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 128 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, 128GB
- Supports wide operating temperature (-40°C - 70°C) 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

EN50121-3-2 E13 FC CE CMI TECHNOLOGY CFM TECHNOLOGY MEC TECHNOLOGY

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

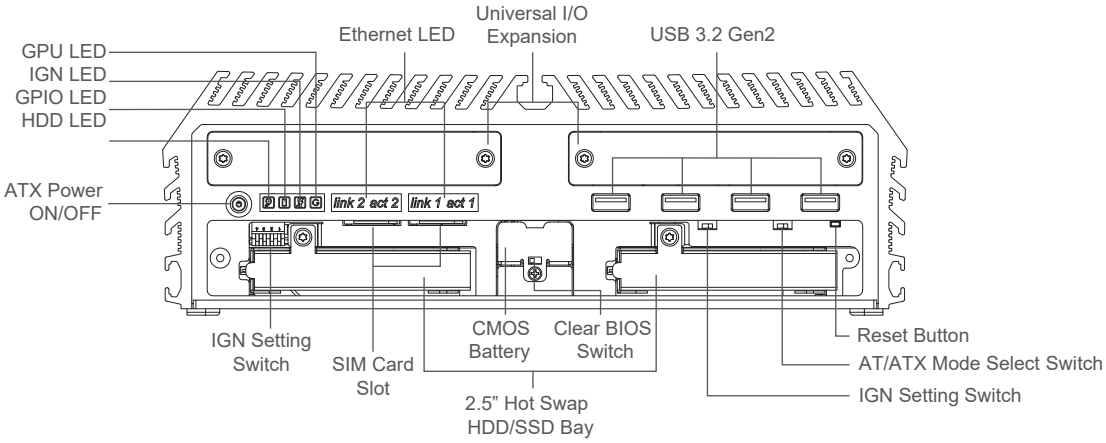
Model Name	GM-1000
System	
Processor	▪ 9th Generation Intel® Coffee Lake-R CPU: - Intel® Xeon® E-2278GE 8 Cores Up to 4.7 GHz, TDP 80W - Intel® Xeon® E-2278GEL 8 Cores Up to 3.9 GHz, TDP 35W - Intel® Core™ i7-9700E 8 Cores Up to 4.4 GHz, TDP 65W - Intel® Core™ i5-9500E 6 Cores Up to 4.2 GHz, TDP 65W - 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-PCIe 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
CNVi	▪ 1 x PCIe x2 M.2 Key E 2230 socket, support Intel CNVi Module
Mini-PCIe Sockets	▪ 3x Full-size Mini-PCIe 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)	▪ 150 x 105 x 52.3 mm
Weight	▪ 4.6kg
Construction	▪ Extruded Aluminum with Heavy Duty Metal
Mounting	▪ Wall Mount/VESA Mount/DIN Rail/Side Mount

