

DS-1402

12th Generation Intel® Core™ Series Processors, High Performance, Expandable and Modular Rugged Embedded Computer with 2x PCI/PCIe Expansion Slot



High Performance | Highly Expandable

DS-1402, 12th Gen. Intel Alder Lake-S Rugged Embedded Computer



Overview

The DS-1402 is a high-performance, expandable, and rugged embedded computer, boasting outstanding performance as well as rich industrial I/O interfaces and robust functionalities. To meet various application needs, it has dual PCI/PCIe expansion capability and it can also flexibly expand the required I/O and specific functions through Cincoze's unique CMI, CFM, and MEC modules. Moreover, the DS-1402 has passed multiple international certifications, ensuring stable and reliable performance in diverse harsh environments. It is an ideal choice for manufacturing and railway applications.

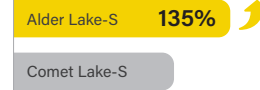
- Intel® 12th Gen Alder Lake-S Core™ i9/i7/i5/i3 Processors (max 65 W TDP)
- 2x DDR5 SO-DIMM Sockets, Supports ECC/non ECC type Memory, Up to 4800MHz, 64GB
- 2x GbE LAN and optional 2x 10GbE LAN
- 2x 2.5" SATA storage, 3x mSATA sockets, 1x M.2 key M for NVMe SSD
- 2x PCI/PCIe expansion slots
- Optional CMI modules for I/O expansion
- Optional CFM modules for ignition sensing & PoE
- Wide operating temperature -40°C to 70°C
- MIL-STD-810G military standard and EN50155 (EN 50121-3-2 only)



Rapid Processing and Inference

The DS-1402 supports 12th gen Intel® Core™ i9/i7/i5/i3 (Alder Lake-S) processors based on the Intel 7 process, with up to 16 cores (8P + 8E) and 24 threads, delivering more than 1.35x the speed of Comet Lake-S platform. The Intel® Xe architecture of the UHD 770 graphics chip boosts GPU image classification inference performance to 2.8x the speed of Comet Lake-S, providing the processing performance needed for AI and edge computing.

CPU Performance



Alder Lake-S

GPU Image Classification Inference Performance



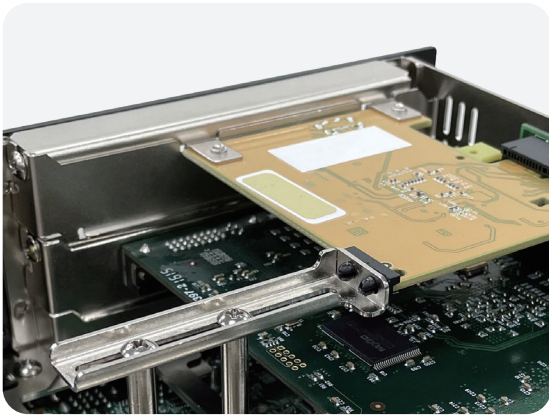
Industrial I/O and Modular Expansion

The DS-1402 offers a vast array of industrial-focused I/O including up to 2x GbE LAN, 6x USB 3.2, and 2x USB 2.0, 2x RS232/422/485, 2x 2.5" SATA, 3x mSATA, 1x M.2 key M for NVMe SSD, 2x SIM card slots, 3x full-size Mini-PCIe and quad independent displays (DisplayPort, HDMI, VGA). It also features modular expansion through Cincoze's CMI/CFM modules, adding additional I/O or other functionality such as high-speed 10GbE LAN, PoE, and IGN (power ignition sensing).

PCI/PCIe Add-on Cards

The DS-1402 accommodates dual PCI/PCIe expansion slots. It can support a maximum of one 110W add-on card with dimensions of 111 x 237 mm. This flexible slot allows integration of I/O, GPU, image capture, data acquisition, and motion control cards to suit specific application needs.





