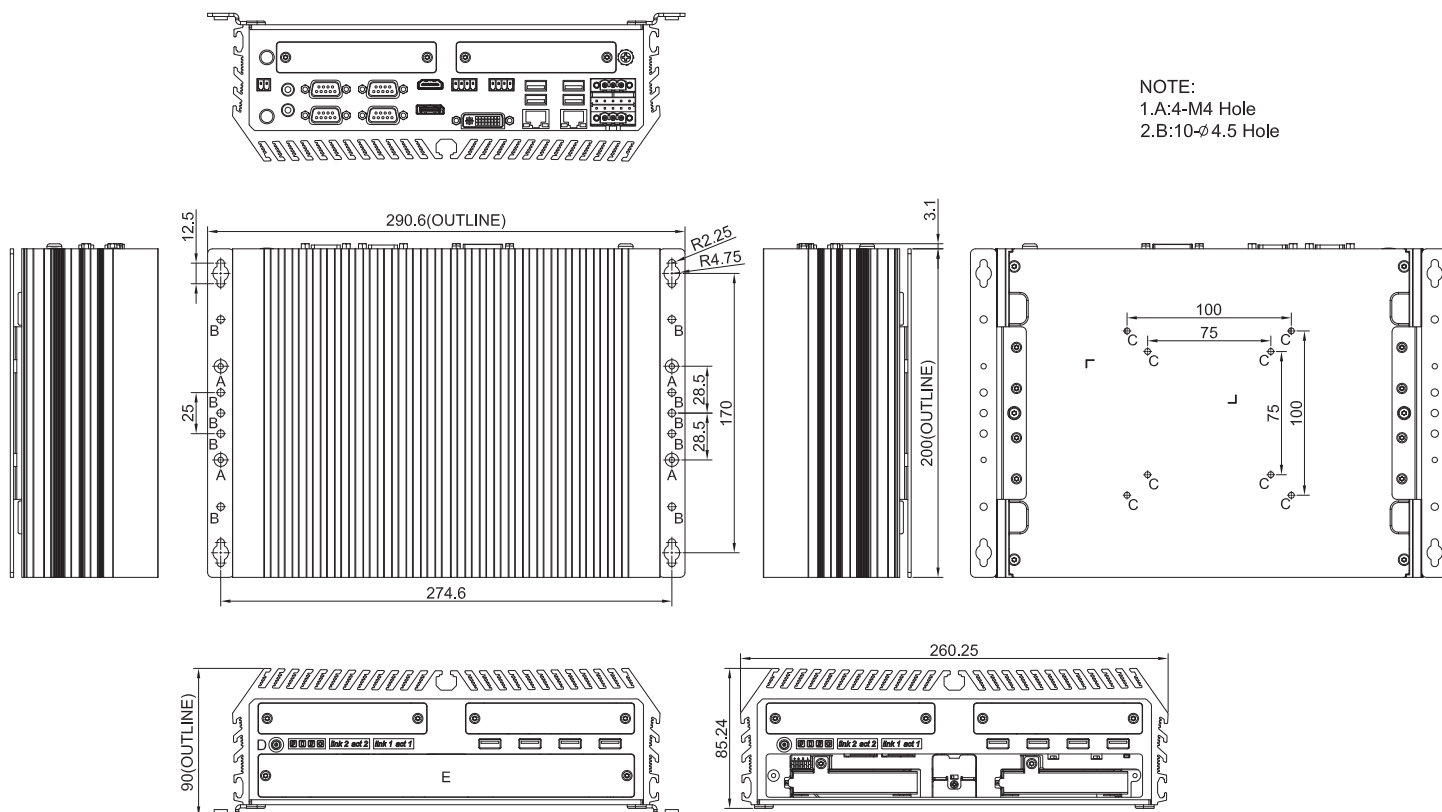
Front I/O



Rear I/O



Dimensions



Unit: mm

Ordering Information

Available Models

Model No.	Description
GM-1000-R10	9th/8th Gen Intel® Xeon®/Core™ Embedded GPU Computer, Supports 1x MXM 3.1 GPU Expansion Socket

Package Checklist

• GM-1000 GPU Computer x 1	• Remote Power On/Off Terminal Block Connector x 1
• CPU Heat Sink and Thermal Pad x 1	• Fan Terminal Block Connector x 2
• Screw Pack x 1	• DVI-I to VGA Adaptor
• Power Terminal Block Connector x 2	• Wall Mount Kit x1