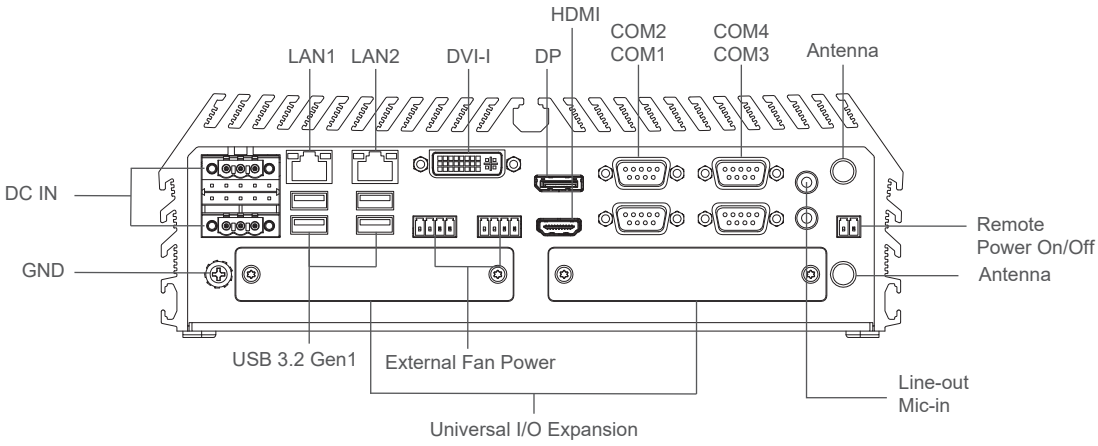
Physical Design	▪ Unibody Chassis ▪ Fanless Design ▪ Jumper-less Design ▪ Cable-less Design
Protection	
Reverse Power Input Protection	▪ Yes
Over Voltage Protection	▪ Protection Range: 51~58V ▪ Protection Type: shut down operating voltage, re-power on at the preset level to recover
Over Current Protection	▪ 30A
Operating System	
Windows	▪ Windows® 10
Linux	▪ Supports by Project
Environment	
Operating Temperature	▪ CPU 35W, Operating Temp. -40°C - 70°C ▪ CPU 65W with FAN module, Operating Temp. -40°C - 60°C ▪ CPU 80W with FAN module, Operating Temp. -40°C - 55°C * 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
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: AC Power: 2 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