Adjustable PCIe Card Retainer

A patented adjustable PCIe card retainer can securely fasten add-on cards. This unique design effectively prevents the cards from loosening due to vibrations in high-vibration environments, ensuring the stable operation of the system.

Patent No. I773359

Robust and Reliable

The DS-1402 is built tough, reflected in its industrial-grade protection design and industry certifications in different fields. In addition to features such as wide temperature (-40 - 70°C), wide voltage input (9 - 48 VDC), overvoltage, overcurrent, and ESD protection, it also complies with the US military shock vibration standard MIL-STD-810G. For more secure railway computing, it also passes the EMC EN 50121-3-2 standard in EN 50155.



Specifications

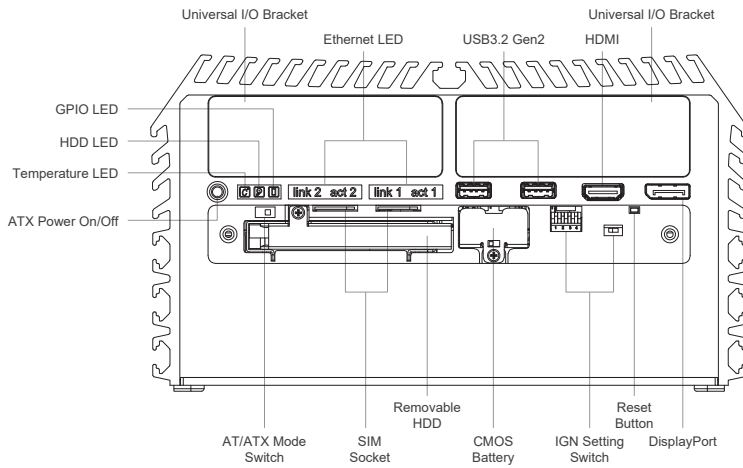
| Model Name | DS-1402 |
|------------------------|---|
| System | |
| Processor | <ul style="list-style-type: none"> 12th Generation Intel® Alder Lake-S Series CPU: <ul style="list-style-type: none"> Intel® Core™ i9-12900E 16 Cores Up to 5 GHz, TDP 65W Intel® Core™ i7-12700E 12 Cores Up to 4.8 GHz, TDP 65W Intel® Core™ i5-12500E 6 Cores Up to 4.5 GHz, TDP 65W Intel® Core™ i3-12100E 4 Cores Up to 4.2 GHz, TDP 60W Intel® Core™ i9-12900TE 16 Cores Up to 4.8 GHz, TDP 35W Intel® Core™ i7-12700TE 12 Cores Up to 4.7 GHz, TDP 35W Intel® Core™ i5-12500TE 6 Cores Up to 4.3 GHz, TDP 35W Intel® Core™ i3-12100TE 4 Cores Up to 4.0 GHz, TDP 35W Intel® Pentium® G7400E 2 Cores Up to 3.6 GHz, TDP 46W Intel® Pentium® G7400TE 2 Cores Up to 3.0 GHz, TDP 35W Intel® Celeron® G6900E 2 Cores Up to 3.0 GHz, TDP 46W Intel® Celeron® G6900TE 2 Cores Up to 2.4 GHz, TDP 35W |
| Chipset | <ul style="list-style-type: none"> Intel R680E Chipset |
| Memory | <ul style="list-style-type: none"> 2x DDR5 4800 MHz SO-DIMM Socket, Supports Un-buffered and ECC Type, Up to 64GB |
| BIOS | <ul style="list-style-type: none"> AMI BIOS |
| Graphics | |
| Graphics Engine | <ul style="list-style-type: none"> Integrated Intel® UHD Graphics 770: Core™ i9/i7/i5 Integrated Intel® UHD Graphics 730: Core™ i3 Integrated Intel® UHD Graphics 710: Pentium®/Celeron® |
| Maximum Display Output | <ul style="list-style-type: none"> Supports Quad Independent Display |
| VGA | <ul style="list-style-type: none"> 1x VGA Connector : 1920 x 1080@60Hz |
| DP | <ul style="list-style-type: none"> 2x DP Connector : 4096 x 2304@60Hz * Verified maximum DP resolution: 3840x2160 @60Hz |
| HDMI | <ul style="list-style-type: none"> 1x HDMI Connector : 4096x2160@30Hz * Verified maximum resolution: 3840x2160 @30Hz |
| Audio | |
| Audio Codec | <ul style="list-style-type: none"> Realtek® ALC888, High Definition Audio |
| Line-out | <ul style="list-style-type: none"> 1x Line-out, Phone Jack 3.5mm |
| Mic-in | <ul style="list-style-type: none"> 1x Mic-in, Phone Jack 3.5mm |
| I/O | |
| LAN | <ul style="list-style-type: none"> 2x GbE LAN, RJ45 <ul style="list-style-type: none"> GbE1: Intel® I219 GbE2: Intel® I210 |
| COM | <ul style="list-style-type: none"> 2x RS-232/422/485 with Auto Flow Control (Supports 5V/12V), DB9 |
| USB | <ul style="list-style-type: none"> 2x 10Gbps USB 3.2 Gen2, Type A 4x 5Gbps USB 3.2 Gen1, Type A 2x 480Mbps USB 2.0, Type A |
| PS/2 | <ul style="list-style-type: none"> 1 x PS/2, 6 Pin Mini-DIN Female Connector |
| Storage | |
| SSD/HDD | <ul style="list-style-type: none"> 1x 2.5" Front Accessible SATA HDD/SSD Bay (SATA 3.0) 1x 2.5" Internal SATA HDD/SSD Bay (SATA 3.0) |
| mSATA | <ul style="list-style-type: none"> 3x mSATA Socket (SATA 3.0, shared by Mini-PCIe socket) |
| M.2 SSD | <ul style="list-style-type: none"> 1x M.2 Key M Type 2280 Socket, Support PCIe Gen3 x4 NVMe SSD or SATA SSD (SATA 3.0) |
| RAID | <ul style="list-style-type: none"> Support RAID 0/1/5/10 |