Optional MXM GPU Module & Accessories

Model No.	Description
MXM-AD5000-R10	NVIDIA Embedded RTX AD5000 MXM Type B, 16G, 80W Kit with Heatsink and Thermal Pad
MXM-AD3500-R10	NVIDIA Embedded RTX AD3500 MXM Type B, 12G, 80W Kit with Heatsink and Thermal Pad
MXM-AD2000-R10	NVIDIA Embedded RTX AD2000 MXM Type A, 8G, 60W Kit with Heatsink and Thermal Pad
MXM-A4500-R10	NVIDIA Embedded RTX A4500 MXM Type B, 16G, 80W Kit with Heatsink and Thermal Pad
MXM-A2000-R10	NVIDIA Embedded RTX A2000 MXM Type A, 8G, 60W Kit with Heatsink and Thermal Pad
MXM-A1000-R10	NVIDIA Embedded RTX A1000 MXM Type A, 4G, 60W Kit with Heatsink and Thermal Pad
MXM-A500-R10	NVIDIA Embedded RTX A500 MXM Type A, 4G, 40W Kit with Heatsink and Thermal Pad
MXM-T1000-R10	NVIDIA Quadro Embedded T1000 MXM Kit with Heatsink and Thermal Pad
MXM-HSKA-01	MXM Type A Heatsink Kit for MXM-A500
MXM-HSKA-02	MXM Type A Heatsink Kit for MXM-A1000, MXM-A2000, and MXM-AD2000
MXM-HSKA-03	MXM Type A Heatsink Kit for MXM-T1000
MXM-HSKB-01	MXM Type B Heatsink Kit for MXM-A4500
MXM-HSKB-03	MXM Type B Heatsink Kit for MXM-AD3500 & MXM-AD5000

Optional Modules & Accessories

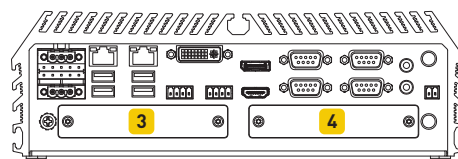
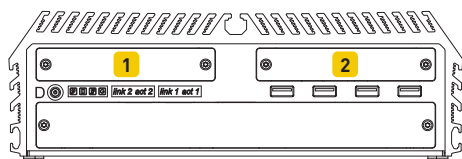
Model No.	Description
CB-DP01-R10	Carrier Board Module with 1x MXM 3.1 Interface and 4x DisplayPort Output / 1x Universal Bracket with 4x DP Cutout
CB-DP02-R10	Carrier board with one MXM 3.1 interface and no DisplayPort output. (Compatible with GM-1000 standard universal bracket)
CB-DP04-R10/UB1329	Carrier Board with 1x MXM 3.1 Interface and 4x DisplayPort Output / 1x Universal Bracket with 4xDP Cutout
CB-DP05-R10/UB1336-R10	Carrier Board with 1x MXM 3.1 Interface and 3x DisplayPort Output / 1x Universal Bracket with 3xDP Cutout
CMI-LAN01-R12/UB1312	CMI Module with 4x Intel® I210 GbE LAN, RJ45 Port / 1x Universal Bracket with 4x RJ45 Cutout for GM Series
CMI-2P5GLAN01-R10/UB1312	CMI Module with 4x Intel 2.5GbE LAN, RJ45 Port / 1x Universal Bracket with 4x RJ45 Cutout for GM Series
CMI-10GLAN01-R10/UB1328	CMI Module with 2x Intel® X550 10GbE LAN, RJ45 Port / 1x Universal Bracket with 2x RJ45 Cutout for GM Series