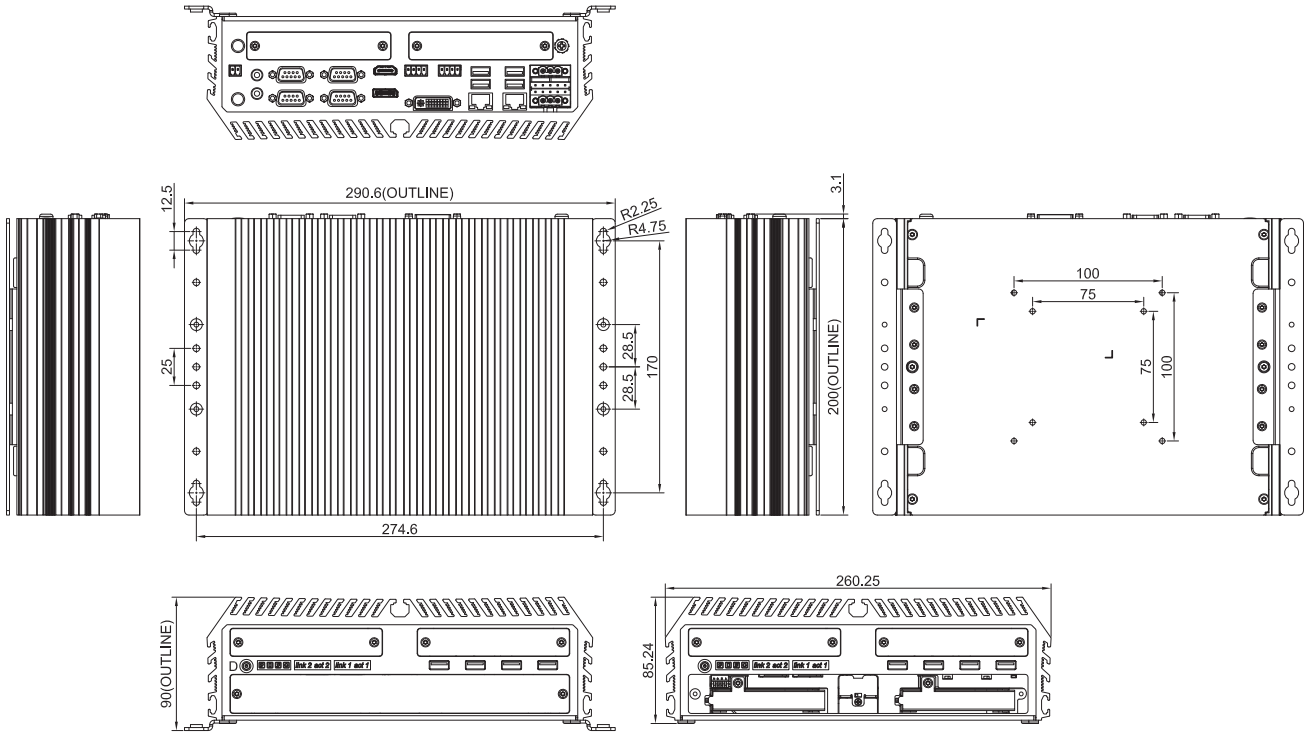
Front I/O



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

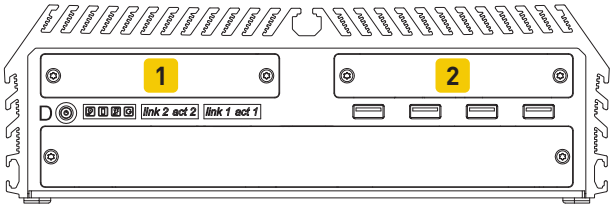
Model No.	Description
MXM-A2000-R10	NVIDIA Embedded RTX A2000 MXM Type A, 8G, 60W Kit with Heatsink and Thermal Pad
MXM-A1000-R10	NVIDIA Embedded RTX A1000 MXM Type A, 4G, 60W Kit with Heatsink and Thermal Pad
MXM-RTX3000-R10	NVIDIA Quadro Embedded RTX3000 MXM Kit with Heatsink and Thermal Pad
MXM-T1000-R10	NVIDIA Quadro Embedded T1000 MXM Kit with Heatsink and Thermal Pad

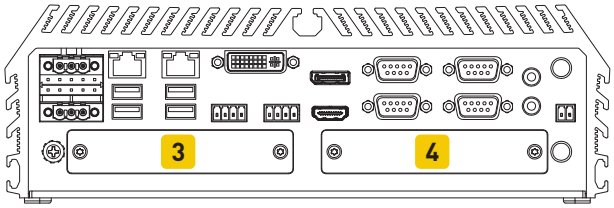
Optional Modules & Accessories

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
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-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-DIO01/UB1318	CMI Module with 16DIO (8in 8out) / 1xUniversal 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-IGN01	CFM Module with Power Ignition Sensing Control Function, 12V/24V Selectable
MEC-COM-M212-TDB9/ UB1303	Mini-PCIe Module with 2x RS-232 Serial Ports, 1x Thin DB9 Cable / 1x Universal Bracket with 2x DB9 Cutout for DX & GM Series

Model No.	Description
MEC-COM-M334-TDB9/2xUB1303	Mini-PCIe Module with 4x RS232/422/485 Serial Ports, 2x Thin DB9 Cable / 2x Universal Bracket with 2x DB9 Cutout forDX & GM Series
MEC-LAN-M102-30/UB1311	Mini-PCIe 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-PCIe 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

Optional Module Configuration





Model No.	Description	1	2	3	4
CB-DP01-R10	Carrier Board Module with 1x MXM 3.1 Interface and 4x DisplayPort Outout / 1x Universal Bracket with 4x 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-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-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-PCIe 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-PCIe 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-PCIe 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-PCIe Module with 2x USB Ports, 1x 30cm cable / 1x Universal Bracket with 2x USB Cutout for DX & GM Series	-	-	V	-

V : Compatible

Operating Temperature Matrix Table

Model No.	GPU Model	35W CPU	65W CPU	80W CPU
MXM-A2000-R10	Embedded NVIDIA RTX™ A2000	-20°C - 40°C	-20°C - 40°C	-20°C - 35°C
MXM-A1000-R10	Embedded NVIDIA RTX™ A1000	-20°C - 40°C	-20°C - 40°C	-20°C - 40°C
MXM-RTX3000-R10	NVIDIA Quadro Embedded RTX3000 (80W)	-40°C - 40°C	-40°C - 40°C	-40°C - 40°C
MXM-T1000-R10	NVIDIA Quadro Embedded T1000 (50W)	-40°C - 55°C	-40°C - 55°C	-40°C - 50°C

* 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)

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