| Expansion | |
|---|---|
| PCI Express | <ul style="list-style-type: none"> • 2x PCI/PCIe Expansion Slot with Optional Riser Card * Supports maximum dimensions of add-on card (H x L) : 111 x 237 mm |
| Mini PCI Express | <ul style="list-style-type: none"> • 3x Full-size Mini-PCIe Socket |
| SIM Socket | <ul style="list-style-type: none"> • 2x SIM Socket |
| CMI (Combined Multiple I/O) Interface | <ul style="list-style-type: none"> • 2x High Speed CMI Interface for optional CMI Module Expansion • 2x Low Speed CMI Interface for optional CMI Module Expansion |
| CFM (Control Function Module) Interface | <ul style="list-style-type: none"> • 1x CFM IGN Interface for optional CFM-IGN Module Expansion |
| Other Function | |
| External FAN Connector | <ul style="list-style-type: none"> • 1x External FAN Connector, 4-pin Terminal Block (Support Smart Fan by BIOS) |
| Power Ignition Sensing | <ul style="list-style-type: none"> • Support Power Ignition Sensing Function with Delay Time Management and Selectable 12V/24V (With Optional CFM Module) |
| Clear CMOS Switch | <ul style="list-style-type: none"> • 1x Clear CMOS Switch |
| Reset Button | <ul style="list-style-type: none"> • 1x Reset Button |
| Instant Reboot | <ul style="list-style-type: none"> • Support 0.2sec Instant Reboot Technology |
| Watchdog Timer | <ul style="list-style-type: none"> • Software Programmable Supports 256 Levels System Reset |
| Power | |
| Power Button | <ul style="list-style-type: none"> • 1x ATX Power On/Off Button |
| Power Mode Switch | <ul style="list-style-type: none"> • 1x AT/ATX Mode Switch |
| Power Input | <ul style="list-style-type: none"> • 9 - 48VDC, 3-pin Terminal Block |
| Remote Power On/Off | <ul style="list-style-type: none"> • 1x Remote Power On/Off, 2-pin Terminal Block |
| Remote Power LED | <ul style="list-style-type: none"> • 1x Remote Power LED, 2-pin Terminal Block |
| Physical | |
| Dimension(W x D x H) | <ul style="list-style-type: none"> • 227 x 261 x 128 mm |
| Weight Information | <ul style="list-style-type: none"> • 5.44 kg |
| Mechanical Construction | <ul style="list-style-type: none"> • Extruded Aluminum with Heavy Duty Metal |
| Mounting | <ul style="list-style-type: none"> • Wall |
| Physical Design | <ul style="list-style-type: none"> • Fanless Design • Cableless Design • Jumper-less Design • Unibody Design |
| Reliability & Protection | |
| Reverse Power Input Protection | <ul style="list-style-type: none"> • Yes |
| Over Voltage Protection | <ul style="list-style-type: none"> • Protection Range: 51~58V • Protection Type: shut down operating voltage, re-power on at the preset level to recover |
| Over Current Protection | <ul style="list-style-type: none"> • 15A |
| CMOS Battery Backup | <ul style="list-style-type: none"> • SuperCap Integrated for CMOS Battery Maintenance-free Operation |
| MTBF | <ul style="list-style-type: none"> • 371,274 Hours - Database: Telcordia SR-332 Issue3, Method 1, Case 3 |