CMI-M12LAN01-R12/UB1310	CMI Module with M12 Connector, 4x Intel® GbE LAN / 1x Universal Bracket with 4x M12 Cutout for GM Series
CMI-XM12LAN01-R10/ UB1330-R10	CMI Module with M12 X-Coded Connector, 4x Intel I210 GbE LAN Ports / Universal Bracket with 4x M12 X-Coded Cutout
CMI-10GXM12LAN01-R10/ UB1337-R10	CMI Module with 2x Intel 10GbE LAN, M12 X-Coded Connector / Universal Bracket with 2x M12 X-coded Cutout
CMI-CAN01-R10/UB1338-R10	CMI Module with 2x CAN FD Ports / Universal Bracket with 2x DB9 and 1x Switch Cutout for CMI-CAN Expansion
CMI-DIO01/UB1318	CMI Module with 16DIO (8in 8out) / 1x Universal Bracket with DIO Cutout for DX & GM Series
CMI-COM01/UB1303	CMI Module with 2x RS232/422/485 (Support 5V/12V) / 1x Universal Bracket with 2x DB9 Cutout for DX & GM Series
CMI-LAN01-R12/UB1312/ CFM-PoE01	CMI Module with 4x Intel® I210 GbE LAN, RJ45 Port / 1x Universal Bracket with 4x RJ45 Cutout for GM Series / CFM Module with PoE Control Function, Individual Port 25.5W
CMI-M12LAN01-R12/ UB1310/CFM-PoE01	CMI Module with M12 Connector, 4x Intel® GbE LAN / 1x Universal Bracket with 4x M12 Cutout for GM Series / CFM Module with PoE Control Function, Individual Port 25.5W
CFM-PoE01	PoE Control Function Module, Power Boost 50-57V
CFM-IGN01	CFM Module with Power Ignition Sensing Control Function, 12V/24V Selectable
UB0932-R10	Universal Bracket with 3x Antenna Cutout
UB1332-R10	Universal Bracket with 3x Antenna Cutout
MEC-COM-M212-TDB9/UB1303	Mini-PCle Module with 2x RS-232 Serial Ports, 1x Thin DB9 Cable / 1x Universal Bracket with 2x DB9 Cutout for DX & GM Series
MEC-COM-M334-TDB9/ 2xUB1303	Mini-PCle Module with 4x RS232/422/485 Serial Ports, 2x Thin DB9 Cable / 2x Universal Bracket with 2x DB9 Cutout for DX & GM Series
MEC-LAN-M102-30/UB1311	Mini-PCle Module with 2x LAN Ports, 2x 30cm cable / 1x Universal Bracket with 2x RJ45 Cutout for DX & GM Series
MEC-USB-M102-30/UB1314	Mini-PCle Module with 2x USB 3.2 Gen1 Ports, 1x 30cm cable / 1x Universal Bracket with 2x USB Cutout
FAN-EX102	External Fan Kit with 2x 4pin Terminal Block Plug for GM Series, Support Smart Fan Function
SIDE-GM	GM Series side mount kit
DIN01	DIN-RAIL Mount Kit, KMRH-K175
GST220A24-CIN	Adapter AC/DC 24V 9.2A 220W with 3pin Terminal Block Plug 5.0mm Pitch, with TUBES, level VI
GST360A24-CIN	Adapter AC/DC 24V 15A 360W with 3pin Terminal Block Plug 5.0mm Pitch, with TUBES, level VI
RSD-200D-24	Railway Single Output DC-DC Converter 200W / DC 24V
PPM-I360-03-R10	360W Power Protection Module for GM Series

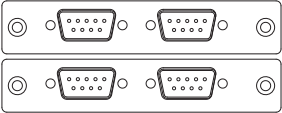
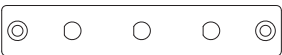
Carrier Board and MXM GPU Compatibility Matrix

	CB-DP01	CB-DP02 (compatible with standard UB)	CB-DP04/UB1329	CB-DP05/UB1336
MXM-AD5000			V	
MXM-AD3500			V	
MXM-AD2000				V
MXM-A500		V		
MXM-A1000	V			
MXM-A2000	V			
MXM-A4500			V	
MXM-T1000	V			