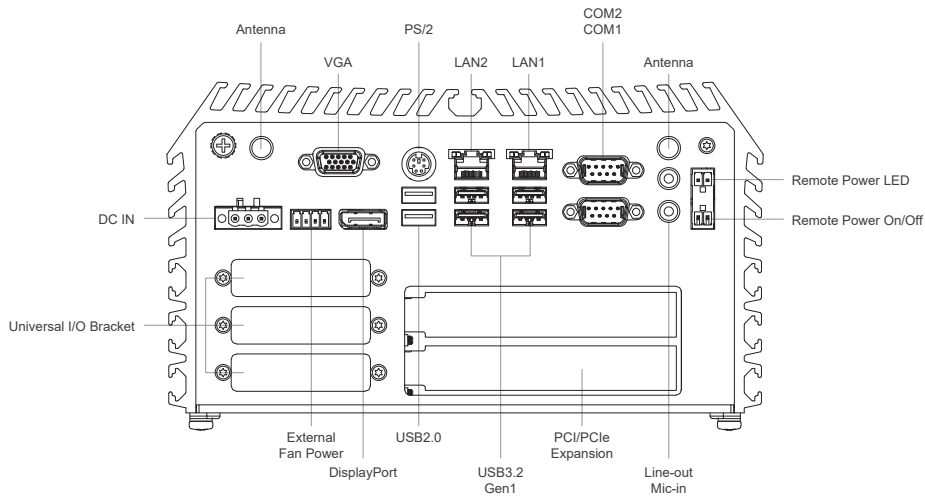
| Operating System | |
|-------------------------|--|
| Windows | <ul style="list-style-type: none"> ▪ Windows® 10 |
| Linux | <ul style="list-style-type: none"> ▪ Supports by project |
| Environment | |
| Operating Temperature | <ul style="list-style-type: none"> ▪ 35W TDP Processor: -40°C to 70°C ▪ 65W TDP Processor: -40°C to 50°C (With External Fan Kit) <ul style="list-style-type: none"> - With extended temperature peripherals; Ambient with air flow - According to IEC60068-2-1, IEC60068-2-2, IEC60068-2-14 |
| Storage Temperature | <ul style="list-style-type: none"> ▪ -40°C to 85°C |
| Relative Humidity | <ul style="list-style-type: none"> ▪ 95%RH @ 70°C (non-Condensing) |
| Shock | <ul style="list-style-type: none"> ▪ MIL-STD-810G |
| Vibration | <ul style="list-style-type: none"> ▪ MIL-STD-810G |
| EMC | <ul style="list-style-type: none"> ▪ CE, UKCA, FCC, ICES-003 Class A ▪ EN 50155 (EN 50121-3-2 Only) |

External Layout

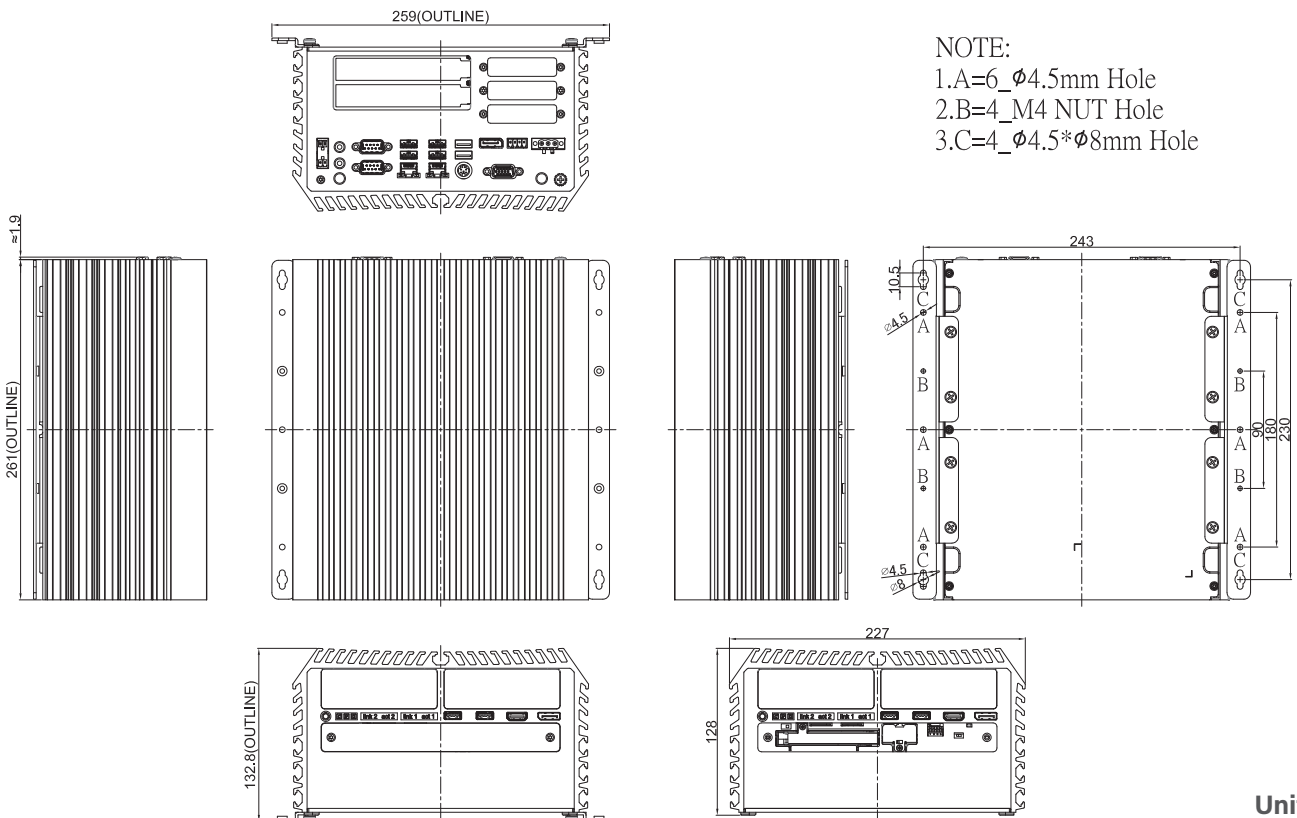
Front I/O



Rear I/O



Dimensions



Unit: mm

Ordering Information

Available Models

| Model No. | Description |
|-------------|---|
| DS-1402-R10 | 12th Generation Intel Core Series Processors, High Performance, Expandable and Modular Rugged Embedded Computer with 2x PCI/PCIe Expansion Slot |