Optional Module Configuration



Model No.	Description	1	2	3	4
CB-DP01-R10/UB1329 	Carrier Board Module with 1x MXM 3.1 Interface and 4x DisplayPort Outout / 1x Universal Bracket with 4x DP Cutout	V	-	-	-
CB-DP02-R10 	Carrier board with one MXM 3.1 interface and no DisplayPort Output (Compatible with GM-1000 standard universal bracket)	V	-	-	-
CB-DP04-R10/UB1329 	Carrier Board with 1x MXM 3.1 Interface and 4x DisplayPort Output / 1x Universal Bracket with 4xDP Cutout	V	-	-	-
CB-DP05-R10/UB1336-R10 	Carrier Board with 1x MXM 3.1 Interface and 3x DisplayPort Output / 1x Universal Bracket with 3x DP Cutout	V	-	-	-
CMI-LAN01-R12/UB1312 	CMI Module with 4x Intel® I210 GbE LAN, RJ45 Port / 1x Universal Bracket with 4x RJ45 Cutout for GM Series	-	V	-	-
CMI-2P5GLAN01-R10/UB1312 	CMI Module with 4x Intel 2.5GbE LAN, RJ45 Port / 1x Universal Bracket with 4x RJ45 Cutout for GM Series	-	V	-	-
CMI-10GLAN01-R10/UB1328 	CMI Module with 2x Intel® X550 10GbE LAN, RJ45 Port / 1x Universal Bracket with 2x RJ45 Cutout for GM Series	-	V	-	-
CMI-M12LAN01-R12/UB1310 	CMI Module with M12 Connector, 4x Intel® GbE LAN / 1x Universal Bracket with 4x M12 Cutout for GM Series	-	V	-	-
CMI-XM12LAN01-R10/UB1330-R10 	CMI Module with M12 X-Coded Connector, 4x Intel I210 GbE LAN Ports / Universal Bracket with 4x M12 X-Coded Cutout	-	V	-	-
CMI-10GXM12LAN01-R10/UB1337-R10 	CMI Module with 2x Intel 10GbE LAN, M12 X-Coded Connector / Universal Bracket with 2x M12 X-coded Cutout	-	V	-	-
CMI-CAN01-R10/UB1338-R10 	CMI Module with 2x CAN FD Ports / Universal Bracket with 2x DB9 and 1x Switch Cutout for CMI-CAN Expansion	-	V	-	-
CMI-DIO01/UB1318 	CMI Module with 16DIO (8in 8out) / 1xUniversal Bracket with DIO Cutout for DX & GM Series	-	-	-	V
CMI-COM01/UB1303 	CMI Module with 2x RS232/422/485 (Support 5V/12V) / 1x Universal Bracket with 2x DB9 Cutout for DX & GM Series	-	-	-	V
CMI-LAN01-R12/UB1312/CFM-PoE01 	CMI Module with 4x Intel® I210 GbE LAN, RJ45 Port / 1x Universal Bracket with 4x RJ45 Cutout for GM Series / CFM Module with PoE Control Function, Individual Port 25.5W	-	V	-	-
CMI-M12LAN01-R12/UB1310/CFM-PoE01 	CMI Module with M12 Connector, 4x Intel® GbE LAN / 1x Universal Bracket with 4x M12 Cutout for GM Series / CFM Module with PoE Control Function, Individual Port 25.5W	-	V	-	-
MEC-COM-M212-TDB9/UB1303 	Mini-PCle Module with 2x RS-232 Serial Ports, 1x Thin DB9 Cable / 1x Universal Bracket with 2x DB9 Cutout for DX & GM Series	-	-	V	V

MEC-COM-M334-TDB9/2xUB1303 	Mini-PCle Module with 4x RS232/422/485 Serial Ports, 2x Thin DB9 Cable / 2x Universal Bracket with 2x DB9 Cutout forDX & GM Series	-	-	V	V
MEC-LAN-M102-30/UB1311 	Mini-PCle Module with 2x LAN Ports, 2x 30cm cable / 1x Universal Bracket with 2x RJ45 Cutout for DX & GM Series	-	-	V	-
MEC-USB-M102-30/UB1314 	Mini-PCle Module with 2x USB Ports, 1x 30cm cable / 1x Universal Bracket with 2x USB Cutout for DX & GM Series	-	-	V	-
UB0932-R10 	Universal Bracket with 3x Antenna Cutout	-	-	V	V
UB1332-R10 	Universal Bracket with 3x Antenna Cutout	V	V	-	-

V : Compatible

Operating Temperature Matrix Table

MXM GPU TDP	35W CPU	65W CPU	80W CPU
60W~80W	UP to 40°C (104°F)	UP to 40°C (104°F)	UP to 40°C ^[1] (104°F)
50W	UP to 50°C (122°F)	UP to 45°C (113°F)	UP to 45°C (113°F)

[1] The GM-1000 with an 80W processor and MXM-A2000 supports an operating temperature of up to 35°C (95°F).

- * External Fan Kit - FAN-EX102 is required for above configurations.
- * PassMark BurnInTest: 100% CPU, 2D Graphics (without thermal throttling)
- * Furmark: 1920x 1080, 8x MSAA (without thermal throttling)