Package Checklist

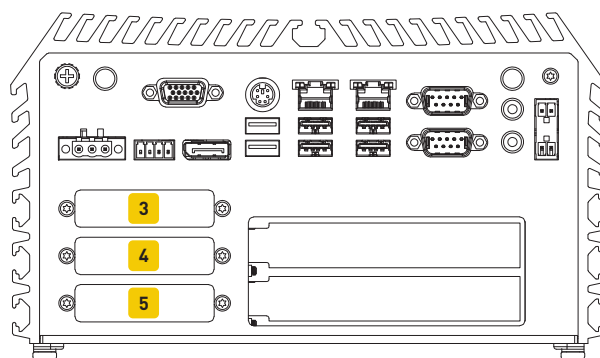
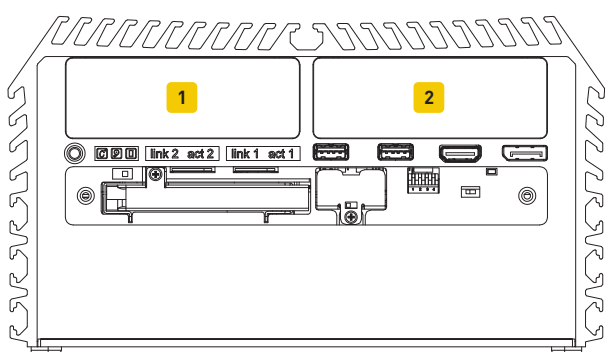
| | |
|--------------------------------------|--|
| • DS-1402 Embedded System x1 | • Heatsink Pack x1 |
| • Wall Mounting Kit x1 | • Screw Pack x1 |
| • Power Terminal Block Connector x 1 | • Remote Function Terminal Block Connector x 2 |
| • Fan Terminal Block Connector x 1 | |







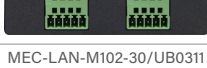

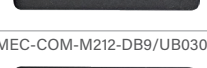

Optional Modules and Accessories

| Model No. | Description |
|-------------------|---|
| CMI-LAN01-R12 | CMI Module with 4x RJ45 Intel I210 GbE LAN Ports |
| CMI-M12LAN01-R12 | CMI Module with 4x M12 Intel I210 GbE LAN Ports |
| CMI-XM12LAN01-R10 | CMI Module with M12 X-Coded Connector, 4x Intel I210 GbE LAN Ports |
| CMI-10GLAN03-R10 | CMI Module with 2x Intel X550 10GbE LAN, RJ45 Port |
| CMI-COM02 | CMI Module with 4x RS232/422/485 Serial Ports |
| CMI-ICOM01 | CMI Module with 4x Electrical Isolated RS-232 Serial Ports |
| CMI-DIO02 | CMI Module with 16x Optical Isolated DIO (8 in/8 out) |
| MEC-LAN-M102-30 | Mini-PCIe Module with 2x LAN Ports, 2x 30cm cable |
| MEC-USB-M102-30 | Mini-PCIe Module with 2x USB 3.2 Gen1 Ports, 1x 30cm cable |
| MEC-COM-M212-DB9 | Mini-PCIe Module with 2x RS-232 Serial Ports, 1x Standard DB9 Cable |
| UB1004 | Universal Bracket with 4x DB9 Cutout |
| UB1010 | Universal Bracket with 4x M12 Cutout |
| UB1012 | Universal Bracket with 4x RJ45 Cutout |
| UB1018 | Universal Bracket with DIO Cutout |
| UB1028 | Universal Bracket with 2x RJ45 Cutout |
| UB1030-R10 | Universal Bracket with 4x M12 X-Coded Cutout |
| UB0303 | 2x Universal Bracket each with 1x DB9 Cutout |
| UB0311 | Universal Bracket with 2x RJ45 Cutout |
| UB0314 | Universal Bracket with 2x USB Cutout |
| CFM-PoE03 | CFM Module with PoE Control Function, Individual Port 25.5W |
| CFM-IGN101 | CFM Module with Power Ignition Sensing Control Function, 12V/24V Selectable |
| RC-E8E8-R10 | Riser Card with 2 x PCIe8 Slots |
| RC-E16E1-01 | Riser Card with 1x PCIe16 and 1x PCIe1 Slots (PCIe x16 Slot Supports Dual Deck Add-on Card) |
| RC-E16PI-01 | Riser Card with 1x PCIe16 and 1x PCI Slots (PCIe x16 Slot Supports Single Deck Add-on Card) |
| RC-PIPI-01 | Riser Card with 2x PCI Slots |

| | |
|---------------|---|
| FAN-EX101 | External Fan with 4pin Terminal Block Plug, Mounting Bracket, Support smart fan |
| FAN-UB100 | Exhaling fan with 4pin Connector, Universal Bracket |
| FAN-UB101 | Inhaling fan with 4pin Connector, Universal Bracket |
| GST120A24-CIN | Adapter AC/DC 24V 5A 120W with 3pin Terminal Block Plug and Tubes, Level VI |
| GST220A24-CIN | Adapter AC/DC 24V 9.2A 220W with 3pin Terminal Block Plug and Tubes, Level VI |

Optional Module Configuration



| Model No. | Description | 1 | 2 | 3 | 4 | 5 |
|---|---|----|----|----|----|----|
| CMI-LAN01-R12/UB1012  | CMI Module with 4x Intel I210 GbE LAN, RJ45 Port / 1x Universal Bracket with 4x RJ45 Cutout | V | V | -- | -- | -- |
| CMI-M12LAN01-R12/UB1010  | CMI Module with M12 Connector, 4x Intel GbE LAN / 1x Universal Bracket with 4x M12 Cutout | V | V | -- | -- | -- |
| CMI-XM12LAN01-R10/UB1030-R10  | CMI Module with M12 X-Coded Connector, 4x Intel I210 GbE LAN Ports / Universal Bracket with 4x M12 X-Coded Cutout | V | V | -- | -- | -- |
| CMI-10GLAN03-R10/UB1028  | CMI Module with 2x Intel X550 10GbE LAN, RJ45 Port / 1x Universal Bracket with 2x RJ45 Cutout | V | -- | -- | -- | -- |
| CMI-COM02/UB1004  | CMI Module with 4x RS232/422/485 Ports (Support 5V/12V) / 1x Universal Bracket with 4x DB9 Cutout | V | V | -- | -- | -- |
| CMI-ICOM01/UB1004  | CMI Module with M12 Connector, 4x Intel GbE LAN / 1x Universal Bracket with 4x M12 Cutout | V | V | -- | -- | -- |
| CMI-DIO02/UB1018  | CMI Module with 2x Intel X550 10GbE LAN, RJ45 Port / 1x Universal Bracket with 2x RJ45 Cutout | V | V | -- | -- | -- |
| MEC-LAN-M102-30/UB0311  | Mini-PCIe Module with 2x LAN Ports, 2x 30cm cable / 1x Universal Bracket with 2x RJ45 Cutout | -- | -- | V | V | V |
| MEC-USB-M102-30/UB0314  | Mini-PCIe Module with 2x USB 3.2 Gen1 Ports, 1x 30cm cable, 1x Universal Bracket with 2x USB Cutout | -- | -- | V | V | V |
| MEC-COM-M212-DB9/UB0303  | Mini-PCIe Module with 2x RS-232 Ports, 1x Standard DB9 Cable / 2x Universal Bracket each with 1x DB9 Cutout | -- | -- | V | V | V |

Remark:
Maximum one CMI-COM02 or CMI-ICOM01 module can be installed in this system.

V : Compatible